

2.4 Examination of Common Items for Phase 1 and Phase 2a

2.4.1 Traffic Management Plan and Safety Control Plan during Construction Period

2.4.1.1 Construction Safety Measures

In Phase 2a FS, safety and environment are mentioned in IV.3.5. LABOR SAFETY AND ENVIRONMENTAL PROTECTION and those items are IV.3.5.1. Labor safety, 1) Human resource safety, 2) Equipment safety, 3) Construction work safety, 4) Electrical safety, IV.3.5.2. Fire prevention method, IV.3.5.3. Environmental sanitary safety, 1) General condition, 2) Excavation, 3) Construction of concrete bridge, and 4) Bridge painting. There is also some description about safety and environment in VII.3. CONSTRUCTION METHOD. Although some of safety measures are stated specifically in those Clauses, they are expressed as what contractors to do. Moreover, roles that the execution agency and construction supervisory consultant should fill and safety control system for the entire project are not found in the FS. Furthermore, there is no description on calculation, election and maintenance of temporary structures.

Meanwhile, JKT prepared “Construction Safety Manual” (JKT/REP/0074/E dated 15th July 2011). Although the manual detailedly states work items with possible dangers and safety measures which are generally required in construction works, it is prepared as a part of bid and contract documents, thus all the items are stated as what contractors should do. Safety control is not conducted by contractors only, but by together with the project execution agency and construction supervisory consultant. Therefore, those three parties should build the safety control system appropriate for the project and carry out.

JKT proposes to separate safely management cost from indirect construction cost and make it an independent pay item in order for to assure necessary safety measures to be taken. This is considered one of possible and appropriate measures for the improvement of safety control. JKT should prepare detailed draft, have necessary discussions with VNR/RPMU and realize the measure.

“Safety and Quality Control System Checklist” is that JICA requires the executing agency to answer. The checklist filled by VNR/RPMU which is the executing agency of this project is attached in Annex 5.

2.4.1.2 Measures for Reducing Impact on Road Traffic

Impact of the construction on road traffic is briefly mentioned in Clause VII.3. CONSTRUCTION METHOD of Phase 2a FS. Meanwhile, JKT proposal simply states measures for minimizing impact of the construction on road traffic in Clause “Public Convenience and Safety”.

Since the construction works of this project for the south of Hanoi station are carried out along the National Road No. 1, temporary and partial occupation of the road will be necessary. In Hanoi city where traffic congestion is normal status, the construction works may cause further traffic congestion. It is important for the execution agency to follow relating laws and

regulations, have prior consultation with road authority of Hanoi city, Hanoi People's committee and police jurisdiction about traffic control plan, and ensure the basic matters. Particularly, it will be required to obtain consensus on location, area and period of temporary road occupation, and to obtain permission or approval for proper detour route where one way regulation is forced to be set.

In addition, the existing VNR railway from the south is planned to be maintained up to temporary at-grade Giap Bat station until the completion of Phase 1 and 2a of the project. Therefore, since the construction works along the section between Van Dien and Giap Bat will be adjacent to the live line, safety measures toward train operation during the construction period is required.

2.4.1.3 Train Operation Plan of Existing National Railway during Construction Period

In VII.4. TRAIN OPERATION METHOD DURING PHASE IIA-CONSTRUCTION of Phase 2a FS, train operation route for the existing national railway during construction period of this project is mentioned. However, this route includes the East Belt Line that there is no specific plan and even no survey has been carried out. In addition, national trains from the north can be operated to Gia Lam (temporary) station since construction of Phase 2b (Yen Vien ~ Gia Lam section) will not be commenced during Phase 2a construction period. JICA survey team inquired of TRICC which prepared the FS authenticity of the above, and it was found that those were incorrect. The train operation plan of the existing national railway during construction period of Phase 2a section is described in Clause 2.5.2 Appropriateness of Integration of Phase 1 and 2a (Simultaneous Inauguration).

2.4.2 Procurement

2.4.2.1 Project Packages

When project is divided into several contract packages, the following conditions are generally taken into account:

- Geographical features;
- Type (field) of works and contract (FIDIC1999: “Red Book” (Building and Engineering Works Designed by the Employer), “Yellow Book” (Design & Build), and “Silver Book” (Engineering Procurement and Construction (EPC));
- Contract amount;
- Construction schedule
- Status of Japanese contractors
- STEP loan conditions; and
- Land acquisition.

JKT has been considering) the project packaging and discussing with VNR and RPMU. A report “Project Contract Packaging, Overall Schedule and Tendering Plan-Revision 4” (JKT/REP/0268/E dated 14th December 2011) was issued by JKT, dividing the project into the following five groups:

- <Group 1> Ngoc Hoi station complex;
- <Group 2> Construction of civil & elevated railway structures;
- <Group 3> Railway bridge over the Red River;
- <Group 4> Procurement & installation of goods & equipment for signaling, telecommunication, electrification & electric power supply; and
- <Group 5> Procurement of electric multiple units (EMU).

JKT has taken into account of the construction schedule and sequence of packages, request of Japanese contractors which have shown their interest in this project, contract amount which would not be a risk for the contractors which are the members of the Overseas Construction Association of Japan, Inc. and intention of Vietnam side, and proposed sub-divided contract packages. Phase 1, 2a and 2b have 20, 8 and 7 contract packages respectively and 35 contract packages in total. Project contract packages proposed by JKT are shown in Table 2.4.2.1-1.

Table 2.4.2.1-1 Project Contract Packages Proposed by JKT

Group		Package		Form of Contract	Phase
1	Ngoc Hoi Station Complex	101	Ground Preparation & Soil Improvement	Red Book	1
		102	External Civil Works	Red Book	1
		103	Civil & Architectural Works	Red Book	1
		104	Installation of Track & Temporary Train Operation System	Red Book	1
		105	Power Supply	Red Book	1
		106	Depot Equipment for Ngoc Hoi Complex & Gia Lam Depot	Yellow Book	1
		107	Civil & Architectural Works for Ngoc Hoi Complex for Phase II-a	Red Book	2a
2	Construction of Civil & Elevated Railway Structures	201	Ngoc Hoi - Van Dien	Red Book	2a
		202	Van Dien - Giap Bat	Red Book	2a
		203	Track Installation: Ngoc Hoi - Giap Bat	Red Book	2a
		204	Giap Bat Station	Red Book	1
		205	Giap Bat - Bach Mai	Red Book	1
		206	Bach Mai - Hanoi	Red Book	1
		207	Hanoi Station	Red Book	1
		208	Hanoi - Railway Bridge Over The Red River	Red Book	1
		209	Railway Bridge Over The Red River - Gia Lam	Red Book	1
		210	Gia Lam Station	Red Book	1
		211	Gia Lam Depot	Red Book	1
		212	Track Installation: Giap Bat - Gia Lam	Red Book	1
3	Railway Bridge Over The Red River	301	Construction of Railway Bridge Over The Red River	Red Book	1
4	Procurement & Installation of Goods & Equipment for Signalling, Telecommunication, Electrification & Electric Power Supply	401	Signalling, Telecommunication, Electrification & Electric Power Supply System	Yellow Book	2a
		402	System-Wide Station Equipment	Yellow Book	2a
		403	Automatic Fare Collection System	Yellow Book	2a
		404	Signalling, Telecommunication, Electrification & Electric Power Supply System	Yellow Book	1
		405	System-Wide Station Equipment	Yellow Book	1
		406	Automatic Fare Collection System	Yellow Book	1
5	Procurement of Electric Multiple Units	501	Procurement of Electric Multiple Units (EMU)	Silver Book	1
		502	Procurement of Electric Multiple Units (EMU)	Silver Book	2a

Source: JKT

JICA contact mission in August 2011 pointed out that the project had been divided into too many contract packages at that time, and required VNR to investigate the possibility of management cost reduction by an integration of packages. This survey also, with considering how the project packaging should be, reviews the JKT proposal and study the possibility of project cost reduction.

< Group 1 >

- Ngoc Hoi station complex construction should be proceeded with first in the project and separated from the main line construction.
- 101 is a large scale land formation work including soft soil improvement work requiring contractors with special skills and technology, and therefore becomes an independent contract package.
- 102 was originally out of the project scope since it consists of roads, sidewalk, flyovers, etc. which can be constructed by local Vietnamese contractors. However, strong request of VNR and a need of coordination with Ngoc Hoi station complex construction make 102 an independent package and considered becoming a part of scope of JPY loan.
- 104 of track works is an independent package from packages of civil and architectural structures due to its expertise and continuous construction.
- Considering a power supply crunch in Vietnam, 105 is separated from E&M of Group 4, becomes an independent contract package and is proceeded with in early stage of the project so as to improve the position of the power supply (to create a fait accompli and ensure vested rights of VNR for the power supply).
- 106 might be able to be merged with 103, however 106 is an independent contract package because 103 and 106 are different in contract type and expertise, and total contract amount of 103 and 106 exceeds 30 billion JPY.

- 107 seems to be able to be merged with 201 in Group 2 due to their work contents and continuity and reasonable total contract amount, which reduces one number of contract package.

< Group 2 >

- The Group 2 consists of all civil and architectural structures and track works packages except the railway bridge over the Red River.
- 211 is an independent contract package since this package should be proceeded with in early stage of the project though there are pros and cons of the elevated structure of the Gia Lam depot.
- 204 (Giap Bat), 207(Hanoi) and 210 (Gia Lam) are independent contract packages because those urban and national stations are not affected by land acquisition issue, and are large scale stations of rigid frame structure which requires total engineering skills of civil and architecture.
- Construction schedule of sections between the urban and national stations is expected to be largely influenced by the progress of land acquisition. If construction of the section between the urban and national stations has only one contract package, the commencement of construction work may be delayed, and the contract amount will be very high inclusive of three intermediate stations, which increases a risk of contractors. Therefore, the sections between the urban and national stations are divided in two contract packages.

< Group 3 >

- The Group 3 is an independent group only for the railway bridge over the Red River since construction work of this structure is carried out in river section that land acquisition is unnecessary and the bridge is a long span steel bridge which requires special construction skills and technology.

< Group 4 >

- E&M has an independent group since the contract type complies with FIDIC Yellow Book and requires expertise.
- Station equipment such as escalators and elevators are separated from packages in Group 2 and utilizes common type for an efficiency and economy of future maintenance.
- Packages on automatic fare collection (AFC) system are independent from the other E&M packages since it is expected to take a certain period of time for Vietnamese side to select card type due to the consideration and coordination with other urban railways in Hanoi such as Line 3, Line 2a and Line 5.
- When Phase 1 and 2a sections open simultaneously, package 401 and 404, 402 and 405, and 403 and 406 can be merged, which can reduce three numbers of contract packages.

Although there may be a concern that some contract packages will not have any bidders since there are too many contract packages, the same also applies to projects with a small numbers of contract packages. The less numbers of contract packages in the project make each contract package a larger scale and its contract amount becomes higher. The larger scale contract packages also have larger risks. It is not easy even for large companies to bid for the large scale contract packages. Therefore, the large contract packages may narrow the range of Japanese companies to participate in a bid, which is contrary to the purpose of the STEP. Recently, Japanese construction contractors have been cautious in receipt of overseas construction work

orders. However, the amount of the most of the contract packages on civil and architectural structures shown in the above are in a range between 5 to 10 billion JPY and it can be said that such scale of the contract packages are appropriate for Japanese contractors to bid.

The more the number of contract packages are, the higher the cost of construction supervisory service and management cost of contractors becomes. This is mainly because of an increase in the number of assignment due to more complex coordination between packages and an increase in management cost due to the more number of contractors. However, it can be said that this cost increase is not excessive compared with the total project cost. Moreover, the cost increase due to many subdivided contract packages is in an acceptable range when considering the risk arisen from the less number but the larger scaled contract packages. The same contractors may receive more than one contract package order and implement works, in which case the cost increase will be suppressed by bidding.

The important is that an appropriate packaging is made for bidders, all the contract packages have bidders and all the bids are successfully completed. It is deemed that the packaging proposed by JKT has well taken into account of the above conditions and has an appropriateness for contractors to take part in a bid.

It should be noted that the JICA survey team merges package 107 and 201 of JKT proposal, which makes the total number of contract packages of Phase 1 and 2a 27, and carries out calculation of construction cost and total project cost. Some contract packages in Group 4 and 5 are not considered to be merged in this survey because it has not been confirmed that Phase 1 and 2a are constructed simultaneously.

2.4.2.2 Regulation and Procedure for Procurement of Consultants and Contractors, and Approval Procedure in Vietnam

1) Procurement Procedure, Regulation and Application

The following laws and decrees shall be applied to the procurement procedure and selection of consultants and contractors.

Table 2.4.2.2-1 Law and Decree on Procurement Procedure

Class	Name	Number	Issue Date
Law	Construction Law	No. 16/2003/QH11	26 Nov. 2003
Law	Bidding Law	No. 61/2005/QH11	29 Nov. 2005
Law	Law Amending and Supplementing a Number of Articles of the Laws Concerning Capital Construction Investment	No. 38/2009/QH12	19 Jun. 2009
Decree	Guiding the Bidding Law and the Selection of Construction Contractors under the Construction Law	No. 85/2009/ND-CP	15 Oct. 2009

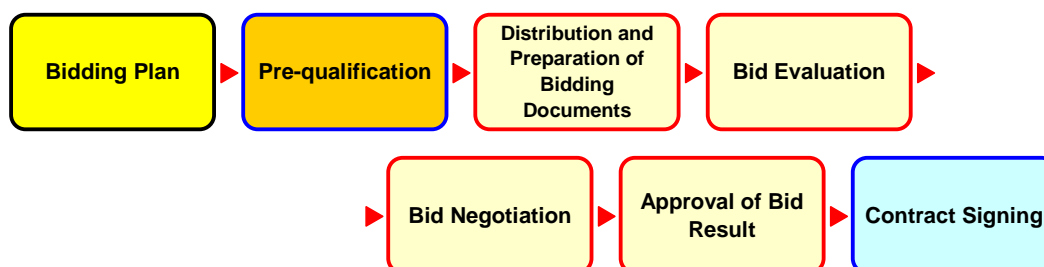
Source: JICA Survey Team

The law and decree shall be applied to the following projects.

- a) Development investment projects with more than 30% of its capital originating from the state budget, including:
 - Projects on investment in construction or expansion of already invested and built works;
 - Projects on investment in procurement of assets, including equipment and machinery which need not be installed;
 - Projects on regional development planning, branch development planning or urban or rural construction planning;
 - Projects on scientific research, technological development or technical assistance;
 - Other development investment projects
- b) State budget-funded projects for procurement of assets to maintain regular operations of state agencies, political organizations, socio-political organizations, socio-political-professional organizations, social organizations, socio-professional organizations or people's armed forces units
- c) State budget-funded projects for procurement of assets in service of renovation or overhaul of already invested equipment, production chains, works or workshops of state enterprises

For official development assistance (ODA) projects, the bidding must be based on the contents of treaties to which the Socialist Republic of Vietnam is a contracting party or international agreements which competent agencies or organizations of the Socialist Republic of Vietnam have signed.

The detail contents of procurement procedure are described in the laws and decree as shown in the table 2.4.2.2-1. The procedure from the bidding plan to the contract signing as specified in the following figure shall be explained hereinafter.



Source: JICA Survey Team

Fig. 2.4.2.2-1 Flow of Bidding

2) Bidding Plan

Bidding plans must be approved in writing by competent persons after or at the same time with investment decisions in cases where such plans meet conditions serving as legal bases for project owners¹ to select contractors, except for bidding packages such as the consulting services etc which must be executed before investment decisions are issued. A bidding plan must be elaborated for an entire project; where conditions are not fully met and it is not really necessary, a bidding plan may be prepared for several packages to be executed in advance. A bidding plan must state clearly the number of bidding packages and contents of each bidding package, with covering the followings:

- The name of the bidding package;
- The bidding package price;
- The capital source(s);
- The form of selecting contractors; the mode of bidding;
- The time for selection of contractors;
- The form of contract;
- The contract performance duration

3) Pre-qualification

Based on the nature and size of a bidding package, the pre-qualification selection of contractors shall be conducted before an open bidding is organized in order to select fully capable and experienced contractors as required by the bidding package to participate in the bidding. The criteria for evaluation of pre-qualification responded by the contractors must be stated in pre-qualification documents according to the forms set by the Government, including technical capability, financial capability and experience criteria. The pre-qualification time shall be at most 30 days for domestic

¹ According to the Laws, it is mentioned as “Investors” which mean capital owners or persons assigned to represent capital owners or borrowers in directly managing and executing projects. Here, for good understanding, it shall be “Project Owners”

bidding, and 45 days for international bidding, from the date of distribution of pre-qualification documents till the approval of pre-qualification results.

4) Distribution and Preparation of Bidding Documents

The bidding documents shall be distributed when all the following conditions are met:

- The bidding plan has been approved;
- The bidding documents has been approved;
- The notice of invitation for bids or list of contractors invited for participation in bidding has been published according to the provisions of the Law.

a) Compilation of Bidding Documents

Bidding documents shall be compiled according to the forms set by the Government and have the following contents:

- Technical requirements:
For procurement bidding packages, requirements on the scope of supply, quantity and quality of goods to be determined through their characteristics, technical parameters, technical standards, production standards, warranty duration, environmental requirements and other necessary requirements;
For construction and installation bidding packages, requirements based on technical designs, which are accompanied by estimates, technical instructions, and other necessary requirements;
- Financial and commercial requirements:
Requirements based on expenses which cover execution of bidding packages, offered prices and price quotes, goods delivery conditions, payment modes and conditions, financial sources, bidding currencies and terms mentioned in the general and specific conditions of contracts.
- Evaluation criteria, related articles of the laws, treaties or agreement of ODA loan, preferential conditions (if any), taxes, insurance and other requirements

b) The Form of Selection of Contractor and Mode of Bidding

The following forms of selection of contractors and mode of bidding shall be considered and applied in compliance with the condition of bidding packages.

Table 2.4.2.2-2 the Form of Selection of Contractor and Mode of Bidding

Form of Selection of Contractor	Mode of Bidding
i) Open Bidding ii) Restricted Bidding iii) Appointment of Contractor iv) Direct Appointment	i) One-Envelop Mode The one-dossier-bag bidding mode shall apply to open bidding and restricted bidding for procurement, construction and installation or EPC bidding packages. Contractors shall submit bids, including technical and financial proposals, according to requirements of the bidding documents. Bids shall be opened only once.
	ii) Two-Envelop Mode The two-dossier-bag bidding mode shall apply to open bidding and restricted bidding for the supply of consultancy services. Contractors shall submit technical and financial proposals separately according to requirements of the bidding documents. Bids shall be opened twice whereby technical proposals shall be opened first for evaluation; then, financial proposals of all contractors having technical proposals which have been evaluated as meeting the set requirements shall be opened for general evaluation. For bidding packages with high technical requirements, the financial proposals of contractors that attain the highest technical points shall be opened for consideration and negotiation.
	iii) Two-stage Bidding Mode The two-stage bidding mode shall apply to open bidding and restricted bidding for procurement, construction and installation or EPC bidding packages with new, complicated or diverse technical or technological specifications, which shall be conducted in the following order: In the first stage; Based on the bidding documents for this stage, contractors shall submit technical proposals and financial plans without bidding prices; the bidding documents for the second stage shall be determined on the basis of discussion with each of the contractors participating in the first stage; In the second stage; based on the bidding documents for this stage, contractors that have participated in the first stage shall be invited to submit bids for the second stage, which shall cover technical proposals and financial proposals, including bidding prices, and bid security measures.

Source: JICA Survey Team

c) Invitation of Bids

Invitation of bids shall be conducted in case of open bidding, restricted bidding or open bidding involving pre-qualification. The time for announcement of an invitation for bids shall be at least 10 days, before the distribution of the bidding documents. The time for preparation of bids shall be at least 15 days for domestic bidding, and 30 days for international bidding, from the date of distribution of bidding dossiers till the bid-closing time. The valid time limit of bids shall be at most 180 days as from the bid-closing time; in case of necessity, this time limit may be extended for not more than 30 days.

d) Distribution of Bidding Documents

Bidding documents shall be distributed to contractors participating in open bidding, to contractors on the lists of those invited to participate in restricted bidding or to contractors having passed the pre-qualification. Where bidding documents should be modified after distribution, such must be notified to all contractors having received the documents at least 10 days before the bid-closing time.

e) Bid Opening

Bid opening must be conducted publicly right after the bid-closing time, with regard to bids submitted according to requirements of bidding documents. Major information

mentioned in bids of each contractor must be publicized in the bid-opening session and recorded in the bid-opening minutes, which shall be signed for certification by representatives of bid executing experts², contractors and concerned agencies.

5) Bid Evaluation

a) Bid Evaluation Methods

Bid-evaluating methods must be consistent with evaluation criteria described in bidding documents. Bid-evaluating criteria include criteria for evaluating capability and experience (in case pre-qualification selection is not applied), criteria for technical evaluation; criteria for general evaluation of consultancy service bidding packages or contents for determining evaluation prices on the same technical, financial and commercial grounds in order to compare and rate bids for procurement, construction and installation or EPC bidding packages.

With regard to consultancy service-bidding package, the point-rating method shall apply to technical evaluation. Upon formulation of evaluation criteria, the minimum technical requirements must be specified but not lower than 70% of the total technical points, or not lower than 80%, for bidding packages with high technical requirements. The formulation of evaluation criteria for comparing and ranking bids shall comply with the following provisions:

- For consultancy service-bidding packages without high technical requirements, a general point scale which combines technical points and financial points shall be used to rank bids. The general point scale must ensure the principle that technical points shall not be lower than 70% of the total points of the scale. The bid of the contractor with the highest point shall be ranked first;
- For consultancy service-bidding packages with high technical requirements, the contractor whose bid has the highest technical point shall be ranked first for consideration of financial proposals

For procurement, construction and installation and EPC bidding packages, the marking method or method of evaluation using the "satisfactory" or "unsatisfactory" criterion will be applied for technical evaluation. When formulating technical evaluation criteria in the form of a point scale, prescribed minimum technical requirements must not be lower than 70% of total technical points, or not lower than 80%. for bidding packages with high technical requirements. Bids which have passed technical evaluation shall be compared and rated based on evaluation prices on the same technical, financial and commercial grounds. The bid of a contractor having the lowest evaluation price on the same ground will be ranked first.

² According to the Laws, it is mentioned as "Bid Solicitors" which mean investors or professional organizations which are fully capable and experienced and employed by investors to organize biddings in accordance with the provisions of bidding law. Here, for good understanding, it shall be "Bid Executing Experts"

b) Bid Evaluation Order

First of all, preliminary evaluation of bids shall be conducted in order to eliminate invalid bids which fail to meet important requirements of bidding documents. The detailed evaluation of bids shall be conducted according to the following provisions:

- To evaluate technical proposals of bids to determine whether they meet the basic requirements of bidding documents or not;
- For procurement, construction and installation or EPC bidding packages, evaluation prices on the same technical, financial and commercial grounds shall be determined to compare and rate bids. For consultancy service bidding packages, general evaluation shall be conducted to compare and rate bids: particularly, consultancy service bidding packages with high technical requirements, financial proposals of the contractors technically ranked first shall be considered.

c) Duration of Bid Evaluation

The maximum duration for evaluating a bid is 45 days, for domestic bidding, or 60 days, for international bidding, from the bid-opening date to the date the bid executing expert submits bidding results to the project owner for approval.

6) Bid Negotiation

The negotiation and finalization for signing of contracts with bid winners must be based on the following:

- The approved bidding results;
- The model contracts which have been filled with all specific information of bidding packages;
- The requirements stated in the bidding documents;
- The contents of bids and bid winners' explanations to clarify their bids (if any);
- The contents to be negotiated and finalized for contracts between bid executing experts and bid winners

The results of negotiation and finalization of contracts shall be dealt as a basis for project owners and contractors to sign contracts. In case of unsuccessful negotiation and finalization of a contract, the project owner shall consider and select next-ranked contractors. If the next-ranked contractors still fail to meet requirements, the case shall be considered and handled under regulations.

7) Approval of Bid Result

Contractors undertaking goods supply, construction and installation or EPC bidding packages shall be considered and proposed to be bid winners if they fully meet the following requirements:

- Having valid bids
- Being evaluated as meeting the requirements on capabilities and experiences

- Having their technical proposals evaluated as meeting the requirements of the point-rating system or according to the "pass" or "fail" criterion
- Offering the lowest evaluation price on the same ground
- Offering bid-winning prices not exceeding the approved prices of bidding packages

a) Submission of Bid Results for Approval and Appraisal

The bid executing expert shall make a report on bid results and submit it to the project owner for consideration, decision and further sending to a responsible agency or organization for appraisal. The appraising agency or organization shall, based on the bid executing expert's report, make an evaluation report on bid results and submit it to the investor for consideration and decision.

b) Approval of Bid Result

Project owners shall consider and approve bid results based on the evaluation reports on bid results. Where a contractor wins bids, the written approval of bid results must cover the following contents:

- The name of the bid winner
- The bid-winning price
- The form of contract
- The contract performance duration
- Notes (if any)

Where no contractors win bids, such must be stated clearly in the written approval of bid results and the bidding shall be cancelled for the selection of contractors according to the provisions of this Law.

c) Announcement of Bid Result

Bid results shall be announced right after obtaining investors' decisions approving bid results. Announcements of bid results need not explain reasons to bid-failing contractors.

8) Contract Signing

Based on 4) to 7) mentioned the above, the contract signing shall be conducted with the following documents.

- Contract Documents
- Results and minutes of negotiation and finalization of contracts
- Decisions approving and written notices on contractor-selecting results
- General and specific terms of the contract
- Bids, documents of proposal and documentation explaining bids of selected contractors
- Bid documents of requirement, modification and addition
- Other enclosed documents (if any)

Besides, the contract signing must ensure the following conditions.

- Bids of selected contractors remain valid
- Information on technical and financial capabilities of contractors updated at the time of signing contracts must meet the requirements of bidding documents

Signed contract documents shall be submitted to the government agencies or organizations for their approval. After approval of the contract, the contractors and project owners are able to go forward to the implementation stage.

9) Procurement Process and Schedule of this Project

Based on the laws and regulation, procurement process and duration of procurement in this project is considered with the following table.

Table 2.4.2.2-3 Procurement Process and Schedule of this Project

No	Procedure	Executing Agency	Decision Making Agency ³	Duration according to the Regulation	Duration expected by JICA ⁴
1	Bidding Plan	VNR/RPMU	MOT	10 days after submission	
2	Pre-qualification	RPMU/JKT	VNR/JICA	Maximum 45 days after closing	90 days from approval of the document until approval of evaluation result
3	Distribution and Preparation of Bidding Documents	RPMU/JKT	VNR/JICA	Preparation period is at least 30 days	Approval of documents: 90 days Preparation time: 60 days
4	Bid Evaluation	RPMU/JKT	VNR/JICA	Maximum evaluation period is 60 days Bid validity is at maximum 180 days but time is allowed to extend within 30 days	Evaluation by VNR: 60 days Evaluation by JICA: 30 days
5	Bid Negotiation	RPMU/JKT	VNR		60 days
6	Approval of Bid Result	RPMU	VNR/JICA		
7	Contract Signing	VNR/RPMU	MOT/JICA		Approval by JICA: 30 days

Source: JICA Survey Team

10) Confirmation and Comparison of the Procurement Schedule of ODA Projects Executed by VNR

VNR has been executing the following 4 projects.

- Hanoi - Ho Chi Minh City Railway Rehabilitation Project, Phase I
- Hanoi - Ho Chi Minh City Railway Rehabilitation Project, Phase II and Additional Works
- Hanoi - Ho Chi Minh City Railway Line Bridges Safety Improvement Project
- Hanoi City Urban Railway Construction Project (Line 1), Phase I

³ It is necessary to obtain JICA's review and concurrence for the pre-qualification documents, the evaluation criteria and result of evaluation of pre-qualification, and bidding documents, bid evaluation criteria, result of bid evaluation and the contract documents

⁴ It is referred to JICA standard schedule which was prepared based on the discussion between JICA and VNR on 24 Feb. 2012

Hanoi city urban railway construction project is now on detailed design stage. Hanoi - Ho Chi Minh City railway rehabilitation project, phase I, phase II and additional works had been executed before establishment of the Bidding Law.

Therefore, for confirmation and comparison of the procurement schedule, the schedule of Hanoi - Ho Chi Minh City railway line bridges safety improvement project shall be considered as a reference and shown in the table 2.4.2.2-4.

Table 2.4.2.2-4 Procurement Schedule of Hanoi - Ho Chi Minh City Railway Line Brices Safety Improvement Project

No	Package	Submission of Bidding Plan	Approval of Bidding Plan	Issuance of Pre-qualification Documents	Pre-qualification Opening	Approval of Pre-qualification Result	Submission of Bidding Documents	Approval of Bidding Documents	Issuance of Bidding Documents	Bid Opening	Submission of Bid Evaluation Report	Approval of Bid Evaluation Report	Submission of Bid Result (Negotiation)	Approval of Bid Result	Conclusion of Contract	Months from (h) to (n)
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	
1	CP1 ^(*)	25 Jan 08	17 Mar 08	1 Oct 07	30 Nov 07	N/A	N/A	1 Oct 08	2 Oct 08	2 Dec 08	failed	failed	failed	failed	failed	-
2	CP1A	29 Apr 09	1 Jun 09	none	none	none	7 Jul 10	20 Jul 10	23 Jul 10	22 Oct 10	28 Nov 11	13 Dec 11	11 Jan 12	11 Jan 12	12 Jan 12	17.93
3	CP1B	29 Apr 09	1 Jun 09	none	none	none	21 Apr 10	22 Apr 10	26 Apr 10	26 Jul 10	14 Jan 11	11 Feb 11	N/A	N/A	18 Feb 11	9.93
4	CP1C	29 Apr 09	1 Jun 09	none	none	none	21 Apr 10	22 Apr 10	28 Apr 10	30 Aug 10	29 Mar 11	15 Apr 11	18 Apr 11	25 Apr 11	26 Apr 11	12.1
5	CP1D	29 Apr 09	1 Jun 09	none	none	none	8 Apr 10	9 Apr 10	3 May 10	6 Aug 10	3 Aug 11	24 Aug 11	24 Aug 11	26 Aug 11	29 Aug 11	16.1
6	CP2	25 Jan 08	17 Mar 08	23 Jun 08	8 Aug 08	31 Dec 08	18 Feb 10	5 Mar 09	10 Mar 09	10 Jun 09	14 Jan 10	2 Feb 11	4 Feb 10	N/A	9 Feb 10	11.2
7	CP3 ^(*)	25 Jan 08	17 Mar 08	24 Jul 08	24 Oct 08	failed	failed	failed	failed	failed	failed	failed	failed	failed	failed	-
8	CP3A	24 Jul 09	13 Aug 09	none	none	none	8 Jul 10	not yet	not yet	not yet	not yet	not yet	not yet	not yet	not yet	-
9	CP3B	24 Jul 09	13 Aug 09	none	none	none	19 Nov 10	not yet	not yet	not yet	not yet	not yet	not yet	not yet	not yet	-
10	CP3C	24 Jul 09	13 Aug 09	none	none	none	19 Nov 10	not yet	not yet	not yet	not yet	not yet	not yet	not yet	not yet	-
11	CP4 (1st) ^(*)	25 Jan 08	17 Mar 08	none	none	none	N/A	N/A	17 Apr 09	failed	failed	failed	failed	failed	failed	-
12	CP4 (2nd)	8 Dec 10	29 Jan 11	none	none	none	30 Nov 10	11 Mar 11	24 Mar 11	22 Nov 11	not yet	not yet	not yet	not yet	not yet	-
13	EP	25 Jan 08	17 Mar 08	none	none	none	25 Aug 08	25 Sep 08	26 Sep 08	12 Dec 08	4 Jun 09	7 Jul 09	9 Jul 09	N/A	10 Jul 09	9.57

Source: JICA Survey Team

Notes: CP means construction package, EP means equipment purchasing package

1/ Bid for CP1 was failed due to a big gap between cost estimate and cost proposed by the bidder

2/ Pre-qualification process of CP3 was cancelled due to receipt of only one application

3/ Bid process of CP4 was cancelled due to no application from the bidder

The comparison shall be made based on the duration from issuance of bidding documents until the contract signing in case of Hanoi - Ho Chi Minh City railway line bridges safety improvement project since it is a little bit complicated if it applies from the bidding plan to the contract signing. According to table 2.4.2.2-4, most of bidding packages has taken their bidding process more than 1 year and they are surely longer than the duration specified in the regulation and the duration expected by JICA. As a result of hearing the bidding circumstance, it is considered that the prolongation of bid might be caused by difficulties of technical evaluation and tough negotiation due to single bid. On the other hand, it might be possibly caused by an organization of bid execution as well.

Bid executing experts who manage bidding process have been selected from a department of RPMU but they seem not to be able to handle and manage the execution of the plural number of bidding packages at the same time due to a shortage of their human resource. Besides, some of experts are still young and seem to be lack of their language ability and profession on that field although bid proposal prepared by the contractor is English and requires technical knowledge for its evaluation.

According to the contract of consulting services, the consultant is requested to assist the project owner in bidding process but the project owner seems not to prefer the consultant's participation in the bid. It seems to be rather exclusive and the project owner has a strong tendency to manage and settle the bid by himself despite causing inefficient. Such situation has been confirmed in other projects under management of MOT. Participation of the consultant in whole bidding process makes a little costly but it could obtain more transparency and efficiency of bids. Besides, the bidding process could be shorten by raising efficiency and increase of the construction cost due to price escalation also could be restrained by early commencement of works. Consequently, total cost of the project will be decreased by participation of the consultant in bid and this is the point that the project owner is requested to understand. Especially, Hanoi City urban railway construction project (line 1), phase I has a huge scope compared with the project which VNR has been executing and has so many new technologies to be installed as the first case in Vietnam, therefore, it is keenly necessary to pay close attention to management and execution of bids.

2.4.3 Project Implementation Schedule

An overall schedule of this project (Phase 1, 2a and 2b) which was prepared by JKT on 28th December 2011 is shown in Table 2.4.3-1. Examinations and calculations of this survey have been carried out using this schedule. The aforementioned schedule should have been reviewed first. However, the JKT schedule without review had to be utilized since calculation of project cost needed to be started in the beginning stage of this survey.

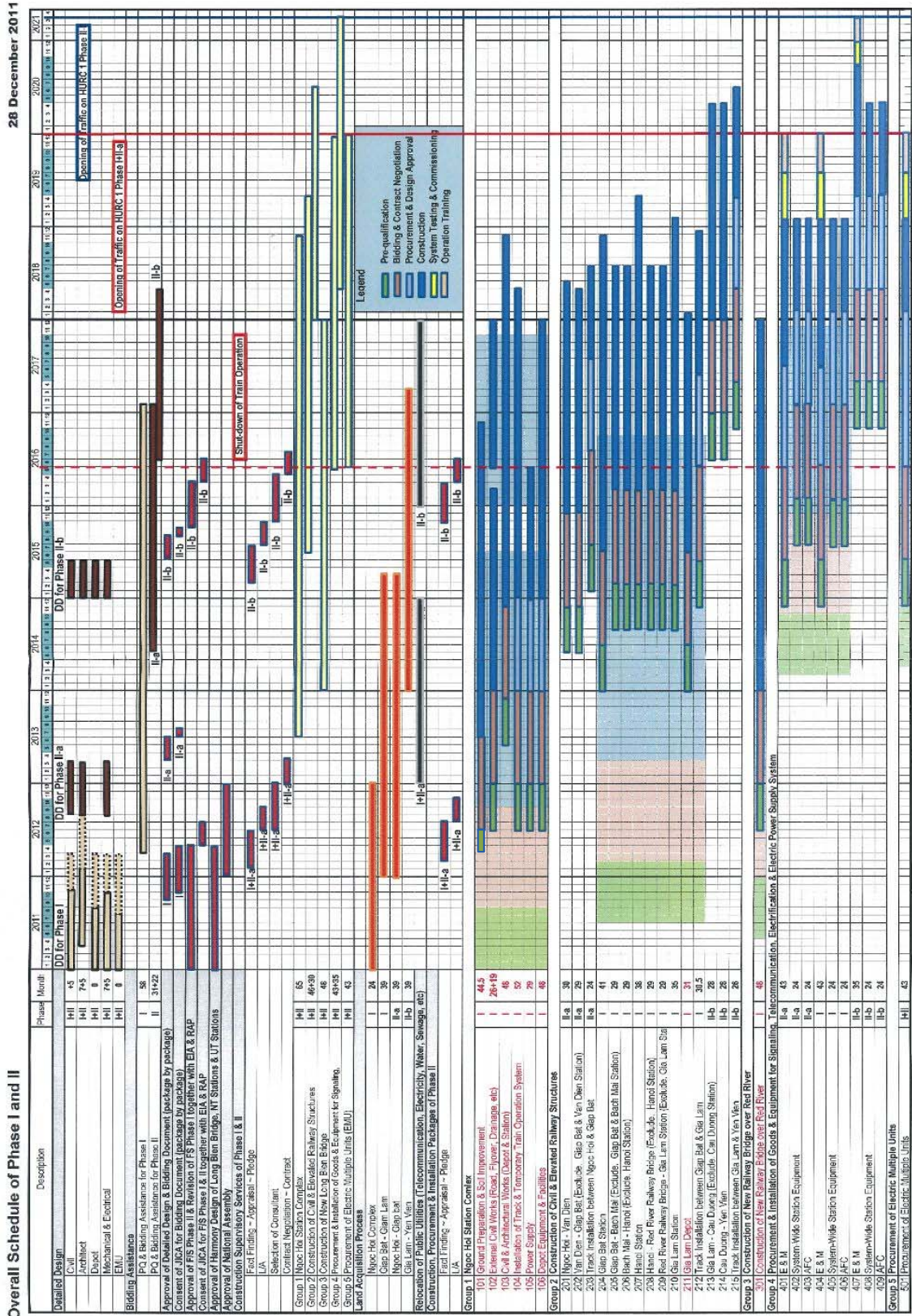
According to the JKT schedule, packages relating to Ngoc Hoi station complex will commence Pre-qualification (PQ) and bid in July 2012, packages for viaduct, stations and track works, and packages on E&M and electric multiple units (EMU) will succeed, and the section of Phase 1 and 2a will be opened in January 2020. As a basis of the aforementioned schedule, an

implementation of JICA appraisal mission of first batch of year 2012 and smooth progress of required process and approval in Vietnam are assumed.

As a matter of fact, however, there are various problems on this project. They are decision of project scope and phase, design approval, approval of the Government of Vietnam and national assembly for the project and project cost, planning and implementation of land acquisition and re-settlement, etc. Although a certain period of time for resolving and completing those problems should be properly estimated and refracted to the overall project schedule, it is not easy to estimate the period due to some issues stated in Chapter 5.

Meanwhile, an idea to minimize delay of entire project schedule by identifying a critical path of the project schedule and proceeding with the project partially is worth considering. Since the overall project schedule shows that there is a gap of one and half to two years between the commencement of packages on Ngoc Hoi station complex and following packages on main line structures, it is considered that the problems on the project could be resolved during this gap. Ngoc Hoi station complex area has little problem such as land acquisition and re-settlement, and there was a discussion between JICA contact mission and VNR in February 2012 about proceeding with construction of this area first. The contents of this discussion is described in Clause 5.8.

Table 2.4.3-1 Project Implementation Schedule



Source: JKT

2.4.4 Project Cost Estimate

2.4.4.1 Calculation of Project Cost

Project cost of Phase 1 and 2a simultaneous construction calculated using JICA cost calculation system is shown in Table 2.4.4.1-1 to 2.4.4.1-3.

Basic conditions for the project cost calculation are as follows:

- Base Procurement / Construction Cost comes from the reviewed construction cost estimated by JKT (mostly based on basic design since detailed design is still in progress;
- Base year for cost estimate (October 2011), exchange rate (0.0037JPY/VND), price escalation rate (foreign currency portion: 1.6% per year, local currency portion: 12.6% per year), physical contingency rate (5% in principle), tax and VAT (import tax: 3%, VAT: 10%), etc. are stipulated in “General Guidelines for the 2nd batch of FY2011 Japanese ODA Loan Projects (draft)” given by JICA;
- Construction schedule is based on the overall project schedule which was prepared by JKT on 28th December 2011 and attached in 2.4.3 (commencement of construction works in July 2013, completion of construction works in December 2019, and open in January 2020);
- Schedule and cost for Phase 2a detailed design and construction supervisory service refer to the draft proposed by JKT;
- Cost for land acquisition and re-settlement comes from FS in 2007 (before divided into two phases), Phase 1 FS in 2008 and Phase 2a FS (draft) in 2011, which are all prepared by Vietnamese consultant; and
- Schedule for land acquisition is based on the overall project schedule which was prepared by JKT on 28th December 2011 (commenced in January 2011 and completed in March 2015).

Table 2.4.4.1-1 Project Cost Calculation (Phase 1 + 2a)

(This part was deleted to disclose information in certain period)

Table 2.4.4.1-2 Estimated Project Cost (Phase 1 + 2a, Cost by Items)

(This part was deleted to disclose information in certain period)

Table 2.4.4.1-3 Annually Necessary Amount (Phase 1 + 2a, unit: million JPY)

(This part was deleted to disclose information in certain period)

Project costs when Phase 1 and 2a are separately constructed are also calculated. The results for Phase 1 only and Phase 2a only are shown in Table 2.4.4.1-4 to 2.4.4.1-6 and 2.4.4.1-7 to 2.4.4.1-9 respectively. It should be noted that the calculation is made for the case that Phase 1 and 2a are totally independent, and cost for construction supervisory service is estimated for each of Phase 1 and 2a. Therefore, the total amount of project costs for Phase 1 only and Phase 2a only is different from the project cost when construction of Phase 1 and 2a is simultaneously carried out.

Table 2.4.4.1-4 Project Cost Calculation (Phase 1 only)

(This part was deleted to disclose information in certain period)

Table 2.4.4.1-5 Estimated Project Cost (Phase 1 only, Cost by Items)

(This part was deleted to disclose information in certain period)

Table 2.4.4.1-6 Annually Necessary Amount (Phase 1 only, unit: million JPY)

(This part was deleted to disclose information in certain period)

Table 2.4.4.1-7 Project Cost Calculation (Phase 2a only)

(This part was deleted to disclose information in certain period)

Table 2.4.4.1-8 Estimated Project Cost (Phase 2a only, Cost by Items)

(This part was deleted to disclose information in certain period)

Table 2.4.4.1-9 Annually Necessary Amount (Phase 2a only, unit: million JPY)

(This part was deleted to disclose information in certain period)

Since detailed design by JKT has yet to be completed as of December 2011, the above calculations are conducted using data and information of basic design.

2.4.4.2 Ratio of Local Currency and Foreign Currency

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2.4.4.3 Factors of Construction Cost Increase

Regarding total amount of construction cost for Phase 1 section, its cost based on JKT design is 2.35 times as high as FS stage. Actually it can not be easily carried out to compare costs of FS stage and JKT design because most of work items and costs indicated in FS are not based on actual design, what each of those items includes is not clear, and those items in FS do not tally with items in Bill of Quantity (BOQ) by JKT design. However, comparison of main items is made between Phase 1 FS and JKT design on possible factors of the construction cost increase as follows:

1) Price Escalation

Price escalation rate in Vietnam has currently been over 10%, especially soaring labor cost is remarkable. For example, when the price escalation rate in Vietnam for next three years keeps 12.6% which is stipulated by JICA for this survey, the cumulative price escalation rate becomes approximately 43%. The price escalation in Vietnam pushes up all unit prices of material and equipment to be procured in Vietnam, resulting in an increase of construction cost.

Meanwhile, as stated in 2.4.4.2, the exchange rate of VND to JPY has continuously declined for recent years. The exchange rate at the time of FS Phase 1 was 131.75 VND/JPY, and current exchange rate is 270.27 VND/JPY (calculated from the exchange rate of 0.0037 JPY/VND which is stipulated by JICA for this survey).

Value of VND against JPY is halved, which offsets the abovementioned price escalation as a result. Thus the price escalation in Vietnam is not a factor of construction cost increase when considering the amount all converted into JPY.

2) Changes in Design and Quantity Increase by JKT

There are several items of which cost increases due to specification change for equipment and quantity increase by change of given conditions of design (results of geological and topographical surveys, railway alignment (both plane and longitudinal) about location change of the railway bridge over the Red River and some of stations and clearance with newly found planned crossing roads, change of power source type), improvement on safety (for construction and structure type), review of train operation plan (the number of siding tracks, car inspection and maintenance), construction conditions (construction in urban congested area, etc.), and design (stations, etc.). The following are the main items of the above:

- Ngoc Hoi station complex soft soil improvement work: quantity increase of soft soil to be treated and change of construction method;
- Ngoc Hoi station complex structures, roads and drainage: area expansion and design change of some structures;
- Ngoc Hoi station complex track work: extension of total track length and mostly change to dual-gauge;
- Ngoc Hoi station complex some of depot equipment;
- Viaduct: quantity increase due to rail level increase, longer span of girder, change from steel to PC girder for some section;
- Stations (both terminal and intermediate): quantity increase by station scale expansion, specification change for interior, exterior and equipment;
- Elevated Gia Lam station and depot: change from at-grade to elevated structures due to the rail level increase, expansion of depot structures and buildings;
- Track works for main line;
- Railway bridge over the Red River (sub-structure): change of foundation type;
- Signaling and telecommunication: changes due to introduction of Japanese system;
- Electrification: change from direct current (DC) to alternating current (AC); and
- Electric Multiple Units (EMU): quantity increase due to change of train operation plan, specification change due to change of power source type.

3) Additional Items by JKT Design

There are some items which were not considered or included in Phase 1 FS stage but are added to Phase 1 scope of works in JKT design stage, which contributes to the construction cost increase. Those are items which are additional due to an influence to surrounding areas by project construction works, which were originally in the scope of Vietnamese side but may become eligible for the JPY loan due to necessity of coordination of timing and connection with the project main construction works, which were originally included in Phase 2 but are shifted to Phase 1 by review of national train operation plan during construction stage and after completion, and

which are newly added due to design concept and conditions. Main items of the above are as follows:

- Construction of civil structures (roads, flyovers, drainage, etc.) outside of Ngoc Hoi station complex;
- Construction of passenger car depot (buildings and equipment) in Ngoc Hoi station complex;
- Installation of power supply equipment and facilities (temporary power supply system, power transmission cable installation) for Ngoc Hoi station complex; and
- Part of depot equipment in Ngoc Hoi station complex (urban train depot, diesel locomotive depot and freight car depot)

4) Missing Items and Under-estimated Quantities and Unit Costs in FS

There are several items which are missing in FS and whose quantities and unit prices might be under-estimated even though they are essential items for the project, which, as a result, appears as cost increase. The following are the major items of the above:

- Ngoc Hoi station complex soft soil improvement work (quantity of soft soil to be treated);
- Ngoc Hoi station complex depot equipment (unit price);
- Ngoc Hoi station complex equipment for freight station (missing);
- Railway bridge over the Red River both sub- and super-structures (unit cost);
- Turnout (unit price);
- Station elevators and escalators (unit price);
- Signaling and telecommunication equipment (unit price);
- Automatic fare collection (AFC) system (unit price); and
- Electric multiple units (EMU) (quantity).

Analysis of factors for construction cost increase is shown in ANNEX 6. Type, specification and quantities of main items (structures, equipment, system, etc.) are compared between Phase 1 FS and JKT design, and factors for cost increase and construction costs by package are summarized. There are some items that quantity and/or construction cost can not be compared properly because contents of structures and scope of each package in FS do not necessarily match with those in JKT design. The following are packages that increased amount or rate of construction cost is very high, and possible factors for the increase are stated:

(This part was deleted to disclose information in certain period)

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2.4.4.4 Investigation of Measures to Reduce Project Cost (Loan Amount)

In August 2011, JICA Contact Mission strongly required VNR/RPMU to try to reduce the project cost. Although JKT has kept the cost reduction in mind for his detailed design since then, the construction cost is actually not reduced. The reason is assumed that the basic design by JKT had been completed when the JICA Contact Mission was sent, and the detailed design had also been in progress. The possibility of the project cost (loan amount) reduction from now on is examined as follows:

1) Possibility of Cost Reduction by Implementing Construction Works with Vietnamese Own Fund

Among packages proposed by JKT, there are several packages which are considered possible to be implemented by local competitive bid, local fund and local contractors. The following are those packages:

- Package 101 (Ngoc Hoi station complex ground preparation and soft soil improvement);
- Package 102 (Ngoc Hoi external civil works);
- Package 105 (Ngoc Hoi station complex power supply; and
- Other packages which mainly consists of relatively simple civil structures construction work.

For Package 101, some of construction methods require special techniques and keep local contractors at a distance. When pre-fabricated vertical drain (PVD) method (to extract water from soft soil layer to improve strength of the layer) which is widely used in Vietnam is adopted, however, construction equipment is available and local contractors can well implement the work. Construction of ordinary reinforced concrete and pre-stressed concrete structures such as road flyover can also be carried out by local contractors which have sufficient experiences and skills. Installation of power supply cable and equipment is an usual work and can be conducted by local contractors as well.

However, since possible delay of budgeting and construction, problems on quality and coordination between packages, etc. are highly expected, it is desirable that all the packages are eligible for the yen loan in order to smoothly proceed with entire project.

2) Possibility of Cost Reduction by Re-consideration of the Number of Contract Packages

Contract packages of the project is stated in 2.4.2.1, and the cost increase due to a large number of packages is not excessive. If re-consider (reduce) the number of packages, the small amount of cost reduction may be possible. However, this is considered not an appropriate measure to reduce the cost because larger scale packages have higher risk.

3) Possibility of Cost Reduction by Use of Cheaper Material and Equipment and Adoption of Construction Method of Lower Price

Material and equipment which are widely used in Vietnam are given standard unit prices by Ministry of Construction (MOT) and Hanoi People's Committee (HPC). Those unit prices are regularly updated and applied for construction cost estimate. Thus those material and equipment do not lead to the cost reduction. Meanwhile, special material and equipment and imported goods do not have such standard unit price. Therefore, cheaper products should be tried to be selected and used among ones which satisfy quality and other conditions required by design. If STEP conditions can be fulfilled as a whole project, some of goods which are currently expected to be procured from Japan, such as PC cable for viaduct, interior and exterior material for stations, elevators and escalators, rail, turnout, depot equipment, E&M system equipment, etc. are changed to cheaper ones from other countries, which can make some construction cost reduction. As an example, cost of PC cable made in Japan in February 2012 is approximately 300 thousand JPY per ton (depending on size and type of cable) but PC cable imported from other country, such as Thailand, costs only 1,500 USD per ton (approximately 120 thousand JPY in the same time) which is less than half of Japanese. There is also possibility of the construction cost reduction in Ngoc Hoi station complex soft soil improvement work when selecting an optimum method by comparing several construction methods about cost and period. To be more specific, PVD method which is mentioned in the above 1) is cheaper but requires longer period, and Cement Deep Mixing (CDM) method (to improve strength of soft soil by mixing with cement) is expensive but takes shorter period. The method should be chosen with taking into account of elements which may affect the total project cost.

4) Possibility of Cost Reduction by Change of Ratio of Local Currency and Foreign Currency

As mentioned in Sub-clause 2.4.4.1 and 2.4.4.2, the price escalation rate in Vietnam is high and the project cost is largely affected by total amount of local currency. This means that the project cost will decrease if reducing local currency portion which price escalation is high and increasing foreign currency portion which price escalation is low. Such a measure can be taken for goods which are not possible to be procured in Vietnam. If goods which can be procured in Vietnam are changed to imported ones, Base Procurement / Construction Cost will be increased because price of imported products are generally higher. Moreover, Vietnam side has an intention to want to use material and equipment which can be procured in her own country. The further examination will be necessary if pursuing the possibility of the cost reduction by this measure.

5) Possibility of Cost Reduction by Re-consideration of Project Purpose and Design Concept

For significant project cost reduction, it is necessary to drastically change the project purpose and design concept. One of the major factors of high construction cost of this

project is that the existing national railway trains and international trains come into the new elevated urban railway, which requires most of tracks to be dual-gauge, makes some of railway equipment complicated, and needs larger scale stations. Although the cost reduction is expected to be tens of billions of JPY if sharing the Line 1 with long distance trains is given up and the Line 1 becomes exclusive for the urban trains, such change of the project purpose seems not to be realistic.

2.4.5 Ratio of Japan Origin Goods

It is expected that Japan origin goods are procured based on the purpose, plan and design of this project when material and equipment which satisfy the design requirements of quality and function cannot be obtained in Vietnam. There are the following four reasons for selecting and purchasing Japan origin goods:

- 1) Design concept has adopted Japanese system, resulting in an automatic procurement of products made in Japan (Signaling, telecommunication and OCC system, automatic fare collection (AFC) system);
- 2) Since design standard is Japanese (e.g. Japan Industrial Standards (JIS)), materials to be used for construction need to meet the requirements of the standard and, as a result, some of the Japan origin materials will be procured (some of materials for civil structure);
- 3) Conditions and constraints on design (e.g. compact and high-performance) lead to the situation that Japanese products can only be selected and procured (some of depot equipment and facilities); and
- 4) In order to fulfill the STEP conditions, high-quality products, i.e. products with reliability and safety due to uniformity and durability, are selected and procured. (materials for architectural structures and buildings, materials and equipment for track structures, electric multiple units (EMU)).

Goods under STEP conditions expected at this moment are as follows;

- Materials for civil structures (steel bridge members for super-structure, steel pipe sheetpile, PC cable)
- Materials for architectural structures and buildings (interior and exterior of station buildings, elevators and escalators);
- Materials and equipment for track structures (rail (50kg/m and 43kg/m), turnout (50kg/m and 43kg/m for dual-gauge));
- Depot equipment and facilities (wheel load measuring system, coil spring tester, damper tester, air compressor testing equipment, pantograph testing equipment, air valve tester, relay tester, fuel supply stand, underground fuel tank, water supply equipment, magnetic flaw detector, ultrasonic flaw detector, magnetic frame tester, ultrasonic cleaner, engine performance test system, lubricating oil supply equipment, cooling water supply system, cooling water system, engine starting machine, engine carrier, wheel fitting press, automatic car body washer)

- Sub-station system and equipment, overhead catenary system and equipment, power distribution equipment and SCADA;
- Signaling system and equipment (automatic signaling system, electronic interlocking device, automatic train protection system (ATP), train detection system, train number recognition device, centralized traffic control (CTC) system, operation control system, system condition monitoring equipment, electrical turnout, train operation status display, railroad crossing safety equipment, signaling cable, power supply equipment for signaling equipment)
- Telecommunication system and equipment (synchronous digital hierarchy (SDH) equipment, train radio system, optical fiber cable, telecommunication cable, automatic telephone switchboard, dispatcher telephone, telephone along railway, passenger information system, system condition monitoring equipment, public address system (PA), closed circuit television system (CCTV), disaster prevention system along railway, talk-back for station, electronic watch system, power supply equipment for telecommunication equipment, lightning arrester and earthing equipment)
- Operation control center system and equipment (train operation control system, train operation diagram control system, centralized traffic control system, train number shifting equipment, power supply and distribution control system, system condition monitoring equipment, train operation status display, disaster prevention system along railway, train radio system, centralized telephone system, CCTV, electronic watch system, dispatcher training system (train operation control system, power distribution control system))
- AFC system equipment and facilities; and
- Electric Multiple Units (EMU).

The construction stage of this project is planned to be under STEP loan conditions. The STEP stipulates that total cost of goods and services to be procured from Japan must be no less than 30% of the total amount of contract(s) (excluding consulting services) financed by a STEP loan. Approximate amounts (base costs) of goods expected to be under STEP are shown in Table 2.4.5-1. The percentage in the Base Procurement / Construction Cost accounted for total amount of goods under STEP, which shown in Table 2.4.4.1, exceeds 40%. However, a trial calculation shows that the rate of the total amount of goods under SETP that a price escalation is taken into account in the expected total amount of contract (excluding consulting services) is 28.9%, which does not satisfy the requirement of the STEP (Note: The estimation ratio will exceeds 30% by taking into account of steel for station building and factory as well as labor cost of Japanese contractors.). This is mainly because that the high price escalation rate for local currency (12.6% per year) and the low price escalation rate for foreign currency (1.6% per year) are applied for the calculation of total project cost. It may be necessary to re-consider the selection of goods and services under STEP to meet the requirement with monitoring change of price escalation and expected total amount of contract.

When selecting goods and services under STEP, it is important to fulfill all the requirements of design and STEP. In addition, intention of Vietnam side should be reflected for the selection and the final decision is made by the project owner. It should be noted that when carrying out the above trial calculation, the total amount, which is estimated taking account of the price escalation of 1.6% for foreign currency with distributing the amount of the base total cost of goods under STEP to each year based on a rate of annually necessary amount of the project cost, is applied.

Table 2.4.5-1 Goods under STEP and Approximate Amount (Base Cost)

(This part was deleted to disclose information in certain period)

2.4.6 Necessary Consulting Services for Project Implementation

The Engineering Service for Hanoi City Urban Railway Construction Project (Line 1) is currently conducting detailed design for Phase 1 and will carry out bidding assistance for Phase 1 in accordance with the contract between VNR and JKT. In case Phase 1 and 2a are simultaneously constructed, construction supervisory service for Phase 1, and detailed design, bidding assistance and construction supervisory service for Phase 2a are necessary. In addition, consulting service for an establishment of new management company and for education and training for train operation and maintenance will be required.

- 1) Consulting Service for Phase 2a Detailed Design (Proposal)
Terms of Reference (TOR) of detailed design for Phase 2a section (Ngoc Hoi~Giap Bat) are almost the same as those for Phase 1.
(Man-Month (M/M) was deleted to disclose information in certain period)

- Site survey, collecting necessary information
- Review of basic design
- Integrated design with Phase 1 section, other urban train lines and other transportation sectors
- Provision of detailed design, drawings and cost estimate
- Preparation of Pre-qualification, bidding documents and evaluation criterion
- Bidding assistance
- Monitoring and assistance for land acquisition and resettlement of residents
- Complementing Environmental impact assessment (EIA)

2) Consulting Service for Construction Supervision (Proposal)

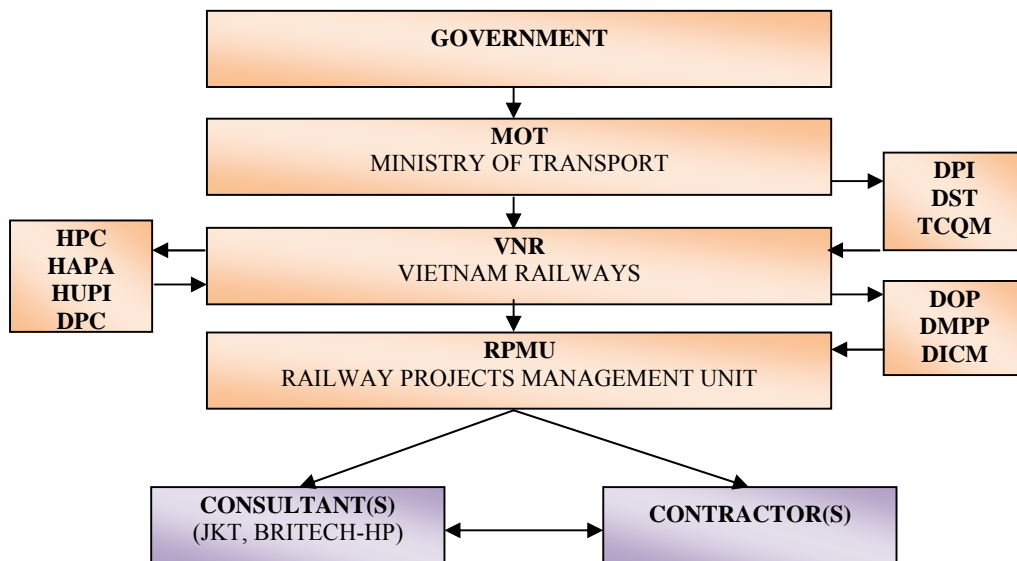
This project consists of packages that contractors construct structures in accordance with detailed design drawings prepared by design consultants, that contractors implement detailed design, fabrication and construction, and that contractors are responsible for design, procurement and installation. For each package group, FIDIC Red Book, Yellow Book and Silver Book is applied respectively. When construction supervisory service is planned and drafted, staffing shall be properly carried out taking account of peculiarity and construction schedule. The following are terms of reference of construction supervisory service for Phase 1 and 2a.

(Man-Month (M/M) was deleted to disclose information in certain period)

- Supervision of project schedule, construction cost, quality of works and safety
- Supervision of construction works
- Review of design calculation and construction drawings prepared by contractors
- Supervision of construction methods and process
- Examination of changes of design and construction method proposed by contractors
- Inspection of goods, parts and material
- Advice to the Employer on construction problems
- Supervision of urban train system operation tested by contractors
- Inspection assistance when completed portions to be handed over from contractors to the Employer
- Planning and implementation of education and training for establishing new management company
- Detailed planning and implementation of education and training for EMU maintenance equipment
- Detailed planning and implementation of education and training for train operation

- 2.4.7 Examination of Project implementation structure and Operation & Maintenance Management structure
- 2.4.7.1 Review of project implementation structure and Proposal to secure operation & maintenance management capability in respect of technology & economy
- 1) Arrangement of jurisdiction task, organization structure, staffs organization and legal positioning
- a) Jurisdiction task, organization structure, and staffs organization
- The design of the Line 1 began in October 2009, and the preparation towards full-scale start of construction is soon made.
 - About the yen loan of this project, the duty of (1) MOF = Borrower, (2) MOT = Line Agency, (3) VNR = Executing Agency, and (4) RPMU = Implementing Agency is borne respectively.
 - MOT, VNR, RPMU (a project implementation organization of VNR), and the JKT, which accepted the consignment from VNR, are cooperating to carry out the project. The technical committee is particularly established between RPMU and JKT to solve technical problems of the project. Moreover, there is also participation of TRICC which has accepted the consignment of FS preparation from VNR.

Project implementing organization chart is shown in Fig. 2.4.7.1



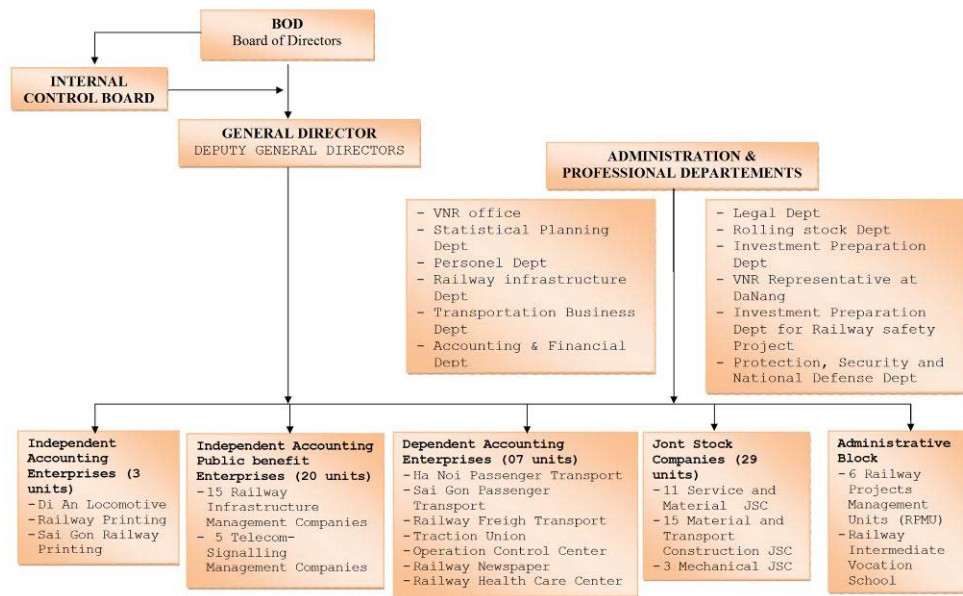
In which

- DPI : Department of Planning and Investment
- DST : Department of Science and Technology
- TCQM : Transport Construction and Quality Management Bureau
- DMPP : Department of Railways Project Investment Preparation
- DICM : Department of Investment and Construction Management
- DOP : Department of Planning
- HPC : Hanoi People's Committee
- HAPA : Hanoi Authority of Plainning and Architecture
- HUPI : Hanoi Urban Planning Institute
- DPC : Distriert People's Committee

Source: JICA survey team

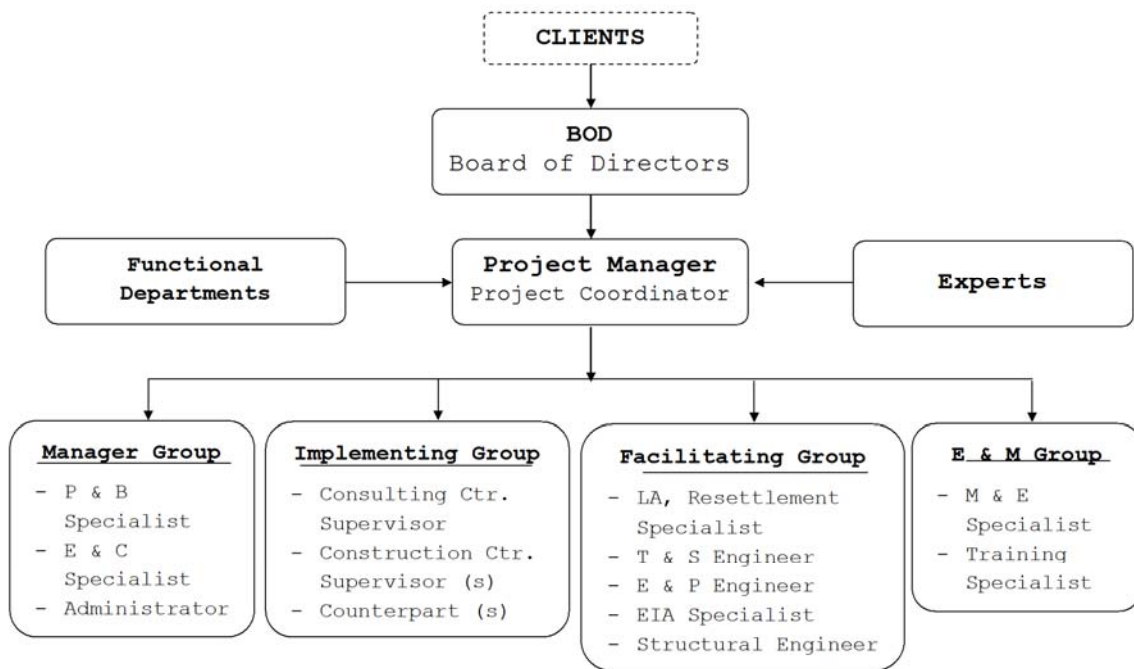
Fig. 2.4.7.1-1 Chart of project implementing organization

The organization of VNR and RPMU is shown as Fig. 2.4.7.1-2, 2.4.7.1-3



Source: RPMU data

Fig. 2.4.7.1-2 The organization chart of VNR



Notes:

- P & B : Procurement & Budgeting
- T & S : Telecommunication & Signaling
- M & E : Monitoring & Evaluation
- E & C : Economic & Contract

Source: RPMU data

Fig. 2.4.7.1-3 The organization chart of RPMU

- MOT and VNR are giving approval of budget and etc. related to construction. Because the standard or rule, etc. of a railway is under MOT's jurisdiction, the first design principles should obtain approval of MOT. Moreover, though basic design is approved by MOT, detail design is approved by VNR.
- Although the project is now in the stage of detail design and the organization of VNR and RPMU is the same as mentioned above, the engineering service including detail design, bids assistance and work management of Phase 2a is entrusted to consultant from now on and will be carried out. Furthermore, contractor will carry out construction, procurement of rolling stock and equipment & materials.
- "Ngoc Hoi Urban Railway Company (Fig. 2.4.7.1-4)" will be established as VNR's internal organization to prepare for the commercial operation after the construction starts. "Ngoc Hoi Urban Railway Company" is due to be established as a subsidiary of "Hanoi Passenger Transport Company" which is taking charge of passenger transport as a subsidiary of VNR.

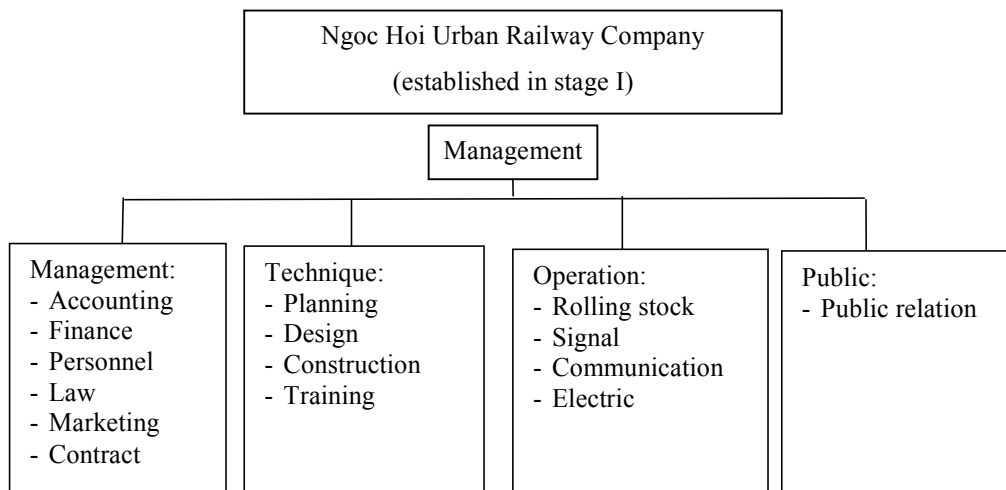


Fig. 2.4.7.1-4 Chart of Ngoc Hoi Urban Railway Company

- Although at "2.3.2.4 3) IT System for company management", the problem of IT system was described, the problem has not been examined because the experts of office IT system are not deployed in both JKT and RPMU.
- Although the examination of company organization for commencement of operation by FS of Phase 2a has not been carried out sufficiently, it is under examination in JKT now. About "Ngoc Hoi Urban Railway Company" and "Ngoc Hoi Infrastructure Management Company", it is required to examine the company organization which includes the safety control organization most important for railway, education system and OCC (Operation Control Center), etc. About the implementation structure of the project, the problem in particular has not risen except for the matter described below.

b) The issue of legal positioning

- In Railways Laws (No.09/2005/L-CTN of June 27,2005) , the People' s Committee is responsible for the urban railway. However, VNR takes charge of Line 1. According to HPC, by the historical circumstances, there are some exceptions in which they were based on directions of the Prime Minister of those days etc. In addition, other than No. 1 line of Hanoi city urban railway, VNRA has also managed the 2a line project of the Hanoi city urban railway. By the way, LA of the Hanoi city urban railway No. 1 line (between Giap Bat-Gia Lam and about 4 km section around Ngoc Hoi station) signed on March 31, 2008. In the LA of project cost which was needed for consulting service of detail design and bid assistance, etc., Borrower was the Socialist Republic of Vietnam government, and Executing Agency was VNR.
- "Ngoc Hoi Urban Railway Company" will be established as VNR's internal organization for the preparation of the operation commencement. Decision-making of the establishment should be approved by higher-rank organizations such as MOT based on a statute.
- The standard adjustment or special recognition in connection with the Vietnam railway standard for Line 1 construction should be approved by MOT.

2) Arrangement of Financial Affairs, Budget Structure and Technical Standards (Construction, procurement Capability, Etc.)

a) Financial affairs and budget structure

Revenue of VNR

Profit-and-Loss and financial situation of the latest VNR is shown in table 2.4.7.1-1 ~2.4.7.1-3. Total revenue of VNR in 2010 was 6,025,557 Million VND (about 23 billion yen, exchange rate of 1 yen=250VND), in which transportation revenue was 3,162,354 Million VND (about 12 billion yen billion yen, exchange rate of 1 yen=250VND). The revenue in 2008 and 2009 was leveling off mostly. The revenue in 2010 was increased year-on-year increase of about 8%, but it was based on fare hike. Since the track of VNR is single track, it is difficult to provide extra trains for passenger and freight on train diagram composition. Therefore revenue increase must depend on fare hike Also in it, the rates of passenger traffic income has the slightly increasing tendency in comparing with freight traffic income.

The Vietnam government has put out the subsidy to maintain railway infrastructure to VNR. It is the difference of total revenue and transportation revenue shown in table 2.4.7.1-1 VNR has received the same amount subsidy as the transportation revenue.

Expense of VNR

Each year expense of VNR is shown to increase and decrease almost corresponding to the rate of income. Personnel expenses and fuel cost occupy big weight in cost. However, it cannot be said that personnel-expenses rate is high in comparison with railway in Japan. The rate of fuel cost is high rather. Considering the power rates of Vietnam when railway will be electrified, its cost poses a problem. Although the increase of personnel expenses for these three years is 4.1%, the increase of fuel cost

shows 6.1%. However, the personnel expenses of railway infrastructure maintenance divisions such as track and signal communication maintenance, etc. which hold 10,000 or more staffs, are covered by the subsidy from the government, Consequently, the personnel-expenses rate on the same base as Japan is considered to be higher.

Although the railway infrastructure usage fee show the numerical value of 7.8-7.9 to transportation revenue, this serves as 8% of numerical value to the rail traffic income except non-railway business.

Balance Sheet of VNR

In comparing main items between years 2010 and 2003, since investments in recent years have progressed, fixed assets of 2010 have increased 9 times than that of 2003. On the other hand, the debt has stopped by about twice and is not increasing so much. In addition, the capital and the capital reserve of equity are increasing, and the owner's equity ratio has also been improved. However, the total amount of owner's equity is 11,167,171 Million VND (about 44 billion yen, exchange rate of 1 yen = 250VND), and the total amount of the debt has still become about 1.6 times of transportation revenue. As corresponding to the increase of debt accompanying with future large-sized facilities investment etc., reinforcement of the further owner's equity may need to be examined.

Table 2.4.7.1-1 Revenue and Profit and Loss of VNR (Unit: Million VND)

(This part was deleted to disclose information in certain period)

Table 2.4.7.1-2 Profit and Loss of VNR (Unit: Million VND)

(This part was deleted to disclose information in certain period)

Table 2.4.7.1-3 Balance sheet of VNR in 2010 (Unit: Million VND)

(This part was deleted to disclose information in certain period)

b) Technical Standards (construction, procurement capability, etc.)

Rolling stocks and train operation concerned

- The technical standards of VNR does not influence on manufacturing EMU (electric multiple unit).
- The computer systems for performing CTC of train traffic control system and making changes of train operation plan are not in the conventional VNR, so it is necessary to focus on educating and training the related persons from the construction period.

Civil infrastructure and track

- Equipment from developed countries and technical guidance are needed for civil structures requiring special construction techniques. General construction techniques have been successfully used in Vietnam and can therefore be employed without problems. Below are examples of structures that require such special construction techniques.
- The PC girders are assembled from precast segments on top of the viaduct and require construction equipment and erection techniques used in developed countries. The girders for the Red River Railway Bridge are fabricated on site and erected by launching which also requires equipment and technology from developed countries.
- About track, the "elastic directly fastened track" is mainly to be used, but the technology is the first in Vietnam. Therefore, track experts should instruct and supervise it from the construction period.
- Although the continuous welded rail is partially used in Vietnam, it is not widespread because of cost problem. For this reason, track experts should instruct and supervise it from the construction period, including welding technology.
- Three-line track has been already used in Vietnam.

Electric power and Telecommunication system

- Construction of the power distribution system includes mainly the 22-kV system and the low-voltage system. The affiliated company of EVN can do the construction work such as connecting the 22kV-power cable, wiring, installation of power transformer, equipment etc. A construction company and a manufacturer do the examination of a control panel. The expert on the railway power system should supervise the construction work since there are some matters specific to the urban railway.
- The affiliated company of EVN can construct substation equipment in general. The 110-kV portion of the railway power substation is the same as that of an electric power company. A construction Company and a manufacturer do the examination of a control panel. The expert on the railway power system should supervise the construction work such as power supply to OCS (Overhead Contact System), AT (Auto Transformer) post, SSP (Sub-sectioning post), etc. which has the specific to the electrified railway.
- 25kV-OCS is the new system for Vietnam. It is necessary to employ the technicians of the transmission line construction work which is the similar work of OCS. This will contribute to make the ability of the construction workers increase. The leaders of the construction technician group and the construction workers work after educational course required for the OCS work. It is necessary for the Vietnamese leaders of the construction technician group to drill the OCS work at the school in Japan using real equipment. It needs the cooperation of railway company and construction company. It is why the whole line of the present VNR is non-electrification, and construction of 25kV-OCS is the first In Vietnam. A railway engineer educates Vietnamese construction worker in Vietnam. The expert on the Railway power system needs to do the positive instruction and supervision.
- A manufacturer can install the power SCADA at OCC.

- A manufacturer mainly does the examinations on apparatus. A local staff can work in conveyance, wiring, a steel tower, grounding construction, clearance measurement, insulation resistance measurement, etc. The expert on the railway power system should do the instruction and supervision. The energizing test by the actually applied voltage (or equivalent examination) is done by the reliable engineer and the organization.
- The expert on the railway power system should carry out the tests and the measurement such as power collection of OCS, voltage-current-measurement in substation, the induced voltage on the communication cable alongside the railway line, and the magnetic field on the substation during the construction phase including the test runs of EMU.
- It seems that a contractor needs to report the result of the voltage-current-measurement at the incoming point of the railway substation to VNR and EVN. The expert on the railway power system should analyze the results.

2.4.7.2 Role of relevant organizations, and Confirmation of contact system with the implementation organization

The main organizations related to Hanoi urban railway construction and management are as below:

- 1) Ministry of Transport (MOT: Ministry of Transport - Line Agency)
MOT is the Government's central ministry responsible for the transportation administration throughout Vietnam. In the Hanoi urban area, MOT carries out the formulation of traffic/ transportation strategies, the planning of public transport, and the investigation of transportation infrastructure development.
 - a) Vietnam Railway Administration (MOT-VNRA: Vietnam Railway Administration)
About standard adjustment or special recognition related to Vietnam railway standard in Line 1 construction, the approval of MOT is a must. Moreover, about approving problem of driving license of the urban railway and the certification of education & training facilities, although there is a portion which is not clear in roles of HPC and MOT, eventually in process of the argument up to this time, approval of MOT will be required eventually.
 - b) Department of Planning and investment (MOT-DPI: Department of Planning & Investment)
The department takes budget control of the tasks under MOT's responsibility, and plans the total project expense including land acquisition expense and consultant fee. F/S formulated by VNR is also approved by MOT-DPI.
- 2) Ministry of Construction (MOC: Ministry of Construction)
MOC is the Government's central ministry responsible for the infrastructure administration throughout Vietnam. However, in the case of transportation infrastructure, the facilities examination related to public traffic comes is carried out by MOT, not MOC. In addition, the quality standards of the elevated and underground structure of railway infrastructure are based on what MOC defined.

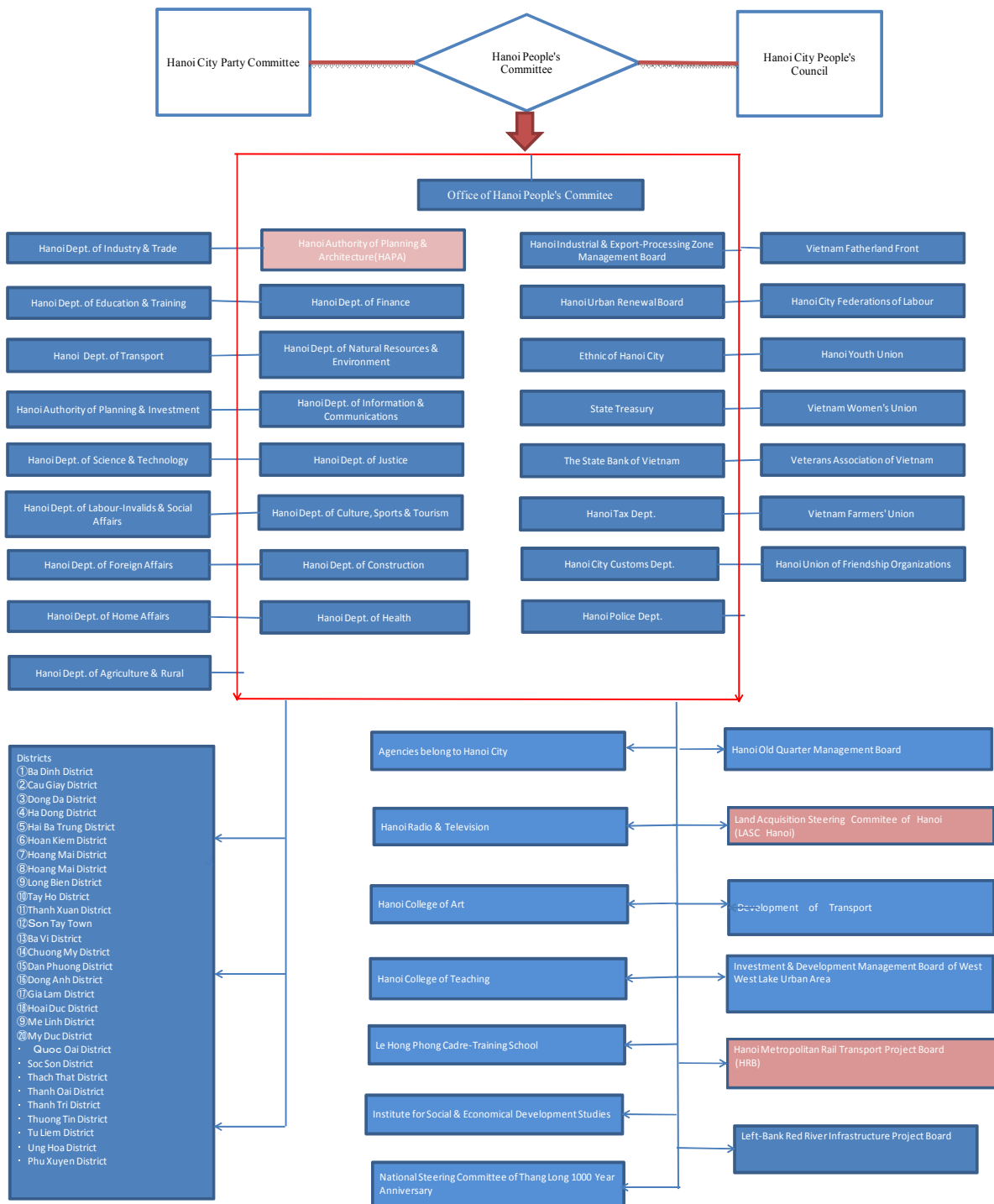
Furthermore, these estimation standards of construction cost are depended on what MOC defined.

- 3) MONRE: Ministry of Natural resources & Environment
Standards of EIA are established by this MONRE. However, application paper for approval about Environment Impact Assessment (EIA) of No. 1 line is presented to the environmental agency of MOT
- 4) Vietnam railways (VNR: Vietnam Railway - Executing Agency)
The Vietnam railways was transformed from the state-owned company into "one member LLC (LLC stands for Limited Liability Company)" on July 1, 2010. VNR has 2,600-km operation kilometers and employees more than 40,000 people. Although VNR is managing the railway of the Vietnam whole country, the organization of the headquarter is simplified, and Passenger railway company, Freight railway company, Locomotive company, Railway maintenance company and Railway Signaling and telecommunication company etc. of VNR subsidiary are bearing actual business, respectively. The Line 1's O&M company is also going to be one of the companies of VNR.
- 5) VNR railway project management unit (RPMU: Railway Projects Management Unit-Implementing Agency)
Belonging to VNR, RPMU not only is responsible for railway maintenance management focusing on repair and construction of Vietnam railways, but also promotes the construction of Hanoi Line 1.
- 6) Hanoi People's Committee (HPC: Hanoi People's Committee)
HPC is the organization responsible for implementing maintenance including the construction of the public traffic network of the Hanoi urban area and the maintenance management of traffic infrastructures, which were determined in the higher rank plan formulated by MOT and MOC. In Railways Laws, the people's committee takes charge of urban railway. However, Line 1 is taken in charge of by VNR.
 - a) Hanoi Railway Board (HPC-HRB: Hanoi Metropolitan Railway Transport Project Board)
Belonging to HPC, HRB is responsible for the project management of Hanoi Line 2 and Hanoi Line 3, which is been carrying out now. About the issue related to common use of AFC (automatic fare collecting system) and IC card, whose examination is required from now on, it is necessary to make adjustment plan with HRB.
 - b) LASC Hanoi: Land Acquisition Steering Committee of Hanoi
LASC Hanoi is in charge of land acquisition and RAP (Resettlement Action Plan) which impact big influences on the construction schedule of Hanoi city urban railway No. 1 line. DPC (District People's Committee) is also participating in this as an area organization.

c) HAPA: Hanoi Authority of Planning and Architecture

HAPA is the organization in charge of issuing construction permits for buildings such as the station building of this project. Moreover, in the relationship with the master plan of city planning, it also partly connects with Red Line Boundary and RAP (Resettlement Action Plan). Furthermore, HAPA is bearing the tasks of urban landscape. In addition, Red Line Boundary will be drafted by HUPI (Hanoi Urban Planning Institute) based on basic design of JKT, and eventually submitted to HPC for approval

The internal organization of HPC is shown in Fig. 2.4.7.2-1 Organization Chart of HPC.



Source: HPC

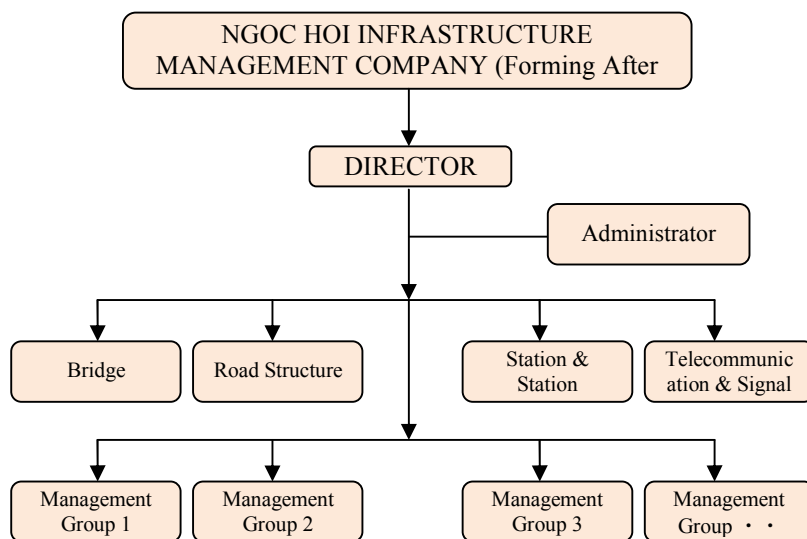
Fig. 2.4.7.2-1 Organization Chart of HPC

2.4.7.3 Review of Operation & maintenance management structure (compatibility with financial structure, fare level, income-and- expenditure structure, and a related line), and Planning to secure operation & maintenance management capability in respect of technology & company management

1) Arrangement of Jurisdiction task, organization structure, staffs organization and legal positioning

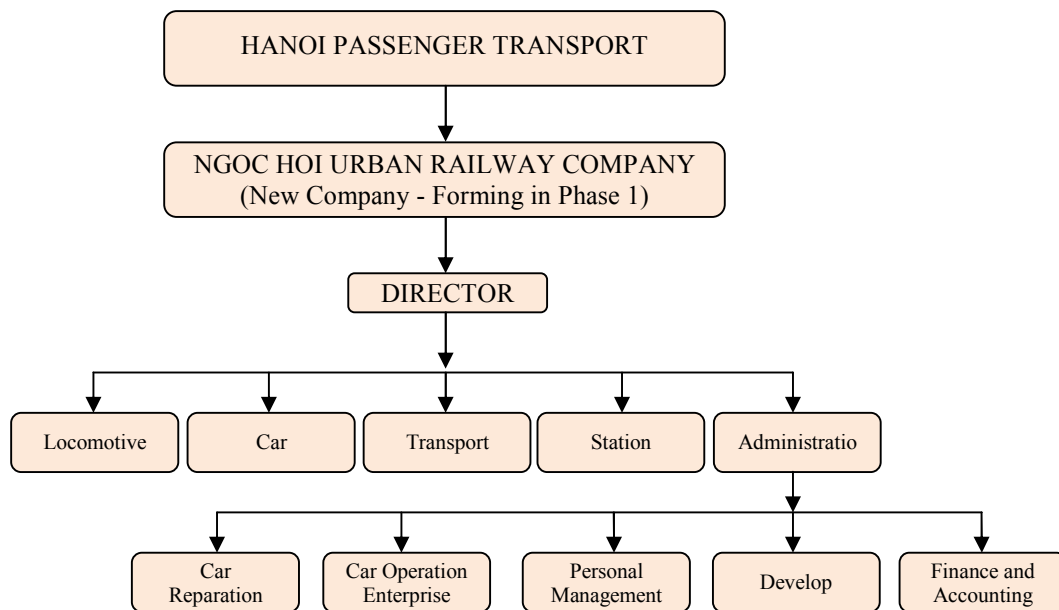
a) Jurisdiction task and organization structure

- In FS of Phase 1 and Phase 2a, it has been considered that two companies including (1) Ngoc Hoi Infrastructure Management Company (Fig. 2.4.7.3-1), and (2) Ngoc Hoi Urban Railway Company (Fig. 2.4.7.3-2) will be established as VNR’s organizations/ parts for the operation & maintenance management of Line 1. “Ngoc Hoi Infrastructure Management Company” is due to be established as a direct control subsidiary of VNR, and "Ngoc Hoi Urban Railway Company" as a subsidiary of "Hanoi Passenger Transport Company" which is taking charge of passenger transport as a subsidiary of VNR.
- However, it was then argued that asset utilization company (Railway Property management company), which develops such as the used lands around Hanoi Station, should be established. But, establishment of "VR Land Company" which takes charge of non-rail business and real estate as VNR’s organization is also considered. It is not determined whether this asset utilization company shall be O&M company’s organization or VNR’s whole organization.



Source: JKT

Fig. 2.4.7.3-1 Organization Chart of Ngoc Hoi Infrastructure Management Company



Source: JKT

Fig. 2.4.7.3-2 Organization Chart of Ngoc Hoi Urban Railway Company

b) Staff organization

- The personnel number of Phase 1, which combines two companies mentioned about, is "441 persons" On the other hand, the personnel number in FS of Phase 2a are "increase of 95 persons", and the total are expected "537 persons".
- At the proposal of the JKT, the total personnel number of two companies ((1) Ngoc Hoi Management Company and (2) Ngoc Hoi Urban Railway Company) will be more than "2,000 persons" In comparison with the planned staffs needed for Hanoi Line 2 (41.5 km) and Ho Chi Minh City Line 1 (19.7 km), to which operation kilometers are similar, the required staffs of the two companies mentioned above is too large. These personnel number are not needed at the urban railway fully equipped with safety and laborsaving equipment. Therefore, this matter should be reconsidered. The personnel number of related urban railway is shown in Annex 7.
- The number based on FS of Phase 1 and of Phase 2a was used, and the crew's number accompanying reexamination of transport planning were reviewed. The partially corrected personnel number (Table 2.4.7.3-1) accompanying this reexamination was used in the assessment of financial and economic efficiency,

Table 2.4.7.3-1 Number of Staff

Section	No. of Staff (2020 year)				2036	2045
	Phase 1 (FS)	Phase 2a (FS)	Modification (crew)	Total		
Director	1	1		1	1	2
Management Unit	128			128	128	128
Operating Unit	142	95	64	301	346	434
Depot & Works	171			171	171	171
Total	442	95	64	601	646	735

Source: JICA Team

c) Issues related to the laws

- VNR or its related company has the right of land use under elevated railway pursuant to "the railway and budget laws ((1)35/2005-/QH11 (railway) and (2)1/2002-/QH11 (national budget))", which is greatly concerned with non-railway revenue.
- It poses a problem whether approval of MOT on certification for the training center as driving educational facilities, and training time for driving license can be obtained.

2) Arrangement of Financial Affairs, Budget Structure, and Technical Standards

a) Financial Affairs and Budget Structure

The issues and reexamination of the financial and economic efficiency assessment and the income-and-expenditure perspective are as follows:

Fare Level

About fare level used as the basis of the company revenue, the starting fare in 2019 is 6,000VND in FS of Phase 2a. The fare is based on the current bus fare. The current bus fare is 3,000VND so the urban railway fare is calculated 6,000VND in 2019 by the inflation rate of 8 % and after that by the annual inflation rate of 5 %. Although there are some views of the fare setup method such as (1) flat fare, (2) fare according to section, and (3) distance-based fare, the flat fare system have been adopted for the first four or five years , and when it shall be stabilized after that, it is considered to use distance-based fare. However, student discount and commuter discount in the case of bus transport are rather high. Therefore, these discount rates are not considered in the revenue account of Line 1. As the base of the company management, fare setup not only is simply dependent on bus fare, but also should be taken into consideration of further examinations including affordability for the railway fare of people living in Hanoi and the conversion incentive to the railway from motorbikes, etc. the fare setup method of other urban line is shown in Annex 8 as reference.

AFC (Automatic Fare Collection Systems) and IC Card system

The specification of AFC and IC card should be arranged so that users can use the same IC card whether or not the management company is the same in the urban railway constructed in Hanoi from now on,. The specification of AFC and IC card was mentioned in "SAPI for establishment of an organization for the O&M of MRL in Hanoi" Hanoi and Ho Chi Minh City People's Committee asked MOT to issue regulations related to the specification of AFC and IC card. Therefore, final decision

of the specification is waiting the regulations. Basic Requirements for the Specifications of AFC and Contactless IC Card is as follows.

Table 2.4.7.3-2 Specifications of AFC and Contactless IC Card

Items	Description	Remarks
Communication type	Communication between AFC and contactless IC card is through telecommunication. There are some types of communication registered as international standard. Communication type of AFC and IC card should be compatible among the integrated lines. IC card requires high performance type in order to reduce the number of AFC and to secure the money in the card.	It has been said so far that high performance IC card is costly. But the price is getting cheaper these days.
Data format	Data contents and its format in IC card should be common.	

Source: JICA survey team

Non-rail revenue and cost

In FS of Phase 2a, 20% of non-rail revenue is expected from the first year of operation commencement. It is necessary to get 5% in the first year of operation commencement and after that 10%, 20%, of gradual revenue increase. Moreover, only the revenue of non-rail business is counted, but the cost is not expected. Non-rail business cost should be expected about at least 60% of non-rail revenue.

Personnel expenses cost

The personnel expenses unit price used in FS of Phase 1t was also adopted in FS of Phase 2a, but the unit price itself was quite low as shown Table 2.4.7.3-3, and we decided to reconsider the unit price. Incidentally, the unit price (1 personnel /1 month: million VND, 2011 year) of tentative calculation in this time are ①Director = 50.0 ②Managing Unit and Operating Unit = 11.0 ③Depot & WS = 9.0.

Table 2.4.7.3-3 Personnel average cost

	2015 year	2020 year	2030 year
Phase 1 + Phase 2a Average cost /1 personnel /1 month (million VND) (US\$)	4 (192)	5.5 (264)	7 (336)

Source: JICA survey team

Power cost

Although power cost of Phase 1 was reconsidered in FS of Phase 2a, the cost was too high. We decided to correct Power cost.

Table 2.4.7.3-4 Power cost (Billion VND)

	2015	2020	2030	-
Power cost in Phase 1 FS	21.1	36.5	95.6	-
Power cost in Phase 1 + 2a FS	397.3	519.2	866.6	
Estimation in this time	59.2	73.9	92.7	128.6

Note: The inauguration time of Phase 1 and Phase 1 + 2 is different, but we assumed it is the base year.

Source: JICA Survey Team

Replacement cost

We considered renewal cost of E&M and rolling stocks because it was not considered in Phase 1 FS and Phase 2a FS report.

Owner of property

Regarding the ownership of railway assets, FS of Phase I and Phase IIA mentions that the infrastructure belongs to the Government and VNR just operates trains by using Government's assets. Therefore, the assets, such as elevated-railway infrastructure, track, and rolling stock to be constructed and purchased in the project, shall be possessed by the Government. Also at this meeting with VNR, it is said that the new O&M Company must pay usage fees of infrastructure and rolling stock for the Government after the inauguration.

However, when the assets belong to others, it is usually said that the asset owners hesitate to pay the maintenance expenses. It is expected that O&M company has the assets as much as possible to ensure the safety of train operation as the urban railway, and come towards an independence management. In the case of the Ho Chi Minh City No. 1 line under present plan, or the Hanoi No. 2 line, owner of rolling stock and E&M is taken as the O&M company. Although in this financial and economic efficiency assessment, we decided to carry out the policy based on VNR's opinion. As a future subject, however, in order to ensure the safety of train operation as urban railway and to aim at independence management, the possession method of the assets should be examined.

The income-and-expenditure perspective of the O&M company

The reexamination of income and expenditure, and the assessment of financial and economic efficiency based on some assumptions are mentioned at 2.4.8. But the further detailed examination of income-and-expenditure perspective is required to

decide whether the urban railway company can become truly independent. The reconsideration of fare setup based on reexamination of demand estimate including the conversion policy from the motorbike not only to a No. 1 line but the whole urban railway of Hanoi, detail checking of cost and the possession method of the assets is also required.

b) Technical Standards (operation, maintenance management, etc.)

Rolling stocks and train operation concerned

It is inexperienced in maintenance of EMU in Vietnam. However, because the direct-current motor of DL19E is maintained, it is thought that maintenance of an AC (alternate-current) motor is easy. The measure against failure of EMU is to replace apparatus parts, not carry out part repair. Because high-voltage electricity is still supplied as maintaining EMU, it is very important to take safety measures and make manual preparation for the maintenance work at the time of turning on electricity.

Until now it is only a single-track operation, but in the case of urban railway, it will become high-density and high-speed train operation. Because the train protection of the double-tracked section, and the measure against abnormalities as various kinds of apparatus failures happening, become important at the time, the sufficient education and training should be provided.

The computer systems for operating CTC of train traffic control system and making changes of train operation plan are not in the conventional VNR as mentioned above. The related personnel's education, etc. are required, especially for the computer systems, and the technical instruction by the engineer of construction company is needed three years after the commencement of operation.

Management of civil infrastructure and track

Corrosion of reinforcing steel due to cracking has a big impact on the durability of concrete structures. It is therefore necessary to repair any cracks found during inspections. The durability of steel deteriorates by the influence of cracking caused by corrosion. Regular inspections and appropriate repairs conducted in accordance with management manuals are necessary to maintain the durability of steel structures.

Because a certain period is necessary to stabilize the track as maintaining “elastic tie directly fastened track”, track experts need to instruct the method of inspection and maintenance, and provide sufficient education and training to related engineers in the period.

Electric power and Telecommunication system

A railway company should train the workers so that they can repair work after the revenue service started. If OCS was fractured at operation time, there were many examples which require most time to repair OCS even in Japan. For example, it is recommended for a railway company to install the OCS with the dual gauge track in Ngoc Hoi area. It is recommended for a railway company to invites the expert on the

railway power system of the manufacturer who supplies equipment and to educate workers. (It is preferred to continue for three years after equipment completion.)

A railway company should educate the operation staff of power SCADA (Supervisory Control And Data Acquisition) which is installed in OCC after the revenue service started. For example, it is recommended for a railway company to invites the engineer of the manufacturer who supplies equipment and to educate workers by the engineer. It is preferred to continue for three years after equipment completion.

A railway company shall have the countermeasures to reduce the influence by failure after an operation started, and also cope with the unexpected risks. For example, it is recommended to reside a expert on the railway power system in Hanoi after the construction completed for 3 years. The expatriate shall grasp the operational situation of electrification system, cope with the unusual situation, contact the manufacturer and the construction company if necessary, etc.

The railway operation company should make the educational system for electrified railway vocational training by obtaining the support from a foreign country before the revenue service. This system includes the OJT and the OFF-JT. For example, it is recommended to establish the courses such as the newcomer education classified by course at the time of entrance into a company (18 years-old course, university graduate, college graduate, etc.), the elementary course for one to three years after entrance into a company (education of the whole equipment), the middle course for three to five years after entrance into a company (educational contents were subdivided), the special courses (the operator of the maintenance wagon, a radio engineer, etc.). The existing school can be used for OFF-JT education. It is recommended to have the educational course dedicated for engineers who work on the electrified railway. Apparatus and equipment required for HURC1 is arranged on this vocational training course. It is recommended for a railway company to invites the engineer of the railway company to educate workers. (It is preferred to continue for three years after equipment completion.)

It is necessary to give technical assistance (education and training) for the maintenance staff of signal and telecommunication facilities about the outline (especially -- 3 line track) of the signal and telecommunication facilities, inspection manual, interlocking table, disturbance research and etc.

Education and Training

About the education of the related personnel in each section described above, JKT association has prepared and paid much attention on the "Education & Training Plan for Operation and Management Staff" (Table 2.4.7.3-5, 2.4.7.3-6)

The education-and-training plan of the staffs including top management, other management and crew formulated in detail. In this plan, overseas training and its expense in Japan are contained. For the domestic training in Vietnam, (1) preparation of regulations, manuals, and textbooks, (2) training at VNR Vocational college, and (3) dispatch of the lecturer to OJT training etc. are considered. The support system after operation commencement is also taken into consideration. However, number of

staffs for education and training stated at "staff organization" is on the basis of 2000 staffs. Therefore, if this number of target staffs is examined carefully, the number for education & training and expense is thought to be changed also.

The computer systems for operating CTC of train traffic control system and making changes of train operation plan are not in the conventional VNR as mentioned above. Also in Japan, the related personnel are dispatched to manufacturer etc. and are in charge of the technical acquisition from a construction stage. Also in the Hanoi City urban railway No.1 line, how to develop these systems engineers is inquired.

These differences of education and training plan should be adjusted from now on.

Table 2.4.7.3-5 Education and training plan for preparing commercial operation

Item	Details	Contents
1. Overseas training in Japan		<ul style="list-style-type: none"> • Operation Dept. —Driver, Conductor, Train operation personnel at station or Depot (about 40 persons) • Maintenance Dept. —Rolling stock, Track maintenance, Power supply, Signaling, Telecommunication (about 40 persons)
2. Training in Vietnam	1) Preparation of Regulations, Manuals, and Textbooks	<ul style="list-style-type: none"> • TC and contractors will draft the regulations for train operation and the maintenance and inspection of facilities jointly with the core staff • Core staff shall be tasked with preparing the textbooks and manuals to be used at the training center and in the field with the help of TC and contractors.
	2) Training at Training Center	<ul style="list-style-type: none"> • TC and contractors will be the instructors to train the core staff at the training center. They will also support the core staff, who will then train the operation and maintenance staff.
	3) On-the-job Training	<ul style="list-style-type: none"> • Similar to the academic training at the training center, TC and contractors will train the core staff to be the instructors for the operation and maintenance staff. After the training, the core staff will provide on-the-job training to the operation and maintenance staff with the help of TC and contractors. • As for the OCC, however, the dispatchers need to fully understand the functions of various dispatching systems, including the traffic control system and electric power monitoring panel, and be able to accurately dispatch and give instructions to the field when an emergency occurs. Therefore, TC and Contractor will be the instructors for on-the-job training of the dispatchers, rather than just supporting the core staff.
	4) Support System after the Start of Train Service	<p>After the start of train service, any malfunctions related to the rolling stock, railway structures, and electric-related facilities will be taken care of by their respective contractors during the warranty periods. Furthermore, TC and contractors will be deployed to Vietnam for the first six months after the start of train service to provide technical support for the various systems.</p>

Notes: Regarding the education plan of JKT, education plans of both (1) Technical Consultant and (2) Contractor are considered.

Source: JKT

Table 2.4.7.3-6 Education and training schedule for preparing commercial operation

Item	2013	2014	2015	2016	2017	2018	2019
Main schedule for the Start of Service	Outline	Detailed Planning	Establish start-up preparation company	Establish start-up preparation Depot	Establish Training center	Individual System Test Total System Test & Approval	Open practical training Start of Service
Prepare related regulations, and text books & manuals		Establish related regulation (Made by Core staff with TC(★) & Contractor) ★ TC: Technical Consultant		Prepare textbooks & manuals for operation (made by Core staff supported by TC & Contractor)		Prepare textbooks & manuals for maintenance (made by Core staff supported by TC & Contractor)	
Education and Training	Primary training by O&M company	For Core staff				For Driver and Dispatcher For Conductor, Station and Depot operation staff	For Maintenance staff
	Education and training in the Training center			Core staff (Operation) Core staff (Maintenance)		Driver & Dispatcher Conductor & Station staff	Maintenance staff
	Oversea training			Core staff (Operation) Core staff (Maintenance)			
	OJT			Core staff		Operation Maintenance	

Source: JKT

2.4.7.4 Provision of technical support for the executing and operating agencies

1) The personnel for Line 1 operation

The personnel required for Line 1 operation should be produced by increasing the efficiency of the present VNR as much as possible. The present VNR itself has 40,000 or more personnel, and it is hard to say this is an efficient management even if the number of Vietnamese railway staffs is compared with that of Asian nations. The staffs of not only Line 1 but also many other urban railway lines built in Hanoi and Ho Chi Minh City from now on should be produced by increasing the efficiency of the present VNR's staffs as much as possible. As for the present VNR, most of the maintenance expense for civil infrastructure and track are provided by the Government. From viewpoint of the independent railway company, the matter mentioned above means that VNR has not become independent. Although it is surely difficult for the public transportation system to be managed without assistance of the Government, the target of independent management should not be thrown away as much as possible. It is thought that the subject of future VNR is how to increase the efficiency of VNR's management and staffs.

As a concrete method, there are many means of personnel rationalization which were once performed by Japan National Railway. For example, (1) re-examining standard of on-train's staff, (2) rationalizing number of personnel by modernizing CTC and interlocking device of stations, (3) rationalizing the number of shunting staffs by train radio, and (4) reducing maintenance staffs by introducing large-sized maintenance machine for track maintenance.

2) Company setup procedures and education & training system for employees

a) About company setup procedures

VNR has established many companies until now, and there is no problem occurring during the setup process. The appropriate time of establishing Company for preparing commercial operation is considered prior to the beginning of education and training of related personnel. By the education and training schedule which JKT formulated, education and training of the core staff are planned in about four years prior to starting revenue service. If based on this, the necessity for incorporation procedures will arise in four to five years about four years prior to starting revenue service.

b) Education and training system of employee

In the No.1 line, many new technologies which are used for the first time or currently seldom used in Vietnam, will be introduced, such as electrification, CTC, electronic linkage, ATP, train radio, elastic directly fastened track, continuous welded rail, and track circuit. For this reason, it is required for the company to provide training for related staffs to master new technology, and this training must be performed from the construction stage.

Moreover, these technical education and instruction have to be performed continually even after commencement of operation, including accident prevention education.

It is very important to establish the education and training structure of these related engineers as education organization, such as the inside organization of the company or a training center. In particular, since the consciousness of necessity for OJT (on-the-job training) which has high education effect is poor in VNR, it is necessary to strengthen this point. About the qualification of the present railway staffs, which is shown clearly in the law, rolling stock drivers has been drivers throughout their life.

After joining the railway company, if an employee may work at the same job until retirement, his motivation will fall down. For this reason, in order to increase efficiency and motivation of employees, railway companies in Japan have provided the training system which enables employees to work at various jobs as Station -> Conductor -> Driver, etc.

In the Vietnamese case, because of mentioned restrictions, it is impossible to take these measures flexibly. It is thought the education & training system should be assigned for the company in the future.

3) Driving license issue and approval of MOT about certification for the training center as driving educational facilities

The discussion about the driving license with MOT has already been performed by the Ho Chi Minh City Line 1. Since there is no law of driver license for urban railway now, The same procedure as VNR is needed as a rule. That is, three steps are needed, including ①Certificate of finishing required courses and skill training, ②experience of the assistant driver for 24 months, and ③pass of the examination that VNR carries out. Moreover, about the lecturer experience, it is supposed that the experience in actual business for five years is required. If the present view of MOT is applied, it is

worried that a long-term training period for drivers, in the urban railway equipped with security equipment is required. This matter will not be considered in Japan. We think that driver assistant's experience in particular is practically meaningless. Because it is the loss of expense and time for Vietnam, the suitable training time should be arranged. VNR should solve this problem positively.

4) Technical assistance for educating and training related engineers

The personnel training plan for the preparation of the No. 1 line is already made by JKT associations above mentioned. The total expenses that these take will become remarkable, and this training is due to start in about four years prior to starting revenue service. It is needed to provide budget securing measures in order not to miss that timing.

In addition, although the VNR Vocational College's building is improved, the education & training equipment is very old and even out-of-date. The equipment cannot meet demands of educating staffs for urban railway. The equipment supply for improving education and training equipment including operation simulators etc. should be considered by a certain method. And with these equipments supply, dispatch of urban railway experts is also needed as lecturer. If this is fixed, it will be possible to also accept urban railway staffs other than Line 1.

2.4.8 Setting of Operation and Effect Indicators and Review of IRR

2.4.8.1 Setting of Operation and Effect Indicators

This preparatory survey sets up the same indicators that were selected in the JICA appraisal mission of the year 2007, and targets the respective figures for the year 2022 as shown in Table 2.4.8.1-1 based on the demand forecast and train operation planning of this survey (see Annex 1 and Annex 3) that details the preconditions and data used for the forecast and planning).

Table 2.4.8.1-1 Indicators

Indicators		Unit	Target Year 2022
Operation	Volume of transportation	Passengers-km/day	1,939,000
	Number of running trains	Trains/day	244
	Operation Rate	%	85.7
	Running distance of train (4,465km/train-sets x 6 trains/train-set)	Train-km/day	26,790
Effect	Running time between Ngoc Hoi and Gia Lam	Minutes	37

Source: JICA Survey Team

Operation rate of the above table is computed below.

The composition of 84 trains operation (6 trains x 14 train-sets) is as below.

- The number of trains under operation 72 trains (6 trains/train-set x 12 train-sets)
- The number of trains for spare 6 trains (1 train-set)
- The number of trains under maintenance 6 trains (1 train-set)
- The total number of trains (procurement) 84 trains

As assumed above

$$\begin{aligned} \text{Operation Rate} &= (\text{Operating trains}) / \text{Procured train} \times 100 (\%) \\ &= 72 / 84 \times 100 = 85.7 (\%) \end{aligned}$$

2.4.8.2 Review of IRR

1) Findings through Interview on F/S Phase 2a Report

The JICA Survey Team interviewed to TRICC regarding Chapter 12 (Assessment on Financial and Economic Efficiency) of the FS Phase 2a Report prepared by TRICC (hereafter “the Report”). The interview revealed the wrong manners lying in the analysis as shown in Table 2.4.8.2-1, so that the JICA Survey Team recommended TRICC to apply the appropriate manners also shown in Table 2.4.8.2-1; the economic and financial analysis in this preparatory survey is to be conducted in line with these manners.

Table 2.4.8.2-1 Problems and Appropriate Manners

Problems		Appropriate Manners for Correction
1)Overall	The price of each year is adjusted with inflation rate estimated for respective each year.	The said price must be consistent with the base year's price (base year: 2011).
2. Economic Evaluation		
1)Benefit	Demand forecast methodology is unclear. Benefit derived from travel-time-savings includes non-business savings as well.	The said forecast and benefit must be reviewed.
2)Project Cost (Investment and O&M Cost)	Replacement cost of such as E&M is un-counted.	The said cost must be estimated and included in the project cost.
	Leasing fee for the Government-owned assets is counted.	The said fee must be excluded because of double counting; the investment cost is already counted.
3. Financial Evaluation		
1)Revenue	Train fare is set up based on bus fare only.	The fare must be set up taking into consideration such as taxi fare and motorbike driving cost as well.
	Non-fare revenue that is estimated at 20% of fare revenue is too high.	The appropriate level should be 10% of fare revenue according to the experiences in other Asian cities.
2) Project Cost (Investment and O&M Cost)	Depreciation cost is counted.	The said cost must be excluded because of double counting.
	Non-fare business cost is uncounted.	The said cost must be included in the cost.
3) Debt Payment of ODA Loan	Borrower and debt payment of ODA loan is unclear.	The ownership of the project assets and the borrower of ODA loan must be clarified even if provisionally. (Note: clarified through the interview with VNR on 4 th of January 2012)

Source: JICA Survey Team

2) Economic Analysis

The objective of the economic analysis is to review Chapter 12 of the F/S Phase 2a Report and to re-assess the project from the economic view point of the country. For economic analysis, "Economic Internal Rate of Return (EIRR)" is calculated so as to ascertain the economic viability of the project. For the economic analysis, 10% of opportunity cost of capital is applied by referring to the project reports of JICA and WB. And the evaluation time horizon is set at 30 years after starting operation.

a) Subjects for Analysis

This preparatory survey makes an economic analysis of "Phase1+2a". In addition but only tentatively, the analysis of "Phase1+2a+2b" is also made, assuming that the "Phase 2b" and the "Phase1+2a" would start the operation simultaneously. The results of the economic analysis are presented in Table 2.4.8.2-17 respectively.

b) Preconditions and Assumptions

EIRR is calculated based on the economic benefit and cost. To estimate the benefit and cost, the following preconditions and assumptions of Table 2.4.8.2-2 are applied.

Table 2.4.8.2-2 Preconditions and Assumptions

Items	Preconditions and Assumptions	
1. Prices	As of October 2011	
2. Exchange Rate	US\$ 1 = VND 20,628	Source: JICA General Guidelines for the 2 nd batch of FY 2011
	US\$ 1 = JPY 77.2	
	VND 1 = JPY 0.0037	
	EURO 1 = VND 26,960	As of end December 2011
3. GDP/capita of Hanoi	VND 37,000 in 2010 (disclosed by HPC)	
4. GDP Real Growth Rate (Hanoi)	2011: 5.6%, 2012: 5%, 2021: 4.5%, 2031: 4%, 2041: 3.5%	
5. Population of Hanoi	6,562 million in 2010 (Statistical data of GSOV)	
6. Population Growth Rate (Hanoi)	1.39% (Average rate of 2008-2010)	
7. Conversion Factor	Conversion rate of 0.9 for the local cost	
8. Economic Life ^(note)		
1) Civil & Architecture	>30 years	
2) EMU	30 years	
3) E&M: Signal & Telecommunication	10 years	30% of total E&M investment cost are assumed to be replacement cost in every 14 years. ^(note)
4) E&M; Power supply	40 years	
5) Tracks	30 years	
9. Salvaged Value	The residue value of investment cost of EMU and E&M: to be salvaged at the 30 th year.	

Note: Elaborated by JICA Survey Team from “SAPI for Establishment of an Organization for the Operation and Maintenance of Metropolitan Railway Line in Hanoi City, November 2011, JICA” and “The Project for Support on Set up of Operation & Maintenance Company of Urban Railways in Ho Chi Minh city, December 2011, JICA”

Source: JICA Survey Team

c) Economic Benefits

The following 3 benefits are selected and quantified in monetary bases as economic benefits for this preparatory survey.

- (1) Saving of Time Travel Cost (TTC)
- (2) Saving of Vehicle Operation Cost (VOC)
- (3) Reduction of CO2 Emission

Saving of TTC

The saving of TTC is calculated as follows:

$$\text{Saving of TTC} = (\text{Saving of Travel Time per year}) \times (\text{GDP/capita/hour})$$

Table 2.4.8.2-3 presents “Saving of Travel Time” (see Annex 1 for the data used to compute saving of travel time).

Table 2.4.8.2-3 Saving of Travel Time

Unit	Particulars	2020	2030	2040	2049
Hours/day (thousand)	Motorbike	66.0	87.2	117.2	158.9
	Passenger Car	39.5	79.8	142.6	237.4
	Bus	39.4	66.8	112.3	177.5
	Total	144.9	233.8	372.1	573.8
Hours/year (thousand)		52,889.8	85,336.2	135,813.4	209,425.5

Source: Demand Projection of JICA Survey Team

Table 2.4.8.2-4 presents “GDP/capita per hour”.

Table 2.4.8.2-4 GDP/capita per Hour

Items	Unit	2011 Base Year	2020	2030	2040	2049
GDP	VDN trillion	256.3	397.6	617.5	914.1	1,245.8
Population	million	6,653	7,533	7,851	9,926	11,238
GDP/capita	VDN million	38.5	52.8	71.4	92.1	110.9
Working Time	Weeks/year	Assumed to be 47				
	Days/week	Assumed to be 5				
	Hours/day	Assumed to be 8				
GDP/capita	VDN/hour	20,500	28,100	38,000	49,000	59,000

Source: JICA Survey Team

The yearly amount of “Saving of TTC” is quantified monetarily as shown in Table 2.4.8.2-5 that is computed from the above Table 2.4.8.2-3 and Table 2.4.8.2-4.

Table 2.4.8.2-5 Saving of TTC

Items	Unit	2020	2030	2040	2049
Working Trip	%	Assumed to be 50 ^(note)			
Saving of TTC	VND billion/year	743	1,621	3,327	6,178

Note: The same assumption used in “Feasibility Survey on Hanoi Elevated Railway Project, Ngoc Hoi – Yen Vien, 2005, JETRO” is applied.

Source: JICA Survey Team

Saving of VOC

The saving of VOC is calculated as follows:

$$\text{Saving of VOC} = (\text{Travel Distance per year}) \times (\text{VOC/km})$$

Table 2.4.8.2-6 presents “Travel Distance per year” (see Annex 1 for the data to compute vehicles/day and average travel distance of km/day).

Table 2.4.8.2-6 Travel Distance

Unit	Particulars	2020	2030	2040	2049
Vehicles/day (thousand)	Motorbike	108.1	129.0	156.3	188.7
	Passenger Car	24.3	44.7	73.9	111.9
	Bus	1.2	1.9	3.0	4.3
Average Travel Distance (km/day)		7.74			
Vehicle-km/year (million)	Motorbike	305.5	364.5	441.5	533.2
	Passenger Car	68.6	126.3	208.9	316.1
	Bus	3.4	5.5	8.4	12.1

Source: JICA Survey Team

Table 2.4.8.2-7 presents “Vehicle Operation Cost/km”.

Table 2.4.8.2-7 Vehicle Operation Cost

Items	Particulars	Unit	Motorbike	Passenger Car	Bus
1. Operation Distance		Km/year	7,000	12,000	77,000
2. Operation Cost					
1) Personnel		VND million	-	-	115.2
2) Repair and Maintenance	1) Spare parts		0.2	34.3	50.0
	2) Tyre		0.1	1.9	26.3
	3) Fuel		5.4	26.0	528.5
	4) Oil		0.5	0.9	12.0
Total			6.1	63.2	616.9
3) Insurance			0.1	8.7	18.6
4) Overhead					36.6
5) Depreciation			1.5	57.2	83.3
Total			7.6	129.1	870.6
Operation Cost/vehicles-km		VND	1,100	10,800	11,300

Source: Elaborated by JICA Survey Team based on the F/S 2a Report of TRICC

Table 2.4.8.2-8 presents the yearly amount of “Saving of VOC” that is quantified monetarily from the above Table 2.4.8.2-6 and Table 2.4.8.2-7.

Table 2.4.8.2-8 Saving of VOC (VND billion)

Vehicles	2020	2030	2040	2049
Motorbike	336	401	486	587
Passenger Car	740	1,364	2,255	3,413
Bus	39	62	95	137
Total	1,115	1,827	2,836	4,137

Source: JICA Survey Team

Reduction Value of CO₂ Emission

The reduction value is calculated as follows:

$$(1) \text{ Reduction Value of CO}_2 \text{ Emission} = (\text{Reduction of CO}_2 \text{ Emission per year}) \times (\text{CER Price})$$

(Note) CER : Certified Emission Reductions

Table 2.4.8.2-9 presents the reduction value of CO₂ emission (see Chapter 4.2 for the data used to compute the reduction amount of ton/year).

Table 2.4.8.2-9 Reduction Value of CO₂ Emission

Items	Unit	2020	2030	2040	2049
Reduction of CO ₂ Emission <u>1/</u>	Ton/year	11,408	20,196	38,052	64,155
CER price <u>2/</u>	EURO/ton	4			
	VND/ton	107,840			
Reduction Value	VND billion	1.2	2.2	4.1	6.6

Source: 1/ CO₂ Emission – JICA Survey Team and.

2/ CER - Web of PointCarbon, secondary CER OTC future price of Dec. 2012 as of end 2011

d) Economic Project Cost

The economic project cost consists of 1) initial and additional investment cost, 2) replacement cost, and 3) operation and maintenance (O&M) cost. Price escalation and the taxes such as import tax and VAT are disregarded in the economic project cost. The local cost is discounted by applying the conversion factor of 0.9 as presented in Table 2.4.8.2-2. The ongoing engineering service project costs are disregarded as a sunk-cost in this survey.

Initial and Additional Investment Cost

Table 2.4.8.2-10 and Table 2.4.8.2-11 present the initial investment cost (investment before starting operation) and the additional investment cost (investment after starting operation) respectively.

Table 2.4.8.2-10 Initial Investment Cost

(This part was deleted to disclose information in certain period)

Table 2.4.8.2-11 Additional Investment Cost after starting operation

(This part was deleted to disclose information in certain period)

Replacement Cost

The initial E&M cost is assumed to be replaced in every 14 years after starting operation as mentioned in Table 2.4.8.2-2 (preconditions and assumptions). Table 2.4.8.2-12 shows the replacement cost of E&M.

Table 2.4.8.2-12 Replacement Cost of E&M

(This part was deleted to disclose information in certain period)

O&M Cost

The organizational structure of operation and management is discussed in Chapter 2.4.7. The O&M cost is computed on the basis of the said structure. In this survey, the O&M cost consists of 1) personnel cost, 2) power cost, 3) repair and maintenance cost and 4) other miscellaneous cost. The contents of respective costs are illustrated in tables below.

Table 2.4.8.2-13 Personnel Cost

Items	Particulars	2020	2036	2045
No. of Staff 1/	Directorate	1	1	2
	Managing Unit	128	128	128
	Operating Unit	301	346	434
	Depot & Workshop	171	171	171
	Total	601	646	735
Monthly Salary 2/	Directorate	50 VND million		
	Managing Unit	11 VND million		
	Operating Unit	11 VND million		
	Depot & Workshop	9 VND million		
Personnel Cost	VND billion	75.7	81.6	93.9

Source: 1/ Elaborated by JICA Survey Team based on the operation planning and F/S 2a Report of TRICC.

2/ Elaborated by JICA Survey Team based on "SAPI for Establishment of an Organization for the Operation and Maintenance of Metropolitan Railway Line in Hanoi City, November 2011, JICA

Table 2.4.8.2-14 Power Cost

Year	2020-27	2028-36	2037-45	2046-49
VND billion	59.2	73.9	92.7	128.6

Source: JICA Survey Team (see Chapter 2.3.3.6 for details)

Table 2.4.8.2-15 Repair and Maintenance Cost

Assumptions	E&M <u>1/</u>	1.0% <u>2/</u> of procurement cost from the 3 rd year of operation			
	EMU <u>1/</u>	1.5% <u>2/</u> of procurement cost from the 3 rd year of operation			
	Other Assets	0.5% <u>2/</u> of initial investment cost excluding E&M and EMU			
Year		2020-21	2022-34	2035-47	2048-49
VND billion		146	296	385	478

1/ 2-years' spare parts of E&M and EMU are included in the initial procurement cost.

2/ The same figures used in "SAPI for Establishment of an Organization for the Operation and Maintenance of Metropolitan Railway Line in Hanoi City, November 2011, JICA" are applied.

Source: JICA Survey Team

Table 2.4.8.2-16 Other Miscellaneous Cost

Assumptions <u>1/</u>	30% of (Personnel + Power + Repair & Maintenance) Cost			
Year	2020	2030	2040	2049
VND billion	80	139	163	204

1/ The same figures used in "SAPI for Establishment of an Organization for the Operation and Maintenance of Metropolitan Railway Line in Hanoi City, November 2011, JICA" are applied.

Source: JICA Survey Team

e) Economic Evaluation

The EIRR is figured out from the above economic benefits and costs. Table 2.4.8.2-17 presents the result of "Phase 1+2a" (for details, see Annex 8 and 11). And the tentative result of "Phase 1+2a+2b" is also presented in Table 2.4.8.2-17. The EIRR of both cases resulted in the level far below 10% of the opportunity cost of capital. Consequently, in order to attain the feasible level, a substantial amount of benefit increase and cost reduction is expected. However, the substantial benefit-increase is obviously unrealistic because it must be followed simultaneously by a significantly large increase of base factors such as demand, GDP/capita and VOC. The cost reduction is deemed to be more realistic; accordingly, as for reference, a reduction amount to attain 10% of EIRR is tentatively calculated and presented in Table 2.4.8.2-17.

Table 2.4.8.2-17 Economic Evaluation

Items	EIRR	Initial Investment Cost Reduction to attain the Feasible Level (EIRR: 10%)
This Preparatory Survey		
Phase 1+2a	3.3%	Original cost: 61 trillion VDN → Reduction to 21 trillion VDN (65% reduction)
For Reference ^(note)		
Phase 1+2a+2b	6.2%	Original cost: 75 trillion VDN → Reduction to 56 trillion VDN (25% reduction)

Note: See Annex 11 for the data used to compute.

Source: JICA Survey Team

3) Financial Analysis

The objective of the financial analysis is to review Chapter 12 of the F/S 2a Report and to re-assess the project from the financial point of view of an implementation organization. For financial analysis, “Financial Internal Rate of Return (FIRR)” is calculated so as to ascertain the financial viability of the project. For the financial analysis, the evaluation time horizon is set at 30 years after starting operation. And 10% of opportunity cost of capital is applied considering the current real interest rate of Vietnam: that is, a rate of 12-months’ inter-bank interest rate (20%) with a deduction of annual inflation rate (10%).

a) Subjects for Analysis

Through the discussion with VNR, the current concept regarding the ownership of the project assets and the borrower of the loan was revealed as shown in Table 2.4.8.2-18; that is, Vietnam Government (VG) owns all project assets, creates a new operation company (NC) and leases this NC these assets. According to this VNR concept, the financial analysis is carried out for this NC as a “Base Case” in this preparatory survey.

- Base Case: NC operates only; however, VG owns all assets.

Table 2.4.8.2-18 Current Concept of VNR regarding Owner of Assets and Borrower of Loan

Assets	Owner	Borrower of Loan	Leasing Fee	Repair	Renewal
1. Infrastructure	VG	VG	Between 8% and 10% of Fare Revenue	VG	VG
2. Stations					
4. E&M					
3. EMU				NC	

Source: JICA Survey Team

In addition to the above Base Case, the following 2 subjects are analyzed as references in this preparatory survey.

- Reference 1: NC owns all assets with self-finance and operates.
- Reference 2: NC owns E&M/EMU with soft loan, and operates.

Additional conditions:

- 1) Exemptions of taxes due in the initial investment stage
- 2) Government subsidy for additional procurement of EMU after starting of operation

In addition but only tentatively, the analysis of “Phase1+2a+2b” is also made, assuming that the “Phase 2b” and the “Phase1+2” would start the operation simultaneously and NC would own all assets and operate. The results of the financial analysis are presented in Table 2.4.8.2-22 respectively.

b) Revenue

Two types of revenue are counted in this analysis: that are, fare revenue and non-fare revenue. One-time fare is set at 7,500 VDN based on the information from the report “SAPI for Establishment of an Organization for the Operation and Maintenance of Metropolitan Railway Line in Hanoi City, November 2011, JICA”. The fare is a midpoint level between the minimum fare of bus (3,000 VND) and the initial fare of taxi (12,000 VND).

Regarding a prepaid-ticket IC (Integrated Circuit) card, 50% (note) (in 2020) and 90 % (note) (in 2049) of passengers are expected to buy it with a privilege of 10% discount on the one-time ticket (note: elaborated by JICA Survey Team based on “Urban Railway Project in Ho Chi Min City”) .

Non-fare revenue is estimated at 1% (note) of the fair revenue in 2020, 5% (note) in 2021, 7% (note) in 2022, and 10% (note) in 2023 afterwards (note: elaborated by JICA Survey Team based on the data in other Asian cities and “Urban Railway Project in Ho Chi Min City”) .

Table 2.4.8.2-19 presents the number of passengers and revenues in every 10 years from 2020.

Table 2.4.8.2-19 Passengers and Revenues

Items		Unit	2020	2030	2040	2049
Passengers		Per day	232,000	324,000	451,000	611,000
Revenue	Fare	VDN billion/year	604	830	1,140	1,524
	Non-fare	VDN billion/year	6	83	114	152
	Total			610	913	1,254

Source: JICA Survey Team

c) Financial Project Cost

The financial project cost consists of 1) initial and additional investment cost, 2) replacement cost, and 3) operation and maintenance (O&M) cost. Price escalation is not considered. The taxes such as import tax and VAT are included in the financial project cost; however the income taxes are disregarded. The ongoing engineering service project costs are disregarded as a sunk-cost in this survey.

Initial and Additional Investment Cost

Table 2.4.8.2-20 and Table 2.4.8.2-21 present the initial investment cost (investment cost before starting operation) and the additional investment cost (investment after starting operation) respectively. “Base Case” is not included in these tables because it incurs none of investment cost.

Table 2.4.8.2-20 Initial Investment Cost (VND billion)

(This part was deleted to disclose information in certain period)

Table 2.4.8.2-21 Additional Investment Cost after starting operation

(This part was deleted to disclose information in certain period)

Incidentally, “Reference 2 (NC owns E&M and EMU, and operates.)” is a case to borrow a soft loan. For such case, the terms and conditions of the loan are set below in line with JICA guideline:

- Soft loan: JICA STEP loan to entire initial investment (E&M and EMU) excluding taxes and administration cost
- Loan period: 40 years
- Grace period: 10 years
- Interest rate: 0.2%
- Commitment fee: 0.1%
- Loan to Consultant Service: interest rate 0.01%

Replacement Cost and O&M Cost

These costs are estimated applying the same manner that is used for the above economic analysis. (see Annex 9 for respective costs) .

d) Financial Evaluation

The FIRRs of the 4 cases are figured out from the above revenue and financial costs as presented in Table 2.4.8.2-22 (for details, see Annex 9). The FIRR of base case is too high; meanwhile, the FIRRs of other 3 cases are resulted below 10% of the opportunity cost of capital. For reference, some suggestions for financial adequacy (for base case) and improvement measures (for other 3 cases) to attain 10% of FIRR are presented also in Table 2.4.8.22.

Table 2.4.8.2-22 Financial Evaluation

Items	FIRR	Suggestions: financial Improvement measures to attain 10% of FIRR
Base Case	400%	Extremely high level of FIRR if the fare is set at 7,500 VDN. The fare can be lowered to 3,000 VDN, which enables FIRR to sustain still the level of 10%.
Reference 1	-7.0%	Strong measures such as sharp cost cut, drastic upward-revision of fares and financially secure support of VG are suggested to be taken.
Reference 2	7.5%	FIRR cannot reach 10% even if expecting privileges such as exemption of taxes non-eligible for soft loan and VG subsidies for additional procurement of EMU after operation. So, another VG subsidy for replacement cost of E&M is suggested to be secured.
Phase 1+2a+2b <u>1/</u>	-5.9%	Strong measures such as sharp cost cut, drastic upward-revision of fares and financially secure support of VG are suggested to be taken.

1/ See Annex 11 for the data used to compute.

Source: JICA Survey Team

2.4.9 Practical implementation of demand stimulation measures

The Hanoi city area will experience increase in the urban traffic volume along with future population growth and economical development. There is a concern that, in the near future, chronic traffic congestion, increased traffic accidents and worsened air quality environment, and consequential deterioration of the life environment and competitiveness of the city will occur. In this context, shifting to the public mode is strongly demanded. As a countermeasure, development of UMRT and public transport facilities has been just started.

UMRT and BRT are advantageous in safe and comfortable mass transport while keeping punctuality. However, most of citizens use convenient motorcycles enabling door-to-door trip, and it is considered difficult to shift the citizens accustomed to such convenience toward the public transport mode. It is therefore essential to promote positively shifting toward UMRT and other public transport modes.

2.4.9.1 Measures to promote shifting to UMRT

To promote shifting from private mode to UMRT and other public transport modes, suppression of private transport and establishment of the convenient and comfort transport system are essential.

1) Suppressing the private mode

Possible measures to suppress private mode with motorcycles and passenger cars are a) suppression of ownership of vehicles, b) suppression of their travel, and c) suppression of their parking. Principal measures are described below;

- a) Suppression of ownership of vehicles
 - Strengthening the garage regulation
The Hanoi citizens will be obliged to register the car parking place when they are to own passenger cars.
 - Raising tax on acquisition and holding

The tax on acquisition and holding of motorcycles and passenger cars will be to be raised to increase the economic burden, thereby restricting holding.

- b) Suppression of travel
 - Restricting the traffic capacity of roads
The road way will be partially converted to the bus exclusive lane and sidewalk, thereby reducing the road capacity for private mode.
 - Entry restriction
Entry of vehicles other than licensed ones will be restricted by providing the license only to vehicles of residents within the area concerned, vehicles for package handling, and taxis.
 - Tax rise on fuels
Tax on gasoline and diesel oil will be raised.
- c) Suppression of parking
 - Strengthening of regulation against illegal parking
Illegal parking on the road will be prohibited by arranging the guard or raising the fine against parking violation. In addition, motorcycle parking business along the sideway of trunk roads of the inner core of Hanoi will be abolished.
 - Raising the parking fee
The parking fee will be set higher in areas nearer to the inner core.

2) Establishment of the convenient and comfortable public transport system

The measures to establish the convenient and comfortable public transport system are shown below:

- a) Expansion of the public transport network
 - Early development of four UMRT routes and two BRT routes whose construction has been proposed
 - Development the feeder bus to connect to UMRT/BRT to eliminate the area where transport service is not provided or difficult to use
 - New construction and transfer of the bus stop
- b) Improving the transit convenience
 - Guide signs
 - Guide displayed in Vietnamese, English, and French for the convenience of tourists
 - Provision of destination signs in electric railcars and platform while installing the guide plates in the transfer station
 - Personnel of transfer information arranged in principal UMRT stations
 - Searching of the shortest cut to the destination with the shortest period at the lowest cost on the Web site



Destination sign on the train



Destination sign on the platform



Transfer guide plate

Photo 2.4.9.1-1 Example of Guide Signs

- Development of the transfer facilities for UMRT and BRT, feeder buses, existing buses, medium to long-distance buses, and taxis
- Development of the station building and station plaza to facilitate easy transfer to UMRT and other public transports
- Installation of elevator and escalator to facilitate free travel of those disabled and the elderly, provision of the slope to overcome steps, and renewal of buses to low-bed ones



Easy Transfer Station



Elevator for Universal Access



Low-floor Bus

Photo 2.4.9.1-2 Example of Transfer Station Facilities

Development of the bus terminal and park-and-ride parking area for suburban stations
To help suburban residents to use UMRT, the feeder bus terminal and the motorcycle and passenger cars parking area for park-and-ride are to be constructed at Yen Vien and Ngoc Hoi stations.

Easy-to-understand fare structure

- Low fare setting
- Introduction of the common travel card that can be used among different public transport means
- Introduction of the fare discount system for transfer among different operators

c) Improving the comfort

Introduction of air-conditioned clean vehicles

Reduction of the wait time

- Increasing the service frequency
- Setting earlier time for the first train and later time for the last train
- Provision of the bus oncoming display and the bus location system

Keeping the punctuality

- Provision of the bus exclusive lane for BRT
- Provision of bus priority lane for feeder buses

- Introduction of the Public Transportation Priority System (PTPS) to control the signals along the bus route to allow the bus to pass at blue signal all the time

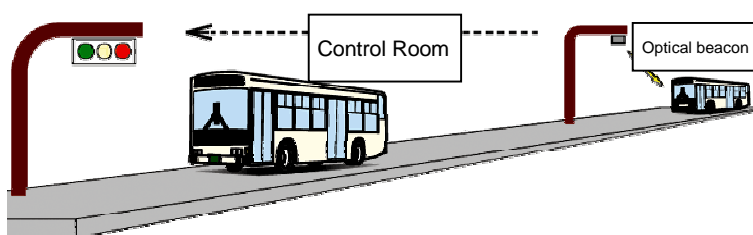
Security

Development of the bus stops

- Provision of the roof and bench
- Provision of the bus oncoming display and bus location system



Bus Oncoming Display



PTPS (Public Transportation Priority System)

Photo 2.4.9.1-3 Example of Bus Facilities

2.4.9.2 Demand stimulation measures to UMRT

To stimulate the demand on public transport, in particular, UMRT, shifting toward UMRT must be promoted. In addition, the method to enhance attractiveness of UMRT must be planned. Principal measures are described below:

- 1) Enhancing the convenience for railway users by developing the commercial facilities, branch offices, day nursery within the UMRT station building
 - Railway users can enjoy shopping and meals, and finish official procedure without going out of the station building.
 - Provision of day nursery will make transportation of children easier.



Photo 2.4.9.2-1 Images of In-station Shops

- 2) Enhancing the convenience for railway users by allowing the use of IC type travel card for payment for UMRT and BRT, buses, and inside the commercial facilities in the station building
- This will allow the users to utilize the public transport means without buying the ticket.
 - This will ensure smooth passage of the ticket gate.
 - This will enable shopping even when the user has not a purse.



Turnstile at the station

Pay by card at the shop

Photo 2.4.9.2-2 Images of IC Card Use

- 3) Activation of the city through urban development of the area around the station, along with UMRT construction
- This will enable sound high-level utilization of the area around the station and renewal of urban facilities.
 - Redevelopment of the area around Gia Lam and Giap Bat stations will contribute to creating the secondary center of the city where utilization of UMRT is highly improved. This in turn will create the new opportunity for economic activities.
- 4) Development of the garden city in the suburb along UMRT
- Development of the green residential district with satisfactory living environment in Yen Vien and Ngoc Hoi is expected to increase the UMRT users.



Under construction in late 1960s 1/



After the opening the Line in 1974 1/



Station Yard in Present 2/

Source: 1/ www.tamaplaza-terrace.com/project/column.php

2/ Wikipedia

Photo 2.4.9.2-3 Transition of Tama Plaza Garden City in Yokohama, Japan

- 5) Promotion of development for deliberate arrangement of public facilities and guest attracting facilities along the route of UMRT
 - Arranging the shopping center, playground, school, and public facilities along the route of UMRT is expected to increase the UMRT users.

2.4.9.3 Implementing agency, implementation period for the demand situation measures

Assumed implementing agency and implementation period for the above mentioned demand situation measures are shown in Table 2.4.9.3-1. For the suppressing the private traffic, strong opposite by the residents is expected. Therefore, it's necessary for HDOT (Hanoi Department of Transport) to study the concrete suppression method and its introduction method with HPC before the UMRT construction, and to announce to the residents little by little by strengthening regulation against illegal parking by HTP (Hanoi Traffic Police).

Table 2.4.9.3-1 Implementing agency, implementation period

Demand situation measures	Major implementing agency	Implementation period		
		Before construction	Under construction	After start-up
a) Suppression of the private mode				
•Suppression of ownership of vehicles	HDOT, HPC	△	△	○
•Suppression of travel	HDOT, HPC	△	△	○
•Suppression of parking	HTP, HDO, HPC	△	△	○
b) Establishment of the convenient and comfortable public transport system				
•Expansion of the public transport network	HDOT	○	○	○
•Improving the transit convenience	VNR, HDOT			○
•Improving the comfort	VNR, HDOT			○
c) Implementation of demand situation measures				
•Location of in-station shops	VNR		○	○
•Installation of IC card system	VNR		○	○
•Development of area around the station	HPC		○	○
•Development of the garden city	HPC, VNR		○	○
•Development along the route	HPC		○	○

Note: ○ : Implementation period, △ : Preparation period

Source: JICA Survey Team

2.5 Review on Integration of Phase 1 and 2a

2.5.1 Review of Phase 2a FS Report and its Consistency with the Project

Contents of Phase 2a FS Report are reviewed in the previous Sub-chapters; items relevant to Phase 2a section are described in Sub-chapter 2.3 and items relevant to both of Phase 1 and 2a section are described in Sub-chapter 2.4. In Phase 2a FS Report, some items and expression of technical specification shall be revised. The revision list is shown in Annex 2 attached to this report. Basically, there is no significant contradiction with Phase 1 and the technical consistency as a whole project is secured. In the final approval process of the Report in the Government of Vietnam, it is recommended to adopt indications of this survey and FS Report to be revised.

In the progress of this survey, important items that shall be solved such as approval of Resettlement Action Plan and total project cost were confirmed. These matters are described in Chapter 5 in detail. In order to solve these problems, it is recommended, not only for VNR as executing agency to take necessary measures, but also for relevant Ministries and Authorities such as MOT, MOF, MPI, HPC, etc. to reach a consensus.

2.5.2 Appropriateness of Integration of Phase 1 and 2a (Simultaneous Inauguration)

1) Chronology of consideration on simultaneous inauguration

In the original FS, after operation inauguration of Phase 1, national and international trains from South will depart from and arrive at Ngoc Hoi Station, except trains from

HCMC which will reach as far as Hanoi Station. Freight trains which are operating through Line 1 to northern part are detoured from Ngoc Hoi Station Complex to Western Belt Line. In addition, deadhead urban electrical train (EMU) are sent to Ngoc Hoi through existing line from Giap Bat for inspection and maintenance in Depot. Consequently, a temporary ramp structure (steel) of railway line is necessary to be constructed to the south of Giap Bat Station, for the purpose of moving deadhead EMU from elevated Giap Bat Station to on-ground existing line until inauguration of Phase 2a section. Moreover, procurement of a diesel locomotive to pull deadhead EMU through non-electrified section of existing line is necessary.

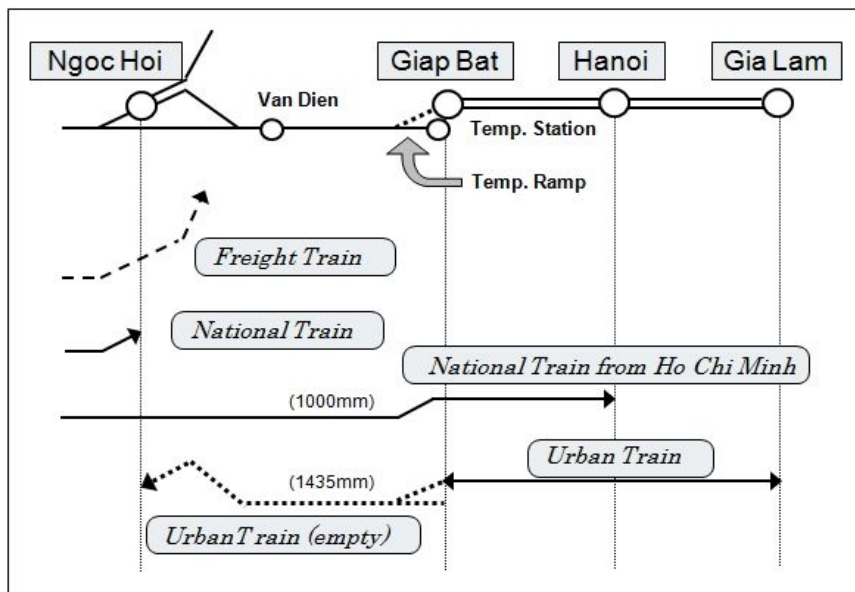


Fig. 2.5-1 Train operation route after inauguration of Phase 1

After JKT started FS review and basic design, it was found that a steep grade for the temporary ramp in south of Giap Bat Station was permissible for EMU, however, for long distance trains pulled by locomotive, gradual grade was required and construction cost had to high. In addition, in order to operate both of national train and EMU on the same line, dual-gauge track, i.e. standard-gauge (1,435mm) for EMU and narrow-gauge (1,000mm) for medium-long distance trains, must be laid. Furthermore, another difficulty was found that, before the completion of Phase 2a construction work, switching work from temporary ramp to elevated track was necessary. During the switching work period (6 months), operation of long distance train had to be suspended through this section. Also deadhead operation of EMU from Giap Bat Station to Ngoc Hoi Station Complex became unavailable. Thus, problem in maintenance and inspection of EMU occurs.

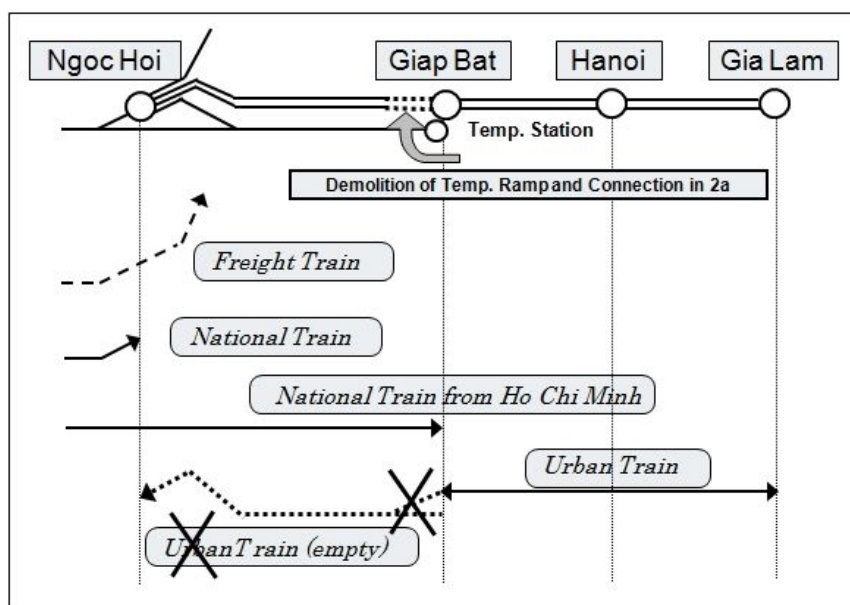


Fig. 2.5-2 Train operation route during switch-over work before completion of Phase 2a

In order to solve the aforementioned problems, VNR requested JKT to examine simultaneous construction of Phase 1 and Phase 2a. Afterwards, JKT conducted operational examination based on train operation planning, maintenance planning and demand forecast. As a result, simultaneous constructions have advantages consist of (1) reduction of construction cost for dual-gauge deadhead line, (2) omission of procurement of diesel locomotive to pull EMU, (3) avoidance of returned operation of national train during switch-over work, (4) avoidance of difficulty in maintenance and inspection of EMU, (5) Increase of passengers between Ngoc Hoi and Hanoi that lead to increase of operational profit. In addition, required period for viaduct construction of Phase 2a section, which is about 30 months, is not a critical pass of overall construction schedule including Phase 1, then, there is no disadvantage of the simultaneous construction in terms of construction schedule.

Based on the above results, MOT, HPC and VNR conducted general meeting in November 2010 and agreed to carry out simultaneous construction of Phase 1 and 2a. As a result, detailed design of temporary slope in south of Giap Bat Station was excluded from the scope and detailed design work is in progress assuming simultaneous inauguration of Ngoc Hoi – Gia Lam section (Phase 1 + 2a section).

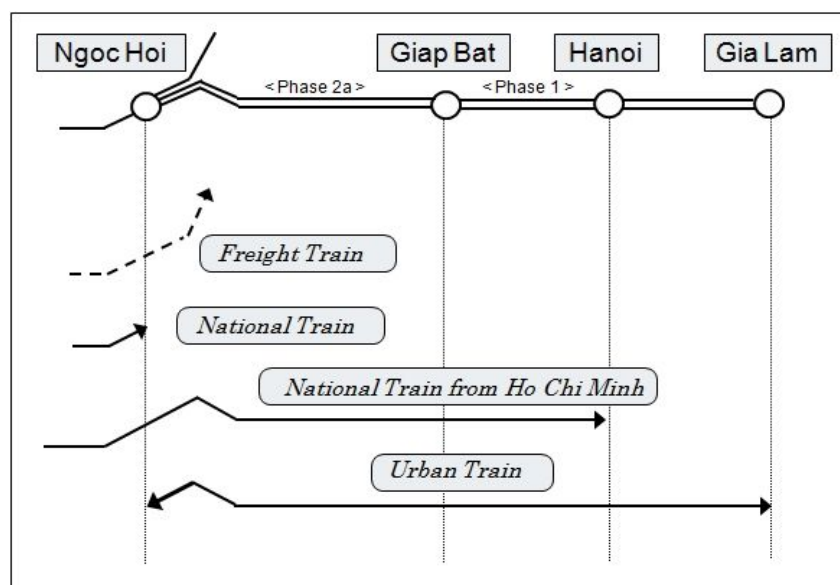


Fig. 2.5-3 Train operation route after completion of Phase 1 + 2a

2) Appropriateness of civil works and operation planning

In the original plan, during the period between inauguration of Phase 1 and inauguration of Phase 2a, deadhead EMU would move to Ngoc Hoi Station Complex for stabling, inspection and maintenance every day. Thus, dual-gauge track should be installed from Giap Bat to Ngoc Hoi Station Complex section to support operation of EMU. In addition, construction of temporary ramp (railway line) from Giap Bat to the existing line was necessary. Furthermore, procurement of diesel locomotive was necessary to pull deadhead EMU going through non-electrified line.

On the other hand, in case of simultaneous inauguration of Phase 1 and 2a, temporary structure and facilities are unnecessary and related cost could be reduced. As shown in Table 2.5-1, estimated cost reduction is about 2.5 billion yen. Reduction items are described as follows:

- Removal of existing rail of Giap Bat – Ngoc Hoi Section and construction of dual-gauge track
- Construction and removal of temporary ramp connecting elevated Giap Bat Station with on-ground dual-gauge track
- Installation of temporary overhead catenary of above temporary ramp section (EMU are stabled in the on-ground temporary Giap Bat station)
- Renovation of existing superstructure of Van Dien Railway Bridge (correspondence with dual-gauge track)
- Procurement of diesel locomotive (equipped with multi-type coupler) to pull deadhead EMU from Giap Bat to Ngoc Hoi
- Installation of a part of dual-gauge track and overhead catenary inside Gia Lam Depot for the period of switching work from temporary ramp to viaduct.

Table 2.5-1 Cost reduction by simultaneous construction of Phase 1 and 2a

Item	Volume	Cost (JPY 1 = VND 250)	
		VND	JPY
Removal of existing rail of Giap Bat – Ngoc Hoi Section and construction of dual-gauge track	5,283m	▲ 165,401,000,000	▲ 661,604,000
Construction and removal of temporary ramp connected elevated Giap Bat Station with on-ground dual-gauge track	932m 900ton	▲ 177,623,000,000	▲ 710,492,000
Installation of temporary overhead catenary of above temporary ramp section	L/S	▲ 94,973,000,000	▲ 379,892,000
Renovation of existing superstructure of Van Dien Railway Bridge	50m 90ton	▲ 33,173,000,000	▲ 132,692,000
Procurement of diesel locomotive to pull deadhead EMU from Giap Bat to Ngoc Hoi	1set	▲ 91,875,000,000	▲ 367,500,000
Installation of a part of dual-gauge track and overhead catenary inside Gia Lam Depot	L/S	▲ 64,036,000,000	▲ 256,144,000
Total		▲ 627,081,000,000	▲ 2,508,324,000

Source: JICA Survey Team

3) Validity of implementing of Substation, OCS, Power Distribution equipment

When power equipment is fixed in two stages, massive temporary equipment (the centralized substation control system, OCS and the power distribution system) is required by the construction of Phase 1. The work for modification is also needed in the case of Phase 2a construction. This modification work turns into quite complicated work, and causes cost increase. Moreover, prudent consideration is needed for safe execution of construction because it needs the procedure to cut off the power for the energized parts as well as the dangerous work near the energized equipment. This work becomes a matter to which we must pay careful attention since the worker and the supervisor of Vietnam are familiar with neither the work with power cut nor the work near commercial operation. If the construction of Phase 1 and the 2a is carried out simultaneously, such complicated modification work, cost increase, and the risks for safety are avoidable.

The simultaneous construction work with the elevated structure is reasonable since especially the transmission cable is due to be installed in the side of the elevated structure. If the construction work is executed by the phase 1 only, the temporary underground cable work is carried out once and then the additional power cable installed on the elevated structure is further needed in the stage of Phase 2a although 110-kV cable work is very expensive. It also needs to have the exclusive temporary facilities to cross the river near Ngoc Hoi. This work makes the construction cost high. Moreover, the field testing of the power cable and the tests to check the centralized substation control system after modification work is required. However, those additional works will not be needed if the construction work of phase 1 and the phase 2a is carried out at the same time.

4) Appropriateness of signal and telecommunication equipment

In case of installation of signal and telecommunication of Phase 2a being conducted stage by stage after operation of Phase 1 section, significant repair work is necessary for already constructed equipment (station and central equipment), which lead to cost increase. In addition, this repair work is quite complicated. In case of Phase 1 and 2a are constructed simultaneously, such complicated repair work and cost increase could be avoided.

5) Increase of passengers of urban train

According to the demand forecast of passengers in 2020, operation of Phase 1 section only will attract 105,000 passengers per day. On the contrary, simultaneous inauguration of Phase 1 and 2a will attract 233,000 passengers per day, more than 2 times comparing with Phase 1 only. In addition, average of traveling distance will also increase from 5.1 km to 7.7 km if both sections are operated at the same time. As a result, difference of passenger - km will be very large: 0.540 million persons-km comparing with 1.797 million passenger-km. In case of distance-based fare is adopted, fare revenues could be estimated based on passenger-km. Thus, fare revenues of simultaneous operation of Phase 1 and 2a is about 3.3 times more comparing with operation of Phase 1 only. Comparison of number of passengers is shown in Table 2.5-2.

Table 2.5-2 Passenger number of urban train

Section	Only Phase 1 (10.7km)	Phase 1 + 2a (18.5km)	Increasing ratio
Passenger number (000 person)	105	232	2.2
Passenger – km (000 person)	540	1,797	3.3
Average traveling distance (km)	5.1	7.7	1.5

Sources: JICA Survey Team

6) Convenience improvement of existing railway line

If the original plan is adopted, after construction of Phase 1 is completed and then construction of Phase 2 follows, then, operation of national train from South to Hanoi will be as follows:

- During construction of Phase 1: arrive at and depart from temporary Giap Bat Station
- After construction of Phase 1: through temporary ramp to enter the elevated section until Hanoi Station
- During construction of Phase 2a, above temporary ramp will be removed and elevated Giap Bat Station will be connected with elevated section: national train have to return again at temporary Giap Bat Station.
- After operation of Phase 2a: through Ngoc Hoi Station and then same as EMU, enter the elevated section until Hanoi Station.

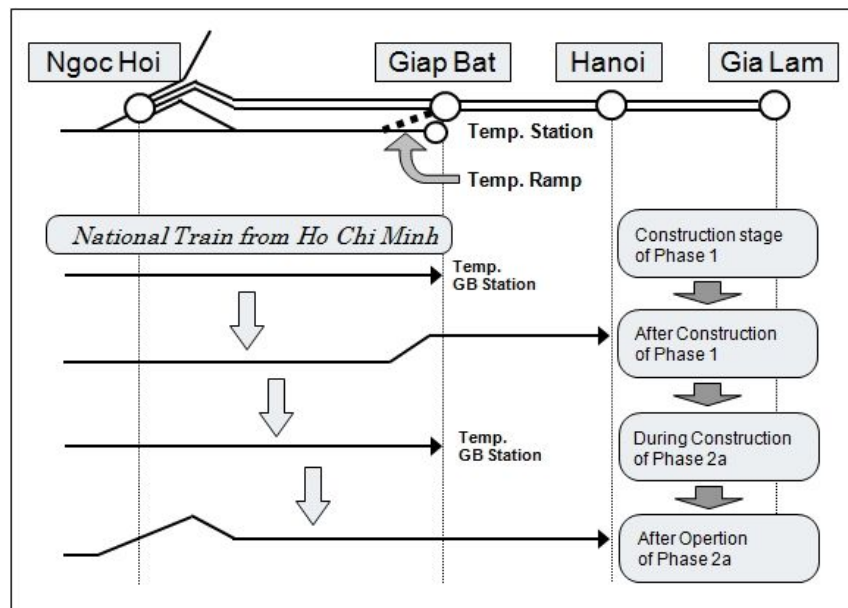


Fig. 2.5-4 Operation condition of national train based on each construction stage

However, if construction of Phase 1 and 2a is executed simultaneously, operation of national train from South to Hanoi will be as follows:

- During construction of Phase 1 + 2a: arrive at and depart from at temporary Giap Bat Station
- After operation of Phase 1 + 2a: through Ngoc Hoi Station and then similar with EMU, enter the elevated section until Hanoi Station.

In construction of Phase 2a, required period to remove temporary ramp and to connect elevated Giap Bat Station with elevated section is estimated about 6 months. Simultaneous inauguration of Phase 1 and 2a has great advantages and more convenience because avoiding of unnecessary train operation plan and passenger confusion

2.5.3 Main issues and recommendations for smooth implementation of this Project

Chapter 2 describes the present situations, issues and the recommendations for their improvement in the smooth Project implementation. The following table shows the points considered particularly vital among those recommendations. Tasks facing the Project involve a wide scope of related fields, and require early actions for resolution. These actions should be conducted by not only the executing agency, VNR, but also the relevant authorities including MOT, HPC, MOF and MPI.

Table 2.5.3-1 Main issues and recommendations for smooth implementation of the Project

No	Main Issues	Recommendations	Implementation period of recommendation				
			Early execution	Until completion of DD Phase 1	Until construction commencement of Phase 1 + 2a	During construction of Phase 1 + 2a	After inauguration
1	Submission of English version of Japanese standard & regulations for approval of Design Framework	Discussion among MOT, VNR and JKT (Preparation of English translation of brief version of standards & regulations)		○			
2	Special approval from MOT regarding construction and rolling stock envelopes	Early examination		○			
3	Implementation of Phase 2a DD (including adjustment of Phase 1 to confirm with simultaneous inauguration of Phase 1 and 2a).	Early implementation	○				
4	Other projects related with the Project: <u>Relation with freight train of Western Belt Line and Ngoc Hoi Freight Station</u> ● Freight train operated in Western Belt Line pulls onto Ngoc Hoi Freight Station. <u>Track alignment and station structure of Gia Lam Station</u> ● Location of Yen Vien Station and location and scale of storage track for medium-long distance passenger trains ● Track alignment of Line 1, Phase 2b (double-double track) and Phase 3 (double track), train operation of Hanoi - Hai Phong line up to Hanoi station and freight train operation through Phase 2b section.	Early examination	○				
5	Determination of project implementation schedule (the following matters are mutually related with determination of the schedule): ● Approval of FS 2a Report and EIA Report ● Approval of Design Framework, BD, DD, RLB of Phase 1 ● Preparation of RAP (Phase 1 + 2a) ● Approval of project scope and cost ● Implementation of Project Adjustment ● Approval of project cost by National Assembly	Early resolution	○				

No	Main Issues	Recommendations	Implementation period of recommendation				
			Early execution	Until completion of DD Phase 1	VNR construction commencement of Phase 1 + 2a	During construction of Phase 1 + 2a	After inauguration
6	Ascertain of plan and budget of public facilities relocation (electrical, telephone, water & sewerage, road, traffic sign, etc.) <ul style="list-style-type: none"> ● After preparation of relocation plan is finished by JKT, VNR will send it to each related authorities for approval ● Relocation work is not yet included in the Project ● Each related authority ensures budget for relocation work by requesting HPC or by his own arrangement ● VNR requested a Yen loan for relocation work 	Implementation of following matters before construction commencement of the Project: <ul style="list-style-type: none"> ● Discussion about relocation plan between VNR and each related authorities ● Each related authority may consider a Yen loan as budget source for relocation work. ● Completion of relocation work 	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		
7	Relocation of 10 locations of high-voltage line (110kV and 22kV) which crossing the Line 1 <ul style="list-style-type: none"> ● Relocation plan and cost are not yet included in the Project 	Early implementation of preparation of relocation plan and cost estimation of relocation work (In Phase 2a DD) <ul style="list-style-type: none"> ● A large amount of cost is expected and thus, may be included in the Project 	<input type="radio"/>				
8	Allocation of tasks in preparation of station plaza development plan and construction work is unclear <ul style="list-style-type: none"> ● Preparation of development plan and its implementation is not yet included in the Project. 	Clarification of the followings <ul style="list-style-type: none"> ● Decision of executing agency ● Preparation of development plan ● Ascertain of cost and implementation of station plaza development 	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	
9	Unification of IC Card and AFC system	VNR will follow final decision of MOT.		<input type="radio"/>			
10	Coordination with HPC and relevant authorities to increase number of passengers	Examination and implementation to stimulate demand <ul style="list-style-type: none"> ● Preparation of an action plan ● Management of transportation demand (suppression of private transportation mode) ● Development of station plaza and bus route for connection with public bus ● Fascination station design for attraction of passengers 	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>
11	Decision of O&M structure of Line 1 (VNR is examining the following formation) <ul style="list-style-type: none"> ● Operator company of urban railway Line 1 ● Maintenance company of Line 1 ● Asset management company of railway 	Early decision is necessary from viewpoint of preparation of a business plan	<input type="radio"/>				

No	Main Issues	Recommendations	Implementation period of recommendation				
			Early execution	Until completion of DD Phase 1	Until commencement of construction of Phase 1 + 2a	During construction of Phase 1 + 2a	After inauguration
12	Preparation of a business plan of O&M company for Line 1	Step-by-step examination of inauguration <ul style="list-style-type: none"> ● IT System ● Balance (Income and expenditure) ● Non-ticket revenue and expenditure ● Measures for revenue increase and demand stimulation ● Possession of assets 	<input type="radio"/>		<input type="radio"/>		
13	Preparation and implementation of education and training plan for O&M staff	Preparation of a comprehensive implementation & budget plan, and step-by-step implementation: <u>First period</u> <ul style="list-style-type: none"> ● Preparation of regulations, guidance & manuals for O&M of urban railway ● Driver training plans and its approval by MOT ● Trainings in Vietnam/Japan ● Dispatch plan of instructors ● Education and training facilities ● IT system of O&M company <u>Second period</u> <ul style="list-style-type: none"> ● Finalization of above matters ● Implementation of education and training (start about 4-5 years before inauguration) 	<input type="radio"/>		<input type="radio"/>		
14	Provision of education and training facilities for urban railways	Development of education and training facilities (driving simulator, etc.) for VNR Vocational College			<input type="radio"/>		
15	Supporting in technical and knowledge transfer in O&M after project inauguration	Dispatch of experts to support O&M as well as dealing with expected and unexpected circumstances within 3 or 4 years after inauguration. (Railway administration, management of train operation, operation system, financial, train operation planning, power and electricity, signal, telecommunication, EMU maintenance, mechanical maintenance, etc.)					<input type="radio"/>

Note: Implementation period of recommendation as shown in the table is tentative, and further examination is necessary.

Source: JICA Survey Team

**3. REVIEW ON SOCIAL AND ENVIRONMENTAL
CONSIDERATIONS**

3. REVIEW ON SOCIAL AND ENVIRONMENTAL CONSIDERATIONS

3.1 Review of EIA reports

3.1.1 Approval status of the EIA reports

The EIA report covering Phase 1 and Phase 2a was already approved by MONRE in 2008(the Decision No. 202/QD-BTNMT dated on 1st February 2008 by Minister of Ministry of Natural Resource and Environment). However, since the project was not going to commence within 2 years of the approval, as stipulated by the Vietnamese regulations on EIA then (the Decree No.80/2006/ND-CP dated 9th August, 2006 by the Government on detailing and guiding the implementation of a number of articles of the Law on Environmental Protection and the Circular No.08/2006/TT-BTNMT dated 8th September, 2006 by Ministry of Natural Resource and Environment on guiding assessment of strategic environment, environmental impact an environmental protection commitment), an additional EIA was carried out and the supplement EIA report with updated data was compiled in 2011 (according to Article 13, 1-b of the Decree No. 80/2006/ND-CP dated 9th August, 2006 by the Government on detailing and guiding the implementation of a number of articles of the Law on Environmental Protection). In this supplement EIA report, the changes in the Project design (the width of the Ngoc hoi complex and the location of the new Long Bien Bridge) were also covered. When this additional EIA was being carried out, the report was to be submitted to MONRE for approval. However, by the new EIA regulation introduced in September 2011(The Decree No.29/2011/ND-CP dated 18th April, 2011 by the Government on providing strategic environmental assessment, environmental impact assessment and environmental protection commitment and the Circular No.26/2011/TT-BTNMT dated 18 July 2011 by Ministry of Natural Resources and Environment, detailing a number of articles of the Government's Decree No.29/2011/ND-CP of April 18,2011 on strategic environmental assessment, environmental impact assessment and environmental protection commitment), the EIA report should be now submitted to the Ministry of Transport - Environmental Division by each phase for approval along with a draft FS report (The Decree No.29/2011/ND-CP, Article 17, paragraph 2). RPMU is planning to submit the EIA report on Phase 1 in March 2012, and, for Phase 2, after March 2012 when a draft FS report for Phase 2a is ready. It normally takes 30 working days to obtain an approval after submission (The Decree No.29/2011/ND-CP, Article 20, 1-b). An approved EIA report is prerequisite for approval of FS report.

3.1.2 Review on existing EIA reports

The following two documents are to be reviewed.

- 1) Environmental Impact Assessment Report, Hanoi elevated railway project, Ngoc hoi – Yen Vien Section
It was prepared and submitted by RPMU (the implementing consultant was CTSTEP) and was approved by MONRE in 2008.
- 2) Report on Supplemental Environmental Impact Assessment (Draft),
Since it was expected that commencement of the project will be more than 3 years after the EIA approval in 2008, a supplement EIA report was prepared by JKT (the implementing consultant was DRCC) according to the EIA regulations back then.

The existing EIA reports (2008 and 2011) are reviewed based on the JBIC guidelines for Environmental and Social Considerations. The JICA Survey Team revised the existing reports referred to World Bank Safeguard Policies OP4.01 Annex B and Annex C. The revised EIA report is for submission to JICA.

3.1.2.1 Summary of the revised EIA report for JICA

Below is a summary of the items and data in the existing EIA reports, items missing in the existing reports and recommendations. Please refer Annex 12 for the revised EIA report for JICA.

3.1.2.2 Project description

The existing EIA reports are covering the project description. In the supplement EIA report (2011), the changes in the designs since 2008, such as the location of the new Long Bien bridge (it was changed from 30 m to 168m upstream from the existing bridge since the design in 2008) and the expansion of the Ngoc Hoi Complex (it was about 96ha in 2008, but expanded to 114ha) are described.

In the revised EIA report for JICA, the changes in the supplement EIA report (2011) will be incorporated. Further, some of the information in the EIA report (2008) that seems excessive is omitted so that general readers can understand the project description.

3.1.2.3 Baseline survey

Baseline surveys were conducted during the EIA in 2008 and supplement EIA in 2011. Table 3.1-1 summarizes the environmental items related to natural environment and pollutions and their parameters in the existing reports, and corresponding items in the revised EIA report for JICA.

Table 3.1-1 Summary of Baseline Data

大項目	既存報告書の項目		データ		既存報告書 ページ番号 (記載報告書)	JICA提出版EIA 報告書の項目	
	中項目	小項目	定性的	定量的			
Geographic, geological conditions	Geographic location	Coordinales		○	II-1 (2008)	Topography, Geography and Geology	
		Segments' length		○	II-1 (2008)		
	Engineering geology	terrain		○	II-1 (2008)		
		geological characteristics		○	II-1 (2008)		
Geographic, geological conditions	Hydrogeology	hammering results		○	II-1 (2008)	Ground water	
		N factor			II-1 (2008)		
		aquifer		○	II-5 (2008)		
		underground water level		○	II-5 (2008)		
Weather conditions	Temperature	average temperature		○	II-6 (2008)	Climate	
		highest and lowest temperature		○	II-6 (2008)		
	Humidity	average humidity		○	II-6 (2008)		
		highest rainfall		○	II-6 (2008)		
	Rainfall	average rainfall			II-9 (2008)		
		highest rainfall		○	II-7 (2008)		
	Evaporation	average number of monthly rainy days			II-7 (2008)		
		average evaporation		○	II-7 (2008)		
	Sunny hours	highest evaporation		○	II-7 (2008)		
		average sunny hours		○	II-7 (2008)		
	Fog	foggy days		○	II-7 (2008)		
		Wind velocity	average wind velocity		○		II-7 (2008)
	storm wind			○	II-7 (2008)		
	Hydrological characteristics	Rivers and canals	length, width, depth, coefficient of winding		○		II-11 (2008)
area, depth, water level max				○	II-11 (2008)		
Inner lakes		flow		○	II-12 (2008)		
		average turbidity		○	II-12 (2008)		
Effect of Hoa Binh reservoir regulation on		average alluvium flow		○	II-12 (2008)		
		description of Hoa Binh reservoir		○	II-13 (2008)		
Duong river hydrological characteristics		red river flow in dry season		○	II-13 (2008)		
		water level		○	II-14 (2008)		
Nhue river hydrological characteristics		alluvium flow		○	II-14 (2008)		
		flow		○	II-14 (2008)		
Flood, water-logging		Hydrological characteristics of small rivers, canals, drainage ponds and lakes	general descriptions		○	II-14 (2008)	
			water-logged and flooded areas in 20-21 rain (Nov. 1984)		○	II-15 (2008)	
			floods in the past		○	II-16 (2008)	
Biological resource		Ground ecosystem			○	II-17 (2008)	Ecosystem
	Plant/Vegetation			○	II-17 (2008)		
Aquatic ecosystem	Animal	zoo system		○	II-17 (2008)	Ecosystem	
		micro fauna		○	II-17 (2008)		
		in farmland		○	II-17 (2008)		
		plants		○	II-18 (2008)		
		animals		○	II-18 (2008)		
		fish		○	II-18 (2008)		
Air	Air quality	insects		○	II-18 (2008)	Air Quality	
		bottom animals		○	II-18 (2008)		
Noise	Air quality	CO, SO ₂ , NO ₂ , HC, TSP, temperature, humidity, air pressure, wind velocity and direction		○	II-18 (2008)	Air Quality	
		CO, SO ₂ , NO ₂ , HC, SPM, temperature, humidity, air pressure, wind velocity and direction		○	24 (2011)		
Vibration	Noise	LA _{Aeq} , LA _{max} , LA ₅₀		○	II-22 (2008)	Noise and Vibration	
		Leq, LA _{max} , LA ₅₀		○	28 (2011)		
Water	Vibration	Leq, LA _{eq} (vibration acceleration), L _{veq} (vibration velocity)		○	II-23 (2008)	Water Quality	
		LA _{eq} (vibration acceleration), L _{veq} (vibration velocity)		○	32 (2011)		
		Surface water quality	pH, DO, COD, BOD ₅ , SS, Cu, Zn, Pb, As, Cd, Hg, NO ₂ ⁻ , NO ₃ ⁻ , Ni, Mn, CN, Cr ⁶⁺ , total coliform, oil-grease		○		II-25 (2008)
		Surface water quality	pH, Temp, Turbidity, EC, TSS, DO, COD, BOD ₅ , Cu, Zn, Pb, As, Cd, Hg, NO ₂ ⁻ , NO ₃ ⁻ , Fe, PO ₄ ³⁻ , total coliform, oil-grease		○		35 (2011)
Soil	Underground water quality	temperature, pH, colour, hardness, total solids, As, Cd, Pb, Cu, Mn, Zn, CN, Hg, Fe, NO ₂ ⁻ , Cl ⁻ , SO ₄ ²⁻ , fecal coli, coliform		○	II-32 (2008)	Soil contamination	
		temperature, pH, colour, hardness, total solids, As, Cd, Pb, Cu, Mn, Zn, CN, Hg, Fe, NO ₂ ⁻ , Cl ⁻ , SO ₄ ²⁻ , fecal coli, coliform		○	39 (2011)		
Solid waste control	Soil	pH, total organics, T-N, T-P, acidity, Cl ⁻ , SO ₄ ²⁻ , Cu, Zn, Cd, Pb, Hg, organic pesticide group		○	II-36 (2008)	Wastes	
		pH, total organics, T-N, T-P, acidity, Cl ⁻ , SO ₄ ²⁻ , Cu, Zn, Cd, Pb, Hg, organic pesticide group		○	43 (2011)		
	Solid waste	waste quantity		○	II-38 (2008)		
		waste composition		○	II-38 (2008)		
	Market waste	waste quantity		○	II-38 (2008)		
		waste composition		○	II-38 (2008)		
Road waste	waste quantity		○	II-39 (2008)			
	waste composition		○	II-39 (2008)			
Manure	Manure	manure quantity		○	II-39 (2008)		

Source: JICA Survey Team

In terms of the baseline information and data on social environmental items, both existing EIA reports cover the description of each of the seven districts affected by the project. In the supplement EIA report also lists the institutions that require special considerations such as graves, pagodas, schools, hospitals, etc.

The following items in Table 3.1-2 are not mentioned or described as separate items, but are included in the revised EIA report for JICA.

Table 3.1-2 Additional Items for the EIA Report for JICA

Item	Remarks
Protected Area	There is no protected area around the project site. No additional survey is necessary.
Land use	Enough information is available in the existing reports. No additional survey is necessary.
Existing social infrastructures	Enough information is available in the existing reports. No additional survey is necessary.
Heritage	Enough information is available in the existing reports. No additional survey is necessary.

3.1.2.4 Legal framework and organizational institutions for environmental impact assessment

The existing reports describe the legislation, regulations and standards in Vietnam related the project, EIA, and environmental standards.

In the revised EIA report for JICA, the updated legal framework is described in Chapter 5. The Vietnamese legal framework and the WB policies and JBIC guidelines are compared to confirm there is no large gap between them.

3.1.2.5 Analysis of alternatives

The existing reports covers analysis of alternatives in terms of the project alignment, station design, bridge, flyovers and others.

In the revised EIA report for JICA, the analysis of alternatives from both existing reports as well as the zero option alternative is summarized in Chapter 6.

3.1.2.6 Scoping

Based on the scoping and descriptions of impacts in the EIA report (2008) and supplement EIA report (2011), expected impacts are summarized in Table 3.1-3.

Except that the names used for the environmental items in the existing items slightly differs from those of the checklist in the JICA guidelines, the essence of the items, characteristic of the impacts, their timing of occurrence, duration, and range, the reversibility of the impacts by application of mitigation measures are basically same between the scoping in the existing reports and in this revision. The reasons for this conclusion are as follows. Details of the impacted environmental items by project periods and their descriptions are found in Table 3.1-5.

- By the existing reports, the most serious adverse impact is resettlement and land acquisition. Other impacts on land use and socioeconomic activities related to resettlement are also mentioned. It is not possible to avoid resettlement and land acquisition completely, however the other impacts can be mitigated. This evaluation is same as the result of this revision.
- By the existing reports, the impacts predicted during construction period are air pollution, water pollution, noise and vibration, waste, impacts on socioeconomic activities in the proximity of construction site, impacts on surrounding communities due to the influx of workers, impacts on the river and sediment due to bridge construction activities, etc. These impacts are related to construction activities, therefore the timing of occurrence and period are within construction period and the range of impacts is limited to the immediate proximity of the construction site and other relevant work sites. These impacts can be mitigated by applying appropriate management and measures. In the scoping and descriptions of impacts in the existing reports, the names used for environmental items are slightly differed from the ones by the JICA checklist (e.g. there is no item on HIV/AIDS in the existing reports, however there is an item to describe prevention of infectious diseases in general), the essence of the items described, characteristic of the impacts, their timing of occurrence, duration, and range, the reversibility of the impacts by application of mitigation measures are basically same between the scoping in the existing reports and in this revision.
- By the existing reports, the impacts during operation period are described as air pollution, water pollution, noise and vibration, waste and accidents due train service operation, passengers at stations and operation of train repairing workshops. The range, duration and reversibility of these impacts described in the existing reports are same as the revision.

Table 3.1-3 Environmental Impact Matrix

	Environmental Item	Project Period	Adversed Impact Factors						Positive Impact Factors		
			Total Evaluation	Planning	Construction			Operation	Operation		
				Land acquisition, loss of structure and crops	Ground clearance	Operation of vehicles and heavy equipments for construction	Construction activity of stations, elevated railway, etc	Traffic control	Inflow of construction workers and establishment of construction bases	Presence of elevated railway, stations and other related structures	Reduce car/motorbike users
Social Environment	1 Resettlement	-A	-A	D	D	D	D	D	D	D	D
	2 Living and Livelihood	+A/-B	-B	-B	D	-B	-B	D	D	+A	+A
	3 Utilization of land and local resources	-B	-B	D	D	D	D	D	D	+A	+A
	4 Social institutions such as social capital and local decision-making institution	D	D	D	D	D	D	D	D	D	D
	5 Existing social infrastructures and services	+A/-B	-B	-B	D	-B	-B	D	D	+A	+A
	6 Socially vulnerable groups (poors, minorities, etc)	+B/-B	-B	D	D	D	D	D	D	D	+B
	7 Equality of benefits and losses	D	D	D	D	D	D	D	D	D	D
	8 Heritage (Graves, pagodas, etc.)	-B	-B	D	D	D	D	D	D	D	D
	9 Local Conflicts of Interest	D	D	D	D	D	D	D	D	D	D
	10 Water Right/Common	D	D	D	D	D	D	D	D	D	D
	11 Social Consensus	D	D	D	D	D	D	D	D	D	D
	12 Public Health	-B	D	D	D	D	D	-B	-B	D	D
	13 Infectious Diseases(AIDS/HIV)	-B	D	D	D	D	D	-B	D	D	D
	14 Working Environment	-B	D	-B	-B	-B	D	-B	D	D	D
Natural Environment	15 Topography and Geology	D	D	D	D	D	D	D	D	D	D
	16 Land Erosion	-B	D	D	D	-B	D	D	D	D	D
	17 Ground Water	D	D	D	D	D	D	D	D	D	D
	18 Hydrology	-B	D	D	D	-B	D	D	D	D	D
	19 Protected Areas	D	D	D	D	D	D	D	D	D	D
	20 Ecosystem	D	D	D	D	D	D	D	D	D	D
	21 Climate	D	D	D	D	D	D	D	D	D	D
	22 Landscape	D	D	D	D	D	D	D	D	D	D
	23 Global Warming	+B/-B	D	D	-B	D	D	D	D	+B	D
Pollution	24 Air Quality	+B/-B	D	-B	-B	D	D	D	-B	+B	D
	25 Water Quality	-B	D	D	D	-B	D	D	-B	D	D
	26 Soil Contamination	D	D	D	D	D	D	D	D	D	D
	27 Wastes	-B	D	-B	D	-B	D	D	-B	D	D
	28 Noise and Vibration	+B/-B	D	-B	-B	-B	D	D	-B	+B	D
	29 Subsidence	C	D	D	D	C	D	D	D	D	D
	30 Odor	-B	D	D	D	-B	D	D	-B	D	D
	31 Sediment	-B	D	D	D	-B	D	D	D	D	D
	32 Accident	+B/-B	D	D	-B	-B	D	D	-B	+B	D

"+/-": positive/adverse, A: Significant impact, B: Some impact, reversable and mitigatable, C: Unknown impact, D: No impact

Source: JICA Survey Team

3.1.2.7 Impact assessment and mitigation measures

Impact assessment and mitigation measures are described in the EIA report (2008). In the supplement EIA report (2011), the items in Table 3.1-4 were changed according to the expansion of the Ngoc Hoi complex, the location of the New Long Bien Bridge, and renewal of the demand forecast.

Table 3.1-4 Changes on Impacts in the Supplement EIA Report 2011

Item	Descriptions
Resettlement	Increase of the land clearance due to the expansion of the Ngoc hoi complex. Change of the location of the land to be acquired due to the change of the location of the bridge.
Air Pollution (During construction)	Increase of the transportation of raw materials, due to the expansion of the Ngoc hoi complex.
Water Quality (During construction)	Increase of the construction workers and the construction period due to the expansion of the Ngoc Hoi Complex leads to the increase of waste water.
Noise and Vibration (During construction)	Due to the change of the location of the bridge, the construction site will be close to the school.
Accidents (During construction)	Unexploded bombs and mines around the Red River.
Water Quality (During operation)	With the revision of the demand forecast, the predicted number of passengers for each station has decreased, hence the decrease in the amount of the waste water.

Source: JICA Survey Team based on the supplement EIA report (2011)

According to the supplement EIA report (2011), the above changes are not leading to the changes in the characteristic or scale of the impacts, but rather in their location and some prolonged period, therefore they can be mitigated by the same counter measures proposed in the EIA report (2008). The only item added was the measures against noise problem for Nguyen Trung Truc School in Hoan Kiem District.

In Table 3.1-5, the impacts and mitigation measures described in the existing EIA reports and recommendations and revisions made in the revised EIA report for JICA. The most serious impact of this project is resettlement and other impacts associated with it. Details of this impact and mitigation measures are described in 3.2 Status of Land Acquisition and Resettlement Plan and Implementation. The other impacts are noise, vibration, air pollution by heavy machineries and vehicles during construction, impacts (such as public health, etc.) to communities by influx of construction workers, accidents during construction, and impacts to the river during bridge construction. However, these impacts are assumed to be for a limited time, and can be mitigated with appropriate mitigation measures.

The mitigation measures added during this study are listed under “Recommendations for the revised EIA for JICA” in the table. Some of the additions are as follows.

- Land acquisition and resettlement, as well as the relevant impacts are not only mitigated by the Vietnamese regulations, but also by applying JBIC guidelines and referring to JICA

guidelines and WB policies, with an aim to restore and improve living conditions of affected people and to minimize impacts on communities.

- Relocation of utility service lines will cause interferences on services. A plan must be made and known to the communities, to reduce impacts.
- Relocation of about 650 graves must be planned and implemented with involvement of the families and relevant institutions and under cultural and religious consideration.
- Awareness program about HIV/AIDS and other STD is added to the mitigation measures against the risk of infectious diseases caused by influx of construction workers.
- Details are added to the measures to keep good working environment.
- Details are added to the measures to prevent water pollutions caused by runoff water and waste water, etc. during construction.
- Details, such as the time period for operation of and the location of noise and vibration generating machines, are added to the mitigation measures against noise and vibration problem during construction.
- The standards for night and day time are added for noise during operation.

Table 3.1-5 Summary of Impacts and Mitigations in the Existing Reports and the EIA report for JICA

During Planning

<u>Impacted Items/Impact</u>	Mitigations (summary) in the existing EIA reports	Recommendations for the revised EIA for JICA
<u>Resettlement:</u> Resettlement of about 2300 households. About 123 ha of land is acquired.	- General Land Acquisition Plan in accordance with the Vietnamese law and regulations.	RAP should be prepared and implemented in accordance with the JBIC guidelines (2002) and the Vietnamese law and regulations, as well as referring to JICA guidelines (2010) and WB safeguard policies.
<u>Living and Livelihood</u> Affected households' living and livelihood may be affected.	- To compensate for material damage in accordance with the Decree 197/2004/ND-CP of the Prime Minister and Decision 26/2005/QD-UB of the People Committee of the Hanoi City. - Residents who are losing their job will receive assistance in job training. - Priority to employment opportunities related to this project.	The above .RAP will include the rehabilitation program for affected households.
<u>Utilization of land and local resources:</u> Land acquisition will affect the land use	- Compensation in accordance with General Land Acquisition Plan and the Vietnamese law and regulations.	The compensation will be paid according to the RAP as above.
<u>Existing social infrastructure and services</u> Utility lines need to be relocated	Not covered in existing report	A detailed plan must be made and known for relocation of utilities.
<u>Socially vulnerable groups</u> Affected households may include socially vulnerable groups	Preparing plans for assisting families with socially vulnerable group. Provide them financial and labor resources to move to new places and constructing new living places...	The results of census survey for RAP will be used to identify households in need of special assistance, and appropriate assistance program will be planned and included in RAP.
<u>Cultural/historical</u>	-The design of components like national station,	Collaborate with families and

<u>Impacted Items/Impact</u>	Mitigations (summary) in the existing EIA reports	Recommendations for the revised EIA for JICA
<u>heritage</u> 650 Graves need to be relocated	urban station, overpass, bridges took architectural aspects as well as avoiding cultural/historical heritage sites into consideration so as the least impacts will be made. - Provide financial support and suitable location for relocation of graves.	relevant institutions to prepare a plan and implement the relocation of graves based on appropriate cultural and religious considerations

During Construction

<u>Impacted Items/Impact</u>	Mitigations (summary) in the existing EIA reports	Recommendations for the revised EIA for JICA
<u>Living and livelihood</u> Construction activities, traffic controls around the construction site may affect local economic activities	-Detailed traffic control - Coordinate with the local authority in notifying the traffic flow division -Large material storage should not be in the area of streets. - Not to operate excavators, bulldozer, roller, pile-driving machine at night.	-Affected business should be properly assisted through the RAP as above.. -Provide suitable access to households living and shops/business in the surrounding area
<u>Existing social infrastructure and services</u> Construction activities, traffic controls around the construction site may affect the access to hospitals and schools. Construction activities may affect the utility services.	-Compliance to the Vietnamese regulation. - Develop detailed traffic control. -Cooperation with police and other authorities. - Design traffic organization in strict compliance with road signal regulations - Use plastic isothermal paint for road safety marking to reduce speed of vehicles at the locations near schools, hospitals or at important intersections.	No recommendation
<u>Public Health/ Infectious diseases</u> Inflow of workers may affect public health.	-Education on healthy living style. -Waste and waste water at the camp should be properly controlled. -Workers will be provided with accommodation with proper living condition	Workers should receive education on personal hygiene and STD. Health awareness including HIV/AIDS awareness program should be implemented
<u>Working Environment</u> Workplace accidents and poor health of workers	-Increase technical and labor safety -Workers will be provided with accommodation with proper living condition. Protective working cloths will be provided to work outside. -Risk prevention and safety measures to be taken for dangerous activities. -ID cards will be issued to keep the security at the construction site.	-Compliance to Vietnamese labor code and other regulations to maintain the working place safe and healthy. -General safety measures for the construction works, such as provision of safety equipment, safety procedures, should be implemented. -To accommodate the needs of the workforce, the contractor should provide suitable housing, adequate supplies of potable water, and toilet and bathing facilities within the housing area. Onsite facilities for preparing food need to be provided, or food service contracted.
<u>Land erosion</u> During construction of	-Minimize impacts by design and construction process.	-Implement soil erosion and sedimentation control measures at

Impacted Items/Impact	Mitigations (summary) in the existing EIA reports	Recommendations for the revised EIA for JICA
the bridge, increased sedimentation and slope instability	<ul style="list-style-type: none"> -Implement soil erosion and control measures at susceptible locations -Proper grading practices and water diversion structures -Maintain vegetation cover or apply concrete for slope embankment, etc. 	susceptible locations -Installation of rock or stabilization structures
<u>Hydrology</u> During construction of the bridge, interference in the river flow.	<ul style="list-style-type: none"> -Minimize impact with design and construction process. -Avoid construction of structure during flooding season. -Maintain vegetation cover for slope embankment. -Temporary drainage to prevent flooding -Occupying dyke for the working platform shall not exceed 1/3 of the flow section 	-The construction bridge's pile/abutment will be one by one so the impact on hydrology will be minimized
<u>Global Warming</u> Emission from vehicles and heavy machinery	<ul style="list-style-type: none"> -Not covered, but the mitigation for the air pollution will be applicable. - Not to use too old vehicles and equipment to transport materials and use for construction. - Not to transport construct material exceed a vehicle' load. - Maintain regularly construction trucks and equipment to minimize exhausted gases - Implement technical measures to mitigate the pollution -Set up a plan of periodic inspection, maintenance, replacement or renovation of production plants and equipment on time to prevent pollutants and toxic substances from leaking out to the environment 	No specific recommendation. The same mitigation as air quality can be applied.
<u>Air Quality</u> Dust, emission from vehicles and heavy machinery, ground clearance, construction activities,	<ul style="list-style-type: none"> -Compliance to the Vietnamese regulations -Dust control measures are in place. Examples are: <ul style="list-style-type: none"> • Watering work area • Minimizing traffic • Cover stockpiles and material. -Minimizing emission of air pollutants with measures such as; <ul style="list-style-type: none"> • Maintenance of vehicles and equipment • Control load and time. 	Cover or make fence around exposed stockpiles and material and use them as soon as possible
<u>Water Quality</u> Leak or spillage of water pollutants, flowing of waste water into surface or ground water, run-off	<ul style="list-style-type: none"> - Location of mobilizing and placing construction equipment will be arranged far from the flow - A temporary water guiding system around the construction area of bridge abutment and culverts will be provided to prevent the flood situation - Elevations of placing petrol tanks shall be higher than the flood water level - Waste overflowing water like vehicle-washing water, waste water from concrete mixing plants, washing materials and etc. shall be guided into a temporary channel to the garbage chamber. Gas, lubricant and other fuels used for means, 	<ul style="list-style-type: none"> - Storage areas to be prepared to avoid runoff of materials. - Fuel should be stored in properly sealed containers. - All fuel storage areas to be securely fenced and provided with oil and water separators. Fuel houses and shut off valve to be locked. -All refueling to be done at least 20 m away from waterways by trained personnel. - All waste oil and oil filters to be

Impacted Items/Impact	Mitigations (summary) in the existing EIA reports	Recommendations for the revised EIA for JICA
	<p>equipment shall be kept carefully to avoid oil spill, at the same time it must have regulations on safety;</p> <ul style="list-style-type: none"> - Prevent from penetrating concrete mortar, oil-bearing waste into the flow Along with waste management, enough measures are in place, such as prevention of spillage or leak of oil, fuel, lubricant, location of equipment, waste water management, mudguard, etc. 	<p>collected and if possible recycled, otherwise to be disposed of to landfills.</p> <ul style="list-style-type: none"> - The contractor is to have developed an accidental spill handling action plan. - Maintain good drainage system at the worker camp to avoid creating of stagnant water, where mosquito can breed
<p><u>Sediment/</u> Aluvium, suspended solid could be built up at river bed during construction of bridge</p>	<ul style="list-style-type: none"> - Control to prevent the redundant on the talus spill over into the water flow. - Vegetation recovery shall be done soon in the vegetation lost areas. - The bridge piles in the river shall be constructed in dry season and the abutments at the two ends of the riversides shall be reinforced to prevent erosion. - The materials gathering site with a large volume shall be covered. 	<p>No recommendation</p>
<p><u>Wastes</u> Wastes from ground clearance, construction site and camp, and construction activities</p>	<ul style="list-style-type: none"> -Minimize wastes produced in construction -Reusable debris substances can be utilized for the leveling. -Any waste which can be recycled or reused shall be collected, classified and transported to the designated site of the city. -The domestic solid waste produced at the project area shall be collected and stored in proper bins and shall not be buried or burnt at the site. <ul style="list-style-type: none"> -Sufficient number of movable toilets shall be provided in the project area, but away from the source of water. -The waste lubricant shall be collected into proper bins placed in the project area. -Keep solid wastes from the source of water 	<p>All waste materials to be collected and sorted;</p> <ul style="list-style-type: none"> (i). those that can be recycled and (ii) those that need to go to an approved landfill site for disposal.
<p><u>Noise and Vibration</u> Noise and vibration nuisance to surrounding communities.</p>	<ul style="list-style-type: none"> -Compliance with the Vietnamese regulations. -Control time and activities. -Use of equipment of low level noise. -Setting up fixed machine far from residence or sensitive areas. -Avoid using noise/vibration generating equipment at the same time. -Supervise the level of noise/vibration. -Anti-noise walls, when necessary. 	<ul style="list-style-type: none"> -If particularly noisy activities are required work may need to be limited to daylight hours. -Noise not to exceed 55dBA at boundary of any residential area between 2100 - 0600hrs and 70 dBA between 2100 and 0600hrs. -In construction phases, location of the strong vibration generation sources should be at least 100m from historical buildings, school, and 50m from houses and shops. -Residential areas should be at least 24 meters from the road and viaduct.
<p><u>Accident</u> Accidents caused by not properly organized traffic.</p>	<ul style="list-style-type: none"> -Detailed traffic control and accident prevention measures -Measures in case of flooding are mentioned. 	<ul style="list-style-type: none"> -All vehicles to be properly maintained and operated in accordance with road laws.

<u>Impacted Items/Impact</u>	Mitigations (summary) in the existing EIA reports	Recommendations for the revised EIA for JICA
Accident during operation of heavy machinery, handling hazardous substance, etc. The project site is in the flood prone area.	-Cooperation with police and other authorities.	-All loads to be properly secured to avoid possible dropping or leakages. -Drivers to be punished if ignore safety requirements.

During Operation

<u>Impacted Items/Impact</u>	Mitigations (summary) in the existing EIA reports	Recommendations for the revised EIA for JICA
<u>Public Health/</u> Many passengers will gather at station, creating solid waste, wastewater and infectious diseases	Management of waste sources: dust, solid waste and wastewater. Construction of the treatment plant, planting more trees, removes pollutants	-Place waste bin at station and regularly empty them -Keep public toilet clean -Provide water for hand washing and hygienic purposes
<u>Air pollution</u> Emission of air pollutants from locomotive, coach repairing factories. Emission from traffic around stations. Pollution inside stations.	For repair factories, measures are, such as: <ul style="list-style-type: none"> · Technical measures will be applied. · Tree planting · Regular maintenance of machines and equipment, etc. · Road surface around station areas will be paved. · Proper ventilation and air conditioning system to limit pollution inside stations. 	No recommendation
<u>Water quality</u> Waste water from stations and locomotive, coach repairing factories. Industrial waste water from operation of locomotive, coach repairing factories. Overflowing of rain water.	Waste water treatment for different types for waste water is in place. Drainages on the route, station and enterprises are in place.	No recommendation
<u>Waste</u> Waste from stations and locomotive, coach repairing factories.	Proper waste management (separation and collection) is in place.	No recommendation

<u>Impacted Items/Impact</u>	Mitigations (summary) in the existing EIA reports	Recommendations for the revised EIA for JICA
<u>Noise and Vibration</u> Noise and vibration from operation of the elevated railway. Noise and vibration from operation of locomotive, coach repairing factories	For the elevated railways, measures are, such as: · Mitigation by design. · Anti-noise walls For repairing factories: · Anti-noise buffers at the leg of fan and compressor, · Proper setting and maintenance of machines. · Installing silencer and vibration-proof rubber, etc.	-The operation of urban railways should conform with proper procedures and maintenance to ensure noise level within limits. -Noise not to exceed 55dBA at boundary of any residential area between 2100 - 0600hrs and 70 dBA between 2100 and 0600hrs.
<u>Accident</u> Railway accident Fire, lightning, power lines	Accident prevention measures such as installation of signal system, information system, dispersed current system, fire prevention measures, etc., are in place.	-Proper maintenance of vehicles -Installation of speed limits and railroad signage -Proper maintenance or railroad and repair, as required

Source: JICA Survey Team

3.1.2.8 Environmental Management Plan

The both existing reports cover EMP (implementing organizations, monitoring plan), thus for the items appearing in the both reports, the ones in the supplement EIA report are the latest. In the report in 2008, the cost was estimated, but not for the additional items in 2011. Hence the estimation for the additional items are calculated and added to the cost in 2008 to estimate the total cost. The EMP implementing organization during operation must be organized when the operation and management organizations for the elevated railway itself are determined.

3.1.2.9 Public Involvement

In the existing EIA reports, comments from the affected communities are described, but the records of stakeholder meetings are not included. In 2008, apart from the EIA report, Report of Public Consultation: Hanoi Elevated Railway Project Ngoc hoi- Yen vien Section was compiled with the results of meetings and interviews with stakeholders and communities held under RPMU.

According to this report, total of 10 stakeholder meetings were held from October 2007 to April 2008 to cover the affected districts and attended by a total of 324 people, including representatives from districts/wards/communes and residents. The number of participants might be more, as some lists of participants are missing. The meetings were held at the time of preparing a draft EIA report, but not when scoping for EIA, as recommended by JBIC guidelines. However, in the conclusion of the report, it is said that the public consultation task was carried out based on the Vietnamese law and JBIC requirements and the meeting minutes indicated that the first meeting held in October 2007 was attended by JBIC representatives. Further, from the contents of the report, we can understand that;

- the information about the project and its impacts on natural and social environment was well informed to projected affected communities and other stakeholders by media such as TV and radio and leaflets;

- survey on environment and socio-economic situations along the project site was conducted;
- the results of interviews to project affected residents are compiled;
- the project description and its impacts were discussed in the meetings, and
- RPMU was open to receive any comments/opinions from public the meetings.

Providing these facts, the stakeholder meetings during the EIA in 2008 are deemed to have served the purposes of public involvement such as exchanging opinions and building agreement with stakeholders about the project.

According to the report, most of stakeholders are supportive about the project, and their opinions and questions are concerning compensation and resettlement, construction plan, impacts on the proximity during construction, and commencement of the project.

The summary of EIA report in 2008 was disclosed at wards/communes after the EIA report was approved. (The period of disclosure is unknown)

Recommendations on public involvement are:

- The EIA report submitted to MOT should be disclosed in the same manner as in 2008 for an appropriate length of time, and RPMU should continue to be open to receive comments/opinions from public concerning the project and its EIA report.
- RPMU should strength the information dissemination about the project.

3.1.2.10 Environmental Checklist

According to the JICA guidelines (2010), a draft of the environmental checklist was compiled based on the current status as in Table 3.1-6.

Table 3.1-6 Draft of Environmental Checklist

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) Y (b) Y (c) N (d) N	(a) EIA report has been made in 2007. Supplemental EIA has been made in 2011. However, according to law change, separate EIA reports for phase I and phase IIA will be made in 2012 and to be submitted for approval by Ministry of Transport. (b) EIA report obtained approval decision 202/QD-BTNMT dated 1 st February 2008. However, according to law change, EIA report for phase I will be submitted in March 2012 for approval by Ministry of Transport and EIA report for phase IIA will also be submitted later for approval by Ministry of Transport.
	(2) Explanation to the Local stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) Y	(a) Yes. An independent Public Consultation was made in May 2008 with stakeholders face-to-face and in written communication and fully recorded with: (1) opinion of local commune People's Committees and Fatherland Front, (2) socio-economic questionnaire for, (3) leaflet, (4) quick interview, (5) Minutes of meetings, (6) figures and (7) questionnaire template. (b) The project design has paid attention to the responses from the stakeholders. Clear example is that the design of Ngoc Hoi complex was adjusted to reflect these opinions.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Yes. Especially for the selection of location for the railway bridge crossing Red River.
2 Pollution Control	(1) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas? (b) Do effluents from the project facilities, such as stations, comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards?	(a) N (b) Y	(a) No. Bare land within this project is only at Ngoc Hoi complex (existing condition it is the agricultural land) where the top soil will be removed to stabilize the foundation and then it will be covered with concrete. (b) Yes. The design standards for wastewater treatment plant in Ngoc Hoi complex and wastewater from all the toilets at stations will be in accordance with the QCVN 14:2008/BTNMT National Technical Regulation on domestic wastewater.
	(2)	(a) Are wastes generated from the	(a) Y	(a) All the wastes generated from the

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	Wastes	project facilities, such as stations and depot, properly treated and disposed of in accordance with the country's regulations?		project will be collected and treated properly to satisfy the Vietnamese regulations.
	(3) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	(a) Y	(a) Vietnamese National Technical Regulation on Noise QCVN 26: 2009/BTNMT is considered during the design and operation.
	(4) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence (especially in case of Undergrounds/Subways)?	(a) N	(a) No. The project will not extract groundwater and not include underground construction.
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The project site is not in or near protected areas.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock? (e) Is there a possibility that installation of rail roads will have impacts, such as destruction of forest, poaching, desertification, reduction in wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered? (f) In cases the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	(a) N (b) N (c) N (d) N (e) N (f) N	(a) No. The project is not near any ecologically valuable habitats. (b) No. The project will not affect any protected habitats. (c) No. The project will not cause any significant ecological impacts. (d) No. There will be no impact so that there is no protection measures prepared. (e) No. The project will not have impact on forest, wetland and ecosystem. (f) No. The project is within Hanoi city that is one of the most urbanized areas in Vietnam and there is no extensive loss on natural environment.
	(3) Hydrology	(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	(a) N	(a) No. Hydrological surveys have been made and careful considerations for surface and groundwater protection have been made to ensure that there will be no adverse impact on hydrological system.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(4) Topography and Geology	(a) Is there a soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed? (b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides? (c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	(a) Y (b) Y (c) N	(a) There is soft ground in Ngoc Hoi complex. Proper considerations have been made to ensure that there will be no failures during construction and operation periods. (b) Design and construction of a bridge are carried out with proper considerations to ensure that there will be no failures during construction and operation periods. (c) No. The project area is within Hanoi city urban area therefore the soil runoff generation and impact are negligible thanks to the proper construction plan.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Are the compensations going to be paid prior to the resettlement? (e) Are the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a) Y (b) Y (c) Y (d) Y (e) Y (f) Y (g) Y (h) Y (i) Y (j) Y	(a) The project involves land acquisition and relocation of about 2500~3000 households. A Resettlement Action Plan will be prepared and implemented with accordance to the JBIC guidelines(2002), JICA guidelines(2010), WB safeguard policies and Vietnamese law and regulations to ensure that loss of property will be adequately compensated and minimize adverse impacts (b) During preparation and implementation of the RAP, stakeholder meetings and consultations with affected people will be held. (c) There will be the study of Livelihood Restoration Plan based on socioeconomic surveys. (d) This procedure is required by Vietnamese regulations. (e) This procedure is required by Vietnamese regulations. RAP will cover this subject. (f) This procedure is required by Vietnamese regulations. RAP will cover this subject. (g) This procedure is required by Vietnamese regulations. During preparation and implementation of the RAP, stakeholder meetings and consultations with affected people will be held to have agreements. (h) This procedure is required by Vietnamese regulations. Local government is responsible for arranging resources for successful implementation of RAP (i) It will be included in the RAP (j) Grievance redress mechanism will be established during preparation of a RAP based on the Vietnamese regulations and JBIC guidelines..

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(2) Living and Livelihood	<p>(a) Where railways are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?</p> <p>(b) Is there any possibility that the project will adversely affect the living conditions of inhabitants other than the affected inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>(c) Is there any possibility that diseases, including infectious diseases, such as HIV will be brought due to immigration of workers associated with the project? Are adequate considerations given to public health, if necessary?</p> <p>(d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., by causing increases in traffic congestion and traffic accidents)?</p> <p>(e) Is there any possibility that railways will impede the movement of inhabitants?</p> <p>(f) Is there any possibility that structures associated with railways (such as bridges) will cause a sun shading and radio interference?</p>	<p>(a) Y (b) N (c) Y (d) N (e) N (f) N</p>	<p>(a) The new railway is expected to reduce motorbike/car users and reduce the traffic congestions. About 130ha of land is newly acquired. The alternatives to minimize land acquisition were examined and RAP will be prepared to compensate the loss of property and support those livelihood is affected.</p> <p>(b) No. The project expects that the living condition will be significantly better for local communities. Livelihood Restoration Program is made and will be applied to make sure that the living condition is better or at least the same for inhabitants and project affected people/households.</p> <p>(c) A Program for Strengthening HIV/AIDS/STIs prevention awareness and behaviour change is included in the project to improve the awareness and protect both workers and residential local people's health.</p> <p>(d) No. The project will run within its separate right of way therefore it will not affect road traffic in the surrounding area.</p> <p>(e) No. The project will construct elevated railways that do not impede the movement of inhabitants in existing lower roads.</p> <p>(f) No. The project runs within Hanoi city area therefore sun shading will have no impact. Regarding radio wave, there will be no significant impact since the viaduct is about 20 m high.</p>
	(3) Heritage	<p>(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?</p>	<p>(a) Y</p>	<p>(a) The project will require relocation of about 600 graves. This relocation will be covered in RAP and relocation plan is being prepared through consultations with affected families and respected agencies.</p>
	(4) Landscape	<p>(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?</p>	<p>(a) N</p>	<p>(a) No. The project makes considerations during the design, coordinates closely with the HAPA (Hanoi Authority of Planning & Architecture) for expertise therefore, the project expects to have the positive impact regarding landscape and aesthetic aspect.</p>
	(5) Ethnic Minorities and Indigenous Peoples	<p>(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?</p> <p>(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?</p>	<p>(a) N (b) N</p>	<p>(a) The project does not include ethnic minorities and indigenous people.</p> <p>(b) The project does not include ethnic minorities and indigenous people.</p>
	(6) Working Condition	<p>(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country</p>	<p>(a) N (b) Y (c) Y</p>	<p>(a) No. The project will strictly comply with local regulations on working condition.</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	s	<p>which the project proponent should observe in the project?</p> <p>(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?</p> <p>(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?</p> <p>(d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?</p>	(d) Y	<p>(b) Safety at work will be paid proper attention so that accident will be prevented.</p> <p>(c) Yes. The project has made preparation for all the safety standards to be applied for all the workers during construction period, for railway staffs and passengers during operation period. Traffic safety and public health are also paid attention.</p> <p>(d) Yes. All the security guards involved in the project will not violate safety of other individual involved and local residents following Vietnamese law and regulations.</p>
5 Others	(1) Impacts during construction	<p>(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?</p> <p>(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?</p> <p>(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p> <p>(d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts?</p>	(a) Y (b) N (c) Y (d) Y	<p>(a) Examples of measures implemented to reduce impacts during construction are, but not limited to:</p> <p><u>For Noise/vibration</u></p> <ul style="list-style-type: none"> -Compliance with the Vietnamese regulations. -Control time and activities. -Supervise the level of noise/vibration. -Anti-noise walls, when necessary. <p><u>For Water</u></p> <ul style="list-style-type: none"> -Water guiding system around the construction area to prevent the flood situation - Waste water shall be guided into a temporary channel to the garbage chamber. -Avoid oil/fuel spillage and leak, etc. <p><u>For Air</u></p> <ul style="list-style-type: none"> -Dust control by watering and covering piles. -Maintenance of machinery/vehicle <p><u>For Waste</u></p> <ul style="list-style-type: none"> -Compliance with the regulations. -Minimize, separate, reuse and recycle when possible. -Hazardous waste should be treated appropriately according to regulations. -Treatment of waste water. <p>Other mitigation measures towards, such as, accident, sediment, hydrology and land erosion are also in place.</p> <p>(b) The project will not affect any ecosystem.</p> <p>(c) Some examples of mitigation measures implemented to reduce impacts on social environment are:</p> <ul style="list-style-type: none"> -Minimize the interference on economic activities around the project site. -Keeping appropriate working environment, including sanitation and accommodation facilities, for project

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
				workers -Educate project worker on public health and prevention of infectious diseases. (d) Some measures of the consideration of traffic congestion prevention are: - Develop detailed traffic control. -Cooperation with police and other authorities. - Design traffic organization in strict compliance with road signal regulations - Use plastic isothermal paint for road safety marking to reduce speed of vehicles at the locations near schools, hospitals or at important intersections.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a) Y (b) Y (c) Y (d) Y	(a) Monitoring plan is included in the EIA report. (b) The items to be monitors are, e.g. noise, vibration, air quality, surface water quality, underground water quality and soil quality. The detailed methods, locations, frequencies are included in the EIA report. (c) Monitoring framework is included in the EIA report. (d) Reporting is required by Vietnamese environmental regulations in regular and contingent basis
6. Notes		(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation). (b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities)	(a) N (b)	(a) The project will not affect any forest. (b) The electricity team will take care of proper design to follow Vietnamese Regulations/specification to ensure the safety for electricity system.
		(a) If necessary, the impacts to transboundary or global issues should be confirmed, if necessary (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of ozone layer, global warming)	(b) N	No such impacts are expected.

Source: JICA Survey Team based on the information of JKT

3.2 Status of land acquisition and resettlement plan and implementation

The objectives of this study were originally to review the existing RAP, to conduct additional surveys if necessary and to report the progress of the implementation of resettlement for Phase 1. However, it was found that a RAP meeting the requirements for JICA appraisal (e.g. inclusion of the results from a census survey on the all affected households, etc.) was not yet prepared. The study objectives are then changed to confirm the procedural steps for the land acquisition and resettlement completed so far and ones need to be carried out and provide recommendations to assure that the RAP preparation and implementation will be carried out in accordance with JBIC guidelines, as well as referring to JICA guidelines and WB policies. To provide the information and data that can be useful for the procedures in future, the survey team created a draft RAP framework (Annex 13), a draft TOR for RAP (Annex 14) preparation, and a brief comparison report on the price of land issued by HPC and the replacement cost.

Fig. 3.2-1 is a flowchart of the procedures for land acquisition and resettlement with relevant organization at each procedural step. In terms of preparation of FS reports and designing, VNR and its line organizations are responsible, however, in terms of preparation of documents related to land acquisition and resettlement, their approvals and implementations are of HPC and DPC.

3.2.1 Progress Status of the Project

The followings are documents complied and procedures completed in relevance to land acquisition and resettlement as of now.

On 19 October 2007, the Minutes of Discussions concerning environmental and social considerations was signed by JBIC, MOT and RPMU. The following points concerning land acquisition and resettlement were confirmed in this document:

- Schedule for land acquisition and resettlement
- The land to be acquired, the number of affected households, etc. for Phase 1.
- Entitlement Matrix
- Forms for implementation and monitoring activities.
- TOR for external monitoring

Documents required for land acquisition and resettlement and the current status of their completion for the project are shown in Table 3.2-1.

The FS report for Phase 1, which was prepared by TRICC under the subcontract of RPMU and approved in 2008, includes the Land Acquisition Plan. The detail of this plan will be described in 3.2.2, however, the points confirmed in the above MD in 2007 are not mentioned in this plan.

In the FS report for Phase 2a, prepared by TRICC under the subcontract of RPMU in 2010, the land acquisition plan with the similar format as for Phase1, is included. The detail of this plan will be described in 3.2.2, however, as in the plan for Phase 1, the points confirmed in the above MD in 2007 are not mentioned in this plan.

In 2010, DRCC under the subcontract of JKT carried out socioeconomic survey targeting 30% of affected households are conducted in each of the seven districts within Phase 1 and Phase 2a. The reports of this survey were submitted to RPMU.

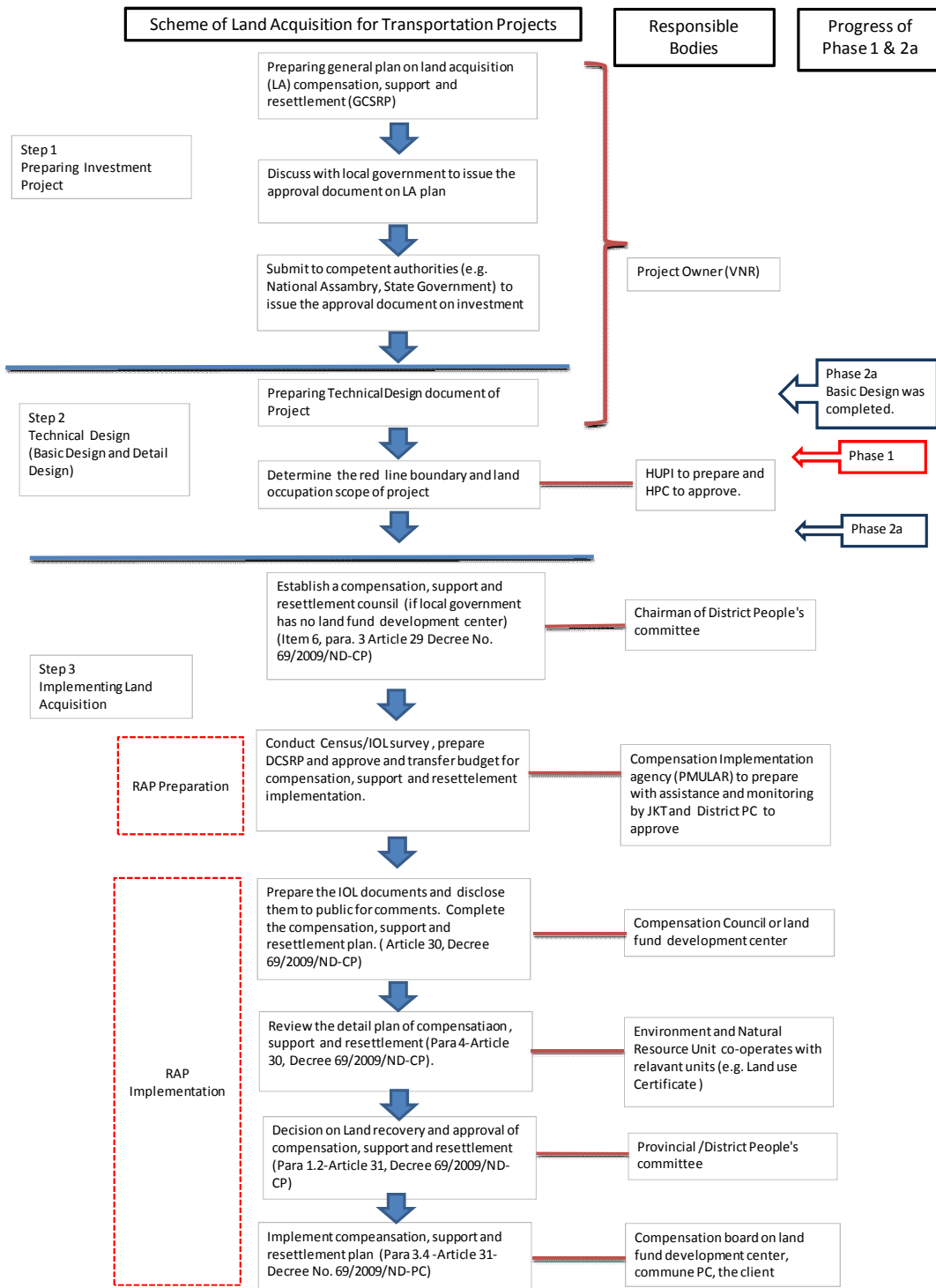
As of February 2012, HUPI is preparing Red Line Boundary Documentations based on the basic design for Phase 1 and Phase 2a. The documents are prepared by the five sections to cover the entire Line 1. Four of the five sections fall into Phase 1 and Phase 2a. For the Ngoc hoi Complex section, the document was already completed and authorized by HPC. The documentations of the other 4 sections are under preparation.

According to the procedures by the Vietnamese regulations, after HPC's approval of the Red Line Boundary, PMULAR under each district will take on the census and detailed measurement survey (DMS) and prepare DCSR. The preparation of DCSR will be assisted by JKT.

The RAP to be reviewed as a subject of a JICA yen loan project must be based on the census survey on all project affected households.

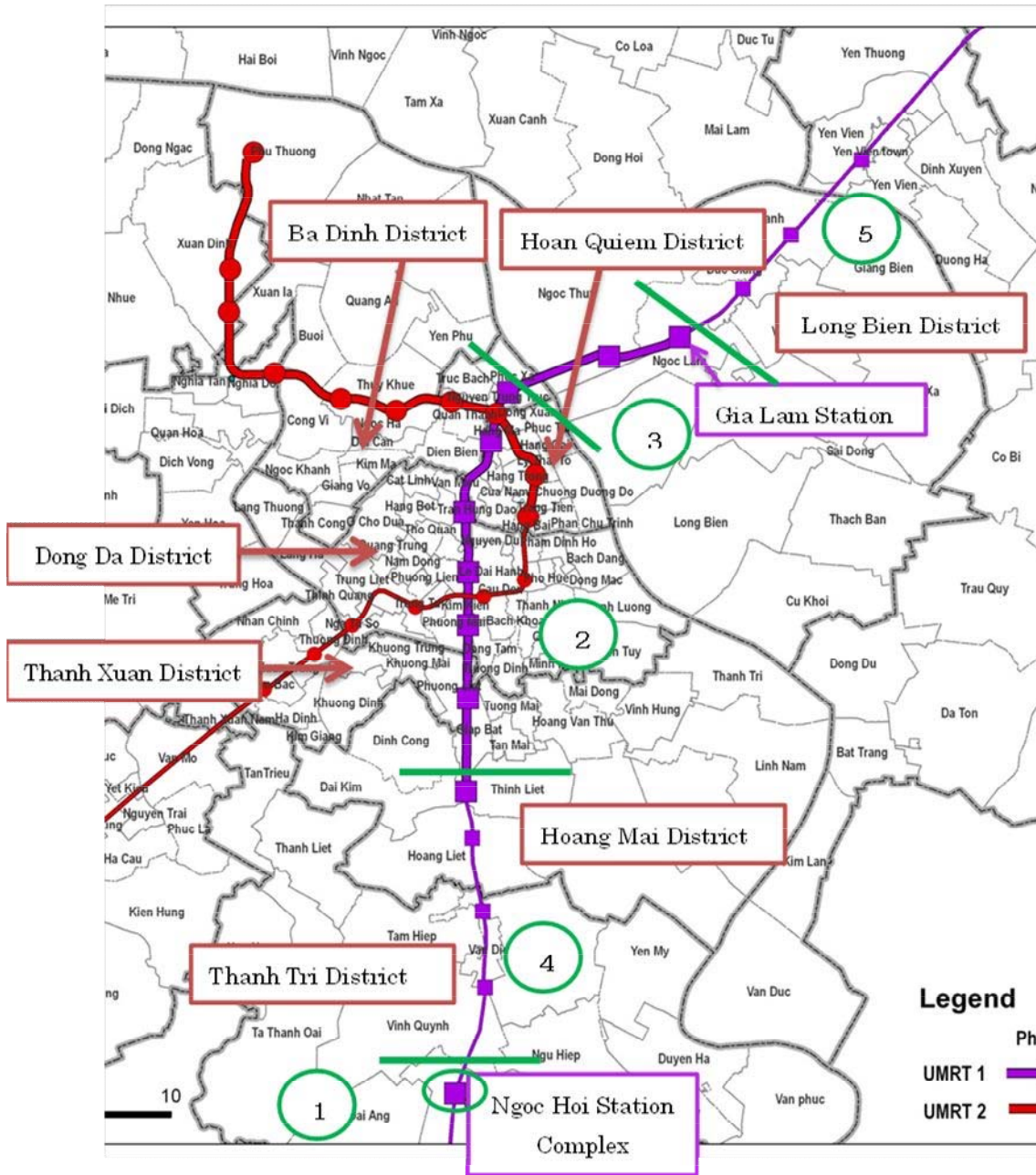
Table 3.2-1 Land Acquisition and Resettlement Documents for HURC 1

Document Name	Description	Relevant Authorities/Institution	Progress on Phase 1	Progress on Phase 2a
General Compensation, Support and Resettlement Plan (GCSR)	Estimation of the costs for land acquisition and resettlement based of the land and structures within Right of Way. Number of households is estimated, but not systematically. The document is part of FS report.	Preparation by RPMU as part of FS.	Prepared in 2008 by the name "Land Acquisition Plan" as part of the Phase 1 FS report approved in 2008.	Prepared in 2010 by the name "General Plan of Land Acquisition" as part of the Phase 2a FS report.
Socioeconomic Survey Reports	Socioeconomic Survey on 30% of affected households.	Prepared by JKT for RPMU.	Completed in 2010.	Completed in 2010.
Red Line Boundary Document	Demarcation of the land and structures to be acquired or removed based on the Basic Design and development plans of the area. The documents will be prepared by 5 sections covering the entire Line 1.	Preparation by HUPL. Approval by HPC.	As of February 2011, the document for the Ngoc Hoi Complex is approved by HPC. The other sections are under preparation	Under preparation.
Detailed Compensation Support and Resettlement Plan (DCSRP)	Equivalent to RAP by the JICA definitions. Land acquisition and resettlement plan based on detailed measurement survey (census on all affected households/persons) and Inventory of Loss survey within the Red Line Boundary.	Preparation by DPC/PMULAR Assistance and monitoring by RPMU/JKT Approval by HPC	For the Ngoc hoi complex, the DCSR will be prepared by 15 March. For the rest, they are to be prepared after Red Line Boundary approvals.	To be prepared after Red Line Boundary approvals.



Source: JICA Survey Team based on the information from RPMU and JKT

Fig. 3.2-1 Scheme of Land Acquisition for Transportation Projects



Source: JCIA Survey Team based on the information from JKT

Note: Grey line: District boundaries. In some area, it is overlapping with the Line 1 (shown in purple line)
Green line: Section boundaries.

Fig. 3.2-2 Sections of Line 1 and Districts

Table 3.2-2 Sections and Districts

Section/Phase	Location	Districts
Section 1/Phase 1	Ngoc hoi Complex	Thanh Tri
Section 2/Phase 1	Giap Bat-South of Long Bien	Hoang Mai Thanh Xuan Dong Da Ba Dinh
Section 3/Phase 1	South Long Bien – Gia Lam	Hoan Kiem Long Bien
Section 4/Phase 2a	Ngoc hoi – Gia bat	Thanh Tri Hoang Mai
Section 5/Phase 2b	Gia lam – Yen vien	Long Bien

Source: JCIA Survey Team based on the information from JKT

According to the person in charge of land acquisition and resettlement in JKT, the time frame for completion of DCSRP and approval by HPC will vary widely from one district to another, since the impacted conditions such as the surface area of the land to be acquired, houses and business to be resettled, the number of project affected households, etc, are very much different among the districts (Table 3.2.-3). The rating in the table is according to the person in charge of land acquisition and resettlement in JKT. According to this person, if the census and DMS are carried out by RPMULAR by each district as planned, in Than tri District, it is expected to take about 3 months to conduct the census and DMS. On the other hand, in Hoan kien District, possibly the most complicated case among others, is expected to take 6 months. This table is created based on the information from the land acquisition plans for Phase 1 and Phase 2a mentioned above, and the number of affected households and of affected persons were the estimations in each plan.

Table 3.2-3 Estimation of Land Acquisition and Resettlement by District

No.	District Name	Land	Displaced House		Household/People		Graves	Land Use Characteristics	Anticipated problem	Rating
		New allocation	Number (house)	Area (m2)	HH	People				
I	Thanh Tri	1,097,706	462	22,252	661	2,584	650	Agricultural, some factories, and residential areas	Relocation of new graves	Easy
II	Hoang Mai	20,775	114	7,038	116	477	0	Residential and commercial		Moderate
III	Thanh Xuan	2,625	44	7,180	66	396	0	Residential and commercial		Moderate
IV	Dong Da	12,524	255	18,767	361	1419	0	Residential and commercial (Hanoi Station, Hospitals)	Identification of PAH/PAP Compensation to commercial land users.	Difficult
V	Hoan Kiem	12,866	219	13,733	350	1282	0	Residential and commercial	Identification of PAH/PAP Compensation to commercial land users.	Most Difficult
VI	Ba Dinh	7,063	40	2,995	52	284	0	Residential and commercial	Identification of PAH/PAP Compensation to commercial land users.	Difficult
VII	Long Bien	78,128	554	39,831	719	3177	0	Residential and commercial		Easy
Total		1,231,687	1,688	111,796	2,325	9,619	650			

Source: JICA Survey Team based on the information from JKT

3.2.2 Review of the Existing Land Acquisition Plans

The result of review of the existing Land Acquisition Plans (Land Acquisition Plan Phase 1 and General Plans of Land Acquisition Phase 2a) and recommendations for the RAP preparation are summarized in the Table 3.2-4. The items to be covered in RAP are based on the World Bank OP4.12 Annex A “Involuntary Resettlement Instruments.” Since the General Plans for Land Acquisition for Thanh tri and Hoang mai Districts are prepared in the same format, they are reviewed as one document.

The recommendations in the table will be incorporated to the final RAP, by carrying out the RAP preparation assistance and monitoring in accordance with the JICA and JBIC guidelines and WB policies by JKT to RPMU. In the mid-March, 2012, the RAP for the Ngoc hoi complex is expected to be ready and for other sections, the process should follow after the approval of Red Line Boundary by HPC.

Table 3.2-4 Review of Phase 1 and Phase 2a GSRPs

Items to be covered	Phase 1	Phase 2a	Recommendations
Description of the project, the alternatives to avoid /minimize resettlement, the reasons for resettlement	<p>The project description is covered.</p> <p>No alternatives are mentioned.</p> <p>The ROW is based on basic design: 3m from the outer edge of elevated structure outwards on both side and 5m from the toe of the embankment.</p>	Same as Phase 1.	Describe how resettlement was minimized or avoided and analyzed through the course of designing.
Magnitude of land acquisition and resettlement (census, socioeconomic studies, inventory of loss, etc)	<p>The surface of the land by land use types within ROW and the number of structures are estimated. Estimation methods for the numbers of houses, affected households, affected persons, etc. is not mentioned clearly.</p>	<p>The surface of the land by land use types within ROW, and the number of structures are estimated. The number of affected households and persons are estimated as “the number of houses = the number of households, the number of affected persons = the number of households x 4.”</p>	<p>Census or Detail Measurement Survey (DMS) planned to be conducted later on, should refer the methods recommended by the World Bank to understand more accurate data on the number of affected households/persons, livelihood, living standards, vulnerable groups etc. This information should be used for analyzing entitlement, planning compensation and assistance and other activities during the RAP preparation.</p>
Legal framework	<p>Description about the Vietnamese legal framework at the time of the document preparation.</p> <p>No mentioning on the JBIC, JICA or other international donor guidelines or policies.</p>	Same as Phase 1.	Conduct a gap analysis between the Vietnamese legal framework and the World Bank policies on resettlement and describe the mechanism to fill the gaps, if any.
Institutional framework/ Organizational responsibilities	<p>Only mentions the relevant decision of HPC</p> <p>No detailed description.</p>	Same as Phase 1.	Describe the step by step process of the resettlement and identify the responsible agencies at each process.

Items to be covered	Phase 1	Phase 2a	Recommendations
Eligibility	No definitions of project affected persons or criteria for their eligibility are described. Cut-off-date is not mentioned.	Same as Phase 1.	Create an entitlement matrix by analyzing the definition of project affected persons and criteria of eligibility based on the WB policies. Set or define the cut-off –date.
Valuation of and compensation for losses	Based on the prices issued by HPC. Compensation is for losses of land, agricultural land, structures, such as houses, graves, trees and livestock.	Based on the prices issued by HPC. Compensation is for losses of land, agricultural land, structures, such as houses, graves, trees and livestock.	Confirm the prices issued by HPC that will be applied for compensation.
Resettlement measures	Brief description on different supports(relocation, living settlement and production activity settlement, job transferring and training, etc.) regulated by HPC.	Only mentions the relevant decision of HPC No detailed description.	Based on the census and socioeconomic survey, examine the compensation and supports by HPC are adequate to restore or improve livelihood of project affected persons. If not, plan appropriate measures to restore their livelihood and living standards.
Relocation and resettlement site/ Housing, infrastructure and social services	No detailed description, other than that the employer will support a part of cost for construction of technical infrastructure of resettlement area. For Hanoi urban districts, resettlement is depending on the city's general plan, and for suburban districts, it is depend on each district plan. No further detailed description.	Same as Phase 1.	Describe the resettlement site, housing, infrastructure, etc., as well as the plan for transferring of the rights, and resettlement schedule.
Community participation by resettlers and host-populations for the resettlement process.	No description.	No description.	Describe how resettlers and host – populations will be involved in resettlement activities.

Items to be covered	Phase 1	Phase 2a	Recommendations
Grievance procedures	Only mentions the relevant decision of HPC No detailed description	Same as Phase 1.	Describe about the grievance procedure mechanism, including members of responsible party, rights, and process of dispute settlement.
Implementation schedule	From the third quarter of 2008 to the third quarter of 2012. No detailed schedule is described.	From the first quarter of 2012 to the last quarter of 2014. No detailed schedule is described.	Based on the latest project work plan, revise and provide more detailed resettlement schedule covering the activities, timeframe and responsible actors to pursue the activities.
Costs and budget	The total cost estimation by district is available, but no breakdowns. The funding source is from State's budget.	Cost estimation including breakdowns at District and Commune/town level is available. The funding source is from State's budget.	Calculate compensation based on the price issued by HPC. Include cost estimations for all the activities necessary for resettlement. Identify the funding source for each item, including how the items not covered by the Vietnamese legal framework will be secured.
Monitoring and evaluation	No description.	No description.	Identify monitoring organizations (both internal and external), items, index and timing.
Stakeholder meetings	No description.	No description.	Conduct stakeholder meetings according to the JBIC guidelines and World Bank policies, and take the views expressed by stakeholders into the preparation of RAP. Attach the records of meetings as annex to RAP. Explain the method of information disclosure about the RAP.

Source: JCIA Survey Team

3.2.3 Recommendations on the Procedures Concerning Environmental and Social Considerations

Recommendations on the EIA reports are as follows.

- Parts or data that are not adequate, unclear or illogical in the existing EIA reports should be revised based on the review and complete the revised EIA report for JICA.
- The contents of the revised EIA report for JICA should be incorporated in the EIA reports for Phase 1 and 2a that are to be submitted to MOT.
- Based on the contents of the revised EIA report for JICA, recalculate the costs for mitigation measures, EMP, etc. Clarify the process to secure the budget for the costs.

Recommendations for RAP preparation and implementation are as follows.

Although the project proponent is VNR, the responsible agents in terms of land acquisition and resettlement are HPC and DPC. In order to ensure that the RAP preparation and implementation of this project are adhering to JBIC guidelines as well as referring to JICA guidelines and WB policies, it is important for HPC and DPC to understand and to have a consensus to follow the guidelines and policies. This will make the assistance by JKT to DPC in the RAP preparation and implementation more effective and also ensure smoother approval process by HPC. However, at this point, there is no concrete record or fact that this matter has been discussed or agreed on with HPC and DPC. It is necessary to have a discussion on this matter and clarify with HPC and DPC before the census or other activities in project affected areas take place following the approval of the Red Line Boundary.

Further, the costs estimated in the existing land acquisition documents are not based on the actual number of the affected households; therefore the amount figures may be grossly underestimated. Considering these points, we made the following recommendations.

- Organize the data, information and activity records related to the land acquisition and resettlement and centralize them under RPMU.
- Build consensus with HPC and DPC to apply JBIC guidelines and refer to JICA guidelines and WB policies when preparing and implementing RAP for this Project.
- Prepare RAP in accordance with JBIC guidelines as well as referring to JICA guidelines and WB policies. This RAP must cover the recommendations in the Table 3.2.-3 such as the census survey, IOL survey, etc. Apply the RAP framework (Annex 13) and draft TOR for RAP preparation (Annex 14)
- The costs related to land acquisition and resettlement should be calculated based on the above mentioned RAP and should be incorporated into the Project cost. The method of securing the budget for the costs should be also clearly described in the RAP.
- Provide timeframe for preparation and implementation of RAP in relation to the work schedule of the project.

4. EVALUATION OF CLIMATE CHANGE MITIGATION EFFECT

4. EVALUATION OF CLIMATE CHANGE MITIGATION EFFECT

4.1 Required Data Collection for Quantitative Understanding of GHG Emission Reduction Effect

The project not only has good effects on improving traffic congestion and air pollution, but also promotes GHG (Greenhouse Gas) emission reductions by realizing modal shift from existing transport system such as cars, motorbikes and buses to a MRT (Mass Rapid Transit) system.

4.1.1 Methodology for Estimation of GHG Emission Reductions

4.1.1.1 CDM Methodology and JICA Climate-FIT

It is possible to evaluate the GHG emission reduction effects in the traffic and transportation sector quantitatively using a methodology described in CDM methodology (ACM0016) and the effects also can be evaluated with JICA Climate-FIT (JICA Climate Finance Impact Tool), which was developed based on existing methods such as CDM methodology. The basic concepts are similar, but there are differences between the CDM methodology (ACM0016) and JICA Climate-FIT (Traffic and transportation sector/MRT). The followings are the main differences between them.

Table 4.1-1 Main Differences between the CDM Methodology and JICA Climate-FIT

Items	CDM Methodology	JICA Climate-FIT
a) Transit systems	All MRT systems	MRT systems (only subway and elevated train systems)
b) GHG emission factors	CO ₂ and CH ₄	Only CO ₂
c) Effects of GHG emission reductions by the improvement of technology	Considered as a technology improvement factor (which is assumed to be 0.99/year)	Not considered
d) Indirect GHG emissions	Additional GHG emissions by utilizing new stations etc. are considered	Not considered
e) Effects of GHG emission reductions due to improvement of traffic congestion	Considered	Not considered
f) CO ₂ emission factors for passenger cars and taxis	Function of speed	Independent of speed
g) Changes in load factors of conventional buses and taxis	Considered	Not considered
h) Motive power	Internal-combustion engine and/or electricity	Electricity

Source: JICA Survey Team (created referring to JICA Climate-FIT (mitigation) methodology sheet by sub-sector)

As shown in Table 4.1-1, the calculation method used in JICA Climate-FIT (Traffic and transportation sector/MRT) is a simplified methodology of the CDM methodology. Although there are differences between the two methodologies, JICA Climate FIT is used for estimation in this survey for the following reasons.

1) Description of a) and h) in Table 4.1-1

Both CDM methodology and JICA Climate-FIT are applicable for the project because the project is about new construction of an urban MRT system of which the motive power is electricity.

2) Description of b) in Table 4.1-1

It is said that the amount of CH₄ emission comprise only less than 2% of the total GHG emissions in the project like this and that the impact of CH₄ emission will be limited.

3) Description of c) in Table 4.1-1

The effects of GHG emission reductions due to the improvement of technology are considered in the CDM methodology and the amount of emissions are assumed to be reduced by 1% per year (i.e. the amount of emissions becomes 99 percent of that of the previous year). In the above condition, the baseline emissions become about 0.91 times in the 10th year, about 0.83 times in the 20th year and 0.75 times in the 30th year the emission of the first year. In developing countries, old vehicles will be continuously used, and so it is not necessary reasonable to assume that the amount of emissions becomes 99 percent of that of the previous year.

4) Description of d), e), f) and g) in Table 4.1-1

It is difficult to collect all the data to completely apply the CDM methodology to the project due to the availability of required data in the range of this survey. Therefore, in case the CDM methodology is applied to the project, there are possibilities that the estimation method would be finally simplified without clear standards and/or that the data which is not so appropriate would be used.

5) Other

Because JICA Climate-FIT does not require much data for estimation of GHG emission reductions compared to the CDM methodology, it is easy to recalculate the amount of GHG emission reductions in case the results of demand forecasting and/or train operation plan change. The result of this survey is easily compared to the other estimation results which are calculated with JICA Climate-FIT.

4.1.1.2 Concepts of Estimation Method of JICA Climate-FIT

The amount of CO₂ emission reductions due to introductions of new urban railway systems is calculated as the difference between baseline emissions (emissions with the existing transport system (cars, buses, motorbikes and other vehicles) assumed to continue) and project emissions (emissions after realizing the modal shift from existing transport system to MRT). The

followings are the estimation methodology for baseline and project emissions in JICA Climate-FIT.

1) Methodology for Estimation of Baseline Emissions

Baseline emissions are estimated by multiplying the number of passengers of each existing transportation mode which shares the similar number of passengers of the new urban railway, with their CO2 emission factors per passenger. The following formulas are used for estimation.

$$BE_y = \sum_i (EF_{P,i,y} \times P_{PJ,i,y})$$

$$EF_{P,i,y} = \frac{EF_{KM,i} \times TD_i}{OC_i}$$

$$EF_{KM,i} = \sum_i \left[(1 - \alpha_{x,i}) \times \left(\frac{1}{SEC_{x,i}} \right) \times EF_{CO2,x} \times \left(\frac{N_{x,i}}{N_i} \right) \right]$$

BE_y Baseline emissions in the year y (gCO2/year)

$EF_{P,i,y}$ CO2 emission factor per passenger for vehicle category i (gCO2/passenger)

$EF_{KM,i}$ CO2 emission factor per km for vehicle category i (gCO2/km)

$P_{PJ,i,y}$ Annual number of passengers transported by vehicle category i
(passengers/year)

TD_i Average trip distance driven by vehicle category i (km/vehicle)

OC_i Average occupancy rate for vehicle category i (passenger/vehicle)

$\alpha_{x,i}$ Mixing rate of biofuel

$SEC_{x,i}$ Specific fuel consumption per vehicle category i using fuel type x (km/liter)

$EF_{CO2,x}$ CO2 emission factor of fuel type x (gCO2/liter)

$N_{x,i}$ Number of vehicle of category i using fuel type x (vehicle)

N_i Number of vehicle of category i (vehicle)

2) Methodology for Estimation of Project Emissions

Project emissions are estimated by multiplying the total annual electricity consumption of MRT trains with the CO2 emission factor of electricity. The following formulas are used for estimation.

$$PE_y = TC_{et,y} \times EF_{CO_2,e}$$

$$TC_{et,y} = DD_y \times SEC_{et,y}$$

PE_y Project emissions in the year y (gCO₂/year)

$TC_{et,y}$ Total annual electricity consumption of MRT trains (kWh/year)

$EF_{CO_2,e}$ CO₂ emission factor of electricity (gCO₂/kWh)

DD_y Total annual trip distance traveled by MRT trains (train km/year)

$SEC_{et,y}$ Electricity consumption rate (kWh/train km)

4.1.2 Data Used to Estimate GHG Emission Reductions

4.1.2.1 Baseline emissions

Baseline emissions are estimated using the values in the demand forecasting and existing survey results (Table 4.1-2).

Table 4.1-2 Data used to estimate baseline emissions (phase 1+2a)

Items	Values			Units
	Car	Motorbike	Bus	
Passengers of existing transport systems <u>1/</u>	Depend on the year			passengers/year
Average occupation rate of existing vehicles <u>1/</u>	2.02	1.36	30	passengers/vehicle
Average trip distance driven by existing vehicles <u>1/</u>	7.74	7.74	7.74	km/vehicle
Specific fuel consumption of existing vehicles <u>2/</u>	Gasoline	12.987	55.556	km/l
	Diesel	15.152	-	
CO ₂ emission factor of fuels <u>3/</u>	Gasoline	2,313		gCO ₂ /l
	Diesel	2,661		
Percentage of gasoline and diesel <u>2/</u>	Gasoline	0.85	1.00	-
	Diesel	0.15	0.00	
Mixing ratio of biofuels <u>4/</u>	Gasoline	0.05	0.05	-
	Diesel	0.05	0.05	

Source: 1/ JICA Survey Team

2/ Measuring the Invisible Quantifying Emissions Reductions from Transport Solutions Hanoi Case Study, Lee Schipper etc. ,2008

3/ Defined values of JICA Climate-FIT

4/ Status and Potential for the Development of Biofuels and Rural Renewable Energy, Nguyen Do Anh Tuan etc. ,2009

1) Methodology for Estimation of Baseline Emissions

Existing transportation modes are assumed to be cars, motorbikes and buses, and the number of shared passengers every 10 years is calculated using the demand forecasting results. Table 4.1-3 shows the number of shared passengers of each existing transport mode every 10 years from the opening year. The number of passengers of motorbike is large and the percentage of car is increasing gradually.

Table 4.1-3 Number of passengers of existing transportation modes every ten years

Year	Car(passengers/year)	Motorbike(passengers/year)	Bus(passengers/year)
2020	17,890,840	53,672,155	13,311,915
2030	32,969,355	64,047,645	21,152,115
2040	54,511,655	77,567,975	32,443,390
2050	85,610,750	95,480,350	48,428,565

Source: JICA Survey Team

2) Average Occupation Rate and Average Trip Distance of Existing Transport Systems

Common values with the data used in demand forecasting are used for the values of the average occupation rate and average trip distance of existing transportation modes.

3) Specific Fuel Consumption Rate and Percentage of Gasoline and Diesel

Values indicated in a study on Hanoi¹ are used for the parameters of specific fuel consumption rate and the percentage of gasoline and diesel. The study assumed several scenarios (see Table 4.2-3) and this survey mainly shows the results using the values estimated in a scenario case 5 (public transport trip share is 30% and emission standard is Euro 4).

4) CO2 Emission Factor of Fuel

Defined values of JICA Climate-FIT, which is based on IPCC database, are used for the CO2 emission factor of fuels.

5) Mixing Ratio of Biofuel

Mixing ratio of biofuel was decided as 5% assuming that biofuel production B5 and E5 are used according to the descriptions of an investigation report of ADB (Asian Development Bank)².

4.1.2.2 Project Emissions

Project emissions are estimated using the data shown in Table 4.1-4. Total annual trip distance by new train and electric power consumption are different according to the year.

¹ Measuring the Invisible Quantifying Emissions Reductions from Transport Solutions Hanoi Case Study, Lee Schipper etc. ,2008
http://pdf.wri.org/measuringtheinvisible_hanoi-508c_eng.pdf

² Status and Potential for the Development of Biofuels and Rural Renewable Energy, Nguyen Do Anh Tuan etc. ,2009
<http://www.adb.org/Documents/Reports/Biofuels/biofuels-vie.pdf>

Table 4.1-4 Data Used to Estimate Project Emissions

Items	Values	Units
Total annual trip distance by new train 1/	Depend on the year	train km/year
Electric power consumption 1/	Depend on the year	kWh/train km
CO2 emission factor 2/	576.4	gCO2/kWh

Source: 1/ JICA Survey Team, 2/ A published value of the Government

1) Total Annual Trip Distance by New Train

Table 4.1-5 shows the total annual trip distance by the new train, which are estimated based on the total annual trip distance in 2020 and the train operation plan.

Table 4.1-5 Total Annual Trip Distance by New Train (Phase1+2a)

Year	Total annual trip distance by new train (train km/year)
2020 - 2036	1,629,725
2037 - 2045	1,766,600
2046 - 2050	1,903,475

Source: JICA Survey Team

2) Electric Power Consumption per Kilometer

Table 4.1-6 shows the values of electric power consumption per kilometer estimated based on the train operation plan where the electric power consumption per 1000ton km is 48.4 (kWh/1000ton km), the weight of six-car train is 336.51(ton/train) and the weight of eight-car train is assumed to be 8/6 times that of six-car train.

Table 4.1-6 Electric Power Consumption (Phase1+2a)

Year	Electric power consumption (kWh/train km)
2020 - 2027	16.287
2028 - 2050	21.716

Source: JICA Survey Team

3) CO2 Emission Factor per kWh

A published value of the Government³ is used for the CO2 emission factor per kWh.

4.2 Evaluation of GHG Emissions Reduction Effect

4.2.1 Estimation of CO2 Emission Reductions

CO2 emission reductions every year of phase 1+2a are estimated using JICA Climate-FIT. Table 4.2-1 and Fig. 4.2-1 show the estimation results of GHG emission reductions. The amount of baseline emissions every year is estimated by interpolating linearly that of baseline emissions every ten years. Baseline emissions increase as the number of shared passengers of existing transportation modes increases on a regular base while project emissions increase in jumps as the transportation plan changes. The amount of CO2 emission reductions increase because the increase of the project emissions is smaller than that of the baseline emissions.

³ Status and Potential for the Development of Biofuels and Rural Renewable Energy, Nguyen Do Anh Tuan etc. ,2009
<http://www.adb.org/Documents/Reports/Biofuels/biofuels-vie.pdf>

4.2.1.1 Estimation Results (Phase1+2a)

1) Estimation of Baseline Emissions

Estimated baseline emissions are 26,708 tCO₂/year in 2020, 40,596 tCO₂/year in 2030, 60,165 tCO₂/year in 2040 and 87,981 tCO₂/year in 2050. The emission is estimated to increase about 3.3 times in the 31 years.

2) Estimation of Project Emissions

Estimated project emissions are 15,300 tCO₂/year from 2020 to 2027, 20,400 tCO₂/year from 2028 to 2036, 22,113 tCO₂/year from 2037 to 2045 and 23,826 tCO₂/year from 2046 to 2050. The emission is estimated to increase about 1.6 times in the 31 years.

3) Estimation of CO₂ Emission Reductions

The amount of CO₂ emission reductions are estimated to increase from 11,408 tCO₂/year in 2020 to 65,155 tCO₂/year in 2050. The amount increases about 5.6 times in the 31 years. The total and the average amount of reductions over the 31 years are 1,014,284 tCO₂ and 32,719 tCO₂ respectively.

Table 4.2-1 Estimated Amount of GHG (CO2) Emission Reductions (Phase1+2a)

Year	Baseline Emissions (tCO2/year)	Project Emissions (tCO2/year)	CO2 Emissions Reduction (tCO2/year)
2020	26,708	15,300	11,408
2021	28,097	15,300	12,797
2022	29,486	15,300	14,186
2023	30,875	15,300	15,575
2024	32,264	15,300	16,964
2025	33,653	15,300	18,353
2026	35,042	15,300	19,742
2027	36,431	15,300	21,131
2028	37,820	20,400	17,420
2029	39,209	20,400	18,809
2030	40,596	20,400	20,196
2031	42,553	20,400	22,153
2032	44,510	20,400	24,110
2033	46,467	20,400	26,067
2034	48,424	20,400	28,024
2035	50,381	20,400	29,981
2036	52,338	20,400	31,938
2037	54,295	22,113	32,182
2038	56,252	22,113	34,139
2039	58,209	22,113	36,096
2040	60,165	22,113	38,052
2041	62,947	22,113	40,834
2042	65,729	22,113	43,616
2043	68,511	22,113	46,398
2044	71,293	22,113	49,180
2045	74,075	22,113	51,962
2046	76,857	23,826	53,031
2047	79,639	23,826	55,813
2048	82,421	23,826	58,595
2049	85,203	23,826	61,377
2050	87,981	23,826	64,155
Total	1,638,431	624,147	1,014,284
Average	52,853	20,134	32,719

Source: JICA Survey Team

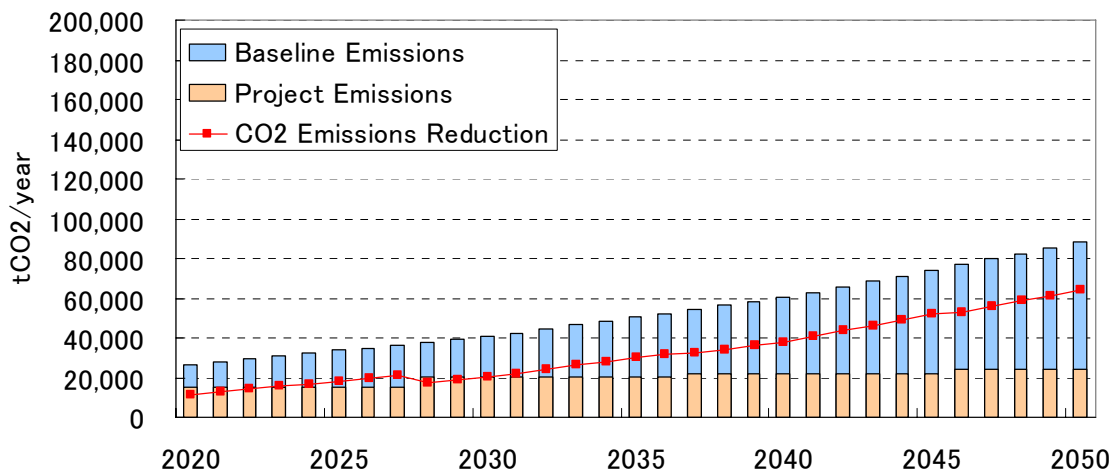


Fig. 4.2-1 Estimated Amount of GHG (CO2) Emission Reductions (Phase1+2a)

4.2.1.2 CO2 Emission Reductions with Other Emission Scenarios

The results above are estimated using the values of specific fuel consumption rate and the percentage of gasoline and diesel in scenario case 5 (public transport trip share is 30% and emission standard is Euro4) indicated in the study on Hanoi⁴ as noted previously. Table 4.2-3 shows the estimation results of CO2 emission reductions using values of the same parameters in scenarios case 1 to case 5 (see Table 4.2-2). Table 4.2-2 and Table 4.2-3 indicate that the CO2 emission reductions are larger where fuel-inefficient vehicle are supposed to be used.

Table 4.2-2 Specific Fuel Consumption Rate and the Percentage of Gasoline and Diesel in Each Scenario

		Case1	Case2	Case3	Case4	Case5
		Euro1	Euro2	Euro2	Euro3	Euro4
		2020 Business as usual		2020 High Mass Transit		
Public Transport Trip Share		14.5%		30%		
Percentage of diesel	Car	0.075	0.075	0.15	0.15	0.15
	Motorbike	-	-	-	-	-
	Bus	0.75	0.75	0.90	0.90	0.90
Specific fuel consumption rate (Gasoline) (km/l)	Car	8.197	8.696	11.628	12.346	12.987
	Motorbike	21.739	32.258	43.478	50.000	55.556
	Bus	1.372	1.610	2.174	2.273	2.381
Specific fuel consumption rate(Diesel)(km/l)	Car	10.417	10.989	13.699	14.493	15.152
	Motorbike	-	-	-	-	-
	Bus	1.742	2.045	2.500	2.632	2.857

Source: Measuring the Invisible Quantifying Emissions Reductions from Transport Solutions Hanoi Case Study, Lee Schipper etc. ,2008

Table 4.2-3 Estimated Amount of CO2 Emission Reductions for Each Scenario (Phase1+2a)

Year	Case1	Case2	Case3	Case4	Case5
2020	38,934	27,069	16,519	13,589	11,408
2030	58,192	43,058	27,328	23,280	20,196
2040	90,564	70,998	47,993	42,396	38,052
2050	137,012	111,368	78,041	70,272	64,155

Source: JICA Survey Team

4.2.2 CO2 Emission Reductions in Other Projects

Table 4.2-4 shows estimation results of GHG emission reductions in eleven projects registered in CDM in the transportation sector as of January 2012. Two projects in Table 4.2-4, 'Metro Delhi, India' and 'Mumbai Metro One, India' are the projects with GHG emission reduction effects by modal shift from existing transportation systems to railways. The outline of these projects is shown in Table 4.2-5 and Table 4.2-6.

The amount of CO2 emission reductions in this survey is smaller than that of the projects as shown in Table 4.2-5 and Table 4.2.6. One of the reasons for this is the large number of passengers for the two projects. Another reason is that the smaller value of average trip distance is used in this survey.

⁴ Measuring the Invisible Quantifying Emissions Reductions from Transport Solutions Hanoi Case Study, Lee Schipper etc. ,2008 http://pdf.wri.org/measuringtheinvisible_hanoi-508c_eng.pdf

Table 4.2-4 Project Registered in CDM in the Transport Sector

Registered	Title	Host Parties	Other Parties	Methodology <u>1/</u>	Reductions <u>2/</u>
2006/12/7	BRT Bogotá, Colombia: Trans Milenio Phase II to IV	Colombia	Switzerland Netherlands	AM0031	246,563
2007/12/29	Installation of Low Green House Gases (GHG) emitting rolling stock cars in metro system	India	Japan	AMS-III.C. ver. 10	41,160
2010/4/26	Cable Cars Metro Medellín, Colombia	Colombia	Switzerland	AMS-III.U.	17,290
2010/10/19	BRT Chongqing Lines 1-4, China	China	Switzerland Germany	AM0031 ver. 3	218,067
2010/12/17	Plant-Oil Production for Usage in Vehicles, Paraguay	Paraguay	Switzerland	AMS-III.T.	17,188
2011/2/4	Modal Shift from Road to Train for transportation of cars	India		AMS-III.C. ver. 11	23,001
2011/5/30	BRT Lines 1-5 EDOMEX, Mexico	Mexico	Switzerland Portugal	ACM0016	145,863
2011/6/7	BRT Zhengzhou, China	China	Switzerland Portugal	AM0031 ver. 3	204,715
2011/6/30	Metro Delhi, India	India	Switzerland	ACM0016	529,043
2011/8/10	BRT Metrobus Insurgentes, Mexico	Mexico	Spain	ACM0016 ver. 2	46,544
2011/10/4	Mumbai Metro One, India	India	Switzerland	ACM0016 ver. 2	195,547

1/ AM - Large scale, ACM - Consolidated Methodologies, AMS - Small scale

2/ Estimated emission reductions in metric tonnes of CO₂ equivalent per annum (as stated by the project participants)

Source: JICA Survey Team (with UNFCCC homepage)

Table 4.2-5 Outline of the Project “Metro Delhi, India”

Project Name	Metro Delhi, India							
Country	India							
Length(km)	101.67km							
Passengers (passengers/year)		2011	2012	2013	2014	2015	2016	
	Passengers	386,569,310	613,195,568	648,454,313	685,740,436	725,170,511	766,867,816	
		2017	2018					
	Passengers	810,962,715	285,864,357					
CO2 Emission Reductions (tCO2/year)		2011	2012	2013	2014	2015	2016	
	Baseline emissions	494,074	775,888	812,296	850,413	890,319	932,097	
	Project emissions	188,997	298,498	314,307	330,966	348,520	367,020	
	Emission Reductions	305,077	477,389	497,989	519,448	541,799	565,077	
		2017	2018					
	Baseline emissions	975,836	340,542					
	Project emissions	384,753	135,099					
	Emission Reductions	591,082	205,443					

Source: UNFCCC HP

Table 4.2-6 Outline of the Project “Mumbai Metro One, India”

Project Name	Mumbai Metro One, India							
Country	India							
Length(km)	11.4km							
Passengers (passengers/year)		2011	2012	2013	2014	2015	2016	
	Passengers	67,944,250	209,090,400	214,483,665	220,016,044	225,691,125	231,151,781	
		2017	2018	2019	2020	2021		
	Passengers	236,744,560	242,472,657	248,339,347	254,347,983	173,668,000		
CO2 Emission Reductions (tCO2/year)		2011	2012	2013	2014	2015	2016	
	Baseline emissions	81,342	247,816	251,666	255,576	259,547	263,168	
	Project emissions	19,579	59,291	62,461	63,032	70,043	70,572	
	Emission Reductions	61,762	188,525	189,205	192,544	189,503	192,596	
		2017	2018	2019	2020	2021		
	Baseline emissions	266,840	270,564	274,339	278,167	188,032		
	Project emissions	71,108	71,651	72,202	72,761	48,885		
	Emission Reductions	195,732	198,912	202,136	205,406	139,147		

Source: UNFCCC HP

5. CONCERNED ISSUES FOR SMOOTH PROJECT IMPLEMENTATION

5. CONCERNED ISSUES FOR SMOOTH PROJECT IMPLEMENTATION

5.1 Scale and Validity of Project

(This part was deleted to disclose information in certain period)

As a result of the increased cost, EIRR of this Project is assumed as 3.3% in case of simultaneous inauguration of Phase 1 + 2a. Even in the case that Phase 1 + 2a + 2b is to be inaugurated simultaneously, EIRR of this Project is still low, 6.1%.

Table 5.1-1 Comparison between Project Cost and IRR

(This part was deleted to disclose information in certain period)

In Vietnam, according to Decree No.12/2009/ND-CP, in case of total project cost and/or project objectives are changed since FS was approved, a procedure named “Project Adjustment” is required to obtain approval from government. In addition, in case of total project cost exceeds VND 35 trillion, approval of National Assembly is mandatory based on Resolution No.49/2010/QH12, June 19, 2010.

In Vietnam, required time for the Project Adjustment of MRT Project in HCMC was rather long, for example. In the case of this Project, Project Adjustment is unavoidable because total project cost is drastically increased. The survey team conducted a hearing from MOT and VNR for procedure of the Project Adjustment, but exact timing of the procedure could not be confirmed. Approval from the Government of Vietnam concerning the increased project cost is a precondition for smooth implementation of this Project.

5.2 Approval Procedure of Project Cost in Vietnam

According to the regulation in Vietnam, if total project cost and/or objective, contents of public project is changed comparing with what was approved according to FS, Project Adjustment is necessary. Since the cost of this Project (Phase 1) is increased from the original FS and further in case of Phase 1+2a is constructed simultaneously, this approval process is indispensable. VNR has already informed MOT that the scale of the Project cost is drastically increased, and then MOT principally agreed by a letter dated 20 December 2011 (No.528/TB-BGTVT). In this letter, MOT requested VNR to carefully study the total project cost, then report it to MOT for approval procedure to the Prime Minister and National Assembly.

1) Procedure of Project Adjustment

According to Decree of Vietnamese Government on Management of Investment Projects on the Construction of Works: No.12/2009/ND-CP Article 14, an investment project on the construction of a work can be adjusted by the following cases: (1) it is affected by natural disaster, (2) there arise elements which bring about higher efficiency for the project, (3) changes in construction planning directly affect the project's location, size, nature and objective, (4) there are abnormal fluctuations in prices of raw materials, materials or fuel or in exchange rates with respect to foreign-currency capital amounts. When project adjustments result in changes in the project's location, size or objective or an increase in the approved total investment, investor shall report thereon to investment deciders for decision. In this Project, VNR is "investor" and MOT is "investment decider".

In case of the Project Adjustment is carried out for the Project, VNR will select a consultant to carry out the Project Adjustment for the Project. However, based on letter No.528/TB-BGTVT of MOT, approval of basic design, red line boundary and architectural alternative are preconditioned for beginning of Project Adjustment.

Approval of the Project Adjustment is not only from MOT as investment decider, but also shall be agreed by the government (prime minister). In this process, opinion from MOF and MPI also shall be obtained. In case of MRT Project in HCMC, the investment decider is HCMC People's Committee. Procedure of the Project Adjustment is finalized after the Prime Minister approved changes of project's contents proposed by HCMC People's Committee by taking into consideration of opinions from MOF, MPI and MOT. In that case, MOT submitted opinion as a responsible line ministry for transport sector, however, in the case of this Project, MOT itself is "investment decider".

2) Approval Procedure of National Assembly

In 2010, National Assembly published a Resolution No.49/2010/QH12 in June 19, 2010 related to projects and works of national importance. The resolution title is “Projects and works of national importance to be submitted to the National Assembly for decision on their investment”. The criteria of projects which are subject to this resolution are shown in Table 5.2-1.

Table 5.2-1 Project Condition which Require National Assembly’s Approval

1	Having a total investment capital of VND 35 trillion or more, including a state capital amount of VND 11 trillion or more
2	Greatly affecting the environment or having a latent risk of seriously affecting the environment
3	Requiring change of the use purpose of a land area of 500 ha or more currently used for two rice crops every year
4	Requiring resettlement of 20,000 inhabitants or more for mountainous areas, or 50,000 inhabitants or more for other areas
5	Being located in a geographical area which exists a national relic of specially important historical-cultural significance or a scenic place ranked as a national one
6	Being located in a geographical area of special national defense or security importance
7	Requiring a special mechanism or policy which must be decided by the National Assembly

Approval by National Assembly shall be obtained in Pre-FS stage for projects which are relevant to the above conditions. However, according to Article 10 of the resolution, on-going projects which are relevant to the above conditions also shall be submitted and considered by National Assembly. This is the case that, although scale of the project was not relevant with the above conditions, FS was already approved and the Project is on-going, when the total project cost becomes relevant to above condition after Project Adjustment, it shall be submitted to National Assembly for consideration.

Total cost of this Project in original FS was less than VND 20 trillion, which was below the criteria of approval by National Assembly. Therefore, the Project was executed after approval from Prime Minister was obtained. However, it is currently in detail design stage, and it became clear that total project cost exceeds VND 35 trillion, which shall be submitted to National Assembly. Letter No.528/TB-BGTVT from MOT mentioned that VNR is requested to carefully study the total project cost then submit it to MOT for consideration, submission and reporting to the Prime Minister and National Assembly. Statement in this letter is related with the aforementioned resolution. However, in Article 10 of the aforementioned resolution, there is a stipulation “consideration and decision to suit reality” for on-going project, which implies treatment between the new project and on-going project is slightly different.

3) Approval of Total Project Cost

MOT and VNR understand that the Project Adjustment is necessary according to the total project cost. However, they stated that the cost estimation of package of Ngoc Hoi Station Complex is below the original approved cost estimation for Phase 1. Thus, construction could be commenced if loan is provided. Parallel with construction commencement, the Project Adjustment will be continued. VNR stated that before the accumulated project cost exceeds the approved total project cost, approval on revised project cost will be inevitable. In addition, MOT and VNR stated that for on-going projects whose project cost exceed VND 35 trillion, approval from National Assembly is not necessary like MRT Project in HCMC. During the discussion with JICA Contact Mission in February 2012, VNR did not request unification of Phase 1 and Phase 2a, but will consider as two different projects which will be completed and inaugurated in the same time. This statement implies that FS of Phase 1 was already approved, and then it shall be treated as on-going project.

Both of Project Adjustment and National Assembly approval is domestic matter of Vietnamese side. Since these issues might become bottlenecks for smooth project implementation, prompt attention from concerned authorities in Vietnam is required. JICA Contact Mission in February 2012 also requested VNR to obtain consensus with MOF and MPI.

In general, executing agency will select a consultant to carry out works of the Project Adjustment. However, letter of MOT No.528/TB-BGTVT stipulated that the Project Adjustment shall not be implemented until sufficient approvals have been obtained for red-line boundary, architecture alternative and basic design. Thus, acceleration for these approvals is required.

5.3 Procedure of Land Acquisition

Necessary land acquisition for the Project, as mentioned in Chapter 3, sub-chapter 3.2.1, after PMULAR of each area prepared RAP (DCSRP: Detailed Compensation, Support and Resettlement Plan), then detail compensations are assessed and decided based on negotiation between affected persons and related institution. Land acquisition cost is included in the total project cost although excluded from yen loan. Currently, allocation for land acquisition cost is VND 3.25 trillion (JPY 12.03 billion yen) according to FS. In General Land Acquisition Plan, which was attached to FS, number of houses to be resettled for the Project was mentioned. Cost for land acquisition will be calculated based on the compensation cost for relocation as decided by HPC.

Since the Project is implemented referring to the JBIC Guidelines published in 2002, calculation of compensation cost will follow the decision of Hanoi City. This policy was notified to VNR in March, 2012 by JICA.

In General Land Acquisition Plan, which was attached to FS, land acquisition cost is financed from national budget. At first, HPC calculates the cost based on RAP, then VNR allocate it in total project cost, and finally, MOT will secure the estimated budget.

5.4 Approval of EIA Report

As described in Chapter 3, sub-clause 3.1.1, EIA Report for Phase 1 and 2a section were approved by MOT in 2008. Afterwards, since the project is not yet started within 2 years after approved, according to the regulation of EIA in Vietnam at that time, Supplemental EIA was prepared in 2011. EIA data were updated according to the current condition, and then Supplemental EIA Report was prepared. In this Report, design changes of the Project consisting of width of Ngoc Hoi Station Complex and relocation of Red River Bridge were already reflected. Afterwards, Supplemental EIA Report was going to be submitted to MONRE. However, regulation of preparing EIA were revised in September 2011. According to the new regulation, existing EIA Report shall be separated and reorganized phase by phase, and then submitted to MOT Environmental Division to obtain approval.

Currently, RPMU is still selecting consultants to prepare EIA Reports. EIA Report for Phase 1 will be submitted in March 2012, and for Phase 2a is expected after March 2012. Approval period is usually within 30 business days. Draft of FS Report for relevant section shall be attached to the EIA Report in order to obtain approval, but FS Report of Phase 2a is still not completed and need to be awaited. As the approval of EIA is precondition of obtaining approval of FS Report, if submission of EIA Report is delayed, final approval of FS is also delayed.

The Project is referring to JBIC guidelines published in 2002. This survey will ensure and suggest that the EIA Report for JICA shall be prepared in accordance with the guidelines. EIA Report to be submitted to MOT is also suggested to reflect this suggestion. In addition, necessary cost for environmental and social consideration (mitigation, monitoring, etc.) shall be calculated based on EIA Report, and then included in the total project cost.

5.5 Approval of Phase 2a FS

In the discussion with JICA Contact Mission in August 2011, VNR expressed to receive yen loan which covers Phase 1 and Phase 2a at the same time. Since JICA needed to review the contents of FS Phase 2a, JICA asked VNR to accelerate the approval process of FS Phase 2a. In response to this request, VNR decided to submit its draft English version even before its final approval by Vietnam side. Then, this preparatory survey was implemented after JICA received draft English version of FS Phase 2a from VNR. In the first version of draft report, Chapter 8: Land acquisition and resettlement action, Chapter 9: EIA, Chapter 12: Economical and financial analyses were missing. Also, Chapter 10: Breakdown of construction cost was not complete. Later, the above lack items were submitted to the survey team after the survey commencement.

However, progress of work preparation and approval of Phase 2a FS report is delayed and period to obtain official approval is unclear. RPMU had stated to complete and submit FS Report in February 2012 to VNR, and then VNR would submit it to MOT in March 2012. Approval from MOT is estimated could be obtained in April 2012. However, approval of EIA Report is a precondition to obtain approval of FS as above. JICA expressed that appraisal for the following term of yen loan, approval of Phase 2a FS Report by the Government of Vietnam is indispensable condition.

Procedures to obtain approval of Phase 2a FS Report are as follows, 1) VNR contracts a consultant to carry out FS, then the mentioned consultant prepare and submit report to VNR, 2) Appraisal consultant assists VNR to review the FS contents, 3) VNR approves the FS, then submits to MOT, 4) Parallel with the previous procedure, VNR also select a consultant to carry out EIA. Afterwards, EIA Report attached with Draft FS Report is submitted to MOT to obtain approval. Finally, after EIA Report is approved, FS Report attached with approved EIA Report is submitted to MOT and Prime Minister Office to obtain approval.

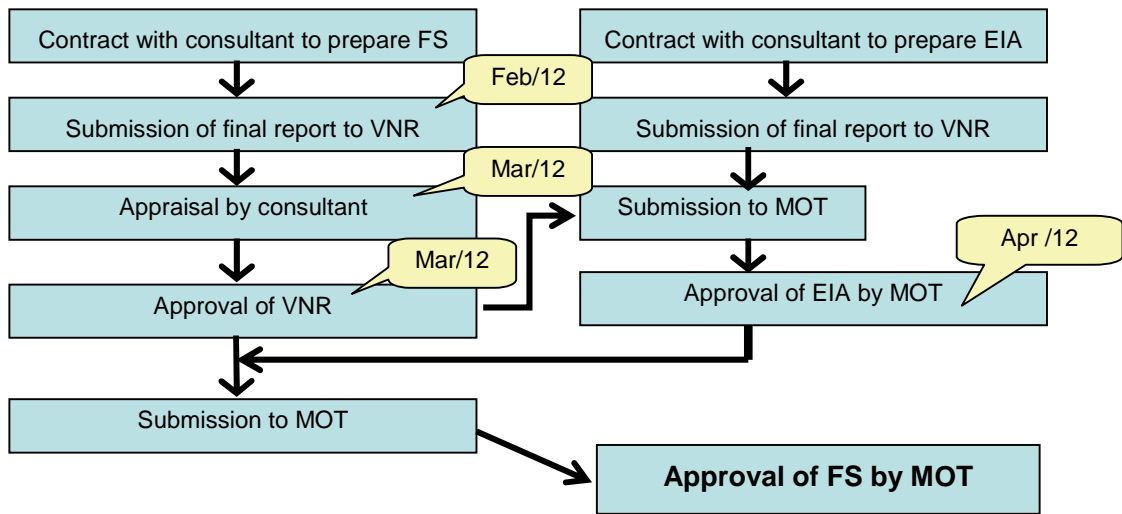


Fig. 5.5-1 Approval Procedure of FS and EIA

5.6 Various Matters related to the Project Implementation

According to analysis of relation of various matters of the project approval, as aforementioned in sub-chapter 5.2, approval of total project cost by the Government of Vietnam is necessary. Thus, total project cost shall be calculated. Generally, appropriateness of total project cost is conducted based on FS level estimation. However, since this Project already entered detailed design of Phase 1, estimation of project cost will be more accurate if it is calculated based on detailed design. However, basic design of the Project which already submitted more than 1 year ago is still not yet approved by HPC. Thus, detailed design cannot be finalized. In addition, as RAP based on census is not yet carried out, land acquisition cost in the total project cost is still not clear.

In order to combine scope of Phase 1 and 2a, approval of Phase 2a FS report is a precondition. Sequential relation of these necessary procedures, considering Project Adjustment and National Assembly's approval is inevitable, are shown in the left side of Fig. 5.6-1.

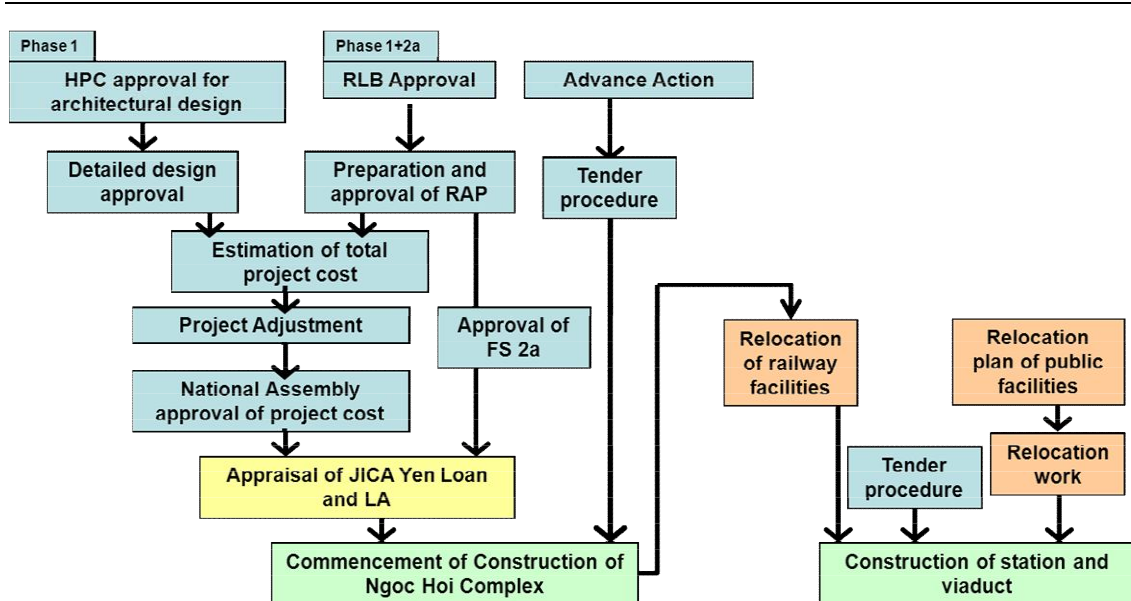


Fig. 5.6-1 Relation of Various Matters for Project Implementation

Related to the context after yen loan is implemented, only after Ngoc Hoi Station Complex is developed, existing railway facilities for freight transport in Giap Bat Station could be relocated. Afterwards, train operation of existing line is stopped to commence construction of viaduct and station building. In addition, power line, water supply and sewerage facilities, which cross project site and become construction obstacles, shall be completely relocated.

Advance Action as shown in Fig. 5.6-1 is a special procedure in Vietnam, which allows a part of procurement step of consulting service or contractor to proceed even before LA is signed, which shall be executed only after LA is signed and coming into effect in principle. Thus, commencement of Ngoc Hoi Station Complex, which influence overall construction schedule and needed to be conducted firstly, is become possible earlier than the case without Advance Action. Currently, approval process of contract package targeted by Advance Action is on-going. In March 2012, final decision of targeted contract package is to be conducted by VNR and then reported to MOT for obtaining JICA's concurrence. Although in the initial step of Advance Action, 6 development banks including JICA mutually agreed on respective projects targeted to Advanced Actions, decision-making by Vietnamese side is taking long time. Thus, World Bank and ADB have withdrawn the agreement. Since Advance Action is not systematically established in Vietnam, further progress shall be carefully monitored.

In the contract of consulting services conducted by JKT since 2009, the scopes of basic design from Ngoc Hoi to Yen Vien (all sections of Phase 1 + 2a + 2b), detailed design and assistance in tender of Phase 1 section are included. Basic design of all sections was already finished by JKT. According to the approval procedure, after approved by VNR, final approval by MOT is necessary. However, parts of basic design consisting of track alignment, station location, ROW drawing, Red Line boundary drawing, architectural design of station, architectural design of Red River Bridge, and architectural design viaduct are subject to approval by HPC. Long time is needed to obtain approval. According to the architectural design of each station, the location of the 5 terminal stations and the 10 dedicated urban railway stations as well as the station plaza designs are all mostly adjusted with the HAIMUD plan. All of these matters were reflected in

application drawing for building permission (Master Layout Plan, etc.) and has been submitted to HAPA. However, in March 2012, none of the station designs have yet been approved. Because the Master Layout Plan is part of the Basic Design, the architectural detailed design work has been put on hold.

Critical pass of the Project in the construction schedule is the packages of Ngoc Station Complex. Commencement time of this package will greatly affect overall construction schedule. Afterwards, the schedule of resettlement of residents and relocation of interfered facilities will affect the progress. In addition, as stipulated in sub-chapter 5.2, in case of approval of total project cost by Vietnamese Government is to be processed in parallel way, approval time will also influence the construction schedule.

5.7 Existing Condition of Each Section

Hanoi Urban Railway Line 1 could be separated into 5 sections consists of Yen Vien, Gia Lam, Hanoi, Giap Bat and Ngoc Station Complex. Table 5.7-1 shows current condition of basic design progress, detailed design progress, approval progress of ROW and RLB, preparation of RAP, difficulty level in resettlement, and estimation of construction cost (including EMU).

In the column of Expected Difficulty of Resettlement, quantitative judgment is uneasy because census to the influenced residents is not yet implemented. Thus, it is assumed that © means number of resident to be resettled is small, and on the contrary, × means number of resident to be resettled is large.

Table 5.7-1 Current Condition of Various Procedures of Hanoi Line by Each Section

	Phase	BD	DD	BD/D D Appro -val	ROW Aprv	RAP Preparation	Difficulty level of Resettlement
					by VNR/ RLB by HPC		
Yen Vien	2b	Done	-	×/-	Done/×	×	△ 1/
Gia Lam	1	Done	Ongoing (report in Feb)	×/×	Done/×	Draft (w/o census, IOL)	×
Hanoi	1	Done	Ongoing (report in Mar)	×/×	Done/×	Draft (w/o census, IOL)	△
Giap Bat	2a	Done	-	×/-	Done/×	Draft (w/o census, IOL)	○
Ngoc Hoi	1	Done	Ongoing (Submit -ted)	×/×	Done/×	Draft (w/o census, IOL)	◎

Note:

1/ Difficulty level is supposition. Marks shows necessary period for census and IOL survey. X means longer and ◎ means shorter.

5.8 Recommendation to Accelerate Project Implementation

In order to execute the Project, various matters that should be solved are summarized in the following. These matters had confirmed by JICA to VNR prior to Contact Mission in February 2012.

- Decision of project scope and phasing
- Total project cost
- Procedure of Project Adjustment
- Preparation of RAP by HPC
- Approval of Basic Design by VNR and HPC
- Necessary design for early construction commencement of Ngoc Hoi Station Complex, approval procedure of RLB, RAP and Project Adjustment as well as other necessary works to accelerate the Project implementation.

JICA Contact Mission focused on the above matters, agreed to accelerate implementation of Project and prepared Minutes of Meeting confirming the following issues.

1) Project Scope

Considering the project effectiveness, JICA judged that integration of Phase 1 and 2a is more appropriate. However, VNR considered as two different projects which will be inaugurated at the same time. In addition, VNR also requested to prioritize the construction commencement of Ngoc Hoi Station Complex as part of Phase 1.

2) Project Cost Increase and Project Adjustment Procedure

Both parties agreed that the Project Adjustment is necessary because total project cost is increased comparing with original plan. Although, JICA mentioned that the Project Adjustment shall be finished prior to the construction commencement and approval by National Assembly is inevitable, VNR expressed that construction of Ngoc Hoi Station Complex could be started because the cost estimation is within the range the original project cost of Phase 1. In addition, approval from National Assembly is not necessary for on-going project.

However, JICA stated that even loan is financed for the construction of Ngoc Station Complex only, consensus from MOF and MPI is necessary. VNR agreed to obtain agreement from both ministries.

3) Preparation of RAP

The VNR agreed to prepare the RAP in accordance with the JICA guidelines. Regarding compensation for removal, JICA agreed that Hanoi City's price shall be adopted, not reacquisition price. The VNR also agreed to prepare the RAP for Ngoc Hoi area before appraisal mission is dispatched.

4) Existing condition of Ngoc Hoi Station Complex

JICA understands the necessity of early commencement of Ngoc Hoi Station Complex as explained by VNR. Then, JICA requested VNR to take necessary steps within Vietnamese side.

5) Detailed design of Phase 2a

JICA took note on the necessity of early commencement of detailed design of Phase 2a as explained by VNR.

6) Additional request of Loan Coverage Item

JICA took note on additional request of VNR regarding loan coverage items for relocation of high-voltage power line, relocation of public utilities crossing the alignment, construction cost for resident resettlement site