Feasibility Study Guideline (FSG)

Major Projects Secretariat
Infrastructure Fund, TL

- Agriculture and Fisheries
- Water and Sanitation
- Public Buildings
- Electricity
- Roads
- Flood control
- Telecom
- Airports
- Ports

March 2020

ABBREVIATIONS

ADB	Asian Development Bank
ADN	National Development Agency
BoQ	Bill of Quantities
CAFI	Council of Administration of the Infrastructure Fund
PC	Project Concept
DED	Detailed Engineering Design
E&F	Economic and Financial
FS	Feasibility Study
GOJ	Government of Japan
GoTL	Government of Timor-Leste
HCDF	Human Capital Development Fund
IF	Infrastructure Fund
IPE	Infrastructure Project Evaluation
JICA	Japan International Cooperation Agency
LMs	Line Ministries
MDG	Millennium Development Goals Program
MOF	Ministry of Finance
MPS	Major Project Secretariat
MPSI	Ministry of Planning and Strategic Investment
MOPTC	Ministry of Public Works, Transport and Communications
NPC	National Procurement Commission
O&M	Operation and Maintenance
OECD	Organization for Economic Cooperation and Development
OJT	On the Job Training
PMU	Project Management Unit
SDP	Strategic Development Plan 2011-2030
SDGs	Sustainable Development Goals
SMM	Standard Method of Measurement
Suco	Village
TL	Democratic Republic of Timor-Leste
Unit Rate	Unit Rate/Unit Price

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INTRODUCTION & PURPOSE OF THE GUIDELINE

Timor-Leste acknowledges an importance of infrastructure development of the country and emphasis a high priority of infrastructure projects according to the Strategic Development Plan 2011 – 2030 (SDP). The Infrastructure Fund is one of the special funds which was established according to the Law No 1/2011 of February 14, 2011. The Decree Law № 8/2011 established the regulation of the Infrastructure Fund and defined the Fund's purpose and objectives. During the implementation of the Infrastructure Fund in 2011-2015 there were some functional limitations for long-term projects that affected to implementation, such as budget rollover of unspent budget at the end of each fiscal year and related project delay. By the end of 2015 the Government transformed the Infrastructure Fund into autonomous fund with the main intention to eliminate above mentioned functional limitations.

The legal framework of the Infrastructure Fund as the autonomous agency is based on the State Budget Law No. 1/2016 and the Decree Law No.13/2016 as the substitution of Decree Law № 8/2011. The transformation of the Infrastructure Fund into Autonomous Fund has an intention to alleviate functional challenges existed during the implementation since its establishment. Now it is possible to retain unspent funds each year which transfer to a succeeding year. These changes enable to reallocate IF resources in a more efficient, transparent and accountable manner.

As a result of IF programs and projects implementation since 2011 up to the end of 2019 a total amount of 4.628 billion has been approved and allocated to the Infrastructure Fund to finance IF programs, including Public Private Partnership and External Loan financed programs. This approved budget has already being utilized to finance the total IF projects of 1614, where 867 projects (50%) have already been completed and another 50% of projects are ongoing or under the preparation and to be started once the budget shall be approved.

Most of infrastructure projects that have been implemented without proper feasibility study documents. Instead of feasibility study, many projects have only DED, which is required for the construction of the infrastructure. Current situation is as follows:

- Very few projects have a proper feasibility study;
- Most of the project proposals have only idea or at a concept stage from SDP or Sector plan;
- Many projects go directly from concept design/idea to DED and then to construction.

However, there is a significant difference between DED and the Feasibility Study. It is important to focus on a project status, considering readiness of study for all projects that will have DED prior to the construction stage. DED does not contain such information about the project as legal regulation, social and economic impact (including benefits, employment, and cost-benefit analysis), land acquisition and environmental study etc. The figure below shows the main difference between FS and DED.

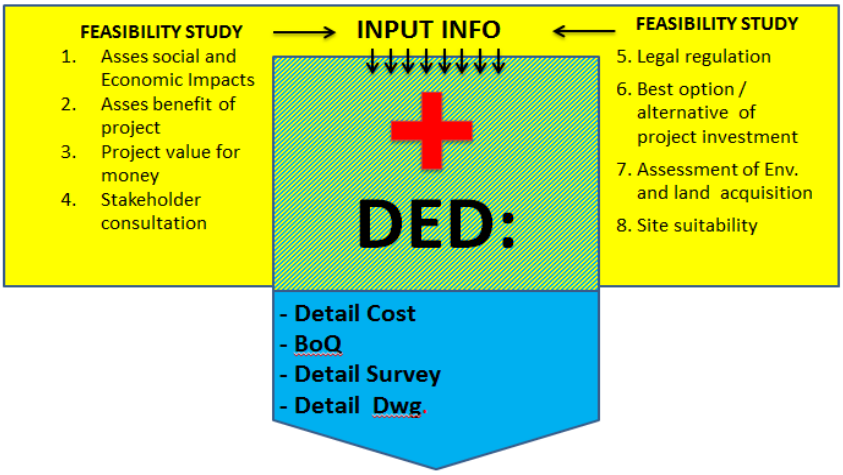


Figure A. Difference between DED and Feasibility Study

Without a proper feasibility study, the project will face various risks during implementation, as DED only the stage for one single option, that will affect to the project implementation risks. Also there is no assessment during DED that would normally being taking for various aspects related to social and economic conditions, site suitability, environmental impact of the project. In the absence of the feasibility study, a project may suffer from the following:

- Project delay due various issue (unexpected social issue) and readiness of the project;
- Cost overrun due to design changes or variation order;
- No accountability and transparency;
- No clear analysis of the value for the money of the project.

Therefore ideally, the project must follow the proper hierarchy of the implementation process in order to avoid the risks as identified above.

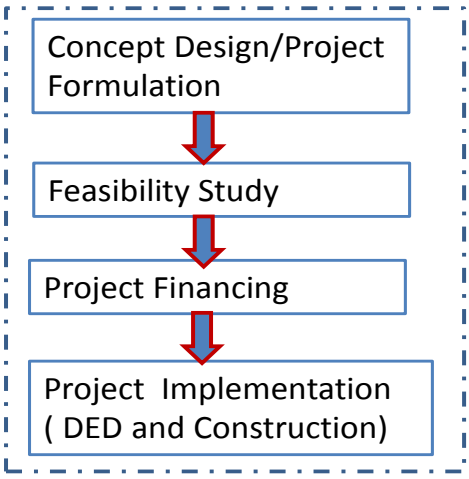


Figure B. General workflow of project implementation

The feasibility study must be conducted to assess various technical options and financial instruments/option that are required for make a decision on whether to allocate necessary funds to a newly proposed project. The project that prepared through the feasibility study has a greater chance to avoid all the above mentioned risks and likely to produce the outcome that fits the final purpose.

The advantages and the objectives of the feasibility study are as follows:

- Avoid project delay (all the factors that potentially causes project delay shall be assessed in the feasibility stage and solution should already being taking prior to the construction of the project);
- Provide the best implementation scenarios with the best value for money;
- Asses all potential risk, which need to be mitigated during the project implementation;
- which also means saving resource and money;
- With the Feasibility Study decision makers can allocate funding to the projects that have the best value and a strategic impact to the development of the economy;
- With the Feasibility Study a proper resource allocation can be set and controlled;
- With the Feasibility Study the baseline information will be provided that will be used to better monitoring and evaluation of the outcome of the project against the SDP goals.

However, not every project required a feasibility study prior to the implementation. For instance, the rehabilitation of the existing school, office building or roads and bridges may not need a detailed feasibility study. Therefore, the target of the feasibility for infrastructure projects should focus on the following criteria:

- New project that has strategic economic and social impacts with the significant cost;
- Project that will contribute a significant risk to the environment and social issues.

For existing rehabilitation and upgrading project the scope of the feasibility study can be limited to the cost and benefit analysis in order to provide information for decision makers on the prioritization on the funding allocation. Moreover, the scope of feasibility study for the rehabilitation of the existing system/project could also include the assessment of the resettlement required, up - scaling the infrastructure based on demand now and in the future.

Although the purpose and the contents of a Feasibility Study for each particular project are different. This Guideline presents standard structure of a project similar to all sectors to make FS as simple as possible and standardized. This Guideline is a dynamic document, which should continuously improve and update with the experience in the field. In actual case, some adjustments will be required on the actual process of TOR and FS preparation.

Agio Pereira
President of the Council for Administration of the Infrastructure Fund
Minister of State and of the Presidency of the Council of Ministers
Minister of Planning and Strategic Investment (Interim)

PART 1:

GUIDELINE FOR THE FEASIBILITY STUDY IMPLEMENTATION

Chapter 1-1. What process is required for execution of IF Projects?

Currently, for selection of IF projects, MPS requests to submit *"Application Standard Form"* and *"Project Brief"* to prepare recommendations of IF Projects to CAFI ("*Appraisal Report*").

Now, MPS requests to carry out a **Feasibility Study** (FS) for major projects *based on the dispatch of the Prime Minister*[1] for the project appraisal procedure as shown in the Figure 1-1.

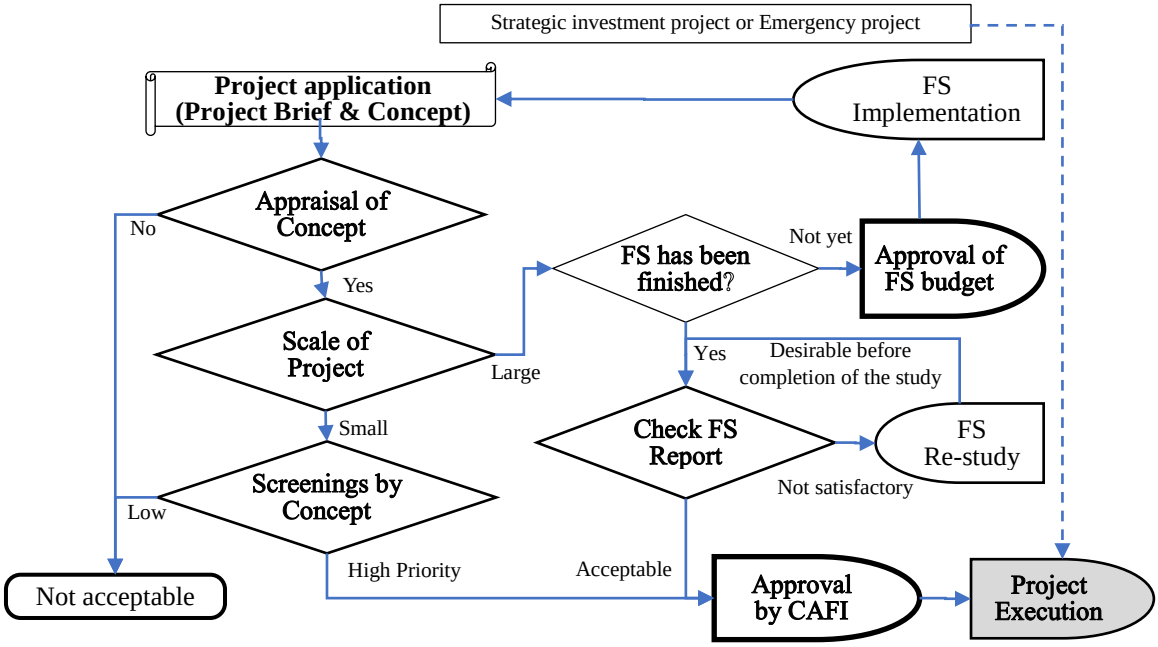


Figure 1-1: FS and Project Execution Process

Please refer the Appendix 1-10 of this Guideline for the detailed process up to the approval of the major infrastructure projects in Timor-Leste.

To propose projects to be financed through the Infrastructure Fund, LMs are requested to submit necessary documents as shown in the Table 1-1 below.

Table 1-1: Application and Appraisal Steps

STAGE	WORK ITEM	DOCUMENTS (and reference)	Assessment/Evaluation (and reference)
1	Application for FS execution	FS Application Form (Appendix 1-12)	For Application Form (Chapter 2 of FS GL Part 4)
2	*Approval of execution of FS*		
3	Tender for FS	Technical Proposal (Appendix 1-11&1-13) Financial Proposal	For Technical Proposal (Chapter 3 of FS GL Part 4)
4	*Execution of FS*	*Monthly Progress Report*	*(Hearing & Comments)*
5	Evaluations of FS Report	FS Report (Draft & Final) (Chapter 7 of FS GL Part 1)	For FS Report (Chapter 4 of FS GL Part 4)
6	*Approval of the Project Execution*		
7	*Execution of DED, Land Acquisition and Construction*		

[1] Letter No. 313/SGP/IX/2018 dated on 14 Sep 2018 about the request of feedback and comments

Chapter 1-2. What is the Feasibility Study (FS)?

The initial stage of the public construction work should start from preparation of the Project Concept, not just an idea. The Feasibility Study is the process that cannot be predicted at the concept stage and required analysis, such as environmental study affects, rough costs, economic effects, etc. FS will examine comprehensively whether the project is important and can be implemented or not. The target project should be listed in one in the upper plans as shown in Figure 1-2.

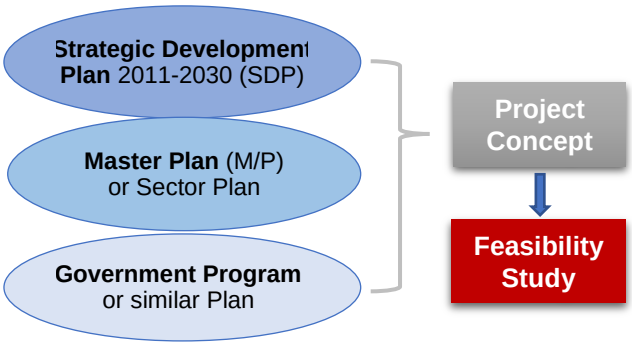


Figure 1-2: Upper plans for selection of FS

After the Feasibility Study, project process enters into DED, Construction and moves to O&M Stage as shown in the Figure 1-3.

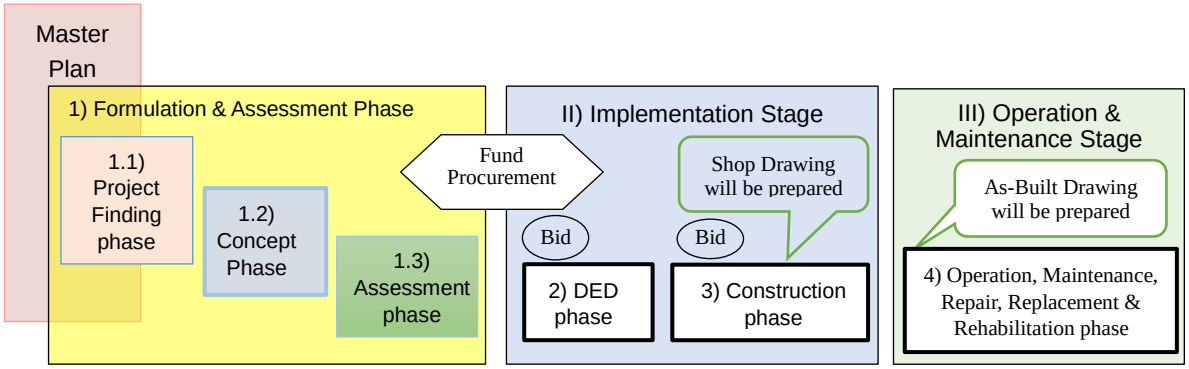


Figure 1-3: Overview of Project cycle

Source: United States Army Corps of Engineers (USACE)

At first, the **Master Plan** is necessary to study current issues in the area or sector and to formulate project to solve the problem. In case of a large scale of the project, the Master Plan for the project itself should be prepared that will cover several projects.

The **Feasibility Study** is a kind of assessment phase for comparatively large project in case when major risks and environmental influence cannot be ignored. In case of the small project, assessment could be executed internally based on the Project Concept (please refer to the Chapter 3 of the FS Guideline).

Based on the **FS**, the budget for the project execution could be allocated, and **DED** work could be started after the issuance of the Environmental License (EL). Land Acquisition (LA) should be executed based on DED.

The Table 1-2 shows a comparison of main project items to study at each stage.

Table 1-2: Major Items to be studied on each stage

	Concept	FS	DED	Construction	O&M
Main purpose	**Check the plan/idea practical or just idea**	**Study how to make feasible**	**Estimate cost to ensure the budget**	**Realize durables one**	**Contribute to social (beneficiaries)**
	Relevance				
Background	Confirmation of project position in the development plan		x	x	x
	Confirmation of rerated regulations		x	x	x
	Check for privatization		x	x	x
Defining the problem	Current status		x	x	x
	Current issues	Specific issues on execution		Issues on construction	Risk management
Environment	Impact	Natural environmental study	EIA & Countermeasures	Monitoring	
	x	Social impact study			
Who is the beneficiary?	Justification of the new project		Efficiency	x	x
Possible Schedule	Time schedule		Detailed schedule	Progress control	x
Budget & Revenue Financial Economical	Financial resources	Detailed cost estimation		Cost control	x
	Operation methods		x	Effectiveness	Expenditure management
	Possibility of Revenue		x	x	Revenue management
	Sustainability				
QQA (Quality, Quantity and Accuracy)	x	x	Quality Control		x
	Rough scale	Rough Quantity	Detailed Quantity	Quantity Control	x
	x	x	x	Accuracy control	x

Chapter 1-3. For what kind of project FS is necessary?

Principally, FS is required to all projects. However, some projects are executed without FS. The Table 1-3 shows for what kind of project its necessary to execute FS, and for what kind of project FS usually is not implemented.

Table 1-3: When FS is necessary and not necessary?

Category	Example	Remarks	
FS is necessary	Infrastructure project with the large scale of development plan	Project of which estimated Budget is more than US$ five million per project [2]	Generally, Project may involve Environmental issues and Resettlement
	Improvement Project with the expansion or widening plan with possible new social influences	influences such as resettlement of the peoples, and possibility to the environmental affect (i.e. rare species)	
	Commercial project / for example, *Tourism project*	Financial analysis will be prioritized	
FS is not necessary	Urgent countermeasures for the damage by natural disasters	Countermeasure-project based on a long-term perspective against disaster is an object for FS	
	Symbolic / Religious project	Example: Parliament Hall, National University, Public Park, Sports Stadium, National Cemetery, National Church etc.	
	Expansion / Maintenance Project with normal demand	FS may become necessary if the expectable demand is few (Such as traffic volume in case of road project)	
	Small project	Appraised internally based on Project Concept	
	Project which has no prospect of feasibility	*as the result of appraisal by Project Concept*	
	Study/Survey Project how to solve the current issues	It will be checked by Project Concept or preliminary study (such as for environmental affect)	

Good Concept is necessary for all projects
(see Chapter 5 of the FS Guideline Part 1)

[2] FS is requested for the project with its estimated cost of more than US$ 5 million tentatively

Chapter 1-4. Why a Project Concept is necessary for FS?

The expected process of a project in Timor Leste is shown in the Figure 1-4 below:

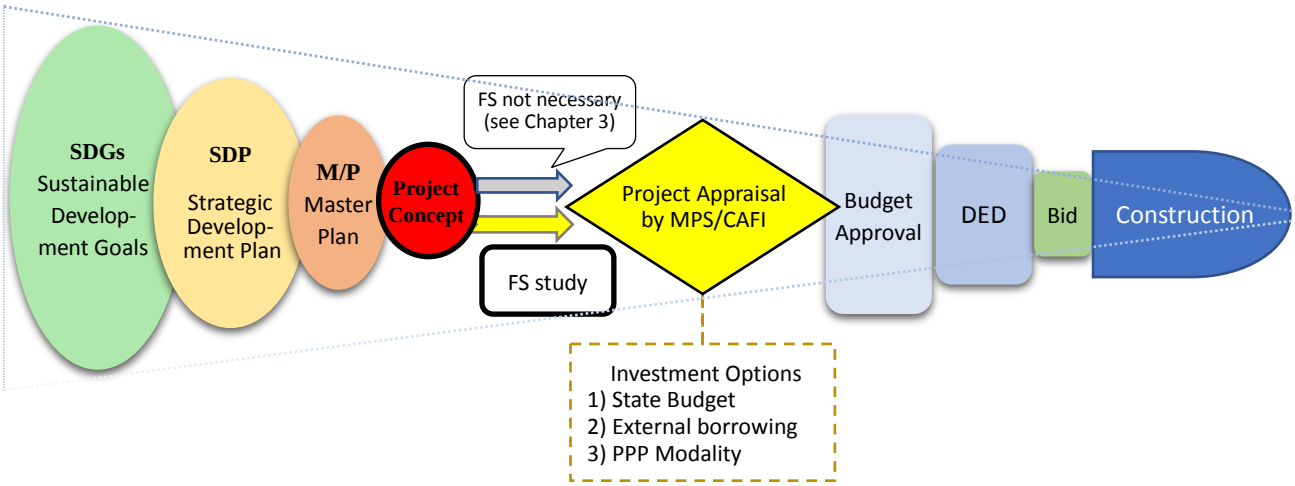


Figure 1-4: Project Process

The executing agency should prepare a project concept as the first step of the project preparation process as shown in the Table 1-4 to clarify the proposal is practical or just an idea or dream. From the Project Concept, the Government could decide that the proposal is feasible and worth implementing FS or not. The Project Concept and FS have the following relations.

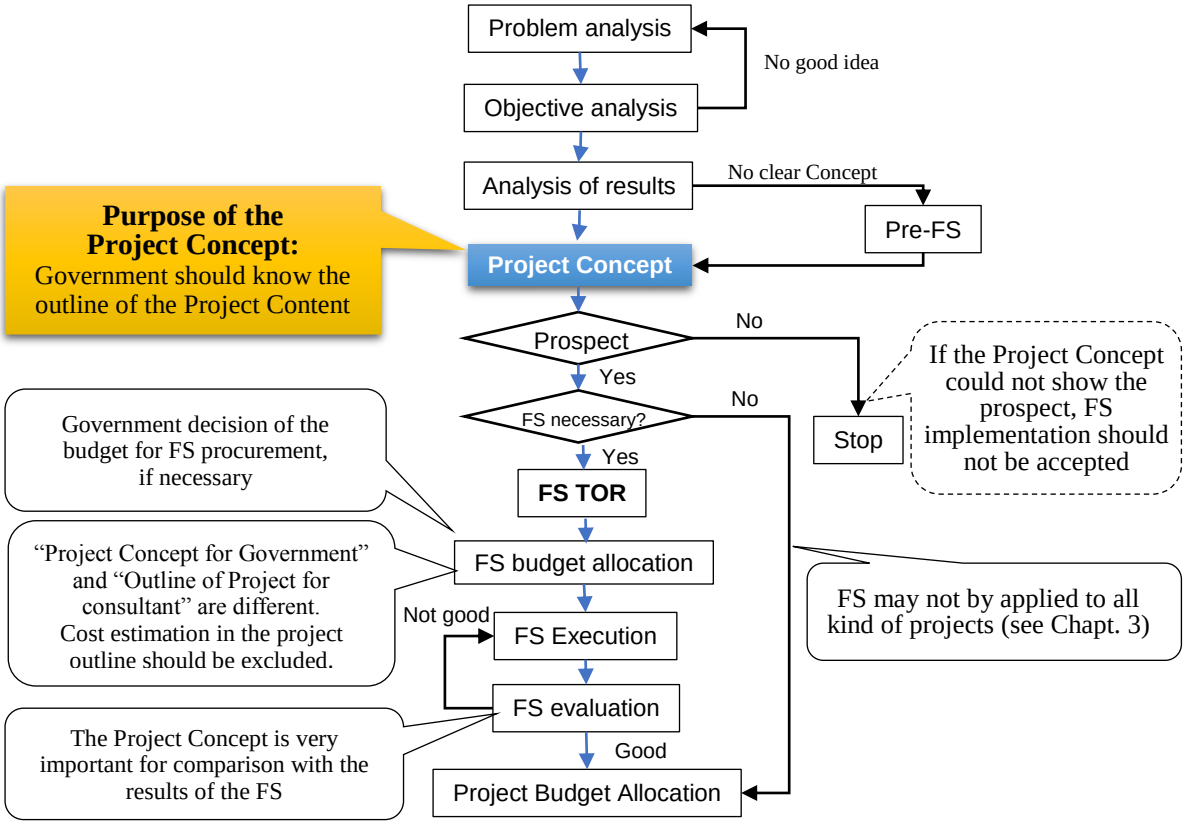


Figure 1-5: Process for project Implementation

Chapter 1-5. What content is necessary for the project concept?

Preparation of the "Project Concept" is important precondition to prepare application Form in the Appendix 1-12 and to get the approval of FS budget and execution of FS.

FS should not be implemented without a good "Project Concept". However, preparation of the "Project Concept" is not common in Timor Leste.

- ✓ "Project Concept" is also called Concept design or Concept Plan;
- ✓ The Concept is **not just an idea**. It should have minimum principal elements, such as *What, Where, Why, When Who and How much* as shown in the Figure 1-6;
- ✓ The estimated cost in the Concept becomes the base of the checking of FS report;
- ✓ "Project Concept" should be clarified by LMs to propose required project.

The "Project Concept" should include the following items[3]:

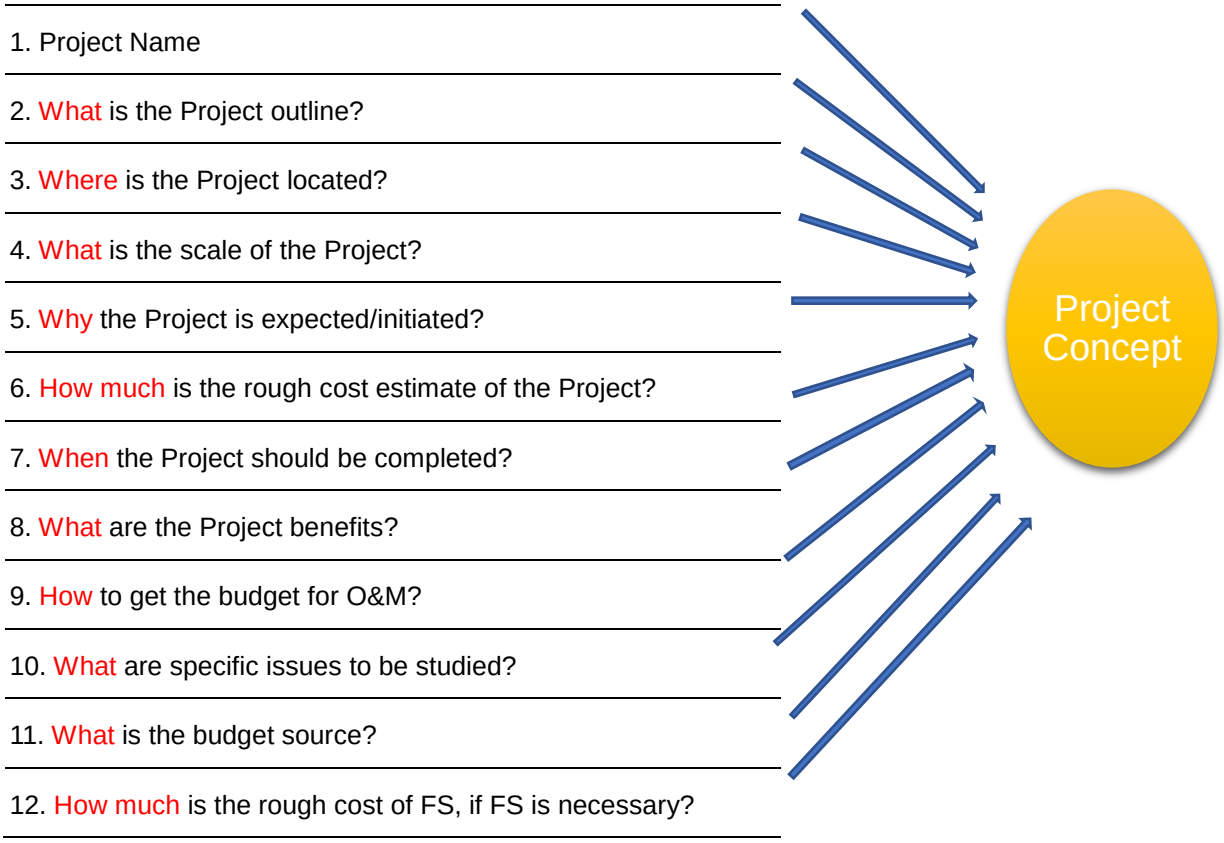


Figure 1-6: Element of "Project Concept"

The Project Concept should be prepared in a tabular form. The example of the Project Concept form is shown in the following Table 1-4.

[3] These sequences are variable according to the Project Character

Table 1-4: Project Concept Format

1. **Project Name**

   Describe simple Name which shows the character of the Project

2. **Outline of Project** *(Within a few lines as shown below)*

   "In (Location / Target), completion of (Project Purpose) will contribute to (Overall goal) by executing of (Output)"

3. **Project Location Map or Photo**

   Location name with map/pictures or photo

4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*	*Expected Plan*
Area (m2) or Length (km)		
Capacity		
Total employee number		
Current Issues / Items to be improved		

5. **Relevance: (Background)**

   List of upper plans (with page number) in which the project is recommended

6. **Rough Cost estimate**

   Very rough estimate. Attach breakdown at the end of this Table, if possible

7. **Implementation Schedule** (Expected schedule like below Table)

F/S	*DED*	*Land Acquisition*	*Construction*	*O&M*
(2020)	*(2021)*	*2022-2024*	*2023-2026*	*2027-*
(6 months	*(12 months)*	*3years*	*4 years*	

8. **Project Benefits**

   Quantitative: B/C, Redemption period
   Qualitative: Narrative in few sentences

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. **Specific Item to be studied (if F/S is necessary)**

    Study items to solve the Current issue
    (it is not good to describe the current issues only)

11. **Expected Financial Resources**

    "Infrastructure Fund" or "Loan" or "Grant"

12. **Estimated F/S budget (if F/S is necessary)**

    Very rough estimate

The Project could be pre-appraised by using following rating from the Project Concept & Self Project Evaluation Sheet as shown in the Table 1-5.

Table 1-5: Example of Self-Evaluation Sheet

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-benefit during evaluation period	Total Cost	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation /conservation	Relevance of the Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility of the project realization (or conservation possibility after completion)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional	Structure are breaking the harmony of scenery	Structure are breaking the harmony of scenery
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

Table 1-6: Rating criteria for assessment as self-checking by Consultant

	Conformity	**Minus Impact**	**Achievement ratio**	**Period/Cost**	**Rating**
Indicators	Good	None	Completed	Less of plan	4
	No problem	Almost none	More than 80% of plan	100%	3
	Some problem	Somewhat	80%-50% of Plan	100-150% of plan	2
	Serious problem	None	Less than 50% of plan	Over 150% of plan	1

Chapter 1-6. What is the procedure of the FS implementation?

FS is necessary to confirm the validity of the proposed Project Concept. The most important subjects in FS are the financial and/or economic analysis and environmental/social impacts. The Government should decide whether to finance or not for the execution of project based on the results of FS. Site investigation survey, Outline design, Rough Quantity calculation are the base for the Cost estimation. The procedure of FS is shown in the Figure 1-7.

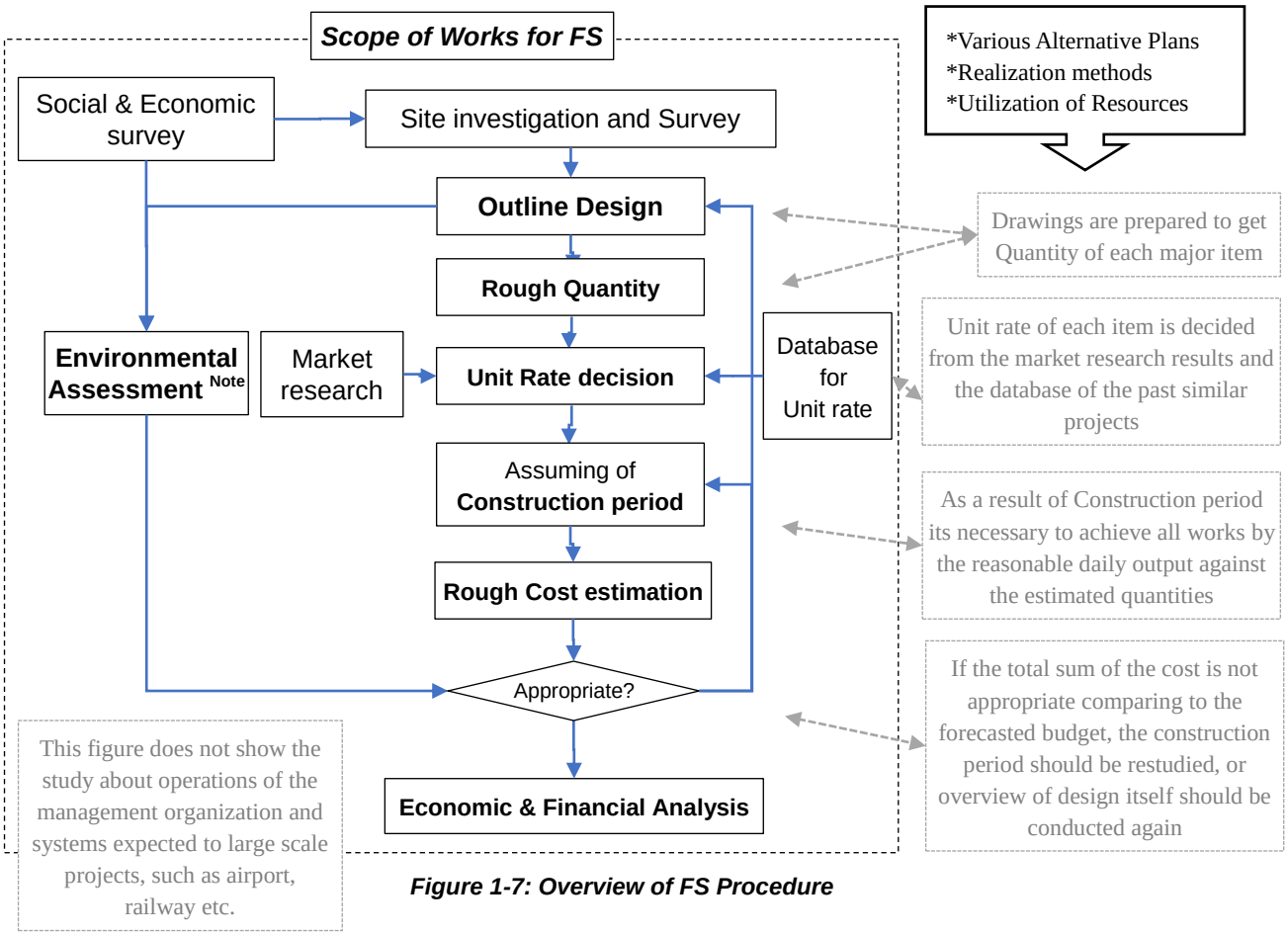


Figure 1-7: Overview of FS Procedure

The Appendices 1-8 & 1-9 show the quantity required based on the best practice. However, simple method is expected in case of FS in TL.

Table 1-7: Types of Environmental Assessment

IEE	Initial Environmental Examination	Based on relatively easy-to-obtain information such as existing data, prediction / assessment of environmental impact, examination of mitigation measures, monitoring plan, etc. based on simple field survey as necessary.	Mainly for FS
EIA	Environmental Impact Assessment	Based on detailed field survey, it refers to the level at which alternative plans, detailed prediction and appraisal of environmental impacts, mitigation measures, examination of monitoring plans, etc. are carried out.	Mainly for DED

Chapter 1-7. What should be described in the FS Report?

The items to be studied in FS are different according to the type of each project[4].
The general contents of the FS Report is generally as shown in the Table 1-8.

Table 1-8: Contents of FS Report (Example)

1) **Summary** of the Report	
2) Main Text	1) Purpose of the project and Overall Goal (including Beneficiaries)
	2) Background
	3) Stakeholders
	4) Surrounding Conditions
	5) Implementation Schedule
	6) Practicality of the project & Specific Technology, if necessary
	7) Expectable impact to SDG, and benefits
	8) Rough Cost estimate and Economic & Financial Projection
	9) Environment & Social Assessment with Negative Impact * Environmental impact could not be ignored * Especially resettlement becomes important
	10) Findings and Recommendations (with Operation and Maintenance Plan)
3) Appendices	Outline Drawings [Note1]----------(Page 14, Table 13 and 14) Implementation Schedule of Project----------(Appendix 1-4) Summary table of Rough Cost estimate ----------(Appendix 1-5) Unit Rate, Quantities of Major Item ----------(Appendix 1-6) Unit Rate of Similar Project ----------(Appendix 1-7) **Checklist** ----------(Appendix 1-1)

[Note1] *Outline drawings should be attached to measure the quantities for the rough cost estimation*

For the reference:
For implementation of the project, land acquisition may be necessary. Principally detailed land acquisition and Resettlement plan belongs to the DED stage. But, if such work is expected to be a large scale, it is recommended to study at the FS stage. In this case, the project owner or the Government is expected to start negotiations with the land user, even if the land use is illegal. It will be classified as shown in the Table 1-9.

Table 1-9: Land Acquisition, Compensation and Resettlement

TARGET AREA	METHOD	REMARKS
Small or a few	Compensation for land, house and garden tree etc.	Demolition fee should be considered
Middle or Large scale	Compensation and/or Resettlement	Compensation plus relocation destination are arranged by the project owner. Decision of relocation destination is sometimes by political arrangement

[4] Appendix 1-2 shows the examples of classification by the project category

Table 1-10: Detailed Content of the FS Report

	Required Content *[ ]* variable requirement according to the project's content
1) Project Purpose and the Overall Goal	・ What is the project purpose and the overall goal? ・ Compatibility with the National Development Plan
2) Background Legal matters /regulation	・ Background of Project (Why the project is expected?) ・ Relations with other projects, such as, for oil development, airport, railways project etc. ・ Who are the beneficiaries? ・ Relative law or customs, such as tax & custom law, construction law, labor employment law, technical standard & specification, etc.
3) Stakeholders	・ Brief introduction of the owner of the project and relevant agencies or resident/personnel, about their main function, organization, annual budget ・ *[staff skill level about the maintenances or management]* for the implementation and O&M)
4) Surrounding conditions 4-1) Natural condition	・ Topography of Site: *[topographical map, contour drawing, if necessary]* ・ Status of ground: *[boring log, property of soil quality, bearing capacity of ground]* ・ *[Temperature, humidity : average, maximum, minimum of each month, according project]* ・ *[Precipitation: daily & hourly maximum, annually flood records, annual raining days]* ・ *[Wind speed, wind direction : maximum & average of each month]* ・ *[Tide level: highest sea level, high tide level]* ・ *[Damaged area by flood, hurricane, tsunami, earthquake, drought in the past]*
4-2) Site condition	・ Status of land use around the site, existing facilities *[building, underground property]* ・ *[Securing/procurement condition: lease etc. of required facility of site/camp & land*] ・ *[Measures for the sustainability of the project]* ・ *[Indemnity for the area, if necessary]*
4-3) Similar project records (if any)	・ *[Description of the past similar work: constructed location, facility scale, period, construction method, temporary work methods, contracted Unit Rate, contract type etc.]*
5) Implementation Schedule	・ Recommendable Time schedule up to the project completion ・ [Construction plan, construction method, temporary work methods] ・ *[Incidental works, related works]* ・ *[Detour of access to construction site and during under-construction]*
6) Practicality of the project & Specific Technology, if necessary	・ Feasibility study about the following items to achieve the proposed infrastructure development: ✓ Technical feasibility ✓ License feasibility for technical matters (patents etc.) ✓ Resource feasibility ✓ Time Schedule feasibility
7) Rough cost estimation	・ Rough project cost estimate based on the quantities derived from outline drawings and by the unit rate of major work items, retrieved from the database or experience of similar project
8) Economic & Financial analysis and Expectable benefits	・ Benefits should be calculated for the Financial and Economic Analysis Example of project benefits for Economic analysis are shown in the Appendix 1-3 ・ Net present value (NPV), Cost-Benefit calculations (B/C), and Internal Rate of Return (IRR) ・ In case of profitable project, Financial feasibility becomes important through the market research studies and Operational feasibility from Expenditure & Revenues becomes necessary
9) Environmental & Social Assessment ✓ Land acquisition & Resettlement ✓ Consultation results with the local community/ Stakeholders	Scope and study methods to be analyzed, range of significant negative impacts based on related Laws and Standards (or guideline etc., if necessary). Environment & Social Impact Assessment should be prepared according to the Environment Basic Law" Decree Law No. 26/2012 of 4 July 2012 and get the license according to the Decree Law No. 5/2011 of 9 February 2011 by classifying the project categories: ✓ Screenings of Project for the categorization A, B, or C ✓ Monitoring methodology for Categories A & B
10) Findings and Recommendations	・ Summarize the findings in the Feasibility study ・ *[Recommendable O&M plan]*

Chapter 1-8. What items are required for a field survey?

For implementation of the survey in FS, at first, a project location should be identified on the topographic map /or satellite photo (Google earth photo may be accepted as the worst case).

The following items in the Table 1-10 should be checked before and during the implementation of survey or investigation for FS by using the **checklist, which** is shown in the Appendix 1-1. However, not all items are required for every project. Necessary items for the project should be selected according to the type of the project by sorting the *necessity Rank* as shown the Table 1-11.

Table 1-11: Field survey Items of FS

Category mark	**Field survey Items** (including by document study)	Page in the report	Necessity Rank
a	Existing Development Plan		5,4,3,2,1
b	Climate survey		5,4,3,2,1
	Hydraulic survey		5,4,3,2,1
	Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)		5,4,3,2,1
	Geological survey (such as foundation or ground survey etc.)		5,4,3,2,1
	Location survey or topographic survey		5,4,3,2,1
c	Regulations / Design standard		5,4,3,2,1
d	Social conditions before project (such as population, land use etc.)		5,4,3,2,1
	Inventory Survey for exiting available facilities or demolished		5,4,3,2,1
	Utilization status survey (traffic, cargo, vessel number, possible user number)		5,4,3,2,1
	Current issues survey		5,4,3,2,1
	Current revenue, if any		5,4,3,2,1
	Recent budget for the sector		5,4,3,2,1
e	Resource survey (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)		5,4,3,2,1
i	Privatization tendency		5,4,3,2,1

LMs and/or Consultant could revise the name of check items and may add /revise in the same category, **but <u>the category mark should be kept</u> to make clear the content of check item in Appendix 1-1.**

Necessity Rank is expected to be categorized into 5 ranks: 5 "very important" to 1 "not essential"

Chapter 1-9. What items should be studied for a feasibility of the project?

The items in the Table 1-12 should be studied in FS based on the site investigation/survey. LMs are expected to check the study items prior to submission of FS report to MPS/ADN by using the **checklist**, which is shown in the Appendix 1-1. However, not all these items are required for every project. Necessary items are expected to be selected according to the type of the project.

Table 1-12: Items for FS Study

Category mark	Items for FS Study	Page in the report	Necessity Rank
a	Study of Spatial/ Sector plan		5,4,3,2,1
	Consistency with Upper National Plan		5,4,3,2,1
c	Design load and design strength of the object's foundation		5,4,3,2,1
d	Target Area study result (such as features, issues, etc.)		5,4,3,2,1
e	Future demand or necessary capacity		5,4,3,2,1
	Necessary facilities volume and/or numbers etc.		5,4,3,2,1
	Ancillary facilities (such as warehouse or equipment)		5,4,3,2,1
	Location or route selection or Distribution methodology of the products		5,4,3,2,1
	Design scale of each facilities (such as height, level or depth etc.)		5,4,3,2,1
	Approach measures to the object (such as roads or railways)		5,4,3,2,1
	Quantities for Major Items Project Cost / Necessary construction period		5,4,3,2,1
	Necessary resources or energy (such as aggregate, cement, steel, skilled labor, electric power supply, water, owner's ability etc.)		5,4,3,2,1
f	E & F analysis		5,4,3,2,1
g	Influence of the project to the surroundings, including IEE, Resettlement etc.		5,4,3,2,1
h	Beneficiaries		5,4,3,2,1
i	Future extension plan, if necessary		5,4,3,2,1
	Alternative proposal (such as location or routes or methodologies)		5,4,3,2,1
j	Countermeasures for the disasters, waste or emission		5,4,3,2,1
	Operation and Maintenance plan (O&M)		5,4,3,2,1

LMs and/or Consultant could revise the name of check items and may add /revise in the same category, **but <u>the category mark should be kept</u> to make clear the content of check item in Appendix 1-1.**

Necessity Rank is expected to be categorized into 5 ranks: 5 "very important" to 1 "not essential"

Chapter 1-10. What are the minimum drawings to be prepared?

The following types of the Outline drawings in the Table 1-13 are required to attach to the FS Report as the base of grasping the project outline, and quantity survey for the rough cost estimation.

Table 1-13: Outline Drawings in FS

	Drawing name	Remarks
Civil works	(1) Location map	* Drawing showing physical relationship of project area and construction location in topographical map
	(2) General plan	* Drawing showing total idea plan
	(3) Typical cross section	
	(4) Longitudinal cross section	
	(5) Facility plan	* Recommendable Facilities Installation plan, and alternatives (comparative plan) in topographical map * Important incidental Facilities plan
There are some differences in each sector		
Architectural Works	(1) Location map	* Drawing showing physical relationship of project area and planned faculties in topographical map
	(2) General Plan	
	(3) Layout plan	* Drawing showing the arrangement of facilities in the project area
	(4) Typical cross section	
	(5) Elevation view	
	(6) Facility plan	* Diagram figure which shows concept of system of facilities
(Appendix)	Soil boring log etc.	* It is used for decision of foundation structure and be attached to the investigation report

Expected Scale of the Drawings as shown in Table1-14:

Table 1-14: Expected Scale of Drawing in FS

Type	General contraction scale from the examples in the past
General plan	Range scale 1/1000~5000 Scale 1/10000-50000 might be used in large scale facilities
Facility layout plan	Range scale 1/1000-5000 Scale 1/10000-50000 might be used in large scale facilities
Plan, Cross section, Longitudinal cross section	Range scale 1/1000~5000 Scale 1/10000-50000 might be used in large scale facilities * Larger scale might be used in case of water supply conduit, line, electric grid etc. * The different scale might be used for horizontal and vertical cross section in case of cross section and longitudinal cross section view
General structural drawing	Range scale 1/500-1/5000 to make clear the structural main size, part's thickness and material quality

Please see the column of calculation basis in the Appendices1-8 & 1-9.

Note: *Above scale is 10 times less comparing to the best practice, but in Timor Leste it is possible to use bigger scale as shown in the above Table 1-14 for the time being. Different scale can be applied according to the type of the project (see the Appendix 1-8& 1-9).*

Chapter 1-11. What methods are required for rough cost estimation in FS?

(1) or (2) methods in the Table 1-15 are the most popular for the Cost estimation in case of FS.

Table 1-15: Cost estimation methods

Methods	*Overview*	*Remarks*
(1) Rough Cost estimate methods by the past contract result (**Total sum method**)	· Analyzing statistically the past contract cost data for each kind of facilities or structures considering their recent tendencies as shown below: · [$ x0000,00 / school] · [$ x0000,00 / bridge] · [$ x0000,00 / road km] · [$ x0000,00 / irrigation area ha]	· This method is useful to know the total project cost roughly to secure the budget · It is important to collect the past project data as much as possible and analyzing them to keep in the data base
(2) Contracted Pay Item (**Unit Rate method)**	· To execute the Rough Cost estimate about the major pay items based on the unit rate of the past actual contract of the similar project, considering location, current construction conditions, and market prices tendencies	· Estimation based on the actual contracted Unit Rate (actual value in the past). This cost estimation results shows most practical one · It is necessary to confirm that the unit rate includes the indirect cost, and should be adjusted the unit rate, if the indirect cost is included
(3) Estimate collection method	· Collect the necessary unit rate estimates from the consultants, contractors and suppliers. · The Rough cost could be calculated by utilizing the unit rate and the quantities picked up from the prepared drawings	· It is not easy to collect reliable estimates about necessary all items, and other methods may be used simultaneously
(4) Built-up cost estimation method or Unit rate breakdown method	· 1st; Prepare Unit Rate of each pay item's composed of labor cost, material cost, equipment depreciation cost · 2nd: Pick up quantities based on drawing. · 3rd: Prepare each productivity, and calculate numbers of necessary labor and equipment · 4th: To calculates each pay item's cost by multiplying unit rare and quantities or numbers about all of kinds of construction pay items · 5th: Summary up to get total project cost	· This is most reliable method applied to Detailed Design Study · Unit rate table of each pay items could be introduced from other developed countries by adjusting productivity, if the market of construction work is in immature status to collect basic data

Note: More detailed breakdown of the cost estimation may be requested in FS as the best practice.

The following Table 1-16 presents the example of expected range of cost and methodology.

Table 1-16: Expected Accuracy of Cost estimate

TYPES OF ESTIMATION	EXPECTED ACCURACY RANGE	METHODOLOGY	REMARKS
Project Concept	-20% ~ -50% to +30% ~ +100%	Analogy, or Judgment by the experience	Please refer method (1)
FS	**-15% ~ -30% to +20% ~ +50%**	**Analogy methods from the past project**	**Please refer method (1) or (2)**
DED	-5% ~ -15% to +5% ~ +20%	Detailed Cost by BoQ and Unit rate breakdown of Consultant	Please refer method (4)
Contract	-3% ~ -10% to +3% ~ +15%	Detailed Cost by BoQ and Unit cost breakdown of Contractor	

Chapter 1-12. What is the content of TOR for FS?

TOR is a technical requirement for the Consultants to execute FS. Executing Agency should prepare TOR for the implementation of FS based on this Guideline (with the help of independent expert, if necessary) and under the consultation with ADN and MPS (if necessary) to formulate the Project Concept. TOR for FS bidding should specify followings information, presented in the Table 1-17 (Model TOR is in the Appendix 1-13).

Table 1-17: Structure and Contents of FS TOR

1. Project Purpose	What is requested to the project?	- brief overview of the project; - project area (location) and scale;
	What should be solved by this project?	- Current problem to be solved
	Who are the beneficiaries?	- numbers of beneficiaries
2. Project Background	Who is the Responsible organization? Why initiates the project?	
	What is in background?	Political decision or Based on Upper Plan or Related regulations or law Project environment or special conditions General support by the Employer
3. Scope of FS	What should be achieved by FS? What should be studied and clarified? What is expected outcome/output?	Itemized the requests necessary for the implementation of the process.
4. Assignment of Experts Note	How many months are allowed for FS? Required number of experts involved, with their profession, education, experience, skills, Location of assignment, logistic, etc.	
5. Reporting Requirements	Language, Work content Kinds, numbers and time limit	
	Administrative Arrangements (References and Documentation list related to project)	
6. Outline of the Project	The details of Project contents are recommended to be attached excluding estimated project cost	

Unique Point

Note:

Assignment of Experts is a major part of TOR in case of conventional TOR. Especially in case of TOR for "DED and Construction Supervisory Works", because they are necessary to estimate design or construction supervisory cost, which is usually prepared based on the FS study.

However, the Assignment of Experts for FS is different, because it is difficult to define the appropriate number of necessary experts based on the scope of works of FS that is not so clear comparing with the DED or Construction. Therefore, the Employer may request the outsource or in-house Consultant to prepare TOR for FS that gives an advantageous for the Consultant to receive the DED or Supervision.

Assignment of Experts for FS TOR is recommended to be attached just as an example. But it is better to be proposed as a technical proposal of the Consultants during the bid within the maximum budget of the employer side as shown in the Sample TOR in the Appendix 1-13.

Chapter 1-13. What is the difference between FS and DED?

There is a common question about the difference of TOR between FS and DED. FS covers wider range of survey and study comparing to DED. On the other hand, DED requests a specific detailed scope necessary for the implementation of the actual construction (see p. 1-3). The following Table 1-18 shows the difference of the content of FS and DED. DED should be conducted after the government decision about the project budget based on the FS results.

Table 1-18: Difference of the content of FS and DED

	Feasibility study (FS)	Detailed design study (DED)
Investigation	Maximum utilization of the past available data is expected for topographic map, ground data (boring data is unavailable usually), weather data, traffic data, development plan, demand forecast, if possible	Actual survey is essential: Topographic survey, Geological survey, River flow survey, Traffic survey, Population growth survey and Future commodity tendencies etc.
Environmental assessment	Initial Environmental Examination (IEE) including natural and social impact	Environmental Impact Assessment (EIA) with land acquisition and resettlement
Study	Legal basis, Project Benefit, Site suitability	Best option for implementation of the Project
Drawings	**Outline Drawing (**minimum followings) Location map General plan or Arrangement plan And, Facility plan or Typical cross section (if necessary)	**Detailed Drawing** Drawings showing accurate size for each work
Quantity list	Principal quantity list for major works	Detailed calculation list of each work and materials from the detailed drawings
Construction Schedule	Total project schedule	Detailed work schedule showing critical path
Work efficiency table	(none)	Work efficiency for each work items about labor and equipment is necessary Work efficiency means the daily/hourly output, which will be decided by the construction period and by the past data This is affected by the local conditions and construction schedule
Unit rate list	Example for main products * Road /km, Bridge /m2 or per one bridge, * Building /m2 or per a school, * Power /MW, * Water supply /m3, * Irrigation /ha	Detailed list of each pay items based on the latest market price about materials, equipment & labor cost
Estimates	**Rough cost**	**Detailed cost** based on the built-up estimation Cost = Quantity / Work efficiency x Unit rate
Output	FS Report with necessary attachments	DED Report with detailed cost estimation and Bid Document, such as Special Condition of Contract, Special Specification, BOQ, Drawings, Instruction to Tenderer, etc.

Note: *Required accuracy of Cost estimate is shown in the Table 1-16.*

Chapter 1-14. What is the difference between the Preliminary Study, PFS & FS?

In General, the process project preparation and appraisal for construction is shown in the Figure 1-8. And various types of documents should be prepared.

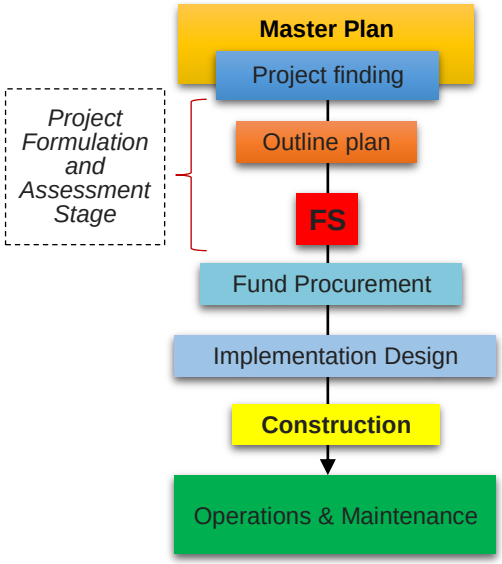


Figure 1-8: Project Process

First Step

Master Plan M/P is "Outline plan" in the spatial / sector planning including phasing and recommendation of "Priority Project". In case of huge project, such as area development, airport, port project, M/P will be required to decide priority projects in the M/P and their phasing.

Second Step

Preliminary Study done for the Project Formulation and Assessment to define the project scope through the site survey, to identify the focus areas & direction, to take for the subsequent preparatory study and to determine and draft out ultimate policy options. Some of the study results are used for the Project Concept.

Various terms are used for the documents in this stage, such as Preparatory study, Preliminary study, Pre-Feasibility study, Outline study, Feasibility Study, Basic design study etc. The exact definition of these deference is not an easy, because the assessment process of the project is variable according to each project's background.

Pre-Feasibility Study PFS looks like a type of FS, but principally PFS is not FS. PFS is used generally to the following different character studies:

1. If the Project Concept is not clear and several alternative plans are assumed. PFS is implemented to study the optimum plan to transfer to FS. (it closes M/P than FS).
2. If the Project Concept covers large scale of contents, PFS is implemented first to select the priority or to decide the most appropriate process to limit the scope of works of FS.
3. In case of the project with the heavy burden against the country budget, support from overseas agencies could be expected. PFS report is desired as a basic attachment to the request letter to the overseas agencies. The overseas agencies will decide whether to support the requested Project based on their own standards of the implementation of FS. It is carried out in a simplified manner comparing with general FS.

Third Step

Feasibility Study FS is prepared prior the actual funding stage to confirm the feasibility of a specific project selected in the Master Plan (M/P) or upper plan.

Chapter 1-15. What is the difference between FS and Ex-Ante Evaluation?

The Feasibility Study and Ex-Ante Evaluation (Pre-implementation Evaluation) are similar on the point of view to appraise before the project implementation. The comparison is between FS and Ex-Ante Evaluation is shown in the following Table 1-19.

Table 1-19: Difference between FS and Ex-Ante Evaluation

	Feasibility Study	***Ex-Ante Evaluation***
Purpose	To identify problems that can be anticipated in project implementation and examining their countermeasures	To appraise project investment effects and project implementation situations
Work contents	FS is one of the stages to implement a project to analysis about the project concept contents, such as project site conditions, surrounding natural conditions etc.	It is just checking of the contents of the project through the documentation and hearing without special study work.
Person in charge	Usually executed by selected Consultant nominated through tender	Government officer (or specific consultant)

The main items required in the report in FS and vie points in Ex-ante evaluation are different. The detailed description and the difference is presented below in the Table 1-20.

Table 1-20: Difference of the Required Items of FS and Ex-Ante Evaluation

Items required in FS Report	**Viewpoints in Ex-Ante Evaluation**
1) Project Purpose and Overall Goal	
2) Background Legal matters /regulation	Relation with higher level plan
3) Stakeholders	Consensus from the local people (Who are Direct beneficiaries?)
4) Surrounding conditions 4-1) Natural condition 4-2) Site condition 4-3) Similar project records (if any)	Reduction of natural disasters Reduction in accidents and disasters Utilization of local resources Stabilization of local communities Promotion of local culture Relationship with another Project
5) Implementation Schedule	Technical difficulty
6) Practicality of project & Specific Technology	
7) Rough cost estimation result	Cost-Benefit analysis
8) Economic & Financial analysis and Expectable benefits	Profitability (if Project could charge some fee)
9) Environmental & Social Assessment 9-1) Land acquisition & Resettlement	Status of legal procedures
9-2) Consultation results with local Stakeholders	Impact on community life Expansion of production Increase in employment Conserving the living environment Conserving the natural environment Improvement of landscape
10) Findings and Recommendations	

Appendices

Appendix 1-1: Checklist for Survey/ Investigation and Study

Target project in this check sheet is:

Show the figures in Appendix 1-2 of this Guideline

Report page number or chapter number shall be filled by Consultant

(Categories of the Project) Please refer example list in the Appendix 1-2

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 and Chapter 10)	***Necessity Rank***	***Report page/ Chapt***	***Checked by LM***	***Date***	***Checked by MPS***
a) Existing Development Plan					
a) Study results of Spatial/ Sector plan					
a) Consistency with Upper National Plan					
b) Climate survey					
b) Hydraulic survey					
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)					
b) Geological survey (such as foundation or ground survey etc.)					
b) Location survey or topographic survey					
c) Regulations / Design standard					
c) Design load and design strength of the object's foundation					
d) Social conditions before project (such as population, land use etc.)					
d) Inventory Survey for exiting available facilities or demolished					
d) Utilization status survey (traffic volume, cargo, vessel number, possible user number)					
d) Current issues					
d) Current revenue, if any					
d) Recent budget for the sector					
d) Target Area study result (such as features, issues, etc.)					
e) Future demand or necessary capacity					
e) Location or route selection or Distribution methodology of the products					
e) Necessary facilities scale and/or numbers etc.					
e) Necessary ancillary facilities (such as warehouse or equipment)					
e) Design scale of each Project facilities (such as height, level or depth etc.)					
e) Approach measures to the object (such as roads or railways)					
e) Quantities for Major Items, Project Cost and Necessary construction period					
e) Resource survey results (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)					
f) Economic & Finantial analysis results					
g) IEE, Resettlement etc., including Influence of the project to the surroundings					
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders					
i) Future extension plan, if necessary					
i) Alternative proposal (such as location or routes or methodologies)					
i) Privatization tendency					
j) Countermeasures for the risks, such as disasters, waste or emission					
j) Operation and Maintenance plan (O&M)					
Drawings prepared in FS (Consultants may add drawing list, if necessary) see Part 1 - Chapter 11	***Necessity Rank***	***Report page /chapt***	***Checked by LM***	***Date***	***Checked by MPS***
1) Location map					
2) General plan					
3) layout Plan					
4) Typical Cross section					
5) Facility Plan					
Quantity, Unit Rate of major Item & Construction Period in FS		***Report page***	***Checked by LM***	***Date***	***Checked by MPS***
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Appendix 3)		***Report page***	***Checked by LM***	***Date***	***Checked by MPS***
8) Direct Benefit (refer Appendix 1-3)					
9) Indirect Benefit					

Consultant should put his idea about necessity rank: i.e
5: very important, 4: important,
3: desirable, 2: not important,
1: ignorable

Items in each category could be added/ revised based on the project status, but not be deleted.

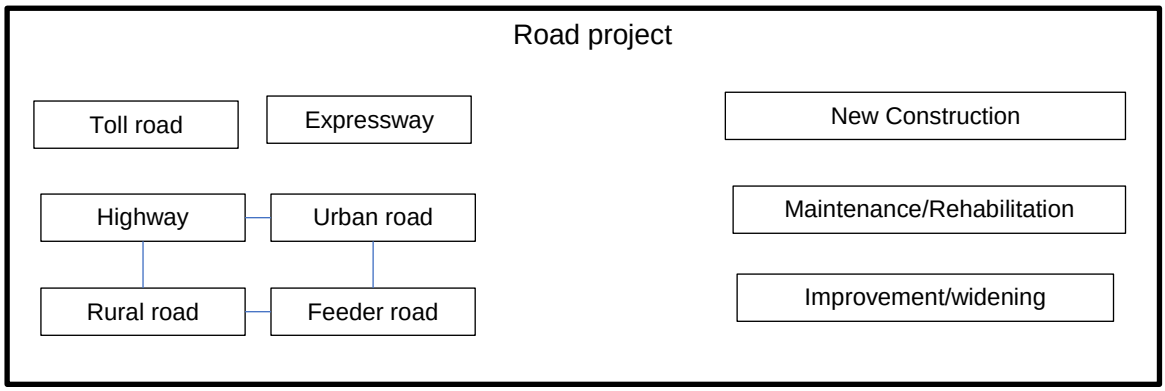
Necessary drawings are different according to the Project

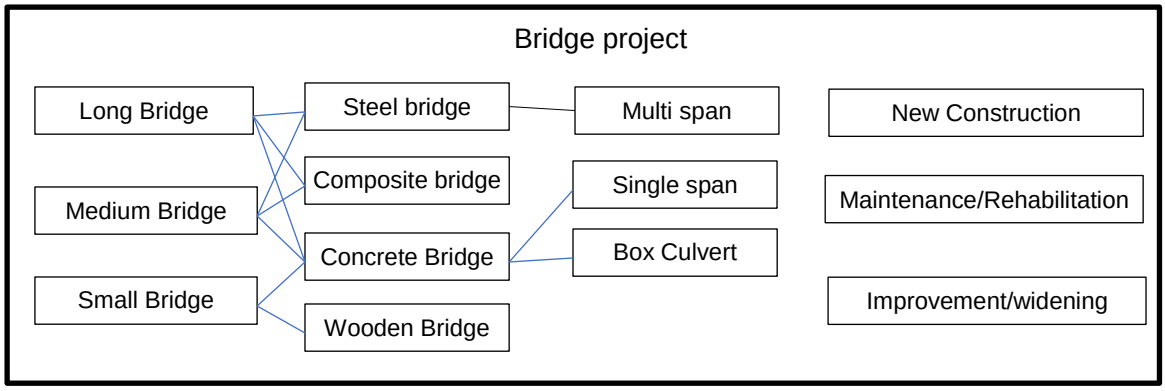
This Checklist is the most important to make easy FS evaluation, and Consultants may put additional pages, if necessary

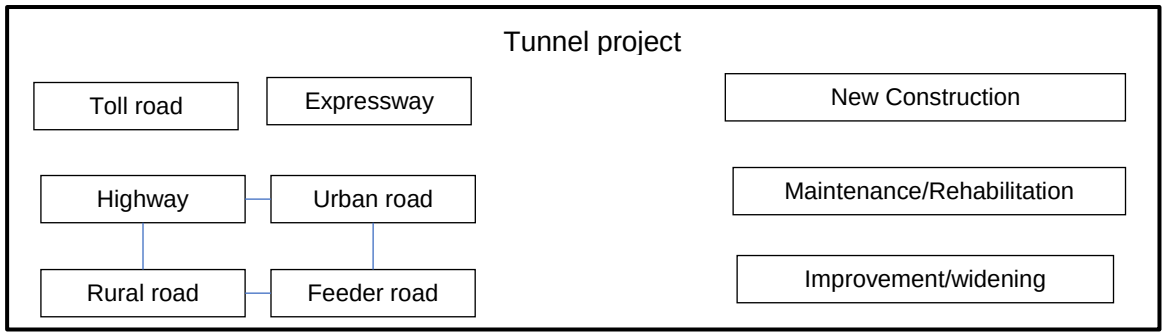
Appendix 1-2: Project type for different sectors

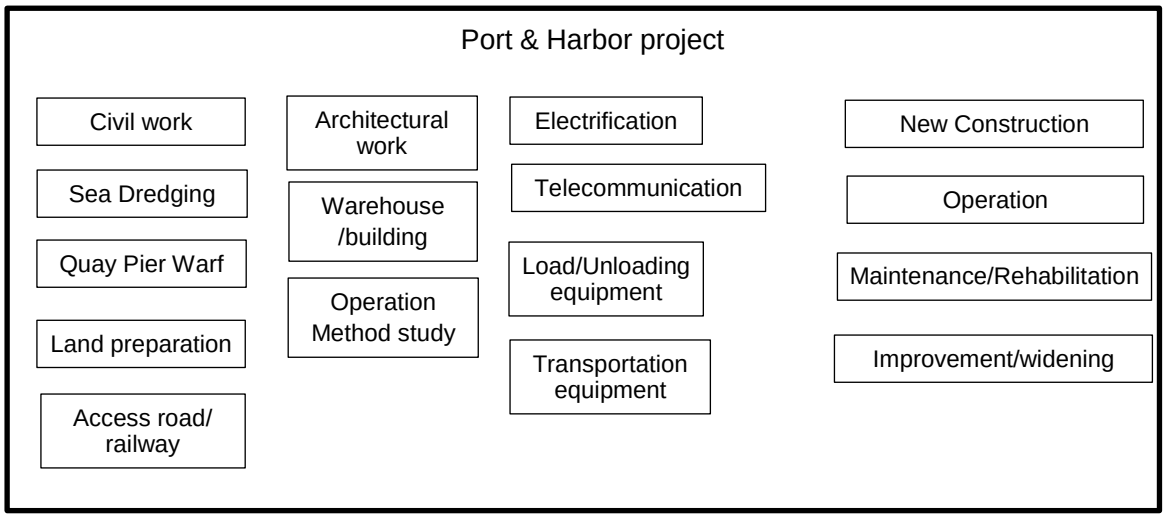
The following figure should be on the top of the **checklist** to show the type of project.

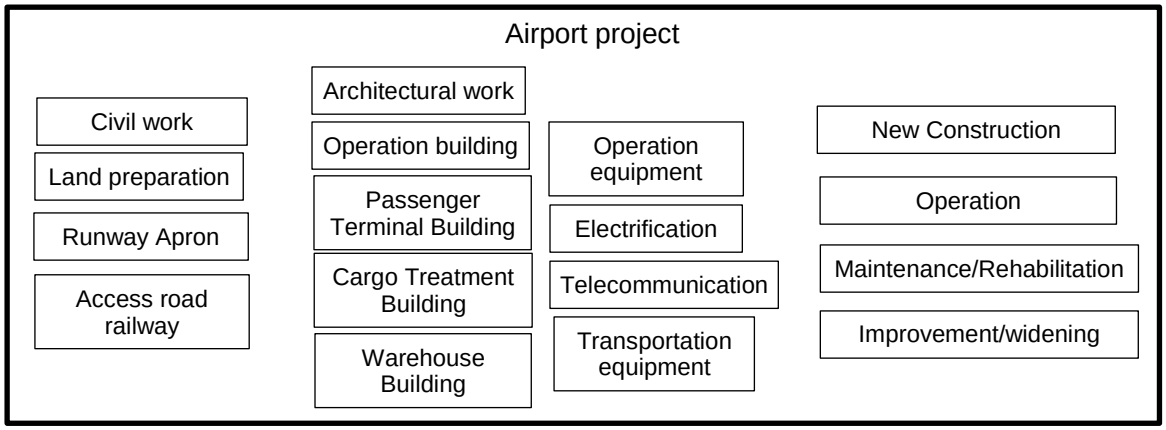
These categorizations are expected to be used as key words and help to find similar project in data base. And LMs are expected to attach this project classification on the top of the **checklist** to show the project type.

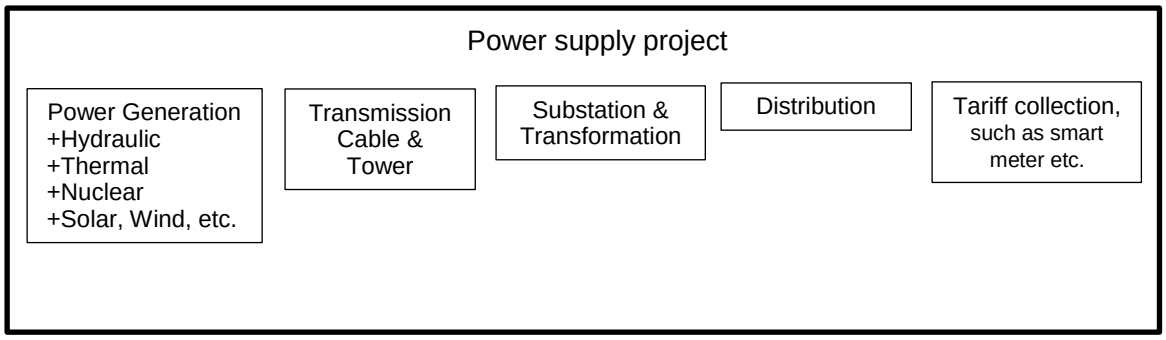


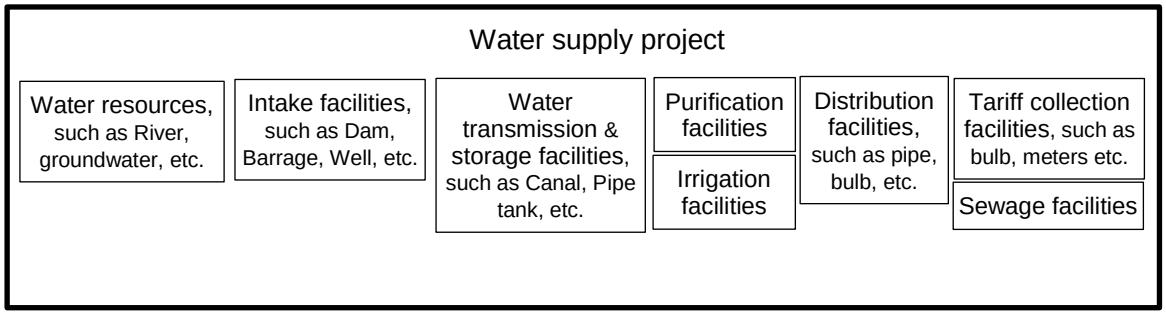


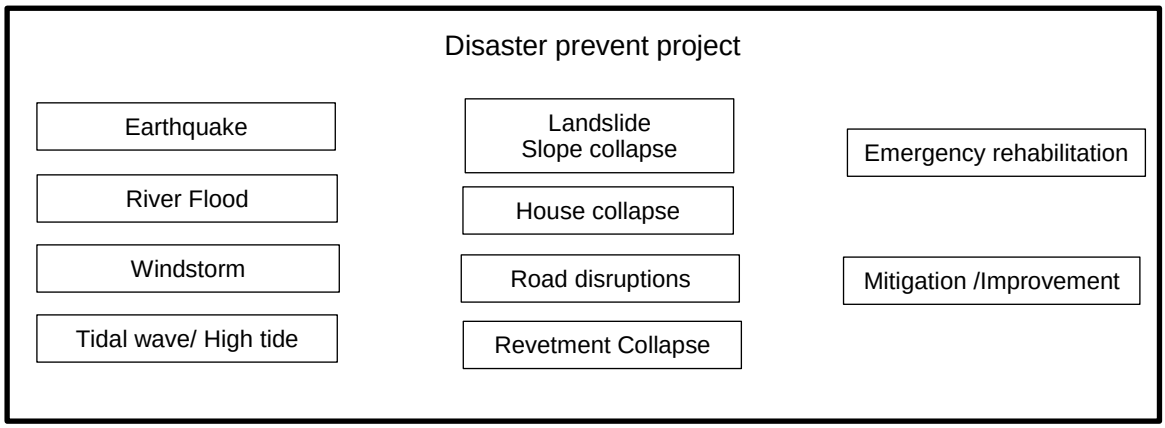


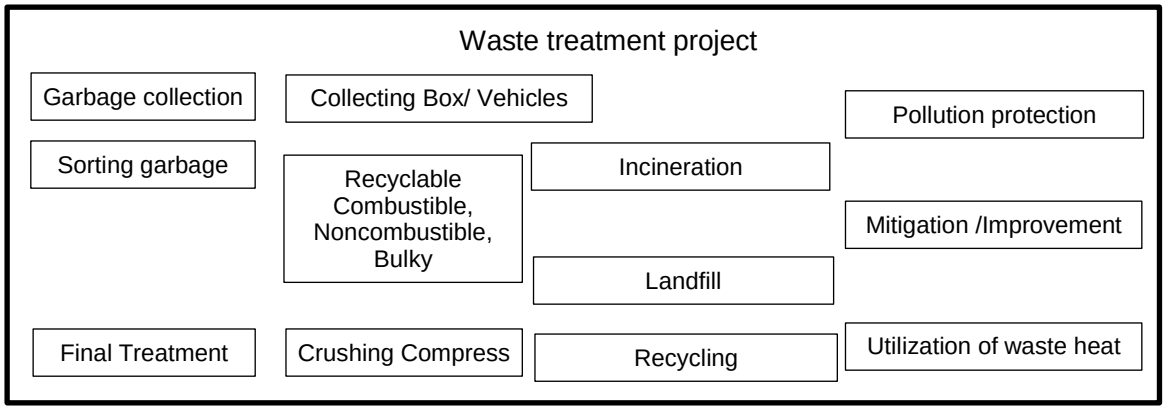

Port & Harbor project
Civil work
Sea Dredging
Quay Pier Warf
Land preparation
Access road/ railway
Architectural work
Warehouse /building
Operation Method study
Electrification
Telecommunication
Load/Unloading equipment
Transportation equipment
New Construction
Operation
Maintenance/Rehabilitation
Improvement/widening

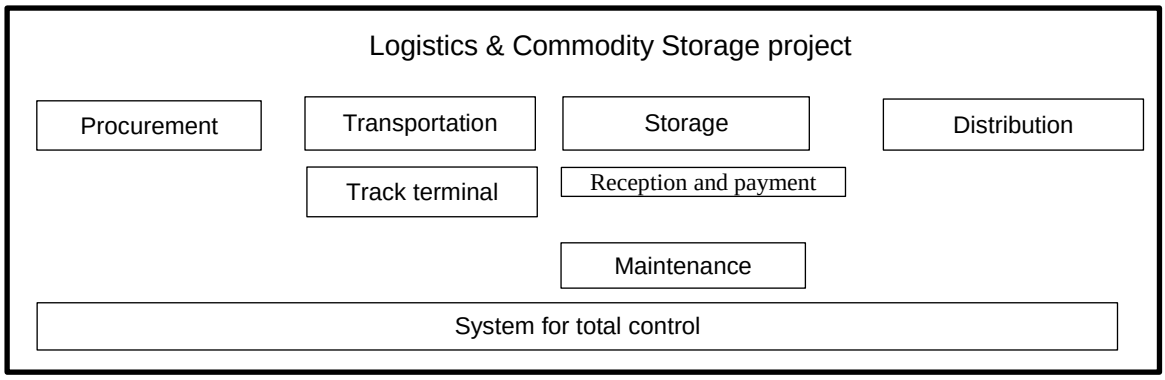

Airport project
Civil work
Land preparation
Runway Apron
Access road railway
Architectural work
Operation building
Passenger Terminal Building
Cargo Treatment Building
Warehouse Building
Operation equipment
Electrification
Telecommunication
Transportation equipment
New Construction
Operation
Maintenance/Rehabilitation
Improvement/widening

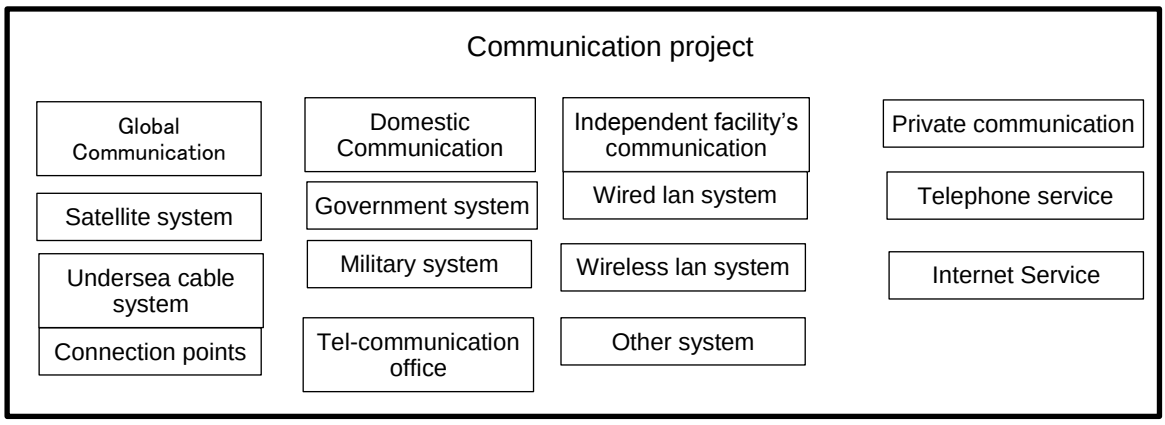

Power supply project
Power Generation +Hydraulic +Thermal +Nuclear +Solar, Wind, etc.
Transmission Cable & Tower
Substation & Transformation
Distribution
Tariff collection, such as smart meter etc.

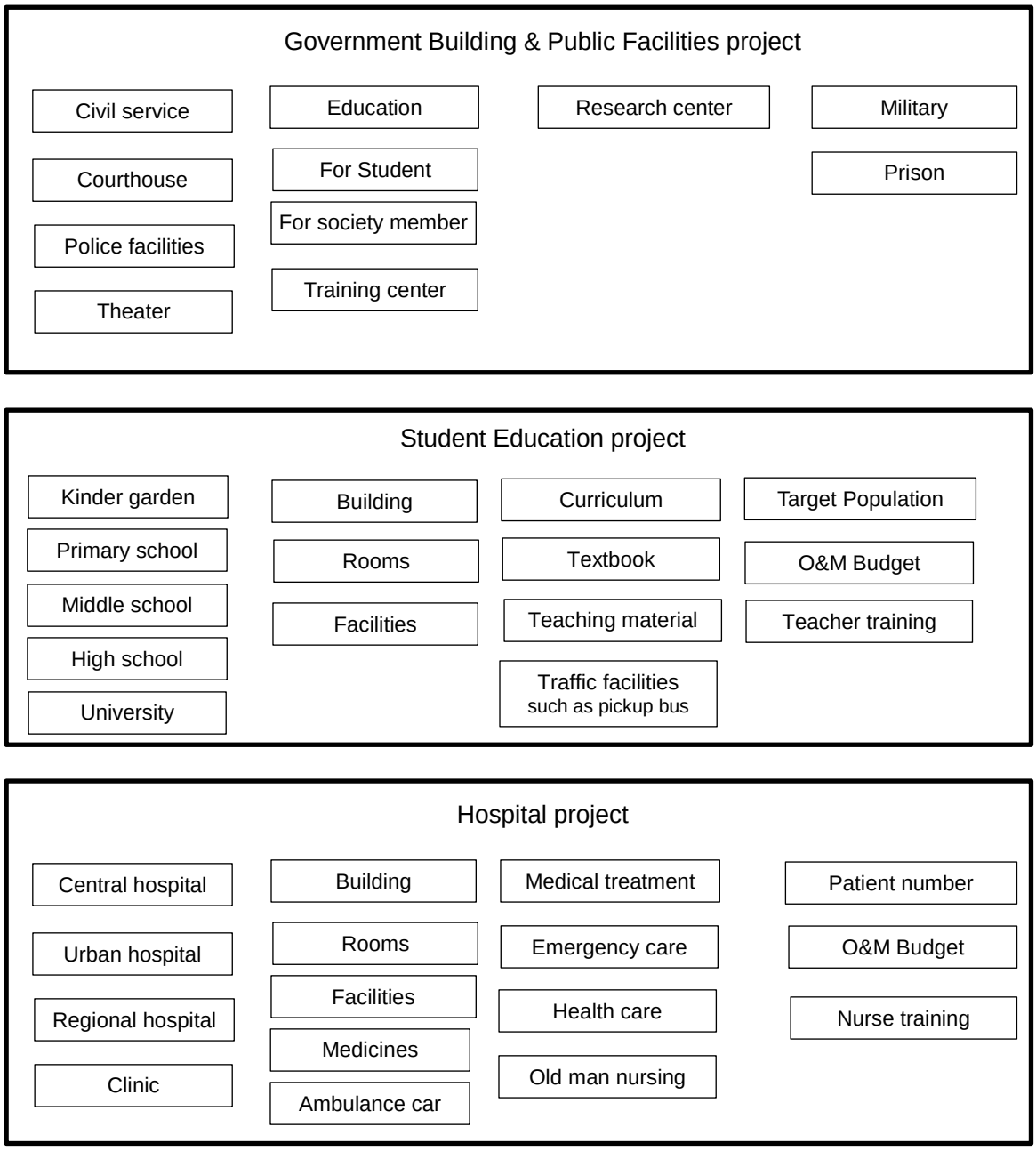

Water supply project
Water resources, such as River, groundwater, etc.
Intake facilities, such as Dam, Barrage, Well, etc.
Water transmission & storage facilities, such as Canal, Pipe tank, etc.
Purification facilities
Irrigation facilities
Distribution facilities, such as pipe, bulb, etc.
Tariff collection facilities, such as bulb, meters etc.
Sewage facilities


Disaster prevent project
Earthquake
River Flood
Windstorm
Tidal wave/ High tide
Landslide
Slope collapse
House collapse
Road disruptions
Revetment Collapse
Emergency rehabilitation
Mitigation /Improvement


Waste treatment project
Garbage collection
Sorting garbage
Final Treatment
Collecting Box/ Vehicles
Recyclable
Combustible,
Noncombustible,
Bulky
Crushing Compress
Incineration
Landfill
Recycling
Pollution protection
Mitigation /Improvement
Utilization of waste heat


Logistics & Commodity Storage project
Procurement
Transportation
Track terminal
Storage
Reception and payment
Maintenance
Distribution
System for total control


Communication project
Global
Communication
Satellite system
Undersea cable
system
Connection points
Domestic
Communication
Government system
Military system
Tel-communication
office
Independent facility's
communication
Wired lan system
Wireless lan system
Other system
Private communication
Telephone service
Internet Service


Government Building & Public Facilities project
Civil service
Education
Research center
Military
Courthouse
For Student
Prison
Police facilities
For society member
Theater
Training center
Student Education project
Kinder garden
Building
Curriculum
Target Population
Primary school
Rooms
Textbook
O&M Budget
Middle school
Facilities
Teaching material
Teacher training
High school
Traffic facilities
such as pickup bus
University
Hospital project
Central hospital
Building
Medical treatment
Patient number
Urban hospital
Rooms
Emergency care
O&M Budget
Regional hospital
Facilities
Health care
Nurse training
Medicines
Clinic
Old man nursing
Ambulance car

Appendix 1-3: Example of project impact & benefits for Economic Analysis

Please refer also Appendix 2-4 Quantifiable economic benefits (p.2-57) of FS Guideline Part 2.

Project type	Type of benefit	Benefit item		Tangible benefit	Tangible benefit, but due to the project type	Difficult to utilize as the tangible benefit
Road Project	User benefit	Cost saving effect for vehicle running		○		
		Time cost saving effect	Passenger	○		
			Cargo		○	
		Saving effect for maintenance cost etc.		○		
		Induced traffic benefit			○	
		Safety effect increase (Reduction of Traffic accident)			○	
		effect increases for comfort・convenience				○
	Ripple effect	Environment impact			○	
		Area development effect				○
Urban traffic project	User benefit	Vehicle running cost saving		○		
		Operation cost saving		○		
		Time cost saving	Passenger (business trip)	○		
			Passenger (out of business trip)		○	
			Cargo		○	
		Saving of maintenance cost etc.		○		
		Induced traffic benefit			○	
		Safety increase (Traffic accident reduction)			○	
		Increase of comfort/convenience				○
	Ripple effect	Reduction of environmental contaminate materials (Reduction of air pollution by Exhaust gas)			○	
		Area development effect				○
Railway project	User benefit	Time cost saving effect	Passenger	○		
			Cargo	○		
		Running cost saving effect	Passenger	○		
			Cargo	○		
		Maintenance cost saving effect		○		
		Safety effect increase			○	
		Effect increase of comfort/convenience (punctuality, operation frequency)				○
	Ripple effect	Induced traffic effect			○	
		Environment impact			○	
		Area development effect				○

Airport Project	User benefit	Travel time saving effect	Business trip	○		
			Other trip	Partially tangible		
		Travel cost saving effect		○		
		Cargo/transportation cost・time saving effect		○		
		Safety increase			○	
		increase of comfort/convenience (operation frequency)・assurance (punctuality)				○
	Ripple effect	Induced traffic effect			○	
		Environment influence (mainly noise)			○	
		Area development effect				○

Port Project	User benefit	Saving benefit of transportation cost	○		
		Benefit by reducing of transportation time	○		
		Cost saving of maintenance for alternative transportation means etc.	○		
		Safety increased effect (reduction of maritime accident, safety improvement of anchorage)		○	
		increased effect of comfort/convenience			○
	Supplier benefit [1)]	Trans-shipment effect		○	
	Ripple effect	Environment impact		○	
		Area development effect			○
	Note [1)]: trans-shipment user is sometimes foreign registry one, and usually benefit is counted by Port fee revenue (supplier benefit)				

Ground water development Project	Cost Reduction (for current water supply volume)	Cost saving for current alternative water supply Mitigation for drawing water time etc.	○		
	Increased water supply volume	Payment-will amount by the user against increased water usage	○		
	Damage avoidance	Avoidance of Water outage or Water reduction damage by the stable water supply		○	
	Public health Improvement effect	Mitigation effect for the human health damage due to plague occurrence prevention		○	
	Productivity Improvement	Increase of agricultural production etc.		○	
	Life environment Improvement effect	User life environment Improvement			○
	Other effect	Tourism project acceleration effect		○	
		Land use effect etc.			○

Water supply Project	Cost Reduction (for the current water supply portion)	Cost saving for current alternative water supply	○		
	Increased water supply volume	Payment-will amount by the user against increased water usage	○		
	Resource Conservation Effect	Savings effect of Resource (Water resource conservation due to deduction of water leakage etc.)	○		
	Damage avoidance	Avoidance of water outage or water reduction damage due to the stable water supply		○	
	Public health Improvement effect	Mitigation effect for the human health harm due to plague occurrence prevention		○	
	Life effect by environment Improvement	Improvement of user life environment			○
	Other effect	Effect for the Acceleration of tourism		○	
		Land use effect etc.			○

Sewage Project	Cost Reduction effect	Reduction of Human urination treatment cost of sewage by the current processing method	○		
		Reduction of water supply treatment cost by improving the water resource quality		○	
	Productivity increased	Increasing of Agricultural and Fishery productivity		○	
	Water damage Mitigation effect	Avoidance of water hazard damage amount by the Stagnation of internal water		○	
	Public health Improvement effect	Mitigation effect for the human health damage due to plague occurrence prevention		○	
	Environment conservation effect	Resource saving effect (Reusing of treated water)	○		
		Reduction effect of environment contaminated materials		○	
	Living effect by environment Improvement	User's living environment Improvement (sewage exclusion)			○
	Land use effect	Rising of land value by the improvement of land use			○
	Other effect	Acceleration effect of Tourism/Recreation project		○	

Waste management Project	Reduction effect of treatment cost	Cost saving effect	○		
	Production volume increase	Revenue effect due to Project	○		
	Life environment conservation effect	Waste exclusion effect (comfort increase)			○
	Public health Improvement effect	Bad smell reduction & harmful insect effect、Plague Occurrence Prevention effect, human health harm mitigation effect		○	
	Environment conservation effect	Reduction effect of environment contaminated materials		○	
		Reduction effect of the final treatment volume		○	
		Reduction effect of related substances for global warming		○	
	Other effect	Residents' awareness enlightenment effect			○
		Former site use effect, Tourism/Recreation project acceleration effect		○	
		Area development effect			○

Flood control & Erosion control Project	Direct damage Mitigation effect	Mitigation of general property damage (Mitigation of property damage, such as house, factory, shop, office building etc.)	○		
		Damage mitigation of agricultural products, livestock products, fishing products	○		
		Damage mitigation of Public civil engineering facility etc.	○		
		Damage Mitigation of human life		○	
	Indirect damage Mitigation effect	Damage mitigation of suspension of business		○	
		Cost saving for emergency measures		○	
		Mitigation of traffic block off damage		○	
		Mitigation of Ripple damage			○
		Mitigation of Mental damage			○
	Ripple effect	Environment impact		○	
		Area development effect			○

Earthquake hazard mitigation Project	Direct damage Mitigation effect	Mitigation of general property damage (Mitigation of property damage, such as house, factory, shop, office building etc.)	○		
		Damage Mitigation for public civil engineering facility etc.	○		
	Indirect damage Mitigation effect	Damage Mitigation of Suspension of business		○	
		Cost saving for Emergency measures		○	
		Mitigation of traffic block off damage		○	
		Mitigation of ripple damage			○
		Mitigation of mental damage			○
	Ripple effect	Environment impact			○
		Area development effect			○

Education Project	Personnel	Ability Improvement (Literacy rate, Learning ability etc.)			
		Acquisition of techniques necessary for life, Learning of Social experience			○
		Personal income increase (Lifetime wage increase)		○ Note	
	Social	Productivity Improvement			
		Standard of living Improvement (Health and sanitation standards, decline of infants Mortality rate, Decline of birthrate)			○
		Cost Reduction by disparity correction and avoidance of regional conflict etc.			○
		Inheritance of Culture, Values & Social development			○
	Note: On economic evaluation, social productivity improvement effect is measured by the increase of personnel lifetime wage				

Appendix 1-4: Form of Implementation Schedule

A construction schedule should be presented in a simple form for each major work item as shown below:

Table: Sample of Implementation Schedule

	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Preparation																		
Work item 1																		
Work item 2																		
Work item 3																		
Work item 4																		
Clearing-up																		

Prepared by	Checked by	Appraisal by
Consultant name	Ministry & Department	MPS
Person name	Person name	Person name
Signature	Signature	Signature
Date	Date	Date

Important!

This table is expected to attach on the bottom of following documents:

- Outline drawing
- Implementation schedule
- Summary table of rough cost estimates
- Unit rate of Major Items
- Unit rate of similar project
- Check sheet

Appendix 1-5: Sample summary table of rough cost estimate

Project name	*Ministry name*	*Consultant Name*	*Date*
Water supply			

	No	*Items*	*Amount*	*Remarks*	*Checked by*	*Date*
[1] Initial cost	1.	Case 1 Civil works construction cost				
	1)	Construction net cost				
	(i)	Direct Construction Cost				
		Intake facilities	$2,000,000	Q=200,000m3/day		
		Purification Plant	$4,000,000	Q=200,00003/day		
		Water Pipe	$20,000,000	L=8km D=2000 Steel Pipe incl. tunnel		
	(ii)	Indirect Common works cost	$5,000,000	(i)x X% + actual necessary cost		
	(iii)	Site administrative cost	$2,500,000	((i)+(ii)) x Y%+ actual necessary cost		
		*Subtotal	$33,500,000			
	2)	General and administrative costs etc.	$1,500,000	((i)+(ii)+(iii))) x Z%		
		*total	$35,000,000			
	1.	Case2 Architecture construction cost				
	1)	Construction net cost				
	(i)	Direct Construction Cost=Building		300m2		
	(ii)	Common works		(i)x X% + actual necessary cost		
	(iii)	Site administrative cost		((i)+(ii)) x Y%+ actual necessary cost		
		*Subtotal				
	2)	General administrative cost		Subtotal x H%		
		*total				
	2.	Design supervision				
	(1)	Design cost	$2,800,000		.	
	(2)	Supervision	$2,100,000	24months		
		*total	$4,900,000			
	3.	Soft component costs				
	(1)	Soft component costs	Nil	Breakdown cost		
		*total	Nil			
	4.	Necessary Cost for LMs				
		Project administrative cost				
		*total	$3,000,000			
	5.	Preparation, cost				
	(1)	Land acquisition costs	$1,000,000	Approximate cost		
	(2)	Compensation cost	$1,000,000	Ditto (the same)		
	(3)	Demolition	$300,000	Ditto (the same)		
		*total	$2,300,000			
		*Grand total	$45,200,000			
[2]O&M Cost	1)	Administration cost for 30 years	$600,000	20,000-/year		
	2)	Maintenance cost (First 10 years)	$3,500,000	Subtotal construction cost x 1%/year		
	3)	Maintenance Cost (Second 10 years)	$10,500,000	Subtotal construction cost x 3%/year		
	4)	Maintenance Cost (Third 10 years)	$17,500,000	Subtotal construction cost x 5%/year		
		*total	$32,100,000			

Prepared	Checked	Appraised
Consultant name	Ministry & Department	MPS
Person name	Person name	Person name
Signature	Signature	Signature
Date	Date	Date

Appendix 1-6: Unit rate list for major items

The major work items should be described as shown below:

	Major Item name	*Unit*	Rate	Amount	Remarks
Similar Project Name		***km***			
AAA		***m***			***Pavement thickness? cm***
		m			

Similar Project Name		***km***			
BBB		***m***			***Pavement thickness? cm***
		m			

Example of Analysis of Unit rate

Project Name: Upgrading and maintenace of Dili (AP junction) – Tibar Section 2 Tasitolu-Tibar
Contract date: Sep 2016 Contract No: ICB /032/MPWTC –2015
Contractor: China Wu Yi Co. Ltd
Project Brief: Conecting Tibar and Tasitolu by opencutting the moutains

Length 4.55 km 4 Bridges 7+5+7+26m
Width (4lanes): 18 m

items	Quantity		Amount		unit rate/m	unit rate/m3 or/m2	
General requirement			440,308	3%	97 $/m		
Removal work			96,718	1%	21 $/m		
Earth work (fill)	288,218 m3	63 m3/m	2,541,216	20%	559 $/m	8.8 $/m3	
(excavation)	11,487 m3	3 m3/m	46622	0%	10 $/m	4.1 $/m3	
subbase	80,500 m2	41,521 m3	808,829	6%	178 $/m	10 $/m2	19.5 $/m3
& base	80,500 m2	21,900 m3	859,794	7%	189 $/m	11 $/m2	39.3 $/m3
surface course	80,500 m2		1,800,040	14%	396 $/m	22 $/m2	
bridge construction	796 m2		1,356,745	11%	298 $/m	1704 $/m2	
slope protection			1,581,848	17%	470 $/m		
drainage			2,136,781	3%	74 $/m		
miscellaneous			335,445	3%	74 $/m		
bio engineering			285,106	2%	63 $/m		
daywork			83,138	1%	18 $/m		
subtotal			12,372,590	96%	2,719 $/m		
PS			57,796	0%	13 $/m		
contingency			400,000	3%	88 $/m		
subtotal			457,796		101 $/m		
Total			12,830,386	100%	2,820 $/m		

Appendix 1-7: Unit rate list of similar past project for major items

Example of the Unit Rate List from Similar Past Road Project

Road	Distance (km)	Total Cost (US$)	Cost/km (US$)
Tibar-Liquica	28.7	20,516,415	715,000
Tibar-Gleno	32	29,292,168	915,000
Manatuto-Laclubar	35	28,011,855	800,000
Laclubar-Natarbora	47	34,379,730	731,000
Aileu-Ainaro, Lot 3	30	28,823,606	961,000
Aileu-Ainaro, Lot 4	25	28,138,737	1,126,000
Aileu-Ainaro, Lot 5	23	26,875,070	1,168,000
Maubara-Karimbala	37.8	20,748,566	549,000
Dili-Manatuto	48.7	48,314,976	992,000
Manatuto-Baucau	57.7	59,287,454	1,028,000
Baucau-Lautem	59.3	29,315,346	494,000
Average			**862,000**

Example of the Unit Rate List from Similar Past Building Project

Building	Total Area (m2)	Component	Cost	Unit rate (m2)
CNE National Election Commission	3,249	Physical	2,843,913	957
		Design	132,195	
		Supervision	116,643	
		PMU	17,730	
		Total (US$)	3,110,482	
CFP Public Service Commission	3,984	Physical	3,031,548	761
		Design	140,917	
		Supervision	124,339	
		PMU	18,900	
		Total (US$)	3,315,704	
MoJ (Ministry of Justice)	5250	Physical	4,4044,938	770
		Design	188,023	
		Supervision	165,903	
		PMU	25,217	
		Total (US$)	4,424,082	
MoF (Ministry of Finance)	20,516	Physical	20,356,530	992
		Design	749,748	
		Supervision	621,158	
		PMU	67,565	
		Total (US$)	21,795,000	

Appendix 1-8: Example 1 of Quantity calculation required in FS for Road Project

(This shows the best practice example for reference)

Major Group	Work item	Pay item	unit	calculation method	calculation basis	remarks
Earthwork	Cut & fill work	Clearing and grubbing	M^2	Objects are upland and hill with trees. Calculate by projected area to horizontal plan	plan 1/3000~1/5000	calculates by planimeter
		Cut & fill work	M^3	Calculate with 100m interval using Cross section of scale 1/200 – 1.500	cross section 1/200~1/500	No consideration for soil kind, changing ratio or deduction of ditch etc.
		Slope	M^2	Calculate the area for cut & fill area separately using cut section of scale 1/200 ~ 1/500. Gardening area should be calculated separately	cross section 1/200~1/500	No consideration for special slope work
		Retaining wall	M or M^2	Calculate from plan & cross section.	plan & cross section	
		Ditch/Gutter	M	Calculates quantity from plan & cross section.	plan & cross section	No consideration for the foundation treatment
Pavement	Pavement work	Pavement work	M^2	Calculates pavement area by cross-sectional area calculation sheet		
		Curbs (ACC/CCC)	M	Calculate the length		
Tunnel			M	Calculate tunnel length		
Bridge	long bridge middle bridge small bridge over bridge	Foundation Substructure Superstructure Paving Handrailing Lighting	M^2	Calculates the bridge are using plan		Bridge type, span will be decided from topography conditions and workability etc.
Ancillary facilities	Median strip costs	Median	M	Calculate from earthwork length	Plan	
	Road facilities	Interchange Service area Parking area Bus stop	set	Principally check the style and the area only If necessary, calculate the details as shown above	Plan 1/3000~1/5000	
	Traffic management facilities	Traffic sign Fence Illumination Tel com duct facilities	Km Km Set Km Set	Rough estimate as same as outline design or by quantity survey list		
Miscellaneous work costs	General work	Sound wall Plantation Protection Snow guards	M KM Set Set	Rough estimate as same as outline design or by quantity survey list		
Land compensation cost	Land	Housing area Field Forest others	M^2 M^2 M^2 M^2	Rough estimate as same as outline design or by quantity survey list		
	compensation	House Power line Vegetation Public facilities others		Rough estimate as same as outline design or by quantity survey list		

Note: Please see Appendix 9, if necessary

Appendix 1-9: Example 2 of Quantity calculation required in FS for Road project

Major group	Work item	Pay item	unit	calculation method	calculation basis	remarks
Earthwork	Cut & fill work	Clearing and grubbing	M^2	Objects are upland and hill with trees Calculate by projected area to horizontal plan	plan 1/1000	
		Road excavation Borrow excavation waste excavation	M^3 M^3 M^3	Calculate by planimeter for each cross section. The volume should be divided into “Road excavation”, “Borrow excavation” and “waste excavation” form the total volume of cut and fill. Percentage of 3 kinds of excavation will be decided by the average for each section	cross section 1/200	
		Upper subgrade	M^2	Calculate from design cross section	Calculation sheet for cut/embank	
	Stabilization of ground	Sand mat	M^2	Calculate by planimeter	plan 1/1000	
		Sand drain Sand compaction	M	decide the pitch & diameter from the design calculation book	Cross section 1/200	
	Slope	Seed spray Seed blow Loan Vegetation (hole) Concrete frame Rock net Rock guard Net fence	M^2	calculate the area separating to cut and fill area cross section the ratio of each methods will be decided considering the soil conditions Calculate of area of specific one, such as concrete block etc., if applied them	Cross section 1/200	
	Retaining wall	Concrete block Gravity type Reverse T Leaning type	M^2 M M M	Calculate the quantity after preparing simple expansion plan	Plan 1/1000 Cross section 1/200 Expansion plan	
	Ditch/ Gutter	Culvert	M	Calculate the length from Plan & Cross section Inner cross section & overburden depth should be described clearly	Plan 1/1000 Cross section 1/200	
		Pipe culvert	M	Calculate the length over 1.0 m diameter		
	Drainage	Drainage	km	Calculate from Plan	Plan 1/1000 Drainage calculation sheet	
Pavement	Sub base	Sub base	M^2	Work Area should be calculated by using cut/fill **checklist** and cross section by separating of each direction		H=20cm
	Base Binder Surface	Base Binder Surface	M^2			H=15cm H=6cm H=4cm
	Curb	AC curb	M	Calculate from plan	Plan 1/1000	

		Precast CC Curb	M			
Median strip costs	Median strip	Median W=3.0 m W=2.0 m	M	Calculate for each traffic lane width by the length of earth work	Plan 1/1000 Road length list of each road structure	
Tunnel	tunnel	Tunnel main part Illumination	M M	Calculate design length, cross-section, earth volume, air ventilation volume etc. by dividing existence or non-existence of investigation pass and excavation methods by dynamite or mechanical method	Plan 1/1000 Cross-section calculation sheet	
Bridge costs	long-span bridge middle bridge small bridge Over bridge Viaduct	Super structure	M^2	calculates the bridge surface area bridge type & span should be decided considering the location and installation conditions through the discussion with the owner (agency)	General drawing Plan 1/1000 Plan 1/200 Longitudinal section	long-span: >50m Middle<50m Type: * Steel * PC * RC
		substructure	No	Calculate separately by Type, Height, Width, Fix, Movable etc. against abutment and Piers	Cross-section	Type: * Gravity * Reverse T * Leaning * Hollow * Ramen * Single pier * Independent pier
		foundation	M or M^2	Calculate separately by work item, diameter, length etc., if the foundation is necessary due to the ground conditions		Type: Precast concrete Steel pipe Site placing Deep excavation Cason (open, pneumatic)
Road facilities	Interchange Service area Parking area Bus stop	Interchange Service area Parking area Bus stop	Set Set Set Set	Calculate by using the pay item cost of main road	Plan 1.1000 Cross section 1/200 Longitudinal section	
	Frontage road	Gravel surface Gravel base Low-cost surface	M^2 M^2 M^2	Calculate the area separately for work item and design thickness		Gravel surface t=5cm or 10cm Gravel base 20cm Low cost pave 20cm (Base15cm+ AS5cm)
Traffic management facilities	Sign board	Sign board	km	Calculate the road length excluding tunnel length	Plan 1/1000	
	Protection Fence	Protection Fence	km	Calculate the length of fill section for both direction		No division for guard rail / guard cable
	Guard fence	Guard fence	km	Calculate the necessary length for wire net or barbed wire		
	illumination work	Illumination work	place	Calcite for each facility including: Interchange / carriageway barrier Service are / parking area Bus-stop		Usually not necessary

	Tel com duct	Tel com duct	km	Calculate the road length excluding tunnel length		
	information and investigation facilities	Variable sign board weather monitoring equipment Traffic counter vehicle height detector	Set Set Place Set	Necessary one should be calculated		
Miscellaneous work	sound insulation walls	Sound barrier	m	Necessary one should be calculated	Plan	H2m/3m: earth section H1m/2m/3m viaduct section
	Road side vegetation	Road side vegetation	km	Calculate for earth work length		
	Environment vegetation	Environment vegetation	km	Calculate for earth work length (one side)		
	Protecting work	Peg for ROW	no	For each 20m interval		
	countermeasure against snow, ice	Road heating Protection fence Etc.	M^2 M	According to local conditions		
Land compensation	Land	Housing area Field Forest others	M2 M2 M2 M2	Calculates by planimeter		
	Compen-sation	House Power line Vegetation Public facilities others	No No. M^2 No. Set	Calculate by three-oblique line method		
Supplementary works		Connection road Alternative road Alternative canal River work Erosion work Alternative bridge	Set Set Set Set Set Set			

Appendix 1-10: Process up to approval of the major project under IF

In charge	Stage	Documents	Attachment	GL Reference
LMs	(Project Selection)	SDP, Master Plan		Part1.Capter 3
	(Preparation of Concept)	Project Concept		Part1 Chapter 6
LMs	Application of the Project FS TOR		TOR (with Project Concept)	Part1.Appendix 12
ADN	Acceptance of TOR			-
LMs	Application of the budget for **FS**	Application letter	Project Brief and Concept	Part1. Appendix 11
MPS		Appraisal report		Part4.Chapter 2
CAFI		Approval Letter		-
NPC ➡LMs	Preparation of **Bid Documents for FS**	Bid Documents With Draft Contract documents	Invitation letter Instruction o Consultants Outline of Project TOR (Requested Study) Condition of Contract Draft contract	Part4.Chapter 5.1 - - Part1. Appendix 12 - -
(NPC)	Approval of Bid/Contract Documents	*Jump in case of Minor Projects*	Draft Bid documents Draft Contract Documents	- -
NPC ➡LMs	(Bid process)	Pre-Bid Conference Tender Evaluation of Each proposal Negotiation with Tenderer Signing of Contact		- - Part4.Chapter 4 - -
Consultants	(FS execution) IEE	Submission of **FS Report**	Drawings Rough Cost Estimates **Checklist** Others	Part1.Chapter 11 Part1. Chapter 12 Part1. Chapter 9&10 -
LMs	**Evaluation of FS (Draft) Report**	Evaluation report of **FS**	Check sheets	
	Authorization of Project	Application letter for Project Execution	Appraisal report Consultant FS report	
CAFI(MPS)		Approval Letter for Project Execution	Notice, if necessary	
NPC(&LMs)	Preparation of Bid Documents for DED		Invitation letter Outline of Project Requested Study (TOR) Condition of Contract Draft contract	
NPC	Approval of Bid/Contract Documents		Draft Bid documents Draft Contract Documents	
NPC&(LMs)	(Bid Process)			
Consultants	(DED Execution) EIA			
	Preparation of Bid Documents for Construction			
LMs	Appraisal of DED Report			
NPC	Approval of Bid/Contract Documents		Draft Bid documents Draft Contract Documents	
LMs	Land acquisition・Resettlement			
LMs	(Bid Process)			
Contractor	Construction	Notice to Proceed		
LMs	Handover the site			
LMs	Operation and Maintenance			

Appendix 1-11: Key points of execution of the major infrastructure projects

1) **Project Concept** should be prepared by LMs (not by external consultant);
2) **Project Concept** should be realistic one including rough cost with quantitative data (Narrative one is not recommendable. Sample is shown in the Appendix 11 of Part 1 as revised draft);
3) **TOR** should be prepared by LMs as shown in FS Guideline and get acceptance from ADN;
4) **Outline Project** is recommended to attach to TOR excluding cost matters from the Project concept;
5) LMs should get the acceptance of FS execution from CAFI based on the Project Concept;
6) NPC/LMs prepare tender documents for FS based on the approval format by NPC.

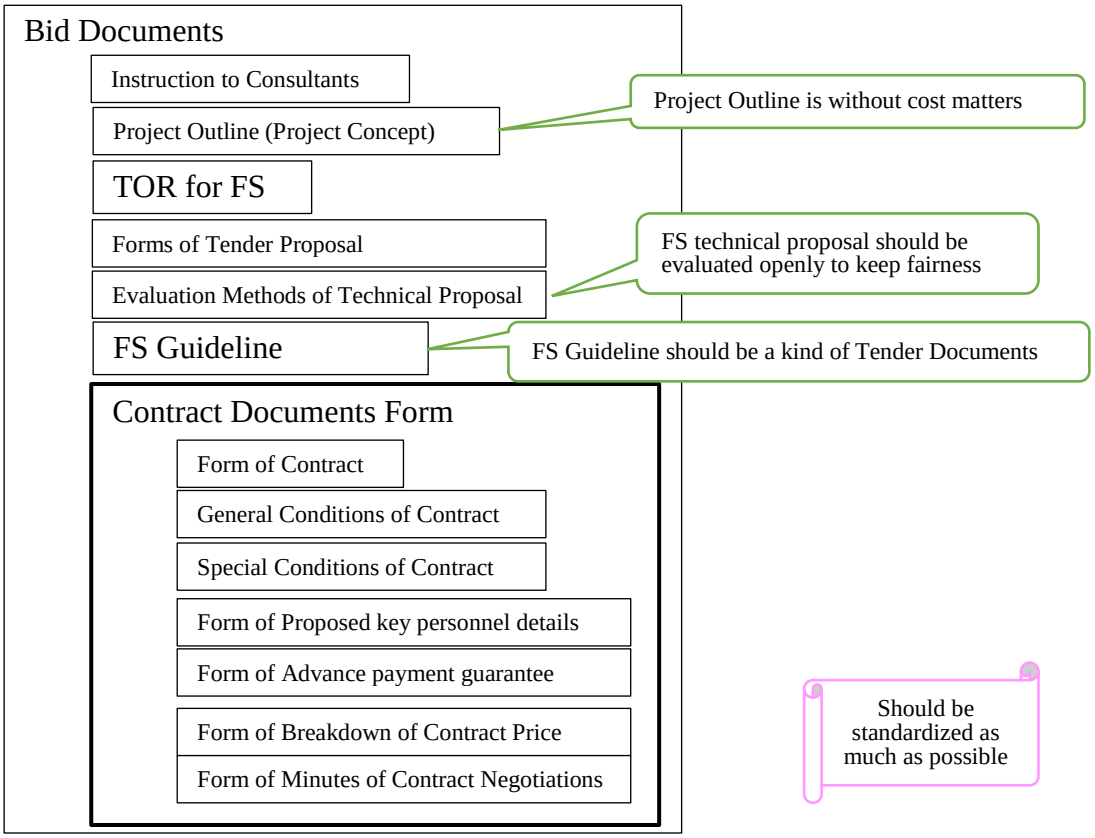


Figure: Composition of Bid Documents

7) FS contract price is preferable to be fixed price for the time being (1-3% of assumed construction cost).

Appendix 1-12: FS Application Form (Revised)

Project Brief	rating

1. Prepared by	Ministry Name	/1
Contact person	Name: Position: Phone: Email:	/1
Partners/ advisory Organizations, if any	Name of governmental or non-governmental organization to collaborate	/1

2. Name of Project		/1

3. Project Budget	US$					/1
Budget for 1st year (for budget book)		Budget for 2nd year (for budget book)				/1
Breakdown of Major Item						
Major Item 1		$	Major Item 5		$	/1
Major Item 2		$	Major Item 6		$	/1
Major Item 3		$	Major Item 7		$	/1
Major Item 4		$	Major Item 8		$	/1
Budget verified by ADN?			☐No		☐Yes	/1
Budget source for DED & Construction			☐IF ☐ADB ☐JICA ☐Others			/1
Operation & Maintenance Cost Source (O&M)			☐IF ☐ADB ☐JICA ☐Others			/1

4. Project Location	District:	Sub-District	/1

5. Project Period	Start(month/year): _____	End (month/year): _____	Total years _____	/1

6. Type of Project		/1
☐Agriculture ☐Water & Sewage ☐Road ☐Bridge ☐Disaster Control ☐Urban ☐Education ☐Security ☐Defense ☐Health ☐Public Building ☐Tourism ☐Port □ Airport ☐Resettlement ☐Maintenance ☐DED Preparation ☐Electricity ☐Informatics ☐Financial System ☐Social Solidarity ☐Youth & Sport	☐New (Not Started) ☐Ongoing ☐Rehabilitation ☐Maintenance ☐Emergency ☐Finished 100%	/1

7. Project Description (narrative explanation within 3-4 lines for each)						
Brief explanation of Project (Size, Feature etc.)						/1
Project Background						/1
Overall Goal						/1
Problems to be solved						/1
Strategic priority Project in Line with	Strategic Development Plan	☐No	☐Yes	Pages in SDP	p	/1
	Sector Plan/ Master Plan /Ministry's plan (or Name of Plan)	☐No	☐Yes	Pages in Plan	p	/1

8. Project Benefits		
Beneficiaries	(narrative)	/1
Benefit for Strategic Policy	(narrative)	/1

How many people will get benefits from the Project		☐ <10000	☐ 10,000-100,000	☐ >100,000	/1
Employment jobs	Number of jobs during Construction	Number of jobs during O&M	Total Number of other indirect jobs created by the Project		/1 /1 /1
IRR calculated ☐No ☐Yes	EIRR %				/1
	FIRR %				/1
NPV calculated ☐No ☐Yes	NPV				
B/C calculated ☐No ☐Yes	B/C				

9. Study status related to the Project (Please attach the copy to this Project Brief)						
			Agency/ Consultant conducted the Study	Status of Preparation	Year	
Project Concept Design	☐No	☐Yes				/1
Feasibility Study (FS)	☐No	☐Yes				/1
Environmental Study	☐No	☐Yes				/1
Detailed Engineering Design	☐No	☐Yes				/1
Bill of Quantities (BoQ)	☐No	☐Yes				/1
Other study for the project, if any	☐No	☐Yes				/1

10. Land for Project					
Site location Identified?			☐Yes	☐No	/1
Resettlement is required?			☐Yes	☐No	/1
Necessary area	From:				/1
	To:				
	For bridge	(m2)	For Building	(m2)	/1
	For Road	(km)	For other	(m2)	
Land acquisition for Construction	☐Not yet	☐Yes, but partial	☐Yes, more than 90%		/1
IEE (Initial Environmental Examination) is conducted? ☐Yes ☐No			What is the category?	☐A ☐B ☐C	/1

11. Other important information about Project, such as special conditions to implement project	
	/1

12. If the Project cost is more than 5 million, please fill the followings:			
Necessary Budget for FS	US$		/1
Study Item	Cost Incurred ($)	Period(M)	
☐ Project outline studies including scale and classification			/1
☐ Selection of technology requirements including provisions of materials and equipment			/1
☐ Cost Studies (including Land Acquisition / Resettlement)			/1
☐ Social Analysis			/1
☐ Environmental Analysis			/1
☐Analysis for potential effects of natural hazards and climate change on the project and on the vulnerability of the people in the project site during construction and during the operation and maintenance stages			/1
☐ Operations and Maintenance Plan after project completion			/1
☐ Others (specify study item)			/1

Expected Duration of the FS Implementation	from	to	/1

Signature Name and Job title
Date

Appendix 1-13: Model TOR

Italic parts mean the sentences to be changed project by project

Example (Dili Water Supply)

1) Objective of Project (a few lines one is desirable, maximum half page)

Project purpose is to ask for new water resources to solve the near future vital issues. As one of most practical solution, surface water utilization from Railaco area and Gleno Area is considered. However, the river flow volume is variable according to the seasonal variation, and construction of dams with water transition pipe to the Dili purification plant are requested.

Beneficiaries: (should include estimated beneficiaries' number)
Dili citizen including Tibar and Hera (340,000 in 2030, 500,000 in 2050)

2) Background (maximum 1 page)

The Directorate General of _____ (hereinafter referred to as "the EMPLOYER"), the Ministry of _____, will require the consulting services of Feasibility Study (*FS*) of ***Dili Water Supply Project*** (hereinafter called as the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is an integral part of *the Sector Investment Plan 2018-2039 for Water Supply and sanitation in Timor Leste* with the following essential functions:

- ✓ *To ensure Water Resources to Great Dili Area, thereby contributing to civilized citizen life in Dili City;*
- ✓ *To supplement the functions of supplying water for Educational center of Hera area, New Tibar Port and its hinterland Industrial Park;*
- ✓ *To ensure the public water for green zone in the area and for fireworks; and*
- ✓ *To support the development of Great Dili and Timor-Leste.*

Water demand of Dili city (including Tibar industrial area and Tasi Tolu area) is sure to expand in the future, and a water supply project is essential to deal with this tendency.

About 600 L/Ps (=52,000m3/d) is assumed as the current resource. The shortage of water resources becomes 500 L/Ps (=40,000m3/day) in 2030 and 2000lps (=180,000m3/day) in 2050.

Ground water resources, which are very popular in present, is not recommendable considering the hygiene effect and ground settlement in future.

Project Concept/Idea for the Project was planned in *MM of YYYY* by the (Ministry Name) to properly develop ***the Dili Capital City Area***.

The **Project Outline** is attached at the end of this TOR.

3) Scope of Works
3-1) General Requirement of FS
The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study

- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social impact Assessment
- ✓ Preparation of Checklist of the study

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.

FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 7, Chapter 8 for Survey and Investigation and Chapter 9 for the study of "FS Guideline".

3-2) Specific Request:

Specific request out of General scope works should be described in

1) *Necessary water volume in 2030 shall be restudied. (not nece… age in the road map of Dili water supply)*
2) *Source areas and their available quantities be studied*
3) *Pipe line route and necessary storages for the supply*
4) *Purification plant expected to be constructed at Southern Tibar Area and/or Comoro river side*
5) *Distribution lines to houses and facilities will be excluded*
6) *Purification plant and Distribution lines to houses with facilities are excluded*
7) *Future increase of agricultural water at the water source area should be considered*
8) *Dam life due to sedimentations, and measures for resettlement of residents in the future shall be considered (including necessary land regulations)*

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.
In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4) Assignment of Experts

4-1) Period of FS

The required period for FS work is ***4 months*** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Table: Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period
Water Infrastructure Engineer	*Master*	*Min. 15 years*	*3*
Water Dam Engineer	*-*	*Min. 10 years*	*3*
Structure Engineer	*-*	*Min. 10 years*	*1*
Environmental Specialist	*-*	*Min. 10 years*	*1*
Economic Specialist	*-*	*Min. 10 years*	*1*

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in the Table below.

Summary of Work Sharing Table of Each Experts

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name.
The cost estimation of each staff should be shown in the Financial Proposal.

5) Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And the Main Report should be translated to Portuguese and Tetum as the official languages (excluding Attachments).

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 7 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (Page number of each item should be filled)

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

Document	Hard Copy Number	Time limit
Inception Report	6 copies	Within *1* calendar week after the Notice of the Commencement of the Services of the Project
Monthly Progress Report	5 copies	By the *10th* day of each month during Study period
Draft Final Report	*8* copies	Within ***3*** calendar weeks before the final date of contract. (Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer)
Final Report	*10* copies	Within ***1*** calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report
One Soft Copy is required with hard copies on submission of each Report		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

1) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work. See Chapter 11 of "Part 1").
   - ✓ Location map
   - ✓ General plan
   - ✓ Layout plan
   - ✓ Typical cross section
   - ✓ Elevation view
   - ✓ Facility plan

2) Rough Construction schedule (Sample Form is attached in Appendix 1-4 of "FS Guideline Part 1);
3) Rough Cost estimates (Sample Form is attached in Appendix 1-5 of "FS Guideline Part 1);
4) Quantities and Unit Rate of Major Item (Sample Form is attached in Appendix 1-6 of "FS Guideline Part 1);
5) Unit rate reference of the past similar project (Sample Form is attached in Appendix 1-7 of "FS Guideline Part 1);
6) Checklist of FS/FS Report (Sample Form is attached in Appendix 1-1 of "FS Guideline Part 1.

5-5) Checklist

- ✓ Consultant shall prepare the Checklist as the sample sheet attached to TOR.
- ✓ Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER.
- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Chapter 8 & 9 of "FS Guideline Part 1".
- ✓ Consultant may change his subject name for survey and study but shall keep the Category of defined item categorization for the convenience of the appraisal by the EMPLOYER.
- ✓ Consultant may add survey subject or study subject within a defined Category specified in Chapter 8 & 9 of "FS Guideline Part 1".
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

6. Outline of Project

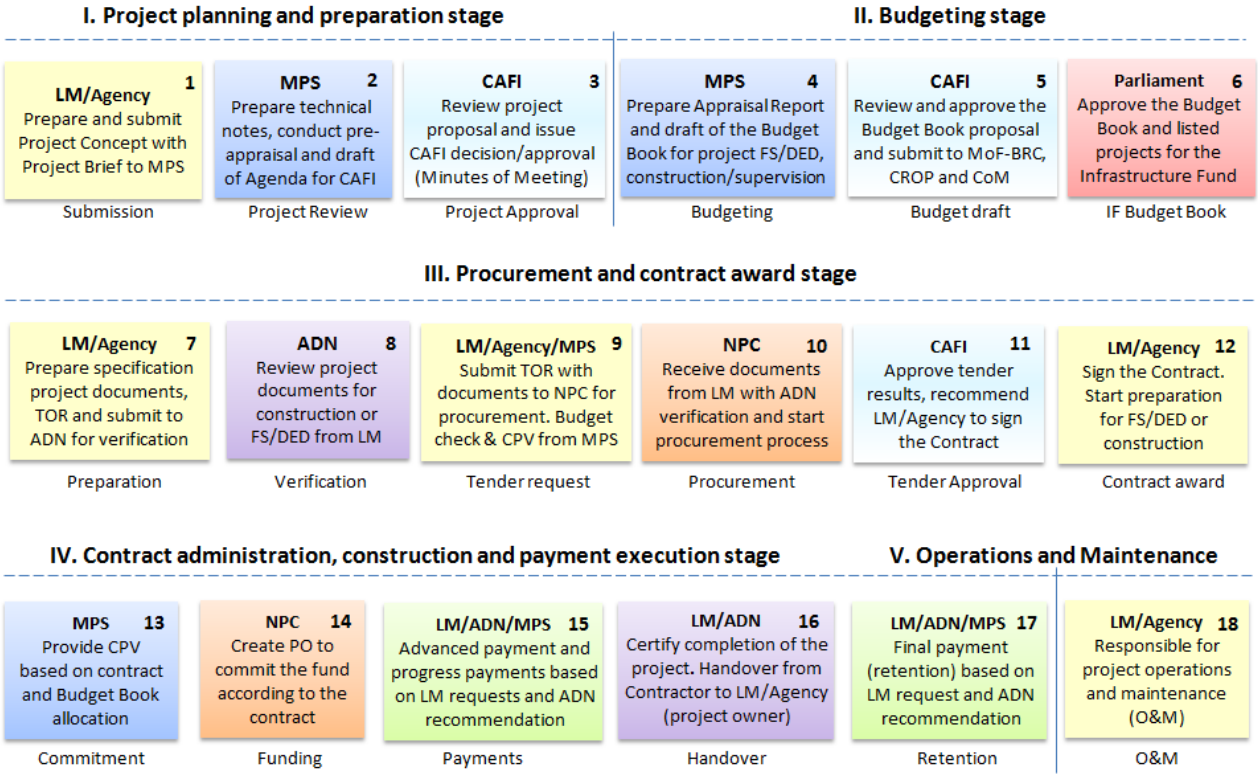
(Followings are not TOR text, just for explanation about Outline of Project)

- ➢ Outline of Project is requested to attach to show the details of Project Contents.
- ➢ Outline of Project could be prepared from Project Concept, which will be prepared on the initial stage of the Project. The difference between Project Concept and Outline of Project is shown in Table below:

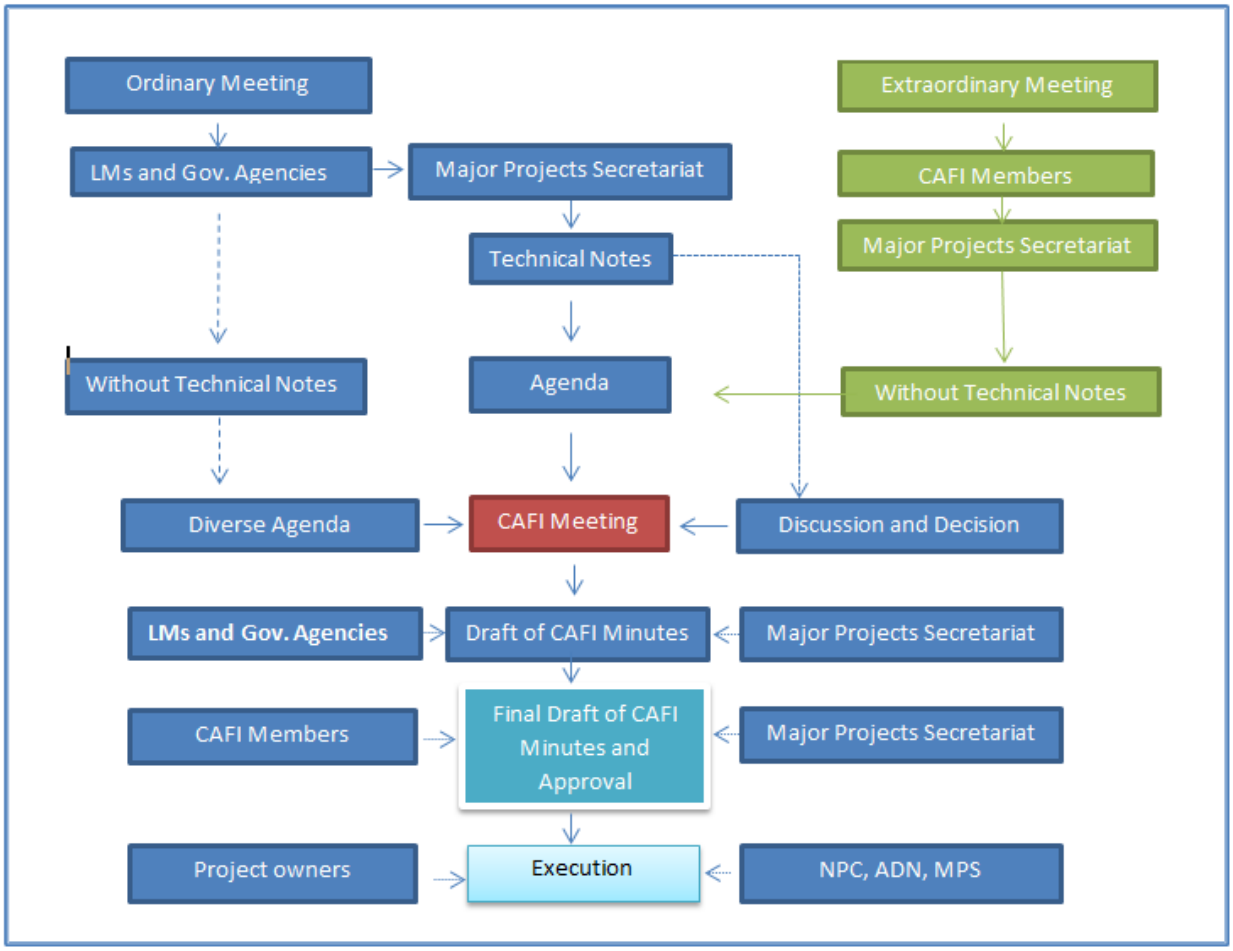
Example structure of Project concept and Outline of project

Project Concept	Outline of Project
Project Name	Project Name
Location	Project Purpose Location
Outline scale and characteristics of the project	Background Outline scale
The reasons, especially why the project has a priority comparing with other projects	Characteristics of Project
Project benefits (if possible with the estimated amount) and beneficiaries (with estimated numbers)	Construction timeline
Expected timeline: project duration and period of completion of construction	Available source Road Map for future development
Special conditions, if any (e.g. climate, soil, residents, rare species, etc.)	(Not Necessary)
Rough cost estimate, cost/benefit (B/C) and payback period of investment	

Appendix 1-14: Workflow process of the Infrastructure Fund



Appendix 1-15: CAFI Workflow



PART 2:

GUIDELINE FOR ECONOMIC & FINANCIAL ANALYSIS

2.1. Preface

2.1.1 Purpose of the Guideline for Economic & Financial Analysis

This document, including examples of case study for economic and financial analysis (E&F Analysis) on projects in the infrastructure sector, is formulated for the Timor-Leste Government agencies relevant to the planning/appraisal/evaluation of infrastructure projects to follow in their respective areas of function where E&F Analysis on infrastructure projects is needed.

Particularly, the document will provide instructions on how to calculate the three major indicators i.e. IRR, NPV and B/C, and how to apply them to the appraisal and evaluation of infrastructure projects.

(1) For the Line Ministries (LMs)

For LMs the document is intended to enable the staff members to understand the methodology and process of E&F Analysis so that it will be possible for them to check the soundness of the E&F Analysis in a Feasibility Study (FS) Report submitted by the consultant based on a check list which is to be formulated separately.

(2) For the Major Projects Secretariat (MPS)

For MPS it is intended also to enable the staff members to understand the methodology and process of E&F Analysis so that it will be possible for them to check the soundness of the E&F Analysis in a FS Report submitted by LMs based on a check list, and meanwhile to assess the appropriateness of the proposed infrastructure project from the economic perspective, and what's more, to conduct recalculation of the results of E&F Analysis later at the stage of ex-post evaluation.

2.1.2 Background

(1) Problem Analysis

According to the Budget Book 3A of "General National Budget", the Timor-Leste government has set the target for Infrastructure Fund expenditure. But the actual executed amount of budget is less than 100%. Such progress in budget execution may be attributed to several causes, but, as illustrated by the following "Problem Tree" constructed through a group discussion within MPS for "Problem Analysis" on the above-mentioned key issue, the low quality and low efficiency in project planning and project appraisal, among others, are considered to be the major causes, which in turn point to the issue of absence of guidelines for project appraisal as well as pre-study (PS) or FS implementation.

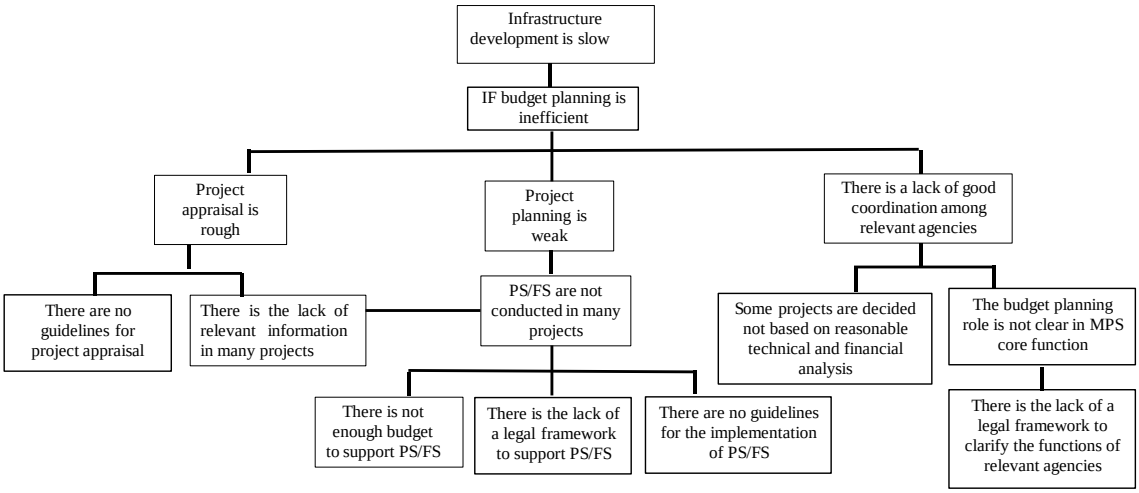


Figure 1-1: Flow Chart of Problems Faced by TL Government in IF Budget Planning

(2) Objective Analysis

Based on the results of "Problem Analysis", an "Objective Tree" is built by converting the problems listed above into the objectives to be achieved by the government in its effort to address the key issue of a slow progress in budget execution. As suggested by the "Objective Tree", having relevant guidelines for the implementation of PS or FS as well as guidelines for project appraisal is, among others, the immediate objective that the government is required to attain as soon as possible. This result justifies the task of guideline formulation for economic and financial analysis on infrastructure projects.

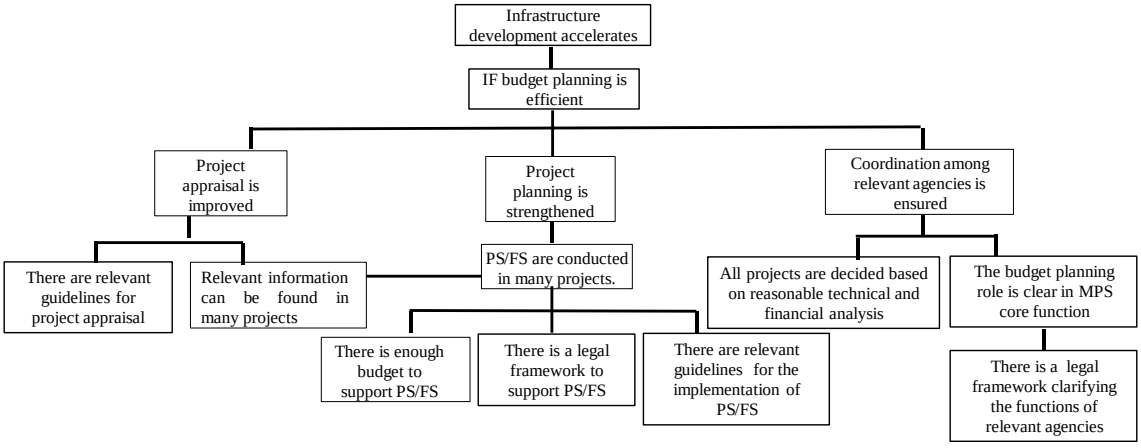


Figure 1-2: Flow Chart of Objectives to Improve IF Budget Planning by TL Government

2.2. Methodology of E&F Analysis

2.2.1. Definition of Economic Analysis and Financial Analysis (E&F Analysis)

(1) Financial Analysis (FA)

FA is an analysis undertaken from the individual or project agency's perspective to confirm the financial viability, or the self-sustainability of a project, where only the costs and benefits accruing to the project owner are considered, and the costs and benefits are estimated using existing market prices.

(2) Economic Analysis (EA)

EA is an analysis undertaken from the perspective of the society or national economy as a whole to confirm the economic impact and viability of a project, where the costs are viewed as the opportunity costs[1] or losses of welfare, while benefits are the gains of welfare or saving of resources to the society or national economy, and both are measured using Shadow Prices (adjusted market prices)[2].

The difference between FA and EA can be summarized in the following table:

Table 2-1: Difference between Financial Analysis and Economic Analysis

Parameter	Financial Analysis	Economic Analysis
Perspective	An individual entity	The society or national economy as a whole
Costs	Initial investment and O&M cost to be actually disbursed from the project's budget	Initial investment and O&M cost measured as social opportunity costs/ welfare losses
Benefits	Revenues of the project to be actually received by the project owner	Welfare gains/ resource savings to the society or national economy as a whole
Way of Pricing	Using existing market prices (financial prices)	Using Shadow Prices (adjusted market prices/ economic prices)

Source: Created by JICA Advisor

2.2.2. Types of EA

EA can be further divided into Cost-Benefit Analysis (CBA) and Cost-Effectiveness Analysis (CEA). CBA is used to value projects with tangible benefits while CEA to analyze projects with intangible benefits. The difference between the two types can be described in more detail as follows:

(1) CBA

It values benefits by direct calculation or by proxies, i.e. indicators or representative factors which give a more or less reliable value and are relatively easy to estimate. It includes "Cost Recovery" in calculating costs, revenue, cash flows, solvency and sustainability.

It allows calculating profitability criteria (NPV, IRR) that show the proportion between costs and benefits and can be used to choose between various projects.

(2) CEA

It analyzes intangible benefits unable to be valued in monetary terms by direct calculation or by proxies, focusing on costs per unit of benefit, and compares them with comparable costs elsewhere, e.g. comparing the cost of vaccinating one person, or of one bed-night in hospital, or of a child's schooling for one year, in the project area; with the costs elsewhere in the country, in neighboring countries, or even, in certain cases, regionally or world-wide[3].

---

[1] In economic theory, "Opportunity Cost" means the value of the next-highest-valued alternative use of a resource viewed from the perspective of an economic entity. When this is viewed from the perspective of the national economy or the whole society, it is called "Social Opportunity Cost".

[2] "Shadow Price" is the opportunity cost of an activity or project to a society, computed where the actual price is not known or, if known, does not reflect the real sacrifice made, while "Shadow Pricing" refers to the practice of allotting a dollar-value to an abstract commodity for the purpose of cost-benefit analysis. For the meaning of "Opportunity Cost", please refer to Footnote 3 on P.7 for details.

[3] When comparing with projects in other countries, these values aree expressed in shadow prices in order to be valid.

It is usually specific to a sector, since comparisons are normally only possible within a sector (health, education etc.) and not between sectors.
The differences between CBA and CEA can be summarized in the following table. In this guideline, however, the term EA refers only to CBA.

Table 2-2: Difference between CBA and CEA

Parameter	CBA	CEA
Property of Benefit Items	Possible for direct calculation, or possible to be valued in monetary terms by a proxy	Intangible benefits which cannot be valued in monetary terms by direct calculation or by proxies
Major Concern	Paying attention to the concept of "Cost Recovery" and "Affordability"	Focusing on costs per unit of benefit, and comparing them with comparable costs elsewhere
Sectors Applicable	Allowing calculating profitability criteria to show the proportion of cost to benefit that can be used to choose between projects of different sectors	Usually specific to a sector, as comparisons are normally only possible within a sector (health, education…) and not between sectors

Source: Created by JICA Advisor

2.2.3. Position of E&F Analysis in PFS/FS and Project Appraisal/Evaluation

(1) Position of E&F Analysis in PS/FS

At the stage of project formation/preparation, E&F Analysis is adopted in a PS or FS report, and is conducted based on the data of financial cost acquired from the results of Design & Cost Estimates. Its relationship with the work of Design & Cost Estimates is reflected in the figure underneath.

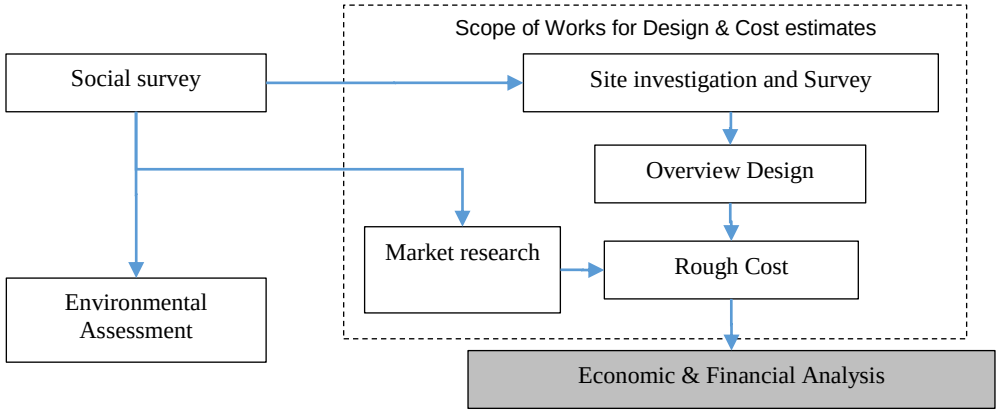


Figure 2-1: Relationship between E&F Analysis and Cost Estimate in PS/FS of Infrastructure Projects

(2) Position of E&F Analysis in Project Appraisal/Evaluation

With regard to infrastructure projects, project evaluation basically includes ex-ante evaluation (project appraisal) and ex-post evaluation. Both of the two kinds of project evaluation usually conducted from the six perspectives including the perspective of Economy/Finance as seen from the figure below, while E&F analysis is indispensable for the evaluation from the perspective of Economy/Finance.

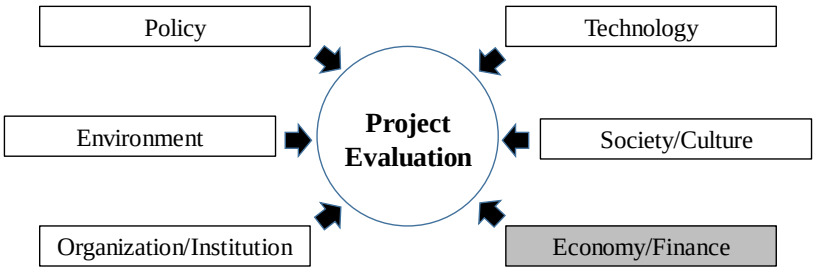


Figure 2-2: Major Cross-Sectional Perspectives Applicable to Project Evaluation

(3) Timing for Implementation of E&F Analysis

1) Project Formation/Preparation Stage

- FS and Project Planning:

E&F analysis will be conducted by Consultant and checked by LMs.

- Appraisal/Ex-ante Evaluation:

The part of E&F analysis in the FS Report submitted by LMs will be checked and appraised by MPS.

2) Project Completion/O&M Stage

- Ex-post Evaluation:

E&F analysis will be conducted by MPS with a view to recalculating the results of E&F analysis conducted in the appraisal/ex-ante evaluation and to confirming the economic soundness of the infrastructure project.

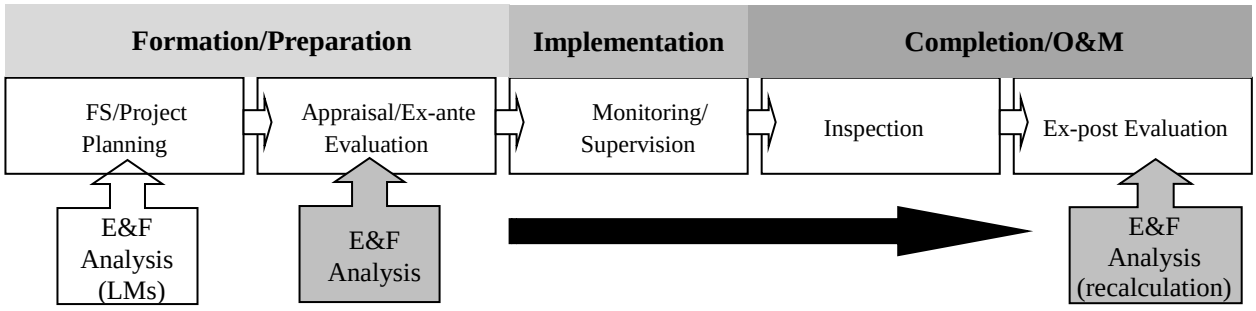


Figure 2-3: Timeline for implementation of E&F Analysis

2.2.4. Three indicators (criteria) used in E&F Analysis (NPV, IRR, B/C)

(1) Definitions and Applicability of NPV, IRR and B/C

The major task of E&F analysis is to calculate the indicators of NPV, IRR and B/C so as to assess the financial viability or economic soundness of a project. The definitions of the indicators and their applicability in E&F Analysis are summarized in the following table:

Table 2-3: Definitions and Applicability of NPV, IRR and B/C

	Definition	Investment Criteria	Major Features
NPV	NPV is used as an indicator to forecast the future cash flow of a project whereby to judge the viability of investment on this project, which is estimated by subtracting the present value of cost from that of the benefit of a project as shown by the formula below. NPV is called FNPV in financial analysis and ENPV in economic analysis. $NPV=\sum_{t=0}^{T}\left\{\frac{B_t}{(1+r)^t}\right\}-\sum_{t=0}^{T}\left\{\frac{C_t}{(1+r)^t}\right\}$	△ NPV＝0 ○ NPV＞0 × NPV＜0	Possible to compare the value of net benefit between different projects
IRR	IRR is the discount rate (DR) when the value of NPV becomes 0. In the case of EIRR, it is required to surpass the value of Social Discount Rate (SDR) of a country where the proposed project is to be implemented. IRR is called FIRR in financial analysis and EIRR in economic analysis. $IRR=r,$ when $\sum_{t=0}^{T}\left\{\frac{B_t}{(1+r)^t}\right\}-\sum_{t=0}^{T}\left\{\frac{C_t}{(1+r)^t}\right\}=0$	△ IRR＝CC ○ IRR＞CC × IRR＜CC (CC: Cost of Capital. In the case of EIRR, CC is the value of SDR.)	Possible to evaluate the efficiency or profitability of a project investment by comparing IRR with CC
B/C	B/C is used indicate the proportion of the total present value of benefit generated throughout the project period to that of the total cost. $B/C=\sum_{t=0}^{T}\left\{\frac{B_t}{(1+r)^t}\right\}/\sum_{t=0}^{T}\left\{\frac{C_t}{(1+r)^t}\right\}$	△ B/C＝1 ○ B/C＞1 × B/C＜1	Possible to compare the efficiency of investment by the value of benefit per unit of cost

Note: t=number of year, B_t=benefit in n year, C_t=cost in n year, r =discount rate, △=acceptable, ○=good, ×=bad

In the able above, CC, as a reference value for the value of IRR to be compared with, represents the value of DR for FIRR and the value of SDR for EIRR. With regard to the definition of CC and SDR, please refer to P. 7 for further details.

(2) Calculation Based on Present Value (PV) and Introduction of Time Discount

1. Time Discount

When undertaking an E&F analysis, it is needed to specify the project period so as to conduct the calculation by converting the additional cost and benefit arising from the implementation of the project within the project period into the present value using a discount rate. This work of conversion is known as "Time Discount".

For example, suppose that the bank interest rate is 10%. In this case, the amount of $1,000 will become $1,100 one year after being deposited in the bank ($1,000*1.1), and two years later it will become $1,210 ($1,100*1.1). That is to say, the amount of $1,100 one year later will become $1,000 if converted to the present value. Similarly, the amount of $1,210 two years later will also become $1,000 if converted to the present value (Figure 6). Meanwhile, in the case of $1,000 one year later, it will become $909 when converted to the present value ($1,000/1.1), and if the $1,000 is to be realized two years later, its present value will become $826 ($909/1.1). The above-mentioned bank interest rate is therefore the discount rate used for the "Time Discount".

2. DR and SDR

DR is the Cost of Capital (CC) used in an FA, while in the case of an EA, SDR is adopted, which contains the concepts of Social Opportunity Cost of Capital (SOC) and Social Rate of Time Preference (SRTP)[4]. The difference between DR and SDR is summarized in the following table:

Table 2-4: Difference between DR and SDR

	FA	EA
Name of the Rate	Discount Rate (DR)	Social Discount Rate (SDR)
Essential Concept	Cost of capital raised by the project owner	Social Opportunity Cost, Social Rate of Time Preference
Value of the Rate	Weighted Average Cost of Capital (WACC), which is the weighted average of cost of all the sources of capital paid by the project owner, including equity, bonds and any other long-term debt.	10-12% as widely used for developing countries by international assistance agencies

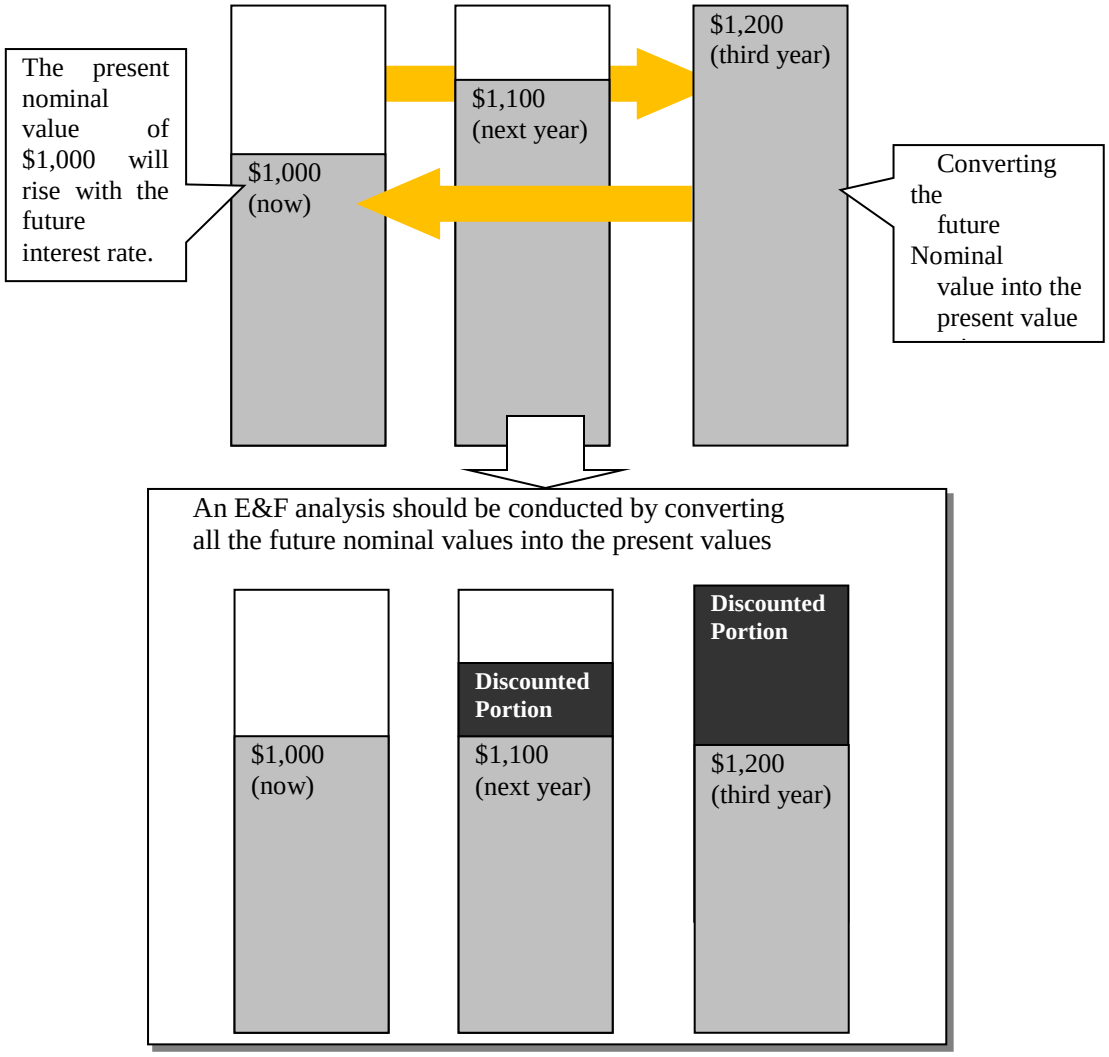


Figure 2-4: Conversion of Future Nominal Values into the Present Values

[4] "Theory and Practice in the Choice of Social Discount Rate for Cost-benefit analysis: A Survey" ERD Working Paper No. 94 of ADB, May 2007.

(3) Calculation Based on Cash Flow Table

The calculation of the afore-mentioned three indicators can be easily conducted based on a Cash Flow Table with information of cost and benefit occurring each year within the project period, which requires the following preparation works:

- Deciding on the DR (for FA) and SDR (for EA)
- Determination of the project evaluation period
- Calculation of cost and benefit directly derived from the project activities

Regarding the way of calculation based on Cash Flow Table, please refer to Pp15-16 for further details.

2.3. How to conduct Financial Analysis (FA)

To conduct an FA, the following financial costs and benefits are necessary input items.

Table 3-1: Items of Financial Cost and Benefit Necessary for an FA

Financial Cost	Financial Benefit
➢ Initial Cost (construction, design/supervision, land acquisition, administration cost) ➢ O&M Cost (Maintenance cost, administration cost)	➢ Revenue of the Project >Highway Toll (road) >Water Rate (water) >Electricity Rate (power), etc.

2.3.1. Overview of the procedure for FA

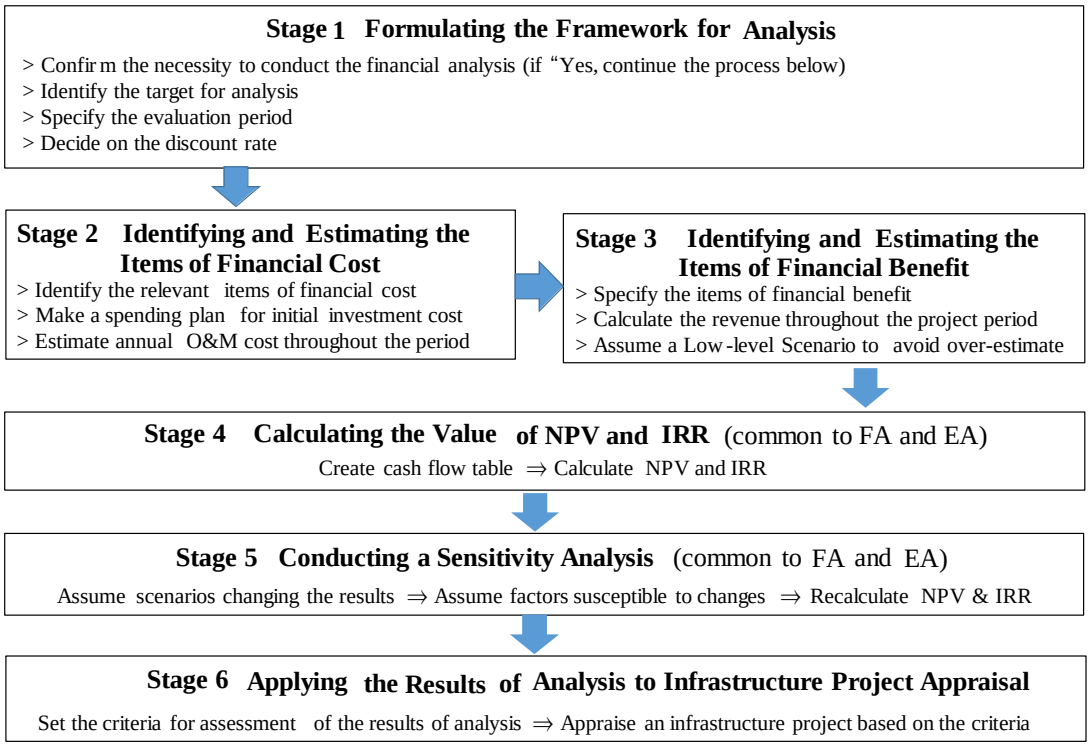


Figure 3-1: Flow Chart of the Procedure for FA

2.3.2. Stages for conducting FA

(1) **Stage 1**: Formulating the Framework for Analysis

1. Confirming the Necessity to Conduct the FA

At the very beginning of the process of E&F analysis, a choice needs to be made between the following two approaches:

- Conduct both financial analysis and economic analysis (EA).
- Conduct EA only.

The decision can be made through Q&A in the following process:

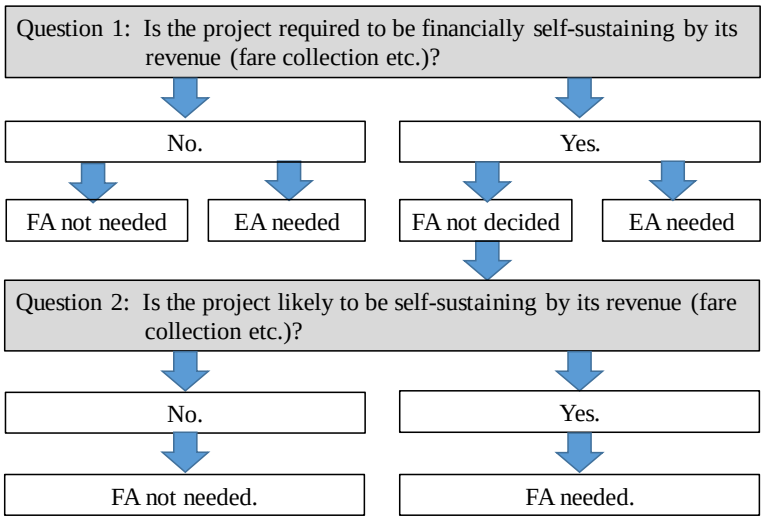


Figure 3-2: Flow Chart of Decision Making Regarding the Necessity to Conduct FA

Table 3-2: Questions to Decide the Relevant Approach for Analysis

Question	Answer	FIRR	EIRR	Relevant Sectors
1. Is the project required to be financially self-sustaining by its revenue (fare collection etc.)?	No	No	Yes	Open road, environment, etc.
	Yes	?	Yes	Water, sewage, toll road, railway, power station, airport, port, etc.
2. Is the project likely to be self-sustaining by its revenue (fare collection etc.)?	No	No	Yes	
	Yes	Yes	Yes	

<Points to Remember>

- FA is needed only when a project is required to be financially self-sustaining and is likely to be so.
- However, even in the case that only EA is needed, the estimation of financial costs is indispensable as the economic costs can be estimated only based on the values of financial costs.

2. Identifying the Target for Analysis

As far as the structure of infrastructure project is concerned, there are two types of project as below:

- A single project with the facilities installed mainly in one site
- A project group with a number of similar small-scale components scattering in different sites or with a number of components in different sectors.

The way to identify the target for analysis on a single project and a project group is summarized in the following table:

Table 3-3: The Way to Identify the Target for Analysis

Type of Project	Identification of the Target	Way of Calculation
1. A single project with the facilities installed mainly in one site	● Taking the whole project as the target.	● Specifying the cost and benefit items of the project for calculation.
2. A project group		
1) A project group with a number of similar small-scale components scattering in different sites.	● Focusing on a certain district to identify the components implemented there as the "target project group".	● Specifying the cost and benefit items of the identified "target project group" for calculation.
2) A project group with a number of components in different sectors	● In the case that a certain purpose is intended to be achieved by implementing a number of components, taking all the components as the 'target project".	● Specifying the cost and benefit items of the identified "target project" for calculation.
	● In the case that the respective components are intended for different purpose, taking them as separate "target projects".	● Specifying the cost and benefit items of the "target projects" respectively and doing the calculation separately.

3. Specifying the Evaluation Period

- Evaluation Period of an Infrastructure Project:

Construction period + in-service period (durable years or economic life of the facility)

- Durable Years of Major Infrastructure Facilities:

Figure 3-3: Estimated lifetime of infrastructure projects for E&F Analysis

	10			20		30		40		50
Agriculture Irrigation										50
Railway					25～40					
Water and Sewerage					20～30					
Road					20～30					
Flood Control							30～50			
Dam							30～50			
Harbor						25～30				
Airport					20～30					
Power Plant					20～50					
Telecommunication				20						

Source：JBIC「IRR calculation manual of Loan Project：Practice 」April, 2007

4. Deciding on the DR

In the case of FA, DR adopted for converting the future cost and benefit values into the present values and as a reference value for FIRR is usually decided with reference to the cost of capital raised by the project owner for the investment of the project. As this guideline is intended for the E&F analysis of major infrastructure projects supported solely by the Infrastructure Fund (IF) of the Timor-Leste government, the DR used for an FA should be the cost of the money from the IF, which is actually provided by the Petroleum Fund of Timor-Leste at the cost **3%**.

In the case that a project is invested by a private company, the DR should be the Weighted Average Cost of Capital (WACC), which is the weighted average of cost for all the sources of capital, including equity, bonds and any other long-term debt raised by the company. Therefore, in the case that the government project is funded with capital raised from more than one source, the DR for FA should also be the WACC. The formula for the calculation of WACC is as follows:

$$WACC = r_e \times \frac{E}{E+D} + r_d \times (1-T_c) \times \frac{D}{E+D}$$

(Where, r_e=cost of equity, r_d=cost of debt, E=market value of the company's equity, D= market value of the company's debt)

(2) **Stage 2**: Identifying and Estimating the Items of Financial Cost

1. Identifying the Relevant Items of Financial Cost

The cost items required for the calculation of FIRR for an IF project at the stage of FS are indicated in the table below.

Table 3-4: Financial cost items to be identified at FS Stage

Cost Items	Remarks
1. Initial Cost	
1.1 Construction Cost	Including machines/materials and labor cost
1.2 Design and Supervision Cost	
1.3 Administration Cost	Cost at the preparation/construction stage
1.4 Land Acquisition Cost	
2. O&M Cost	Including maintenance and operation (administration) cost

Note: 1. Land acquisition cost may not be needed for some projects.

2. Scheduling the Spending of Initial Investment Cost

The initial cost includes items of 1.1to 1.4 are the items of cost to be spent in the project preparation and construction period. The spending of initial cost should be scheduled on annual basis with reference to the information of project plan or project concept. In the case of information shortage, the scheduling can be done by simply dividing the total amount equally among the years of construction/preparation period. The following table is an example of making an initial cost spending schedule (based on information of a road and bridge construction project using yen-loan in Vietnam).

Table 3-5: Rearranging the Initial Cost into Annual Spending Items (Unit: mill. yen)

Cost Items		Financial Cost
Initial Investment Cost for Bridge Construction	Construction Cost	35,900
	Loan Commission	400
	Land Acquisition Cost	840
	Total	37,140
Initial Investment Cost for Road Construction	Construction Cost	20,700
	Administration Cost	120
	Construction Cost	1,075
	Other Cost	1,285
	Land Acquisition Cost	2,835
	Physical Contingency	6,065
	Total	32,080
Grand Total		69,220

Item		Amount	Year 1	Year 2	Year 3	Year 4	Year 5
Initial Investment Cost for Bridge Construction	Construction Cost	35,900			11,967	11,967	11,967
	Loan Commission	400			400		
	Land Acquisition Cost	840			840		
Initial Investment Cost for Road Construction	Construction Cost	20,700	6,900	6,900	6,900		
	Administration Cost	120	40	40	40		
	Consultant Cost	1,075	358	358	358		
	Other Cost	1,285	428	428	428		
	Land Acquisition Cost	2,835	2,835				
	Physical Contingency	6,065	2,022	2,022	2,022		
Grand Total		69,220	12,583	9,748	22,955	11,967	11,967

Source: Feasibility Study Report of JICA project.

3. Estimating Annual O&M Cost throughout the Project Evaluation Period

The data of O&M cost will also be the "Rough Cost" acquired from the result of cost estimation. As the data are estimated on annual basis, a spending schedule covering the whole project evaluation period needs to be worked out. Regarding the breakdown of O&M cost, although it may differ with project, the basic items normally include maintenance cost and operation (administration) cost.

When making the spending schedule, the following points warrant attention:

- There should be periodic change of maintenance cost stemming from the occurrence of medium-scale and/or large-scale repairs on a medium-term and/or long-term basis respectively in addition to the daily maintenance activities.
- Normally, the O&M cost will gradually increase with the growth of users or revenue from fare collection, which needs to be reflected in the spending schedule.

The following is an example of making a spending schedule of O&M cost throughout the project period (based on information of the same source as Table 3-5).

Table 3-6: Spending Schedule of O&M Cost (Unit: mill. yen)

Year	Operation Cost	Maintenance cost of Bridge	Maintenance cost of Road	Total O&M Cost
1	85	0	9	94
2	95	0	9	104
3	105	10	9	124
4	130	10	36	176
5	140	10	14	164
6	150	40	14	204
7	160	15	14	189
8	170	15	14	199
9	220	15	176	411
10	230	15	18	263
11	245	195	18	458
12	260	20	18	298
13	275	20	18	313
14	345	20	86	451
31	1,775	1140	45	2,960
32	1,835	50	45	1,930

Source: Feasibility Study Report of JICA project.

(3) **Stage 3**: Identifying and Estimating the Items of Financial Benefit

The Stage 3 includes the following three steps:

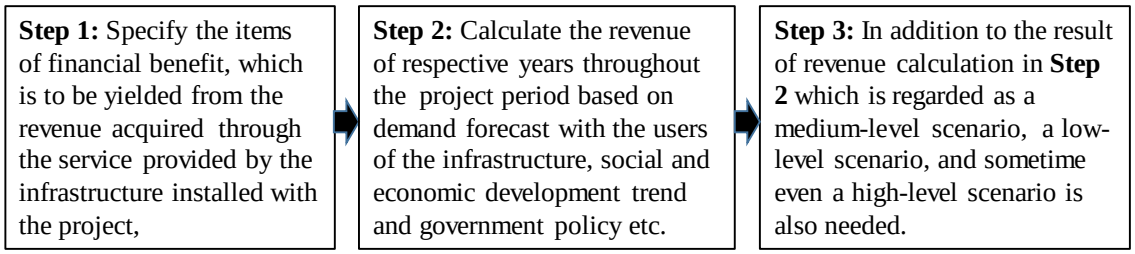


Figure 3-4: Steps of Financial Benefit Estimation

1. Specifying the Items of Financial Benefit

As previously mentioned, the infrastructure project where an FA is needed is the one that is required to be financially self-sustaining and is likely to be able to sustain by itself. Examples of this kind of projects and their respective revenue items are as below:

Table 3-7: Examples of Project Likely to be Self-sustaining and Revenue Items

Examples of Project	Assumable Revenue
Toll Road Project	Highway toll (or expressway toll)
Water Supply Project	Water rate
Power Station Project	Electricity rate

2. Calculating the Annual Revenue throughout the Project Period

The calculation of annual revenue throughout the project period usually requires the following two steps:

- Conducting a demand forecast, which is normally subcontracted to a consulting company.
- Calculating the annual revenue of each year by multiplying the value of unit price of fare by the values of quantity of demand of all the years throughout the project period.

Examples of annual revenue calculation in major sectors are indicated as below:

Table 3-8: Examples of Annual Revenue Calculation

Examples of Project	Annual Revenue
Toll Road Project	highway toll per vehicle * number of vehicles per annum
Water Supply Project	water rate per cubic meter * water consumed (cubic meter) per annum
Power Station Project	electricity rate per kWh * electricity consumed (kWh) per annum

3. Assuming a Low-level Scenario to Avoid Over-estimate

To avoid over-estimate regarding the result of demand forecast, it is necessary to assume a low-level scenario in addition to the middle-level or high-level scenario. The low-level scenario is normally assumed in the forecast of major factors influencing the future demand such as GDP growth rate, GDP per capita, population growth rate, etc.

This should be a work required of the subcontracted consulting company.

(4) **Stage 4**: Calculating the Value of NPV and IRR (Common to FA and EA)

1) Creating a Cash Flow Table

The cost and benefit data estimated through the above-mentioned stages shall be used for the creation of a cash flow table. The following is an example.

Table 3-9: Example of Calculating NPV, IRR and Other Indicators (with the DR at 10%)

	A	B	C	D	E	F	G	H	I
1		Future Value (FV)					Present Value (PV) with DR at 10%		
2	Year	Construction Cost	O&M Cost	Total Cost a	Benefit b	Net Benefit a-b	PV of Total Cost a'	PV of Benefit b'	PV of Net Benefit a'-b'
3	1	3.9	0	3.9	0	-3.9	3.5	0	-3.5
4	2	7.8	0	7.8	0	-7.8	6.4	0	-6.4
5	3	11.6	0	11.6	0	-11.6	8.7	0	-8.7
6	4	11.6	0	11.6	0	-11.6	7.9	0	-7.9
7	5	3.9	0	3.9	0	-3.9	2.4	0	-2.4
8	6	0	1.2	1.2	10.4	9.2	0.7	5.9	5.2
9	7	0	1.2	1.2	10.4	9.2	0.6	5.3	4.7
10	8	0	1.2	1.2	10.4	9.2	0.6	4.9	4.3
11	9	0	1.2	1.2	10.4	9.2	0.5	4.4	3.9
12	10	0	1.2	1.2	10.4	9.2	0.5	4	3.5
13	11	0	1.2	1.2	10.4	9.2	0.4	3.6	3.2
14	12	0	1.2	1.2	10.4	9.2	0.4	3.3	2.9
15	13	0	1.2	1.2	10.4	9.2	0.3	3	2.7
16	14	0	1.2	1.2	10.4	9.2	0.3	2.7	2.4
17	15	0	1.2	1.2	10.4	9.2	0.3	2.5	2.2
18	16	0	1.2	1.2	10.4	9.2	0.3	2.3	2
19	17	0	1.2	1.2	10.4	9.2	0.2	2.1	1.8
20	18	0	1.2	1.2	10.4	9.2	0.2	1.9	1.7
21	19	0	1.2	1.2	10.4	9.2	0.2	1.7	1.5
22	20	0	1.2	1.2	10.4	9.2	0.2	1.5	1.4
23	21	0	1.2	1.2	10.4	9.2	0.2	1.4	1.2
24	22	0	1.2	1.2	10.4	9.2	0.1	1.3	1.1
25	23	0	1.2	1.2	10.4	9.2	0.1	1.2	1
26	24	0	1.2	1.2	10.4	9.2	0.1	1.1	0.9
27	25	0	1.2	1.2	10.4	9.2	0.1	1	0.8
28	26	0	1.2	1.2	10.4	9.2	0.1	0.9	0.8
29	27	0	1.2	1.2	10.4	9.2	0.1	0.8	0.7
30	28	0	1.2	1.2	10.4	9.2	0.1	0.7	0.6
31	29	0	1.2	1.2	10.4	9.2	0.1	0.7	0.6
32	30	0	1.2	1.2	10.4	9.2	0.1	0.6	0.5
33	Total			68.8	260	191.2	35.8	58.6	22.8
34					PV of Cost	PV of Benefit	NPV	IRR	B/C
35					35.8	58.6	22.8	17%	1.6

2) Calculating the Value of NPV and IRR

- Calculation of NPV

Based on the cash flow table above, the present value of net benefit known as NPV can be worked out by subtracting the present value of total cost from that of the total benefit as illustrated by the following formula and Table 3-9.

NPV indicates the scale of a project's net profit in terms of present value, but it is not an indicator of the project's efficiency or profitability.

$$NPV=\sum_{t=0}^{T}\left\{\frac{B_t}{(1+r)^t}\right\}-\sum_{t=0}^{T}\left\{\frac{C_t}{(1+r)^t}\right\} \quad \text{or} \quad NPV=\frac{B_1-C_1}{(1+r)^1}+\frac{B_2-C_2}{(1+r)^2}+\cdots+\frac{B_n-C_n}{(1+r)^n}$$

(Where, t=number of year, B_t=benefit in t year, C_t=cost in t year, r =discount rate,)

- Calculation of IRR

IRR is the indicator showing the profitability of a project; or in other words, it serves as a criterion for the investor to judge the desirability of a project in terms of efficiency or profitability. The formula for the calculation of IRR is indicated as below, though in practice it can be calculated by using the spreadsheet of EXCEL together with NPV and other relevant indicators as shown in Table 3-9.

$$\text{IRR = r, when } \sum_{t=0}^{T}\left\{\frac{B_t}{(1+r)^t}\right\}-\sum_{t=0}^{T}\left\{\frac{C_t}{(1+r)^t}\right\}=0 \quad \text{or} \quad \frac{B_1-C_1}{(1+r)^1}+\frac{B_2-C_2}{(1+r)^2}+\cdots+\frac{B_n-C_n}{(1+r)^n}=0$$

(Where, t=number of year, B_t=benefit in t year, C_t=cost in t year, r =discount rate,)

(5) **Stage 5**: Conducting a Sensitivity Analysis (Common to FA and EA)

1) Assumption of Situations Resulting in the Change of NPV and IRR

The sensitivity analysis is conducted to simulate the effect of the change of major variants (factors) on the result of E&F analysis. The significance of sensitivity analysis lies in the fact that, although a project's cost and benefit throughout the project period are required to be estimated as precisely as possible, in reality, the existence of many uncertain factors may cause the change of cost and benefit, thus influencing the reliability of the result of E&F analysis. In this regard, it is advisable to assume several scenarios in which the result of E&F analysis may be affected and conduct calculation relevant to the respective scenarios to estimate the possible changes of the result.

2) Assumable Scenarios and Factors Susceptible to Changes

The following table summarizes the assumable types of scenario and the relevant factors susceptible to changes:

Table 3-10: Assumable types of scenario and factors susceptible to changes

Types of Scenario	Influence to Cost and Benefit	Affected Variants
1. Increase of Cost	>Increase of cost	>Total cost and annual amount
2. Extension of Project Period	>Increase of cost	>Total cost and annual amount of investment >The proportion of investment (construction) period and O&M period in the project > Total revenue/benefit and annual amount
3. Output Unrealized	>Decrease of revenue/benefit	> Total revenue/benefit and annual amount
4. Insufficient Demand	>Decrease of revenue/benefit > Increase of O&M cost	> Total revenue/benefit and annual amount > Total cost and annual amount
5. Plummet of Market Price	>Decrease of revenue/benefit	> Total revenue/benefit and annual amount
6. Hyperinflation	—	>Modification of discount rate

3) Practical Ways to Conduct a Sensitivity Analysis

In practice, various ways of sensitivity analysis are conducted by the evaluators. One of the example is to assume two cases including: a) downward revision of benefit and b) additional initial investment cost, and assume a change of 10%, 20% and 30% for the two cases occurring simultaneously as well as respectively. In this example, there are altogether 9 scenarios for sensitivity analysis as seen from the following table:

Table 3-11: Scenarios of Change in Benefit and Cost for Sensitivity Analysis

Range of Change	Scenario	Downward Revision of Benefit	Additional Initial Investment Cost
10%	1	✓	
	2		✓
	3	✓	✓
20%	4	✓	
	5		✓
	6	✓	✓
30%	7	✓	
	8		✓
	9	✓	✓

Based on the 9 scenarios assumed in Table 3-11, the sensitivity analysis is conducted by using the example of Table 3-9, and the results are indicated in the following table. The results show that the project will become economically unviable in Scenario 9, in which the downward revision of benefit and upward revision of initial investment cost together reach 30%, leading to the results that the value of EIRR becomes lower than SDR (10%), NPV falls down to less than 0, and B/C is lower than 1.

Table 3-12: Results of the Sensitivity Analysis (using the example of Table 3-9)

	Scenario	EIRR	NPV	B/C
1	Benefit -10%	16%	20	1.5
2	Initial Investment Cost +10%	15%	17	1.5
3	Benefit -10%, Initial Investment Cost +10%	14%	14	1.4
4	Benefit -20%	15%	17	1.4
5	Initial Investment Cost +20%	14%	11	1.3
6	Benefit -10%, Initial Investment Cost +20%	11%	5	1.1
7	Benefit -30%	14%	14	1.3
8	Initial Investment Cost +30%	12%	5	1.1
9	**Benefit -30%, Initial Investment Cost +30%**	**9%**	**-3**	**0.9**
Results of the Original Economic Analysis in Table 24		17%	23	1.6

(6) **Stage 6**: Setting of the value for assessment and application of the result of analysis

1) Criteria for Evaluation of FIRR

The value of FIRR is required to be compared with the Cost of Capital (CC), which is usually the rate of WACC (Refer to P.12). But in the case of infrastructure projects using Infrastructure Fund (IF) established by the Timor-Leste government, the cost of the fund is the annual interest rate of **3%**, which should be the CC for the value of FIRR to be compared with[5].

2) Utilization of the Results of FA

When using the results of FA for the investment decision making regarding an infrastructure project which is required to be financially self-sustaining, the primary concern should be the sustainability ensured by the profitability/efficiency of the project itself. In this regard, the value of FIRR should come first to be used in the investment decision making. The basic standards for judgment is as below:

FIRR＝CC	(Acceptable, but not desirable)
FIRR > CC	(Desirable, and the larger the value, the higher the desirability)
FIRR < CC	(Not suitable for investment)

As the second step, NPV will be used to assess the size of net benefit/profit yielded by the investment on the infrastructure project. The basic standards for judgment in this case are as below:

NPV＝0	(Acceptable, but not desirable)
NPV＞0	(Desirable, and the larger the value, the higher the desirability)
NPV＜0	(Not suitable for investment)

[5] This value is subject to change. Also, in the case that the government project is funded with capital raised from more than one source, the discount rate used for FA should also be the WACC.

2.4. How to conduct Economic Analysis (EA)

As EA is needed for all the infrastructure projects owing to their public nature in which their impacts extend beyond the project owners themselves, this section is intended to explain the way of conducting an EA by comparing its differences from FA.

To conduct an EA, the following economic costs and benefits are necessary input items.

Table 4-1: Items of Economic Cost and Benefit Necessary for an EA

Economic Cost	Economic Benefit
The following items of financial cost need to be adjusted: >Construction Cost (***VAT and import duty on imported goods subtracted, followed by adjustment with Shadow Prices***) >Design/Supervision, Administration, Land Acquisition (***VAT subtracted, followed by adjustment with Shadow Prices***) >O&M Cost (***VAT and import duty on imported goods subtracted, followed by adjustment with Shadow Prices***) >Opportunity Cost of Externalities (if any)	Benefit items are identified from the following two perspectives: >Incremental Analysis (***Compare cases of with and without***) >Ripple Effect Analysis (***Indirect benefit resulted from the generation of direct benefit, mostly unquantifiable***)

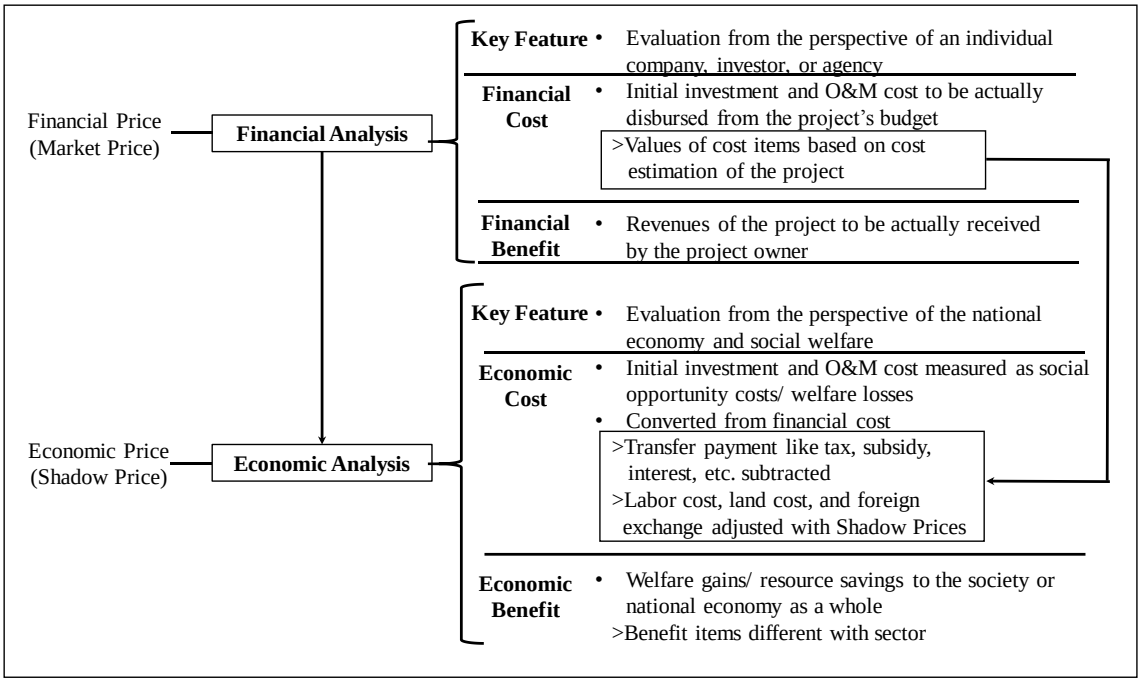


Figure 4-1: The Difference and Relation between EA and FA in Costs and Benefits

2.4.1 Overview of the procedure for EA

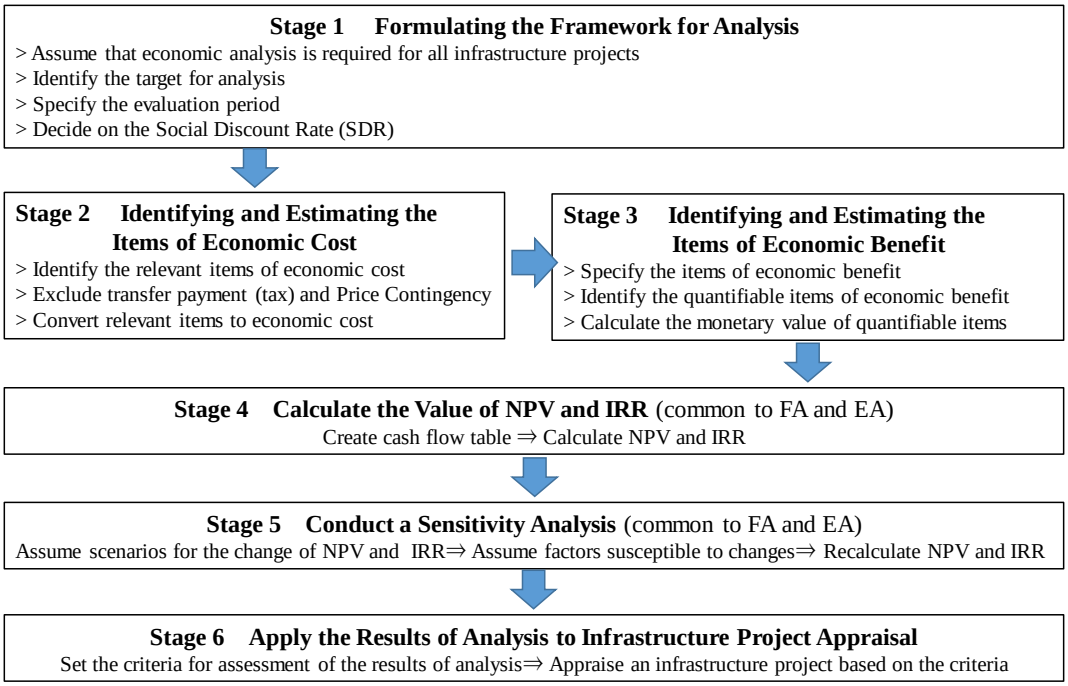


Figure 4-2: Flow Chart of the Procedure for EA

2.4.2. Stages for conducting EA

(1) **Stage 1**: Formulating the Framework for Analysis

1) Assuming That EA Is Required for All Infrastructure Projects

As previously mentioned, EA is necessary for all infrastructure projects due to their public nature and their impacts extending beyond the project owners themselves.

2) Identifying the Target for Analysis

Please refer to Table 3-3 for detail information.

3) Specifying the Evaluation Period

Please refer to P.11 for detail information.

4) Deciding on the SDR

As mentioned in Table 2-4 on P.7, the value of 10-12% has been adopted by most of the international assistance agencies for projects in developing countries in general, though some countries worked out their own values of SDR. Here in Timor-Leste, the value of SDR is assumed to be 12% with reference to the ADB projects.

(2) **Stage 2**: Identifying and Estimating the Items of Economic Cost

<Normal Way to Identify and Estimate Economic Cost>

Normally, the economic cost items are required to be identified and estimated through the following steps:

- Identify the Economic Cost Items with Reference to the Financial Cost Items
- Subtract the Values of Transfer Payment (import duty and VAT) from the Financial Cost
- Convert the Relevant Items of Financial Cost to Economic Cost with Respective Conversion Factors (CFs)
- Identify the Externalities (if any) as Economic Cost

The specific process of the Normal Way is as below.

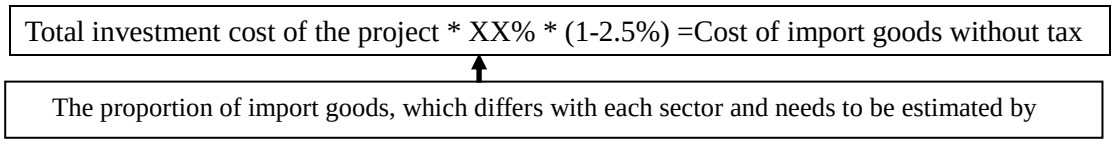
1) Identifying the Relevant Items of Economic Cost

The items of economic cost are basically the same as that of financial cost, except in the case where an "externality" is foreseen and needs to be counted as an additional item of economic cost. Therefore, the information in Table 3-5 is of reference here, although normally adjustments by excluding transfer payment and shadow pricing as mentioned below are required.

2) Excluding Transfer Payment

Transfer Payment is a term used in EA, including tax, interest, etc. Although in FA they are regarded as the cost of the project owner, they cannot be regarded as the cost of the national economy in EA as they are simply transferred to some other parts of the national economy. Therefore, they should be excluded from the economic cost to avoid over-estimate of the cost.

In Timor-Leste, currently the item relevant to this term is only the import duty, which is at the rate of 2.5% of the customs value, though the levying of VAT is under consideration. Therefore, the cost of imported goods contained in "machinery and material cost" under the item of "Construction Cost" in Table 3-5 needs to be picked out so as to remove the import duty already imposed on it. The way of this adjustment is as follows:



3) Converting the Relevant Items to Economic Cost

When conducting an EA, a financial cost item may need to be converted into economic cost item by a certain Conversion Factor (CF) so as to adjust for the influence from the government intervention (tax, price control, subsidy etc.) and market distortions (labor market distortion etc.). This process is known as Shadow Pricing and these CFs include the Standard Conversion Factor (SCF), Shadow Exchange Rate Factor (SERF), Shadow Wage Rate Factor (SWRF) and so on. For further details of these CFs, please refer to Appendix 4.

In addition, there are two ways of price numeraire to be adopted in an EA, i.e. the world price numeraire and domestic price numeraire, meaning international price level and domestic price level respectively. The way of converting the relevant cost items to economic cost differs with the way of price numeraire adopted. The following table summarized the differences between the two ways of price numeraire regarding the way of converting the financial cost into economic cost:

Table 4-2: Differences between the Two Ways of Price Numeraire

Relevant Items	Using World Price Numeraire	Using Domestic Price Numeraire
Traded Goods	Border Price	Border Price * SERF
Non-traded goods	Domestic price * SCF	Domestic price
Skilled Labor	Official wage rate at domestic price * SCF	Official wage rate at domestic price
Unskilled Labor	Official wage rate at domestic price * SWRF * SCF	Official wage rate at domestic price * SWRF

Note: 1. Border Price also called Reference Price, which is the import (CIF) or export (FOB) price of a commodity used for calculating the gap between market price and support price.
2. For the definition of SCF and SERF, please refer to Appendix 3
3. In the case of using SCF as the conversion factors to convert the values of non-traded goods and labor into Economic price, the values on the benefit side (normally regarded as non-traded goods & services) also need to be adjusted with SCF.

The two ways of price numeraire can be further illustrated by the two figures below.

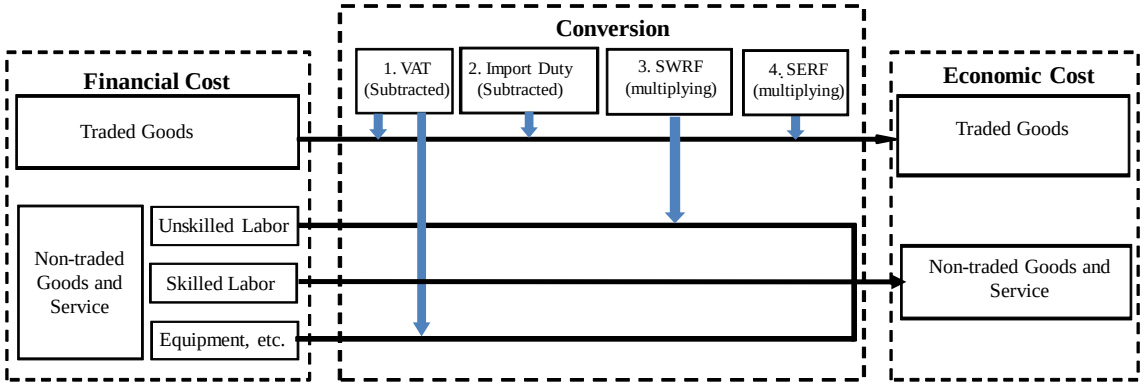


Figure 4-3 Converting Financial Cost to Economic Cost in the Case Using Domestic Price Numeraire

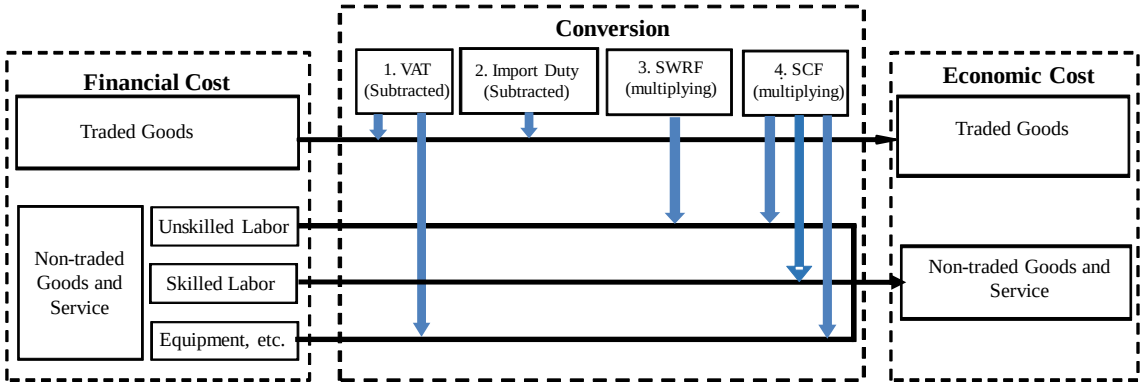


Figure 4-4: Converting Financial Cost to Economic Cost in the Case Using World Price Numeraire

In Timor-Leste, though the US dollar is adopted as the legal currency, which can be regarded as the domestic currency, there are still the two ways of price numeraire to choose for an EA and the above mentioned SCF and SERF are needed to convert the non-traded or traded goods and service into economic price owing to the existence of import duty and export subsidy. The values of SCF and SERF for Timor-Leste need to be calculated based on import and export data etc. by the way described in Appendix 2.

In the case of labor market, as the unemployment rate in Timor-Leste is very high, and the higher unemployment rate means lower SWRF due to the fact that the more surplus labor will result in the cheaper opportunity cost of labor resource from the perspective of the national economy. Therefore, the value of SWRF for unskilled labor in Timor-Leste should be much lower than 1.0, but the appropriate value needs to be decided through identifying the actual minimum wage of the informal sectors and dividing it by the statutory minimum wage (Please refer to Appendix 2 for details).

4) Counting the Externalities as Economic Costs

During an EA, in addition to the items converted from the financial cost, any other opportunity cost caused by the implementation of the project viewed as the loss of resource of the national economy also needs to be counted as the economic cost item.
A typical example is a project in the water sector, where the existing agricultural water is to be converted into potable water, but the value of crop yield using the agriculture water in the "Without Case" should be counted as the economic cost.
Similarly, in the power sector, air pollution incurred by a thermal power project, and forest destruction or damage of downstream fisheries caused by a hydro power project are required to be counted as economic costs.

An opportunity cost of this kind can be defined as an "externality" in economics, which means the cost or benefit that affects a party who did not choose to incur that cost or benefit. Most externalities fall into the category of so-called "technical externalities"; that is, their indirect effects have an impact on the consumption and production opportunities of others, but the price of the product does not take these externalities into account. As a result, there are differences between private returns or costs and the returns or costs to society as a whole.

Therefore, in an EA, these externalities should be taken into consideration, and as their effects can be either positive (benefit) or negative (cost), the positive externalities should be counted as economic benefits, while the negative ones as costs.

< Simple Way to Identify and Estimate Economic Cost>

The problem of lack of information about the breakdown of project cost at the stage of FS makes it difficult to estimate the proportion of imported goods and unskilled labor to total cost so as to convert the values to economic price.

A possible solution for this is to estimate the values of proportion for these two items by sector based on past experiences in implementation of infrastructure projects in Timor-Leste. However, the lack of a database with accumulation of project information in the past as well as the fact that even two different projects may differ from each other in the values of these proportions constitute the additional problems to be solved.

In light of the above-mentioned, as a measure of convenience at the present stage, the values of economic costs are regarded as approximately equal to that of the financial costs, considering also the fact that the results of trial calculation based on past experiences in some of the IF projects show that the total value of economic cost differs from that of total financial cost by not more than a few percent, provided that no other social opportunity cost incurred.

Such a "Simple Way" is thus adopted to simplify the complicated procedure of the above-mentioned "Normal Way" as indicated by the following table:

Table 4-2: Difference between "Normal Way" and "Simple Way" in Economic Cost Identification and Estimation

Step	Normal Way	Simple Way
1	Identify the economic cost items with reference to the financial cost items	Same as the Normal Way
2	Subtract the values of transfer payment (import duty and VAT) from the financial cost	Skip this step
3	>Convert the values of imported goods and unskilled labor cost into economic price with respective conversion factors (SERF and SWRF); >Or, convert the values of domestic goods and labor cost and the value of unskilled labor with SWRF into economic price respectively.	Skip this step
4	Identify the "Externalities" as economic cost if any	Same as the Normal Way
5	Schedule the spending of economic initial investment cost	
6	Schedule the spending of economic O&M cost	

<Point to Remember>

The "Simple Way" is acceptable temporally as a measure of convenience to cope with the difficulty in estimating the breakdown of project cost for converting the values of financial cost into the economic cost at the present stage. So long as the problem preventing proper estimation of the breakdown of project cost can be solved (e.g., construction of a database with accumulation of project information in the past is one of the efforts made by MPS to solve problems of this kind), the "Normal Way" should be regarded as the only way acceptable.

The following two steps in scheduling the spending of economic O&M cost are common to both the Normal Way and the Simple Way:

1) Scheduling the Spending of Economic Initial Cost

The way of scheduling the spending of economic initial investment cost is the same as that of the financial initial cost as indicated in Table 3-5 on P.13.

2) Scheduling the Spending of Economic O&M Cost

The way of scheduling the spending of economic O&M cost is the same as that of the financial O&M cost as illustrated in Table 3-6 on P.13.

(3) **Stage 3**: Identifying and Estimating the Items of Economic Benefit

The calculation of ENPV and EIRR is conducted under the premise that a cost is a factor that results in the decrease of national income whereas a benefit is a factor that give rise to the increase of national income. In this regard, the benefit in EA is different from that in the FA.

The basic steps of economic benefit estimation are as follows:

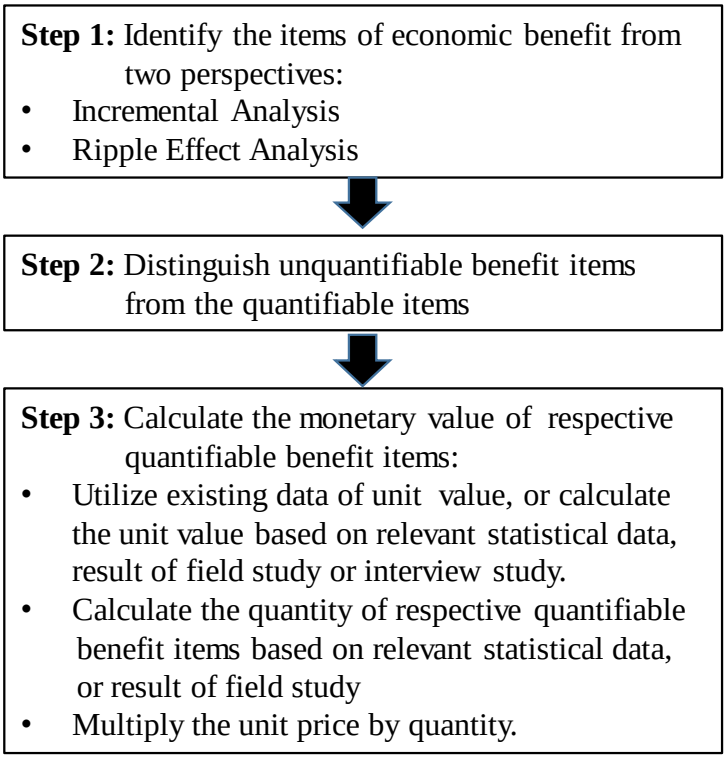


Figure 4-6: Steps of Economic Benefit Estimation

1) **Step1**: Identifying the Items of Economic Benefit from Two Perspectives

- Incremental Analysis

From the incremental analysis perspective, the economic benefit can be identified by comparing the difference between "With" and "Without" the project, which is regarded as either an additional benefit or a cost reduction. Regarding the concept of incremental analysis and "With" and "Without", please refer to Appendix 1 for further details.

- Ripple Effect Analysis

Ripple Effect refers to the impacts resulted from the direct benefit of the project. Examples of this includes positive environmental impacts, regional economic development promotion, etc., which are the benefit items belong to the second-order effect of the project, arising from the generation of the above-mentioned direct benefit of the project.

Examples of economic benefit identified from the above-mentioned two perspectives in major sectors are listed in the following table:

Table 4-3: Examples of benefit items identifications

Sector	Benefit	Quantifiable	Quantifiable with Limitation	Hard to Be Quantified	Perspective
Road	>Travel time reduction	✔			I
	>Travel cost reduction (or Fuel cost reduction)	✔			I
	>Reduced maintenance cost	✔			I
	>Traffic accident reduction		✔		I
	>CO_2 emission reduction		✔		R
	>Air pollutant emission reduction		✔		R
	>Stimulation of economic development			✔	R
	>Increase of local people's income		✔		R
Water Supply	>Cost reduction compared with alternative water source	✔			I
	>Incremental water consumption (WTP)	✔			I
	>Resource conservation		✔		I
	>Prevention of damage by the water outage		✔		R
	>Decline of diseases related to tap water		✔		R
	>Generation of new industries			✔	R
Power	>Cost reduction compared with alternative power source	✔			I
	>Incremental electricity consumption (WTP)	✔			I
	>Resource conservation		✔		I
	>Prevention of damage by the power outage		✔		R
	>CO_2 emission reduction	✔		✔	R
	>Air pollutant emission reduction			✔	R
	>Generation of new industries				R

Note: I= Incremental Analysis perspective, R= Ripple Effect perspective.

2) **Step 2**: Distinguishing Unquantifiable Benefit Items from the Quantifiable Items

As indicated by the table above, while the benefit items identified from the perspective of Incremental Analysis are basically quantifiable, those identified from the Ripple Effect perspective are mostly unquantifiable. Therefore, the unquantifiable benefit items need to be distinguished from the quantifiable so as to exclude them from the calculation of EIRR and NPV and treat them as objectives of qualitative analysis.

3) **Step 3**: Calculating the Monetary Value of Respective Quantifiable Benefit Items

The process for calculating the monetary value of the respective quantifiable benefit items includes the following three steps, and some of the unit values and data of annual quantity regarded as important for the major infrastructure sectors are also listed below.

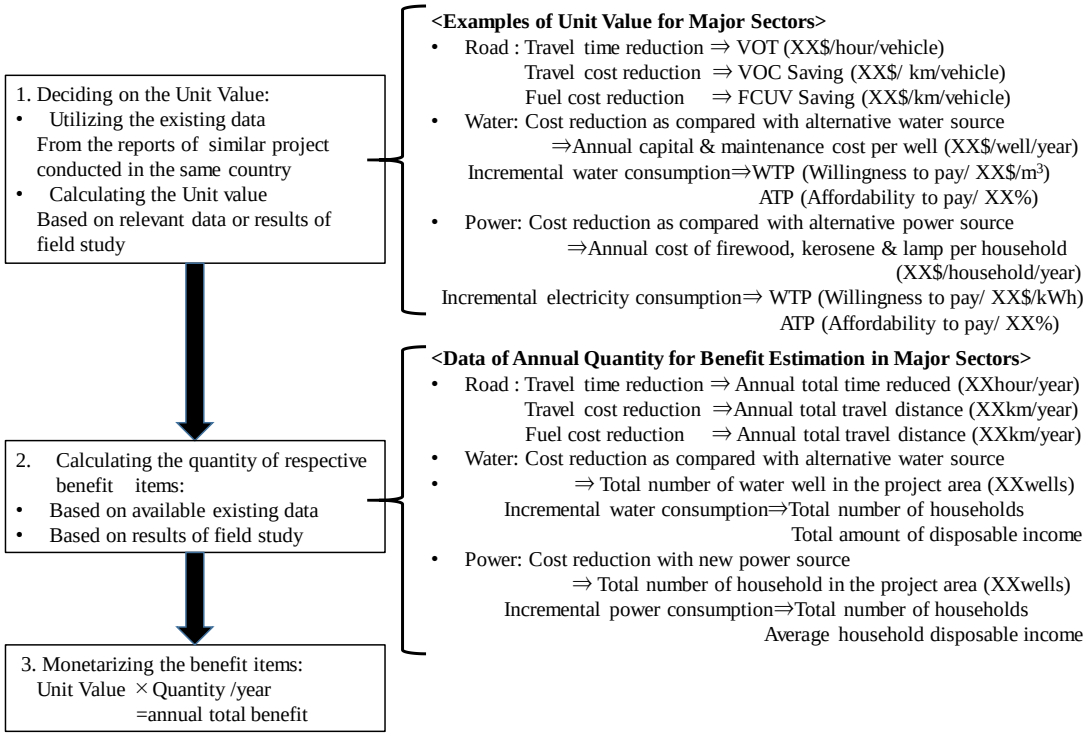


Figure 4-7: Process for the Calculation of Monetary Value of Benefit Items

As the specific way to calculate the monetary value of benefits differs with the sector, please refer to P.28-32, 35-36, and 38-46 for examples in road, water and power sector.

(4) **Stage 4**: Calculating the Value of ENPV and EIRR
Please refer to P.15-16 for details.

(5) **Stage 5**: Conducting a Sensitivity Analysis
Please refer to P.16-17 for details.

(6) **Stage 6**: Reference Values for Assessment and Application of the Result of EA

1) Criteria for Evaluation of EIRR

The value of EIRR is required to be compared with the value of SDR, which is set by the World Bank and ADB as 10-12% for projects implemented in the developing countries. In Timor-Leste, this value is assumed to be 12% with reference to infrastructure projects sponsored by the international assistance agencies.

2) Utilization of the Results of EA

When using the results of EA for the investment decision making regarding an infrastructure project, the primary concern is how much the additional benefit will be generated and how great will the positive impact on the society be produced by the investment on the project. In this regard, the value of ENPV should come first to be used in the investment decision making, which is considered the first step for the decision making. The basic standards for judgment is as below:

ENPV＝0	(Acceptable, but not desirable)
ENPV＞0	(Desirable, and the larger the value, the higher the desirability)
ENPV＜0	(Not suitable for investment)

As the second step, EIRR will be used to assess the efficiency of the investment on the infrastructure project. The basic standards for judgment in this case are as below:

EIRR＝SDR=**12%**	(Acceptable, but not desirable)
EIRR > SDR=**12%**	(Desirable, and the larger the value, the higher the desirability)
EIRR < SDR=**12%**	(Not suitable for investment)

In addition to the aforementioned quantitative economic cost and benefit items and the results of calculation, those unquantifiable cost and benefit items also need to be mentioned and analyzed qualitatively in the EA report, and the effects of this part need to be incorporated into the conclusion of the report.

2.5. Examples of applying the Guideline for E&A Analysis

2.5.1 Application of the Guideline for EA to Road Sector Projects

(1) Inputs Needed for an EA on a Road Sector Project

Values of the following economic cost and economic benefit items are needed for the calculation of EIRR and NPV for a project in the road sector during an EA.

Table 5-1: Economic Cost and Benefit Items Necessary for an EA in the Road Sector

Economic Cost	Economic Benefit
In the case of "Simple Way", the major economic cost items are regarded as approximately the same as financial costs without need for adjustment: ➢ Initial Cost > Construction Cost > Design and Supervision Cost > Land Acquisition Cost > Administration Cost (at preparation/construction stage) ➢ O&M Cost > Maintenance Cost > Administration Cost ➢ Opportunity Cost of Externalities (if any)	Benefit items are identified from the following two perspectives: ➢ Incremental Analysis (compare cases of "with" and "without") >Reduced Vehicle Operation Cost (VOC) (diverted traffic from old road and from other mold of transport, generated new traffic, traffic in the old road) >Time Savings using unit value of time (VOT) > Reduced Maintenance Cost >Accident Reduction ➢ Ripple Effect Analysis (indirect benefit resulted from the generation of direct benefit) >CO_2 Emission Reduction >Air Pollutant Emission Reduction >Stimulation of Economic Development

Source: Created by JICA adviser.

(2) How to Identify and Estimate the Relevant Items of Economic Cost

Given the lack of information regarding the breakdown of project cost at the stage of FS stage, it is acceptable to identify and estimate the economic cost items using the "Simple Way" as below.

1) Making a List of Financial Cost Items Based on Result of Cost Estimation

The relevant items of economic cost can be decided based on the existing information of financial cost acquired from the result of rough cost estimation. The values of financial cost items can be approximately regarded as economic cost values without adjustment.

2) Identifying Possible Opportunity Cost of Externality

In addition to the above-mentioned items identified based on the result of rough cost estimation, attention also needs to be paid to the issue of environmental and social considerations to see whether there exists the possible opportunity cost of externality such as the environmental damage or ecosystem disruption likely to be caused by the implementation of the road project, and to figure out the possibility to quantify this externality. If it is quantifiable, this item should be added to the economic costs.

(3) How to Schedule the Spending of the Project's Economic Cost

1) Scheduling the Spending of Initial Investment Cost

The spending schedule of the initial investment cost should be made on annual basis with reference to the information of project plan or project concept. In the case of information shortage, the scheduling can be done by simply dividing the total amount of initial investment cost by the number of years of the construction/preparation period.
Please refer to Table 3-5 on P.13 for specific example.

2) Scheduling the Spending of O&M Cost throughout the Project Evaluation Period

When making a spending schedule of O&M cost, the following points are to be borne in mind:

- There should be periodic change of maintenance cost stemming from the occurrence of medium-scale and/or large-scale repairs on a medium-term and/or long-term basis respectively in addition to the daily maintenance activities.

- Generally, the O&M cost will gradually increase with the growth of users or revenue from fare collection, which needs to be reflected in the spending schedule..

Regarding the above-mentioned points of concern, please refer to Table 3-6 on P.13 for specific example.

(4) How to Identify and Estimate Economic Benefits for EIRR Calculation

1) Identifying the Items of Economic Benefit from Two Perspectives

- The Perspective of Incremental Analysis

From the incremental analysis perspective, the economic benefit can be identified by comparing the difference between "With" and "Without" the project, which can be either an additional benefit/value or a cost reduction. Regarding the concept of incremental analysis and "With" and "Without", please refer to Appendix 1 for further details.

- The Perspective of Ripple Effect Analysis

Ripple Effect refers to the impacts resulted from the direct benefit of the project. Examples of this include environmental impacts, regional economic development promotion, etc., which are the benefit items belong to the second-order effect of the project, arising from the generation of the above-mentioned direct benefit of the project.
The economic benefits typically found in the road sector consist of the following items. Among them, Reduced Vehicle Operation Cost, Time Savings and Reduced Maintenance Cost are regarded as quantifiable.

Table 5-2: Benefit Items for Projects in the Road Sector

Perspective	Benefit Item	Details	Quantifiability		
			Quantifiable	Quantifiable with Limitation	Hard to Be Quantified
Incremental Analysis	Reduced Vehicle Operation Cost (VOC)	>Diverted traffic from old road >Diverted traffic from other mold of transport (railway, etc.) >Generated new traffic >Traffic in the old road	✔		
	Time Savings	>Time savings for Passengers >Time savings for freight	✔		
	Reduced Maintenance Cost	>Road maintenance cost reduction	✔		
	Accident Reduction	>Property damage >Personal injuries >Fatalities		✔	
Ripple Effect Analysis	CO_2 Emission Reduction	>A result of fuel reduction		✔	
	Air Pollutant Emission Reduction	>A result of fuel reduction		✔	
	Economic Development Stimulation	>A result of all the benefits found in the incremental analysis			✔

Source: Created by JICA adviser based on various feasibility study reports.

2) Calculating the Monetary Value of Respective Quantifiable Benefit Items

- Process of Calculation

The process for calculating the monetary value of the quantifiable benefit items basically includes the following three steps:

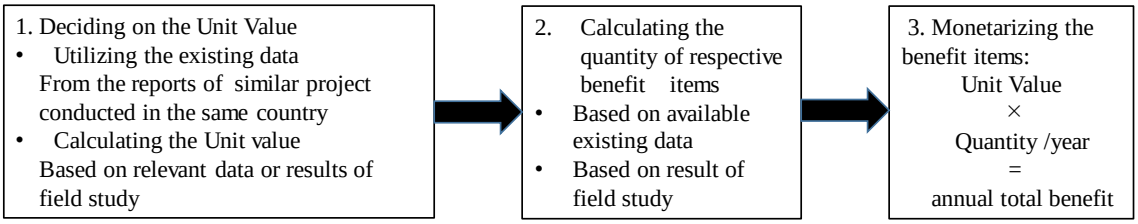


Figure 5-1: Process for Calculating the Monetary Value of the Quantifiable Benefits

- Identifying Alternatives in the Without Case for Comparison with the With Case

The calculation of quantifiable economic benefits necessitates the assumption of alternatives in the Without Case for comparison. These alternatives for respective benefit items of road projects are summarized as follows.

Table 5-3: Alternatives in the Without Case for Comparison with the With Case

Benefit Items	Sub-items	Alternatives in the Without Case
Reduced VOC	For diverted traffic from old road*	VOC on the old road (compared with that of the new road, with the difference regarded as the benefit)
	For normal traffic**	VOC on the unimproved road (compared with that of the improved road, with the difference regarded as the benefit)
	For generated traffic***	VOC on the old road or unimproved road (compared with that of the new road or improved road, with the difference to be halved and regarded as the benefit)
Time Saving	For diverted traffic from old road*	VOT on the old road (compared with that of the new road, with the difference regarded as the benefit)
	For normal traffic**	VOT on the unimproved road (compared with that of the improved road, with the difference regarded as the benefit)
	For generated traffic***	VOT on the old road or unimproved road (compared with that of the new road or improved road, with the difference to be halved and regarded as the benefit)
	For traffic remaining on old road*	VOT on the old road without the project (compared with that of the old road with the project, with the difference regarded as the benefit)
Reduced or Eliminated cost of Maintenance***		Maintenance cost of the old road or unimproved road (compared with that of the new road or improved road, with the difference regarded as the benefit))

Note: 1. * refers to new road construction project.
2. ** refers to road improvement project.
3. *** refers to both new road construction project and road improvement project.
Source: Created by JICA adviser based on various feasibility study reports.

- Way of Calculation for Respective Benefit Items

The way of calculation for respective benefit items are as follows:

Table 5-4: Way of Calculation for Respective Benefit Items in Projects of Road Sector

Project Type	Benefit Items	Estimating the Unit Value of Benefit (a)	Estimating the Annual Total Quantity Relevant to Benefit (b)	Calculation of the Monetary Value (c)
New Road Construction	Reduced VOC	For diverted traffic from old road: $>VOC_{to}–VOC_{tn}=a_1$ ($XX/$V_t$/km) $> VOC_{bo}–VOC_{bn}=a_1$ ($XX/$V_b$/km) $> VOC_{co}–VOC_{cn}=a_1$ ($XX/$V_c$/km) ($t_o$, t_n=truck on old and new road, b_o, b_n=bus on old and new road, c_o, c_n=car on old and new road, V_t=truck, V_b=bus, V_c=car)	$> NV_t * 360 * D_n = b_1$ (XX km/y) $> NV_b * 360 * D_n = b_2$ (XX km/y) $> NV_c * 360 * D_n = b_3$ (XX km/y) (NV_t, NV_b, NV_c=number of truck, bus and car)	
		For generated traffic: $>VOC_{to}–VOC_{tn}=a_1$ ($XX/$V_t$/km) $> VOC_{bo}–VOC_{bn}=a_1$ ($XX/$V_b$/km) $> VOC_{co}–VOC_{cn}=a_1$ ($XX/$V_c$/km)	(1/2 of the result using the same way of calculation as in diverted traffic) $> NV_t * 360 * D_n/2 = b_1$ (XX km/y) $> NV_b * 360 * D_n/2 = b_2$ (XX km/y) $> NV_c * 360 * D_n/2 = b_3$ (XX km/y)	
	Time Savings	The unit value of time (VOT) for drivers of bus/truck, and for passengers of bus/car: >Truck: $VOT_{dt} * N_{dt}/V_t = a_1$ ($XX/$V_t$/h) >Bus: $VOT_{db} * N_{db}/V_b + VOT_{pb} * N_{pb}/V_b = a_2$ ($XX/$V_b$/h) >car: $VOT_{pc} * N_{pc}/V_c = a_3$ ($XX/$V_c$/h) ($N_{dt}$=number of driver per truck, N_{db}=number of driver per bus N_{pb}= number of passenger per bus N_{pc}= number of passenger per car)	For diverted traffic from old road: $> (T_o-T_n) * NV_t * 360 = b_1$ (XX h/y) $> (T_o-T_n) * NV_b * 360 = b_2$ (XX h/y) $> (T_o-T_n) * NV_c * 360 = b_3$ (XX h/y) (T_o=travel time on old road, T_n= travel time on new road) For generated traffic (1/2 of the result using the same way of calculation as in diverted traffic): $> (T_o-T_n) * NV_t * 360/2 = b_1$ (XX h/y) $> (T_o-T_n) * NV_b * 360/2 = b_2$ (XX h/y) $> (T_o-T_n) * NV_c * 360/2 = b_3$ (XX h/y) For traffic remaining on old road: $> (T_1-T_2) * NV_t * 360/2 = b_1$ (XX h/y) $> (T_1-T_2) * NV_b * 360/2 = b_2$ (XX h/y) $> (T_1-T_2) * NV_c * 360/2 = b_3$ (XX h/y) (T_1= travel time on old road before T_2= travel time on old road after)	$a_1*b_1 + a_2*b_2 + a_3*b_3 = c$ ($XX in the 1st year) (work out c of the subsequent years based on forecast of the growth rate of traffic volume)
Road Improvement	Reduced VOC	For normal traffic: The same as the diverted traffic from old road	The same as the diverted traffic from old road	
		For generated traffic: The same as generated traffic in the case of New Road Construction	The same as generated traffic in the case of New Road Construction	
	Time Savings	The unit value of time (VOT) for drivers of bus/truck, and for passengers of bus/car: a_1, a_2 and a_3 are the same as the case of New Road Construction.	For normal traffic on new road: $> (T_o-T_n) * NV_t * 360 = b_1$ (XX h/y) $> (T_o-T_n) * NV_b * 360 = b_2$ (XX h/y) $> (T_o-T_n) * NV_c * 360 = b_3$ (XX h/y) For generated traffic (1/2 of the result using the same way of calculation as in normal traffic): $> (T_o-T_n) * NV_t * 360/2 = b_1$ (XX h/y) $> (T_o-T_n) * NV_b * 360/2 = b_2$ (XX h/y) $> (T_o-T_n) * NV_c * 360/2 = b_3$ (XX h/y)	
	Reduced or Eliminated cost of Maintenance	$M_o – M_n = a$ ($XX/km) ($M_o$=maintenance cost of old road, M_n=maintenance cost of new road)	Total extension of the road = b (XX km)	a*b* = c ($XX in the 1st year) ➡ increase in subsequent years

Note: The rate of diverted traffic from the old road to the new road, the rate of reduction in VOC on the old road resulted from the easing of congestion, and the rate of generated traffic need to be decided case by case based on the result of traffic study.

Source: Created by JICA adviser based on various feasibility study reports.

3) Further Details about the Calculation of Economic Benefits in the Road Sector

<Input Items Essential for the Estimation of Economic Benefits>

- Vehicle Operating Cost (VOC)
- Value of Time (VOT) for Passenger and Freight

<Demand Forecast>

In addition to the above-mentioned input items, the following data are also necessary for the estimation, which can be acquired only by demand forecast (conducted by professional consulting companies).

- Total Vehicle Travelling Time
- Total Vehicle Travelling Distance
- Average Passenger Number by Vehicle Type
- Passengers' Purpose of Trip
- Quantity of Freight by Item

With the above data, the total cost of travelling time for passenger and freight as well as total VOC can be calculated. However, as the calculation of VOC of respective countries involves too many variables, it is usually conducted by professional consultants/researchers using special software.

< The Benefit of Reduced VOC>

The benefit of Reduced VOC can be acquired by comparing the difference between the "With" case and "Without" case in various situations mentioned in the table above, where the VOC with the project is verified to be smaller than that of other alternatives without the projects. The following points cover the major issues of this benefit item.

- Assuming Alternatives in the "Without" Case for Comparison

As the alternatives in the "Without" case may differ with the project type, two basic types of road project are considered regarding the benefit of reduced VOC as follow.

- Project of New Road Construction

In this type of project, the "Without" case may include the following four alternatives for the "With" case to be compared with:

> VOC of Vehicles Travelling on the Old Road (for diverted traffic from the old road)

> Cost of Other Transport Molds (for diverted traffic from other transport molds)

> VOC of Vehicles Travelling on the Old Road
(for generated traffic on the new road which is assumed not to be100% resulted from the road project itself as some other factors like economic development including investment in industry or agriculture may contribute to it)

>VOC of Vehicles Travelling on the Old Road
(for the remaining traffic on the old road, which is assumed to be improved with the congestion eased as a result of the construction of the new road)

Table 5-5: Benefit of Reduced VOC in the Project of "New Road Construction"

Case	Diverted traffic from the old road	Diverted traffic from the other transport molds	Generated traffic on the new road	Traffic on the old road
Without	VOC on the old road	Cost with the other transport mold	VOC on the old road	VOC on the old road
With	VOC on the new road	VOC on the new road	VOC on the new road	VOC with the congestion easing
Benefit	Without-With	Without-With	(Without-With)/2	Without-With

- Project of Road Improvement

The benefit of Reduced VOC resulted from his type of project can be identified by comparing the "With" case with the following two alternatives of "Without" case:

>VOC on the same road without the project (for normal traffic, i.e. the kind of traffic which would have taken place on the existing facility in any case, even without the new investment)

>VOC on the same road without the project (for generated traffic on the new road which is assumed not to be100% resulted from the road project itself but from other factors like economic development including investment in industry or agriculture)

Table 5-6: Benefit of Reduced VOC in the Project of "Road Improvement"

Case	Normal traffic on the new road	Generated traffic on the new road
Without	VOC on the same road without the project	VOC on the same road without the project
With	VOC on the new road	VOC on the new road
Benefit	Without-With	(Without-With)/2

<The Benefit of Time Savings>

The benefit of time savings can be acquired also by comparing the difference of travelling time between the "With" case and "Without" case.

- Estimating the Unit Value of Time (VOT)

The estimation of VOT is generally conducted in the following two ways:

Table 5-7: Two Ways of VOT Estimation

Way of Estimation	Description
Income Estimation	➢ Estimate the time value of transport service users based on their wage level, household income or GDP per capita, etc. ➢ Take into account the difference of users' income strata by vehicle type
WTP Verification	➢ Estimate the time value of users by verifying the maximum amount of money they are willing to pay for the saving of one hour. ➢ Conduct a questionnaire survey using the Contingent Valuation Method (CVM) to confirm the Willingness to Pay (WTP) of the users

Note: For further details about CVM and WTP, please refer to Attachment 3

- Verifying the Average Number of Passengers by Type of Vehicle

Investigation of the average number of passengers (Passenger Occupancy) by type of vehicle is normally conducted by way of "Roadside Survey". Using these values, the values of VOT per passenger can be converted into VOT per vehicle by vehicle type. It is also advisable to utilize the results of similar study conducted in the past.

2.5.2. Application of the Guideline for EA to Water Sector Projects

(1) Inputs Needed for an EA in the Water Sector

Values of the following economic cost and economic benefit items are needed for the calculation of EIRR and NPV for a project in the water sector during an EA.

Table 5-8: Economic Cost and Benefit Items Necessary for an EA in the Water Sector

Economic Cost	Economic Benefit
In the case of "Simple Way", the major economic cost items are regarded as approximately the same as financial costs without need for adjustment: ➢ Initial Cost > Construction Cost > Design and Supervision Cost > Land Acquisition Cost > Administration Cost (at preparation/construction stage) ➢ O&M Cost > Maintenance Cost > Administration Cost ➢ Opportunity Cost of Water (in the case of agricultural water used for potable water, the value of crop yield counted) ➢ Depletion Premium (in the case of depletable water resources)	Benefit items are identified from the following two perspectives: ➢ Incremental Analysis (compare cases of "with" and "without") > Cost Reduction Compared with the Alternative Water Source (on the non-incremental water consumed) >Incremental Water Consumption (measured by WTP) ➢ Ripple Effect Analysis (indirect benefit resulted from the generation of direct benefit) >Decline of Diseases Related to Tap Water >Resource Conservation (ground water resource conservation) >Living Environment Improvement, etc. >Generation of New Industries

Source: Created by JICA adviser.

(2) How to Identify and Estimate the Relevant Items of Economic Cost?

As stated on P.28 it is acceptable to identify and estimate the economic cost items using the "Simple Way" as below.

1) Making a List of Financial Cost Items Based on Result of Cost Estimation

The relevant items of economic cost can be decided based on the existing information of financial cost acquired from the result of rough cost estimation. The values of financial cost items can be approximately regarded as economic cost values without adjustment.

2) Identifying Possible Opportunity Cost of Externality

In addition to the above-mentioned items identified based on the result of rough cost estimation, whether or not the opportunity cost of water will be incurred needs to be clarified at the FS stage of a water project. Also, in the case that such a cost is anticipated, its quantifiability needs to be made sure. If it is quantifiable, this item should be added to the economic costs.

3) Estimating the Depletion Premium as Economic Cost When Necessary

Some water sources may face the problem of depletion, that is, the natural recharge is less than its consumptive use. In such cases, valuation of the economic cost of the water supply projects should include a depletion premium, which is defined as the present value in year t of the increase in future cost. The depletion premium increases each year as the stock of water source diminishes. The formula for the calculation of depletion premium (DP) is as follows:

$$DP_t = \frac{(C_2 - C_1)(1+r)^t}{(1+r)^T}$$

where .C2=cost of water supply per m^3 from the alternative source,
C1= cost of water supply per m^3 from the depletable source,
r= discount rate,
T=time of exhaustion of the water source.
t= year t,

(3) How to Schedule the Spending of the Project's Economic Cost?

1) Scheduling the Spending of Initial Investment Cost

The spending schedule of the initial investment cost should be made on annual basis with reference to the information of project plan or project concept. In the case of information shortage, the scheduling can be done by simply dividing the total amount of initial investment cost by the number of years of the construction/preparation period.
Please refer to Table 3-5 on P.13 for specific example.

2) Scheduling the Spending of O&M Cost throughout the Project Evaluation Period

When making a spending schedule of O&M cost, the following points are to be borne in mind:

- There should be periodic change of maintenance cost stemming from the occurrence of medium-scale and/or large-scale repairs on a medium-term and/or long-term basis respectively in addition to the daily maintenance activities.
- Generally, the O&M cost will gradually increase with the growth of users or revenue from fare collection, which needs to be reflected in the spending schedule.

Regarding the above-mentioned points of concern, please refer to Table 3-6 on P.13 for specific example.

(4) How to Identify and Estimate the Economic Benefits for EIRR Calculation?

1) Identifying the Items of Economic Benefit from Two Perspectives

- The Perspective of Incremental Analysis

From the incremental analysis perspective, the economic benefit can be identified by comparing the difference between "With" and "Without" the project, which can be either an additional benefit/value or a cost reduction. Regarding the concept of incremental analysis and "With" and "Without", please refer to Appendix 1 for further details.

- The Perspective of Ripple Effect Analysis

Ripple Effect refers to the impacts resulted from the direct benefit of the project. Examples of this include decline of diseases related to tap water etc., which are the benefit belong to the second-order effect of the project, arising from the generation of the above-mentioned direct benefit of the project.

The economic benefits typically found in the water sector consist of the following items. Among them, the items under the category of Incremental Analysis are regarded as quantifiable, while most of those under Ripple Effect Analysis are difficult or impossible to be quantified.
In addition, regarding the Non-technical Losses of Unaccounted-for Water (UFW) and Water Sold but Not Paid for, as they actually benefit some consumers who do not pay, they should also be regarded as benefits from the perspective of national economy.

Table 5-9: Benefit Items for Projects in the Water Sector

Perspective	Benefit Item	Details	Quantifiability		
			Quantifiable	Quantifiable with Limitation	Hard to Be Quantified
Incremental Analysis	Cost Reduction Compared with the Alternative Water Source (the non-incremental water consumed)	>Reduction of water well maintenance cost >Water purchasing cost reduction > Water Drawing Labor Savings (time savings)	✔		
	Incremental Water Consumption (measured by WTP)	>Average demand price for incremental water consumed	✔		
	Resource Conservation	>Ground water resource conservation		✔	
Ripple Effect Analysis	Decline of Diseases Related to Tap Water	>Reduction of death rate >Reduction of medical expense >Healthy Life Days (HLDs) saved		✔	
	Prevention of damage by the water outage			✔	
	Living Environment Improvement				✔
	Generation of New Industries				✔

Source: Created by JICA adviser based on various feasibility study reports.

2) Calculating the Monetary Value of Respective Quantifiable Benefit Items

- Process of Calculation

The process for calculating the monetary value of the quantifiable benefit items basically includes the three steps mentioned previously in Figure 5-1 on p. 30.

- Identifying Alternatives in the Without Case for Comparison with the With Case

Alternatives in the without case to be assumed for the calculation of respective benefit items of water projects are summarized as follows.

Table 5-10: Alternatives in the Without Case for Comparison with the With Case

Benefit Items	Sub-items	Alternatives in the Without Case
Cost Reduction Compared with the Alternative Water Source	Reduction of water well capital cost and maintenance cost	Capital cost and maintenance cost of water wells (to be counted as the benefit of the With Case)
	Reduction of water purchasing cost	Cost of purchasing water (to be counted as the benefit of the With Case)
	Water drawing labor cost savings[1]	Cost of water drawing labor (to be counted as the benefit of the With Case)
Incremental Water Consumption	Willingness to Pay (WTP)	Zero benefit in the Without Case (regarded as the incremental benefit generated in the With Case)
	Or, affordability to Pay (ATP) (in case of unavailability of WTP value)[2]	
	Or, official water rate of the new project plus the Consumer Surplus (in case of unavailability of WTP and ATP value)[3]	

Note: 1. Water drawing labor cost refers to labor cost for water drawing from water wells or a river.
2. WTP is regarded as the prototype of the benefit of incremental water consumption, while ATP is adopted only when the value of WTP is not available, and the water rate of the new project is adopted only when the values of WTP and ATP are not available. Regarding WTP and ATP, refer to Appendix 2 for details.
3. WTP and ATP are assumed to contained a "Consumer Surplus", i.e. an additional benefit of satisfaction felt by the consumers acquired from the service provided by the project, which can be measured by the margin of the price possible to be paid by the consumers higher than the official water rate. Therefore, in the case that both the values of WTP and ATP are not available owing to, say, the lack of resource to conduct a relevant survey, the official water rate can be used as a value for reference though an incremental value needs to be added to it as a "Consumer Surplus".

Source: Created by JICA adviser based on various feasibility study reports.

- Way of Calculation for Respective Benefit Items

The way of calculation for respective benefit items are as follows:

Table 5-11: Way of Calculation for Respective Benefit Items in Water Projects

Benefit Items	Estimating the Unit Value of Benefit (a)	Estimating the Quantity Relevant to Benefit (b)	Calculation of the Monetary Value (c)
Cost Reduction Compared with the Alternative Water Source	Reduction of water well capital cost and maintenance cost: ➢ Average cost of capital per well (a_1) ($XX/well/year) ➢ Average annual cost of maintenance per well (a_2) ($XX/well/year)	Number of well in the area covered by the water supply from the project (XX wells)	(a_1+a_2) * b = c ($XX/year)
	Water purchasing cost reduction: Average water purchasing cost ($XX/ household/year)	Number of household in the area covered by the water supply from the project (XX households)	
	Water drawing labor cost savings: Unit value of time for water drawing laborer[1] ($XX/hour)	Number of hours spent on water drawing by all households annually (XX hours/year)	
Incremental Water Consumption	Conducting interview survey to acquire the average unit price of WTP for additional water supply: ($XX/$m^3$)	Quantity of additional water supply from the project With case–Without case (XX m^3/year)	a * b = c ($XX/year)
	With reference to the result of past study by WB, the Affordability to Pay (ATP) for water supply by average household is 4% of household disposable income. Average household annual disposable income $XX/year *4%= $XX	Number of household in the area covered by the water supply from the project (XX households)	
	In the case that new water rate is decided, use the new water rate as the unit value of WTP: ($XX/$m^3$)	Quantity of additional water supply from the project With case–Without case (XX m^3/year)	

Note: Unit value of time for water drawing laborer can be estimated based on the lowest wage of local unskilled labor.

Source: Created by JICA adviser based on various feasibility study reports.

2.5.3. Application of the Guideline for EA to Power Sector Projects

(1) Inputs Needed for an EA in the Power Sector

Values of the following economic cost and economic benefit items are needed for the calculation of EIRR and NPV for a project in the water sector during an EA.

Table 5-12: Economic Cost and Benefit Items Necessary for an EA in the Power Sector

Economic Cost	Economic Benefit
In the case of "Simple Way", the major economic cost items are regarded as approximately the same as financial costs without need for adjustment: ➢ Initial Cost > Construction Cost > Design and Supervision Cost > Land Acquisition Cost > Administration Cost (at preparation/construction stage) ➢ O&M Cost > Maintenance Cost > Administration Cost ➢ Opportunity Cost of Externalities (hydro power may adversely affect the downstream fisheries or forestry, and fossil fuel thermal power may emit air pollutants)	Benefit items are identified from the following two perspectives: ➢ Incremental Analysis (compare cases of "with" and "without") > Cost Reduction Compared with the Alternative Power Source (on the non-incremental power consumed) >Incremental Power Consumption (measured by WTP or by power benefit of capacity improvement) ➢ Ripple Effect Analysis (indirect benefit resulted from the generation of direct benefit) >CO2 Emission Reduction (with hydro power) >Avoided Air Pollution (with hydro power) >Generation of New Industries

Source: Created by JICA adviser

(2) How to Identify and Estimate the Relevant Items of Economic Cost?

As stated on P.28, it is acceptable to identify and estimate the economic cost items using the "Simple Way" as below.

1) Making a List of Financial Cost Items Based on Result of Cost Estimation

The relevant items of economic cost can be decided based on the existing information of financial cost acquired from the result of rough cost estimation. The values of financial cost items can be approximately regarded as economic cost values without adjustment.

2) Identifying Opportunity Cost of Externalities

There are relatively more cases in power sector than in other sectors that an EA of a project has to consider the effects of externalities, which can be either negative (cost) or positive (benefit). In this sector, the negative externalities include air pollution incurred by a thermal power project, and forest destruction or damage of downstream fisheries caused by a hydro power project, which need to be quantified and counted as economic costs of the project. The monetary cost of these externalities can be estimated approximately by the cost of counter-measures needed to address these problems. Further details about externalities can be found on p.22.

(3) How to Schedule the Spending of the Project's Economic Cost?

1) Scheduling the Spending of Initial Investment Cost

The spending schedule of the initial investment cost should be made on annual basis with reference to the information of project plan or project concept. In the case of information shortage, the scheduling can be done by simply dividing the total amount of initial investment cost by the number of years of the construction/preparation period.

Please refer to Table 3-5 on P.13 for specific example.

2) Scheduling the Spending of O&M Cost throughout the Project Evaluation Period

When making a spending schedule of O&M cost, the following points are to be borne in mind:

- There should be periodic change of maintenance cost stemming from the occurrence of medium-scale and/or large-scale repairs on a medium-term and/or long-term basis respectively in addition to the daily maintenance activities.
- Generally, the O&M cost will gradually increase with the growth of users or revenue from fare collection, which needs to be reflected in the spending schedule.

Regarding the above-mentioned points of concern, please refer to Table 3-6 on P.13 for specific example.

(4) How to Identify and Estimate the Economic Benefits for EIRR Calculation?

1) Identifying the Items of Economic Benefit from Two Perspectives

- The Perspective of Incremental Analysis

From the incremental analysis perspective, the economic benefit can be identified by comparing the difference between "With" and "Without" the project, which can be either an additional benefit/value or a cost reduction. Regarding the concept of incremental analysis and "With" and "Without", please refer to Appendix 1 for further details.

- The Perspective of Ripple Effect Analysis

Ripple Effect refers to the impacts resulted from the direct benefit of the project. Examples of this include decline of diseases related to tap water etc., which are the benefit items belong to the second-order effect of the project, arising from the generation of the above-mentioned direct benefit of the project.

The economic benefits typically found in the water sector consist of the following items. Among them, the items under the category of Incremental Analysis are regarded as quantifiable, while those under Ripple Effect Analysis are difficult or impossible to be quantified.

Table 5-13: Benefit items for projects in the Power Sector

Perspective	Benefit Item	Details	Quantifiability		
			Quantifiable	Quantifiable with Limitation	Hard to Be Quantified
Incremental Analysis	Cost Reduction Compared with the Alternative Power Source (the non-incremental power consumed)	> Saving of existing energy cost >Avoidance of alternative power source investment and O&M cost >Reduction of O&M cost for existing generating facilities > Avoidance of resource depletion cost in the alternative power source of fossil fuel	✔		
	Incremental Power Consumption (measured by WTP)	>Average demand price for incremental power consumed	✔		
	Power Benefit of Capacity Improvement	>Net power benefit in a capacity expansion or rehabilitation project	✔		
Ripple Effect Analysis	CO_2 Emission Reduction	>Utilizing Clean Development Mechanism (CDM)		✔	
	Prevention of damage by the water outage			✔	
	Avoided Air Pollution	>Sulfa dioxide (SO_2), >Nitrogen oxide (NOx)		✔	
	Generation of New Industries				✔

Source: Created by JICA adviser based on various feasibility study reports.

2) Calculating the Monetary Value of Respective Quantifiable Benefit Items

- Process of Calculation

The process for calculating the monetary value of the quantifiable benefit items basically includes the three steps mentioned previously in the Figure 5-1 on p.30.

- Identifying Alternatives in the Without Case for Comparison with the With Case

Alternatives in the without case to be assumed for the calculation of respective benefit items of water projects are summarized as follows.

Table 5-14: Alternatives in the Without Case for Comparison with the With Case

Benefit Items	Sub-items	Alternatives in the Without Case
Cost Reduction Compared with the Alternative Power Source	Saving of existing energy cost (in the case of a rural electrification project)	Household cost of purchasing firewood, kerosene and lamp in Without case (to be counted as the benefit in the With Case)
	Avoidance of cost for alternative power source (avoidance of thermal power plant investment and O&M cost in the case of a new hydro-power project)	Capacity cost (kW value) and energy cost (kWh value) of the fossil fuel power plant in Without Case (to be counted as the benefit of the hydro-power project in the With Case)
	Reduction of O&M cost for existing generating facilities (in the case of a capacity expansion or rehabilitation project)	O&M cost for existing generating facilities in the Without Case (to be compared with that of the With Case, with the difference counted as the benefit of the project)
	Avoidance of resource depletion cost in the alternative power source of fossil fuel	Cost of depletion in the resource of coal or natural gas (to be counted as the benefit of the hydro-power project in the With Case)
Incremental Power Consumption	Willingness to Pay (WTP)	Zero benefit in the Without Case (regarded as the incremental benefit generated in the With Case)
	Or, affordability to Pay (ATP) (in case of unavailability of WTP value)	
	Or, official power rate of the new project plus the Consumer Surplus (in case of unavailability of WTP and ATP value)	
	Power Benefit of Capacity Improvement (in the case of a capacity expansion or rehabilitation project)	Capacity benefit (kW value) and energy benefit (kWh value) in Without Case (to be subtracted from that of the With Case)
CO_2 Emission Reduction (reduction of CO_2 Emission from a fossil fuel power plant in the case of a hydro-power project)		CO_2 emission from a fossil fuel power plant (value of the reduced CO_2 emission counted as the benefit of the hydro-power project)

Source: Created by JICA adviser based on various feasibility study reports.

- The way of calculation for respective benefit items are as follows:

Table 5-15: Way of Calculation for Respective Benefit Items in Power Projects

Benefit Items	Estimating the Unit Value of Benefit (a)	Estimating the Quantity Relevant to Benefit (b)	Calculation of the Monetary Value (c)
Cost Reduction Compared with the Alternative Power Source	Saving of existing energy cost in a rural electrification project: ➢ Energy cost for heating: (a_1) annual cost of firewood per household ($XX/year/household) ➢ Energy cost for lighting: (a_2) annual cost of kerosene and lamp per household ($XX/year/household)	Number of households to be electrified by the project: (XX households)	($a_1 + a_2$) * b = c ($XX/year)
	Avoidance of thermal power plant Investment and O&M cost: ➢ Capacity value (kW value of thermal power plant) (a_1) construction cost per kW ($XX/kW) ($a_2$) annual fixed O&M cost per kW ($XX/kW/year) ➢ Energy value (kWh value of thermal power plant) (a_3) fuel cost per kWh + variable O&M cost per kWh ($XX/kWh)	Total installed capacity and annual energy with adjustment factors: ➢ Quantity of kW (capacity) (b_1, b_2) total installed capacity * kW adjustment factor[1]= adjusted total installed capacity (XX kW) ➢ Quantity of kWh (energy) (b_3) annual energy * kWh adjustment factor[2] =adjusted annual energy (XX kWh/year)	a_1*b_1 = c_1 ($XX) a_2*b_2 = c_2 ($XX/year) a_3*b_3 = c_3 ($XX/year)
	O&M cost reduction for existing generating facilities: annual O&M cost in Without case -With case= annual net benefit ($XX/year)		
	Avoidance of fossil fuel resource depletion cost: $DP_t = (C_2-C_1)(1+r)^t / (1+r)^T$ (C2=unit price of the alternative fossil fuel resource, C1= unit price of the existing resource, r= discount rate, T=time of exhaustion of the existing source. t= year t)		
Incremental Power Consumption	Conducting interview survey to acquire the average unit price of WTP for additional power supply: ($XX/kWh)	Annual quantity of additional power supply from the project (kWh): With case–Without case (XX kWh)	a * b= c ($XX/year)
	Or, estimate the Affordability to Pay (ATP) for power supply by average household: Average household annual disposable income $XX/year * X%= $XX/year	Number of household in the area covered by the power supply from the project: (XX households)	
	In the case that new power rate is decided, use the new power rate as the unit value of WTP ($XX/ kWh)	Quantity of additional power supply from the project (kWh): With case–Without case (XX kWh)	
	Power benefit of Capacity Improvement (in a project of capacity expansion or rehabilitation): ➢ Adjusted capacity value (adjusted kW value of thermal power plant) (a_1) (construction cost per kW * capital recovery factor[3] +annual fixed O&M cost per kW) * kW adjustment factor ($XX/kW) ➢ Adjusted Energy value (adjusted kWh value of thermal power plant) (a_2) (fuel cost per kWh + variable O&M cost per kWh) * kWh adjustment factor ($XX/kWh)	Quantity of net incremental capacity and energy output with the project in year t: ➢ Net incremental capacity (b_1) dependable capacity of With Case – Without Case in year t (XX kW) ➢ Net incremental energy output (b_2) energy output of With Case – Without Case in year t (XX kWh)	$a_1 * b_1 + a_2 * b_2$ = c in year t ($XX/year)
CO_2 Emission Reduction	Electrical energy generated by the alternative thermal power plant XX MWh/year * CO^2 Conversion Factor XX t-CO_2/MWh * CO_2 Emissions Trading Rate $XX/ t-$CO_2$[4] = annual CO_2 emission reduction benefit $XX/year		

Note: 1. kW adjustment factor: refer to Table 5-18 for details.
2. kWh adjustment factor: refer to Table 5-19 for details.
3. Capital recovery factor: refer to P. 47 for details.
4. For information of the latest market price for CO_2, please refer to the website of "California Carbon Dashboard" (http://calcarbondash.org/).

Source: Created by JICA adviser based on various feasibility study reports.

3) Further Details about the Major Benefit Items

Further details about the benefit items of "Saving of Existing Energy Cost in a Rural Electrification Project", "Avoidance of Cost for Alternative Power Source", "Power Benefit of Capacity Improvement", "O&M Cost Reduction for Existing Generating Facilities" and "CO_2 Emission Reduction" are given as below.

< Saving of Existing Energy Cost in a Rural Electrification Project>

In a rural electrification project, typically implemented through construction of a hydro-power station[6], the saving of existing energy cost including heating and lighting costs should be counted as the benefit of the project. To calculate the monetary value of this benefit, the following data need to be acquired through energy consumption survey:

- Annual cost of firewood for heating per household
- Annual cost of kerosene and lamp for lighting per household
- Number of households to be electrified by the project

With these data, this benefit can be calculated using the following formula:

$$(a_1 + a_2) * b = c$$

Where, a_1 = annual cost of firewood for heating per household,
a_2 = annual cost of kerosene and lamp for lighting per household
b = number of households to be electrified by the project
c = benefit of saving of existing energy cost

In addition to this benefit relevant to the non-incremental power consumed, there is the benefit arising from the incremental power consumed which can be measured by the Willingness to Pay (WPT) as explained in Appendix 2.

<Avoidance of Cost for Alternative Power Source >

In the case that there is no existing power source to be replaced by the new hydro-power project, the benefit from non-incremental power consumed can be estimated by calculating the investment and O&M cost in the alternative power source. In such a case, the alternative power source is typically assumed to be a combination of a coal-fired power plant for base-load power and a gas turbine power plant or diesel engine power plant for peak-load power. This benefit is known as the power benefit composed of the capacity benefit and the energy benefit derived from both the base-load power and the peak-load power. The calculation of this benefit can be illustrated by the following table:

[6] Hydro-power plants are classified according to their energy production capacity, expressed in megawatts. While large scale hydro-power plants can produce well over 100 MW, small hydro-power plants generally produce less than 10 MW. Based on energy production capacity, small-scale hydro-power production is broken into four size categories of pico- (<5 kilowatts), micro- (5-100 kW), mini- 100 kW-1 MW), and small (1-10 MW), though the upper limit of small-scale hydro-power plant differs with countries.

Table 5-16: Calculation of the Benefit of Avoiding Cost for Alternative Power Source

Benefit of Avoiding Cost for Alternative Power Source		Alternative Power Source	
		Coal-fired Power Plant (base)	Gas Turbine Power Plant (peak)
Capacity Benefit (based on kW value)	a. Unit construction cost	US$ 813~3,067/kW	US$ 627~1,289/kW
	b. Fixed O&M cost per kW	Referring to similar project	Referring to similar project
	c. Installed capacity[1]	$C_b = (E/365 – t * C) / (24 – t)$	$C_p = C – C_b$
	d. kW adjustment factor[2]	$(S_h*O_h*M_h*T_h)/(S_c*O_c*M_c*T_c)$	$(S_h*O_h*M_h*T_h)/(S_g*O_g*M_g*T_g)$
	e. Adjusted construction cost	a * c * d	a * c *d
	f. Adjusted fixed O&M cost	b * c * d	b * c * d
Energy Benefit (based on kWh value)	g. Caloric value	3,583 ~ 6,449 kcal/kg (coal)	290,842 kcal/ MMBtu (N. gas)
	h. Thermal efficiency	35~38% (conventional)	32~38% (simple cycle mode)
	i. Fuel consumption per kWh[3]	860kcal/h/g	860kcal/h/g
	j. Fuel price	US$XX/ton	US$XX/MMBtu
	k. Fuel cost	i * j	i * j
	l. Variable O&M cost	Referring to similar project	Referring to similar project
	m. Annual energy generated	Based on project information	Based on project information
	n. Annual energy cost	(k + l) * m	(k + l) * m
	o. kWh adjustment factor[4]	$(S_h* T_h)/(S_c* T_c)$	$(S_h * T_h)/(S_g* T_g)$
	p. Annual energy benefit	n * o	n * o

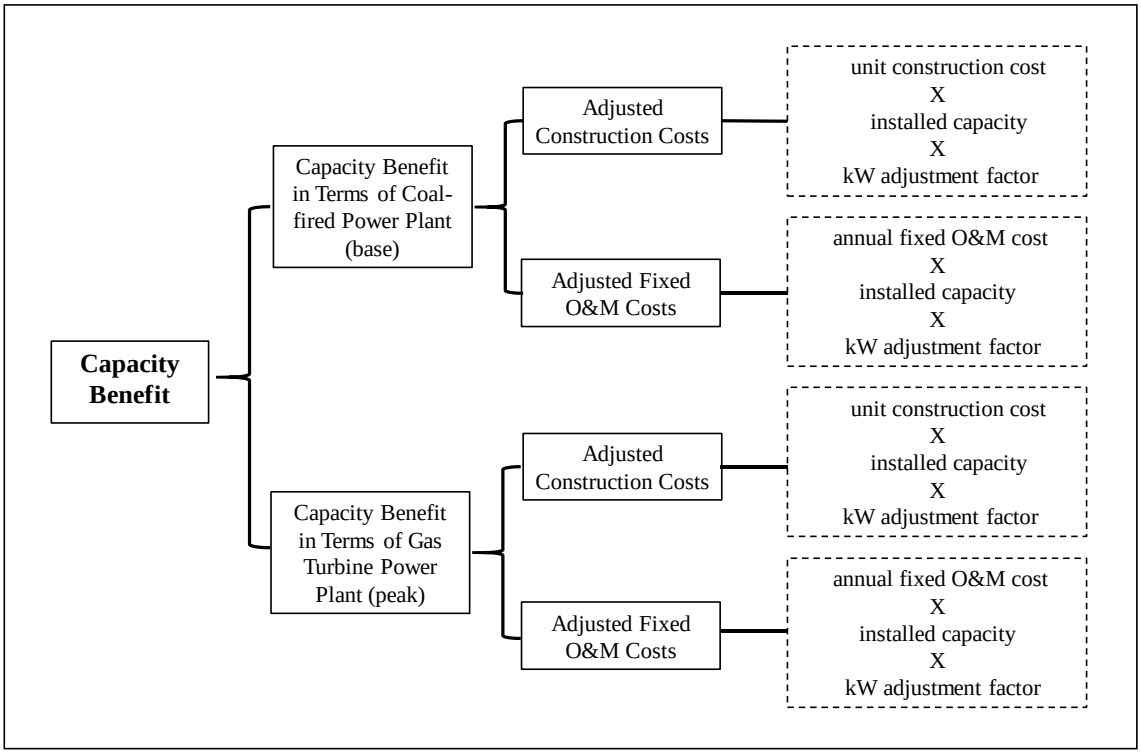
Note: 1. C= total installed capacity; C_b=capacity for base-load; C_p=capacity for peak-load; E=total annual energy; t=peak hours per day; the values of C, E and t are based on project information.
2. S=station service power efficiency; O=operation efficiency; M=maintenance efficiency; T=transmission efficiency; $_h$=hydro-power plant; $_c$=coal-fired power plant; $_g$=gas turbine power plant
3. "860kcal" is the heat content of 1 kWh of electricity (the equivalence of 3,412Btu).
4. This value is relevant to the values of station efficiency (S) and transmission efficiency (T) only.

Source: Created by JICA adviser based on various feasibility study reports and "Projected Costs of Generating Electricity, 2015 Edition" (IEA/NEA report)

The details about the way of calculation regarding the capacity benefit and energy benefit are explained as below.

- Calculation of Capacity Benefit

Capacity benefit consists of saving of construction cost and fixed O&M cost of the alternative power source indicated in terms of kW value. The kW value of construction cost is expressed in sum total, while that of the fixed O&M cost is in annual terms. As the alternative power source includes the base-load power provided by the coal-fired power plant and the peak-load power provided by the gas turbine (or diesel engine power plant), the kW values should also include the two parts. Besides, in light of the difference in property and performance between hydro-power plant and thermal power plant, the kW values of the two types of power plants need to be adjusted by a kW adjustment factor respectively. The breakdown of the capacity benefit is given by the following chart:



Source: Created by JICA advisor

Figure 5-10: Breakdown of Capacity Benefit

The values of the capacity benefit can be worked out in the following way:

- Construction Costs of Coal-fired Power Plant and Gas Turbine Power Plant

The unit construction costs of coal-fired power plant and gas turbine power plant can be estimated with reference to the IEA/NEA document of "Projected Costs of Generating Electricity"[7] or evaluation reports on similar projects in Timor-Leste or neighboring countries. According to the 2015 edition of the IEA/NEA report, the unit construction cost of coal-fired power plant is between US$813 and 3,067 per kW[8], while that of gas turbine power plant is between US$627 and 1,289 per kW[9].

- Annual Fixed O&M Cost of Coal-fired Power Plant and Gas Turbine Power Plant

The O&M cost of a power project is divided into fixed O&M cost and variable O&M cost. The former is entailed regardless of the quantity of electricity generated and is thus counted as part of the capacity value (kW value), while the latter depends on the quantity of electricity generated and is accordingly regarded as part of the energy value.

Regarding the fixed O&M cost per kW, it is usually expressed in a certain proportion to the unit construction cost of the power plant, based on past and existing project examples. In the feasibility study report on a similar hydro-power project implemented in Indonesia, the fixed O&M cost per kW is estimated to be 2% of the unit construction cost of a coal-fired power plant and 2.5% of that of a gas turbine power plant.

- kW Adjustment Factor

As the performance of hydro-power plant is different from that of thermal power plant, the capacity benefit and energy benefit need to be adjusted by the kW adjustment factor and kWh adjustment factor respectively. With regard to the kW adjustment factors for adjusting the

[7] A joint report issued by the International Energy Agency (IEA) and the OECD Nuclear Energy Agency (NEA) every few years since 1983 on the projected costs of electricity generation in OECD member countries and Non-OECD countries. The latest edition is the 2015 edition.

[8] Examples include China US$813, Korea US$1,218, and Portugal US$3,067.

[9] Examples include China US$627, Korea US$845, and New Zealand US$1,289.

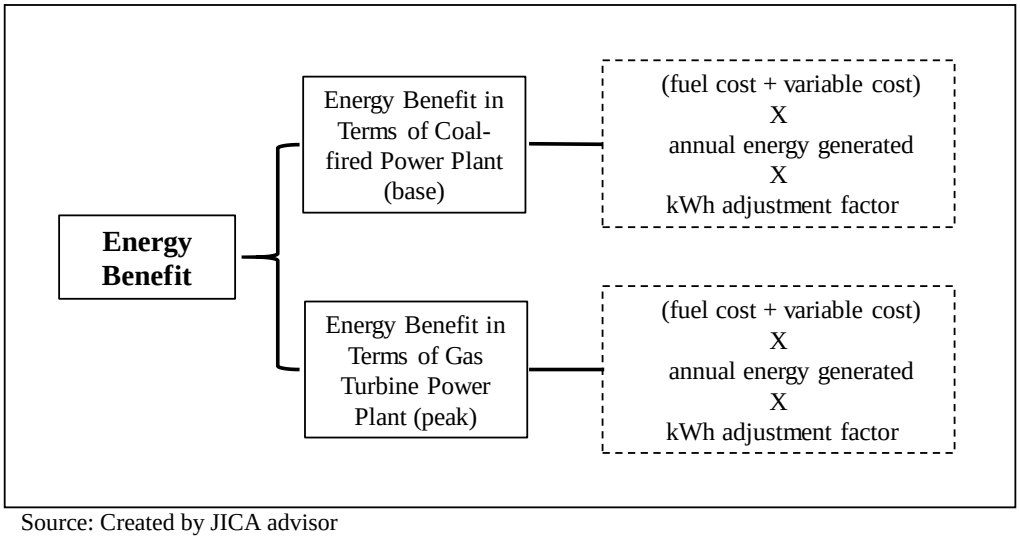
capacity values of coal-fired and gas turbine power plant to that of a hydro-power plant indicated in Table 5-16, the further details about their way of calculation are given in Table 5-17 below, which is created based on an example of JICA project in Indonesia.

Table 5-17: Calculation of kW Adjustment Factors (example of a JICA project)

Elements of the kW Adjustment Factor	Way of Calculation	Data of Power Plants from a Study Project in Indonesia		
		Hydro-power	Coal-fired Power	Gas Turbine Power
Station Service Power Efficiency (S)	1-station power loss	0.997 (1-0.003)	0.930 (1-0.070)	0.990 (1-0.010)
Operation Efficiency (O)	1-unplanned shutdown loss	0.995 (1-0.005)	0.920 (1-0.080)	0.930 (1-0.070)
Maintenance Efficiency (M)	1-planned shutdown loss	0.980 (1-0.020)	0.880 (1-0.120)	0.900 (1-0.100)
Transmission Efficiency (T)	1-transmission loss	0.950 (1-0.050)	0.980 (1-0.020)	0.990 (1-0.010)
Adjustment Factor to Adjust the kW Value of Coal-fired Power Plant		(0.997*0.995*0.980*0.950)/(0.930*0.920*0.880*0.980) =1.252		
Adjustment Factor f to Adjust the kW Value of Gas Turbine Power Plant		(0.997*0.995*0.980*0.950)/(0.990*0.930*0.900*0.990) =1.126		

Note: The above values of three types of power plants are examples for reference.
Source: Created by JICA advisor based on information of "JICA Study on the Master Plan of Hydro-power in Indonesia" (August, 2011)

- Calculation of Energy Benefit



Source: Created by JICA advisor

Figure 5-11: Breakdown of Energy Benefits

Energy benefit consists of the saving of fuel cost and variable O&M cost incurred in the case of alterative thermal power source development. In this case, the base-load power provided by coal-fired power plant and the peak-load power by gas turbine power plant are also assumed, and the kWh adjustment factors are needed for adjusting the energy values of the two types of power plant to make them comparable to that of a hydro-power plant. Figure 5-11 illustrates the composition of the energy benefit.

The values of the energy benefit can be worked out in the following way:

- Fuel Costs of Coal-fired Power Plant and Gas Turbine Power Plant

The value of fuel cost per kWh can be estimated using the values of caloric value of fuel (coal and natural gas), thermal efficiency and heat rate of generation facility, fuel consumption per kWh and fuel price. The way of calculation is as follows:

Heat rate = 860kcal / thermal efficiency
Fuel consumption = heat rate / caloric value
Fuel cost = fuel consumption * fuel price

The values of thermal efficiency and caloric value can be acquired with reference to information of similar projects in Timor-Leste or neighboring countries.

- Annual Energy Costs of Coal-fired Power Plant and Gas Turbine Power Plant

As shown in Table 5-16, the annual energy costs of the two types of power plant can be worked out by adding up the values of fuel cost and variable O&M cost and multiplying the result by the value of annual energy generated. The calculation formula is as below:

Annual energy cost = (fuel cost + variable O&M cost) * annual energy generated

- kWh Adjustment Factor

As previously mentioned, the kWh adjustment factors are needed to bring the values of annual energy cost of coal-fired power plant and gas turbine power plant respectively in line with the condition of a hydro-power plant. They can be calculated as illustrated by the following table.

Table 5-18: Calculation of kWh Adjustment Factors (example of JICA project)

Elements of the kWh Adjustment Factor	Way of Calculation	Data of Power Plants from a Study Project in Indonesia		
		Hydro-power	Coal-fired Power	Gas Turbine Power
Station Service Power Efficiency (S)	1-station power loss	0.997 (1-0.003)	0.930 (1-0.070)	0.990 (1-0.010)
Transmission Efficiency (T)	1-transmission loss	0.950 (1-0.050)	0.980 (1-0.020)	0.990 (1-0.010)
Adjustment Factor to Adjust the kW Value of Coal-fired Power Plant			(0.997*0.950)/(0.930*0.980) =1.039	
Adjustment Factor f to Adjust the kW Value of Gas Turbine Power Plant			(0.997*0.950)/(0.990*0.990) =0.966	

Note: The above values of three types of power plants are examples for reference.
Source: Created by JICA advisor based on information of "JICA Study on the Master Plan of Hydro-power in Indonesia" (August, 2011)

< Power Benefit of Capacity Improvement>

In the case that a project is aimed to improve capacity (capacity expansion or rehabilitation) with the existing facilities remaining in operation, the power benefit composed of the capacity benefit and energy benefit is estimated by comparing values of the With Case (the project) to the Without Case (the alternative power source). In this case, both the capacity benefit and energy benefit are expressed as the annual values of difference between the With Case and the Without Case. The reason for this is that the operation mode of existing facilities is assumed to be changing with each year and thus the difference of capacity and energy generated between the With Case and the Without Case is also assumed to be changing with the passage of time. Therefore, unlike in the case of implementing a new project, the construction cost per kW here needs to be broken down into annual value using a capital recovery factor to make it possible for the above-mentioned annual comparison.

Calculation of the power benefit includes the following two major steps.

- Calculation of Capacity Benefit in Year t

The capacity benefit in year t can be calculated by the following formula:

$$CB_t = \{(C * R + F) * A_{kw} * CW_t\} - \{(C * R + F) * A_{kw} * CO_t\}$$

Where, CB= capacity benefit, C= unit construction cost, R=capital recovery factor, F= fixed O&M cost
A_{kw}= kW adjustment factor, CW= capacity in With Case, CO= capacity in Without Case, $_t$= year t

With regard to the above formula, the values of unit construction cost, fixed O&M cost and kW adjustment factor can be acquired with reference to the information in <Avoidance of Cost for Alternative Power Source >, while the value of capital recovery factor R can be calculated in the following way:

$$R = r / \{1 - (1 + r)^{-n}\}$$

Where, r= discount rate, n= economic life of the asset

- Calculation of Energy Benefit in Year t

The energy benefit in year t can be calculated by the following formula:

$$EB_t = \{(C_f + C_v) * A_{kwh} * EW_t\} - \{(C_f + C_v) * A_{kwh} * EO_t\}$$

Where, EB= energy benefit, C_f= fuel cost, C_v= variable O&M cost, A_{kwh}= kWh adjustment factor,
EW= energy generated in With Case, EO= energy generated in Without Case, $_t$= year t

The values of fuel cost, variable O&M cost and kWh adjustment factor required by the above formula can be acquired also with reference to the information in <Avoidance of Cost for Alternative Power Source >.

2.6. Afterword

2.6.1. Understanding the functions and usage of this E&F Guideline

The major part of this guideline is composed of the sections from 2 to 5.

Section 2 is intended to deal with the general methodology of E&F analysis by explaining the definitions of the relevant basic concepts, while sections 3 and 4 are devoted to the instructions of specific way to conduct an FA and EA respectively.

Section 5 is especially formulated to supplement section 4 by providing sector-specific detail instructions on EA for major infrastructure sectors. This is because while the way of estimating economic costs and benefits is different with the sectors, section 4 provides only the general instructions on the procedures for conducting an E&A analysis without sector-specific details. Accordingly, section 5 is aimed to compensate this weakness in section 4.

In addition, the section of Appendices is provided to give detail information regarding some technical terms important but complicated and supposed to be unfamiliar to the users. Also, considering the difficulty and importance of economic benefit identification and estimation regarding an EA, a table of quantifiable economic benefit items for eight major infrastructure sectors including road, urban traffic, railway, airport, harbor, water, sewage and power is attached as Appendix 4 to enable the staff members in charge to apply the general guideline to the appraisal work in more infrastructure sectors.

2.6.2. Recalculation in Ex-Post Evaluation

The values of IRR and NPV, i.e. FIRR and FNPV, or EIRR and ENPV calculated at the stage of appraisal/ex-ante evaluation needs to be recalculated at the stage of ex-post evaluation.

Two points are considered important to the recalculation, i.e., a) using the same way of calculation as that of the appraisal/ex-ante evaluation stage, and b) using the relevant data with the same source of information and the same way of data collection as that of the appraisal/ex-ante evaluation stage. With these as the premises, the specific points stated in the table below are particularly needed to be kept in mind.

However, in the case that the addition or cancelation of some of the components is happened, which has resulted in the change of project's framework and largely influenced its cost and benefit, the recalculation needs to be conducted by changing the way of calculation as an exception.

Table 6-1: Points of Concern Regarding Recalculation of IRR and NPV at the Stage of Ex-Post Evaluation

Points of Concern	Way of Handling
Calculation based on actual values	>Whereas the calculation of IRR and NPV are mainly based on anticipated values or estimated values of cost and benefit at the stage of appraisal/ex-ante evaluation, the recalculation at the stage of ex-post evaluation is required to use actual values >For this purpose, the implementation agency is required to start gathering actual data regularly from the stage of appraisal/ex-ante evaluation
Calculation based on the present value at the time of the recalculation	>IRR and NPV should be calculated based on the present value at the stage of ex-post evaluation instead of the stage of appraisal/ex-ante evaluation >Therefore, the actual values of cost and benefit need to be converted to the present value at the time of the recalculation
Consistency with the estimation conducted at the previous stage	>In order to evaluate the appropriateness of the estimation conducted at the stage of appraisal/ex-ante evaluation, it is necessary to identify in which point and to what extent the results of the recalculation are different from the estimation conducted at the previous stage >Through repetition of this kind of consistency confirmation between results of recalculation at present and estimation at the previous stage, it would be possible to draw some lessons for the IRR and NPV calculation in the target sector as well as the target country

Appendices

Appendix 2-1. Incremental Analysis

(1) Definition

Incremental Analysis is one of the important methods for economic analysis. It measures the difference between benefit and cost derived from the implementation of the project, calculating the net benefit by comparing the difference of net benefit between "without" and "with" the project.

(2) Points of Concern Regarding Incremental Analysis

In conducting an incremental analysis, the three points described in the following Table are of concern.

Table A2.1-1: Points of Concern Regarding Incremental Analysis

Points of Attention	Details
The difference between With-Without Approach and After-Before Approach	・The After-Before Approach considers only the difference of benefit between the level existing before and after the implementation of the project, regardless of the possible loss of benefit resulting from the decision of not implementing the project ・The With-Without Approach considers the difference of benefit between the level resulting from not implementing the project and the level attained by implementation of the project. The net benefit estimated with this approach is larger than that of the After-Before Approach
Necessity of excluding the Sank Cost	・In the case of a project intended to rehabilitate the existing facilities, the part of capital investment already invested in the existing facilities should be regarded as Sank Cost to be excluded from the project cost. ・Accordingly, the project of rehabilitation normally has higher profitability than that of a new investment project
Assuming Salvage Value as 0	・Salvage Value refers to the value of facilities remaining after the end of the project period being studied, which is estimated based on the number of years of the in-service period. In theory, Salvage Value could be counted as part of the benefit, but in the case of an infrastructure project, the project period is normally longer than the in-service period of facilities; moreover, as the present value of the Salvage Value becomes very small after being discounted, the value can hardly make any difference to the overall result of the calculation; therefore, Salvage Value is usually assumed as 0

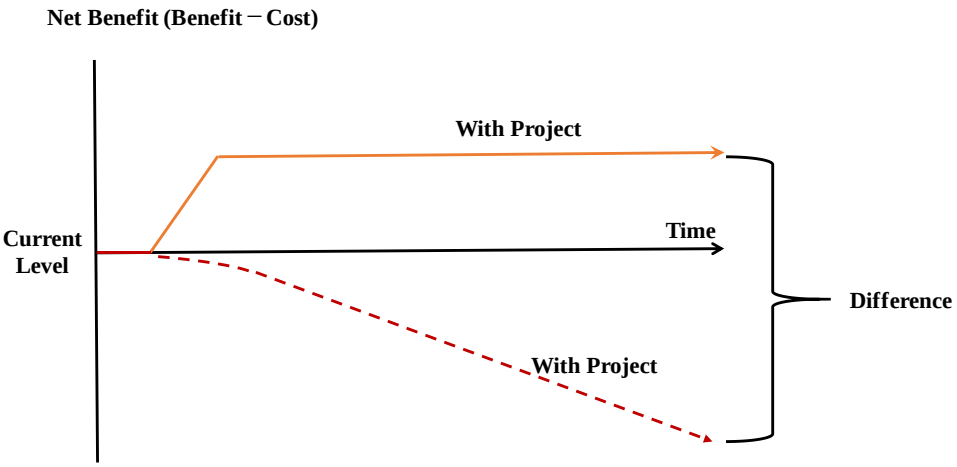


Figure A2.1-1: Difference of Net Benefit between With-Project and Without-Project

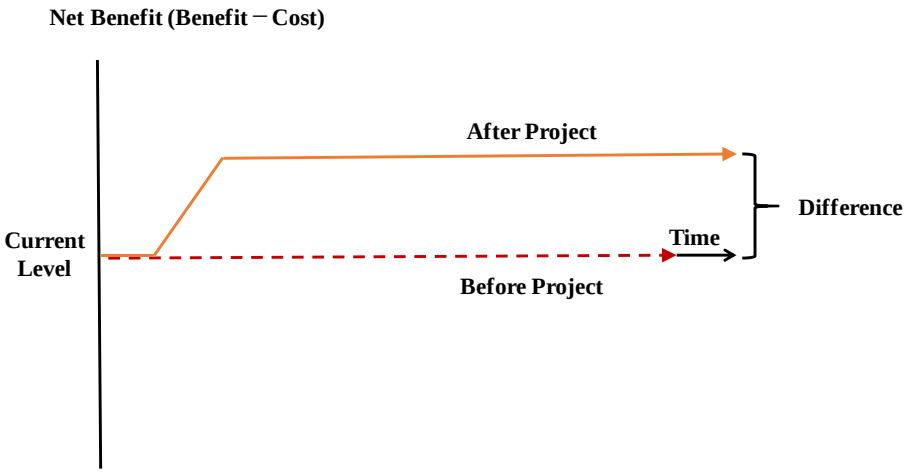


Figure A2.1-2: Difference of Net Benefit between After-Project and Before-Project

Appendix 2-2. Methods for calculating the conversion factors for Economic Analysis

(1) Calculation of Standard Conversion Factor (SCF)

- Definition of SCF

SCF is the conversion factor used to convert the price of Non-traded Goods and Service to the world price numeraire, indicating the extent to which the prices of relevant domestic goods and service are distorted by the imperfectly competitive market factors such as tax, subsidy and the other import restriction, etc.

- Two Ways of SCF Calculation

SCF Can be calculated through the following two ways:

➢ Calculation of SCF Based on Import/Export Data by Commodity in 1 year

$$SCF = \frac{M + X}{M(1 + t_m) + X(1 + s - t_x)}$$

(Where, M=total of major import goods (CIF), X=total of major export goods (FOB),
t_m=weighted average of import duty rate, s=weighted average of export subsidy rate
t_x=weighted average of export duty rate

Table A2.2-1: Example of SCF Calculation (Based on Import/Export Data by Commodity)

	Import Goods (CIF)			Export Goods (FOB)		
	Item	M	t	Item	X	s
1	Petroleum products	709	0.2	Sugar	737	0
2	Machines	453	0.1	Palm oil	380	0
3	Steel	322	0.1	Tea	393	0
4	Vehicles	285	0.3	Lumber	216	0
5	Chemical products	248	0.2	Coal	140	0
6	Grain	181	0.1	Gold	53	0
7	Gunpowder	124	0.2	Banana	45	0
8	Electric products	111	0.2	Mango	31	0
9	Fertilizer	107	0.2	Syrup	28	0
10	Textile products	95	0.5	Starch	28	0
Total		2,639	0.19		2,051	0

SCF= (2,639＋2,051) ／〔(2,639*1.19＋2,051)〕=4,690／5,191=0.90

Source: "Evaluation of Development Project" by Masashi Matsuno & Tetsuo Yaguchi, 1999, P.93

➢ Calculation of SCF Based on General Import/Export Statistics for Multi-Year

$$SCF = \frac{\frac{1}{n}\sum_{i=1}^{n} M_i + \frac{1}{n}\sum_{i=1}^{n} X_i}{\frac{1}{n}\sum_{i=1}^{n} M_i + \frac{1}{n}\sum_{i=1}^{n} X_i + \frac{1}{n}\sum_{i=1}^{n} Tm_i + \frac{1}{n}\sum_{i=1}^{n} Tx_i + \frac{1}{n}\sum_{i=1}^{n} Xs_i}$$

(Where, M=total import goods (CIF), X=total export (FOB), Tm=total import duty,
Tx=total export duty, Xs=total export subsidy)

Table A2.2-2: Example of SCF Calculation (Based on General Import & Export Statistics)

Item	1994	1995	1996	1997	1998	5-year Average
1. Total Import	337,474	376,055	479,529	367,980	684,432	489,094
2. Total Export	247,228	248,653	304,071	354,209	446,735	319,379
3. Total Import Duty	64,391	72,871	81,971	81,610	97,601	79,689
4. Total Export Duty	0	0	0	0	0	0.000
5. Total Export Subsidy	58,761	57,983	67,925	75,512	93,542	70,745
6. = 1+ 2	580,702	624,708	783,601	922,189	1,131,167	808,473
7. = 1+2+3+4+5	703,854	755,562	933,497	1,079,311	1,322,310	958,907
SERF 7/6	1.212	1.209	1.191	1.170	1.169	1.190
SCF 6/7	0.825	0.827	0.839	0.854	0.855	0.840

Source: "Study on the Economic Evaluation Method for Development Survey: General Edition" by JICA, 2002, P.18

(2) Estimation of Shadow Exchange Rate Factor (SERF)

In contrast to the above-mentioned SCF which is used in the case when world price numeraire is adopted, SERF is the conversion factor used in the case when domestic price numeraire is adopted and hence the value of Traded Goods and Service are required to converted to that of the domestic price. This conversion factor is the reciprocal of SCF, i.e. SERF=1/SCF, as seen in the formula indicated on the next page.

It is noteworthy that the terms "world price numeraire" and "domestic price numeraire" means all economic prices "expressed at equivalent world price level" and "domestic price numeraire" instead of "denominated in a certain currency". Therefore, a project's economic price can adopt the world price numeraire while denominated in domestic currency, and vice versa.

In some evaluation reports of projects in Timor-Leste funded by ADB loan, 1.16 is used as the value of SERF when adopting the domestic price numeraire. But the appropriate value of SERF for Timor-Leste needs to be figured out by the way indicated below.

$$\mathbf{SERF} = \frac{\mathbf{M}(1 + t_m) + \mathbf{X}(1 + s - t_x)}{\mathbf{M} + \mathbf{X}}$$

(Where, M=total of major import goods (CIF), X=total of major export goods (FOB),
t_m=weighted average of import duty rate, s=weighted average of export subsidy rate
t_x=weighted average of export duty rate)

(3) Individual Conversion Factors

Apart from the above-mentioned two comprehensive conversion factors (SCF and SER), there are some individual conversion factors which are also important in the calculation of economic cost and EIRR. The major items that require individual conversion factors to convert their values to economic prices are land value, unskilled labor cost and domestic transportation cost.

- Conversion Factor for Land Value

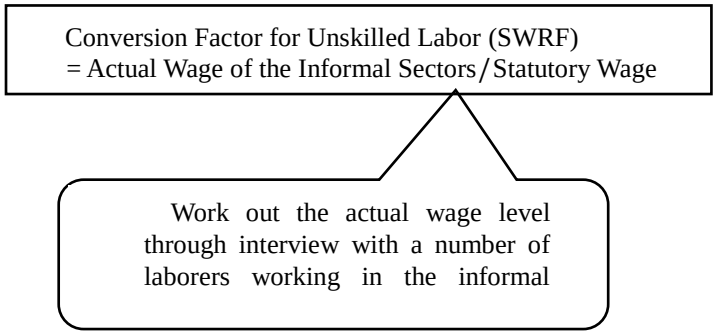
Normally in the case that a land market is assumed to be perfectly competitive, it might be reasonable to use the market price of land as the economic price. However, in the case that land becomes the target for speculation especially in the urban area, as the market price of land diverges greatly from its economic cost (or opportunity cost), it is necessary to assume that the implementation of the project will result in the loss of benefit it would generate if used otherwise, and the value of this loss of benefit can be regarded as the economic cost as illustrated by the following example.

For example, in the case of a project which necessitates the use of part of the existing paddy field for the construction of irrigation channel, the economic cost of acquiring this paddy field is calculated as below:

Economic Cost of the Paddy Field= Harvest yield × Border Price of Rice

- Conversion Factor for Unskilled Labor Cost

Similarly, if a labor market is in a state of perfect competition, the market rate of labor wage can be directly used as economic cost of a project. However, in the case that the labor market is in a state of imperfect competition owing to the existence massive unemployment, which is often the case in the unskilled labor market especially found in the developing countries, the economic cost of unskilled labor is usually lower than its financial cost, with the former expressed as a fraction of the latter. This fraction is known as Shadow Wage Rate Factor (SWRF) which is used to convert the financial cost of unskilled labor into economic cost. On the other hand, in the case of international consultants or local skilled labor (technicians), their salaries are usually used directly as the economic price (The value of SWRF in this case is regarded as 1) as they are assumed to be internationally competitive. Regarding the estimation of SWRF for unskilled labor, the following practice of international financial institutions are worthy of reference:



In Timor-Leste, the unemployment rate in 2013 was 11%[10], which is much higher than the world average level as well as that of the neighboring countries[11]. As the higher unemployment rate indicates that there exists a larger surplus labor, which will result in the lower opportunity cost of labor resource for the national economy and hence the lower value of SWRF, the value of SWRF for unskilled labor in Timor-Leste should be inferably lower than that of the neighboring countries. This value should be much lower than 1 and could be as low as around 0.6 based on the experience in the Philippines[12]. In some evaluation reports of projects in Timor-Leste funded by ADB loan, 0.5 is used as the value of SWRF. But the appropriate value of SWRF needs to be figured out through identifying the actual wage of the informal sectors and dividing it by the statutory wage.

As the statutory wage is usually decided as the minimum wage level, the actual minimum wage in the informal sectors needs to be identified so as to achieve comparability between the numerator (the actual wage) and the denominator (the statutory wage).

[10] Source; Timor-Leste Labor Force Survey 2013

[11] According to the World Development Indicators delivered by the World Bank, the world's average unemployment rate in 2013 was 6%, and those of Indonesia, the Philippines, Thailand and Vietnam were respectively 6.3%, 7.1%, 0.7% and 2.2%

[12] Unemployment rate in the Philippines was 11% in 2004, while the value of SWRF stipulated in a guideline issued by Investment Coordination Committee (ICC) of the Philippines was 0.6

Appendix 2-3. The Concepts of WTP, CVM and ATP

The three abbreviations respectively stand for "Willingness to Pay", "Contingent Valuation Method" and "Affordability to Pay". Their relevance to EA is explained as below.

(1) Willingness to Pay (WTP)

During an EA, in the case that there is no alternative facility or service for an Incremental analysis through comparison between With and Without the project (mainly found in the sectors of water and power, etc.), or where the users and beneficiaries are not the same (as found in sectors of sewage and waste treatment, etc.), it is difficult to estimate the benefit generated by the infrastructure project. To overcome this difficulty, it is necessary to conduct a questionnaire survey with the direct beneficiaries of the project including residents, users and business operators as targets. This kind of survey is intended to estimate the need for the service by verifying the respondents' maximum extent of willingness to pay as a result of the implementation of the project. When conducting the WTP verification survey, it is the key point to identify the level of amount above which the beneficiaries will not pay for the service. This result can be regarded as the monetary value of the maximum satisfaction that the beneficiaries will acquire from the project, which can then be regarded as the value of WTP.

(2) Contingent Valuation Method (CVM)

The above-mentioned way of questionnaire survey is known as CVM, which is currently the prevailing method adopted by evaluators in EA. Nevertheless, it warrants attention that, in doing so, several kinds of biases may happen and need to be avoided carefully. As far as water supply project is concerned, the results of CVM conducted in many projects show that the value of WTP accounts for 3-5% of the household budget.

Example of CVM (WTP Verification Survey) Application (by JBIC).

Japan Bank for International Cooperation (JBIC) has established a system of Beneficiary Survey utilizing CVM to estimate the value of WTP for relevant infrastructure projects.

The standard process of this kind of survey is as below:

Step 1. Select a qualified consultant for the implementation of the survey

Sept 2. Define the meaning of "Beneficiary"

Step 3. Identify the general population

Step 4. Conduct a sampling

Step 5. Decide on the size of sample

Step 6. Conduct a pre-survey or decide the specific way to conduct the survey

Step 7. Prepare the form of questionnaire

Step 8. Conduct the Beneficiary Survey

Step 9. Complete the report of the survey and conduct follow-up survey

(3) Affordability to Pay (ATP)

There is also the relatively simpler way to estimate the value of WTP, which is adopted when there is a lack of resource to conduct a WTP verification survey. In such a case, the value of WTP is estimated in terms of "Affordability to Pay (ATP)" by identifying the proportion of amount possible to spend on utility service to the household's disposable income. According to the result of a World Bank study[13], the value of ATP in major public utility service is as follows:

Water Supply	4%
Waste Treatment	2%
Sewage	1%

These data have been used as a kind of benchmark for project evaluation by some of the international institutions.

[13] "Information and Modeling Issues in Designing Water and Sanitation Subsidy Scheme", May 2000, The World Bank

Appendix 2-4. Quantifiable Economic Benefits

Table A2.4-1: Quantifiable Economic Benefit Items for Major Infrastructure Sectors

Sector	Major Benefit Items	Sub-items
Road	Cost reduction compared with alternative in Without Case	Reduced VOC for traffic in the old road
		Reduced VOC for traffic diverted from the old road
		Time savings (by VOT) for traffic in the old road
		Time savings (by VOT) for traffic diverted from the old road
		Reduced road maintenance cost in the old road
	Benefit resulted from the ripple effect	Reduced VOC for generated traffic in the new road
		Time savings (by VOT) for generated traffic in the new road
Urban Traffic	Cost reduction compared with alternative in Without Case	Reduced VOC for traffic in the old road
		Reduced railway operating cost (ROC) compared with the old railway
		Time savings for passengers and cargos compared with the old mold
		Reduced maintenance cost compared with the old mold
	Benefit resulted from the ripple effect	Reduced VOC or ROC for generated traffic
		Time savings for generated traffic
Railway	Cost reduction compared with alternative in Without Case	Reduced traveling cost for passengers and cargos
		Time saving for passengers and cargos
		Reduced maintenance cost compared with the old railway
	Benefit resulted from the ripple effect	Reduced traveling cost for passengers and cargos of generated traffic
		Time saving for passengers and cargos of generated traffic
Airport	Cost reduction compared with alternative in Without Case	Reduced traveling cost for passengers
		Time saving for passengers (business and non-business trips)
		Time and cost saving for cargo transport
	Benefit resulted from the ripple effect	Time and cost saving for cargo transport and passenger traveling resulted from generated traffic
Harbor	Cost reduction compared with alternative in Without Case	Reduced transportation cost
		Reduced transportation time
		Reduced maintenance cost
Water	Cost reduction compared with the alternative water source	Reduction of water well maintenance cost
		Water purchasing cost reduction
		Water Drawing Labor Savings (time savings)
	Incremental water consumption	Willingness to Pay (WTP) or Affordability to Pay (ATP)
Sewage	Cost reduction compared with the alternative water source	Cost reduction in sewage treatment
		Cost reduction in water supply with the quality improvement in water resource
	Benefit resulted from the ripple effect	Water resource conservation
		Productivity increase in agriculture & fishery
Power	Cost reduction compared with the alternative power source	Saving of existing energy cost (in the case of a rural electrification project)
		Avoidance of cost for alternative power source
		Reduction of O&M cost for existing generating facilities
	Incremental power consumption	WTP or ATP
		Power Benefit of Capacity Improvement (in the case of a capacity expansion or rehabilitation project)

PART 3:

SAMPLE FORMS & CONCEPTS OF FS PROJECTS BY SECTORS

This part shows examples of the concepts, self-evaluation sheets, TOR and FS check-sheets which are prepared by the national staff through the workshops

Table of Contents

Example 1. New Dili Bypass

Project Concept

1. **Project Name**

Construction of New Dili Bypass- Stage 1 (Central Section)

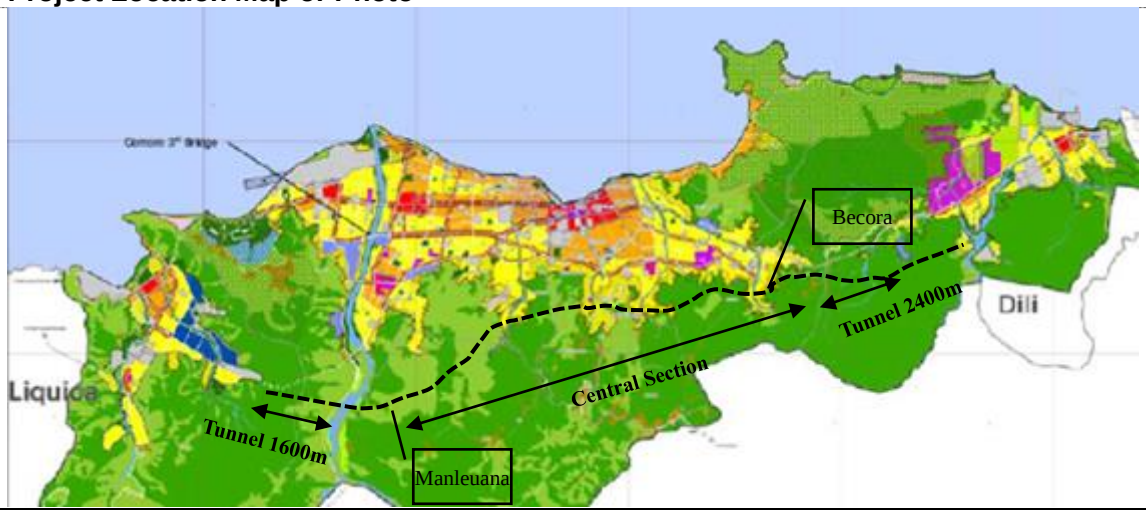
2. **Outline of Project** *(Within a few lines as shown below)*

The bypass project is recommended to construct by dividing into following 4 sections:

Section	PCU/d in 2030	Outline of Routes	Work item	length	Cost (million $)	elapse time to pass
1 Hera - Becora	13,600	New route with Tunnel	Access Road	2.5 km	5	/50k/h =3min
			Tunnel	2.4km	48	/60k/h=2.4min
2 Becora –Hali Laran	17,300	Almost rehabilitation & widening to 4 lanes	Roads	4km	8	/40k/h= 6 min
			Resettlement compensation		5	100 houses
3 Hali Laran – Manleuana	11,400	Almost new road of 4 lanes	new road	5km	10	/40k/h=7.5min
			Resettlement partially		5	100houses
4 Manleuana -Tibar	11,400	New route with Tunnel	New Tunnel	1.6km	32	/60=1.6min
			New Bridge	400m	8	/60=0.4min
			Access road	3km	6	/50k/h =3.6min
			Total		127	24.5 min

Unit Rate for the construction cost calculation		
Road	2,000-~3,000/m	300-~450/m2
Bridge	20,000-/m	3,000-/m2
Tunnel	20,000-/m	

3. **Project Location Map or Photo**



4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*	*Expected Plan*
Area (m2) or Length (km)		
Capacity		
Total employee number		
Current Issues / Items to be improved		

5. **Relevance: (Background)**

Dili Urban Master Plan 2016 Chapter 10.1

6. **Rough Cost estimate**

		Without Project	Bypass with Tunnel	Bypass without tunnel (over mountain roads)
	elapse time	60 min	24.5 min	48 min
Total cost per day	$/day	102,600	41,895	82,080
Cost per year	$/year	37	15	30

difference	$/year			**22**	**7**
construction cost	$			**127**	**59**
Payback period	year			6	8
B/C	for 20years			3.5	2.5

7. **Implementation Schedule** (Expected schedule like below Table)

FS	DED	Land Acquisition	Construction	Open &Maintenance
2019	2020	2021-2024	2022-2026	2027-
6 months	12 months	3years	4 years	

8. **Project Benefits**

Countermeasures for the solution of future traffic congestion could be established
The new bypass could connect two districts of Hera and Tibar within 25 min (Currently, around 1 hours), and the vehicle operation cost could save annually US$ 22 million.

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. **Specific Item to be studied (if F/S is necessary)**

Study of future traffic volume in Dili (Refer Dili M/P 2017- Chapter 10.1)
Study of resettlement or other countermeasures of existing houses and cemetories
Study of legal regulations to prohibit the construction of new houses within future road planning sites

11. **Expected Financial Resources**

"Infrastructure Fund" or "Loan" or "Grant"

12. **Estimated F/S budget (if F/S is necessary)**

Very rough estimate

Comments

- ✓ Traffic mitigation measure in the Dili metropolitan area is an important policy as the Government, and M/P proposes various measures, such as, construction of a ring road, development of parking lots, motorcycle lane, and sidewalks, public bus system, etc. on a long-term perspective
- ✓ Bypass project could be the most cost-effective one
- ✓ The problem is a large total cost and residents' relocation accompanying land acquisition in the central section (section 2 and section 3)
- ✓ Future traffic congestion in Dili Business Area (DBA) is forecasted by Dili M/P, and several kinds of countermeasures are recommended. The most anticipated items in busy city area are Land acquisition and Resettlement. It is not solved in short time. Therefore, it expected to execute FS and to establish long term development plan including the preparation of necessary laws and regulations concerning for Right of Way. This feasibility study is for the urban area section of Dili Bypass project, where the housing construction is rapidly expanding

Self-Evaluation Sheets

Score 51

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

On the preparation of TOR, the black/italic part only should be prepared. Grey text is not necessary to revise

(Dili Bypass stage 1)

1. Objective of Project

Construction of new Dili Bypass, with the total length of around 25km (with two Tunnels).
The Bypass is divided in to 4 sections as shown in Right Table.
The 1st stage of project is the middle part of 9 km road (Section 2 & 3). They are urban area section, where the housing construction is rapidly expanding.
The most anticipated items on the execution of Dili Bypass project is Land acquisition and Resettlement.
It could not be solved in short time. Therefore, it expected to establish long term development plan including the preparation of necessary laws and regulations concerning for Right of Way.

Section	Estimated PCU/d In 2030	Outline of Routes
Section 1 Hera - Becora	13,600	Alternative A Over mountains route
		Alternative B New route with Tunnel
Section 2 Becora – Hali Laran	17,300	Almost route is rehabilitation of existing narrow road to 4 lanes
Section 3 Hali Laran –Manleuana	11,400	Almost route is new road of 4 lanes
Section 4 Manleuana -Tibar	11,400	Alternative A Over mountains route
		Alternative B Tunnel route

Source: Dili Spatial M/P 2017

Beneficiaries:

Dili citizen including Tibar and Hera (340,000 in 2030, 500,000 in 2050).

2. Background

The Directorate General of _____ (hereinafter referred to as "the EMPLOYER"), the Ministry of _____, will require the consulting services of Feasibility Study (FS) of Dili Bypass Construction Project (hereinafter called as the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

Forecasted the traffic volume in 2030 (after opening Comoro 3 bridge) as shown in right Table, and terrible congestion is anticipated in the city center area.
Several kinds of countermeasures are recommended by Dili M/P.

Forecasted Traffic Volume in 2030

A01 road Becora	13,600 (PCU/d)
A03 road Tasitor	26,000
A03 to Tibar	13,900
Banana Rd Comoro	23,200

The Project is an integral part of the Dili Spatial Master Plan with the following essential functions:

- ✓ To avoid Traffic Congestion in City Center Area, thereby contributing to sustainable development of Dili City activities;
- ✓ To supplement the functions of Transportation aspect of New Tibar Port and its hinterland Industrial Park;
- ✓ To enhance the improvement of environmental bad effect and to ensure the safety life of the city center area; and
- ✓ To support the development of Great Dili and Timor-Leste.

Project Concept/Idea for the Project was planned in MM of YYYY by the _ (Ministry Name) _ to properly develop the Dili Capital City Area.

The Project Outline is attached at the end of this TOR.

3. Scope of Works of FS (Requested Output by FS)

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the

above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of FS for DED

On the preparation of TOR, Grey text is not necessary to revise, but change the color of font to black.

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 1-5, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline"

3-2) Specific Request:

- ✓ Bypass road width should be 4-lanes with sidewalks and parking lot at Section 2 and 3
- ✓ Design speed is 40km/h at Section 2 and 3.
- ✓ Target year for the opening the project is 2030
- ✓ Site reconnaissance of the proposed route by Dili M/P 2017
- ✓ Preliminary study for resettlement and environmental affect
- ✓ Preparation of outline drawings including alternative routes
- ✓ Rough estimation of quantities for project dividing into sections as shown below:
- ✓ (Table)
- ✓ Rough estimation of construction time
- ✓ Rough estimation of construction cost

On the preparation of TOR, the black/italic part only should be prepared. Grey text is not necessary to revise

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **4 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Expert

Assignment of Experts are expected as shown in Table below, but it should be proposed by the Tenderer within the allowable budget described in Tender Documents.

Expected Assignment schedule

Title	Degree	Experience of Similar Project	Assignment Period
Highway Engineer		Highway Design Construction	4 months
Environmental Expert		Land Acquisition Resettlement	2 months
Structural Engineer		Bridge Tunnel	1 month
Hydraulic Expert		Climate topographic study	1 month
Economist		E & F analysis	1 month

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ TOR for DED

On the preparation of TOR, Grey text is not necessary to revise, but change the color of font to black.

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard copy Number	Time limit
Inception Report	5 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	4 copies	By the 10th day of each month during Study period
Draft Final Report	6 copies	Within 3 calendar weeks before the final date of contract
Final Report	8 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report. (Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
One soft copy should be submitted on submission of each Report		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

1) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "Part1")
   - ✓ Location map
   - ✓ General plan
   - ✓ Layout plan
   - ✓ Typical cross section
   - ✓ Elevation view
   - ✓ Facility plan
2) Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "Part1");
3) Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "Part1");
4) Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "Part1");
5) Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "Part1");
6) Checklist of FS/FS Report (Sample Form is attached in Attachment 1-1 of "Part1";
7) TOR for DED

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.

Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER.

- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant may change his subject name for survey and study but shall keep the bullet of defined item categorization for the convenience of the evaluation by the EMPLOYER.
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Dili Bypass)

(Project Concept) is expected to attach as Outline of Project, but without cost matters

Example 2. Viqueque - Lospalos Connection Road

Project Concept

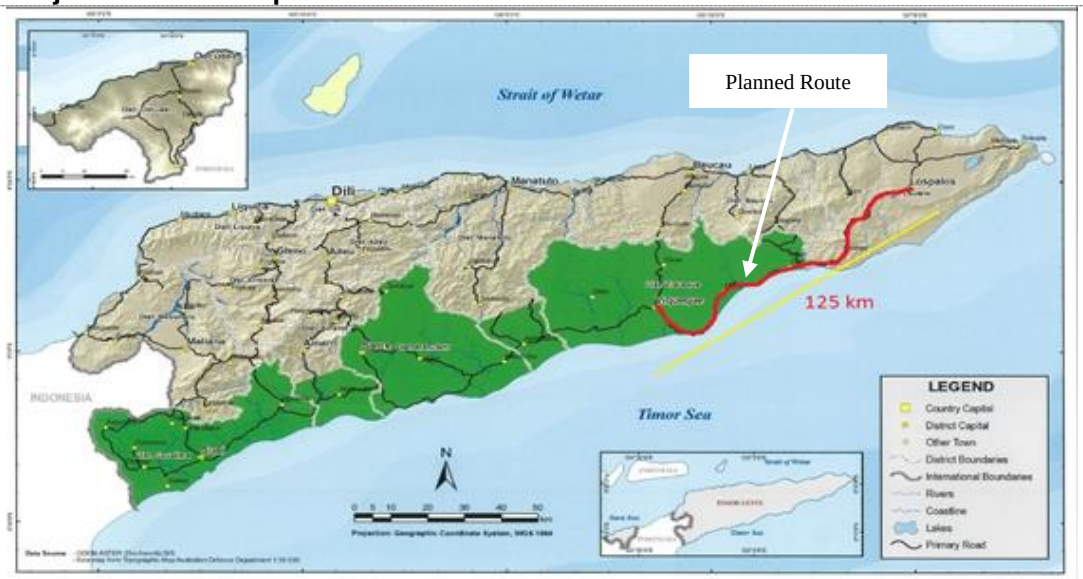
1. **Project Name**

Road Rehabilitation of National Road A08 (Sec. 01 - 03)

2. **Outline of Project** *(Within a few lines as shown below)*

"In (Location / Target), completion of (Project Purpose) will contribute to (Overall goal) by executing of (Output)"

3. **Project Location Map or Photo**



4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

	Without rehabilitation	With rehabilitation
Vehicle number	2200 vehicles/day	
elapsed time	360min	187.5min
Cost per day	US$135,432/day	US$70,538/day
Cost per year	US$49million/year	US$26million/year
Cost saved		US$24million/year
Cost for construction		US$130million
years for depreciation		5 years
B/C for 20 years		3.6

5. **Relevance: (Background)**

The Viqueque to Lospalos road was identified as a "Priority Section of Southern coast road" by the "Strategic Development Plan, 2011-2030". However, the current conditions of this road are very poor, and it cannot fulfill its expected strategic role

6. **Rough Cost estimate**

Very rough estimate. Attach breakdown at the end of this Table, if possible

7. **Implementation Schedule** (Expected schedule like below Table)

Project concept	FS	DED	Land Acquisition	Construction	Open &Maintenance
2018	2019	2020	2021-2023	2022-2025	2026-
	6 months	12 months	3years	4 years	

8. **Project Benefits**

- ✓ To form Southern Coast Road by connecting Viqueque and Lospalos section, and to connect Suai Supply Base (Tasi Mane Project) to Lospalos District
- ✓ Support Agriculture Crops Production and Fishery Development in the area
- ✓ Contribute to the Access to Ira Lalaru Hydraulic Power Development, and Ailambata Natural Gas Development
- ✓ Contribute to the local area life (access to hospital, school and market) by improving poor road condition

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. **Specific Item to be studied (if F/S is necessary)**

Study items to solve the Current issue
(it is not good to describe the current issues only)

11. **Expected Financial Resources**

"Infrastructure Fund" or "Loan" or "Grant"

12. **Estimated F/S budget (if F/S is necessary)**

Very rough estimate

Comments

- ✓ This project is follows the policy to construct the Island orbital road on national development policy
- ✓ Viqueque and Lautem is Protection Area (Binabarobo'o, Matebian), and Environment issues should be considered for wild Animals (Deer, wild buffalo, possum, migrant birds, crocodiles)
- ✓ Social issues will be Religion and Traditional Ritual
- ✓ Aliembata Natural Gas Protection
- ✓ This project is very large as one project, and recommended to divide to a few sections

Self-Evaluation Sheets

Score 58

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(National Road A08 (Sec. 01 - 03) Southern Coast "Viqueque to Lospalos)

1. Objective of Project

Construction of Southern Coast Road between Viqueque and Lospalos.

2. Overall goal

Contribution to sustainable development of southern Coast of Timor Leste.

Beneficiaries:
76,000 people in Viqueque district, and 65,000 people in Lautem district.

3. Background

The Directorate General of Road, Bridge and Flood Control (DRBFC) (hereinafter referred to as "the EMPLOYER"), the Ministry of Development and Institutional Reform, will require the consulting services of Feasibility Study (Hereinafter called FS) of Construction of Southern Coast Road A08-1 to A08-3 Viqueque to Lospalos (Hereinafter called the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is an integral part of the Strategic Development Plan 2011-2030 (p??) and Road Sector Master Plan (p??) with the following essential functions:

- ✓ To connected Southern Coast Road Viqueque to Lospalos, thereby contributing to sustainable development of southern Coast of Timor Leste;
- ✓ To connected Suai Supply Base (Tasi Mane Project) to Lospalos District to enhance the Tasi mane Project;
- ✓ To support Ailambata Natural Gas Development;
- ✓ To Support Agriculture Crops Production to the central market;
- ✓ To support Fishery Development in the Southern Coast;
- ✓ To ensure the safety for traffic movement by the improvement of Road condition;

An extensive network of quality and well-maintained roads is essential to connect the local communities, promote rural development, industry and tourism, and provide access to markets.

Project Concept was planned in March of 2018 by the (Ministry of Development and Institutional Reform) to properly develop the Southern Coast of Timor Leste.
The **Project Outline** is attached at the end of this TOR

4. Scope of Works of FS (Required Output of FS)

4-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of FS for DED

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline".

4-2) Specific Request to be studied in FS:

1) Interconnection effect between Suai Supply Base Project and Viqueque-Lospalos Road
2) Relationship with Aliambata Natural Gas Protection
3) Environment issues
4) Social issues
5) Land acquisition and Resettlement of the people along the road studies
6) Number of traffics PCU per day in Viqueque to Lospalos Roads

4-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

4-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

4-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

- ✓ Counterpart staff;
- ✓ Provision of all available information related to the Project;
- ✓ Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

5. Assignment of Experts

5-1) Period of FS

The required period for FS work is 6 months after Notice to Proceed up to Submission of Final Study Report.

5-2) Assignment of Experts

Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period
Road Engineer (team leader)	Master	Min. 15 years	6
Traffic analyst	-	Min. 5 years	1
Hydrologist	-	Min. 10 years	3
Structure Engineer	-	Min. 10 years	3
Environmental Specialist	-	Min. 10 years	1
Economic Specialist	-	Min. 10 years	1

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

6. Reports and Documents

6-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member

Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

6-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ FS for DED

6-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Copy Number	Time limit
Inception Report	6 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	5 copies	By the 10th day of each month during Study period
Draft Final Report	8 copies	Within **3 calendar weeks** before the final date of contract (Comments will be given within **1 calendar week** after receiving Draft Final Report by the Employer.
Final Report	10 copies	Within **1 calendar week** after the receiving of the formal comment in written from the Employer about Draft Final Report.
One Soft Copy is required on the submission of each Report		

6-4) Attachment to Study Report

The Consultant shall submit following outputs with PFS Report.

- ✓ Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "FS Guideline")
  - ✓ Location map
  - ✓ General plan
  - ✓ Layout plan
  - ✓ Typical cross section
  - ✓ Elevation view
  - ✓ Facility plan
- ✓ Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
- ✓ Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
- ✓ Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
- ✓ Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
- ✓ Checklist of PFS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);

6-5) Checklist

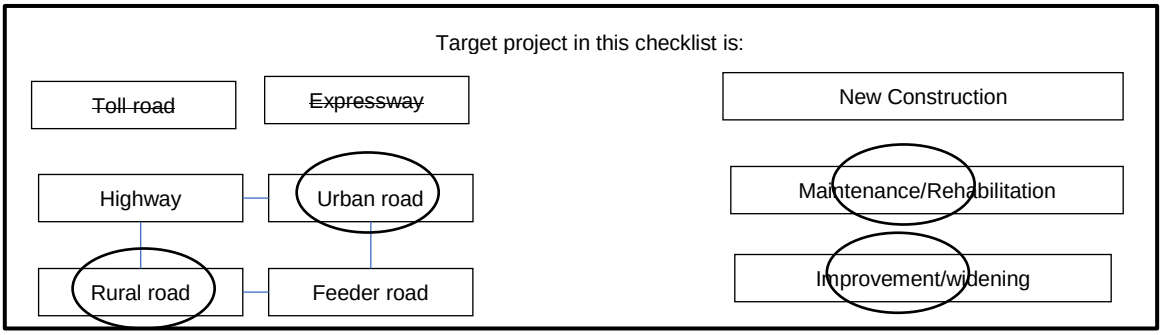
Consultant shall prepare the Checklist as the sample sheet attached to TOR.

Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, or the evaluation rating of PFS report will be subtracted by the EMPLOYER.

- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant may change his subject name for survey and study, but shall keep the bullet of defined item categorization for the convenience of the evaluation by the EMPLOYER.
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Viqueque to Lospalos Road)
Project Concept is expected to attach as Outline of Project without cost matters.

FS Check Sheet



Rehabilitation/Improvement of Urban and Rural Road: Please refer example list on pages 18-21

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 (page 10) and Chapter 10 (page 11))	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
a) Existing Development Plan					
a) Study results of Spatial/ Sector plan	3				
a) Consistency with Upper National Plan	3				
b) Climate survey	5				
b) Hydraulic survey	3				
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)	3				
b) Geological survey (such as foundation or ground survey etc.)					
b) Location survey or topographic survey	5				
c) Regulations / Design standard	3				
c) Design load and design strength of the object's foundation	3				
d) Social conditions before project (such as population, land use etc.) Public transportation & their route	3				
d) Road inventory investigation, if necessary (with land-use status beside road, soundness & safety of road infrastructure)	3				
d) CBR of subgrade and existing pavement structures (necessary for rural road also)	5				
d) Traffic statistical survey, if necessary (registered number, competitive transportation mode status & their use conditions, road extension plan)	3				
d) Traffic volume survey AADT (Annual Average Daily Traffic Volume) on week day, and be shown by PCU (passenger car unit)	5				
d) Current issues					
d) Current revenue, if any	3				
d) Recent budget for the sector	3				
d) Target Area study result (such as features, issues, etc.)	5				
e) Future demand or necessary capacity					
e) Location or route selection or Distribution methodology of the products					
e) Survey of necessary countermeasure points (bottleneck, congestion status & its frequent places, number of traffic accidents, vehicle parking situation study)	5				
e) List up of necessary road facility (such as median, side drainage, street light, street vegetation plan, bus-stop, parking lot, road marking, hump, sign board, pedestrian sidewalk, pedestrian road crossing marking, telecommunication etc.)	3				
e) Necessary ancillary facilities (such as warehouse or equipment)					
e) Design scale of each Project facilities (such as height, level or depth etc.)					
e) Approach measures to the object (such as roads or railways)					
e) Quantities for Major Items, Project Cost and Necessary construction period					
e) Resource survey results (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)	3				
f) Economic & Finantial analysis results					
g) IEE, Resettlement etc. , including Influence of the project to the surroundings	3				
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders	3				
i) Future extension plan, if necessary					
i) Alternative proposal (such as location or routes or methodologies)	3				
i) Privatization tendency					
j) Countermeasures for the risks, such as disasters, waste or emission Study about the necessity of Land slide protection and falling rock prevention works, in case of rural road	3				

Necessity rank shown here is just example. Consultant should put his idea.

Items in each category could be added/ revised based on the project status.

j) Operation and Maintenance plan (O&M)	3				
Drawings prepared in FS (Consul[illegible]y) see Part 1- Chap 11	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
1) Location map 2) General plan	Minimum Drawing for FS				
3) layout Plan 4) Typical Cross section 5) Facility Plan	Secondary Drawing				
Quantity, Unit Rate of major Item & Construction Period in FS		Report page	Checked by LM	Date	Checked by MPS
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Attachment 3)		Report page	Checked by LM	Date	Checked by MPS
8) Direct Benefit (refer Part 1- Attachment 3)					
9) Indirect Benefit					

Necessary drawings are different according to the Project

Prepared by	**Checked by**	**Appraised by**
Consultant name	Ministry & Department	MPS
Person name	Person name	Person name Florindo Martins
Signature	Signature	Signature
Date	Date	Date

LMs and/or Consultant could revise the name of check items and may add in the same category, **but the category should be kept to make clear the content of check item.**

Example 3. Loes - Maliana road improvement

Project Concept

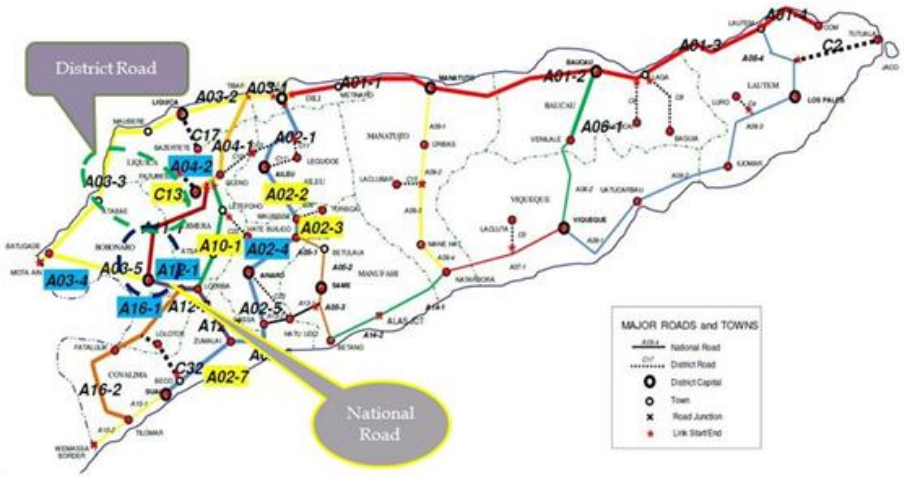
1. **Project Name**

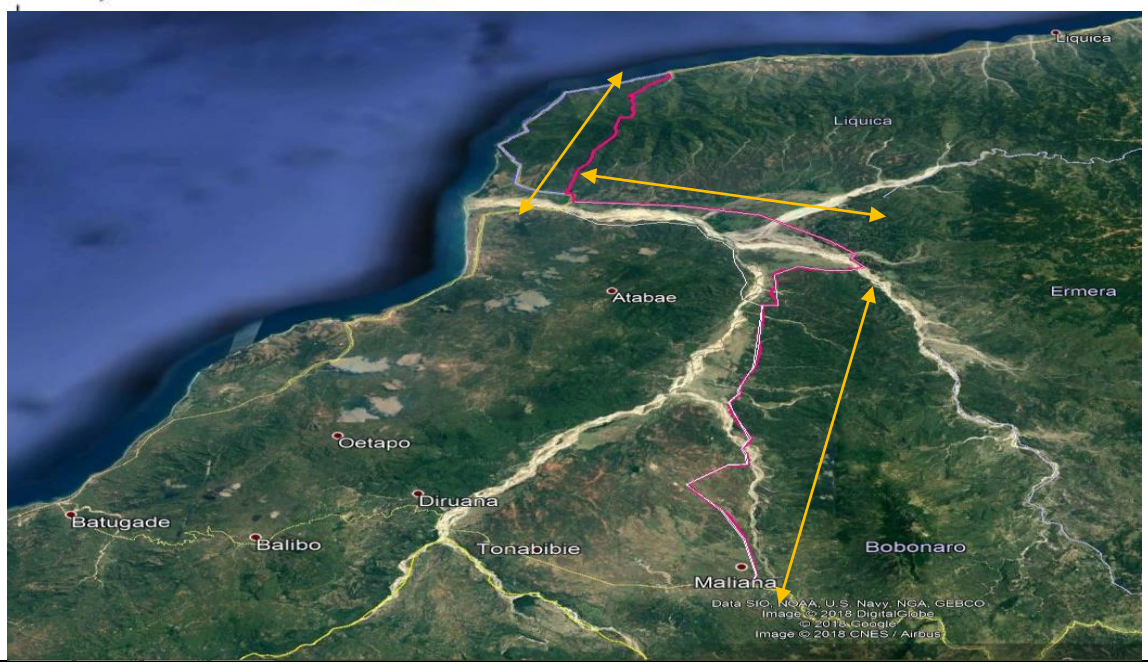
Loes - Maliana road improvement including new shortcut road over cross the mountains

2. **Outline of Project** *(Within a few lines as shown below)*

"In (Location / Target), completion of (Project Purpose) will contribute to (Overall goal) by executing of (Output)"

3. **Project Location Map or Photo**





4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

	Current route	New routes
section	Loes-Batugade-Maliana	Loes-Cailaco-Malina
length	71 km	62 km
condition	seaside roads plus overpass road from Batugade	Loes-Cailaco: Flat 20%, Hilly 80% Cailaco-Malina: Falt 90% Hilly 10%
Lane number	2	2
Bridge number		2 (x 100 m)
Culvert Number		50

5. **Relevance: (Background)**

This project is divided into 2 categories according to SDP

- ✓ National road : Road from Cailaco to Maliana
- ✓ District road : Road from Loes to Cailaco

6. **Rough Cost estimate**

	length	Unit price	amount
Road	62 km	1 million/km	62 million
Bridge	200 m	40 thousand/m	8 million
Culvert	500 m	3 thousand/m	1.5 million
Total Construction cost			71.5 million

7. **Implementation Schedule** (Expected schedule like below Table)

FS	DED	Land Acquisition	Construction	O&M
2019	2020	2020-21	2021-22	2023-
6 months	6 months	18 months	24 months	

8. **Project Benefits**

- ✓ Existing Road Maliana to Liquica and Dili (141km) could be modified by new road to save time, save fuel
- ✓ Contribute local area development. (by exporting agricultural productions to capital area, such as rice, coffee, corn, cow, buffalo, goat etc.)
- ✓ Contribute to basic human needs of the people, such as Access to hospital, school etc.

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. **Specific Item to be studied (if F/S is necessary)**

Study items to solve the Current issue
(it is not good to describe the current issues only)

11. **Expected Financial Resources**

"Infrastructure Fund" or "Loan" or "Grant"

12. **Estimated F/S budget (if F/S is necessary)**

Very rough estimate

Comments

The area suffers frequent river flood. It is expected to consider the conditions for the economic and financial analysis and on detailed design.

Project is better to divide to two or three sections, such as new construction area and widening of existing road sections.

Self-Evaluation Sheets

Score 44

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(Regional Highway: Loes, Cailaco and Maliana)

1. Objective of Project

Construction of a new short cut road between Morai, Loes, Cailaco and Maliana.

- ✓ The length from Dili to Maliana is now 149 km, and it takes approximately 3 hours.
- ✓ New road could reduce the length to 123 km and travel time to 2 hours.

Beneficiaries:

- ✓ Local population 69,000 peoples (Maubara sub district, Hatolia sub district and Cailaco sub district
- ✓ People who travel from Dili and Liquica to Maliana (730,000 Passenger Per year).

2. Background

The Directorate General of _____Public work_____ (hereinafter referred to as "the EMPLOYER"), the Ministry of Minister of Development and Institutional Reform, will require the consulting services of Feasibility Study (FS) of **Morai-Loes-Cailaco-Maliana Road Project** (hereinafter called as the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is an integral part of the Strategic Development Plan 2010-2030 (p73) in Timor Leste and aiming the following functions:

- ✓ Alternative road conection between Dili, Liquica to Malina
- ✓ New Road from Morai to Loes can be an alternative way in case of landslide in Karimbala area
- ✓ To support agriculture production in Maubara, Loes, Hatolia and Cailaco
- ✓ To support livestock production
- ✓ To support basic human needs (such as, access to hospitals and schools)

Project Concept/Idea for the Project was planned by the Ministry of Development and institutional reform in March of 2018 to properly develop District Roads in Loes of Liquica and National Road in Cailaco Maliana.

The **Project Outline** is attached at the end of this TOR.

3. Scope of Works

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of TOR for DED

- ✧ Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- ✧ Shorten study period by parallel works for each survey and study is recommended.
- ✧ The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- ✧ FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline"

3-2) Specific items requested to study:

1) Construction material sources survey (for embankment, sub-base course, base course)
2) Current traffic survey
3) Existing road condition survey and analysis
4) Hydraulically survey and analysis especially for the variation of natural river flow
5) Geological survey
6) Sub grade soil test and analysis, if necessary

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

- ✓ Counterpart staff;
- ✓ Provision of all available information related to the Project;
- ✓ Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts and Junior

4-1) Period of FS

The required period for FS work is **4 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period
Road Engineer (Team Leader)	Master	Min. 15 years	4
Bridge Engineer	-	Min. 10 years	3
Geology Engineer	-	Min. 10 years	3
Hydrologist		Min. 10 years	1
Environmental Specialist	-	Min. 10 years	1
Economic Specialist	-	Min. 10 years	1

Expected Junior Experts Assignment (for the technical transfer to Local Consultant)

	Degree	Experience of Similar Project	Assignment Period
Junior Road Engineer	Bachelor of CE	-	4
Junior Bridge Engineer	Bachelor of CE	-	3
Junior Geology Engineer (GE)	Bachelor of GE	-	3
Junior Hydrologist	Bachelor of GE	-	1
Junior Environment Engineer (EE)	Bachelor of EE	-	1
Junior Economist (E)	Bachelor of E	-	1

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ TOR for DED

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard Copy Number	Time limit
Inception Report	4 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	4 copies	By the 10th day of each month during Study period
Draft Final Report	4 copies	Within 3 calendar weeks before the final date of contract
Final Report	10 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report. (Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
One soft copy should be attached on submission of each Report.		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with PFS Report.

- ✓ Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "FS Guideline")
  - ✓ Location map
  - ✓ General plan
  - ✓ Layout plan
  - ✓ Typical cross section
  - ✓ Elevation view
  - ✓ Facility plan
- ✓ Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
- ✓ Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
- ✓ Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
- ✓ Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
- ✓ Checklist of FS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
- ✓ TOR for DED

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.
Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER.

- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant may change his subject name for survey and study, but shall keep the bullet of defined item categorization for the convenience of the evaluation by the EMPLOYER.
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Loes-Maliana Road)

Project Concept is expected to attach as Outline of Project, but without cost matters.

Example 4. Industrial Park

Project Concept

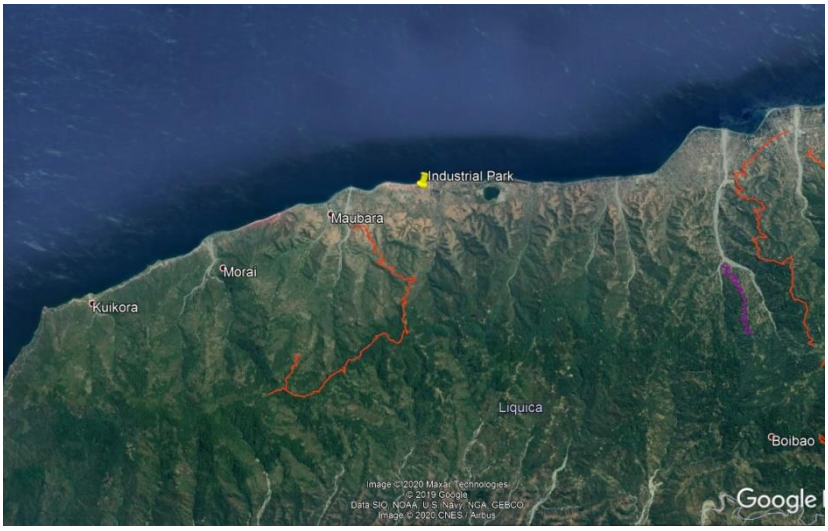
1. **Project Name**

New construction of Industrial Park(Warehouse) in Vatuvou, Liquica

2. **Outline of Project**

*"*Develop a compound of warehouse*"*

3. **Project Location Map or Photo**



4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*	*Expected Plan*
	-	*Vatuvou, Liquica*
Area (m2)	-	*50.000 meter* ^{2}
Capacity	-	*40000m*^{3}
Total employee number	-	*60 jobs*
Current issue / Item to be improve	*There is no warehouse in Timor-Leste that is close to port area*	*To build a warehouse to facilitate Tibar port activity as the port expanded*

5. **Relevance: (Background)**

- ✓ Private investment low 2018
- ✓ Strategic Development Plan (SDP, pg…economic diversification sector page 116)

6. **Rough Cost estimate**

Rough Cost	*Vatuvou Liquica*
Access road	*US$ 500,000*
Site works (Stone masonry wall, main and branch road, main and side ditch, admin office and guard, lawn laying)	*US$ 25,000,000*
Fencing and gating	*US$ 700,000*
Water supply	*US$ 160,000*
Electricity supply	*US$ 143,000*
Extra design and assessment	*US$ 30,000*
Total Cost	*US$ 26,533,000*

7. Implementation Schedule

(F/S)	*(DED)*	*Land Acquisition*	*Construction*	*O&M*
(2019-2020)	*(2020)*	*2020*	*2020-2022*	*2020*
(6 months)	*(2 months)*	*3 months*	*3 years*	

8. Project Benefit

- ✓ Creating jobs. Ultimately accelerating trading.
- ✓ Serve as a regional transshipment hub.
- ✓ The industrial park can provide investors with complementary relationships with the Northern Territory of Australia, Indonesia, Vietnam, Thailand, Singapore and the Philippines.

9. Financial prospect for O&M

(Example)	*Expected Plan*
Annual Revenue (by 1000US$)Company	*40 unit of warehouse*US$ 3,000 per month* *US$ 120,000 * 12 months = US$ 1,440,000* *US$ 1,440,000 * 20 years = 28,800,000*
Expenditure for O&M *(by 1000US$)*	*(60 staff * US$ 300)* *US$ 18,000*
Direct staff number for O&M	***60***

10. Specific Item to be studied (if F/S is necessary)

- ✓ *Comparison with alternative site conditions as industrial park (access, topography, climate, possibility of disaster such as flood, possibility of securing water, possibility of securing employees, etc)*
- ✓ *Examining which kind of industries are suitable as TL industrial parks considering specific conditions in TL, and case studies in similar countries, such as:*
  - *Warehouse and logistic, including repackaging (transshipment hub)*
  - *Recycling plastic, tires, scrap (demand from environment concerns)*
  - *Precast concrete/culvert production (domestic construction demand)*
  - *Rebar processing (domestic construction demand)*
  - *Injection molding for plastic products (cutting transportation cost)*
  - *Furniture assembling (cutting transportation cost)*
  - *Tanning of animal skins (complementary relationship with Australia)*
  - *Food manufacturing (condiments, instant foods, confectionary, etc.) to reduce costs.*
- ✓ *Possibility of securing investors and tenants (promotion method, government preferential treatment (possibility of one-pass process and tax-free district))*
- ✓ *Required facilities (access road, industrial park road, power supply, water supply, communication system, security system, managing office, landscaping)*
- ✓ *Social impact (possibility of increased employment, increased burden on existing infrastructure due to increased traffic)*
- ✓ *Impact on the natural environment (sewage and garbage treatment method, noise/vibration)*
- ✓ *Estimation of investment required*
- ✓ *Prospects for tenants, investors and revenue*

11. Expected Financial Resources

"Infrastructure Fund"

12. Estimated F/S budget (if F/S is necessary)

US 500,000.00

Self-Evaluation Sheet

Score 53

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

Example TOR for Industrial Park

1) Objective of Project (a few lines one is desirable, maximum half page)

Ministry of Tourism, Commerce and Industry (MTCI) is planning to develop the first ever industrial park in the country and offer ready-to-use land under competitive terms of lease contract so that the country might be able to attract more investors, especially foreign investors, and accelerate industrialization.

On the preparation of TOR, the Black part only should be prepared. Grey text is common one to almost project and not necessary to revise

Beneficiaries: (should include estimated beneficiaries' number)
Projected creation of employment: approximately 4,000 jobs).

2) Background (maximum 1 page)

Cabinet General Directorate Industry (hereinafter referred to as "the EMPLOYER"), the Ministry of Tourism, Commerce and Industry, will require the consulting services of Feasibility Study (FS) of **Industrial park in suco Vatuvou** Project (hereinafter called as the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is planned to the attract more investors, especially foreign investors, and accelerate industrialization of the country with the following expected functions:

- ✓ The park can serve as a regional transshipment hub (logistics, warehousing, repackaging) near the new port
- ✓ It can work as a Trilateral Economic Zone
- ✓ Companies can form complementary relationships with the Northern Territory of Australia:
  - Australia's labor cost is about 20 times that of Timor-Leste;
  - Companies in Darwin suffer from a lack of workers, while people in Timor-Leste are looking for jobs.

The **Project Outline** is attached at the end of this TOR.

3) Scope of Works

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social impact Assessment
- ✓ Preparation of Checklist of the study
- ✓ Preparation of TOR for DED

On the preparation of TOR, Grey text part is not necessary to revise.

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.

- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 1-5, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline".

3-2) Specific Request:

✓ Study of Similar industrial park in Asia
✓ Estimation of the kinds and number of investors that can be attracted, such as:
- Warehouse and logistics, including repackaging (Transshipment hub)
- Recycling plastic, tires, scrap (Demand from environment concerns)
- Precast concrete/culvert production (Domestic construction demand)
- Rebar processing (Domestic construction demand)
- Injection molding for plastic products (Cutting transportation cost)
- Furniture assembling (Cutting transportation cost)
- Tanning of animal skins (Complementary relationship with Australia)
- Food manufacturing (condiments, instant foods, confectionary, etc.) to reduce transportation cost.

✓ High profile marketing campaign method to attract investors
✓ Image-building way via publicity materials (pamphlet, website, video, guidebook, newsletter, etc.)
✓ Study about One-Stop Service (OSS) to streamline approval processes
✓ Other required Items in the report:
1) 2-dimentional diagram (Scale: 1/500)
2) Drawings for construction
3) Costing of construction, multiplying process by unit cost
4) 3-dimentional image for marketing of industrial park
5) Environment assessment (not including tenants)

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4) Assignment of Experts

4-1) Period of FS

The required period for FS work is **4 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment

Title	Degree	Experience of Similar Project	Assignment Period
	Master	Min. 15 years	3
	-	Min. 10 years	3
	-	Min. 10 years	1
	-	Min. 10 years	1
	-	Min. 10 years	1

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below.

Summary of Work Sharing Table of Each Experts

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name
The cost estimation of each staff should be shown in Financial Proposal.

5) Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 7 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (Page number of each item should be fillied)
- ✓ TOR for DED

On the preparation of TOR, Black text is not necessary to revise, but change the color of font to black.

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard Copy Number	Time limit
Inception Report	6 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	5 copies	By the 10th day of each month during Study period
Draft Final Report	8 copies	Within **3** calendar weeks before the final date of contract. (Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.)
Final Report	10 copies	Within **1** calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
One Soft Copy is required with hard copies on submission of each Report		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

1) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "Part1")
   - ✓ Location map
   - ✓ General plan
   - ✓ Layout plan
   - ✓ Typical cross section
   - ✓ Elevation view
   - ✓ Facility plan
2) Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "Part1");
3) Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "Part1");
4) Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "Part1");
5) Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "Part1");
6) Checklist of FS/FS Report (Sample Form is attached in Attachment 1-1 of "Part1";
7) TOR for DED

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.

Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER.

- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of "FS Guideline Part 1".
- ✓ Consultant may change his subject name for survey and study but shall keep the Category of defined item categorization for the convenience of the appraisal by the EMPLOYER.
- ✓ Consultant may add survey subject or study subject within a defined Category specified in Table 1-6 & 1-7 of "FS Guideline Part 1".
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

6. Outline of Project

➢ Outline of Project could be prepared from Project Concept, which will be prepared on the initial stage of the Project.

(reference only to whom prepare TOR)

The difference between Project Concept and Outline of Project is shown in Table below:

- Example Structure of Project Concept and Outline of Project

Project Concept	**Outline of Project**
Project Name	Project Name
Location	Project Purpose Location
Outline scale and characteristics of the project,	Background Outline scale
The reasons, especially why the project has a priority comparing with other projects;	Characteristics of Project
Project benefits (if possible with the estimated amount) and beneficiaries (with estimated numbers);	Construction timeline
Expected timeline: project duration and period of completion of construction	Available source Road Map for future development
Special conditions, if any (e.g. climate, soil, residents, rare species, etc.);	(Not Necessary)
Rough cost estimate, cost/benefit (B/C) and payback period of investment.	

Example 5. Securing of Surface Water Resources for Future Greater Dili

Project Concept

1. **Project Name**

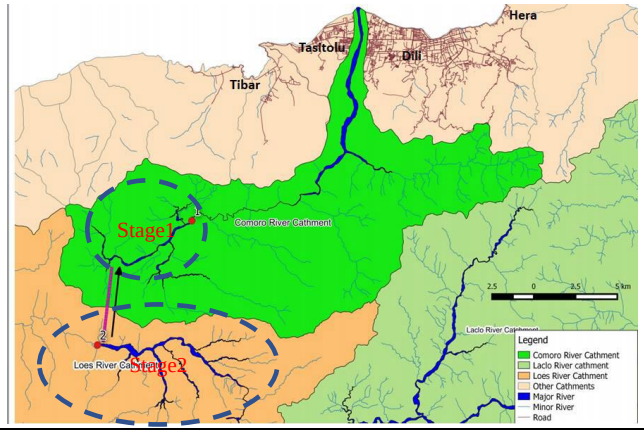
Securing of Surface Water Resources for Future Greater Dili (Water Supply to Dili Metropolitan Area)

2. **Outline of Project** *(Within a few lines as shown below)*

"In (Location / Target), completion of (Project Purpose) will contribute to (Overall goal) by executing of (Output)"

3. **Project Location Map or Photo**

From Railaco and Gleno Basin to Dili Water Plant area



4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

	Stage1: Railaco	Stage2: Gleno
Dam effective height	20m	35m
Dam width	132m	200m
Rock fill dam Volume	250,000m3	530,000m3
Reservoir area	480,000m2	2,300,000m2
Reservoir capacity	7,500,000m3	13,000,000m3
Water transmission	Around 18km	Around 5km (Tunnel)
Relocation of Bridge	2 bridges (L100m & 30m)	none
Relocation of Road	L1500m	none
Resettlement of Houses	50	20

5. **Relevance: (Background)**

6. **Rough Cost estimate**

	Stage1: Railaco	Stage2: Gleno
Total rough Cost	38,750,000	81,300,000
	Stage 1+2=US$ 120,000,000-*1.2= US$**144,000,000**	
Unit Cost Estimation	US$39Miilon*1.2 / (15,600,000m3/year*10year) =**$0.30-/m3** (per 10years)	US$81Miilon*1.2 / (60,000,000 m3/year*10year)=**$0.16/-m3** (per 10years)

7. **Implementation Schedule** (Expected schedule like below Table)

	FS	DED	Construction	O&M
Stage 1 (Railaco)	2019-2021	2021-2022	2022-2028	2029-
Stage 2 (Gleno)	2029-2030	2031-2033	2034-2039-2049 (by 2 stages)	2039-2049-

8. **Project Benefits**

Quantitative: B/C, Redemption period
Qualitative: Narrative in few sentences

9. Financial prospect for O&M (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. Specific Item to be studied (if F/S is necessary)

Necessary water demand of Dili including Tasitolu, new Tibar industrial and Hera considering the future population

	2030	2040	2050
Necessary basic water volume (lps)	500	1000	2000
Ditto (m3/month)	1,300,000	2,600,000	5,000,000

The current water supply capacity is presented in ADB report as shown below.

Source Type	Wet Season	Dry Season	Production Max.	Production Min.
Surface (River)	445	128	151	126
Bore (Ground water)	485	485	485	485
Total	930	613	636	613

Source: ADB Dili Urban Water Supply System: Outline Investment M/P p10

Precipitation Analysis in Railaco and Gleno (following is just reference):

Precipitation		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average 2005-2013 in Dili	mm/month	107	133	88	116	80	32	40	5	16	42	73	170
Railaco Precipitation x1.5	mm/month	161	173	114	151	104	42	52	7	21	55	95	221
Gleno Precipitation x2.5	mm/month	268	333	220	290	200	80	100	13	40	105	183	425

Analysis of available water volume and size of dam.

Railaco in case of 500lps demand	unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly volume into dam	X000m3/M	2,385	3,396	3,084	4,587	3,939	906	906	258	285	258	129	312
Monthly Demand (500lps)	X000m3/M	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296	1,296
Monthly difference	X000m3/M	1,089	2,100	1,788	3,291	2,643	-390,	-390,	-1,038	-1,011	-1,038	-1,167	-984
Dam							Necessary Volume: 6,000,000m3						

at Gleno. in case of 1000lps demand	unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Flow into dam	X000m3/M	7,050	11,223	10,161	15,294	13,038	2,928	2,928	828	882	753	363	1,011
Monthly Demand (1000lps)	X000m3/M	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592	2,592
Monthly difference	X000m3/M	4,458	8,631	7,569	12,702	10,446	336	336	-1,764	-1,710	-1,839	-2,229	-1,581
Dam									Necessary Volume: 8,500,000m3				

Public advertisement of the development Plan before 2020 with the **regulations** about the restrictions on new housing and facilities in the project area to avoid the troubles with the residents

11. Expected Financial Resources

"Infrastructure Fund" or "Loan" or "Grant"

12. Estimated F/S budget (if F/S is necessary)

Very rough estimate

Comments

Securing water in the Dili metropolitan area is one of the most important national policy, and countermeasures have been studied with the support of ADB in the past.
Currently, the water resources of Dili depend on mainly groundwater and surface water (Bemos river), but now ground water is pointed out to have a contamination problems of sea water and sewage, and the possibility of the ground subsidence in future. Accordingly, it is difficult to secure from ground more than present volume. Therefore, the possibility of utilization of surface water of the Comoro River and the Gleno River is expected to be investigated, until the cost of desalination of seawater is reduced to practical level.
FS could be divided into two kinds, for Stage 1 only or for both stage at the same time, according to the availability of FS budget.

Self-Evaluation Sheets

Score 50

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast		Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(Dili Water Supply stage 1)

1. Objective of Project

Secure of future water resources of Great Dili City area up to 2030.

Beneficiaries:

Dili citizen including Tibar and Hera (340,000 in 2030).

2. Background

The Directorate General of _____ (hereinafter referred to as "the Employer"), the Ministry of _____, will require the consulting services of Feasibility Study (FS) of **Dili Water Supply Project** (hereinafter called as the Project).

The Employer intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and the Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

Water demand of Dili city (including Tibar industrial area Hera and Tasi Tolu area) is sure to expand in the future, and a water supply project is essential to deal with this tendency.

About 600 lps (=52,000m3/d) is assumed as the current resource. The shortage of water resources becomes 500lps (=40,000m3/day) in 2030. Ground water resources, which are very common in present, is not recommendable considering the hygiene effect and ground settlement in future.

Dili should ask for new water resources to solve the near future vital issues. As one of most practical solution, surface water utilization from Railaco area and Gleno Area is considered.
However, the river flow volume in Railaco has fluctuation according to the seasonal variation, and construction of dams with water transition pipe to the purification plant are requested.
On the other hands, ground water flow volume in Gleno area seems to be enough as the resources even though the seasonal fluctuation. However, the transition of water to the Dili Area will be a problem to be solved, because the transition pipe to Dili should cross the high mountain area and deep valley area.

For the realization of the National Strategic Development Plan and the Sustainable Development Goal, securing of the sustainability of water resources for Dili urban people is one of the top priority projects for the Government of Timor-Leste.
It has the following essential functions:

- ✓ To ensure of civilized citizen life in Dili City;
- ✓ To supplement the functions of supplying water for Educational center of Hera area, New Tibar Port and its hinterland Industrial Park;
- ✓ To ensure the public water for green zone in the area and for fireworks; and
- ✓ To support the development of Great Dili and Timor-Leste.

Project Concept/Idea for the Project was planned in MM of YYYY by the _ (Ministry Name) _to properly develop **the Dili Capital City Area**.

Project Outline with Current condition of target area is attached at the end of this TOR.

3. Scope of Works of FS (Output required by FS)

3-1) General Requirement of FS:

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of TOR for DED

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline".

3-2) Specific Items requested to study:

- ✓ Necessary water volume in 2030. (not necessary to consider all the stage in the road map of Dili water supply)
- ✓ Source areas and their available quantities.
- ✓ Pipe line route to purification plant and necessary storages for the supply.
- ✓ Purification plant expected to be constructed at Comoro river side and/or Southern Tibar Area. (This location will be informed prior to pre-bid meeting)
- ✓ Future increase of agricultural water at the water source area.
- ✓ Dam life due to sedimentations, and Soil erosion prevention dam
- ✓ Measures for resettlement of residents in the future (including necessary land regulations).
- ✓ Distribution lines to houses and facilities are excluded.
- ✓ Purification plant and Distribution lines to houses with facilities are excluded.

3-2) Cooperation

The Employer has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-3) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-4) Services and Facilities Provided by the Employer

The Employer shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

- ✓ Counterpart staff;
- ✓ Provision of all available information related to the Project;
- ✓ Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **3 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment (for reference only)

	Degree	Experience of Similar Project	Assignment Period
Water Infrastructure Engineer	Master	Min. 15 years	3
Water Dam Engineer	-	Min. 10 years	2
Structure Engineer	-	Min. 10 years	1
Environmental Specialist	-	Min. 10 years	1
Economic Specialist	-	Min. 10 years	1

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ TOR for DED

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard copy Number	Time limit
Inception Report	4 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	3 copies	By the 10th day of each month during Study period
Draft Final Report	5 copies	Within 3 calendar weeks before the final date of contract
Final Report	8 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
One soft copy is requested to submit with hard copies on each report submission		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

- Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with Employer prior to the work): (see Chapter 11 of "FS Guideline")
  - ✓ Location map
  - ✓ General plan
  - ✓ Layout plan
  - ✓ Typical cross section
  - ✓ Elevation view, if necessary
  - ✓ Facility plan
- Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
- Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
- Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
- Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
- Checklist of FS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
- TOR for DED

5-5) Checklist

Consultant shall prepare the Checklist ~~as the sample sheet attached to TOR~~.

- ✓ Checklist is important document for the Employer to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the Employer.
- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant may change his subject name for survey and study, but shall keep the bullet of defined item categorization for the convenience of the evaluation by the Employer.
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

FS Check Sheet

Target project in this checklist:

Water resources, such as River, groundwater, etc.	Intake facilities, such as Dam, Barrage, Well, etc.	Water conveyance facilities, such as Canal, Pipe, etc.	Purification facilities	Distribution facilities, such as pipe, bulb, etc.	Tariff collection facilities, such as bulb, meters etc.
			Irrigation facilities		Sewage facilities

Urban watering project Please refer example list on pages 18-21

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 (page 10) and Chapter 10 (page 11))	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
a) Existing Development Plan					
a) Study results of Spatial/ Sector plan					
a) Urban development plan, or regional plan/ sector plan	3				
a) Water plan for Agricultural & Industrial	3				
a) Consistency with Upper National Plan	3				
b) Climate survey	3				
b) Hydraulic survey	3				
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)	3				
b) Geological survey (such as foundation or ground survey etc.)	5				
b) Location survey or topographic survey	5				
c) Regulations / Design standard					
c) Target watering basic unit	4				
c) Watering basic unit, (lit/m2/day, lit/person/day, lit/bed/day, lit/seat/day)	5				
c) Design load and design strength of the object's foundation					
d) Social conditions before project (such as population, land use etc.)					
d) Social economy status of resident, Supply area, population	5				
d) Number of people/ facilities	5				
d) Watering demand	5				
d) basics facility structure	3				
d) Reservoir, elevated storage tank (capacity, water level, structure)	3				
d) Water cleaning method (drainage, sludge treatment methods of facilities for filtration, etc.)	3				
d) Water transmission method (power source, no pressure flow, pipe, crossing method of hill, river)	5				
d) Water supply method (power, no pressure flow, kinds of pipe, diameter)	5				
d) Water supply volume and Target water supply	5				
d) Water pipe network service, supply area expanding method	5				
d) Inventory Survey for exiting available facilities or demolished					
d) Distribution pipe arranging status	5				
d) Load factor, Time deviation status	3				
d) Watering time, watering pressure	3				
d) water quality from different resources	5				
d) Water meter installation status	5				
d) Status of ancillary facilities	3				
d) Utilization status survey (traffic volume, cargo, vessel number, possible user number)					
d) Demand & supply status of water resources	5				
d) Current issues	3				
d) Current revenue, if any	3				
d) Current fee collection system	5				
d) management status, such as Revenue and expenditure	5				
d) Recent budget for the sector	3				
d) Target Area study result (such as features, issues, etc.)					
e) Future demand or necessary capacity					
e) Forecasting of future time deviation factor	5				
e) Location or route selection or Distribution methodology of the products					
e) Necessary facilities scale and/or numbers etc.					
e) Reduction measure of non-revenue water	3				
e) Necessary ancillary facilities (such as warehouse or equipment)	3				

Necessity rank shown here is just example. Consultant should put his idea.

Items in each category could be added/ revised based on the project status.

e) electric equipment					
e) Design scale of each Project facilities (such as height, level or depth etc.)	3				
e) Approach measures to the object (such as roads or railways)	3				
e) Quantities for Major Items, Project Cost and Necessary construction period	5				
e) Resource survey results (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)	3				
f) Economic & Finantial analysis results					
g) IEE, Resettlement etc. , including Influence of the project to the surroundings	3				
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders	3				
i) Future extension plan, if necessary	3				
i) Alternative proposal (such as location or routes or methodologies)					
i) Privatization tendency	3				
j) Countermeasures for the risks, such as disasters, waste or emission	3				
j) Countermeasure against robbery	3				
j) Operation and Maintenance plan (O&M)	5				
j) ~~Watch &~~ control system for water quantity, water pressure	3				
j) Water supply administration (water tariff bill etc.)	3				
Drawings prepared in FS (Consul[illegible]y) see Part 1- Chap 11	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
1) Location map 2) General plan	Minimum Drawing for FS				
3) layout Plan 4) Typical Cross section 5) Facility Plan	Secondary Drawing				
Quantity, Unit Rate of major Item & Construction Period in FS		Report page	Checked by LM	Date	Checked by MPS
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Attachment 3)		Report page	Checked by LM	Date	Checked by MPS
8) Direct Benefit (refer Part 1- Attachment 3)					
9) Indirect Benefit					

Necessary drawings are different according to the Project

Prepared	**Checked**	**Appraised**
Consultant name	Ministry & Department	MPS
Person name	Person name	Person Mario Jeronimo
Signature	Signature	Signature
Date	Date	Date

LMs and/or Consultant could revise the name of check items and may add in the same category, **but <u>the category should be kept</u> to make clear the content of check item.**

TOR (Terms of Reference)

(Dili Water Supply stage 1 & 2)

1. Objective of Project

Secure of future water resources of Great Dili City area up to 2050.

Beneficiaries:

Dili citizen including Tibar and Hera (500,000 in 2050).

2. Background

The Directorate General of_____ (hereinafter referred to as "the Employer"), the Ministry of _____, will require the consulting services of Feasibility Study (FS) of **Dili Water Supply Project** (hereinafter called as the Project).

The Employer intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

Water demand of Dili city (including Tibar industrial area, Hera and Tasitolu area) is sure to expand in the future, and a water supply project is essential to deal with this tendency.

About 600 lps (=52,000m3/d) is assumed as the current resource. The shortage of water resources becomes 500lps (=40,000m3/day) in 2030 and 2000lps (=180,000m3/day) in 2050. Ground water resources, which are very common in present, is not recommendable considering the hygiene effect and ground settlement in future.

Dili should ask for new water resources to solve the near future vital issues. As one of most practical solution, surface water utilization from Railaco area and Gleno Area is considered.
However, the river flow volume in Railaco has fluctuation according to the seasonal variation, and construction of dams with water transition pipe to the purification plant are requested.
On the other hands, ground water flow volume in Gleno area seems to be enough as the resources even though the seasonal fluctuation. However, the transition of water to the Dili Area will be a problem to be solved, because the transition pipe to Dili should cross the high mountain area and deep valley area.

For the realization of the National Strategic Development Plan and the Sustainable Development Goal, securing of the sustainability of water resources for Dili urban people is one of the top priority projects for the Government of Timor-Leste.
It has the following essential functions:

- ✓ To ensure of civilized life in Dili City;
- ✓ To supplement the functions of supplying water for Educational center of Hera area, New Tibar Port and its hinterland Industrial Park;
- ✓ To ensure the public water for green zone in the area and for fireworks; and
- ✓ To support the development of Great Dili and Timor-Leste.

Project Concept/Idea for the Project was planned in MM of YYYY by the _ (Ministry Name) _to properly develop **the Dili Capital City Area**.

Project Outline with Current condition of target area is attached at the end of this TOR.

3. Scope of Works of FS (Output required by FS)

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
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- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of TOR for DED

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal on FS should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline".

3-2) Specific Items requested to study

- ✓ Necessary water volume up to 2050. (to consider all the stage in the road map of Dili water supply up to 2050)
- ✓ Source areas and their available quantities.
- ✓ Pipe line route to purification plant and necessary storages for the supply.
- ✓ Purification plant expected to be constructed at Comoro river side
- ✓ Future increase of agricultural water at the water source area.
- ✓ Dam life due to sedimentations, and Soil erosion prevention dam
- ✓ Measures for resettlement of residents in the future (including necessary land regulations).

- ✓ Distribution lines to houses and facilities are excluded.
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3-3) Cooperation

The Employer has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the Employer

The Employer shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

- ✓ Counterpart staff;
- ✓ Provision of all available information related to the Project;
- ✓ Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **5 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment (for reference only)

	Degree	Experience of Similar Project	Assignment Period
Water Infrastructure Engineer（PM）	Master	Min. 15 years	5
Water Dam Engineer	-	Min. 10 years	3
Structure Engineer	-	Min. 10 years	2
Environmental Specialist	-	Min. 10 years	2
Economic Specialist	-	Min. 10 years	1

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents.And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline Part1.
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ FS TOR

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard copy Number	Time limit
Inception Report	4 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	3 copies	By the 10th day of each month during Study period
Draft Final Report	5 copies	Within 3 calendar weeks before the final date of contract
Final Report	8 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
One soft copy is requested to submit with hard copies on each report submission		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

- ✓ Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with Employer prior to the work): (see Chapter 11 of "FS Guideline")
  - ✓ Location map
  - ✓ General plan
  - ✓ Layout plan
  - ✓ Typical cross section
  - ✓ Elevation view, if necessary
  - ✓ Facility plan
- ✓ Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
- ✓ Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
- ✓ Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
- ✓ Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
- ✓ Checklist of FS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
- ✓ TOR for FS

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.

Checklist is important document for the Employer to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the Employer.

- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 1nd 1-7 of FS Guideline Part 1.
- ✓ Consultant may change his subject name for survey and study, but shall keep the bullet of defined item categorization for the convenience of the evaluation by the Employer.
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 1nd 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Dili Surface Water Resource)

(Project Concept) is expected to attach as Outline of Project, but without cost matters.

Example 6. Dili Airport Improvement

Project Concept

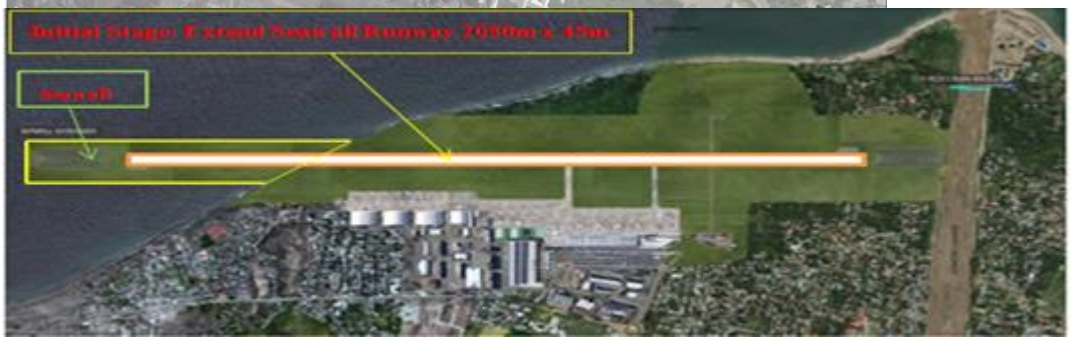
1. **Project Name**

Development of President Nicolau Lobato International Airport

2. **Outline of Project** *(Within a few lines as shown below)*

Expanding and improvement of the President Nicolau Lobato International Airport (PNLIA) to an International Standard Airport to handle **One Million Passengers per Year in 2040**.

3. **Project Location Map or Photo**



4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*	*Expected Plan*
Improvement of runway and aprons to meet with Aircraft A310 and B737		Runway extension to L 2050m W 45m from L 1800m
Current Issues / Items to be improved		Expansion of Terminal Buildings for passenger & Cargo
		Installation /improvement of air Navigation Facilities to meet with ICAO standard for the night time operation.

5. **Relevance: (Background)**

Air Craft, Passenger and Cargo numbers has been increasing rapidly, and expected to correspond to the future traffic volume:

	2008	2009	2010	2011	2012	2013	2014	2015	2020	2025	2035	2040
Aircraft	3,328	4,056	4,980	4,150	4,474	5,208	6,056					
Passenger	97,807	125,722	149,962	151,488	179,493	187,282	198,080	200,000	290,000	400,000	800,000	1,000,000
Cargo (t)	326,410	421,372	415,653	426,029	476,709	239,318	172,390					

(Source: MoPWTC) (by International Finance Cooperation)

6. **Rough Cost estimate**

7. **Implementation Schedule** (Expected schedule like below Table)

Project concept	FS	DED	Land Acquisition	Construction	Open &Maintenance
2018	2018-19	2019-20	2021-2022	2022-2025	2026-
	6 months	12 months	2years	4 years	

8. **Project Benefits**

Quantitative: B/C, Redemption period
Qualitative: Narrative in few sentences

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. **Specific Item to be studied (if F/S is necessary)**

Comparison study about two alternatives in case of Runway extension (following are reference only)

Option 1 Extension for East over Comoro river

		Quantity	Unit price	amount
New airport building plan	M2	300x200	350	21 million
Runway improvement with extension	M2	2500x50	200	25 million
Taxiway	M2	300x30	200	1.8 million
Aero Navigation system				30 million
Apron	M2	200x100	200	4 million
Bridge	M2	250x50	500	17.5 million
Approach road from city	M	3,200	100	0.32 million
Resettlement and land accusation	house	400	25,000	5 million
total				101 million
				102

Option 2 Extension to West side sea area

		Quantity	Unit price	amount
New airport building plan	M2	300x200	350	21 million
Runway improvement with extension	M2	2100x50	200	21 million
Taxiway	M2	300x30	200	1.8 million
Aero Navigation system				30 million
Apron	M2	200x100	200	4 million
Reclamation	M2	700x50	500	17.5 million
Approach road from city	M	3,200	100	0.32 million
Resettlement and land accusation	house	200	25,000	5 million
Total				103 million

11. Expected Financial Resources

"Infrastructure Fund" or "Loan" or "Grant"

12. Estimated F/S budget (if F/S is necessary)

Very rough estimate

Comments

Dili international airport improvement/development is urgent national target to meet with the future demand of passenger and cargo to develop the country.
However, Airport development is a project that requires advanced comprehensive technology, and it can be said that only consultants with sufficient experience and special know-how can do the study.
In view of the current state of TL, the international airport FS is expected to be ordered to the good international consultant considering the necessity of foreign financial assistance also, and local consultant could accumulate experience and know-how through the cooperation works.

Self-Evaluation Sheet

Score 63

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no info
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (Tsunami)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(President Nicolau Lobato International Airport)

1. Objective of Project

Development of President Nicolau Lobato International Airport with:

- ✓ Improvement of the level of services and increase the capacities of airport facilities to handle one million passengers per year.
- ✓ Buildup of stronger aviation links with foreign airports
- ✓ Improvement of infrastructure to enable boost tourism and other sectors in Timor-Leste

Beneficiaries:

Dili citizens (340,000 citizens in 2035 and 500,000 persons in 2050)
Passengers (800,000 passengers in 2035 and 1,000,000 persons in 2040)
Airport employee (600 persons in 2035, and 700 persons in 2040)

2. Background

The Civil Aviation Authority Timor-Leste (AACTL) and Air Navigation Administration Timor-Leste (ANATL) (hereinafter referred to as "the EMPLOYER"), the Ministry of Development and Institutional Reform, will require the consulting services of Feasibility Study (FS) of the Development of President Nicolau Lobato International Airport.

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is an integral part of the Strategic Development Plan 2011-2030 (p.99) with the following essential functions:

- ✓ Generally, the airport is now in poor condition and it needs substantial improvement for the development to meet with increasing passenger numbers and to support the tourist market.
- ✓ To meet future demand, the airport should be expanded to handle up to one million passengers per year. This will involve the extension of the runway and a new terminal building.
- ✓ To strengthen the function and the management by the airport authority on commercial aspects of the airport and to maintain operational capacity under the financing schedule over the longer term.
- ✓ To support the enhancement of tourism and other economic sectors by building stronger aviation links with major Asian airports

Project Concept/Idea for the Project was planned by the Ministry of Development and Institutional Reform in January of 2018 to properly develop of President Nicolau Lobato International Airport.

The Project Outline d is attached at the end of this TOR.

3. Scope of Works

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study

- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of TOR for DED

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose some methods for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline"

3-2) Specific items requested to study:

1) Necessary Runway length and width for the operation of A310 and B737 (recommended runway length by ICAO (International Civil Aviation Organization) is 2500m)
2) New aero-navigation control system
3) Improvement of airport lighting system to day and night
4) Safety area around runway in compliance with ICAO standards
5) Resettlements of local people on the runway expansion area, in case of Alternative A and for Terminal Building Area.
6) Technical possibility of the runway bridge over Comoro River in Case of Alternative A including minimalizing of sedimentation under the bridge
7) Possibility of reclamation or piling for the runway expansion area, in case of Alternative B.
8) Necessary Countermeasure for noise
9) Apron scale to expand the aircraft capacity
10) Terminal building capacity to respond to operation and security requirement for passenger handling
11) Access road improvement between Airport and Dili
12) Necessary traffic treatment during the construction
13) Environments and social influences

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, requires the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **8 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period
Airport Engineer (Team Leader/Airport Planner)	Master	Min. 15 years	8
Assistant Airport Engineer	-	Min. 10 years	3
Architect	-	Min. 10 years	3
Air Traffic control specialist	-	Min. 10 years	3
Electronic and communication Engineer	-	Min. 10 years	3
Environmental Specialist	-	Min. 10 years	3
Economic Specialist	-	Min. 10 years	3

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
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5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

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Inception Report	5 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
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One soft copy should be attached on the submission of each report		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with PFS Report.

1) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "FS Guideline")
   - ✓ Location map
   - ✓ General plan
   - ✓ Layout plan
   - ✓ Typical cross section
   - ✓ Elevation view
   - ✓ Facility plan
2) Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
3) Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
4) Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
5) Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
6) Checklist of PFS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
7) TOR for DED

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.

Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, or the evaluation rating of PFS report will be subtracted by the EMPLOYER.

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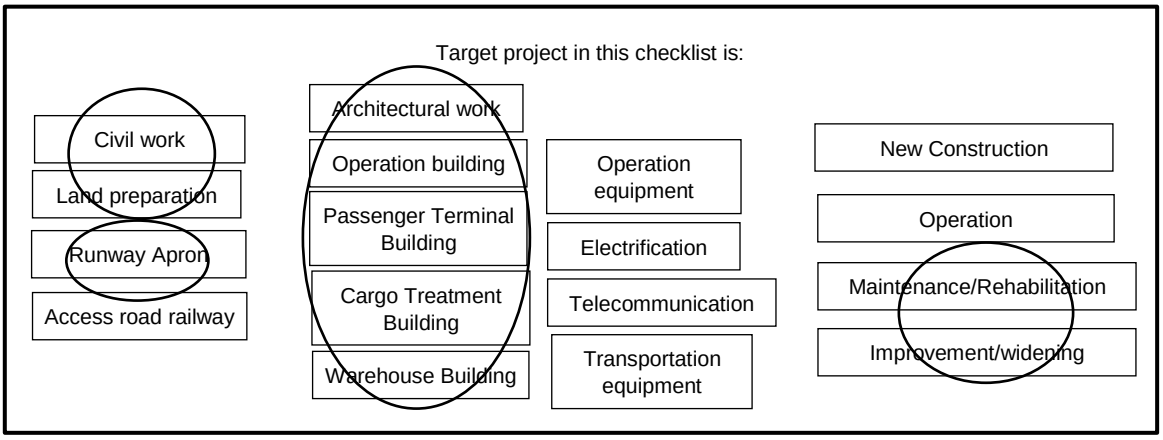
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Dili Airport)

(Project Concept) is expected to attach as Outline of Project, but without cost matters.

FS Check Sheet



Airport (mainly for improvement Project Please refer example list on pages 18-21

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 (page 10) and Chapter 10 (page 11))	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
a) Existing Development Plan	5				
a) Study results of Spatial/ Sector plan	3				
a) Industrial future development plan	3				
a) Consistency with Upper National Plan	3				
b) Climate survey	3				
b) Hydraulic survey	3				
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)	3				
b) Geological survey (such as foundation or ground survey etc.)	3				
b) Location survey or topographic survey	5				
c) Regulations / Design standard	4				
c) Design CBR, design bearing capacity	3				
c) Design load and design strength of the object's foundation					
d) Social conditions before project (such as population, land use etc.)					
d) Inventory Survey for exiting available facilities or demolished	3				
d) Design object aircraft, design volume (aerial demand prediction)	5				
d) Investigation about current number of aircraft taking off and landing	5				
d) Annual number of passengers	3				
d) Number of current transfer transits & Number of passengers at peak period.	4				
d) Utilization status survey (traffic volume, cargo, vessel number, possible user number)					
d) taking off and landing number on peak day	4				
d) Soundness & safety of existing facilities	5				
d) Past as built drawing or design drawing	5				
d) Amount of current freight, number of passengers	5				
d) Study about airline company	3				
d) Related enterprise using of the facilities for the review of amount of freight and the number of passengers in future	3				
d) Current issues	3				
d) Current revenue, if any					
d) Current financial status & Recent budget for the sector	5				
d) Target Area study result (such as features, issues, etc.)	4				
e) Future demand or necessary capacity	4				
e) Location or route selection or Distribution methodology of the products	3				
e) Necessary facilities scale and/or numbers etc.					
e) New airport building plan	5				
e) New Runway number and Apron area	5				

Necessity rank shown here is just example. Consultant should put his idea.

Items in each category could be added/ revised based on the project status.

e) Pavement area (runway, taxiway, apron, overrun, shoulder)	3				
e) Necessary ancillary facilities (such as warehouse or equipment)	3				
e) Design scale of each Project facilities (such as height, level or depth etc.)					
e) Approach measures to the object (such as roads or railways)	3				
e) Quantities for Major Items, Project Cost and Necessary construction period	5				
e) Resource survey results (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)	3				
f) Economic & Finantial analysis results	5				
g) IEE, Resettlement etc. , including Influence of the project to the surroundings	3				
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders	3				
i) Future extension plan, if necessary	3				
i) Alternative proposal (such as location or routes or methodologies)	3				
i) Privatization tendency	4				
j) Countermeasures for the risks, such as disasters, waste or emission	3				
j) Operation and Maintenance plan (O&M)	4				
Drawings prepared in FS (Consul) see Part 1- Chap 11	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
1) Location map 2) General plan	Minimum Drawing for FS				
3) layout Plan 4) Typical Cross section 5) Facility Plan	Secondary Drawing				
Quantity, Unit Rate of major Item & Construction Period in FS		Report page	Checked by LM	Date	Checked by MPS
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Attachment 3)		Report page	Checked by LM	Date	Checked by MPS
8) Direct Benefit (refer Part 1- Attachment 3)					
9) Indirect Benefit					

Necessary drawings are different according to the Project

Prepared	Checked	Appraised
Consultant name	Ministry & Department	MPS
Person name	Person name	Person name Nicolau Belo
Signature	Signature	Signature
Date	Date	Date

LMs and/or Consultant could revise the name of check items and may add in the same category, **but the category should be kept to make clear the content of check item.**

Example 7. Com Fishery Port

Project Concept

1. **Project Name**

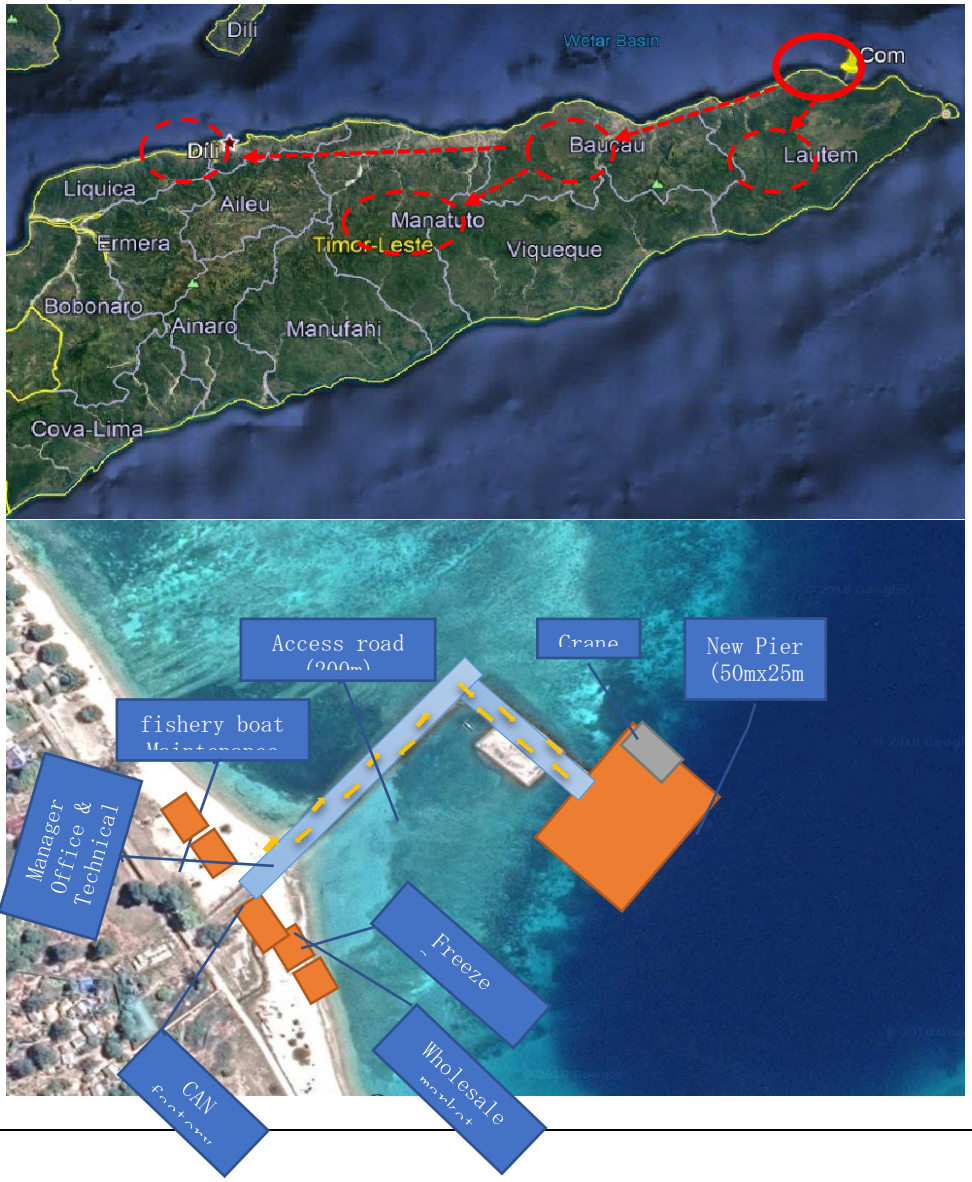
Com Fishing Port

2. **Outline of Project** *(Within a few lines as shown below)*

The aim of the fishing port project is to promote industrial fishing in order to maximize the economic and social benefit that country can draw from the rational exploitation of fishery resource in its economic exclusive zone. Timor Leste's income heavily reliant on Oil and Gas which is the only source that used for development of the country, by increase number of population and economic demand, estimated that, without new sources of income, Timor Leste will face economic crises in the future. So the purpose of Fishing Port Project is an alternative way to generate income as a proponent for sustainable economic of the country

3. **Project Location Map or Photo**

Com, Lautem District



4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*	*Expected Plan*
Area (m2) or Length (km)	***75m x 150m***	***100m x 200m (Development)***
Production Volume of the fish/year	***N/A***	***4500 ton***
Total employee number	***-***	***100 persons***
Current Issues / Items to be improved	***1. Pier damaged 2. Access road damaged 3. No can factory 4. No Refrigerator***	***1. Rehabilitated & expansion of the Pier 2. Improvement of the Access road 3. Construction of can factory 4. Buy new Refrigerator***

5. **Relevance: (Background)**

- The project is priority because it's in line with the Strategic Development Plan (SDP – *page 95 - 97*) of Timor Leste 2011 – 2030 said, Seaport infrastructure development is vital to allow Timor-Leste to import critical goods and equipment to bolster our economy and build major infrastructure.
- Regional ports, Timor Leste will embark on a regional ports construction program over the next ten years. Port facilities will be build, repaired or substantially expanded at:
- Com, where the wharf will be upgraded to build a port and a fisheries industry facility

6. **Rough Cost estimate**

		Quantity	Unit price	amount
Pier	M2	1250	8,000	10 million
Access road	M	200	1,250	0.2 million
Docking repairing	M2	400	5,000	2 million
Maintenance office	M2	400	1,875	0.8million
CAN factory	M2	1,600	6,250	10 million
Refrigerate Storage house	M2	225	2,000	0.5 million
Management Office	M2	225	1,000	0.2 million
Fish market	M2	225	500	0.1 million
Loading facility – Crane	set	1		0.1 million
total				24 million

7. **Implementation Schedule** (Expected schedule like below Table)

(F/S)	*(DED)*	*Land Acquisition*	*Construction*	*O&M*
(2020	*(2020)*	*N/A*	*2021-2024*	*2025---*
(6 months	*(6 months)*	*N/A*	*3 years*	

8. **Project Benefits**

(Example)

1) Contribution to health of the people.
2) Contribution to the development of rural industry.
3) Jobs opportunity to the people in the rural area.

(Quantitative) such as B/C	***1.3***
Redemption period / Cumulative turnaround year	***24/1.2 = 20 years***

		Without Port	**With Port**
per year	mil$/y	0.80	4.38
difference	mil$/y		3.6
construction cost	mil$		24

O&M	10% of the const. cost		2.4
Real Benefit	mil$		1.2
Design period	year		25
B/C	for 25 years		1.3

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by million US$)	*N/A*	*$1.2*
Expenditure for O&M *(by million US$)*	*N/A*	*$2,4*
Direct staff number for O&M	*N/A*	*10*

10. **Specific Item to be studied (if F/S is necessary)**

1. Market research?
2. Available fishing resource in the future?
3. Manufacturing method?
4. Necessary capacity of Refrigerator?
5. Transportation to Baucau & Lospalos?
6. Possibility of fishier Market in Baucau & Lospalos?
7. Scale and facilities as the port, such as:
    a) Size of loading facility (Crane)
    b) Marine navigation system
    c) Fishery boat maintenance factory
    d) Fuel station for ship
    e) Piling methods for pier construction
8. Environment Impact Assessment (EIA)?

11. **Expected Financial Resources**

"Infrastructure Fund" or "Loan" or "Grant"

12. **Estimated F/S budget (if F/S is necessary)**

Very rough estimate (100,000 – 240,000)

Comments

In case of an island country surrounded by the sea, promotion of fishery is indispensable for the national development of TL and for the improvement of nutritional balance of the people. For this reason, fishing ports is an essential social infrastructure.
In fishing port development, basic requirements are the richness of the fish volume in the surrounding sea, easiness of berthing of boat and ship for fishing and exporting, and access conditions to the consumption area.
Com port is suitable as a fishing port to be able to utilize existing pier with enough depth of water, and the richness of fish in the near sea. The problems are transportation to domestic consumption areas, development of facilities such as refrigerating warehouse and quarantine for overseas export, securing fishing vessels, educational facilities of fishermen.
It can be said that it is a time-consuming task to examine these comprehensive possibilities as FS.

Self-Evaluation Sheet
Score 45

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (Tunami)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(New Com Fishing Port, Lautem)

1. Objective of Project

- ✓ The construction of a new fishing port in Com and its operation.
- ✓ After the construction of fishing port, significant quantity of fish from Com could be distributed to other district and also can export to other country. It could promote for increasing employee number of fishery sector in Lautem District, which can respond to the necessity of the local people.
- ✓ The average fish consumption in Timor Leste is very low, 6.1 kg only per year according to the data of FAO. Producing huge number of fishes in Com will contribute to the health of the people in Timor Leste.

Beneficiaries:

Lautem citizen including Baucau, Manatuto, Dili & all Timor Leste people (around 64,000 people).

2. Background

The Directorate General of Fishery (hereinafter referred to as "the EMPLOYER"), the Ministry of Agriculture and Fishery, will require the consulting services of Feasibility Study (FS) of **New Com Fishing Port** (hereinafter called as the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is an integral part of the Strategic Development Plan – SDP (Page 95) (2011-2030) for New Com Fishing Port in Timor Leste with the following essential functions:

- ✓ To ensure the production of fish in Com – Lautem, hereby contributing to life of people in Lautem and to all Timor Leste people in general
- ✓ To create the CAN factory in Timor Leste
- ✓ To promote the fishery sector and attract the private sector for investing; and
- ✓ To support economic development of Timor-Leste.

Project Concept/Idea for the Project was planned by Jendino of MPS in March of 2018 to properly develop **the New Com Fishing Port in Lautem**.

The Project Concept of the Project proposed is attached as the **Project Outline** with Current condition of target area.

3. Output required by FS

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of TOR for DED

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for

the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.

- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline"

3-2) Specific items requested to study in FS:

1) Current source of fish and their quantity.
2) Available fishing resource in future
3) Market research (demand and production) in Timor Leste in 2022 (see attached "Outline of Project").
4) Necessity of wholesale market
5) Distribution route/method of fish both in domestic and outside the country
6) CAN factory necessity including its location
7) Necessity of Refrigerated Storage house
8) Scale and facilities as the port, such as:
   a) Size of Loading facility – Crane
   b) Marine navigation system as the port
   c) Fishery boat maintenance factory
   d) Fuel station for ships
   e) Piling methods for pier construction
9) Fisherman training center.
10) IEE (Initial Environmental Effect)

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **5 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period (Month)
Marine Engineer	Master	Min. 15 years	5
Mechanical Engineer	-	Min. 10 years	1
Electrical Engineer	-	Min. 10 years	1
Civil Engineer	Master	Min. 10 years	1
Environmental Specialist	-	Min. 10 years	1
Economist	-	Min. 10 years	1
Industry expert	-	Min. 10 years	1

Tender should propose their experts' assignment in their technical proposal within the allowable budget described in Tender Documents. It should include total study period of FS, and the detail job description for each staff member and the staff assignment schedule of all staff with their cost estimation as shown in Tender Documents.

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (but not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ FS for DED

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard copy Number	Time limit
Inception Report	5 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	4 copies	By the 10th day of each month during Study period
Draft Final Report	5 copies	Within 3 calendar weeks before the final date of contract. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
Final Report	7 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report.
One soft copy should be attached on the submission of hard copy		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

1) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "FS Guideline")
   - ✓ Location map
   - ✓ General plan
   - ✓ Layout plan
   - ✓ Typical cross section
   - ✓ Elevation view
   - ✓ Facility plan
2) Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
3) Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
4) Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
5) Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
6) Checklist of FS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
7) FS for DED

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.

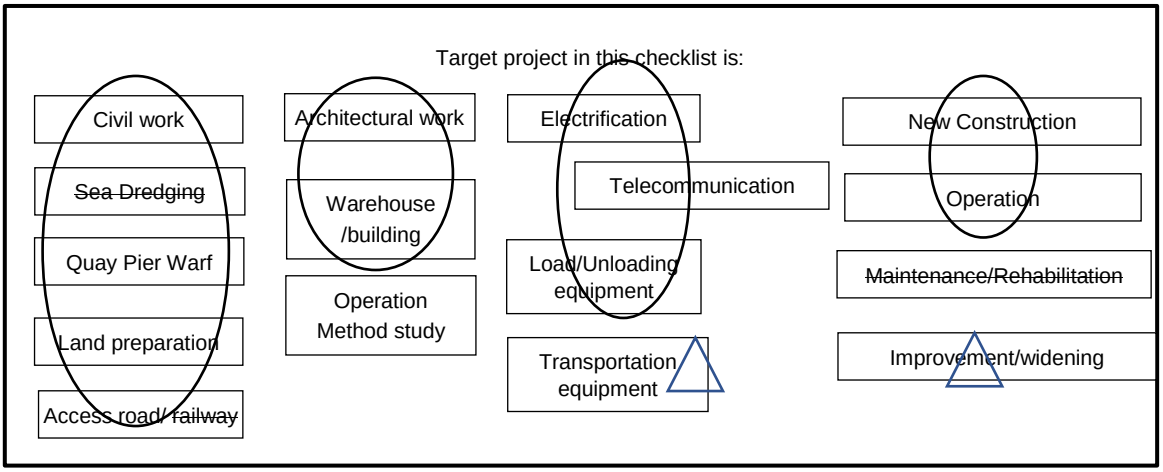
Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER.

- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant may change his subject name for survey and study, but shall keep the bullet of defined item categorization for the convenience of the evaluation by the EMPLOYER.
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Com Fisher Port)

(Project Concept) is expected to attach as Outline of Project, but without cost matters.

FS Check Sheet



Fish Port Project Please refer example list on pages 18-21

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 (page 10) and Chapter 10 (page 11))	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
a) Existing Development Plan	5				
a) Study results of Spatial/ Sector plan					
a) Consistency with Upper National Plan	5				
b) Climate survey	5				
b) Hydraulic survey	3				
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)	5				
b) Geological survey (such as foundation or ground survey etc.)	3				
b) Land use, city & regional plan, rear industrial location plan etc.	5				
b) Natural condition (sea depth, wave & tide level, hydrographic conditions, geological feature)	5				
b) Location survey of sea area, land area and access road	5				
c) Regulations / Design standard	5				
c) Design load and design strength of the object's foundation	5				
d) Social conditions before project (such as population, land use etc.)					
d) Survey about distribution supplier, ship company	5				
d) Related enterprise using the facilities (for the review of amount of freight in future.)	5				
d) Amount of estimated freight					
b) Investigation about number of ship (to enter and leave port) with their ship type, class distribution	5				
d) Inventory Survey for exiting available facilities or demolished	5				
d) Soundness of existing facilities, machinery and materials, maintenance status (for existing port)	5				
d) Utilization status survey (traffic volume, cargo, vessel number, possible user number)					
d) longshoreman efficiency (worker in port)	5				
d) Current issues	3				
d) Current revenue, if any					
d) Recent budget for the sector	5				
d) Target Area study result (such as features, issues, etc.)					
e) Future demand or necessary capacity					
e) Location or route selection or Distribution methodology of the products	5				
e) Necessary facilities scale and/or numbers etc.					
e) New facility arrangement plan					
e) Passage, berth, sea area of plan for changing head	5				
e) quay length, Groin length, seawall length	5				
e) warehouse	5				
e) yard pavement	5				
e) management building	5				
e) Necessary ancillary facilities (such as warehouse or equipment)					
e) Facilities plan such as port road etc., (additional infrastructure)	3				
e Transportation plan from Hinterland	3				
e) cargo handling machine	5				
e) Design scale of each Project facilities (such as height, level or depth etc.)	5				

Necessity rank shown here is just example. Consultant should put his idea.

Items in each category could be added/ revised based on the project status.

e) Approach measures to the object (such as roads or railways)					
e) traffic volume of the access road by the type of car (for land part),	5				
e) Quantities for Major Items, Project Cost and Necessary construction period	5				
e) Resource survey results (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)	5				
f) Economic & Finantial analysis results					
g) IEE, Resettlement etc. , including Influence of the project to the surroundings	5				
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders	5				
i) Future extension plan, if necessary					
i) Future improvement plan	3				
i) Alternative proposal (such as location or routes or methodologies)					
i) Privatization tendency	3				
j) Countermeasures for the risks, such as disasters, waste or emission	3				
j) Administration system and for safety	5				
j) Operation and Maintenance plan (O&M)	5				
Drawings prepared in FS (Consul[illegible]y) see Part 1- Chap 11	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
1) Location map 2) General plan	Minimum Drawing for FS				
3) layout Plan 4) Typical Cross section 5) Facility Plan	Secondary Drawing				
Quantity, Unit Rate of major Item & Construction Period in FS		Report page	Checked by LM	Date	Checked by MPS
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Attachment 3)		Report page	Checked by LM	Date	Checked by MPS
8) Direct Benefit (refer Part 1- Attachment 3)					
9) Indirect Benefit					

Necessary drawings are different according to the Project

Prepared by	**Checked by**	**Appraised by**
Consultant name	Ministry & Department	MPS
Person name	Person name	Person Jendino Beira
Signature	Signature	Signature
Date	Date	Date

LMs and/or Consultant could revise the name of check items and may add in the same category, **but <u>the category should be kept</u> to make clear the content of check item.**

Example 8. Subsea Tel-Communication Cable

Project Concept

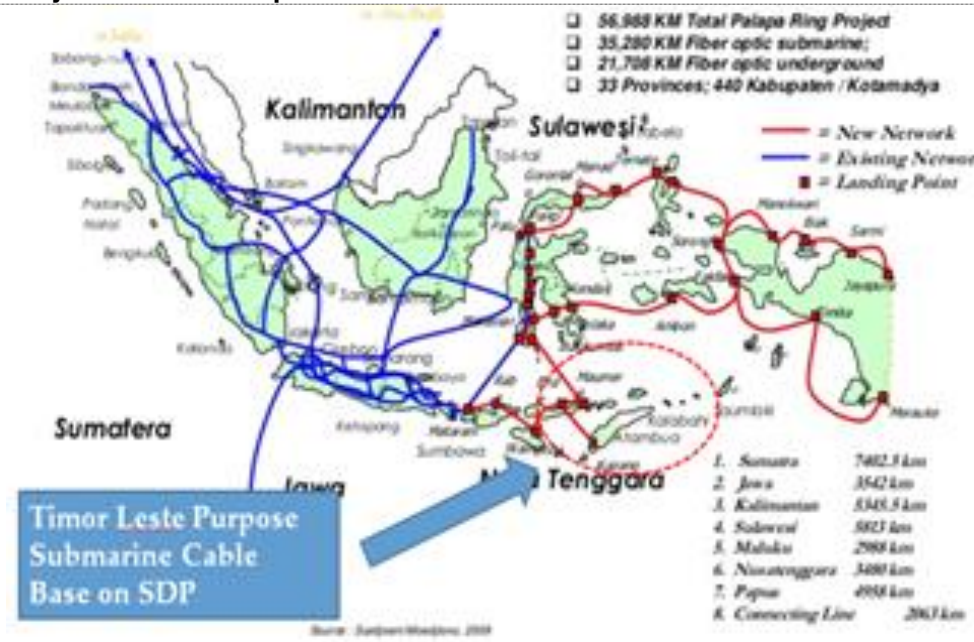
1. **Project Name**

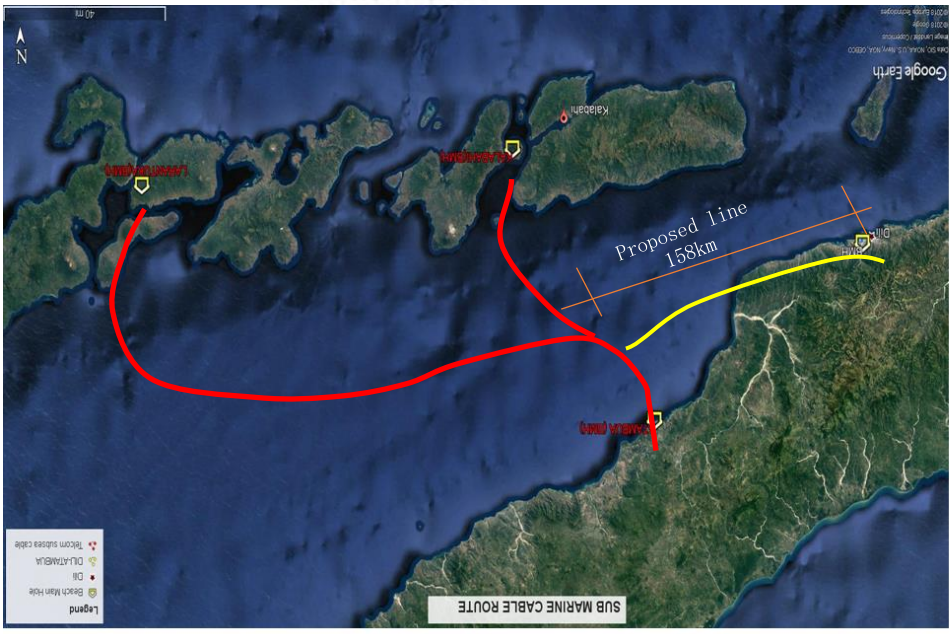
Subsea Fiber Optic Cable Installation

2. **Outline of Project** *(Within a few lines as shown below)*

"In (Location / Target), completion of (Project Purpose) will contribute to (Overall goal) by executing of (Output)"

3. **Project Location Map or Photo**





4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*	*Expected Plan*
Area (m2) or Length (km)		
Capacity		
Total employee number		
Current Issues / Items to be improved		

5. **Relevance: (Background)**

Internet is available in Dili and in district capitals, but speed and quality are inadequate for business, health and education use. Broadband internet access is mostly limited to Dili. Timor-Leste relies on expensive and Limited-capacity satellite connections for its international bandwidth.
Improvement of the international communication measures is one of the most important policy for TL development. As the results of comparison of international communication means, it is most recommendable to connect submarine cable with the cables to Atambua BMH from the operation cost and reliability.

6. **Rough Cost estimate**

Marine materials	1	3,642,475-
Submarine cable	1	2,300,000-
Land acquisition & BMH	1	250,000-
Marine Services	1	4,679,719-
Consulting Fee	1	474,000-
Engineering Fee	1	670,000-
Land Cable	1	450,000-
Total amount		12,466,194-
tax		1,246,619-
Landing party		450,000-
Grand total		14,162,813-
Cost /km	158km	89,638-

7. **Implementation Schedule** (Expected schedule like below Table)

FS	DED	RFC RFI	O&M
2019	2020	2021-2023	2024-
6 months	12 months	3 years	

8. **Project Benefits**

Quantitative: B/C, Redemption period
Qualitative: Narrative in few sentences

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. **Specific Item to be studied (if F/S is necessary)**

	Satellite	Land Cable	Submarine Cable
Latency (Response time)	High latency (response is slow), not suit for high speed requirement	Changing of latency is necessary, more hop will be required	Lower latency (response is quick)
Operational life time	17 years	10 years	25 years
Suitability	Rough terrain and remotes areas limit bandwidth	Domestic Communication more complicated cross border	High bandwidth and lowest latency traffic demand
Cost/MB	High	0	Lowest
Reliability	0	Higher risk from human activities	Lower and More reliable connectivity

11. **Expected Financial Resources**

"Infrastructure Fund" or "Loan" or "Grant"

12. **Estimated F/S budget (if F/S is necessary)**

Very rough estimate

Comments

This FS is an important study. However, it needs specific technology, know-how, experience and plenty of budget. It will be ordered to Special company, not by common consultant.

Self-Evaluation Sheets

Sore 54

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (tsunami)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(Subsea Fiber Optic Cable)

1. Objective of Project

Installation of Fast Internet cable under the sea to connection with foreign countries through Atambua, Indonesia.

Operation and Maintenance of the Fast Internet Cable by the Private Companies under the control by Timor-Leste Government to ensure the security.

Beneficiaries:
The submarine cable is enabling to increase internet penetration in Timor Leste only 1, 2% out of population in 2016 that provides big opportunity to grow.
The internet could offer opportunity for economic growth in the development countries.

2. Background

The Directorate General of Cabinet of Prime Minister (hereinafter referred to as "the EMPLOYER"), the Ministry of _____, will require the consulting services of Feasibility Study (FS) of **Installation and Operation. Maintenance of Subsea Fiber Optic Cable** (hereinafter called as the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is an integral part of the SDP of Timor Leste (p104) to ensure the following essential functions:

- ✓ To install Fast Internet by using Subsea fiber Optic Cable, thereby contributing to civilized citizen life in Timor Leste;
- ✓ To supplement the functions of supplying fast internet for government service, educational, health, security center, and business for support the development Timor-Leste
- ✓ By 2020Timor-Leste will be part of the technology enabled world

Dial-up internet is available in Dili and in district capitals, but speed and quality are inadequate for business, health and education use. Broadband internet access is mostly limited to Dili.

Timor-Leste relies on expensive and Limited-capacity satellite connections for its international bandwidth

Project Concept/Idea for the Project was planned in March, 2018 by the (Prime Minister) to properly develop **Timor-Leste**.

The **Project Outline** is attached at the end of This TOR.

3. Scope of Works

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study

- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of FS for DED

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline"

3-2) Specific Items requested to study:

1) Two Submarine cable route (Indonesia & Australia) and necessary storages for the supply and installation.
2) Beach main hole (BMH)
3) Distribution cable lines to the main data Center and facilities
4) Cable Landing Station
5) Necessary bandwidth of internet speed
6) Security System as Timor Leste
7) Coverage area of Internet Services in Timor-Leste
8) Future increase of internet used.
9) Environment Impact for conservative marine
10) Countermeasures for Seismic Impact

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, requires the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **6 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period
Project manager	Master	Min. 10 years	3
Marine Engineer	-	Min. 10 years	3
IT Engineer Specialist	-	Min. 10 years	2
Structural Civil Engineer	-	Min. 10 years	2
Environmental Specialist	-	Min. 10 years	2
Economic Specialist	-	Min. 10 years	2

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: All activities and progress in the previous month. Problems encountered or problems anticipated with steps taken or recommendations for their correction. The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ FS for DED

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard Copy Number	Time limit
Inception Report	6 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	5 copies	By the 10th day of each month during Study period
Draft Final Report	8 copies	Within 3 calendar weeks before the final date of contract
Final Report	10 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
One Soft Copy is required on the submission of each Report		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with PFS Report.

1) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "FS Guideline")
   - ✓ Location map
   - ✓ General plan
   - ✓ Layout plan
   - ✓ Typical cross section
   - ✓ Elevation view
   - ✓ Facility plan
2) Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
3) Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
4) Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
5) Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
6) Checklist of PFS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
7) FS for DED

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.

- ✧ Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, or the evaluation rating of PFS report will be subtracted by the EMPLOYER.
  - ✧ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of FS Guideline Part 1.
  - ✧ Consultant may change his subject name for survey and study, but shall keep the bullet of defined item categorization for the convenience of the evaluation by the EMPLOYER.
  - ✧ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✧ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✧ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Installation of Subsea Fiber Optic Cable)

(Project Concept) is expected to attach as Outline of Project, but without cost matters.

FS Check Sheet

Target project in this checklist:

Water resources, such as River, groundwater, etc.	Intake facilities, such as Dam, Barrage, Well, etc.	Water conveyance facilities, such as Canal, Pipe, etc.	Purification facilities	Distribution facilities, such as pipe, bulb, etc.	Tariff collection facilities, such as bulb, meters etc.	Information and Technology
			Irrigation facilities		Sewage facilities	

Fast Internet Cable Installation under sea Please refer example list on pages 18-21

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 (page 10) and Chapter 10 (page 11))	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
a) Existing Development Plan					
a) Study results of Spatial/ Sector plan					
a) Consistency with Upper National Plan					
b) Climate survey					
b) Hydrologic survey about Available water resource	5				
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)	3				
b) Geological survey (such as foundation or ground survey etc.)	3				
b) Location survey or topographic survey	3				
b) Marine Survey	5				
c) Regulations / Design standard					
c) Necessary bandwidth of internet speed	5				
c) Design load and design strength of the object's foundation					
d) Social conditions before project (such as population, land use etc.)					
d) Inventory Survey for exiting available facilities or demolished	3				
d) Cable Landing Survey	5				
d) Utilization status survey (traffic volume, cargo, vessel number, possible user number)	3				
d) Current issues					
d) Current revenue, if any	3				
d) Recent budget for the sector	3				
d) Target Area study result (such as features, issues, etc.)					
e) Future demand or necessary capacity					
e) Location or route selection or Distribution methodology of the products					
e) Two Submarine cable route (Indonesia & Australia) and necessary storages for the supply and installation	5				
e) Source of coverage area	5				
e) Installation plan of facilities	5				
e) Necessary facilities scale and/or numbers etc.					
e) Distribution cable lines to the main data Center and facilities	5				
e) Beach main hole (BMH)	5				
e) building of data center (survey location of data center)	3				
e) Security System	5				
e) Necessary ancillary facilities (such as warehouse or equipment)					
e) Future increase of internet user	5				
e) Design scale of each Project facilities (such as height, level or depth etc.)					
e) Approach measures to the object (such as roads or railways)					
e) Quantities for Major Items, Project Cost and Necessary construction period					
e) Resource survey results (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)					
f) Economic & Finantial analysis results					
g) IEE, Resettlement etc. , including Influence of the project to the surroundings	3				
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders					
i) Future extension plan, if necessary					
i) Alternative proposal (such as location or routes or methodologies)					
i) Privatization tendency	3				
j) Countermeasures for the risks, such as disasters, waste or emission					

Necessity rank shown here is just example. Consultant should put his idea.

Items in each category could be added/ revised based on the project status.

j) Seismic Impact	3				
j) Operation and Maintenance plan (O&M)	5				
Drawings prepared in FS (Consul[illegible]y) see Part 1- Chap 11	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
1) Location map 2) General plan	Minimum Drawing for FS				
3) layout Plan 4) Typical Cross section 5) Facility Plan	Secondary Drawing				
Quantity, Unit Rate of major Item & Construction Period in FS		Report page	Checked by LM	Date	Checked by MPS
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Attachment 3)		Report page	Checked by LM	Date	Checked by MPS
8) Direct Benefit (refer Part 1- Attachment 3)					
9) Indirect Benefit					

Necessary drawings are different according to the Project

Prepared	Checked	Appraised
Consultant name	Ministry & Department	MPS
Person name	Person name	Person name Florindo
Signature	Signature	Signature
Date	Date	Date

LMs and/or Consultant could revise the name of check items and may add in the same category, **but <u>the category should be kept</u> to make clear the content of check item.**

Example 9. Spatial Data Infrastructure

Project Concept

1. **Project Name**

Establishment of Timor-Leste Spatial Data Infrastructure (TL-SDI)

2. **Outline of Project** *(Within a few lines as shown below)*

"In (Location / Target), completion of (Project Purpose) will contribute to (Overall goal) by executing of (Output)"

3. **Project Location Map or Photo**

Database Infrastructure place will be selected through FS from the following places in Dili:

4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*	*Expected Plan*
Area (m2) or Length (km)		
Capacity		
Total employee number		
Current Issues / Items to be improved		

5. **Relevance: (Background)**

- ✓ Timor-Leste has invested US$ one billion in infrastructure project in the past. However, the project information is not under the unified management as the government. (i.e.: stored in different places by different agencies in different format.) As the results, the data accessibility and sharing compatibility are in low status. And data updating status is poor and data quality is not reliable.
- ✓ Discussion about spatial data infrastructure in Timor-Leste started since 2009 through formation of Geographic Information Group (GIG)[1]. GIG comprised of government, NGOs, and UN agencies that used geographic information to support government's planning, development and humanitarian response at that time[2]. GIG successfully showcased products of work using spatial information during the celebration of GIS Day in 2009 and 2010. Although the group met regularly to discuss about geographic information, it was never established as a formal group, which caused it to be mostly inactive after 2010.
- ✓ Currently, most government agencies and NGOs that were part of GIG, still continue to use geographic information and have improved their capacity through forming GIS Unit. For example, Ministry of Finance has a GIS Unit under General Directorate of Statistic and received GIS resources from UNMIT before its mission ended in 2013. Ministry of Agriculture and Fisheries has ALGIS that collects and manages information on important agricultural resources in the country. Land and Property of the Ministry of Justice collects and manages cadastral information. Ministry of Public Works has essential information such as roads throughout the country. Similarly, autonomous institutions such as Timor GAP, ANPM, and IPG have the capacity to use spatial information.

[1] Geographic Information Group (GIG). Accessed on 12 March 2018 at https://sites.google.com/site/gigtimorleste/home
[2] Geographic Information Group (GIG). Accessed on 12 March 2018 at https://sites.google.com/site/gigtimorleste/home

- ✓ These government agencies and autonomous institutions are available resources that are vital for establishment of SDI given spatial data that is currently held and managed by these institutions as well as resources in terms of human capacity, technology, infrastructure, and finance to support SDI.
- ✓ Medium Term Goal: 2016-2020 in SDP says "modern information technology will have been adopted by the civil service to support joined-up government and e-government initiatives" (p.229).

6. Rough Cost estimate

Necessary cost for initial establishment is around US$ 4.5 million.
This is estimated from the average of four countries as show in right:

Country	Budget for SDI (US$ Million)
Croatia	7.7
Jordan	5.6
Uganda	3.5
Mongolia	1.2
average	4.5

7. Implementation Schedule (Expected schedule like below Table)

FS	Research, Development and Promotion	Building TL-GSDI Foundation	Data & Resource Development	O&M
2018	2018-19		2019-21	2021-
5 months	12 months		2 years	

Considering available resources as well as benefits and challenges for the establishment of SDI, the following steps are essential to ensure successful development of SDI:

No.	Steps	Activities	Notes
1.	Research, Development and Promotion	• Research and comparative studies on SDI development in other countries • Cataloguing benefits of SDI (social and economic) • Access to resources related to SDI • Build and strengthen relations with other countries on SDI	This is to initial step to sell the concept
2.	Building TL-GSDI Foundation	• Organizational setting and partnership • Policy and standard framework • IT Infrastructure • Stakeholder identification • Working Group Formation	This is planning and preparation stage including identification of stakeholders, working group formation, policy and technological discussion, resources inventory, etc.
3.	Data and Resource Development	• Spatial data and resource identification and assessment • Develop fundamental spatial data • Improve human resources • Technology installation, purchase, and upgrade	This is building the core element of SDI.
4.	Utilization, Consolidation and Operation Maintenance	• Configuration • System management • System support plan	This is the stage to see the operation of the system, adequacy of the system, and resources needed to improve and maintain.

8. Project Benefits

Many people could receive the benefit, such as Government, Academia, Private Sector and Data producer and user as shown below:

Category	Total Number	Remarks	Sources
Public Servants	35'581	Numbers in 2015	http://cfp.gov.tl/wp-content/uploads/2015/04/categorias.pdf
Universtity Lectures	10'939	Numbers in 2015	http://cfp.gov.tl/wp-content/uploads/2015/04/categorias.pdf
Tertiary Students	9'763	1.7% of Total Population of Age Group 15-64 yrs - 574,269	Census Atlas 2010
Businesses	2'384	Numbers in 2009	http://buildingmarkets.org/sites/default/files/pdm_reports/business_community_in_timor-leste_part_one.pdf
PNTL	2'530	PNTL in 2003	https://fundasaunmahein.files.wordpress.com/2010/12/mahein-nia-lian-no-15-1412010eng.pdf
	4'000	Current estimate	
FFDTL	1'600	Members in 2006	https://www.globalsecurity.org/military/world/timor/f-fdtl.htm
	3'000	Estimate by 2020	

9. Financial prospect for O&M (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. Specific Item to be studied (if F/S is necessary)

Study items to solve the Current issue
(it is not good to describe the current issues only)

11. Expected Financial Resources

"Infrastructure Fund" or "Loan" or "Grant"

12. Estimated F/S budget (if F/S is necessary)

Very rough estimate

Self-Evaluation Sheet

Score 70

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(Geo-Spatial Data Infrastructure (TL-GSDI))

1. Objective of Project

Development of TL-GSDI (geo-spatial data infrastructure in Timor Leste) for the followings:

1) To avoid difficulty of accessing, sharing and utilizing of spatial information, thereby contributing to efficiency of implementation and monitoring of development activities;
2) To supplement the functions of integrated data management system;
3) To enhance intra/inter institutional collaboration to improve quality of spatial data catalogue and reduce cost of spatial data production and management; and
4) To support integrated planning practice to ensure sustainable development of Timor-Leste.

Beneficiaries
All the employees of the government, university lecturers and students, PNTL and F-FDTL, and businesses (35,581 in 2015, 20,702 in 2015, 6,500 current estimates, and 2,384 in 2009).

2. Background

The Major Project Secretariat (hereinafter referred to as "the EMPLOYER") of the Ministry of Development and Institutional Reform will require consulting services of a Feasibility Study (FS) for development of Timor-Leste Geo-Spatial Data Infrastructure.

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is an integral part of the Strategic Development Plan to develop a modern information technology to support delivery of government services and "MPS-5 Year Business Plan" to improve overall management of infrastructure.

Project Concept was planned in March of 2018 by the Ministry of Development and Institutional Reform to properly develop TL-GSDI.

Since the Restoration of Independence in 2002, Timor-Leste has invested billions of US dollars on infrastructure projects scattered across the territory of the country to support and accelerate economic growth. Similarly, in recent years, the government has also spent over US$ 30 million on improving information and technology sector such as acquiring LiDAR information and upgrading internet connectivity.

However, the government has faced serious challenges to acquire reliable and updated information on these projects as well as appropriate sharing mechanism to ensure proper use of the information for development purposes. Similarly, LiDAR information and internet technology has not been used to its potential to become part of key spatial data to facilitate development activities although numerous government institutions and non-governmental agencies have the capacity to utilize spatial information.

The **Project Outline** is attached at the end of this TOR.

3. Scope of Works

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study

- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of FS for DED

- ➢ Utilization of existing data for survey and any other assessment approaches could be adopted to minimize the implementation period of FS. However, the consultants could propose alternative method for the actual condition survey with reasonable reason as the optional proposal, if the consultant deems such survey is necessary for the study.
- ➢ Shorten study period by parallel works for each survey and study is recommended
- ➢ This cost proposal shall be submitted separately from the original one. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- ➢ FS, for the documentation of this project, shall include all investigations, survey, studies, the preparation of basic implementation plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline".

3-2) Specific items requested to study:

1) The state of existing spatial data holding, status of human resources and technical capacity as well as condition of technology and infrastructure;
2) Appropriate mechanism to develop core spatial data on the completion of assessment of quality of existing spatial data;
3) Identification of essential and relevant stakeholders and development of appropriate institutional arrangement framework;
4) Options for source and mechanism of funding;
5) Fundamental policy and regulations needed to provide legal base for the execution and implementation of the functions of TL-GSDI;
6) Necessary support mechanism during the initiation, operation, and maintenance period of the TL-GSDI establishment.

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **6 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period (months)
SDI Team Leader	Master	Min. 15 years	6
GIS Expert (Deputy team leader)	-	Min. 10 years	3
SDI-IT expert	-	Min. 10 years	3
LiDAR expert	-	Min. 10 years	3
SDI – Legal & Governance expert	-	Min. 10 years	2
SDI-Economy expert	-	Min. 10 years	2

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited to:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ FS for DED

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard Copy Number	Time limit
Inception Report	10 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	15 copies	By the 10th day of each month during Study period
Draft Final Report	10 copies	Within 3 calendar weeks before the final date of contract
Final Report	20 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
One soft copy should be attached on the submission of each report.		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

1) Outline drawings. Consultant shall decide the necessary drawing and its scale upon consultation meeting with EMPLOYER prior to the work): (see Chapter 11 of "FS Guideline")
   - ✓ Location map
   - ✓ General plan
   - ✓ Layout plan
   - ✓ Facility plan
2) Rough Implementation schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
3) Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
4) Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
5) Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
6) Checklist of FS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
7) FS for DED

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.

Checklist is important document for the EMPLOYER to check the consultant's work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER.

- ✓ Consultant shall categorize any survey subject and any study subject according to the defined item in Attachment 1-7 & 8.
- ✓ Consultant may change subject name for survey and study but shall keep the bullet of defined item categorization for the convenience of the evaluation by the EMPLOYER.
  Consultant may add survey subject or study subject within a defined bullet specified in Attachment 1-7 & 8.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Geo Special Data Infrastructure)

(Project Concept) is expected to attach as Outline of Project, but without cost matters.

FS Check Sheet

Target project in this checklist is:

Information & Technology. | Public sector | Private sector | Development | Application | Hardware & Software | Management | Regulation and Policy

Information and Technology Please refer example list on pages 18-21

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 (page 10) and Chapter 10 (page 11))	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
a) Existing Development Plan	3				
a) Study results of Spatial/ Sector plan					
a) Consistency with Upper National Plan	5				
b) Climate survey					
b) Hydraulic survey					
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)					
b) Geological survey (such as foundation or ground survey etc.)					
b) Location survey or topographic survey	3				
c) Regulations / Design standard	5				
c) Design load and design strength of the object's foundation					
d) Social condition before the project – role of spatial data for planning, monitoring and evaluation of public projects, community resource mapping, forest conservation, water resource management, etc.					
d) Inventory Survey for exiting available facilities or demolished	5				
d) Utilization status survey for use of spatial data, sharing, storing, security	5				
d) Current issue survey for information gaps, technical gaps, policy limitation, institutional collaboration	5				
d) Current revenue, if any	3				
d) Recent budget for the sector	3				
d) Target Area study result (such as features, issues, etc.)	5				
e) Future demand or necessary capacity					
e) Location or route selection or Distribution methodology of the products					
e) Necessary facilities scale and/or numbers etc.					
e) Future demand or necessary capacity	5				
e) Installation and upgrading plan	5				
e) Necessary ancillary facilities (such as warehouse or equipment)	3				
e) Design scale of each Project facilities (such as height, level or depth etc.)					
e) Approach measures to the object (such as roads or railways)					
e) Quantities for Major Items, Project Cost and Necessary construction period	5				
e) Resource survey results (for development of SDI)	5				
f) Economic & Finantial analysis results					
g) IEE, Resettlement etc. , including Influence of the project to the surroundings	5				
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders					
h) Expected economic, social, and environmental benefits expected from the project	5				
h) Number of users and beneficiaries	5				
i) Future extension plan, if necessary					
i) Alternative proposal (such as location or routes or methodologies)	3				
i) Privatization tendency	3				
j) Countermeasures for the risks, such as disasters, waste or emission	3				
j) Operation and Maintenance plan (O&M)	5				
Drawings prepared in FS (Consult…y) see Part 1- Chap 11	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
1) Location map 2) General plan	Minimum Drawing for FS				
3) layout Plan 4) Typical Cross section 5) Facility Plan	Secondary Drawing				

Necessity rank shown here is just example. Consultant should put his idea.

Items in each category could be added/ revised based on the project status.

Necessary drawings are different according to the Project

Quantity, Unit Rate of major Item & Construction Period in FS		Report page	Checked by LM	Date	Checked by MPS
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Attachment 3)		Report page	Checked by LM	Date	Checked by MPS
8) Direct Benefit (refer Part 1- Attachment 3)					
9) Indirect Benefit					

Prepared	Checked	Appraised
Consultant name	Ministry & Department	MPS
Person name	Person name	Person name
Signature	Signature	Signature
Date	Date	Date

LMs and/or Consultant could revise the name of check items and may add in the same category, **but the category should be kept to make clear the content of check item.**

Example 10. Flower Park

Project Concept

1. **Project Name**

Ecotourism Project in Timor-Leste:
Highland Experience Initiative and National Flower Park in Ainaro Municipality

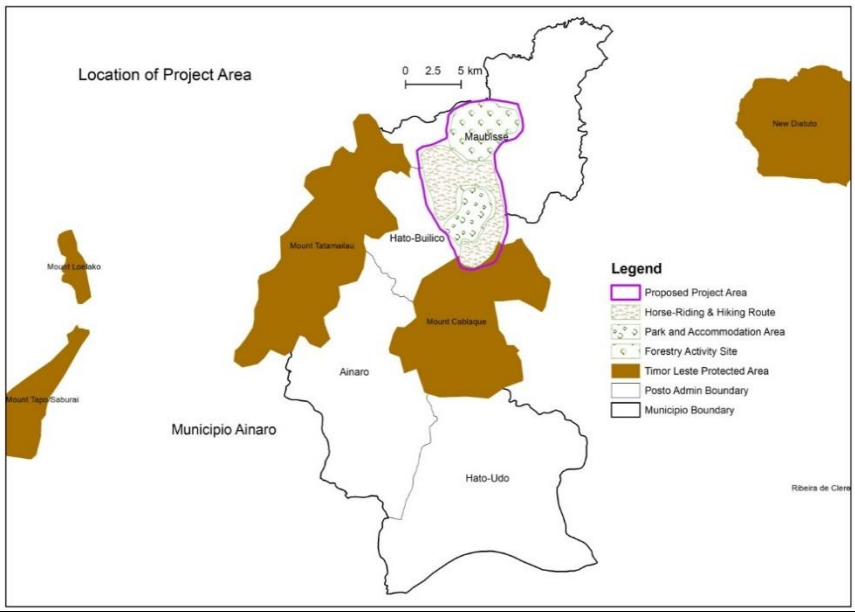
2. **Outline of Project** *(Within a few lines as shown below)*

- ✓ By 2030: Timor-Leste will have a well-developed tourist industry attracting many international visitors, contributing substantially to national and local community income and creating jobs throughout the region." (TL-NSDP 2011-2030).
- ✓ The tourism industrial area and SDP target 2030 also should be considered.
- ✓ To diminish regional economic disparity in the future hence, an ecotourism development project in western zone is essential to deal with this tendency.
- ✓ Ainaro municipality, in the southern part of the country, has spectacular scenery from the central mountains to the wild south coast and provides wonderful opportunities for exploring and hiking. This area includes Timor-Leste's highest peak – Mt Ramelau (2960m) which is sacred to the Timorese and known at Tatamailau (grandfather). The towns of Maubisse and Hato Builico have very spectacular hill settings and the larger town of Ainaro is located at much lower elevation in a lush river valley midway to the Timor Sea.
- ✓ This is definitely scenery where you want to keep your camera close at hand. The panoramic views from the Maubisse pousada on its promontory are especially impressive, as are the views from Mt Ramelau at dawn after a guided climb from Hato Builico. Looking out over the mountain ranges of Timor-Leste bathed in the early morning light is an unforgettable and very rewarding experience.
- ✓ A lot of coffee is grown in the Ainaro area and vegetables are cultivated in between rocky screes on what often seems like impossibly steep slopes. Ponies are still commonly used for carrying produce and other goods between the isolated villages and markets. They and other livestock are seen grazing on the mountain sides.
- ✓ Most of the local people speak Mambae and their villages with characteristic thatched circular, conical roofed houses are scattered across the municipality.

3. **Project Location Map or Photo**

Mt Ramelau & Hato Builico, Maubisse

30km from Dili,
78km from Atambua
and
235km from Kupang.



4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

5. **Relevance: (Background)**

Timor-Leste is one of the least visited countries in the Pacific region in terms of International tourist arrival in 2015. (https://www.indexmundi.com/facts/indicators/ST.INT.ARVL/rankings)

6. Rough Cost estimate

		scale (length)	Unit price	amount	Remarks
FS				0.11 million	
Land Acquisition				0.11 million	
DED				0.55 million	
Construction cost of Basic Infrastructure				11 million	Road, Electricity, Water, Sewage etc.
Tourism infrastructure	Park			0.77 million	
	Hotel			2.75 million	This is mainly private sectors matter
	Shops			1.1 million	PPC is possible
	Hiking Routes			0.22 million	
	Others			0.11 million	
			Total	16.72 million	

7. Implementation Schedule (Expected schedule like below Table)

FS	DED	Construction	Open &Maintenance
2019	2019	2020-30	2023-
6 months	6 months	10years	

	Option	Location	Facilities	Quantity (for reference only)	Unit	Unit Rate (x000 $)	Cost (Mil$)	Unit cost of construction ($ per person)	"Payback period (if $150/person)
Up to 2020	Zona A	Maubesse	Flower Park and show window	2	Km^2				
			Rest & Recreation	2	Km^2				
			Flower production industry	2	Km^2				
Up to 2025	Zona B	Hatubilico I	Horseback Ridding	1	Km^2				
			Trekking	1	Km^2				
			Camping area	1	Km^2				
		Hatubilico II	Outbound	1	Km^2				
			Horseback racing field	1	Km^2				
			Cultural center	1	Km^2				
			Traditional experience	2	km				
Up to 2030	Zona C		Hotel	1					
			Restaurant	2	km				
			Management office	6	km				
			Training facilities						

8. Project Benefits

	Item	Estimated amount
Direct benefit:	profit from flowers production and its marketing,	
	Job opportunity and life improvement of local people.	
Indirect benefit:	Secondary effect of various economies scale, by promotion of local product	Tax 10% of total sales amount per year is US$1,500,000
Intangible benefit	Improves environmental conservation	
	Improves national resilience	

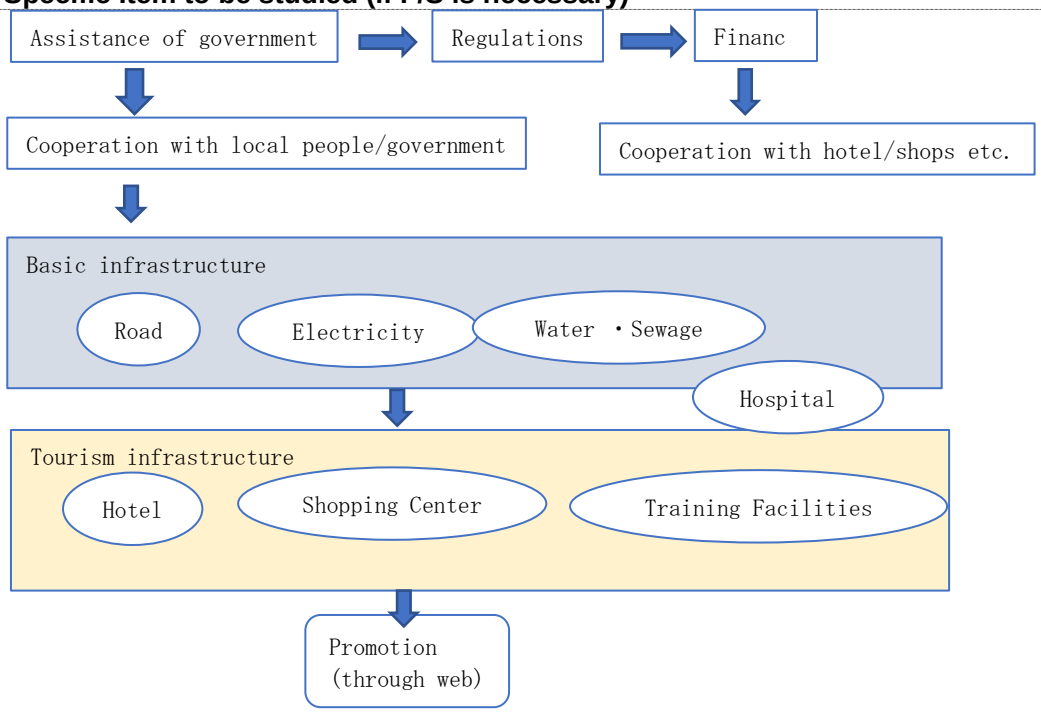
Beneficiaries

Foreign tourists	projected 19,000 in 2015
Local people (jobs)	Ainaro Municipality (66,379 in 2015) age 15-59 is 29,450 in 2015

9. Financial prospect for O&M (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. Specific Item to be studied (if F/S is necessary)



Trends of Adventure travel carter to experiences (World Travel Trends, 2018).
Interest on Key Activities of the Visitors to Timor-Leste; example:

91%	participate in activities related to Biodiversity
69%	visit historical sites and experience cultural activities
56%	participate in adventure-based activities such as mount climbing and hiking

(Data source: 2014 Traveler Survey by TAF and Ministry of Tourism).

11. Expected Financial Resources

"Infrastructure Fund" or "Loan" or "Grant"

12. Estimated F/S budget (if F/S is necessary)

Very rough estimate

Comments

Tourism is an important national policy to develop the country. Government should establish the political road map first with the regulations and necessary budget to assist. Without these roadmap(s) as the country, FS of Tourism project is difficult. FS as the government should be done for the necessary social infrastructure for base point(s) with the cooperation of the development plan of Tourism infrastructure that is mainly managed by private sectors.
From this point of view, this FS is not appropriate at present.

Self-Evaluation Sheet

Score 63

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(National flower park)

1. Objective of Project

The objectives of the project are as follows:

- ✓ To develop new flower production industry around national flower park in Maubisse.
- ✓ To prepare National Flower Park as show window of the flower industry in Maubisse.
- ✓ To develop Highland Experiences Tour in Ainaro Municipality which geographically suitable in Hatubilico.

2. Background

The Ministry of Tourism (hereinafter referred to as "the EMPLOYER"), will require the consulting services of Feasibility Study (FS) of Ecotourism Project in Timor-Leste: Highland Experience Initiative and National Flower Park in Ainaro Municipality (hereinafter called as the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the FS, and this Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

Tourism will be a major contributor to the national economy. (Growing Tourism to 2030)
In tourism industries, Timor-Leste has significant advantages due to our natural resources, geographic location and economic profile."
Timor-Leste will also develop the niche market offerings for visitors seeking adventure tourism, scuba diving and marine tourism, trekking or cultural and historical tourist experiences." (NSDP-TL, Strategy and Actions –p 144)

According to NSDP-TL target, by 2030, Timor-Leste will have a well-developed tourist industry attracting many international visitors, contributing substantially to national and local community income and creating jobs throughout the region.

Geographically, Ainaro Municipality is suitable for these project objectives and the development of National Flower Park is the first project and demand of flowers business in Timor-Leste will be increased every year.

The Project is in line with the Strategic Development Plan and is an integral part of the Tourism National Policy 2030 for Timor-Leste. It needs following function:

1) Developing tourism in the Western zone of Timor-Leste to contribute for the improvement of the life of local communities especially in Ainaro Municipality
2) Enhancing of the green environmental zones with reforestation
3) Promoting the Ainaro Area Development through tourism

As the result, Ainaro Municipality government financial income will increase by managing the project.
Project was planned in March 2018 by the Ministry of Tourism to properly develop **the Ainaro Municipality Area**.

The **Project Outline** is attached at the end of this TOR.

3. Scope of Works

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey

- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of FS for DED

- Utilization of the past existing data for survey could be recommended to shorten the implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.
- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline

3-2) Specific items to be studied:

1) Topography and landscape
2) Soil and water resources
3) Botanical and climate conditions
4) Environmental and social impact
5) Architectural design study (ecological architecture, local tradition and its attributes)
6) Market survey and economic study (source of income, available numbers of local companies and NGO supporting tourism program, market price).

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **5 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period
Team Leader (Architect)	Master	Min. 15 years	5 months
Landscape Architect	-	Min. 10 years	Min. 3 months
Civil Engineer	-	Min. 10 years	Min. 3 months
Horticultural specialist	-	Min. 10 years	Min. 2 months
Parks/Recreation Specialist (Seasonal Florist)	-	Min. 10 years	Min. 3 months
Environmental and social Specialist	-	Min. 10 years	Min. 1 months
Economist and marketing Specialist	-	Min. 10 years	Min. 1 months

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name
The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
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Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
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Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

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Final Report	5 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report.
One soft copy should be attached on the submission of each Report.		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with FS Report.

1) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "FS Guideline")
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   - ✓ General plan
   - ✓ Layout plan
   - ✓ Typical cross section
   - ✓ Elevation view
   - ✓ Facility plan
2) Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
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6) Checklist of FS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
7) FS for DED

5-5) Checklist

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Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, otherwise the appraisal rating of FS report will be subtracted by the EMPLOYER.

- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant may change his subject name for survey and study, but shall keep the bullet of defined item categorization for the convenience of the evaluation by the EMPLOYER.
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Ecotourism Project)

(Project Concept) is expected to attach as Outline of Project, but without cost matters.

Example 11. Coffee Production

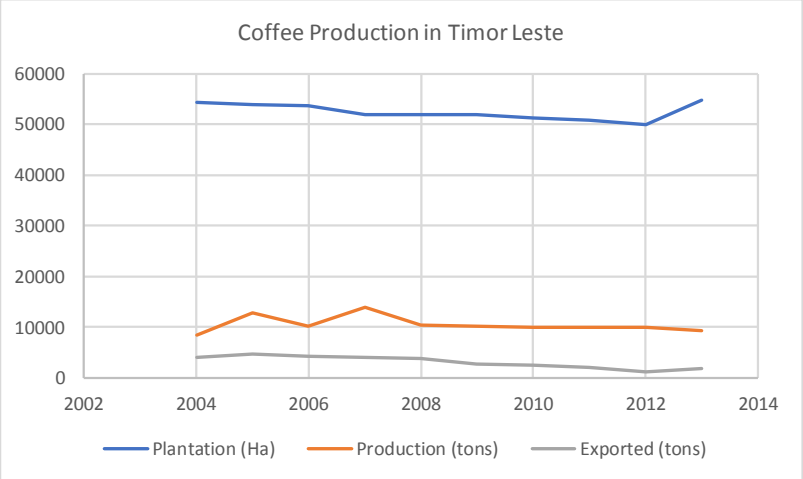
Project Concept

1. **Project Name**

Infrastructure Support for Coffee Production

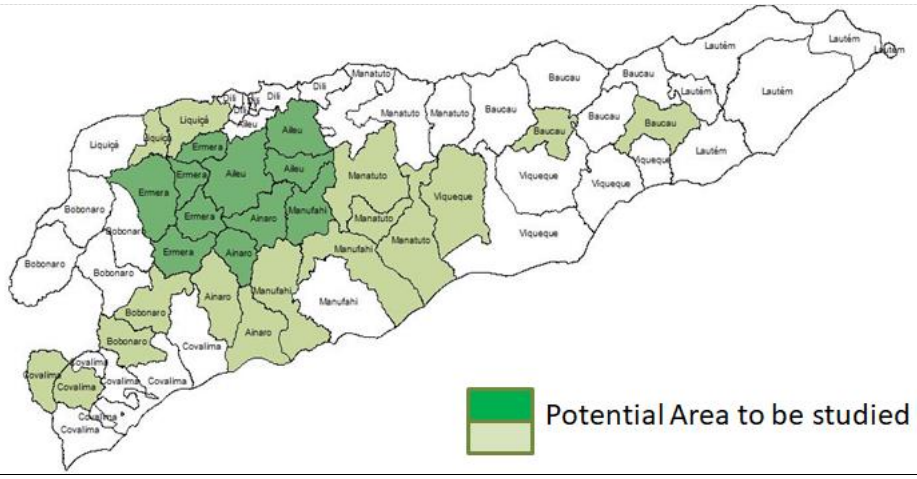
2. **Outline of Project** *(Within a few lines as shown below)*

1) Coffee has been developed since decades ago with the organic systems approach and its products have been exported now to several countries in Europe, USA, Australia, New Zealand, Japan, China and Singapore. This activity plays an important rule to support the income of the country. However, its production has become a problem in last decades due to marketing channel and the fluctuated of coffee price which is significantly affected the price at farmer level. Farmers are usually abandoning coffee plantations and move on to another form of the agriculture.
2) Annual coffee production in Timor-Lester is around 10,000 tons (less than 0.1% of the world: 9,600,000 tons in 2017). But it is one of the essential sectors for Agriculture, and a quarter of total population in TL has relation with coffee industry. It is also very important for employment and export revenue contribute to the national income.
3) Coffee is one of the commodities becoming the source of income of about 25% of households in Timor-Leste which is estimated that over 50,000 families are coffee producers and depend upon income from the crop.
4) Coffee Production in Timor Leste is appreciated by its organic high quality, but famers abandon the coffee production, and it is now decreasing as shown below:



3. **Project Location Map or Photo**

Project area is assumed for total plantation area of Timor Leste (around 50,000 ha), which is in Liquica, Ermera, Ainaro, Bobonaro and Aileu etc. The main production areas are Aileu, Ainaro, Bobonaro, Ermera, Liquiça and Manufahi, with Ermera accounting for half of the total coffee crop.



4. **Outline Scale:** (not quantity) Necessary Items as pilot project

	Length/number	Unit price	amount	Necessary capacity
Coffee Plant Building	2	1 million	2 million	
Pulper machine 1000kg/h	8	10,000	0.08	50,000ha
Washer machine 500kg/h	2	15,000	0.03	x 0.2 ton/ha
Huller machine 100kg/h	4	50,000	0.2	= 10,000ton
Grade machine 400kg/h	2	50,000	0.1	/ 365/6hour
Dry machine 1500kg/h	4	15,000	0.06	=4.6-ton hour
Total cost of factories			2.47 million	
Access Roads Improvement	140 Km	500,000	70 million	
Grand Total			73 million	

6.

5. **Relevance: (Background)**

List of upper plans (with page number) in which the project is recommended

6. **Rough Cost estimate**

Very rough estimate. Attach breakdown at the end of this Table, if possible

7. **Implementation Schedule** (Expected schedule like below Table)

FS	DED	Land Acquisition	Construction	O&M
2018	2019	2020	2021	2022-
6 months	12 months	12 months	2 years	

8. **Project Benefits**

.

Around 370,000 farmers of pilot project area

Total coffee farmers numbers in Timor Leste are shown in right table.

The other beneficiaries by road improvement will be 2-3 times of above.

Districts	population with coffee Plantation	Number of coffee production (tons)
Ainaro	63,136	6,986
Aileu	48,837	6,244
Covalima	12,000	4,271
Liquica	27,879	6,703
Bobonaro	6,845	7,041
Same	53,000	4,954
Manatuto	15,000	2,918
Ermera	120,702	16,939
Baucau	20,000	5,525
Total	367,399	61,581

	Without project	With project	Remarks
Plantation total area	50,000ha	50,000ha	
Annual production	5,000-6,000tons	80,00tons	0.15-0.26 ton/ha
Production rate	0.1-0.12 ton/ha	0.16 ton/ha	
Gross income ($2.5-/kg)	$250-300/ha	$400/ha	Possible up to $500/ha
Production Cost	$100-/ha	$110/ha	
Net Income	$150-200/ha	$290/ha	
Annual increasing income amount		US$5.7million	$(290-175) x50,000ha

Cost for construction		US$73 million	
Redemption period		13 years	

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. **Specific Item to be studied (if F/S is necessary)**

- ✓ Replantation of old coffee tree (more than half of plantation area tree is unproductive, and yield ratio will be improved to two time by replanting)
- ✓ Access road improvement (improvement of workers transportation methods is urgent matters strongly required.)
- ✓ Construction of coffee plants with new system. (improvement of facilities for coffee production is important to raising up the quality and production efficiency)
- ✓ *Following road map study*

	Coffee production (ton/years)	source	Facilities	Quantity	Unit	Unit Rate (x000 $)	Cost (Mil$)	Unit cost of water ($ per m3)	"Payback period (if $1/m3)
Up to 2020	65,000	All districts with coffee plantation	Coffee Manufacture	1					
			Replantation of new seeds	100	ha				
Up to 2030	80,000	All districts with coffee plantation	Coffee Manufacture	2					
			Replantation of new seeds	400	ha				
			Road Rehabilitation		km				

Rough cost is expected to calculate in Project Concept to get the understanding from the Minister, but not necessary to describe in TOR

11. **Expected Financial Resources**

"Infrastructure Fund" or "Loan" or "Grant"

12. **Estimated F/S budget (if F/S is necessary)**

Very rough estimate

Comments

Development of Agri-industry is the most important basic policy as the country. TL coffee production is mainly manage by 4 major groups, such as CCT (Timorese owned), NCBA (USA owned), Delta CAFÉ (Portuguese owned), Ethic Chinese traders (Chinese owned). Starbucks is a major custom in TL.
Government should assist the farmer (and/or agri-company) by supplying subsidy and developping social infrastructure, such as irrigation system, carriage roads of agricultural products etc. based on the long term national policy.
In case of agri-industry, the target of FS will be the development of the basic social infrastructures. Sometimes, investment in production support facilities is also necessary.
It is said that the most important conditions for the development of Coffee industry in TL is to replace the old coffee trees, which started as the plantation by Portugeese more than 300 years ago. It should be done voluntarily by the farmer, therefore cooperation work with coffee farmer orhanization becomes essential.
Therefore, in conducting FS for Coffee Industry, we should have consultations with stake holders to know the most expected assistants as the Government.

Self-Evaluation Sheet

Score 48

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

TOR (Terms of Reference)

(Infrastructure Support for Coffee Production)

1. Objective of Project

What is coffee collection industry?

Development of the infrastructure for Coffee production in Timor Leste

Beneficiaries:
Total of 367,000 persons who planted coffee activities at Ainaro, Aileu, Covalima, Liquica, Bobonaro, Same, Manatuto, Baucau and Ermera.

2. Background

The production of coffee takes an important role to support the income of the country. However, its production has become a problem in last decades due to marketing channel and the fluctuated of coffee price, which is significantly affected the price at farmer level.
Farmers are usually abandoning coffee plantations and move on to another form of the agriculture.

The Directorate General of Coffee Plantation (hereinafter referred to as "the EMPLOYER"), the Ministry of Agriculture and Fisheries, will require the consulting services of Feasibility Study (FS) of Infrastructure Support for Coffee Production (hereinafter called as the Project).

The EMPLOYER intends to engage a consulting company (hereinafter referred to as "the Consultant") for successful implementation of the PFS, and these Terms of Reference (TOR) set out the scope of services to be provided by the Consultant.

The Project is an integral part of the Strategic Development Plan of Timor-Leste 2011-2030 for Economic Development with several essential goals to replace new seedlings and pruning, rehabilitate 40,000 ha of coffee plantation. Because of the price premium for organic coffee Timor-Leste will concentrate on retaining its niches as a producer of quality organic coffee. Integrated pest management techniques, such as cultural control and plant resistance.

This Project Concept was planned in March 2018 by the Ministry of Agriculture and Fisheries to properly develop **the coffee production including its plantation.**

Project Outline is attached on the end of this TOR.

3. Scope of Works

3-1) General Requirement of FS

The Consultants are requested to execute FS on refereeing "FS Guideline" to achieve the above-mentioned objectives:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ Preparation of FS for DED

- Utilization of the past existing data for survey could be recommended to shorten the

implementation period of FS. However, the consultants should propose alternative method for the actual site survey with reasonable reason, if the consultant deemed such survey is necessary for the study.

- Shorten study period by parallel works for each survey and study is recommended.
- The cost proposal should be submitted. However, the total cost of the study should be within the fixed lump-sum amount proposed by the Employer.
- FS for the documentation of this project shall include all investigations, survey, studies, the preparation of basic construction plans as defined in Chapter 8-Table 6, Chapter 9 for Survey and Investigation and Chapter 10 for the study of "FS Guideline"

3-2) Specific Items Requested to study:

1) Market status of coffee in Timor-Leste under the international demand
2) Regulations of market channel
3) Encouraging methods for the coffee production farmer (by such as the expansion of coffee plantation area)
4) Potential location of the coffee collection and processing industry
5) Product diversification system of coffee (Chanel of distribution)
6) Type of current manufacture and necessary facilities
7) Current revenue of coffee production including the exporting
8) Expectable new coffee manufactures
9) Future extension plan of coffee demand
10) Increasing strategy for coffee exporting
11) Social condition and environmental impact

3-3) Cooperation

The EMPLOYER has a consulting meeting prior to the implementation of FS, and from time to time and as necessary, require the Consultant to render other technical support services which are deemed relevant to FS.

In carrying out the work, the Consultant shall cooperate fully with the concerned agencies of the Ministry.

3-4) Responsibility of the Government

In connection with work by the Consultant that requires the cooperation of other Government agencies, the Government will provide liaison and will ensure that the Consultant has access to all information as may be allowed by law for the performance of the Services.

3-5) Services and Facilities Provided by the EMPLOYER

The EMPLOYER shall provide the Consultant with the support staff and information to assist him in performing the services for the effective implementation of the Project:

1) Counterpart staff;
2) Provision of all available information related to the Project;
3) Assistance in securing all necessary permits and authorizations from the Government agencies as required for carrying out the Services.

4. Assignment of Experts

4-1) Period of FS

The required period for FS work is **3 months** after Notice to Proceed up to Submission of Final Study Report.

4-2) Assignment of Experts

Expected Experts Assignment

	Degree	Experience of Similar Project	Assignment Period (Months)
Infrastructure Specialist (Team Leader)	Master	Min. 10 years	3

Economic Specialist	Master	Min. 10 years	2
Environmental Specialist	Master	Min. 10 years	1
Civil Engineer	Master	Min. 10years	2

The Bidder should propose their Experts Assignment schedule to meet with the allowable budget described in Tender Documents. Technical proposal shall include the staff assignment schedule of all staff within the total study period of FS, and the detailed job description for each staff member. Work item in FS for the actual project contents could be revised or added by each Bidders idea. The Bidder should show the summary table of work sharing of each expert as shown in Table below:

Summary of Work Sharing Table of Each Experts (example)

Experts Name / Work Item in FS	Int Expert1 or National Exp 1	Int Expert2 or National Exp 2	Int Expert3 or National Exp 3	Int Expert4 or National Exp 4	Int Expert5 or National Exp 5
Summary of the report					
Purpose of the project and Beneficiaries					
Legal regulation					
Natural conditions					
Site condition					
Similar project records					
Implementation Schedule					
Specific Technology					
Rough Cost estimate data of the past similar project					
Stakeholder's study					
Economic & Financial Projection					
Environment & Social Assessment					
Findings and Recommendation					
Outline Drawings					
Checklist					

Note: Experts name should be actual assignment name

The cost estimation of each staff should be shown in Financial Proposal.

5. Reports and Documents

5-1) Report to be submitted

The Consultant shall submit the FS reports and documents in English, which should include minimum following contents. And Main Report should translate to Portuguese and Tetum (excluding Attachments)

Name	Contents (not limited to)
Inception Report	A summary of the anticipated work Activities and necessary resources required for achieving projects purposes Activity schedule Contents and duration of project activities Key phases of implementation process Level of Stake holders to be involved Information about collecting tools, if any Data Analysis Rules The type of skills and abilities required to team members Duties and responsibilities of each members Period of engagement of each team member
Monthly Progress Report	Brief & concise description of followings: ✓ All activities and progress in the previous month. ✓ Problems encountered or problems anticipated with steps taken or recommendations for their correction. ✓ The works to be performed during the coming month
Draft Final Report	Refer Chapter 8 of FS-Guideline
Final Report	

5-2) Contents of Report

The contents of FS report should include followings, but not limited:

- ✓ Reviewing of relevant studies
- ✓ Applicable Regulation and Standard study
- ✓ Site survey
- ✓ Technical study
- ✓ Outline design
- ✓ Maintenance and Operation Study
- ✓ Rough Cost Estimation and E&F analysis
- ✓ Initial Environmental Impact Assessment
- ✓ Social Impact Assessment
- ✓ Checklist of the study (filling page number of each item)
- ✓ FS for DED

5-3) Reports copy Number and Submission date

Reports should be submitted as specified below:

	Hard Copy Number	Time limit
Inception Report	5 copies	Within 1 calendar week after the Notice of the Commencement of the Services of the Project.
Monthly Progress Report	5 copies	By the 10th day of each month during Study period
Draft Final Report	5 copies	Within 1 calendar week before the final date of contract
Final Report	10 copies	Within 1 calendar week after the receiving of the formal comment in written from the Employer about Draft Final Report. Comments will be given within 1 calendar week after receiving Draft Final Report by the Employer.
One Soft Copy is required on the submission of each Report		

5-4) Attachment to Study Report

The Consultant shall submit following outputs with PFS Report.

1) Outline drawings (Scale shall be around 1/1000-1/5000. Consultant shall decide the necessary drawing and its scale by the consolation meeting with EMPLOYER prior to the work): (see Chapter 11 of "FS Guideline")
   - ✓ Location map
   - ✓ General plan
   - ✓ Layout plan
   - ✓ Typical cross section
   - ✓ Elevation view
   - ✓ Facility plan
2) Rough Construction schedule (Sample Form is attached in Attachment 1-4 of "FS Guideline");
3) Rough Cost estimates (Sample Form is attached in Attachment 1-5 of "FS Guideline");
4) Quantities and Unit Rate of Major Item (Sample Form is attached in Attachment 1-6 of "FS Guideline");
5) Unit rate reference of the past similar project (Sample Form is attached in Attachment 1-7 of "FS Guideline");
6) Checklist of PFS Report (Sample Form is attached in Attachment 1-1 of "FS Guideline" and See final pages also);
7) FS for DED

5-5) Checklist

Consultant shall prepare the Checklist as the sample sheet attached to TOR.

Checklist is important document for the EMPLOYER to check the consultant work efficiently, and consultant shall keep the following provision strictly, or the evaluation rating of PFS report will be subtracted by the EMPLOYER.

- ✓ Consultant shall categorize his any survey subject and any study subject according to the defined item in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant may change his subject name for survey and study, but shall keep the bullet of defined item categorization for the convenience of the evaluation by the EMPLOYER.
- ✓ Consultant may add survey subject or study subject within a defined bullet specified in Table 1-6 & 1-7 of FS Guideline Part 1.
- ✓ Consultant shall submit Checklist on the first meeting after starting FS works with the Employer for the discussion of Scope of Works of FS by filling the necessity Rank, which could be revised during FS with the acceptance of the Employer.
- ✓ Consultant shall put the page number about all his subject on submission of draft report and final report, where they are described in FS report. If the page number is not shown, the FS report shall be rejected without the evaluation of the FS report.

Outline of Project (Coffee Production Infrastructure)

(Project Concept) is expected to attach as Outline of Project, but without cost matters.

FS Check Sheet

Coffee Industry Development Project

New	National	Large	Field
Rehabilitation	Private	Medium	Factory
		Small	Training Center
			Sales

Coffee Plantation Project Please refer example list on pages 18-21

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 (page 10) and Chapter 10 (page 11))	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
a) Existing Development Plan	5				
a) Study results of Spatial/ Sector plan	5				
a) Consistency with Upper National Plan	5				
b) Climate survey	3				
b) Hydraulic survey					
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)					
b) Geological survey (such as foundation or ground survey etc.)					
b) Location survey or topographic survey	5				
c) Regulations / Design standard	5				
c) Design load and design strength of the object's foundation					
d) Social conditions before project (such as population, land use etc.)	5				
d) Inventory Survey for exiting available facilities or demolished	5				
d) Utilization status survey (traffic volume, cargo, vessel number, possible user number)					
d) Design traffic volume	5				
d) Current issues					
d) Current revenue, if any	5				
d) Recent budget for the sector	5				
d) Target Area study result (such as features, issues, etc.)	4				
e) Future demand or necessary capacity					
e) Location or route selection or Distribution methodology of the products					
e) Necessary facilities scale and/or numbers etc.	5				
e) Necessary ancillary facilities (such as warehouse or equipment)	5				
e) Study of the route of distribution	5				
e) Design scale of each Project facilities (such as height, level or depth etc.)	5				
e) Approach measures to the object (such as roads or railways)					
e) Quantities for Major Items, Project Cost and Necessary construction period	5				
e) Resource survey results (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)	5				
f) Economic & Finantial analysis results					
g) IEE, Resettlement etc. , including Influence of the project to the surroundings	3				
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders	5				
i) Future extension plan, if necessary	5				
i) Alternative proposal (such as location or routes or methodologies)					
i) Privatization tendency					
j) Countermeasures for the risks, such as disasters, waste or emission	5				
j) Operation and Maintenance plan (O&M)					
Drawings prepared in FS (Consultants may add drawing list, if necessary) see Part 1- Chap 11	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
1) Location map 2) General plan	Minimum Drawing for FS				

Necessity rank shown here is just example. Consultant should put his idea.

Items in each category could be added/ revised based on the project status.

Necessary drawings are different according to the Project

3) layout Plan 4) Typical Cross section 5) Facility Plan	Secondary Drawing				
Quantity, Unit Rate of major Item & Construction Period in FS		Report page	Checked by LM	Date	Checked by MPS
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Attachment 3)		Report page	Checked by LM	Date	Checked by MPS
8) Direct Benefit (refer Part 1- Attachment 3)					
9) Indirect Benefit					

Prepared	Checked	Appraised
Consultant name	Ministry & Department	MPS
Person name	Person name	Person name Krispin Fernandes
Signature	Signature	Signature
Date	Date	Date

LMs and/or Consultant could revise the name of check items and may add in the same category, **but the category should be kept to make clear the content of check item.**

Example 12. Dili sewage Plant

Project Concept

3. **Project Name**

New Construction of Dili Sewage Plant

4. **Outline of Project**

"Improvement and expansions of wastewater (Black water) management system in Dili"

3. **Project Location Map or Photo**

Tasi Tolu, Tibar , Caicoli

13. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*			*Expected Plan*		
	Tibar	*Tasi tolu*	*Kaikoli*	*Tibar new*	*Tasi tolu*	*Kaikoli*
Area (m2)	*7,000m2*	-	-	*20,000m2*	*20,000m2*	*20,000m2*
Capacity	*??*	-	-	*21,000.m3 (7 days proses)*	*21,000.m3 (7 days proses)*	*21,000.m3 (7 days proses)*
Total employee number	*4*	-	-	*20*	*20*	*20*
Current issue / Item to be improve	*Collection by tank truck to an existing sewage treatment plant in Tibar but "about 80% is penetration to ground*	-	-	*Establishment of network sewage collection and reduce penetration to ground*		

14. **Relevance: (Background)**

- ✓ Final Dili Sanitation Master Plan, 2012, by SKM report
- ✓ Strategic Development Plan (SDP, pg.78) Water and Sanitation Sector

15. **Rough Cost estimate**

Rough Cost	*Tasi tolu*	*Tibar*	*Kaikopli*
Sewage Plant	*$8 M*	*$8 M*	*$8 M*
Transmission pipe	*5m*	*6m*	*4m*
Office Building	*0.5*	*0.5*	*0.5*
4 Pound tank	*1m*	*1m*	*1m*
Land Acquisition	*3*	*3*	*3*
Total Cost	*18m*	*19m*	*17m*

16. **Implementation Schedule**

(F/S)	*(DED)*	*Land Acquisition*	*Construction*	*O&M*
(2020	*(2020-2021)*	*2021-2022*	*2022-2026*	*2027-*
(6 months	*(12 months)*	*3years*	*4 years*	

17. **Project Benefit**

- ✓ *People of Dili can live in a clean and healthy Environment.*
- ✓ *Prevent ground water contamination.*
- ✓ *30,000 m3/d sewage will treated*

18. **Financial prospect for O&M**

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)Company	*(30,000m3/d/5) =6,000 truck* *(6000*$75) =$450,000* *($450*4) =$1,800,00*	*(00,000*$0.02)=$8,000/day* *(8,000*360)=$ 2,880,000.00 /year* *(2,880,000.00 *20 years = 57,600,000.00*
Expenditure for O&M *(by 1000US$)*	*($300*4)=$1,200*	*(20*$500)=$10,000*
Direct staff number for O&M	***4***	***20***

19. **Specific Item to be studied (if F/S is necessary)**
✓ *Capacity and issue of existing sewage plant* ✓ *Necessary capacity of new Plant* ✓ *Comparison study of 3 alternative / option (Caicoli, Tibar, and Tasi Tolu)* ✓ *Construction at an protection area* ✓ *Possibility of changing Tasi Tolu regulation as a protection area.* ✓ *Possibility of distribution method* ✓ *Study about 4 pound tank location* ✓ *Tariff for community and industry (Hotel)*
20. **Expected Financial Resources**
"Infrastructure Fund"
21. **Estimated F/S budget (if F/S is necessary)**
US$600,00

Self-Evaluation Sheet

Score 69

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	<10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect
	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

FS Check Sheet

Target project in this checklist:

Water resources, such as River, groundwater, etc.	Intake facilities, such as Dam, Barrage, Well, etc.	Water conveyance facilities, such as Canal, Pipe, etc.	Purification facilities / Irrigation facilities	Distribution facilities, such as pipe, bulb, etc.	Tariff collection facilities, such as bulb, meters etc. / Sewage facilities

Sewage・Sanitary Please refer example list on pages 18-21

Items to be surveyed and studied for the formulation of FS ("a-j" are category mark in Chapter 9 (page 10) and Chapter 10 (page 11))	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
a) Existing Development Plan	3				
a) Urban development plan, regional plan (water sector plan)	5				
a) Study results of Spatial/ Sector plan					
a) Consistency with Upper National Plan	3				
b) Climate survey	3				
b) Hydraulic survey	3				
b) Disaster survey (storm, flood, corruption, erosion, and current countermeasures or alarm system)	3				
b) Geological survey (such as foundation or ground survey etc.)	3				
b) Location survey or topographic survey					
b) Natural condition (topographic overview) of Planned area for sewage	5				
c) Regulations / Design standard					
c) processed water quality standards	5				
c) Design load and design strength of the object's foundation					
d) Social conditions before project (such as population, land use etc.)					
g) Study of catchment system (joining type, separating type)	5				
d) Population census and projection	5				
d) Forecasted Pollution volume					
d) Inventory Survey for exiting available facilities or demolished					
d) Human waste & putrefaction tank	3				
d) present treatment situation in district	5				
d) Inflow water quality plan	5				
d) Utilization status survey (traffic volume, cargo, vessel number, possible user number)	3				
d) Treatment plant location, and processing methods	5				
d) Status of electric power supply	3				
d) Processed water quality	5				
d) Present situation of discharging point	5				
d) Operation maintenance status	5				
d) Current issues	3				
d) Public health and their hazard issues	3				
d) Water contamination / pollution	3				
d) Current revenue, if any	3				
d) revenue and expenditure, and fee collection system	5				
d) Current budget for sewage treatment	5				
d) Target Area study result (such as features, issues, etc.)	5				
e) Future demand or necessary capacity					
e) Planned sewage volume	5				
e) Location or route selection or Distribution methodology of the products	3				
e) Necessary facilities scale and/or numbers etc.					
e) Water treatment plant (balancing, reservoir, reaction tank, disinfection equipment, reuse facilities)	3				
e) Pumping plant facilities (detritus, tank, pumping equipment, power machine, internal combustion engine)	3				
e) Conduit facilities (pipe, siphon culvert, manhole, storm water outlet & reservoir)	3				
e) Discharge pipe	3				
e) Disposal equipment (facilities of transportation, concentration, digestion, dehydration, dryness etc.)	3				
e) Necessary ancillary facilities (such as warehouse or equipment)					
e) sludge treatment	5				
g) Planned mud quantity, treatment procedures	3				
e) Design scale of each Project facilities (such as height, level or depth etc.)					

Necessity rank shown here is just example. Consultant should put his idea.

Items in each category could be added/ revised based on the project status.

e) Influences for river, lakes and marshes, sea area and waterway	5				
e) Approach measures to the object (such as roads or railways)	3				
e) Quantities for Major Items, Project Cost and Necessary construction period	5				
e) Resource survey results (available materials, equipment, labors, facilities or energy with their unit rate, project's owner ability)					
e) Electricity and other facilities	3				
f) Economic & Finantial analysis results					
g) IEE, Resettlement etc. , including Influence of the project to the surroundings					
g) Social Impact Analysis					
h) Benefit & Beneficiaries, stakehoolders	4				
i) Future extension plan, if necessary					
i) Countermeasures for increasing volume in future	3				
i) Alternative proposal (such as location or routes or methodologies)	3				
i) Privatization tendency	3				
j) Countermeasures for the risks, such as disasters, waste or emission	3				
j) Operation and Maintenance plan (O&M)					
j) Test, management, environmental protection facilities	3				
Drawings prepared in FS (Consul[illegible]y) see Part 1- Chap 11	Necessity Rank	Report page/chap	Checked by LM	Date	Checked by MPS
1) Location map 2) General plan	Minimum Drawing for FS				
3) layout Plan 4) Typical Cross section 5) Facility Plan	Secondary Drawing				
Quantity, Unit Rate of major Item & Construction Period in FS		Report page	Checked by LM	Date	Checked by MPS
6) Quantity and Unit Rate of Major Items					
7) Construction Schedule and Period					
Expectable Benefit (qualitative and quantitative) (refer Part 1- Attachment 3)		Report page	Checked by LM	Date	Checked by MPS
8) Direct Benefit (refer Part 1- Attachment 3)					
9) Indirect Benefit					

Necessary drawings are different according to the Project

LMs and/or Consultant could revise the name of check items and may add in the same category, **but the category should be kept to make clear the content of check item.**

Example 13. Community Upgrading

Project Concept

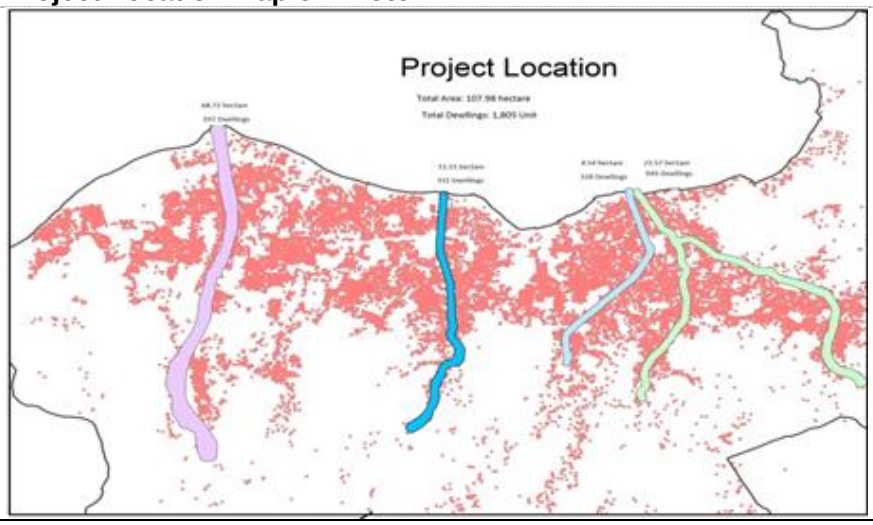
1. **Project Name**

Community Habitat Upgrading in The River Line in Dili Urban Area

2. **Outline of Project** *(Within a few lines as shown below)*

"In (Location / Target), completion of (Project Purpose) will contribute to (Overall goal) by executing of (Output)"

3. **Project Location Map or Photo**



4. **Outline Scale:** (not quantity) *Show by the comparison table about "Current status" vs "Expected Plan"*

(Example)	*Current status*	*Expected Plan*
Area (m2) or Length (km)		
Capacity		
Total employee number		
Current Issues / Items to be improved		

5. **Relevance: (Background)**

List of upper plans (with page number) in which the project is recommended

6. **Rough Cost estimate**

Facility and utility Development and related arrangement	Unit/km/ha	Unit Cost (x1000US$)	Total (x1000US$)
Study & Design			500
Construction			
New Site Arrangement	3.5 ha	200	700
Access road	5 km	200	1
Houses	361 houses	30	10,830
Clinic	4 places	45	180
Community Centre	4 places	60	240
Garbage collection post	50 places	10	500
		Total	12,950

7. **Implementation Schedule** (Expected schedule like below Table)

FS	DED	Site arrangement & Land acquisition	Construction	O&M
2019	2020	2021	2022-2025	2026-
6 months	9-12 months		3 years	

8. **Project Benefits**

1) Generally, all community in Dili Urban Area (222,323 people)
2) Community who live in the river line (approximately 9,025 People)

9. **Financial prospect for O&M** (show by the comparison style)

(Example)	*Current status*	*Expected Plan*
Annual Revenue (by 1000US$)		
Expenditure for O&M *(by 1000US$)*		
Direct staff number for O6M		

10. **Specific Item to be studied (if F/S is necessary)**

Study of following current issues	Study for the solution about followings:
1) Residents of communities are throwing rubbish along the rivers 2) Some houses are in the risky area of disaster such as flooding 3) Some areas have not access roads to public road 4) Some community are not easy access to public facility	Community Organization Establishment Facilities and Utilities Development

11. **Expected Financial Resources**

"Infrastructure Fund" or "Loan" or "Grant"

12. **Estimated F/S budget (if F/S is necessary)**

Very rough estimate

Comments

This project has various categories to be solved and this is not appropriate as FS.
It is better to select one of the followings as FS, or:

- ✓ River flood protection: it is expected to manage first as principal matters. (Project location figure shows the places where problems exist, not project location.)
- ✓ Solusion for the ocuppations by refugees or sqatter in flood risky area:
  If there is no measures for the prohibision of new refugees or sqatter to the risky area from where the people moved to new village, the project purpose becomes no meaning. This is a difficult and common issue to solve in all over the world.
- ✓ The location for the relocation (new village): In case of FS, it should indicate candidate place.
- ✓ Protection methods of throwing rubbish, such as development of regulation.

Self-Evaluation Sheet

Score 42

Main Item	Sub-item	Indicator	Examples of Indicators and reference data			
Investment Efficiency	Cost-Benefit during evaluation period	Cost (million US$)	1-5	5-10	>10	no inform
		Cost benefit ratio (B/C)	>2	>1.5	>1	<1
		Internal Rate of Return (IRR)	>16%	>12%	>8%	<8%
Situations for implementation/ O&M	Relevance of Project	Relationship with higher level plan	Master Plan	Sector Plan	Strategic Plan	no
		Type of Project	Basic Infrastructure	Economic Infrastructure	Social Infrastructure	no
	Possibility for Project Realization (or O&M possibility)	Consensus of local people	Already accepted	Negotiated	Start negotiation	No process
		Situations of legal procedures	Approved already	Sure	On application	No process
		Budget status	Already in the budget book	Next year Budget Plan	Only proposal	No process
		Status of O&M plan preparation	Approved O&M budget	Already has O&M plan	On preparation	No process
	Forecasted technical difficulty	Topographic condition (flood)	No risk	Low risk	Medium risk	High risk
		Topographic condition (land slide)	No risk	Low risk	Medium risk	High risk
		Advanced technology experience for construction and O&M	A lot of experience	Limited experience	Only single case	No experience
Project Effect	Life of the people	Improvement of access / quality to public facilities	Provide initial access	Improve quality (price)	Improve only access	Can't expect
		Improvement of public transportation	Direct result from project	Improve public access	Some benefits	Can't expect
		Interconnection between communities	Become easy and fast	Become possible	Some expected	Can't expect
		Resettlement	No resettlement required	Only a few households	Significant resettlement	Can't expect
		Improvement of tourism	Main target	Bring benefits	Some expected	Can't expect
		Contribution to healthy life	Health project	Good for health	Some expected	Can't expect
	Economy of Concerned area	Expansion of Productivity	Create new products	Improve import/export	Improve internal trade	Can't expect
		Increasing of Job opportunity	Create new permanent jobs	Support current jobs	Only during construction	Can't expect
	Safety securing	Reduction of natural disaster	Direct protection	Improve safety	Somewhat expectable	Can't expect
		Reduction of accidents	Safety project	Improve safety	Somewhat expectable	Can't expect

	Environment	Reduction of air/water pollution	No pollution	Pollution during construction	Pollution after construction	Can't expect
		Reduction of noise	No noise	Noise during construction	Noise after construction	Can't expect
		Conservation of soil	No damage	Some damage	Significant damage	Can't expect
		Conservation of rare species	No lost	Some damage	Significant damage	Can't expect
		Improvement of landscape	Give harmony on natural and artificial beauty	There is some minus effect to the natural and regional,	Structure are breaking the harmony of scenery.	Structure are breaking the harmony of scenery.
	Local Community	Utilization of local materials and human resources	For construction and O&M	Only for construction	Somewhat expectable	Can't expect
		Cost saving for community	Make profit	Reduce expenditures	Minimize damage cost	Can't expect
		Improvement of regional equity	Direct improvement	Only in some areas	Somewhat expectable	Can't expect
		Promotion of local culture	Develop culture and traditions	Save culture and traditions	Somewhat expectable	Can't expect

PART 4:

EVALUATION OF THE FEASIBILITY STUDY REPORT

Chapter 4-1. FS Evaluation on each Stage

FS is requested for major Project, because large project may have lager risks on the implementation, such as environmental affect, unexpected delay and cost overrun. The final goal of this FS GL is how to check reasonably the various kinds of projects' FS report to avoid such risks prior to the implementation of the project.

LMs staff should prepare Project Concept & Project Brief on applying to get the budget allocation of the project implementation. And, if necessary, they should order FS to consultant by preparing TOR, and check the study contents during the preparation of FS report, not after the completion of FS, because evaluating the finished FS report itself does not directly lead to improvement of the project. If so, for what FS is checked? It is to check whether the study is enough or not as the project's preliminary appraisal. Therefore, FS is required to be briefly summarized according to the standard format. Appraisal by scoring is not always necessary although this guideline shows the scoring methods as examples.

Generally appropriate ability and experience is necessary on the evaluation. MPS staff work is to recommend appropriate projects to CAFI in a short period from hundreds of projects even if they are not technically familiar with all fields and all kinds of projects.

For the easy evaluation of various project, three elements are recommended on implementing FS. It is **standardizing**, **simplifying**, and **self-diagnosis** of FS works. Checklist is requested for the self-checking by the executing Consultant of FS as one of their duty against their own FS report, and the owner side could know the points to clarify the important points and issues.

The evaluation work related to FS is divided into the following three stages, and separate evaluations should be carried out at each stage.

Table 4-1: Evaluation methods on each stage

Stage	Documents	Prepared by	Reference
On FS application	Application documents (Project Brief)	Executing Agency	Part 4 Chapter 3
On FS tendering	Technical Proposal	Tenderer	Part 4 Chapter 4
On FS submission	FS Report	Consultant	Part 4 Chapter 5

All above evaluation has a relation for achieving the rational evaluation of FS report.

FS execution methods in this GL are different from the conventional method. Therefore, it is expected to improve this evaluation methods of the guideline through the actual execution based on the opinion of the Employer and the Consultant who engaged in the FS.

Chapter 4-2. Assessment of the Project Concept

FS will be applied for major project, and Project Concept should be attached to application form to get the allocation of budget of FS. On the other hands, appropriateness of small scale of Project will be evaluated by **Project Brief** (Attachment 1-12 of FS-GL Part1) & **Project Concept** (Table 1-4 of FS-GL Part1). Some examples of Project Concept are shown in Part 3 of Guideline.

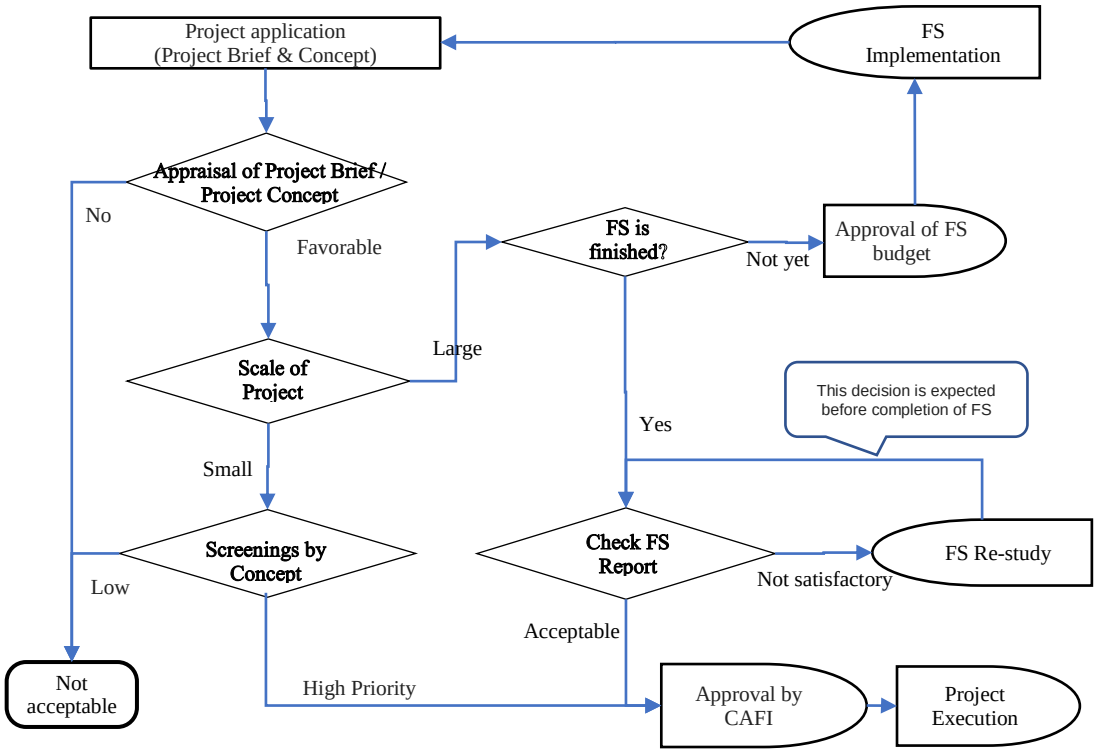


Figure 4-1: FS to Project Execution Process

The Table 4-2 shows the example of scoring of the Project Concept.

Table 4-2: (Draft) Table for Scoring Project Concept

Important items in Project Concept	Project Concept item Number	Described in or not		Clearness of Explanation		Appropriateness	
1. Project Name	(1)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
2. Why Project is expected?	(2)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
3. What is Project Content?	(4)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
4. Where is Project?	(3)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
5. Who will manage project?		Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
10. How about relevance??	(5)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
10. What are special conditions, if any?	(10)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
6. When Project should complete?	(7)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
3. How much the project cost?	(6)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
9. What is project benefit?	(8)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
4. What is the Impact of Project?		Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
4. How about the sustainability?	(9)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
4. What is the budget source?	(11)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
4. How much the estimated FS cost?	(12)	Described Not described	+1 0	Clear Not clear	+2 0	yes maybe none	+2 +1 0
Total							
Note (range of total score):			10 ~ 0		20 ~ 0		20 ~ 0

Chapter 4-3. Evaluation of the Project Brief

Currently MPS requests LMs to submit the application form for Project execution according to the Standard Form (shown in Attachment 12 of Part 1 draft on October 2018). MPS will evaluate the application form and will make scoring based on the Table 4-3 *for the recommendation of appropriate Project to CAFI* or the decision of implementation of FS.

Table 4-3: Scoring Example for Feasibility Study Application (revised draft)

Important items in **Project Brief** for the screenings of project	Item number in Project Brief	Criteria	score	*Item number in Project Concept*
1. Project Owner (and organization in charge of the Study / Design)	(item 1)	Filled properly No mention	1 -1	
1. Partners/ Advisory Organizations (if any)	(item 1)	Filled properly No mention	1 0	
2. Project Name	(item 2)	Filled properly No mention	1 -1	*(item 1)*
3. Location of the Project	(item 3)	Filled all & with Map Filled all but no Map Partially filled No mention	2 1 0 -2	*(item 3)*
3. Rough Cost Estimation of the Project	(item 4)	Filled properly Filled but suspicious No mention	4 2 -2	*(item 6)*
4. Project Period	(item 5)	Filled properly Filled but suspicious No mention	2 1 0	*(item 7)*
6. Type of the Project	(item 6)	Filled properly No mention	1 -1	
7. Background of the Study / Design, and the summary of Project Purpose, especially about the relations with SDP, National space plan and/or District space plan etc.	(item 7)	Filled properly Filled but not enough No mention	**5** 2 -2	*(item 2)*
7. The basic components to achieve the project	(item 7)	Filled with scale Filled item only No mention	**10** 5 -5	*(item 4)*
8. Benefit	(item 8)	Analyzed properly Not enough/ suspicious No mention	**8** 4 -4	*(item 8)*
9. Study status related to the Project	(item 9)	Filled properly Filled but not enough No mention	2 1 0	
10. Land for Project	(item 10)	Filled properly Filled but suspicious No mention	2 1 0	
11. Other important information about Project	(item 11)	Filled properly Filled but not enough No mention	2 1 0	
12. Requested Budget for the Feasibility Study (in US$)	(item 12)	Filled properly Filled but not enough No mention	4 2 -2	*(item 12)*
12. The required specific items for FS		Studied well Studied but not enough No mention	**10** 5 0	*(item 10)*
12. Expected Duration of FS Implementation	(item 12)	Filled properly Filled but suspicious No mention	2 1 0	*(item 7)*
		Total Score	50~ -20	

Note: 1. Project Concept and draft TOR for FS should be attached to Feasibility Study Application
Note: 2. Minimum total score should be more than 40 (80% of full score) for the acceptance of disbursement of FS Budget.
Note: 3. In case of small project, scoring will be done by Project Concept & Project Brief (as Project application)

Chapter 4-4. Evaluation of Technical Proposal for FS

LMs should get the acceptance of TOR from ADN and send the necessary all documents to NPS for the execution of FS Tendering. NPS will conduct the Tendering. *Tendering Committee* will evaluate the Proposal of FS Consultants.

Technical Proposal for FS will be evaluated on the two scoring tables (table 4-4 and 4-5) to keep the fairness of evaluation.

Scoring procedure

1. A few members should be nominated to the evaluation committee.
2. Each member shall fill scoring independently by using Table 4-4 and Table 4-5.
3. There is no definition about full score. It is just a comparison of cumulative points.
4. Average of each member scoring should be used as the final scoring.
5. If a scoring of a member is different extremely from other member's one, his scoring should be deleted on the calculation of average.

Table 4-4: Personal Evaluation Scoring Sheet of FS Technical Proposal (example)

Ministry of _____
Personal Evaluation Sheet (Firm Name_____)

	POSITION/AREA OF EXPEIRT	Name (Initial)	A		B		C		D		Total Score (A+B+C+D)
			General Qualifications		Project-Related Experiences		Overseas/ Country Experiences		Duration of work in TL		
			15%		50%		15%		20%		
			Rating	Score	Rating	Score	Rating	Score	Rating	Score	
	International Consultants										
a	Expert 1(Team Leader)										
b	Expert 2										
c	Expert 3										
d	Expert 4										
e	Expert 5										
	National Consultants										
a	Expert 11										
b	Expert 12										
c	Expert 13										
d	Expert 14										
e	Expert 15										

Rating should be filled based on the following criteria

Rating A-C: Excellent - 5 Very Good - 4 Above Average - 3 Average - 2 Below Average - 1 Noncomplying -0

Rating D: D/T>5% =5, D/T>4%= 4, D/T>3% = 3, D/T>2% - 2, D/T>1% - 1, D/T=0% -0
Here D: Duration of assignment in TL,
T: Total Man-Month of the Team excluding non-expert

Score is calculated "Rate x Percentage described in Table"
Numbers should be rounded to two places after the decimal point and expressed as the first decimal place

Example; checking methods of remuneration of staff
If total contract price is US$452,000;
And total assignment of expert is 18MM(Foreign) +24(National) + 10 (not Key staff)
Then average unit price of remuneration becomes
US$452,000/ (18*3+24) =US$58,000/MM
---this is appropriate as the national staff monthly fee (including overhead fee)?
International Expert 30,000-40,000/M, National Expert 10,000-15,000/M including OH
(Assumed that the remuneration fee of Foreign is 3 times of those of national staff)

Table 4-5: Total Evaluation Scoring sheet of FS Technical Proposal (example)

Ministry of _____

SUMMARY EVALUATION SHEET FOR FULL TECHNICAL PROPOSALS

Project No.- : Title

Evaluation criteria	Max weight	Firm A rating	Firm A score	Firm B rating	Firm B score	Firm C rating	Firm C score	Firm D rating	Firm D score
1. Qualification of firm									
a. Experience in similar projects	5								
b. Experience in similar areas	3								
c. Company Financial status	5								
2. Approach and methodology									
a. Understanding of FS report preparation based on Guideline	3								
b. Understanding of background	1								
c. Understanding about literature to be referred to in the superior plan etc.	2								
d. Stating the related legal to be referred	1								
e. Understanding of objectives	4								
f. Quality of methodology (general)	4								
g. Methodology of Site Survey	3								
h. Methodology for environmental study	2								
i. Methodology for social impact study	2								
j. How to get the construction quantity	2								
k. How to estimate the construction cost	2								
l. How to estimate benefits	2								
m. Innovativeness/comments on TOR	2								
n. Work program	4								
o. Personnel schedule	3								
p. Counterpart personnel & facilities	2								
q. Proposal presentation, if conducted	1								
Subtotal									
3. personnel biodata (Rating come from the "total score" of Table 4)									
International consultants									
a. Team leaders	5								
b. Expert 1	4								
c. Expert 2	4								
d. Expert 3	4								
e. Expert 4	3								
National Consultants									
a. Expert 11	2								
b. Expert 12	2								
c. Expert 13	2								
d. Expert 14	1								
e. Expert 15	1								
f. Expert 16	1								
Subtotal									
Total									

Ratings for 1. & 2.: Excellent=5, Very Good=4, Above Average=3, Average=2, Below Average=1, Noncomplying=0

Criteria Approved by: Date Approved: Evaluation Done by: Date Evaluated:

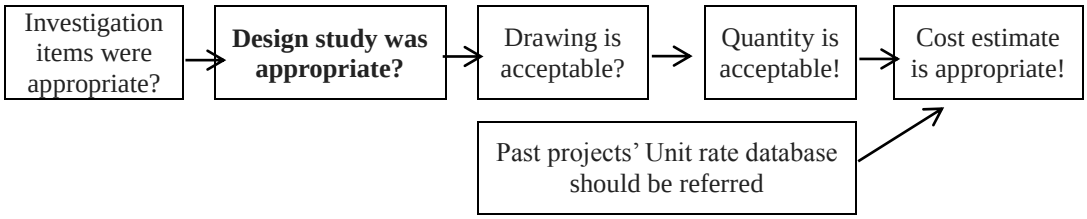
CHAIR PERSON CHAIR PERSON

Chapter 4-5. Evaluation of FS Report

This chapter describes Evaluation method of FS report by scoring to conduct appraisal in a short period with fairness. Following items are generally important items as FS, but this Chapter focuses on Design and Cost matters, because evaluation of appropriate construction period and necessary cost are basic conditions to justify the project's validity.

✓ Construction timing and period, ✓ Necessary budget,	Evaluation items in this GL
✓ Environmental influence, ✓ Resettlement of residents etc.	These parts should be prepared separately

Following chart shows the procedures for the assessment of FS report regarding design and Cost estimate:



The evaluation could be done by scoring based on following 10 processes.

Table 4-6: Evaluation Process about Design and Cost matters

Process	Items	Tables for reference
1	Check of Necessary Documents	Table 4-9. Scoring of Necessary Documents
2	Check of Field Survey and Feasibility study	Table 4-10. Scoring of Survey & Study Items
3	Check of Outline Drawings	Table 4-11. Scoring of Necessary Drawings
4	Check of Project Implementation Schedule	Table 4-12. Scoring of Construction Period with Quantity of Major Work Item
5	Check of Benefit & Beneficiaries	Table 4-13. Scoring of Description of Benefit and the related beneficiaries
6	Check of Rough Cost Estimates	Table 4-14. Scoring of Rough Cost Estimation
7	Check of Unit Rate List of Major Work Item	Table 4-15. Scoring of Unit Rate List of Major Work Item
8	Check of Unit Rate of Similar Past Project	Table 4-16. Scoring of Unit Rate List of Similar Past Project
9	Total score of the Project	Table 4-8. Summary of Project Scoring
10	Screenings of Projects	Table 4-7. Scoring of Screening Results of Project

	E & F Analysis Results	*These parts should be prepared separately.*
	IEE for Natural conditions	
	IEE for Social conditions & Resettlement	

It is expected to modify this method through the actual Evaluation of FS submitted from LMs.

4.5.1. Screenings of projects

It will be recommended to compare the total score of each project by Table below:

Table 4-7: Scoring of Screening Results of Project

Project name	Necessary Document	Field Survey	Study	Outline Drawings	Project Schedule	Benefit & Beneficiary	Rough Cost estimate	Unit Rate of Major Work	Unit Rate of Similar Project	Total	Remarks
A											
B											
C											
D											
E											
F											
G											
H											

Z											
	Table 4-9	Table 4-10	Table 4-11	Table 4-12	Table 4-13	Table 4-14	Table 4-15	Table 4-16	Table 4-17		

4.5.2. Total score will be calculated by using following table.

Checker of MPS is a person in charge (focal point). It is desirable to check by several staff.

Table 4-8: Summary of Project Scoring

	Check Item	Checked by: (person 1 name)	Checked by: (person 2 name)	Score Range
Process 1	Necessary Document			7 ～-7
Process 2	Field Survey			75? ～-15
Process 3	Outline Drawings			30? ～0
Process 4	Project Implementation Schedule			6? ～--1
Process 5	Benefit & Beneficiaries			30? ～0
Process 6	Rough Cost estimate			20? ～0
Process 7	Unit Rate List of Major Work Item			12? ～0
Process 8	Unit Rate of Similar Past Project			20? ～0
	Total			270? ～- 40
	Average			

Process 1: Check of Necessary Documents

Table 4-9: Scoring of Necessary Documents

	Reference to Guideline page		Score
Cover letter	Part4-p19	Attached Not attached	+1 -1
Summary Table of Rough Cost estimate	Part1-p31	Attached Not attached	+1 -1
Unit rate / quantities of Major Work Item	Part1-p32 &Part4-p16	Attached Not attached	+1 -1
Unit rate of Similar project	Part1-p33 &Part4-p16	Attached Not attached	+1 -1
Outline of Time Schedule	Part1-p30 &Part4-p13	Attached Not attached	+1 -1
Outline Drawing	Part1-p14	Attached Not attached	+1 -1
Checklist of the contents of Site survey/ FS design	Part1-p20	Attached Not attached	+1 -1
TOR for DED	Part1-p46/37	Attached Not attached	+1 -1
Total			

Process 2: Check of Field Survey and Feasibility study

Table 4-10 and 4-11 show the scoring table of Checklist about the standard requirement for the FS.

Table 4-9: Scoring of Survey & Study Items

	Scoring methods	Remarks
1st step: for A)	If any of page number of the report, checked date and the checker name is not listed, the score of the item becomes "zero". If number of surveyed or studied items is more than one, all the items should be counted separately	The page number of the report, checked date and the checker name about each check item are listed or not. Page number on the FS report about each check item is necessary to make easy to check the contents of FS report.
2nd step: for B)	The evaluator will check the necessity of the described item in the report, and if the evaluator judged is unnecessary, the score becomes "zero".	Scoring of "Necessity" of item in Report are based on sole decision of the checker of MPS.
3rd step: for C)	If the content can be evaluated as very good one, it may be considered to add points beyond the upper limit of each item	Scoring of "Clear or not" of item in Report are based on sole decision of the checker of MPS.

Here: A) Listed or not, B) Necessity, C) Description in Report, as sown in Table 4-10 & 4-11.

The Project Owner will evaluate the Survey & Study status and put the score in checklist as shown below:

Table 4-10: Scoring of Survey & Study Items

Check item for field survey	Necessity Rank			Report page / Chapter			Description in Report	
a) Existing Development Plan	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
a) Consistency with Upper National Plan	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
a) Study of Spatial / Sector Plan	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
a) Review of relevant tudy	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
b) Climate survey	5	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
b) Hydraulic survey	5	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
b) Disaster survey, storm, flood, corruption, erosion, and current countermeasures or alarm system,	5	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
b) Geological survey (such as foundation or ground survey etc.)	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
b) Location survey or topographic survey	3	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
c) Applicable Regulations/ Design standard	5	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
c) Design load and design strength of the object's foundation	5	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
d) Social condition before project (such as population, land use etc.)	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
d) Inventory Survey for exiting available facilities	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
d) Utilization status survey (traffic, cargo, vessel number, possible user number)	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
d) Current issues	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
d) Current revenue, if any	4	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
d) Recent budget for the sector	2	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
d) Target Area study result (such as features, issues, etc.)	3	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
e) Future demand or necessary capacity	5	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?
e) Necessary facilities scale (such as volume, numbers)	5	Acceptable	+1		Found	+1	Clear &Enough	+2
							Not clear	0
		No	0		No	0	No mention	-1?

e) Necessary Ancillary facilities (such as warehouse or equipment)	5	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
e) Location or route selection or Distribution methodology of the products	2	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
e) Design scale of each facilities (such as height, level or depth etc.)	4	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
e) Approach measures to the object (such as roads or railways)	5	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
e) Quantities for Major Items/ Necessary construction period	3	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
e) Necessary resources or energy (such as aggregate, cement, steel, skilled labor, electric power supply, water, owners' ability etc.)	5	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
f) Economic & Financial Analysis	4	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
g) IEE, Resettlement, including Influence of the project to the surroundings	5	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
h) Benefit / Beneficiaries	4	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
i) Future extension plan, if necessary	4	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
i) Alternative proposal (such as location or routes or methodologies)	3	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
i) Privatization tendency	4	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
j) Countermeasures for the risk, such as disasters, waste or emission	2	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
j) Maintenance and operation plan	4	Acceptable No	+1 0		Found No	+1 0	Clear &Enough Not clear No mention	+2 0 -1?
Total								

Note: If the page number or chapter number described in FS Report is not shown, the score of the item becomes "minus 1" as total.

Process 3: Check of Outline Drawings

Necessary Drawings are attached or not.

Table 4-11: Scoring of Necessary Drawings

	Attached or not		Necessity		Contents	
Location Map	Attached Not Attached	+1 x (each) 0	yes maybe none	+2x (each) +1x (each) 0	Clear Not clear	+2x (each) 0
General Plan	Attached Not Attached	+1 x (each) 0	yes maybe none	+2x (each) +1x (each) 0	Clear Not clear	+2x (each) 0
Typical Cross section	Attached Not Attached	+1 x (each) 0	yes maybe none	+2x (each) +1x (each) 0	Clear Not clear	+1x (each) 0
Facility plan	Attached Not Attached	+1 x (each) 0	yes maybe none	+2x (each) +1x (each) 0	Clear Not clear	+1x (each) 0
Longitudinal cross section	Attached Not Attached	+1 x (each) 0	yes maybe none	+2x (each) +1x (each) 0	Clear Not clear	+1x (each) 0
Elevation view	Attached Not Attached	+1 x (each) 0	yes maybe none	+2x (each) +1x (each) 0	Clear Not clear	+1x (each) 0
Soil Boring	Attached Not Attached	+1 x (each) 0	yes maybe none	+2x (each) +1x (each) 0	Clear Not clear	+1x (each) 0
Total						

Note: Necessity of each drawing is different according to the character or contents of project

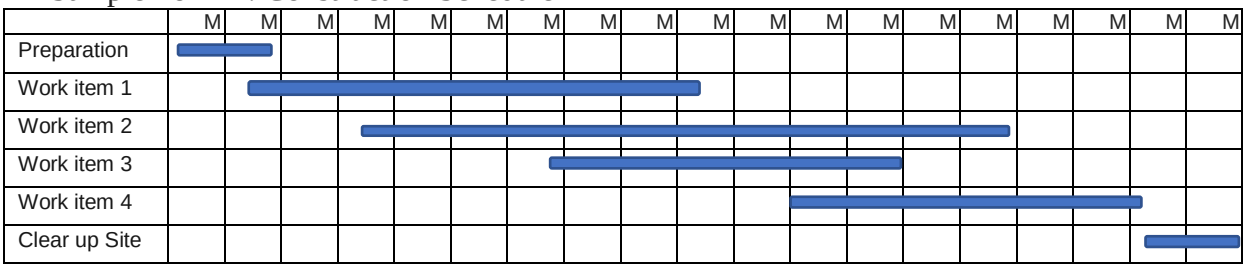
Process 4: Check of Project Implementation Schedule

Construction Period with Quantity of Major Work Items are described or not:

Table 4-12: Scoring of Construction Period with Quantity of Major Work Items

	Attached or not		Explained in report		Appropriateness	
Construction Schedule	Attached Not attached	+2 -1	good so-so No mention	+2 +1 0	yes so-so none	+2 +1 0
Total						

Sample Form 1: Construction Schedule



Process 5: Check of Benefit & Beneficiaries

Description of Benefit and the related beneficiaries should be checked (Pages Part 1-Attachment 3)

Table 4-13: Scoring of Description of Benefit and the related beneficiaries

	Item name	page	Described in Report or not		Explanation in Report		Appropriateness	
Direct Benefit			Described Not described	+1 x (each) 0	Clear No page Not clear	+2x (each) 0 0	yes maybe none	+2x (each) +1x (each) 0
Beneficiaries of direct benefit			Described with numbers Described without numbers Not Listed	+2 x (each) +1 x (each) 0	Clear No page Not clear	+2x (each) 0 0	yes maybe none	+2x (each) +1x (each) 0
Indirect Benefit			Described Not described	+1 x (each) 0	Clear No page Not clear	+2x (each) 0 0	yes maybe none	+2x (each) +1x (each) 0
Total								
Note: "Described" means each benefit is described in the page shown in checklist. If page number is not shown in checklist, score becomes "zero", because MPS could not find out such description from report within the limited Evaluation time. "Numbers" means the beneficiaries' numbers, who could savor the benefit through the project								

Process 6: Check of Rough Cost Estimate

Rough Cost Estimation Table should be checked (Page Part 1-Attachment 5)

Table 4-14: Scoring of Rough Cost Estimation

	page	Table is attached or not		Filled		Appropriateness	
Rough Cost estimate table (page 1-16 & Page 4-9)		attached No	+10 0	all partially none	+10 +5 0	yes maybe none	+2x (each) +1x (each) 0
Total							

Note: "Filled all" means all of the standard format on page 1-26 and on next page with "*" mark are filled

Sample Form 2: Rough Cost estimation sheet (refer Page Part 1-Attachment 5)

Project name	Ministry name	Consultant Name	Date
Water supply			

	No	Items	Amount	Remarks	Checked by	Date
		Civil works construction cost				
	1)	Construction net cost				
	(i)	Direct Construction Cost				
		Intake facilities	$2,000,000-	Q=200,000m3/day		
		Purification Plant	$4,000,000-	Q=200,00003/day		
		Water Pipe	$20,000,000-	L=8km D=2000 Steel Pipe incl. tunnel		
	(ii)	Indirect Common works cost	$5,000,000-	(i)x X% + actual necessary cost		
	(iii)	Site administrative cost	$2.500,000-	((i)+(ii)) x Y%+ actual necessary cost		
		*Subtotal	$33,500,000-			
	2)	General and administrative costs etc.	$1,500,000-	((i)+(ii)+(iii))) x Z%		
		*total	$35,000,000-			
	2	Architecture construction cost				
	1)	Construction net cost				
	(i)	Direct Construction Cost=Building	$1,000,000-	300m2		
	(ii)	Common works	$300,000-	(i)x X% + actual necessary cost		
	(iii)	Site administrative cost	$200,000-	((i)+(ii)) x Y%+ actual necessary cost		
		*Subtotal	$1,500,000-			
[1]	2)	General administrative cost	$100,000-	Subtotal x H%		
		*total	$1,600,000-			
	3	Design supervision				
	(1)	*Design cost	$3,000,000-	.		
	(2)	*Supervision	$1,000,000-	24months		
		*total	$4,000,000-			
	4	Soft component costs				
	(1)	Soft component costs	Nil	Breakdown cost.		
		*total	Nil			
		Necessary Cost for LMs				
	5	Project administrative cost of government		Approximate estimated cost		
		*total	$4,000,000-			
	6	Preparation, cost				
	(1)	*Land acquisition costs	$1,000,000-	Approximate cost		
	(2)	*Compensation cost	$1,000,000-	ditto		
	(3)	*Demolition	$300,000-	ditto		
		*total	$2,300,000-			
		*Grand total	$46.900,000-			
[2]O&M Cost	1)	Administration cost for 30 years	600,000-	20,000-/year		
	2)	Maintenance cost (First 10 years)	3.500,000-	Subtotal construction cost x %/year		
	3)	Maintenance Cost (Second 10 years)	10,500,000-	Subtotal construction cost x %/year		
	4)	Maintenance Cost (Third 10 years)	17,500,000-	Subtotal construction cost x %/year		
		*total	32,100,000-			

Process 7: Check of Unit Rate List of Major Work Item

Table 4-15: Scoring of Unit Rate List of Major Work Item

	Item name	Table is shown		Filled		Appropriateness	
Unit Rate List of Major Item (page 1-27)		described No	+2x (each) 0	all none	+2x (each) 0		
Total							

Note: Major Items are different according to the contents of Project (see page Part 1-Attachment 6)

Sample Form 3: Major Work items (and unit) should be described

	Major work items	Unit	Quantity	Unit rate, $	Remarks
Project		km			
		m			Pavement thickness? cm
		m			

Process 8: Check of Unit Rate List of Similar Past Project

Table 4-16: Scoring of Unit Rate List of Similar Past Project

	Project name	Table is shown		Appropriateness	
Description of Similar Past Project (page 1-28 or page 4-12)		yes No	+2 x (each) 0	yes maybe none	+2x (each) +1x (each) 0
Unit Rate List of Similar Past Project (page 1-28 or page 4-11)		Rates are listed Not Listed	+1 x (each) 0	yes maybe none	+2x (each) +1x (each) 0
Total					

Sample Form 4: Unit Rate of Similar Project

Category: Road

		Upgrading and maintenance of Dili (AP junction) - Tibar Section 2 Tasitolu-Tibar			Construction of Upriver Comoro Bridge			Suai-Beaco Express way				
		Connecting Tibar and Tasitolu by open cutting the mountain			Extension of Banana Road			New Expressway of 30km from Suai to Beaco with 10 bridges				
	Total contract amount	$12,830,386			$33,159,799			$298,100,257				
	Length	4550	m		3875	m		31275	m			
Ratio of Major item	General	3	%		9	%		8	%			
	Drainage	3	%		2	%		7	%			
	Earth work	21	%		2	%		2	7%			
	Pavement	27	%		63	%		26	%			
	Bridge	11	%		20	%		30	%			
	Retaining Wall				3	%						
	Slope Protection	17	%									
	Miscellaneous	3	%		2	%		7	%			
	Bioengineering	2	%		0	%						
	Daywork	1	%		0	%		0	%			
	Provisional Sum	4	%		0	%		0	%			
Road	/m	$2,820	/m		$8,557	/m		9,532	/m			
Unit rate	Common Excavation	$4	/m3		$6	/m3		$4	/m3			
	Common Fill	$9	/m3		$9	/m3		$12	/m3			
	Rock Excavation				$14	/m3		$320	/m3			
	Slope stabilization							$10	/m2			
	Wearing Course							$14	/m2	4cm		
	Binder course	$22	/m2		$57	/m2		$347	/m3	$17	/m2	
	Bae course	$11	/m2					$316	/m3	$79	/m2	
	Granular pave	$10	/m2					$71	/m3	$21	/m2	
	Bridge Sub				$954	/m2						
	Bridge Super	$1,704	/m2		$1,307	/m2		$1,989	/m2			

Sample Form 5: Unit rate of Similar Project

Source: District Capitals water Supply Project Vo.1 Master Plan (Jan 2016)

	Items	m^3/d	unit	cost	Remarks	
Water source development	Provisional sum for water resource investigation & development	LS		1,000,000		5.5%
Storage	Bulk water tank 2660m^3	2	No	2,890,569	$543	-/m3
	Ground level tank 1270m^3	1	No	690,042	$543	-/m3
	Elevated tank 530m^3	2	No	2,899,078	$2,735	-/m3
	Adrai tank 1270m^3	1	No	690,042	$543	-/m3
	Tirilolo tank 840m^3	1	No	456,406	$543	-/m3
	Wainiki tank 530m^3	1	No	287,970	$543	-/m3
	Lamegua tank 530m^3	1	No	287,970	$543	-/m3
	Lower tank 840m^3	1	No	456,406	$543	-/m3
	Control valve & connection	1	No	895,848		4.9%
	Geotechnical Test	LS		64,800		0.4%
Transmission	D375mm	4000	m	1,364,648	$341	-/m
	D250mm	2400	m	418,594	$174	-/m
	D225mm	4000	m	697,657	$174	-/m
	D200m	2800	m	431,116	$154	-/m
	D150mm	7200	m	773,939	$107	-/m
	D100mm	1300	m	86,584	$67	-/m
	Control valve	LS		7,421		0.0%
	Flow meter	LS		33,668		0.2%
Distribution Network	Provisional sum for distribution replacement / augmentation	LS		1,239,759		6.8%
Service connection	Domestic and non-domestic	5493	No	2,286,900	$416	-/No
	Public tap	40	No	38,080	$952	-/No
Water treatment	Chlorination facility & building	LS		10,864		0.1%
O&M facility	O&M building	LS		51,776		0.3%
	Ware house	LS		41,215		0.2%
	Tools & equipment	LS		173,689		1.0%
Total				18,275,041		100.0%

Chapter 4-6. Invitation Letter to FS: Sample Form

Invitation Letter to Feasibility study (Sample)

The Project for the Study of _____

Dear____,

The ~~Water Resources Department~~, Ministry of Public Works, the Government of the Timor Leste, as the Executing Agency of the Project, hereby invites you to submit the tender of Feasibility Study for the captioned Project.

The Project will be financed from Infrastructure Fund based on the terms and conditions of the Timor Leste

The Work under the Contract shall be subjected in all respects to the terms and conditions of the TOR attached.

The contract for the Feasibility Study will be awarded on a Lump Sum Fixed Cost Basis. Prepared budget for the Feasibility Study is maxim ~~US$000,000~~. Consultants are evaluated based on their technical proposal, and qualified consultants will be invited to the contract negotiation.

The tender is required to be submitted to the aforementioned Agency before the Tender Closing Time which is X:00 p.m. on MM DED (xx day), 2016. No tender will be accepted after the Closing Time.

The tender results will be informed to each Tenderer within XX days after the Tender Closing Time.

Yours faithfully,

_____
Director
Water Resources Department
Ministry of Public Works