SOCIALIST REPUBLIC OF VIETNAM
MINISTRY OF CONSTRUCTION
HA NAM PROVINCIAL PEOPLE'S COMMITTEE

DATA COLLECTION SURVEY ON QUALITY MANAGEMENT AND CONSTRUCTION COST ESTIMATION (QCBS)

FINAL REPORT

DECEMBER 2021

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.

1R
JR
21-013

SOCIALIST REPUBLIC OF VIETNAM
MINISTRY OF CONSTRUCTION
HA NAM PROVINCIAL PEOPLE'S COMMITTEE

DATA COLLECTION SURVEY ON QUALITY MANAGEMENT AND CONSTRUCTION COST ESTIMATION (QCBS)

FINAL REPORT

DECEMBER 2021

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.

Exchange Rate

1 USD = 104.67JPY

1 USD = 23,047.8 VND

1 VND = 0.00454 JPY

(As of February 2021)

DATA COLLECTION SURVEY
ON
QUALITY MANAGEMENT AND CONSTRUCTION COST ESTIMATION (QCBS)

FINAL REPORT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

CCQS-P	Project for Capacity Enhancement in Cost Estimation, Contract Management, Quality and Safety in Construction Investment Projects
DPI	Department of Planning and Investment
FDI	Foreign Direct Investment
F/S	Feasibility Study
HNPPC	Ha Nam Provincial People's Committee
JICA	Japan International Cooperation Agency
MM	Man-Month
MOC	Ministry of Construction
MOLISA	Ministry of Labour, Invalids and Social Affairs
ODA	Official Development Assistance
SACE	State Authority for Construction Economics
VAT	Value Added Tax

CHAPTER 1 INTRODUCTION

1.1 Background

In the Socialist Republic of Vietnam (hereinafter referred to as "Vietnam"), there are many plans of infrastructure developments in line with economic growth. However, there are several issues to consider in terms of quality and safety management / control and less construction experience of large-scale infrastructures. In particular, the construction cost estimation system, which has a significant impact on the quality and efficiency of construction work, does not conform to the market economy mechanism. Also, the cost estimation deviates from actual construction costs and international practices and does not ensure a construction management system including adequate quality and safety management.

Japan International Cooperation Agency (hereinafter referred to as "JICA") has supported the Ministry of Construction (hereinafter referred to as "MOC") through technical cooperation projects such as the "Project for Capacity Enhancement in Construction Quality Assurance" from May 2010 to December 2013 and the "Project for Capacity Enhancement in Cost Estimation, Contract Management, Quality and Safety in Construction Investment Projects (hereinafter referred to as CCQS-P)" from April 2015 to April 2018. The technical cooperation is aimed for improving the Vietnamese cost estimation structure to ensure required quality and safety on construction works and has established the guideline for cost estimation. As for the causes of inappropriate construction cost estimation, the Vietnamese government has been slow to conduct a unified survey of actual conditions, and the indirect costs, unit prices, and estimates have deviated from the prevailing prices. These issues have been found not only in projects under the jurisdiction of the Vietnamese central government, which have been the target of past cooperation projects by JICA, but also in Official Development Assistance (ODA) projects and projects under the jurisdiction of local governments.

On the other hand, Ha Nam Province, located next to the southern part of Hanoi City, has seen an increase in Foreign Direct Investment (FDI) in recent years by constructing the basis of investment climate such as the north-south expressway and industrial zones to promote foreign investments. However, the basic infrastructures such as water supply, sewerage, electricity, roads, etc. to the industrial zones and Ha Nam Province had not yet been fully established as of January 2020. JICA planned for the "Ha Nam Province Investment Climate Improvement Project (hereinafter referred to as "HNICIP")" to materialize in order to construct road and sewerage system in the province. As of January 2020, the project faced the difficulty to estimate the reasonable cost to ensure construction quality and safety.

1.2 Objectives of the Survey

Based on the above background, objectives of the surveys are to analyze concerns on cost estimation from the viewpoint of quality management and to point out and summarize suggestions and lessons on cost estimation for infrastructure improvement projects through ODA.

In this survey, the cost estimation for construction and consultancy services on both sewerage and road sectors of HNICIP was selected as the case study. Through the case study and the results and findings of the CCQS-P, the measures to ensure quality and safety of the construction work in Vietnam were proposed.

1.3 Scope of Works of the Survey

In order to achieve the above objectives, the following works are implemented:

(1) Data collection and study on existing documents

(2) Confirmation of cost estimation on structure in Vietnam

- Review of latest Vietnamese regulations, circulars, and related documents on cost estimation
- Comparing cost estimation structure and policies between the Japanese and Vietnamese regulations / standards

(3) Case study on analysis of issues in construction cost estimation in the HNICIP

1) Review of cost estimation for construction works and consultancy services of sewerage and road sectors in terms of the following:

- Technical specification as a basis of cost estimation,
- Method and basis on how to estimate quantity of works,
- Breakdown of unit costs,
- Method and procedure to estimate indirect costs,
- Planning of sewer pipelines such as depth, route and length of the pipes, and
- Consultancy services cost such as remuneration and assignment schedule.

2) Optimization of the design of wastewater treatment plant

- Setting of specifications, its basic design, and updating of cost estimation including treatment facility for ammonium-nitrogen.

3) Optimization of the cost estimation in feasibility study (F/S)

- Preparation of revised cost estimation for construction works and consultancy services of sewerage and road sectors in the HNICIP as case study

(4) Summarizing recommendations and lessons on cost estimation for Vietnamese construction project

1.4 Related Organizations

The related organizations of the survey are as presented below:

- Department of Planning and Investment (DPI), Ha Nam Province
- Ha Nam Provincial People's Committee (HNPPC)
- Ministry of Construction (MOC)

CHAPTER 2 APPRECIATION OF VIETNAMESE COST ESTIMATION STRUCTURE

2.1 Review of Vietnamese Laws and Regulations for Cost Estimation

2.1.1 Latest Vietnamese Laws and Regulations for Cost Estimation

The Vietnamese legal system consists of the following five levels, with the Constitution at the top.

- Law : Complies with the Constitution and is enacted by the National Assembly.
- Decree : Prepared and issued by the Cabinet to set forth specific methods of implementing the law.
- Circular : Provides procedures and guidelines for implementing laws and directives. Prepared and issued by each ministry.
- Decision : Indicates further detailed circulars issued by the Prime Minister or ministries, or special measures related to laws and decrees.
- Official Letter : Indicates measures related to individual or specific operations, issued at the level of the administrative office of each ministry.

The following decree and 10 circulars were established by the Ministry of Construction (MOC) for the cost estimation of the project:

1) Decree 68/2019/ND-CP dated 14 August 2019: Construction Cost Management effective from 1 October 2019 to replace Decree 32/2015/ND-CP dated 25 March 2015 with the purpose to provide a more accurate and market-oriented calculation method.
2) Circulars on 26 December 2019, and the following 10 circulars were valid from 15 February 2020
   - Circular 09/2019/TT-BXD dated 26 December 2019: Instruction of Identification and Management of Construction Investment Cost
   - Circular 10/2019/TT-BXD dated 26 December 2019: Issuance of Construction Norms
   - Circular 11/2019/TT-BXD dated 26 December 2019: Instruction of Identification of Costs of Machine and Construction Equipment
   - Circular 12/2019/TT-BXD dated 26 December 2019: Instruction of Preparation and Management of Database System on Construction Norms, Unit Prices and Construction Price Indices
   - Circular 13/2019/TT-BXD dated 26 December 2019: Regulation on Management of Construction Investment Cost for Works under the National Target Programs on Sustainable Poor Reduction and New Rural Development
   - Circular 14/2019/TT-BXD dated 26 December 2019: Instruction of Preparation and Management of Construction Price Indices
   - Circular 15/2019/TT-BXD dated 26 December 2019: Instruction of Identification of Construction Manpower Cost
   - Circular 16/2019/TT-BXD dated 26 December 2019: Instruction of Identification of Project Management Cost and Consultancy Service Cost
   - Circular 17/2019/TT-BXD dated 26 December 2019: Instruction of Measurement and

Calculation of Construction Quantities

- Circular 18/2019/TT-BXD dated 26 December 2019: Instruction of Conversion of Construction Investment Fund

2.1.2 Main Contents of Decrees and Circulars

The main contents of Decree 68/2019/ND-CP and the related circulars are summarized in Table 2.1.1.

Table 2.1.1 Main Contents of Decree 68/2019/ND-CP and Related Circulars

Item	Contents
1) Decree 68/2019/ND-CP	
Chapter II: Preliminary Total Investment Cost, Construction Investment Cost	
Article 4. Content of Preliminary Total Investment Cost, Construction Investment Cost	2. Total construction investment cost include all construction investment costs of the project, which is identified based on basic design and other contents of the feasibility study (F/S) report. Components of the total construction investment cost are compensation, assistance and resettlement costs (if any); construction cost; equipment cost; project management cost; consultancy service cost; other costs, and contingency cost (physical contingency and price contingency) 4. Cost components of the total construction investment cost are regulated as follows: a) **Compensation, assistance and resettlement costs** include compensation cost on land, house, above-ground structures, land and water surface binding asset and other compensation costs according to the regulations. b) **Construction cost** includes construction cost of works, work items of project; works and work items of temporary construction, auxiliary for construction; demolishing cost of structures do not belong to the scope of land acquisition works which have been identified in the compensation, assistance and resettlement costs. Structure of construction cost comprise of direct cost, indirect cost, taxable income, and value added tax (hereinafter referred to as "VAT"). c) **Equipment cost** includes costs for procurement of work equipment and technological equipment; management cost for procurement of contractor's work equipment; cost for procurement of software license for work equipment, technological equipment of project (if any), manufacture of non-standard equipment (if any); installation, testing, verification costs; commissioning test of equipment following specification requirement; transportation cost, insurance cost; tax and duty and other related cost. d) **Project management cost** includes costs for implementation of project management works from project preparation stage, project implementation, and completion of construction works for taking-over. dd) **Consultancy service cost** includes survey cost; preparation cost of pre-feasibility study (F/S), F/S; cost for detailed design (D/D) and construction supervision (CS); and other related consultancy service cost. e) **Other costs** include necessary costs for project implementation such as: mines, bombs and explosive objects clearance cost; insurance cost of works during construction period; fee and cost for evaluation of project, design, cost estimation; costs for auditing, appraisal, approval of final payment; and other necessary costs for project implementation but not belonging to above items a), b), c), đ) and e) of this Article 4. g) **Contingency cost** includes physical contingency and price contingency during the project implementation period.

Chapter V: Project Management Cost and Consultancy Service Cost	
Article 21. Project Management Cost	2. **Project management cost** includes: salaries of project management staff; wages for contracted employee; allowances; bonuses; common welfare; contributions (social insurance, medical insurance, unemployment insurance; trade union fee, others in accordance with the regulation); utilization of science technology, management of Building Information Modeling (BIM), capacity enhancement for project management staff; payment of public service; stationary; communication, public relation and telecommunication; organization of workshop related to the project; per diem; hiring; repairing, procurement of asset utilized for project management; other costs and contingency cost.
Article 23. Consultancy Service Cost	2. **Consultancy service cost** includes cost for consulting personnel (salary, allowance, bonus, common welfare, social insurance, medical insurance, unemployment insurance, trade union fee, other costs following regulation); cost for utilization of science technology, management of BIM, payment of public service; stationary; communication, telecommunication; hiring; repairing, procurement of asset utilized for consultant (if any); consulting management cost; other costs; taxable income; tax and contingency. Consultancy service cost for survey works and construction specific testing works shall include cost items same as construction cost in the cost estimate. 3. Consultancy service cost is identified based on cost norms issued by MOC or identified by cost estimation based on consulting scope of works, work volume, implementation schedule of package, and following state regulations and policies. 4. Cost for hiring foreign consulting experts to implement some types of works will be identified by cost estimate in accordance with professional qualification and quality of consultants following international practices. 5. Cost norm for consultancy service cost (by rate and by quantity) and method of cost estimate calculation to identify the construction investment consultancy service cost, and cost for hiring foreign consulting experts shall be implemented following MOC regulations.
2) Circular 09/2019/TT-BXD	
Chapter II: Preliminary Total Investment Cost, Construction Investment Cost	
Article 3. Contents of Preliminary Total Investment Cost, Construction Investment Cost	b) **Project management cost** includes the costs stipulated in Clause 2, Article 21 of Decree No. 68/2019/ND-CP. These are the necessary costs to implement project management from the stage of project preparation, implementation, and end of construction to put the works of the project into operation, as follows: - Supervision of construction survey; - Carrying out competitive examination, selection of architectural design of works or selection of plan for architectural design of works; - Implementing the activities of compensation, assistance and resettlement are the responsibilities of the employer; - Appraising the F/S report on construction investment or report on economical - technical construction investment; - Formulating, appraising, verifying and approving the technical design, construction drawing design, and construction cost estimate; - Selecting contractor in construction activities; - Managing quality, volume, progress, construction costs, and construction contract;

	- Managing the BIM system; - Collection and provision of database information for management of construction investment cost upon requirement of state authorized agencies; - Guaranteeing the safety and environmental hygiene of works; - Newly establishing or adjusting the construction norm of works; - Determining the works' construction price and works' construction price index; - Testing the quality of construction materials, structures or products and equipment installed in the works; - Inspecting the quality of work components, work items and work and testing of specialized construction as required; - Controlling construction investment costs; - Converting the works construction investment capital after completion acceptance, handover, and operation; - Making acceptance, payment, and contract finalization; - Making payment and finalization of the works construction investment capital; - Monitoring and evaluating the works' construction investment project; - Making acceptance and handover of works; - Implementing the commencement and inauguration (if any), propagation and advertising; - Determining, updating, and appraising the construction package estimate; - Performing the management activities of competent state agencies (if any); and - Performing other management activities: b) **Consultancy service costs,** including the costs specified in Clause 2, Article 23 of Decree No. 68/2019/ND-CP are the necessary costs to carry out the construction investment consultation from the stage of project preparation, implementation, and completion of works construction and operation, as follows: - Formulating the construction survey tasks, implementing the construction survey and monitoring the construction survey; - Making the pre-F/S report on construction investment (if any), report on recommendation of investment policy (if any), F/S report on construction investment or report on economical - technical construction investment; - Verifying the basic design and technological design of project; - Verifying the plan of compensation, assistance, and resettlement; - Carrying out the competitive examination of architectural design of construction works; - Performing construction design of the works; - Verifying the total construction investment cost, the works construction design, and construction cost estimate; - Preparing and verifying the expression of interest documents, Prequalification (PQ) documents, bidding documents, Request for Proposal (RFP) and evaluation of the same documents for the contractor selection in construction activities; - Verifying the contractor selection result in construction activities;

	- Supervising construction performance and equipment installation; - Making report on environmental impact assessment (EIA); - Formulating and verifying the construction norm, the works construction price and construction price index; - Verifying the traffic safety activities; - Applying the BIM (if any); - Giving advice on project management (in case of consultant hiring); - Testing on specialized construction; - Testing the quality of construction materials, structures, and products and equipment installed in the works as required by the employer (if any); - Inspecting the quality of work items and entire works (if any); - Monitoring and assessing the works construction investment project (in case of consultant hiring); - Making EIA report according to regulations on environmental protection; - Converting the works construction investment capital after completion acceptance, handover and operation; and - Performing other consulting activities: The construction survey costs including direct cost, indirect cost, taxable income, and VAT will be determined and managed in same manner like construction cost in the construction cost estimate. c) **Other costs to carry out the activities**, including: - Demining of bombs and explosives; - Insurance of works during construction time (compulsory); - International quality register and surveying of works deformation (if any); - Audit, verification and approval for finalization of investment capital; - Inspection of acceptance during the construction and completion acceptance of work items and works of competent state management agencies (in case of expert hiring for cooperation); - Technical and scientific research pertaining to the projects, initial working capital for the construction investment projects for the purpose of business and loan interest during the construction; - Costs for trial running with and without load according to the technological process before the handover (excluding the value of products recovered); - Natural resources taxes, fees and charges in accordance with regulations; and - Other costs (if any):
Chapter III: Construction Estimate	
Article 8 Content of Construction Estimate	2. **Construction cost** includes direct cost, indirect cost, taxable income, and VAT with details as follows: a) Direct cost: includes the material costs (including the materials provided by the employer), labor, machine, and construction equipment costs. b) Indirect cost: - General costs include the enterprise's management costs, production operation costs at the construction site, insurance cost for workers at construction site.

	- Temporary house for accommodation and construction management. - Cost of some works with unidentified quantities from design: labor safety and environmental protection cost; testing cost of contractor's materials; relocation cost of labor force within construction site; cost for irregular pumping and sludge dredging works. - Based on specific conditions of each project, works, and package, the indirect cost can supplement other indirect costs including: transportation of machine, specialized construction equipment in and out of the site; cost for transportation safety during construction (if any); cost for material stockpile (if any); construction cost of house for machine and machine base, power supply system, air compressor, water supply system at site, installation and removal of some machines, such as cement mixing plant, asphalt mixing plant, crane, or similar machine and construction equipment. c) Taxable income d) VAT
Appendix	
Appendix I: Method of determining the preliminary total investment cost, construction investment cost	2. Method of determining the total investment cost 2.1.4 Determination of project management cost, consultancy service cost, and other costs The project management cost (GQLDA), consultancy service cost (GTV), and other costs (GK) are determined by rate or by preparation of cost estimate or based on data of other similar executed projects. In case of cost estimate, the total of these costs (excluding interest during construction and initial working capital) should not exceed 15% of the total cost of construction and equipment of the project.
Appendix II: Method of determining the construction estimate	I. Works construction estimate 1.1 Determining the cost of construction (GXD) 1.2 Determining the cost of equipment (GTB) 1.3 Determining the cost of project management (GQLDA) 1.4 Determining the consultancy service cost (GTV) 1.5 Determining the other costs (GK) 1.6 Determining the contingency cost (GDP)
	II. Construction package estimate 2.1 Construction package estimate 2.2 Estimate of equipment procurement package 2.3 Estimate of equipment installation package 2.4 Estimate of construction investment consultation package 2.5 Estimate of Engineering and Construction (EC) package 2.6 Estimate of Engineering Procurement (EP) package 2.7 Estimate of material, equipment Procurement and Construction (PC) package 2.8 Estimate of Engineering, Procurement and Construction (EPC)
Appendix III: Method of determining the construction cost estimate	I. Method of calculation by volume and price of construction works 1.1 Determination by volume and detailed construction unit price of works 1.2 Determination by volume and general construction price
	II. Method of calculation by waste volume of materials, labor, construction machines and equipment and respective quotation

	2.1 Determining total waste volume of materials, labor, construction machines and equipment 2.2 Determining the quotation of materials, labor, construction machines and equipment
	III. Determination of related costs 3.1 Indirect cost 3.2 Taxable income
Appendix IV: Method of determining the price of construction works	I. Method of determining the detailed construction unit price of works 1.1 Basis for determining the detailed construction unit price of works 1.2 Determining the incomplete detailed construction unit price of works 1.3 Determining the complete detailed construction unit price of works
	II. Method of determining the general construction price of works 2.1 Basis for determining the general construction price 2.2 Determining the incomplete general construction price 2.3 Determining the complete general construction price
Appendix V: Method of determining the investment rate, general construction price of structure	I. Method of determining the construction investment rate of works
	II. Method of determining the general construction price of structure
Appendix VI: Method of determining the norm of cost estimate	I. Determining the norm of construction estimate of new works
	II. Determining the norm of modified works construction estimate
Appendix VII: Method of determining the basic norm of cost estimate	I. Concept and classification
	II. Method of determining the basic norms
Appendix VIII: Method of determining cost norm following rate base	I. Norm for project management cost **Project management cost** includes salary of project management staff; wage for contracted employee; allowances; bonus; common welfare; contributions (social insurance, medical insurance, unemployment insurance; trade union fee, others in accordance with regulation); utilization of science technology, management of BIM, capacity enhancement for project management staff; payment of public service; stationary; communication, public relation and telecommunication; organization of workshop related to project; per diem; hiring; repairing, procurement of asset utilized for project management; other costs and contingency cost.
	II. Norm for consultancy service cost **Consultancy service cost** include payment to experts; management cost of consulting firm; other costs (including professional liability insurance); taxable income but excluding VAT. In case of BIM application during implementation period, its cost can be added by preparation of cost estimate.
	III. Norm for indirect cost
Appendix IX: Method of determining the cost estimate for	I. Method based on volume and unit price of survey works
	II. Method based on waste volume of material, fuel, labor; machine and survey equipment and responsive quotation

construction survey works	III. Some cost items related to construction survey
Appendix X: Form of reports	Form 10.1 Report on evaluation/appraisal result of preliminary total investment cost/ total investment cost
	Form 10.2 Report on evaluation/appraisal result of works construction cost estimate
3) Circular 10/2019/TT-BXD	
Article 1. Scope of Adjustment	Attachments to this Circular are promulgated for construction cost norms including: Cost norms for estimation of construction survey works; Cost norms for estimation of construction works; Cost norms for estimation of technical system installation works; Cost norms for estimation of machine and technological equipment installation works; Cost norms for estimation of construction specialized testing; Cost norms for estimation of repair and maintenance of construction works; and Cost norms for estimation of construction material usage.
4) Circular 11/2019/TT-BXD	
This circular is applied for the calculation of construction equipment cost. The contents are too specific for cost estimation, so the detailed explanation is not indicated here.	
5) Circular 12/2019/TT-BXD	
This circular is only for state authorities (like MOC, DOC) in case they want to establish the database system to manage cost norms, unit prices, and price indices.	
6) Circular 13/2019/TT-BXD	
This circular can be applied only for ODA projects for national target program.	
7) Circular 14/2019/TT-BXD	
This circular is only for state authorities (like MOC, DOC) to issue construction price index.	
8) Circular 15/2019/TT-BXD	
This circular is applied for setting the unit price of Vietnamese labor for construction works and local consultant for consultancy service.	
9) Circular 16/2019/TT-BXD	
This circular is applied to calculate the maximum consultancy service cost.	
10) Circular 17/2019/TT-BXD	
This circular is applied for quantity calculation in the cost estimation. The contents are too specific, so the detailed explanation is not indicated here.	
11) Circular 18/2019/TT-BXD	
This circular is applied to estimate the project management cost and project management consultancy service cost. The contents are too specific, so the detailed explanation is not indicated here.	

Source: Decree 68/2019/ND-CP and Circular 09-18/2019/TT-BXD

2.1.3 Application to the Project including the Transition Period

Decree 68/2019/ND-CP and the related 10 circulars are applied to projects utilizing Vietnamese state budget and public-private partnership (PPP) projects. Therefore, Yen Loan projects related to the construction of infrastructure facilities should follow the decree and its guiding circulars.

As for the transitional period[1] of applying the new decree and circulars, if the F/S of the project has not been approved by 15 February 2020, the cost estimate of the project should be updated following the new decree and its guiding circulars. The detailed transition clauses are described as follows:

<Transition Clauses After Enactment of the Decree[2]>

The transition clause (*Article 36.2 of Decree 68/2019/ND-CP*) clearly stipulates that this decree and its guiding circulars shall apply to the construction cost management of the projects that have been 1) formulated and/or appraised[3], but not yet approved; or 2) approved but are yet to be commenced (the approval means F/S approval). In addition, the transition clause (*Article 36.1 of Decree 68/2019/ND-CP*, and *Article 26.1 of Circular 09/2019/TT-BXD*) stipulates that old Decree 32/2015/ND-CP can be applied to projects which were approved by F/S and are in proceeding with the following phases (i.e., survey for D/D after basic design, or completion of consultant selection for D/D) on condition that the investment decision maker chooses to apply the old one.

The cost estimation criteria issued under Circular 10/2019/TT-BXD do not cover all types of construction work in infrastructure facility development projects, and there are still many types of construction work for which estimates must be obtained, such as special construction materials and equipment. The cost estimation criteria will be further updated, especially through the support of the Japanese Consultant under the upcoming JICA technical cooperation project. For items without cost norms, the Employer can employ the Consultant to formulate their own cost norm for application in line with the provision of Article 15.2, Decree 68/2019/ND-CP.

2.1.4 Cost Estimation of Construction Works

(1) Interpretation of New Circulars Guided by MOC

According to the information from MOC and its subsidiary, the State Authority for Construction Economics (SACE[4]), the preliminary total investment cost (ceiling cost under the Pre-F/S and/or total investment cost in F/S) could be estimated based on several methods such as quantity calculated from basic design, cost database of similar projects, investment rate, or a combination of these methods. The Employer can select the suitable method depending on each contract form. However, the estimation of an EPC package should be mainly based on quantity calculated from basic design.

(2) Cost Estimation Structure Based on New Circular

Regarding the cost structure for construction cost estimate, the new cost structure following international practice (direct cost, indirect cost, pre-determined taxable income, and VAT) under Decree 68/2019/ND-CP and Circular 09/2019/TT-BXD will be applied. The cost structure of new/previous circulars is summarized in Table 2.1.2.

[1] The transitional period is not applied in these decree and circulars.
[2] The transitional clauses in Decree 68/2019/ND-CP and Circular 9 define which projects should follow the new Decree 68/2019/ND-CP and its circulars or old Decree 32/2015/ND-CP and its circulars.
[3] The definition of "appraisal" in this context is that the draft F/S (including the basic design and cost estimate) of the Project is under review by the assigned authority.
[4] In charge of estimating, procurement, contracting, and setting up work-in-progress for projects in Vietnam.

Table 2.1.2 Summary of Total Investment Cost

	Circular 06-2016	Circular 09-2019
1	**Compensation, Assistance and Resettlement Costs**	**Compensation, Assistance and Resettlement Costs**
2	**Construction Cost**	**Construction Cost**
2.1	Construction Cost of Main Works *Direct cost includes material costs (including the materials provided by the employer), labor, machine and construction equipment costs*	Construction Cost of Main Works *Same as Circular 06*
2.2	Construction Cost of Auxiliary Works (except camp at site) *The general costs include the enterprise's management costs, production operation costs at the construction site, worker service costs, construction service costs at the construction site and some costs in service of enterprise's other management.*	Indirect Cost: *2.2.1) The general costs: include the enterprise's management costs, production operation costs at the construction site, insurance cost for workers at the construction site.* *2.2.2) Temporary house for accommodation and construction management.* *2.2.3) Cost of some works with unidentified quantities from design: labor safety and environmental protection cost; testing cost of material of contractor; relocation cost of labor force within the construction site; cost for irregularly pumping and sludge dredging works.* *2.2.4) Based on specific conditions of each project, works, and package, the indirect cost can supplement other indirect cost including: transportation of machine, specialized construction equipment in and out of the site; cost for transportation safety during construction (if any); cost for material stockpile (if any);* - *construction cost of house for machine and machine base, power supply system, air compressor, water supply system at site, installation and removal of some machines (such as cement mixing plant, asphalt mixing plant, crane or similar machine and construction equipment);*
2.3	Taxable Income	Taxable Income
2.4	VAT	VAT
3	**Equipment Cost**	**Equipment Cost**
4	**Project Management Cost**	**Project Management Cost**
5	**Consultancy Service Cost**	**Consultancy Service Cost**
5.1	Cost for F/S Preparation Works	Cost for F/S Preparation Works
5.2	Cost for Design Works	Cost for Design Works

5.3	Cost for Construction Supervision Works	Cost for Construction Supervision Works
6	**Other Costs**	**Other Costs**
6.1	Mine, Bombs, and Explosive Objects Clearance Cost - *Demining of bombs and explosives;* - *Insurance of works during construction time (compulsory);* - *International quality register and surveying of works deformation (if any);* - *Audit, verification and approval for finalization of investment capital;* - *Inspection of acceptance during the construction and completion acceptance of work items and works of competent state management agencies (in case of expert hiring for cooperation);* - *Technical and scientific research pertaining to the projects, initial working capital for the construction investment projects for the purpose of business and loan interest during construction; the costs for trial running with and without load according to the technological process before the handover (excluding the value of products recovered);* - *Natural resources taxes, fees and charges in accordance with the regulations; and* - *Other costs (if any):*	Mine, Bombs, and Explosive Objects Clearance Cost *Same as Circular 06*
6.2	General Item Cost - *Costs of temporary house at the construction site for stay and construction operation;* - *Costs of labor safety and environmental protection for the employees at the construction site and ambient setting;* - *Costs of material testing of contractor* - *Costs of movement of workforce within the construction site;* - *Costs of irregular pumping and dredging;* - *Costs of movement of special-use machine and equipment and workforce (having skills under the enterprise's management and long-term labor contract) going in and out of the construction site;* - *Costs of traffic safety assurance in service of construction (if any);* - *Costs of technical infrastructure restoration due to effect upon works*	*This content in Circular No.09 has been moved to Item 2.2 Indirect Cost under construction cost of Item 2*

	construction (if any); and - *Cost of construction of cover house for machine, foundation for machine, power and compressed air supply system and water drainage and supply system at the construction site, installation and dismantlement of some machineries (concrete mixing plant, asphalt mixing plant, overhead crane, tower crane and some other construction machines and equipment with similar features):*	
		Insurance Cost
7	**Contingency Cost**	**Contingency Cost**
7.1	Physical Contingency	Physical Contingency
7.2	Price Contingency	Price Contingency
	TOTAL (1+2+3+4+5+6+7)	**TOTAL (1+2+3+4+5+6+7)**

Source: Circular 06/2016/TT-BXD and Circular 09/2019/TT-BXD

2.1.5 Cost Estimation of Consultancy Services

According to Circular 16/2019/TT-BXD, both lump sum contract and time-based contract can be applied to the calculation of consultancy service cost. In the case of lump sum contract, the maximum cost can be calculated based on the construction cost as explained in Circular 16/2019/TT-BXD. In the case of man-month contract, the consultancy service cost can be calculated based on the manning schedule and unit price. The SACE advised how to set the unit price of international/national consultants as follows:

- Unit rate of local consultant (Pro-B, Pro-C) shall follow Circular 02/2015/TT-BLĐTBXH dated 21 January 2015 of Ministry of Labour, Invalids, and Social Affairs (MOLISA) and Circular 15/2019/TT-BXD of MOC; the remuneration rate for local consultant should be within a range stipulated by these circulars. If the employers would like to apply remuneration rates higher than those stipulated in the abovementioned circulars, they should consult with the higher competent authorities. (SACE did not specify who will be these authorities.)
- In the previous Yen Loan project, the unit labor cost for Vietnamese engineers was set with reference to the unit labor cost set by MOLISA (hereinafter referred to as "MOLISA unit rate"), however, the MOC unit rate was newly established.
- The MOLISA unit rate and the unit rate including indirect costs based on the MOC cost estimation standards (hereinafter referred to as "MOC unit rate") are shown in Table 2.1.3. According to the MOC, the choice of MOLISA unit rate or MOC unit rate can be determined at the judgment of the project implementing agency (local government). The city classification in the MOC unit rate (Circular 90/2019/ND-CP) is shown in Table 2.1.4.

Table 2.1.3 Unit Rate of MOLISA and MOC Consultant

(Unit: VND / month)

Standard	MOLISA Unit Rate (Circular 02/2015/ TT-BLDTBXH	MOC Unit Rate (Circular 15/2019/TT-BXD)			
Region Classification*	Without Region Classification	Region I	Region II	Region III	Region IV
Pro-B1	61,480,000	59,943,000	51,950,600	46,355,920	39,962,000

Pro-B2	46,110,000	45,956,300	39,962,000	35,566,180	31,969,600
Pro-B3	30,740,000	30,770,740	27,174,160	23,977,200	21,579,480
Pro-C	23,055,000	30,770,740	27,174,160	23,977,200	21,579,480

* The region classification for MOC unit rate is specified in Decree 90/2019/ND-CP (issued on 15 November 2019).

Source: Circular 02/2015/TT-BLĐTBXH for MOLISA unit rate, Circular 15/2019/TT-BXD for MOC unit rate.

Table 2.1.4 Region Classification in Decree 90/2019/ND-CP

Region Classification	Regions/Cities
Region I	(1) Ha Noi City: all of the wards of Ha Noi city and the districts: Gia Lam, Dong Anh, Soc Son, Thanh Tri, Thuong Tin, Hoai Duc, Thach That, Quoc Oai, Thanh Oai, Me Linh, Chuong My, Son Tay (2) Hai Phong City: all of the wards of Hai Phong City and districts: Thuy Nguyen, An Duong, An Lao, Vinh Bao, Tien Lang, Cat Hai, Kien Thuy. (3) Ho Chi Minh City: all of the wards of Ho Chi Minh city and districts: Cu Chi, Hoc Mon, Binh Chanh, Nha Be (4) Dong Nai Province: Bien Hoa City, Long Khanh town and districts: Nhon Trach, Long Thanh, Vinh Cuu, Trang Bom (5) Binh Duong Province: Thu Dau Mot City, Thuan An, Di An, Ben Cat, Tan Uyen town and the districts: Bau Bang, Bac Tan Uyen, Dau Tieng, Phu Giao (6) Ba Ria - Vung Tau Province: Vung Tau City, Phu Mỹ Town
Region II	(1) Remaining districts of Ha Noi City (2) Remaining districts of Hai Phong City (3) Remaining districts of Hai Duong City (4) Hung Yen Province: Hung Yen City, My Hao town and the districts: Van Lam, Van Giang, Yen My (5) Vinh Phuc Province: Vinh Yen City, Phuc Yen City and the districts: Binh Xuyen, Yen Lac (6) Bac Ninh Province: Bac Ninh City, Tu Son town and the districts: Que Vo, Tien Du, Yen Phong, Thuan Thanh, Gia Binh, Luong Tai (7) Quang Ninh Province: Ha Long, Cam Pha, Uong Bi, Mong Cai City (8) Thai Nguyen Province: Thai Nguyen, Song Cong and Pho Yen Town (9) Phu Tho Province: Viet Tri City (10) Lao Cai Province: Lao Cai City (11) Nam DInh Province: Nam Dinh City and My Loc District (12) Ninh Binh Province: Ninh Binh City (13) Thua Thien Hue Province: Hue City (14) Quang Nam Province: Hoi An and Tam Ky City (15) Da Nang City (16) Khanh Hoa Province: Nha Trang and Cam Ranh City (17) Lam Dong Province: Da Lat and Bao Loc City (18) Binh Thuan Province: Phan Thiet City (19) Ho Chi Minh City: Can Gio district (20) Tay Ninh Province: Tay Ninh City and Trang Bang, Go Dau district (21) Dong Nai Province: Dinh Quan, Xuan Loc, Thong Nhat districts (22) Binh Phuoc Province: Dong Xoai City and Chon Thanh and Dong Phu districts (23) Ba Ria - Vung Tau Province: Ba Ria City

	(24) Long An Province: Tan An City and Duc Hoa, Ben Luc, Thu Thua, Can Duoc and Can Giuoc districts (25) Tien Giang Province: My Tho City and Chau Thanh district (26) Ben Tre Province: Ben Tre City and Chau Thanh district (27) The districts of Can Tho City (28) Kien Giang Province: The cities of Rach Gia, Ha Tien and Phu Quoc district (29) An Giang Province: Long Xuyen and Chau Doc Cities (30) Tra Vinh City in Tra Vinh Province (31) Ca Mau City in Ca Mau Province (32) Dong Hoi City in Quang Binh Province
Region III	(1) The remaining cities under the Province (except for the cities directly under the Province mentioned in the Region I and II) (2) Cam Giang, Nam Sach, Kim Thanh, Kinh Mon, Gia Loc, Binh Giang and Tu Ky districts of Hai Duong Province (3) Vinh Tuong, Tam Dao, Tam Duong, Lap Thach and Song Lo districts of Vinh Phuc Province (4) Phu Tho town and Phu Ninh, Lam Thao, Thanh Ba and Tam Nong districts of Phu Tho Province (5) The districts of Viet Yen, Yen Dung, Hiep Hoa, Tan Yen and Lang Giang in Bac Giang Province (6) The towns of Quang Yen, Dong Trieu and Hoanh Bo district of Quang Ninh Province (7) Bao Thang and Sa Pa districts of Lao Cai Province (8) The remaining districts belong to Hung Yen Province (9) Phu Binh, Phu Luong, Dong Hy and Dai Tu districts of Thai Nguyen Province; (10) Luong Son district of Hoa Binh Province (10) The remaining districts belong to Nam Dinh Province (11) Duy Tien and Kim Bang districts of Ha Nam Province (12) Cua Lo town and Nghi Loc and Hung Nguyen districts of Nghe An Province (13) Gia Vien, Yen Khanh and Hoa Lu districts of Ninh Binh Province (14) Bim Son town and Tinh Gia, Dong Son and Quang Xuong districts of Thanh Hoa Province (15) Ky Anh town in Ha Tinh Province (16) Towns of Huong Thuy, Huong Tra and districts of Phu Loc, Phong Dien, Quang Dien and Phu Vang of Thua Thien Hue Province (17) Dien Ban town and Dai Loc, Duy Xuyen, Nui Thanh, Que Son, Thang Binh and Phu Ninh districts of Quang Nam Province (18) Binh Son and Son Tinh districts of Quang Ngai Province (19) Song Cau town and Dong Hoa district of Phu Yen Province (20) Ninh Hai and Thuan Bac districts of Ninh Thuan Province (21) Ninh Hoa town and Cam Lam, Dien Khanh and Van Ninh districts of Khanh Hoa Province (22) Dak Ha district of Kon Tum Province (23) Duc Trong and Di Linh districts of Lam Dong Province (24) La Gi town and Ham Thuan Bac and Ham Thuan Nam districts of Binh Thuan Province (25) Phuoc Long and Binh Long towns and the districts of Hon Quan, Loc Ninh and Phu Rieng in Binh Phuoc Province

	(26) The remaining districts belong to Tay Ninh Province (27) The remaining districts belong to Dong Nai Province (28) Long Dien, Dat Do, Xuyen Moc, Chau Duc and Con Dao districts of Ba Ria - Vung Tau Province (29) Kien Tuong town and Duc Hue, Chau Thanh, Tan Tru and Thanh Hoa districts of Long An Province (30) Go Cong and Cai Lay towns and Cho Gao and Tan Phuoc districts of Tien Giang Province (31) Ba Tri, Binh Dai and Mo Cay Nam districts of Ben Tre Province (32) Binh Minh town and Long Ho district of Vinh Long Province (33) The districts of Can Tho City (34) Kien Luong, Kien Hai and Chau Thanh districts of Kien Giang Province; - Tan Chau town and Chau Phu, Chau Thanh and Thoai Son districts of An Giang Province (35) Nga Bay town and Chau Thanh and Chau Thanh A districts of Hau Giang Province (36) Duyen Hai town in Tra Vinh Province (37) Gia Rai town in Bac Lieu Province (38) Vinh Chau and Nga Nam towns in Soc Trang Province (39) Nam Can, Cai Nuoc, U Minh and Tran Van Thoi districts of Ca Mau Province (40) Le Thuy, Quang Ninh, Bo Trach and Quang Trach districts and Ba Don town in Quang Binh Province
Region IV	All other regions and cities not classified from Region I to Region III

Source: Decree 90/2019/ND-CP

- Unit rate of foreign consultant has not been stipulated in the legal documents so far. Decree 68/2019/ND-CP and its circulars do not include any regulatory restriction on the cost, i.e., unit rate or total cost for foreign consultant. However, there was a condition that the consultancy service cost for the addition of a foreign consultant should be up to 2.5 to 3 times the consultancy service cost for a local consultant as stated in Decision 79/QD-BXD dated 15 February 2017 applicable for projects under Decree 32/2015/ND-CP).

2.2 Difference in Cost Estimation Structure between Vietnam and Japan

2.2.1 Cost Structure of Public Construction Projects in Vietnam

(1) Total Investment Cost

According to Circular 06/2016/TT-BXD, the structure of total investment cost in Vietnam is shown in Table 2.2.1.

Table 2.2.1 Structure of Total Investment Cost in Vietnam (Circular 06/2016/TT-BXD)

1st Layer	2nd Layer	3rd Layer	4th Layer
Total Investment Cost	1. Compensation, Assistance, and Resettlement Costs		
	2. Construction Cost	2.1 Construction Cost of Main Works	Material cost
			Labor cost
			Machinery cost
		2.2 Construction Cost of Auxiliary Works	General costs include the enterprise's management costs
			Production operation costs at the construction

			site
			Worker service costs
			Construction service costs at the construction site
			Costs in service of enterprise's other management
		2.3 Taxable Income	
		2.4 VAT	
	3. Equipment Cost	3.1 Equipment Cost	
		3.2 Installation Cost	
		3.3 Import Tax	
		3.4 Taxable Income	
		3.5 VAT	
	4. Project Management Cost		
	5. Consultancy Service Cost	5.1 Cost for F/S preparation	
		5.2 Cost for Design Works	
		5.3 Cost for Construction Supervision Works	
	6. Other Costs	6.1 Mine, Bombs, and Explosive Objects Clearance Cost	
		6.2 General Item Cost	Costs of temporary house at the construction site
			Costs of labor safety and environmental protection
			Costs of material testing of contractor
			Costs of movement of workforce within the construction site;
			Costs of irregular pumping and dredging
			Costs of movement of special-use machine and equipment and work force
			Costs of traffic safety assurance in construction service
			Costs of technical infrastructure restoration
			Cost of construction of cover house for machine, foundation for machine, power and compressed air supply system and water drainage and supply system
	7. Contingency Cost	7.1 Physical Contingency	
		7.2 Price Contingency	

Source: Circular 06_2016_TT-BXD

Because of the establishment of Decree 68/2019/ND-CP and its related circulars, the cost structure is slightly changed as follows. The amendments from Circular 06-2016 to Circular 09-2019 are that "2.2 Construction Cost of Auxiliary Works " has been changed to "2.2 Indirect Cost" and the items in 4th layer has been revised. Also, insurance cost has been added to "6. Other Costs".

Table 2.2.2 Structure of Total Investment Cost in Vietnam (Circular 09/2019/TT-BXD)

1st Layer	2nd Layer	3rd Layer	4th Layer
Total Investment Cost	1. Compensation, Assistance, and Resettlement Costs		
	2. Construction Cost	2.1 Construction Cost of Main Works	Material cost
			Labor cost
			Machinery cost
		2.2 Indirect Cost (Revised from "Construction cost of ancillary facilities")	General costs
			Temporary house for accommodation and construction management (Incorporated from Circular 06-2016 "6.2 General Item Cost")
			Cost of some works with unidentified quantities from design
			Transportation of machine, specialized construction equipment in and out of the site; cost for transportation safety during construction, cost for material stockpile (Incorporated from Circular 06-2016 "6.2 General Item Cost")
			Cost of house for machine and machine base, power supply system, air compressor, water supply system at site, installation and removal of some machines (Incorporated from Circular 06-2016 "6.2 General Item Cost")
		2.3 Taxable Income	
		2.4 VAT	
	3. Equipment Cost	3.1 Equipment Cost	
		3.2 Installation Cost	
		3.3 Import Tax	
		3.4 Taxable Income	
		3.5 VAT	
	4. Project Management Cost		
	5. Consultancy Service Cost	5.1 Cost for F/S Preparation	
		5.2 Cost for Design Works	
		5.3 Cost for Construction Supervision Works	
	6. Other Costs	6.1 Mine, Bombs, and Explosive Objects Clearance Cost	
		6.2 Insurance Cost (Additional items from Circular 06-2016)	
	7. Contingency Cost	7.1 Physical Contingency	
		7.2 Price Contingency	

Source: Circular 09/ 2019/ TT-BXD

(2) Cost of Construction Package in Vietnam

Cost of construction package based on Circular 09/ 2019/ TT-BXD is as shown in Table 2.2.3.

Table 2.2.3 Cost Structure of Construction Package in Vietnam (Circular 09/2019/TT-BXD)

1st Layer	2nd Layer	3rd Layer	4th Layer
Cost of Construction Package	1. Construction Cost	1.1 Construction Cost of Main Works	Material cost
			Labor cost
			Machinery cost
		1.2 Indirect Cost	General costs
			Temporary house for accommodation and

			construction management
			Cost of some works with unidentified quantities from design
			Transportation of machine, specialized construction equipment in and out of the site; cost for transportation safety during construction, cost for material stockpile
			Cost of house for machine and machine base, power supply system, air compressor, water supply system at site, installation and removal of some machines
	2. Equipment Cost	2.1 Equipment Cost	
		2.2 Installation Cost	
		2.3 Import Tax	
	3 Taxable Income		
	4 VAT		
	5. Contingency Cost		

Source: Circular 09/ 2019/ TT-BXD

Construction cost estimation (total price of construction package) is composed of five large items, which are: 1) Construction cost, 2) Equipment cost, 3) Taxable income, 4) Value Added Tax (VAT) and 5) Contingency cost. This structure is applied to all construction projects that the Vietnamese government including local governments carries out, including not only infrastructure and architectural works, but also industrial, agricultural, communicational works, and so forth.

Each cost item is explained in the report of "The Project for Capacity Enhancement in Cost Estimation, Contract Management, Quality and Safety in Construction Investment Projects" which is the technical cooperation provided by JICA.

2.2.2 Cost Structure of Public Construction Projects in Japan

(1) Cost Structures by Categories of Works

Project costs of civil works, building works, mechanical works, and electrical works are estimated separately in Japan as the structures for cost estimation differs among the categories of works. Regarding indirect cost, the process of its estimation and formula of its calculation also differs among the categories of works, however, the formula of main works is applied for the calculation of project cost for each package. Cost structures of public construction projects by categories of works (civil works, building works, mechanical works, electrical works) in Japan are shown from Table 2.2.4 to Table 2.2.7, respectively. For mechanical and electrical equipment, the cost estimation structure for wastewater treatment plants and pumping stations is described hereunder.

Table 2.2.4 Cost Structure of Construction Cost in Japan (Civil Works)

1st Layer	2nd Layer	3rd Layer	4th Layer	5th Layer
Contract Cost	Work Cost	Raw Construction Cost	Direct Cost	
			Indirect Cost	Common Indirect Cost*1
				Site Management Cost*2
		Overhead Expense*3		
	VAT (Consumption tax)			

Source: Ministry of Land, Infrastructure, Transport and Tourism (Japan) (MLIT)
Note: Direct cost + Common indirect cost = Net work cost

Table 2.2.5 Cost Structure of Construction Cost in Japan (Building Works)

1st Layer	2nd Layer	3rd Layer	4th Layer	5th Layer
Contract Cost	Work Cost	Raw Construction Cost	Net Work Cost	Direct Cost
				Common Indirect Cost[*1]
			Site Management Cost[*2]	
		Overhead Expense[*3]		
	VAT (Consumption tax)			

Source: Ministry of Land, Infrastructure, Transport and Tourism (Japan) (MLIT)
Note: Items in underlined italics in the above table = Common cost

Table 2.2.6 Cost Structure of Construction Cost in Japan (Mechanical Works, WWTP&PS)

1st Layer	2nd Layer	3rd Layer	4th Layer	5th Layer	6th Layer	7th Layer
Contract Cost	Work Cost	Raw Construction Cost	Equipment Cost			
			Raw Installation Works Cost	Direct Cost	*Transportation cost*	
					Material cost	*Material cost*
						Ancillary material cost (4% of material cost)
					Labor cost	*Common labor cost*
						Installation labor cost
					Composite cost	
					Direct expense	*Patent cost*
						Utility cost such as water, electricity, etc.
						Direct cost for mechanical works
						Commissioning cost[*4]
						Other special cost
					Cost for temporary works[*5]	
				Indirect Cost	*Common indirect cost*[*1]	
					Site management cost[*2]	
					Indirect cost for installation works[*6]	
			Design Cost[*7]			
		Overhead Expense[*3]				
	VAT (Consumption Tax)					

Source: Ministry of Land, Infrastructure, Transport and Tourism (Japan) (MLIT)
Note: Items in underlined italics in the above table = Net work cost

*4: Commissioning cost:
Commissioning cost = Equipment cost (X) x Correction ratio (as shown in the following table) + Piling-up amount

Classification	Not more than JPY 1 million	More than JPY 1 million but not more than JPY 1 billion	More than JPY 1 billion
Pump station	7.26%	$13{,}520 \times X^{-0.545}$	0.17%
Wastewater treatment	24.09%	$219{,}700 \times X^{-0.66}$	0.25%
Sludge treatment	21.72%	$43{,}330 \times X^{-0.55}$	0.49%

*5: Cost for temporary works:
Cost for temporary works = (Equipment cost + Direct cost excluding the costs for temporary works and commissioning) x Correction ratio (as shown in the following table) + Piling-up amount

Classification	Not more than JPY 1 million	More than JPY 1 million but not more than JPY 1 billion	More than JPY 1 billion
All	3.75%	$33.44 \times X^{-0.1583}$	1.26%

*6: Indirect cost for installation works = 90% of installation labor cost

*7: Design Cost = 90% of labor cost

Design Cost = Equipment cost + Direct cost excluding the costs for temporary works and commissioning (X) x Correction ratio (as shown in the following table)

Classification	Not more than JPY 5 million	More than JPY 5 million but not more than JPY 1 billion	More than JPY 1 billion
All	7.11%	$183.41 \times X^{-0.2107}$	2.33%

Table 2.2.7 Cost Structure of Construction Cost in Japan (Electrical Works, WWTP&PS)

1st Layer	2nd Layer	3rd Layer	4th Layer	5th Layer	6th Layer	7th Layer
Contract Cost	Work Cost	Equipment Cost				
		Raw Construction Cost	Raw Installation Works Cost	Direct Cost	*Transportation cost*	
					Material cost	*Material cost*
						Ancillary material cost (4% of material cost)
					Labor cost	*Common labor cost*
						Technical labor cost
					Composite cost	
					Direct expense	*Patent cost*
						Utility cost such as water, electricity, etc.
						Direct cost for mechanical works
						Commissioning cost[*4]
						Other special cost
					Cost for temporary works[*5]	
				Indirect Cost	*Common indirect cost*[*1]	
					Site management cost[*2]	
					Indirect cost for installation works[*6]	Indirect cost for technical labor[*61]
						Indirect cost for installation equipment[*62]
			Design Cost[*7]			
		Overhead Expense[*3]				
	VAT (Consumption Tax)					

Source: Ministry of Land, Infrastructure, Transport and Tourism (Japan) (MLIT)
Note: Items in underlined italics in the above table = Net work cost

*4: Commissioning cost:

Commissioning cost = Equipment cost (X) x Correction ratio (as shown in the following table) + Piling-up amount

Classification	Not more than JPY 10 million	More than JPY 10 million but not more than JPY 1 billion	More than JPY 1 billion
Pump station	3.47%	$38{,}500 \times X^{-0.5779}$	0.24%
Wastewater treatment	2.50%	$2{,}020 \times X^{-0.4154}$	0.37%
Sludge treatment	3.02%	$862.6 \times X^{-0.3508}$	0.60%

*5: Cost for temporary works

Cost for temporary works = (Equipment cost + Direct cost excluding the costs for temporary works and commissioning) x Correction ratio (as shown in the following table) + Piling-up amount

Classification	Not more than JPY 1 million	More than JPY 1 million but not more than JPY 0.2 billion	More than JPY 0.2 billion
All	12.75%	$300.0 \times X^{-0.2286}$	3.80%

*6: Indirect cost for installation works
*61: Indirect cost for technical labor = 80% of technical labor cost
*62: Indirect cost for installation equipment= Equipment cost x Correction ratio (as shown in the following table)

Classification	Not more than JPY 10 million	More than JPY 10 million but not more than JPY 1 billion	More than JPY 1 billion
All	1.51 %	$12.92 \times X^{-0.133}$	0.82 %

*7: Design cost = 90% of labor cost
Design cost = (Equipment cost + Raw installation works cost) x Correction ratio (as shown in the following table)

Classification	Not more than JPY 20 million	More than JPY 20 million but not more than JPY 1 billion	More than JPY 1 billion
All	4.86%	$158.8 \times X^{-0.2074}$	2.16%

*1, *2, *3: Breakdown of indirect costs in Japan is listed as follows:

Item	Contents of the Item	
*1: Common Indirect Cost	(1) Transportation costs for machines and materials (2) Preparation for work and office (3) Cost of facilities as prevention measures against damages in construction	(4) Safety cost (5) Utility cost (6) Technical management cost (7) Upkeep cost
*2: Site Management Cost	(1) Labor management cost (2) Safety training cost (3) Tax and dues (4) Insurance fee (5) Salary of employee (6) Severance pay (7) Legal welfare expense (8) Welfare expense (9) Office supplies	(10) Communication and transportation cost (11) Social expense (12) Compensation cost (13) Outsourcing expense (14) Work registration fee (15) (Power and water utility cost) (16) (Cost for public office labor cost survey) (17) Miscellaneous expense
*3: Overhead expense	(1) Executive reward (2) Salary of employee (3) Retirement allowance (4) Legal welfare (5) Welfare (6) Repairs and maintenance (7) Office supplies (8) Communication and transportation cost (9) Heating and lighting expense (10) Research cost (11) Advertising expense	(12) Social expenses (13) Donation, Charity (14) Rent of space and land (15) Depreciation cost (16) Research repayment cost (17) Development repayment cost (18) Taxes and dues (19) Insurance fee (20) Contract guarantee cost (21) Other costs (22) Added benefit

As mentioned above, the major difference between the Japanese and Vietnamese cost estimation structure is categorization of the cost estimation, which is four categories in Japan (civil works, building works, mechanical works, and electrical works) and two categories in Vietnam (construction cost, and equipment cost). In the cost estimation of indirect costs, the calculation formulas are different for each category of construction and the calculation cost items are subdivided. Therefore, it is possible to secure the necessary indirect costs compared to the cost estimation structure in Vietnam.

(2) Calculation Process of Common Indirect Cost

- Common indirect cost is composed of the "contents by piling-up" and "contents by rate calculation".

1) Civil Works

- Contents by Rate Calculation

  = Base price (P) x Rate of common indirect cost x Correction ratio (%)

  - Base price (P)

    = Direct cost

    + (Cost for supplied item + Appraisal cost of rental machines without charge)

    + Cost for prevention measures against facilities' damages by construction

    + Disposal cost included in the preparation cost

  - Rate of common indirect cost

Classification		Not more than JPY 6 million	More than JPY 6 million but not more than JPY 1 billion	More than JPY 1 billion
Road improvement works		12.78%	$57 \times P^{-0.0958}$	7.83%
PC bridge works		27.04%	$1{,}636.8 \times P^{-0.2629}$	7.05%
Pavement works		17.09%	$435.1 \times P^{-0.2074}$	5.92%
Classification		Not more than JPY 10 million	More than JPY 10 million but not more than JPY 2 billion	More than JPY 2 billion
Sewerage works	With tunneling boring machine or pipe jacking with big diameter	12.85%	$422.4 \times P^{-0.2167}$	4.08%
	With open cut or pipe jacking with small diameter	13.32%	$485.4 \times P^{-0.2231}$	4.08%
	PS or WWTP	7.64%	$13.5 \times P^{-0.0353}$	6.34%

  - Correction ratio is applied based on the i) categories of works, ii) classification or categories of construction site, and iii) impact of traffic. The applied ratio is from 1.2 to 2.0.

  - Contents of Piling-up: i) Transportation costs for machines and materials, ii) Preparation for work and office, iii) Cost of facilities as prevention measures against damages by construction, iv) Safety Cost, v) Utility Cost, vi) Technical management cost, and vii) Upkeep cost

2) Building Works

- Contents by Rate Calculation

  = Direct cost x Rate of common indirect cost x Correction ratio (%)

  - Rate of common indirect cost

Classification		Not more than JPY 10 million	More than JPY 10 million
Building works	New construction	3.25- 4.33%	(4.34-5.78) x $P^{-0.0313}$
Classification		Not more than JPY 5 million	More than JPY 5 million
Building works	Rehabilitation	3.59-6.07%	(6.94-11.74) x $P^{-0.0774}$
Building equipment (Mechanical)	New construction	4.86-5.51%	(10.94-12.40) x $P^{-0.0952}$
Building equipment (Electrical)	New construction	3.90-7.19%	(9.08-16.73) x $P^{-0.0992}$
Classification		Not more than JPY 3 million	More than JPY 3 million
Building equipment (Mechanical)	Rehabilitation	1.73-4.96%	(2.44-7.02) x $P^{-0.0433}$
Building equipment (Electrical)	Rehabilitation	1.91-5.21 %	(3.10-8.47) x $P^{-0.0608}$

3) Mechanical Works

- Contents by Rate Calculation

  = Base price (P) x Rate of common indirect cost x Correction ratio (%)

  - Base price (P)

    = Direct cost

    + Cost of facilities as prevention measures against damages by construction

  - Rate of common indirect cost

Classification	Not more than JPY 1 million	More than JPY 1 million but not more than JPY 0.5 billion	More than JPY 0.5 billion
Sewerage works (PS or WWTP)	68.76%	2,858.52x P^{-2698}	12.86%

4) Electrical Works

- Contents by Rate Calculation

  = Base price (P) x Rate of common indirect cost x Correction ratio (%)

  - Base price (P)

    = Direct cost

    + Cost of facilities as prevention measures against damages by construction

  - Rate of common indirect cost

Classification	Not more than JPY 1 million	More than JPY 1 million but not more than JPY 0.2 billion	More than JPY 0.2 billion
Sewerage works (PS or WWTP)	45.14%	1,581x P^{-2574}	11.54%

In the Japanese cost estimation structure, the common indirect cost is calculated for each category of work. Also, the division of costs into those to be charged on a piling-up basis and those to be charged on a percentage basis is different from the Vietnamese cost estimation structure.

(3) Calculation Process of Site Management Cost

1) Civil Works

- Site Management Cost

  = Net construction cost (Np)

  x {(Rate of site management cost x Correction ratio (%)) + Adjustment amount}

  - Net construction cost (Np)

    = Net work cost+

    + (Cost for supplied item + Appraisal cost of rental machines without charge)

  - Rate of site management cost

Classification		Not less than JPY 7 million	More than JPY 7 million but not more than JPY 1 billion	More than JPY 1 billion
Road improvement works		32.73%	80 x Np $^{-0.0567}$	24.71%
PC bridge works		30.09%	113.1 x Np $^{-0.0840}$	19.84%
Pavement works		39.39%	622.2 x Np $^{-0.1751}$	16.52%
Classification		Not less than JPY 10 million	More than JPY 10 million but not more than JPY 2 billion	More than JPY 2 billion
Sewerage works	With tunneling boring machine or pipe jacking with big diameter	33.46%	50.8 x Np $^{-0.0259}$	29.17%
	With open cut or pipe jacking with small diameter	36.91%	213.5 x Np $^{-0.1089}$	20.73%
	PS or WWTP	31.58%	48.4 x Np $^{-0.0265}$	27.44%

  - Correction ratio

    Correction ratio is applied based on the i) categories of works, ii) classification or categories of construction site, and iii) impact of traffic. The applied ratio is from 1.0 to 1.2.

2) Building Works

- Site Management Cost = Net construction cost (Np) x Rate of site management cost (%)
  - Np= Np does not include disposal cost
  - Rate of site management cost

Classification		Not more than JPY 10 million	More than JPY 10 million
Building works	New construction	10.01-20.13%	(37.76-75.97) x Np $^{-0.1442}$
Classification		Not more than JPY 5 million	More than JPY 5 million
Building works	Rehabilitation	12.70-26.86%	(87.29-184.58) x Np $^{-0.2263}$
Building	New construction	17.14-31.23%	(90.67-165.22) x Np $^{-0.1956}$

equipment (Mechanical)			
Building equipment (Electrical)	New construction	22.91-38.60%	(156.07-263.03) x $Np^{-0.2253}$
Classification		Not more than JPY 3 million	More than JPY 3 million
Building equipment (Mechanical)	Rehabilitation	15.25-42.07%	(169.65-467.95) x $Np^{-0.3009}$
Building equipment (Electrical)	Rehabilitation	17.67-50.37%	(186.18-530.68) x $Np^{-0.2941}$

3) Mechanical Works

- Site Management Cost

  = Net construction cost (Np) x Rate of site management cost

  - Net construction cost (Np) is shown in Table 2.2.6
  - Rate of site management cost

Classification	Not less than JPY 1 million	More than JPY 1 million but not more than JPY 0.5 billion	More than JPY 0.5 billion
Sewerage works (PS or WWTP)	57.78%	425.39 x $P^{-0.1445}$	23.53%

4) Electrical Works

- Site Management Cost

  = Net construction cost (Np) x Rate of site management cost

  - Net construction cost (Np) is shown in Table 2.2.7
  - Rate of site management cost

Classification	Not less than JPY 1 million	More than JPY 1 million but not more than JPY 0.3 billion	More than JPY 0.3 billion
Sewerage works (PS or WWTP)	75.55%	2,289 x $P^{-0.2469}$	18.47%

In the Vietnamese cost estimation structure, site management costs are included in construction costs, but not included in equipment costs. On the other hand, in the Japanese cost estimation structure, the construction cost and site management cost are calculated separately for each category of work. This differs from the Vietnamese cost estimation structure and is considered to be one of the reasons for the shortage of safety-related costs in the Vietnamese cost estimation structure.

(4) Calculation Process of Overhead Expense

1) Civil Works

- Overhead Expense

  = Raw construction cost (Cp) x (Rate of overhead expense x Correction ratio (%))

  - Raw construction cost: as shown in Table 2.2.4.
  - Rate of overhead expense

Classification	Not less than JPY 5 million	More than JPY 5 million but not more than JPY 3 billion	More than JPY 3 billion
All works	22.72%	-5.48972 x Log (CP)+ 59.4977%	7.47%

- Correction ratio

Advance payment ratio	Not more than 5%	More than 5% but not more than 15%	More than 15% but not more than 25%	More than 25% but not more than 35%	More than 35% but not more than 40%
All works	1.05	1.04	1.03	1.01	1.00

2) Building Works

- Overhead Expense

  = Raw construction cost (Cp) x Rate of overhead expense (%) x Correction ratio

  - Raw construction cost: as shown in Table 2.2.5.
  - Rate of overhead expense

Classification	Not less than JPY 5 million	More than JPY 5 million but not more than JPY 3 billion	More than JPY 3 billion
Building works	17.24%	28.978-3.173 x Log (CP) %	8.43%
Building equipment (Mechanical)	16.68%	27.283-3.049 x Log (CP) %	8.07%
Building equipment (Electrical)	17.49%	29.102-3.340 x Log (CP) %	8.06%

  - Correction ratio of advance payment

Advance payment ratio	Not more than 5%	More than 5% but not more than 15%	More than 15% but not more than 25%	More than 25% but not more than 35%	More than 35% but not more than 40%
All works	1.05	1.04	1.03	1.01	1.00

3) Mechanical Works

- Overhead Expense

  = Raw construction cost (Cp) x (Rate of overhead expense

  x Correction ratio of advance payment (%) x Correction ratio of equipment cost)

  - Raw construction cost: as shown in Table 2.2.6
  - Rate of overhead expense

Classification	Not less than JPY 5 million	More than JPY 5 million but not more than JPY 3 billion	More than JPY 3 billion
Sewerage works (PS or WWTP)	21.78%	-3.5981 x Log (CP)+ 45.883%	11.78%

- Correction ratio of advance payment

Advance payment ratio	Not more than 5%	More than 5% but not more than 15%	More than 15% but not more than 25%	More than 25% but not more than 35%	More than 35% but not more than 40%
All works	1.05	1.04	1.03	1.01	1.00

- Correction ratio of equipment cost = 1- K/1.25

  K: Ratio of equipment cost against raw construction cost

4) Electrical Works

- Overhead Expense

  = Raw construction cost (Cp)

  x (Rate of overhead expense x Correction ratio of advance payment (%))

  - Raw construction cost: as shown in Table 2.2.7
  - Rate of overhead expense

Classification	Not less than JPY 1 million	More than JPY 1 million but not more than JPY 0.3 billion	More than JPY 0.3 billion
Sewerage works (PS or WWTP)	21.27%	-1.081 x Log (CP)+ 27.76%	18.60%

- Correction ratio of advance payment

Advance payment ratio	Not more than 5%	More than 5% but not more than 15%	More than 15% but not more than 25%	More than 25% but not more than 35%	More than 35% but not more than 40%
All works	1.05	1.04	1.03	1.01	1.00

In terms of overhead expenses, the same differences can be observed in the Japanese and Vietnamese cost estimation structure as in the site management expenses mentioned above.

2.2.3 Comparison of the Vietnamese and Japanese Cost Estimations

The main difference between the cost estimation in Vietnam and Japan is presented below.

- Cost estimation in Japan is carried out separating four categories of work (civil, building, mechanical, and electrical), while cost estimation in Vietnam is carried out separating two categories of work (construction costs and equipment costs). Also, in the case of Japan, formula have been established to estimate common indirect costs, site management costs, etc. for each category of work.
- Japanese cost norm was established to ensure sufficient safety cost for the contractor. Therefore, the estimated cost tends to be calculated with a slight margin over the market cost (bid price). In addition, vast amounts of necessary information on the unit prices of a variety of construction works are published and updated periodically, therefore, it can be said that both the basis and necessary information for cost estimation are sufficient in Japan.
- In the case of Vietnamese cost estimation, the cost norm aims to estimate the accurate

construction cost, and the estimated cost is the same as the bid price in the competitive bidding. Although the cost estimation structure has been revised after the formulation of Decree 68/2019/ND-CP and its related circulars, it can be said that the cost estimation structure system is designed for accuracy, as it is necessary to obtain a number of quotation due to information of published unit price is quite limited. On the other hand, the site management cost and overhead expenses are largely related to construction costs, while the site management cost and overhead expenses are not set in the costs of equipment, which are equivalent to mechanical and electrical equipment in the Japanese cost estimation structure. Therefore, there is a possibility that the quality and safety cost may not be sufficient.

2.2.4 Considerations in the Cost Estimation of Yen Loan Projects

In the case of implementation of Yen Loan projects in Vietnam, it is noted that the project budget is not determined by estimated project cost in the JICA preparatory survey, but by Vietnamese approved project cost based on the F/S, basic design, and cost estimation prepared by local consultant. Therefore, it is necessary to pay attention to the cost estimation implemented by the local consultant in order to secure and ensure sufficient budget for quality and safety management.

As mentioned above, in the cost estimation based on the Vietnamese national standard, the bid price will be calculated by Vietnamese contractors, and therefore, it will not be the amount that foreign companies can bid in many cases. There tends to be a large gap between the construction prices calculated according to the Japanese standards and Vietnamese standards for the cost for civil works and construction works. In order to facilitate project approval, it is desirable to sort out the works that can only be carried out by foreign companies and the ones that can be carried out by Vietnamese companies, and to estimate the cost of the works that can be carried out by Vietnamese companies in accordance with the Vietnamese cost estimation standards.

Furthermore, the multiple-staged approval of cost estimation will be required: namely Pre-F/S stage ➔ F/S stage ➔ D/D stage (technical and construction) in Vietnam. Since it is common for the construction cost to be deducted due to price appraisal at each stage, it is advisable to maintain sufficient reserve funds at the F/S stage by taking into account subsequent design changes and approval procedures.

In addition, if the construction work is to be carried out on Yen Loan projects, it is desirable to ensure the sufficient cost for the quality and safety management by foreign companies, since foreign companies and Vietnamese companies will be working together. In particular, construction work in Vietnam tends to be extended due to the requirement of multiple approval procedures at all stages from construction to claim. Foreign companies tend to consider this risk to their cost estimation, therefore, simplifying and shortening the approval process is seemed to be important in terms of lowering construction cost.

Lastly, approval procedures for cost estimation and designs tend to take a long time for technologies that are adopted for the first time in Vietnam (e.g., patented technologies from overseas), therefore, the support from Japanese side is essential when introducing patented technologies from Japanese companies into Yen Loan projects.

CHAPTER 3 SUGGESTIONS AND RECOMMENDATIONS

3.1 Differences in Cost Estimation between Preparatory Survey and Feasibility Study

3.1.1 Project Cost of Yen Loan Projects

The project cost of the Yen Loan project is estimated as follows in the Preparatory Survey carried out by JICA. The final project cost will be determined in the discussion between JICA and implementation agency of the project based on the estimated amount in the Preparatory Survey at the time of the JICA's mission.

(1) Construction Cost

The construction cost is estimated including direct expenses and indirect costs based on the schematic design for each construction package. It is not necessary to comply with the Japanese cost norm in calculating the construction cost in the Preparatory Survey, but instead refer to the cost estimation regulations and unit cost information of Vietnam, the country where the project is implemented. In addition, the construction cost is estimated by adding the price escalation (both in foreign and local currency) and the physical contingency expected during the construction period as set out in the project implementation schedule. In the case of Vietnam, it is customary to set the price escalation rate with reference to previous trends and the physical contingency at 5% of the construction cost.

(2) Consultancy Service Cost

The manning schedule of consultants for design, tender assistance and construction supervision will be prepared for foreign engineers, local engineers and supporting staff, and the remuneration will be calculated by multiplying the unit cost agreed between Vietnam and JICA and the proposed man-months. Furthermore, the direct cost such as office, car, transportation, etc. and the costs for sublet works are accumulated, and, as same as the construction costs, price escalation and physical contingency are added to the consultancy service costs.

(3) Other Costs

The calculation of costs borne by the Vietnam, including the necessary expenses of the project implementing agency, land acquisition and resettlement, value-added tax (VAT), import tax, and interest during construction, etc.

The total of (1) and (2) above is the amount of the Yen Loan, and (3) other costs are added to calculate the total project cost. As of 2021, the maximum eligible amount (loan ratio) of Yen Loan project for Vietnam, which is classified as a middle-income country, is 85% of the total project cost.

3.1.2 Project Cost of Vietnamese Cost Estimation

After the Preparatory Survey by JICA, the local consultant will carry out the F/S, Basic Design (B/D) and cost estimation, each of which must be approved by the implementing agency[1]. The appraisal of technical (F/S, B/D) and cost estimation is normally carried out by the relevant national or municipal authority prior to the said approval.

The project cost for infrastructure development in Vietnam should be estimated in accordance with Decree 68/2019/ND-CP and its related Circulars (Circular 09/2019/TT-BXD to Circular 18/2019/TT-BXD) which were enacted on 1 October 2019.

(1) Construction Cost

The Yen Loan project is large in scale and involves several types of work, including civil, building, mechanical and electrical. According to Decree 68/2019/ND-CP, Civil Works and Building Works are included in "construction costs" and Mechanical Works and Electrical Works are included in "equipment costs". The construction cost is then calculated by including taxable income, VAT, and contingency costs. For contingency costs, a 10% of physical contingency and contingency for price escalation are allowed to be added at the F/S stage. However, as analyzed in Chapter 2, the Vietnamese cost estimation regulations requires that indirect costs be accounted for on an accumulative basis.

(2) Consultancy Service Cost

It is necessary to account for consultancy service costs in accordance with Decree 68/2019/ND-CP and the relevant circulars (Circular 15/2019/TT-BXD and Circular 16/2019/TT-BXD). Both lump sum and time-based contracts can be applied, but the total consultancy service cost in the case of a lump sum contract is specified. The unit rate was previously based on MOLISA unit cost, however, under Decree 68, the unit cost was set by MOC.

(3) Other Costs

Compensation, resettlement costs, project management costs, and other costs will be estimated as necessary.

3.2 The Impact of Requirements in Vietnam for the Implementation of Yen Loan Project

3.2.1 Impact on Project Formulation Stage

More detailed Basic Design (B/D) and more precise cost estimation are required in the approval stage of F/S, which is different from the preliminary design and cost estimation in Preparatory Survey by JICA. Therefore, it takes time for the preparation by the local consultant and approval by the Vietnamese government. This is one of the reasons that delayed the commencement of the project

[1] Although the Vietnamese government (Prime Minister, MPI, MOF, etc.) is involved in the approval of the L/A, the F/S needs to be approved by the local government (the local government (province) approves the F/S (B/D, cost estimation) prepared by the local consultant).

after the completion of Preparatory Survey by JICA.

3.2.2 Impact on Project Implementation Stage

In the project implementation stage in Vietnam, there are many cases where a great deal of time is required at each approval stage, leading to delays in the project in many cases. The approval process in Vietnam involves 1) approval of the overall project and project cost at the Pre-F/S stage, 2) approval of the project content, design, and project cost (including the breakdown of construction cost, consultancy services cost, etc.) at the F/S (Basic Design) stage, and 3) approval of the design and construction cost (two stages: Technical Design and Construction Design) after Detailed Design (D/D), which has an impact on the progress of the project. While these processes are necessary for the proper implementation of the project, there is an issue that the project implementation period is significantly longer than original plan, resulting in an increased risk of insufficient project costs due to price escalation.

Although Decree 68/2019/ND-CP and related circulars have come into effect, and the cost estimation regulations is being developed with the support of JICA technical assistance, etc., the cost estimation regulations are not yet fully prepared. As there is still a lack of guidelines and standards for the design and cost estimation, the design approval process has to be a thorough discussion for almost every project, which is a time-consuming factor.

In addition, the requirements for quality and safety during construction are becoming stricter every year, however, the tools and systems to deal with these requirements are still insufficient and need to be developed accordingly. Also, the management cost of foreign contractors should also be considered for construction projects that require their participation.

3.3 Necessary Improvement Measures (Recommendations)

Considering the appreciation of the new Vietnamese cost estimation regulations, the result of the case study, and the experiences in official development assistance (ODA) projects in Vietnam, the suggestions and recommendations for future ODA projects are summarized in this chapter in order to implement both infrastructure and sewerage development projects more smoothly and effectively.

3.3.1 Project Formulation Stage

In order to overcome the issues mentioned above, it is recommended that the following measures be taken to simplify the project formulation process in Vietnam and ensure smooth implementation of the projects.

- The requirement level of Basic Design (B/D) at the F/S stage will be lowered byapproving schematic design and expedite the project approval. This also requires flexible design changes in the Detailed Design (D/D) stage,
- Even in the cost estimation of F/S stage, the quotation will be approved according to the design level, while also increase the contingency costs in the F/S stage. In particular, since the project period in Vietnam is generally longer than expected, sufficient contingency costs will be needed as there is a greater risk of future price inflation and the change of currency exchange rate. In addition, it is expected that the local government shall have authorized power to increase the project cost at the post-design and construction stage,
- The central government will only be involved in the Pre-F/S stage of projects where the local government (provinces) is the implementing agency, while both the appraisal and approval of

the F/S will be under the jurisdiction of the local government (provinces) to speed up the approval process, and

- It is desirable to ensure a sufficient transition period when enacting a new decree, or to allow retroactive application of the legal system at the time of the start of the project (e.g., at the time of Pre-F/S approval), so that the design and cost estimation will not be required to be revised as a result of changes in standards.

3.3.2 Quality of Design and Cost Estimation

The following measures should be taken to ensure the quality of design and cost estimation.

- To improve the standards and guidelines for design and cost estimation in Vietnam (e.g., the case of the "Vietnamese Standards for Pipe-Jacking Methods[2]", which the MLIT is supporting through the activities of the GCUS Southeast Asia Committee).
- To provide cost estimation guidelines annually, in which the latest decisions and circulars related to the cost estimation are indicated and guided. At this moment, it is difficult to understand the latest Vietnamese decisions and circulars since these are updated frequently without any announcement.

3.3.3 Quality and Safety during Construction

The following recommendations are made to ensure quality and safety during construction.

- To ensure sufficient management costs for quality assurance and safety management cost, these costs are excluded from the target of monetary assessment compared with previous similar projects at the appraisal conducted prior to the approval stage of the F/S and D/D to secure the necessary cost for quality and safety assurance.
- To avoid insufficient budget for construction works and consultancy services to which international competitive bidding is applied, the cost estimation regulations will be adjusted so that the cost for foreign contractors collaborating with Vietnamese contractors can be included in the cost estimate to an appropriate extent.

[2] This report was prepared to promote the pipe-jacking methods in Vietnam, and the Japanese guidelines and cost estimation regulations for the pipe-jacking methods were adjusted to be more applicable for Vietnam. The guidelines and regulations are being revised as deemed appropriate based on the requests of the Vietnamese MOC and relevant authorities, and the 6th edition is being revised in FY2021.