8.7 Compensation Policy, Eligibility and Entitlement

8.7.1 Compensation Policy

Principle policy on land acquisition and involuntary resettlement is based on the JICA Environmental Guidelines and JICA's policy described in Table 8.5-3. Compensation policy of the project should comply with the policy.

Projects affected persons (PAPs) who have assets within or reside within the area of project land-take before the cut-off date are entitled to compensation for their losses. Those who have lost their income and/or subsistence will be eligible for livelihood rehabilitation assistance based on the criteria of eligibility defined by the project in consultation with the PAPs. If, by the end of the project, livelihoods have been shown not to be restored to pre-project levels, additional measures will be provided.

- The compensation rates will be determined based on the results of independent appraisal of the land/crops/assets (associated with the land) in a timely and consultative manner. All fees and taxes on land and/or house transfers will be waived or otherwise included in a compensation package for land and structures/or houses or businesses. The local authorities will ensure that PAP choosing relocation on their own, obtain, without additional costs, the necessary property titles and official certificates commensurate with similar packages provided to those who choose to move to the project resettlement sites
- Land will be compensated “land for land”, or in cash, according to PAP’s choice whenever possible. The choice of *land for land* must be offered to those loosing 30% or more of their productive land. If land is not available, Project Management Unit (PMU) must assure itself, that this is indeed the case. Those loosing 30% or more of their land will have to be assisted to restore their livelihood. The same principles apply for the poor and vulnerable people losing 10% or more of their productive landholding.
- PAPs that prefer “land for land” will be provided with land plots with the equivalent productive capacity for lost lands or a combination of land (a standard land plot) in a new residential area nearby for residential land, and cash adjustment for difference between their lost land and the land plots provided. The resettlement area will be planned properly and implemented in consultation with the PAPs. All basic infrastructures, such as paved roads, sidewalks, drainage, water supply, and electricity and telephone lines, will be provided.
- PAPs who prefers “cash for land” will be compensated in cash at the full replacement cost. These PAPs will be assisted in rehabilitating their livelihoods and making their own arrangements for relocation.

- Compensation for all residential, commercial, or other structures will be offered at the replacement cost, without any depreciation of the structure and without deduction for salvageable materials. Structures shall be evaluated individually. Any rates set by category of structure must use the highest value structure in that group (not the lowest).
- The PAPs will be provided with full assistance (including a transportation allowance) for transportation of personal belongings and assets, in addition to the compensation at replacement cost of their houses, lands and other properties.
- Compensation and rehabilitation assistance must be provided to each PAP at least 30 days prior to the taking of the assets for those who are not to be relocated and 60 days for those who will have to be relocated. Exceptions should be made in the case of vulnerable groups who may need more time.
- If, by the end of the project, livelihoods have been shown not to be restored to pre-project levels, additional measures will be provided.
- Financial services (such as loans or credits) will be provided to PAPs if necessary. The installment amounts and the schedule of payments will be within the repayment capacity of PAP.
- Additional efforts, such as economic rehabilitation assistance, training and other forms of assistance, should be provided to PAPs losing income sources, especially to vulnerable groups, in order to enhance their future prospects toward livelihood restoration and improvement.
- The previous level of community services and resources, encountered prior to displacement, will be maintained or improved for resettlement areas
- Because there are observed several numbers of graves in the paddy field and family alters in specific houses in the project area, assistance for religious ceremony should be considered as well as the compensation for physical loss and/or relocation.

8.7.2 Eligibility Criteria and Entitlements

(1) Project affected persons (PAPs)

People directly affected by the project through the loss of land, residences, other structures, business, assets, or access to resources, specifically are:

- Persons whose agricultural land will be affected (permanently or temporarily) by the Project
- Persons whose residential land/houses will be affected (permanently or temporarily) by the Project;
- Persons whose leased-houses will be affected (permanently or temporarily) by the Project;

- Persons whose businesses, occupations. or places of work will be affected (permanently or temporarily) by the Project;
- Persons whose crops (annual and perennial)/ trees will be affected in part or in total by the Project;
- Persons whose other assets or access to those assets, will be affected in part or in total by the Project; and
- Persons whose livelihoods will be impacted (permanently or temporarily) due to restriction of access to protected areas by the Project.
- Community owned assets, collective assets, enterprise, any other governmental and private organizations, whose properties, production measures, and livelihoods will be impacted (permanently or temporarily) due to land acquisition, restriction of access, any other direct/indirect impacts by the Project.

(2) Vulnerable groups

Based on the initial socioeconomic surveys, the vulnerable groups will generally include the following:

- Poor and poorest households as identified by pertinent national survey results;
- Poor landholders that have limited productive land (this will be determined by the minimum amount of farm land needed to be a viable farmer in the project area)
- Households and individuals who have the stability economic condition is affected severely because of at least 10% means of production of them are affected by Project.
- Other PAP identified by the project management unit and who may not be protected through national land compensation or land titling; or
- Any additional groups identified by the socio economic surveys and by meaningful public consultation.

(3) Gender

Considerations on gender issues should be paid much attention during the project implementation process as follows:

- During the Detailed Measurement Survey (DMS), income restoration program, resettlement site preparation and any other opportunities of public hearing, women's voices should be carefully listened to know their rights and choices

- Representatives of Women's Unions should be invited to participate in public hearing processes as well as grievance redress process.
- The female headed households will be encouraged and supported to fully participate in planning and implementation of income restoration programs as well as assistance.
- Job creation by the project implementation and operation should consider priorities on women.

8.7.3 Entitlement

The eligibility for entitlement to compensation is determined by asset ownership criteria:

(1) Those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country. In the consideration, it is also useful to document how long they have been using the land or the assets associated with it);

(2) Those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan;

(3) Those who have no recognizable legal right or claim to the land they are occupying.

Persons covered under (1) and (2) are provided compensation for the land they lose, and other assistance. Persons covered under (3) are provided resettlement assistance in lieu of compensation for the land they occupy, and other assistance, as necessary, to achieve the objectives set out in this policy, if they occupy the project area prior to a cut-off date and acceptable to JICA. Persons who encroach on the area after the cut-off date are not entitled to compensation or any other form of resettlement assistance. All persons included in (1), (2), or (3) are provided compensation for loss of owned or used assets other than land.

Based on the resettlement policy gap analysis and field surveys, PAPs' eligibility has been discussed as the entitlement matrix in Table 8.7-1.

Table 8.7-1 Entitlement Matrix

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
1. Productive land (Agricultural land, garden, pond, etc.) Either in or out of the residential area.	**1.1 Marginal loss (<30% of land holding or <10% for vulnerable group)** The remaining area of affected plot is still economically viable for use or meets the expected personal yield.	1.1.1 PAPs with Land User Rights Certificate (LURC)* 1) Cash compensation at replacement cost (free from taxes and transaction costs) * Including the people who has LURC and the people has enough condition to get LURC based on the Land Law 2) Land for land compensation can be an option if PAPs required 3) Cash compensation for structures, crops, trees and other assets on the land are compensated with full replacement cost. 1.1.2 PAPs with temporal / leased right 1) Cash compensation at the amount corresponding to the remaining investment on the land 2) Cash compensation for structures, crops, trees and other assets on the land are compensated with full replacement cost. 1.1.3 PAPs without formal / customary rights 1) PAPs receive assistance corresponding to 30-100% of land replacement cost 2) Agricultural land started to use before July 1, 2004 is compensated as per Clause 2, Article 77 of the land law 3) In case PAPs use public land where there was agreement to return the land to the Government, they are not be compensated. In such cased, however, structures, crops, trees and other assets on the land are compensated with full replacement cost.	- Affected households to be notified at least ninety days (90) before land acquisition by the Project - The owner of land will hand over the land within twenty (20) days from the date of compensation

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
	1.2 Marginal Loss (>30% or >10% for vulnerable groups)	1.2.1 PAPs with Land User Rights Certificate (LURC)* 1) Land for land compensation should be given as the preferred option. 2) If appropriate land is not available, or at the PAP's choice, cash compensation can be provided for the lost area with full replacement cost (free from taxes and transaction costs). 3) PAPs are provided with the additional rehabilitation measures to restore the source of income 4) Cash compensation for structures, crops, trees and other assets on the land are compensated with full replacement cost. * Including the people who has LURC and the people has enough condition to get LURC based on the Land Law. 1.2.2 PAPs with temporal / leased right 1) Cash compensation at the amount corresponding to the remaining investment on the land. 2) Cash compensation for structures, crops, trees and other assets on the land are compensated with full replacement cost. 3) PAPs are provided with the additional rehabilitation measures to restore the source of income. 1.2.3 PAPs without formal / customary rights 1) PAPs receive assistance corresponding to 30-100% of land replacement cost 2) Agricultural land started to use before July 1, 2004 is compensated as per Clause 2, Article 77 of the land law 3) In case PAPs use public land where there was agreement to return the land to the Government, they are not be compensated. In such cased, however, structures, crops, trees and other assets on the land are compensated with full replacement cost.	

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
2. Residential land	**2.1 Marginal loss** (i.e., land is still viable for use and not requiring relocation) The remaining area is > 20 m^2 in urban area, >40 m^2 in rural area	1) The remaining area is > 20 m^2 in urban area, >40 m^2 in rural area (i) Replacement cost to the legal and legal-realizable land users; (ii) A financial assistance of an agreed amount to the land users not having recognizable land use right. 2) The remaining area is < 20 m^2 in urban area, <40 m^2 in rural area In this case, project owner will acquire remaining areas with compensation or assistance as well as project affected areas 3) If PAPs have to rebuild their houses, they will receive a house rental allowance for 3 months in recognition of the time needed to rebuild their houses.	- Affected household to be notified at least 180 days before land acquisition - The owner of land will hand over the land within 20 days from the date of compensation
	2.2 PAPs physically relocated	2.2.1 Legal / legal-realizable land users - A land plot in a resettlement site or apartment will be provided. They will have full land title or apartment ownership without any cost. Or cash compensation at full replacement cost plus the amount equivalent to the value of the infrastructure investments calculated averagely for each household in a resettlement site. - The process of compensation for a plot/apartment for legal and legalizable PAPs at the resettlement site will be as follows: ➢ If the selling cost of minimum plot(s)/apartment at the new site is more than the value of the affected residential land, PAPs receive new plot/apartment at no additional cost; ➢ If the plot(s)/apartment at the new site is equal the value of affected residential land, PAPs receive new plot/apartment at the new site without any balance; ➢ If the plot(s)/apartment at the new site is less than the value of affected residential land, PAPs will receive plot/apartment and the difference in cash. 2.2.2 PAPs who do not have formal, or customary rights to the affected land: - An identified financial assistance of agreed amount will be provided. If the PAP has no place to move, the following options will be	- Affected household to be notified at least 180 days before land acquisition - The owner of land will hand over the land within 20 days from the date of compensation - Resettlement site and/or cash compensation/assistance process are elaborated in the chapter of resettlement site in the RAP

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
		provided and the PAP can either pay in installment to buy or rent it for living 1) an apartment in the resettlement site 2) a land plot to build a house by themselves - In case the relocated PAP belongs to poor or vulnerable groups or HHs, the project will provide assistance to ensure that the PAP is able to relocate and re-establish them to a new site.	
3. Houses/Structures	**3.1. Partial impact:** Unaffected portion of the house is still viable for use	1) In case that house/structure is partially affected and the remaining structure is viable for continuous using, allowance will be given, if necessary, in addition to the compensation for affected portion at replacement cost, to enable PAPs to restore it to former or better conditions. 2) Compensation for other structures/fixed assets will be at full replacement cost and will be in cash. Depreciation of structures and assets should not be taken into account.	Calculate compensation amount based on replacement cost and actual affected area
	3.2. Full impact (i.e., house is partially acquired by the project but no longer viable for continued use or the entire structure is acquired).	3.2.1 Owner of House/Structure 1) Compensation in cash for entire affected structures will be provided with full replacement cost for materials and labor cost, regardless of whether or not they have title to the affected land or permit to build the affected structure. Depreciation of structures and assets should not be taken into account. 2) Compensation for other structures/fixed assets will be at full replacement cost and will be in cash. 3) Any investments such as facilities for agriculture and fish cultivation, structures, trees, crops etc. made on the land by the PAPs will be compensated at their full replacement cost. 3.2.2 Tenants of Houses/Structures 1) The tenants of state or organization's houses will be provided with transportation allowance for moving their assets. They will also be	Calculate compensation amount based on replacement cost and actual affected area

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
		assisted in identifying alternative accommodation. 2) The tenants who are leasing a private house for living purposes will be provided with transportation allowance for moving their assets. They will also be assisted in identifying alternative accommodation.	
4. Crops and Trees, aquaculture products	**4.1 Owners**	4.1.1 PAPs with legal status of land For annual and perennial standing crops or trees, aquaculture products, compensation in cash will be paid to the affected persons, who cultivate the land, at full replacement cost in local markets to ensure the compensation is sufficient to replace the lost standing crops, trees or aquaculture products. 4.2.1 PAPs without legal status of land For annual and perennial standing crops or trees, aquaculture products, assistance in cash will be paid to the affected persons, who cultivate the land, at full replacement cost in local markets to ensure the assistance is sufficient to replace the lost standing crops, trees or aquaculture products.	PAPs will be given notice several months in advance. Crops grown after issuance of the deadline will not be compensated.
5. Public structures	**5.1 Loss of, or damage to public assets**	Either in; 1) cash compensation to cover the cost of restoring the affected facilities, or 2) in kind compensation based on the price fixed by the government between responsible organization (e.g. land fund development center) and owners of assets.	Displacement will be carried out by the owners prior to the commencement of construction.
6. Commune owned assets, collective assets	**6.1 Loss of, or damage to assets** (Assets of village, ward, commune, district, provincial government unit)	Either in; 1) cash compensation to cover the cost of restoring the affected facilities, or 2) in kind compensation based on the price fixed by the government between responsible organization (e.g. land fund development center) and owners of assets.	
7. Graves	**7.1 Relocation of graves / tombs**	All costs of excavation, relocation, and reburial will be reimbursed in cash to the affected family.	

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
8. Loss of Income/ Livelihood due to loss of productive land	**8.1 Impacts due to permanent loss of 30% or more of their total productive land or where <30% land affected but the remaining land is rendered unviable.** (Legal, legal-realizable land users and PAPs with lease agreement over the affected land)	Allowance for Loss of Livelihood PAPs will be compensated with one-time payment at cash of equivalent to 30 kg of rice/person/month, including: 1) Affected households losing 30% to 70% of their agricultural land will be assisted for 6 months if the remaining land is viable for continued use, and for 12 months in case the remaining land is rendered unviable and entire land is acquired by the project. In some special cases, in extremely difficult areas, the assistance may be given up to a maximum of 24 months; 2) Affected households losing more than 70% of their agricultural land will be assisted for 12 months if the remaining land is viable for continuous use, and for 24 months in case the remaining land is rendered unviable and entire land is acquired by the project. In some cases, in extremely difficult areas, the assistance may extend to a maximum of 36 months; In addition, these PAPs will be targeted for livelihood restoration program; 3) In case of land-for-land compensation, PAP will be assisted with seedlings, agricultural-forestry extension programs, husbandry etc.	
	8.2 PAPs who lose their productive land	**Vocational conversion assistance** 8.2.2 PAPs who lose all of their productive land Every PAP affected by loss of all of their productive land will be provided with additional assistance no more than 5 times the agricultural land price. 8.2.3 PAPs who lose a part of their productive land Every PAP will be provided with additional assistance based on actual circumstances in the locality to improve their standard of living, income opportunities, and production levels, or at least to restore these to pre-project levels following the Clause 1, b) of Article 20, Decree 47/2014/NĐ-CP.	

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
	8.3 All affected households	**Support for vocational training and job creation** At least one member of households affected by loss of productive land will be entitled to vocational training and assistance in getting employment in the city. The PAPs participating in such training programs will be exempted from payment of tuition fees course will be paid directly to the vocational training centers. After finishing training courses, they will be given priority to be recruited in local manufacturing industries.	
9. Loss of Income/ Livelihood due to relocation of business	**9.1 Marginal impacts** (Owner of the affected business and employees)	PAPs losing income and/or business/productive assets due to land acquisition will be compensated as below; 1) Allowance for Business Loss: All affected businesses and production households whose income is affected will be compensated or supported for losses in business equivalent to 30% of their actual annual income: (a) For licensed businesses the compensation will be based on their average yearly income declared with the taxation agency over the previous three years, and (b) For unregistered affected businesses but have made their tax obligations the compensation will be supported by 50% of the specified 2) Employees who are affected by acquisition of residential/commercial land acquisition, public land or land of enterprises: Allowance equivalent to the minimum salary as per the provincial regulations to affected employees during the transition period for a maximum of 6 months, and will be assisted in finding alternative employment.	PAPs will be given priority for business relocation at conveniently located in order to maximize their benefit from business opportunities.
	9.2 Marginal impacts (Relocating shop owners)	9.2.1 Legal / legal-realizable shop owners - The project will provide alternative site with local advantage and physical attributes similar to the land lost with easy access to customers' base, satisfactory to the PAP, or compensation in cash for the affected land and attached structures at replacement cost, plus transportation allowance for movable attached assets. 9.2.2 Shop owner with temporal / leased right The tenants who are leasing a shop for business purposes will be provided	

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
		with transportation allowance for moving their assets. They will also be assisted in identifying alternative place for their business.	
10. Allowances /Assistance Targeted to Vulnerable Households	**10.1 Loss of land and non-land assets** (Affected vulnerable groups regardless of severity of impacts. The vulnerable groups were defined as in Glossary)	10.1.1 Landless households Assistance through the following provision that PAP can either pay in installment to buy or rent it for living 1) an apartment in the resettlement site 2) a land plot to build a house by themselves 10.1.2 Social Policy (i) PAPs that include heroic mothers, heroic armed force, heroic labor, war veterans, wounded or dead soldiers families will be provided with support as regulated by the HPPC from 2 million to 6 million VND per household (ii) Poor Relocated Households or Poor Households where 30% or more of their productive land is affected or where <30% land is affected but the remaining land is rendered unviable: will be receive the support according to the regulation of HPPC (to be certified by local authority). 10.1.3 Other vulnerable groups Whether they have to be relocated or not, (female headed households with dependents, households with disabled persons, elderly without any source of support, ethnic minority households) will get the same support given to poor households in accordance with the HPPC. - These households are entitled to take part in Income Restoration Program.	- Allowance for households as per Government regulation (social policy households, heroic mothers, wounded, dead soldiers). If the household eligible to more than one additional support allowance for the vulnerable people, only one package with the highest value will be applied

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
11. Other Allowances/ Assistances	**11.1 Loss of land and non-land assets**	11.1.1 Incentive Bonus All PAPs who vacate the affected land immediately after receiving compensation and allowances will be given an additional incentive allowance of 3-5 mil VND. 11.1.2 Repair Allowance 1) If house/structure is partially affected and the remaining structure is viable for continued use, the project will provide a repair allowance equivalent to compensation for the affected part of the structure to enable PAPs to restore it to former or better conditions. 2) The relocating households with children who are going to schools will be supported with 1-year tuition as regulated by the Ministry of Education 3) Based on the actual situation of the locality, HPPC Chairman issues other allowances to ensure accommodation and livelihood restoration for PAPs, if needed.	
12. Temporary impacts	**Temporary loss of land and assets.**	1) Compensation for all damaged or lost assets, including trees, crops at full replacement cost 2) Rental in cash for the land acquired at a rate which will be not less than the net income that would have been derived from the affected property during disruption 3) Restoration of the land within 3 months after use: The contractor is expected to return the land in its original condition within 3 months of the termination of the civil works. 4) Relocation of the Hai Phong Port (Hoan Dieu Port) is the pre-condition of the project and its relocation activities including budget preparation is independent from the project. However, in case that the port relocation is facing to delay and affected by the construction of Nguyen Trai Bridge, the project owner and HPPC should discuss compensation/assistance with the port owner.	If the quality of land is radically changed when returned to PAPs, requiring PAPs to change in the types of land use; then PAPs should be compensated for all estimated cost of losses.

Impacts	Eligible Persons / Level of Impact	Entitlements	Implementation Arrangements
		5) For business disturbance due to temporary impacts, compensation and assistance should be discussed based on "9. Loss of Income/Livelihood due to relocation of business" in this table depending on the situation and degree of impacts.	
13. Any other impacts that may be identified during implementation	**Individuals, organizations in the project area**	1) Entitlements to compensation and other assistance would be provided in accordance with the compensation policy. 2) Secondary impacts on production and business or PAPs isolated from access to resources temporarily have to be compensated and supported in accordance with the RAP.	In case of impacts on livelihoods of PAPs, the contractors, construction units have to agree with the households on payment for disruption of business.

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8.8 Implementation Arrangement

8.8.1 Procedures of Compensation, Assistance and Resettlement

The overall responsibility for preparing land acquisition and resettlement belongs to the PMU of Hai Phong Urban Development Construction (PMU-HPUDC), under HPPC. As an implementing body, the PMU-HPUDC shall be responsible for managing preparatory activities, such as field surveys, stakeholder meetings, and developing the RAP during the survey period. Other relevant bodies, especially PCs at the local level (district, commune, etc.) also have important roles to implement and promote surveys with appropriate participation of local people.

After the RAP preparation process, the draft RAP will be initially reviewed by PMU assisted by Department of Natural Resources and Environment (DONRE) in Hai Phong City, which is a regional organization of the central ministry, MONRE. Based on the results of review and comments from DONRE, HPPC will finally issue the certification to authorize the RAP.

Once the RAP is approved and the project enters the implementation stage after the investment policy approval by the Prime Minister and the project investment decision by HPPC, working groups such as the Land Fund Development Center (LFDC) take over activities in the field such as detailed measurement survey (DMS). The results are approved by the Compensation, Assistant and Resettlement Committees formed by HPPC and DONRE prepares the decisions of land acquisition approved by the HPPC in the following implementation steps.

Based on the Land Law (2013), Public Investment Law (2014), and other relevant decree and circulars, procedures of land acquisition and resettlement are mainly divided into four stages described as below.

Stage-1: "Investment Policy Approval" is the first preparation phase which covers the pre-F/S survey with EIA report preparation. In addition, the RAP is required not due to domestic legal system but JICA's Environmental Guidelines.

Stage-2: "Program/Project Investment Decision" covers F/S report following the results of investment policy approval and resettlement policy framework is developed based on the RAP prepared in former phase.

Stage-3: Public Investment Plan is prepared based on F/S report and land acquisition notification is issued by a competent organization. After the notification, detailed measurement survey (DMS) is implemented to prepare the CAR Plan.

Stage-4: Plans prepared in the previous phase is implemented in parallel with preparation for construction.

During the Stage-1 and Stage-2, PMU-HPUDC will prepare Resettlement Policy Framework (RPF) in Vietnamese complying with approved the RAP in English for domestic procedures for investment policy approval and project investment decision. RPF should be submitted to JICA for reviewing and confirming identification with the RAP.

After the project investment decision (Stage-3 and 4), HPPC will issue land acquisition notice followed by necessary field works such as DMS. Based on the results of the surveys, the CAR Plan is developed. Once again the CAR Plan should be submitted to JICA for reviewing and confirming deification with the RAP and other relevant documents. During these stages, the project areas where land had been acquired under the project of VSIP and Vin Group should be confirmed by due diligence studies by the PMU and the JICA side in terms of its resettlement processes and level of compensation/assistance.

Thus, the Project is required to comply with not only Vietnamese laws and regulation but also the JICA Environmental Guidelines, therefore the CAR policy and the CAR plan shall be reflected the contents of the RAP and submitted to JICA for concurrence.

Table 8.8-1 shows the general flow of land acquisition and resettlement in Vietnam based on Land Law (2013).

Table 8.8-1 Flow of Land Acquisition and Resettlement based on the Land Law

Steps	Outline
1. Land Acquisition Notice (Decision of Land Acquisition)	Based on Article 66 of the Land Law, the People's Committee at the provincial level decides on land acquisition and issues a notice followed by public information by the media and local People's Committees. Beforehand, DONRE's evaluation letter of land use needs has to be approved by the People's Committee.
2. Cadastral Survey and Detailed Measurement Survey (DMS) Implementation	Based on documents on land acquisition issued by the People's Committee, People's Committees at the local level associated with other relevant authorities such as DONRE direct and manage necessary surveys including cadastral surveys, Detailed Measurement Surveys, etc. for fixing entitlement conditions. Due diligence studies will be done for the area of VSIP and Vin Group.
3. Planning, Evaluation, and Approving the General Plan on Land Acquisition and Resettlement	According to the results of field and document surveys in the previous step, the People's Committee develops a general plan for land acquisition and resettlement by asking opinions from the public at public meetings. Opinions are recorded for discussing measures to be reflected in the land acquisition plan.
4. Land Acquisition Plan and Public Disclosure	The People's Committee at the provincial level issues a decision of land acquisition letter associated with relevant authorities. The decision shall be disclosed at local commune offices. In parallel with these activities, landmarks for clearance areas are marked, compensation rates are determined, and necessary documentation and budgetary processes are prepared.
5. Compensation	Based on Article 93 of the Land Law, compensation shall be made within 30 days after the issuance of the decision on land acquisition.
6. Land Clearance and Hand Over	The acquired land will be handed over to the project owner through the People's Committee.

Once Program/Project Investment Decision is completed and land acquisition notice is issued, preparation and implementation of resettlement activities are commenced under competent agencies in local project site level. Based on fundamental law and regulations under central government, each level of people's committee also issued their own guidelines to implement land acquisition.

Table 8.8-2 shows internal procedures in Ngo Quyen District where the approach road of Nguyen Trai Bridge is planned. The procedure is common in other project areas, namely Hai An District and Thuy Nguyen District.

Table 8.8-2 Procedure of Land Acquisition in Hai Phong City (Ngo Quyen District)

Agency/Unit in charge & Time	Work Flow	Relevant Document
Department of Natural Resources and Environment (DONRE) (10 working days since receiving land acquisition notice)	1. Establish a committee for compensation, assistance, resettlement (CAR); Inventory team	BM 01 - TN-02: Decision for establishment of CAR committee BM 02 - TN-02: Decision for establishment of Inventory team
	2. Land acquisition notice	BM 03 - TN-02: Minutes of publishing land acquisition notice
	3. Receive project document and resettlement house and land area plan document	BM 04 - TN-02: Minutes of receiving project document; resettlement house and land area plan document
DONRE *(5 working days since receiving project document)*	4. Prepare and Determine CAR policy and submit CAR policy to JICA through HPPC for reviewing	BM 05 - TN-02: Notice of CAR policy
DONRE *(5 working days since issuing notice of CAR policy)*	5. Disclose CAR policy	BM 06 - TN-02: Minutes of publishing CAR policy BM 05 - TN-02: Informing CAR policy
Land Fund Development Center (LFDC) *(5 working days since publishing CAR policy)*	6. Informing compensation quantity inventory; release inventory sheet	BM 07 - TN-02: Notice of inventory compensation quantity BM 08 - TN-02: Inventory sheet BM 09 - TN-02: Paper requesting hand over of resettlement house, land
LFDC (after releasing self-inventory sheet)	7. Receive inventory sheet and questionnaire requesting hand over of resettlement house, land	BM 08 - TN-02: Inventory sheet BM 09 - TN-02: Paper requesting hand over of resettlement house, land
Inventory team *(according to land acquisition scale)*	8. Check, count at the site (Survey compensation amount)	BM 10 - TN-02: Minutes of inventory compensation quantity BM 11 - TN-02: Minutes of determining that person having land to be acquired does not let the inventory team implement their work intentionally
District's / Ward's People's Committee (15 days)	9. Determine land using source; consider handing over resettlement house, land and disclose	BM 12 - TN-02: Table of determining land using source BM 13 - TN-02: Minutes of meeting for consideration of handing over resettlement house, land BM 14 - TN-02: Minutes of publishing land using source

Agency/Unit in charge & Time	Work Flow	Relevant Document
DONRE (15 days)	10. Appraise land using source; appraise result of handing over resettlement house, land	BM 15 - TN-02: Appraisal document of land using source and appraisal of result of handing over resettlement house, land and publish consideration
LFDC (15 days)	11. Establish CAR plan	BM 16 - TN-02: Report of CAR plan
LFDC (20 days)	12. Disclose CAR plan	BM 17 - TN-02: Minutes of disclosing CAR plan
CAR committee (5 days)	13. Review CAR plan	BM 16 - TN-02: Report of CAR plan BM 18 - TN-02: Minutes of meeting for approving CAR plan
LFDC (10 days)	14. Complete CAR plan and submit to JICA through HPPC for reviewing and confirming identification with the RAP and other relevant documents	BM 16 - TN-02: Report of CAR plan
DONRE (5 days)	15. Appraise compensation, assistance, resettlement plan	BM 19 - TN-02: Appraisal document of DONRE BM 20 - TN-02: Appraisal document of investment management department BM 21 - TN-02: Appraisal document of planning and financial department
LFDC (5 days)	16. Conclude and complete CAR plan	BM 16 - TN-02: Report of CAR plan
DONRE (5 days)	17. Draft land acquisition decision	*BM 22 – TN-02*: Decision on land acquisition
Chairman/vice chairman of people's committee of District / Ward (3 days)	18. Sign on land acquisition decision	*BM 22 – TN-02*: Decision on land acquisition
DONRE (5 days)	19. Prepare document for approval of CAR plan	*BM 23 – TN-02*: Submission for approval of CAR plan
Chairman/vice chairman of people's committee of District / Ward (3 days)	20. Sign on decision approving CAR plan	*BM 24 – TN-02*: Decision on approving CAR plan
LFDC (3 days from the date of CAR plan approval)	21. Spread and disclose CAR plan	*BM 25 – TN-02*: Minutes of meeting on spreading and disclosing CAR plan
LFDC (in the time of paying for compensation,	22. Pay for compensation and assistance	*BM 26 – TN-02*: Minutes of confirmation on paying compensation – resettlement cost.

Agency/Unit in charge & Time	Work Flow	Relevant Document
assistance)		BM 27 – TN-02: Minutes of confirmation for cases of not receiving compensation – resettlement
DONRE (5 days)	23. Determine location of resettlement house, land	*BM 28 – TN-02*: Minutes of determination of resettlement housing, land location
LFDC (in a working day)	24. Receive acquired land	*BM 29 – TN-02*: Minutes of receiving acquired land plan *BM 30 – TN-02*: Minutes of determination of cases not handing over acquired land
DONRE (3 days)	25. Draft decision/statement on handing over resettlement housing, land	*BM 31 – TN-02*: Decision on handing over resettlement housing, land *BM 32 – TN-02:* Report on handing over resettlement housing, land
Chairman/vice chairman of people's committee of District / Ward (3 days)	26. Sign decision/statement on handing over resettlement housing, land	*BM 31 – TN-02*: Decision on handing over resettlement housing, land *BM 32 – TN-02:* Statement on handing over resettlement
DONRE (1 day)	27. Handover resettlement house, land	*BM 33 – TN-02*: Minutes of handing over resettlement house plan, land
DONRE (5 days)	28. Issue certificate of land use right, housing ownership certificate and assets attached to the land for resettlement housing, land	*BM 34 – TN-02*: Application letter for certificate (01/DK-GCN) *BM 35-TN-02*: Statement on land and housing registration fee (01/LPTB) *BM 36-TN-02*: Statement on land use fee payment *BM 37 – TN-02*: Receipt of document and promising the date of giving result
DONRE (1 day)	29. Handover site to project owner	*BM 38 – TN-02*: Minutes of handing over acquired land
LFDC	30. Save files	

8.9 Institutional Arrangement

Organizations related to land acquisition and resettlement are principally under the umbrella of HPPC. During the preparing phases before obtaining project investment decisions, PMU-HPUDC plays a single coordination body to prepare and promote necessary processes including the RAP. After the project investment decision, in the phase of implementation, local

PCs, relevant departments, and established specific committees under HPPC function as implementation bodies. These relevant organizations have some experiences and capacities on land acquisition and resettlement under ODA loans, such as JICA and the World Bank. However, this project would be the first case between new legal framework of the Land Law, Public Investment Law, and other relevant laws and regulations as well as JICA's Environmental Guideline (2010). Therefore, mutual understandings and frequent confirmation should be promoted during the whole project processes from survey and design phase to implementation and monitoring phases.

8.9.1 Hai Phong City's People Committee (HPPC)

The HPPC is the principal authority at the provincial level. In decision No 2680/2014/QD-UBND according to its competency, HPPC has assigned the district with responsibilities, tasks and power for implementation of compensation, assistance and resettlement to affected people, in case of land acquisition within the Hai Phong City's boundaries. Thus HPPC will take responsibilities as follows:

(1) Reviewing the RAP and approving it after the draft final RAP have got agreement from JICA;
(2) Issue Decision on the project's land acquisition and allocate the land to the project for its implementation;
(3) Responsible for the final decision on compensation unit costs, assistances, allowances, and on supporting policies for PAPs, poor and vulnerable affected groups, in accordance with the RAP approved;
(4) Direct relevant agencies in solving unsolved complaints/grievances of PAPs on compensation, assistance and resettlement in accordance with its competency;
(5) Timely provide necessary budget for resettlement implementation;
(6) Ensure that the project's resettlement activities would be carried out in compliance with policies and provisions of the RAP approved.

The tasks, responsibilities and competency of Hai Phong City's Resettlement Steering Committee include as follows.

(1) Supervision, monitoring resettlement implementation performed by concerned

organizations, individuals. Direct related city's line departments to timely solve emerged issues in accordance with their competence.

(2) Receive all complaints, suggestions on remained or newly emerged issues related to application of project resettlement policies and/or during resettlement implementation to guide advice on measures remedying them or report to HPPC for solving the problems, in accordance with its competency.

(3) Coordinate with the DONRE to advice on allocation of land, dwellings, to serve relocation demand of PAPs and options balancing dwelling and land budget for resettlement between different projects.

(4) Conduct regular supervision, monitoring of the project, identified remained or emerged issues to direct or recommend measures to solve the problems; Prepare and submit monthly, quarterly and annual report on status of resettlement implementation within the City.

(5) Fulfill other assigned responsibilities, tasks.

(6) Supervise, monitor and speed up resettlement implementation to ensure that it is carried out in accordance with the approved RAP.

8.9.2 Project Management Unit of Haiphong Urban Development Construction (PMU-HPUDC)

PMU-HPUDC will be the body who assists HPPC to directly manage the project. The PMU-HPUDC will be responsible for daily internal monitoring implementing the RAP. Responsibilities will include the following:

(1) Responsible for cooperation, organization for implementation and internal monitoring of the project resettlement activities. Sign contracts with relevant organizations/agencies for implementation of certain specific resettlement works; (ii) Preparing the CAR plan in accordance with provisions of the approved the RAP. Submit them to HPPC for approval and to JICA for concurrence before implementation.

(2) Adhere preparation of resettlement dwelling fund to organize and remove PAPs to new relocation sites, or ask HPPC to arrange relocation for PAPs. Pay cost of project's resettlement infrastructure development and dwellings in resettlement sites in accordance

with existing regulations.

(3) Submit HPPC organize appraisal, approval.

(4) Prepare resettlement cost estimate to submit to Department of Finance (DOF) and DPC for approval. After 5 days receiving decision on the resettlement cost estimate, allocate the budget to concerned agencies,

(5) Participate District's Resettlement Committees (DRCs). Actively cooperate with them to prepare compensation options in accordance with existing regulations and approved policies,

(6) Provide all project related materials, documents required for DRCs implementation of compensation, assistance and resettlement of PAPs;

(7) Guiding all resettlement activities of the project in accordance with its policies and directives;

(8) Checking approved compensation unit prices for land, structures and other assets. In case there exist a considerable gap between them and the market ones, the PMU will cooperate with DOF and other line departments, submitting recommendations to HPPC for review and amendment of them, following the rules of the RAP;

(9) Prepare adequate and timely resettlement budget for preparation works as well as for delivery of compensation, assistance and resettlement to PAPs. Cooperate with DRCs to directly deliver compensation payment and allocate dwellings to PAPs.

(10) Establishing and managing standardized PAPs databases for each component, as well as for the Project as a whole. The PAPs database should be kept updated and be accessible to all concerned parties

(11) Prepare plan for ongoing internal monitoring to supervise implementation of project resettlement activities and compliance of its resettlement policies provisions.

(12) Recruiting, supervising, and acting upon the recommendations of the external monitoring organization

(13) Cooperating fully with the external monitoring organization

(14) Implement or coordinate due diligence studies and submit the due diligence report to JICA

(15) Reporting periodically on resettlement activities to JICA

8.9.3 District's People Committees (DPC)

In Clause 2 Article 28 Decision No. 2680/2014/QD-UBND dated 03/12/2014 by HPPC issued power attorney for District People's Committee as following: "City People's Committee issued power attorney for District People's Committee to decide land acquisition and approve alternative of compensation, assistance, resettlement for scenario regulated in Clause 3 Article 66 Land Law".

DPCs implement as Clause 4 Article 30 Decision No. 2680/2014/QD-UBND regarding responsibility of organization, individual related to compensation, assistance, resettlement work.

DPCs are responsible for:

(1) Overall management of compensation, assistance and resettlement implementation within their respective competent boundaries. Establish DRCs and its working group for compensation, assistance and resettlement

(2) Appraisal and approval of compensation options for PAPs of their respective districts

(3) Issuing regulations and procedures of solving administrative matters related to the project resettlement and compensation implementation. Assign tasks, responsibilities of districts departments, Ward People's Committees (WPCs) /CPCs and working staff engaged in project's resettlement implementation,

(4) Approve resettlement and land acquisition implementation costs in accordance with its competences

(5) Solve grievance and accuse raised by PAPs in accordance with its competent power.

8.9.4 District's Resettlement Committees (DRCs)

District Council of compensation, assistance and resettlement (Distrct's Resettlement Committee, DRCs) takes roles in accordance with Clause 2 Article 27 Decision No. 2680/2014/QD-UBND dated 03/12/2014 by HPPC.

The staff of DRCs will include:

- Chairman or vice-chairman of DPC will chair their respective DRCs

- Head of district resettlement agency will be the standing Vice-Chairman of the DRC
- Head of District's Department of Finance as a member of DRC
- Head of District's Department of Urban and Land Management (DULM) as member
- Project Owner as member of the DRCs
- Chairman of affected WPCs/CPCs
- Head or deputy Head of District's Taxation Department as member
- When it's necessary, it may call internal affair management agencies to join the DRC
- When there is a need to review compensation options for the project, it may call additional members among the followings to join the DRC:

  + Invite 1 or 2 representatives of PAPs

  + Other members: of the Fatherland Front Committee, mass organizations including the Youth Union, Women's Union and Farmer Association, to participate in adequacy with actual needs, decided by the DRC chairman.

- In case of issue land, house for resettlement, DRCs supplement the component is representative of Division, Unit: Labor – Invalids and Social Affairs, Tax Department, Police, ex-soliders group.

The DRCs will base on collective working principles, following decisions made by the greater part of their members. In case if the different voices have equal number, then the decision made on side of the Chairman will be the final one.

The DRCs are responsible for:

(1) Planning and implementing all daily resettlement activities of the subproject within their districts

(2) Carry out project information dissemination and dissemination of information on project's compensation, assistance and resettlement policies, its schedule, organization, and implementation; mobilize PAPs and concerned parties to participate in resettlement implementation

(3) Review and confirm about legality of land use rights, houses, structures and other affected properties

(4) Review and submit to DPC for approval compensation, rehabilitation options of PAPs within their district

(5) Receiving grievances and appointing inspectors to redress PAPs grievances on resettlement policies and entitlements;

(6) Paying special attention to the needs and demands of specific groups (ethnic minority groups) and vulnerable people (children, the elderly, woman/single headed households);

(7) Cooperating fully with the external monitoring organization. Receive and review recommendations of the IMO and take adequate corrective actions, if necessary, ensuring that the PAPs could be able restoring their prior-project living standards.

(8) Solve the recommendation / grievance of people who compensated, assisted about the related issues on compensation, assistance, resettlement alternative and submit to District People's Committee to solve the issues which exceed power limit.

(9) Guide project owner and local governments to implement of payment for compensation, assistance, resettlement.

8.9.5 Other Relevant Organizations

(1) District's Departments of Natural Resources, Environment, Housing and Land Management

- Cooperate with WPCs/CPCs to check and confirm on legality of PAPs' land use rights, and time they use the land;
- Review land compensation prices and compensation ratio applied for affected land given by the options.

(2) District's Department of Urban Management and Construction

- Guide the working group to prepare documentation on house, structures and identify/confirm about their legality. Appraise their compensation unit prices and ratio applied for affected structures, evaluate value of houses, structures, and assess level of impacts on them.
- Propose measures to solve issues related to partial impacts on houses/structures

(3) District Department of Labors, Invalids and Social Affairs

Cooperate with WPCs/CPCs confirm about HHs receiving social assistance and special policies of the Government.

(4) District Department of Taxation

Guide the registered business and non-agricultural producer PAPs, who have to be relocated, to numerate their annual post tax business income average for three last years, for preparing business assistance measures.

(5) District Department of Inspection

Receive and solve grievance of PAPs after they receive compensation option documents and the DPC decision on the matter.

8.9.6 Ward's/Commune's People Committee

WPC/CPC is responsible for followings:

(1) Participate as member of DRCs. Assign concerned ward/commune officials/professionals to participate all resettlement activities in its ward/commune;

(2) Checking and affirming the legality status of affected land, houses, structures and other assets/losses (origins, original date of land use, status of house/structures and land use) of organizations, individuals located in project recovered areas, within respective competences, serving as basis for preparation of compensation and resettlement options.

(3) Organize administrative implementation measures for DMS or confirm on land acquisition based on existing land and properties management documents to provide basis for project developer to prepare compensation and resettlement options applied for cases when PAPs refuse to numerate their loses by themselves;

(4) Organize administrative measures for implementation of land acquisition in accordance with functions commissioned or delegated by the Chairman of DPC.

(5) Implement and solve issues related to compensation and resettlement in accordance with WPC/CPC competences.

(6) Ward's/commune People's Committee (WPCs/CPCs) conduct and have responsibility about the accuracy of land source extract, population, household, social policy type and propsal on resettlement for people whose land is accquired.

Polices of affected wards, communes

- Organize for confirmation on residency and number of HH's members;
- Ensure social security throughout the project's resettlement implementation;
- Consolidate report and report to DRCs/DPC on case violating state orders.

8.9.7 Land Fund Development Center (LFDC)

The main responsibilities of the Land Fund Development Center (LFDC) are as follows:

(1) Assist the DPCs and HPPC in disseminating information related to the RAP;

(2) Conduct detailed measurement survey (DMS) and develop the CAR Plan within their district before submitting the CAR Plan to DPC and PMU for consideration;

(3) Represent DPC in planning and implementing land acquisition, compensation payment, provision of assistance, organization of resettlement, and other relevant activities within their district - as agreed in the RAP. Take the lead in designing and approve the design for resettlement sites, and work closely with HPPC to agree on unit costs for residential plots in the resettlement site.

(4) Take lead in consulting with households who indicate their need to resettle in district resettlement site, and propose a final plan for resettlement that will be detailed in the CAR Plan.

(5) Conduct meetings with resettled households to agree on the resettlement plan and timely hand over the residential plots to qualified resettling households. Conduct consultation and design income restoration program for affected households.

(6) Work and coordinate closely with project's stakeholders, including PMU, PMU's consultants, to prepare the CAR Plan.

(7) Assist the DPC in handling complaints at district level.

8.10 Relocation Site

8.10.1 Entitlement and Strategy of Relocation

PAPs under certain conditions are eligible for relocation to resettlement site prepared by the project. Entitled PAPs are;

(1) PAPs whose residential land and houses are totally acquired by the project and they do not have appropriate land to live in the original area where their land is acquired;

(2) PAPs whose residential land and houses are acquired, and their remaining land after being

acquired is not large enough for living, and they do not have appropriate land to live in the original area where their land is acquired;

(3) Households where many generations are living together (several couples, eligible to separate into nuclear households, and have the same land use rights to a parcel of land), will be facilitated to live in a resettlement site;

(4) Who are not eligible according to the resettlement entitlement matrix but have no land to live, will be allocated land in resettlement areas for building houses and will be provided with corresponding support policies for resettlement.

Provided land in a resettlement site is expected as;

(1) Rural areas (communes): 200 m^2

(2) Urban areas (wards/towns): 100 m^2.

The case of PAPs who are not eligible for resettlement land allocation but they have no land in the commune/ward/township, the area of land allocation is minimum level. Based on the socio-economic survey, preference of "compensation by land" is different through commune by commune as shown in Table 8.10-1.

Table 8.10-1 Proposed Resettlement Sites for the Project

Commune /Ward	Total Residential Land Owner (*)	Compensation by cash	%	Compensation by land	%	Not decided	%
May To	85	30	35.3	35	41.2	20	23.5
Dong Son	12	8	66.7	4	33.3	0	0.0
Hoa Binh	27	15	55.6	11	40.7	1	3.7
Trung Ha	12	0	0.0	0	0.0	12	100.0
Ngu Lao	73	24	32.9	46	63.0	3	4.1
Lap Le	57	11	19.3	40	70.2	6	10.5

* Only the Land owners answered this question

The planning and detailed design for the relocation sites will be discussed by DONRE, LFDC and other relevant authorities with public consultation and then approved by HPPC. Detailed rule on plot allocation will be developed by HPPC through consultation with commune and

PAPs. For relocating households, assistance is in form of land-for-land of similar characteristics with title at no cost. The replacement land is not less than 40 m^2, or compensation in cash with equal value if PAPs for self-relocation. Area and number of land plot in resettlement sites will be decided in consultation with PAPs.

Entitlements and liabilities of households whose land is acquired and have to move to a resettlement area or another place are as follows;

(1) Relocation of schools for children and prioritization for family having their children in school age.

(2) Households who are compensated less than VND 50 million can keep all this money for building a house if they request it and owe the land use levy (fee)[2] as stipulated.

(3) Households who are compensated more than VND 50 million can keep 50 million for a building house. The remaining shall be used for paying the land use fee. If their remaining money is not enough to pay the land use fee, they will be owed as stipulated. When paying the debt, land users must pay based on the land price at the issuance time of land-use right certificates and house and assets ownerships attached to land; the debt time does not exceed 10 years.

(4) Those who are allocated land in resettlement area will be exempted from fees for land surveys, land use right certificates, transfers of house ownership, and other registration fees. (These fees are included in "replacement cost" and supported by the PMU and the Government).

(5) PAPs are entitled to refuse any resettlement area if it does not meet the conditions as announced to the public.

(6) PAPs must move to the resettlement area as scheduled, build a house and other structures in accordance with the plan, and take responsibility for other liabilities as stipulated by laws and regulations.

[2] Land use levy means an amount of money that a land user shall pay to the State when being allocated land with the collection of land use levy by the State, permitted to change the land use purpose, or having land use rights recognized by the State. (21, Article 3 of the Land Law)

Each resettlement site have to be equipped with necessary infrastructures, such as water, electricity, drainage, etc. based on Para 13, OP 4.12 Annex A.

8.10.2 Process of Compensation and Relocation

(1) If the selling cost of minimum plot(s) at the relocation site is more than the value of the affected residential land, PAPs receive new plot at no additional cost.

(2) If the plot(s) at the relocation site is equal to the value of affected residential land, PAPs receive new plot at the new site without any balance.

(3) If the plot(s) at the relocation site is less than the value of affected residential land, PAPs will receive plot and the difference in cash.

8.10.3 Relocation Site Selection

PMU has cooperated with relevant authorities in Hai Phong to plan and carry out preparation works and development of relocation sites (RSs). PMU temporally indicated four (4) RSs which is managed by the land fund development center[3] in district authorities to accommodate physical resettlement cases as Table 8.10-2. It is estimated that totally 262 Houses have to be physically relocated based on the entitlement matrix.

Table 8.10-2 Proposed Resettlement Sites for the Project

No.	Location	Area	Number of Target Houses	Component
RS-1	Hoa Binh Commune, Thuy Nguyen District	2 ha	42 Houses	RR3
RS-2	An Lu Commune, Thuy Nguyen District	3 ha (among 12 ha)	71 Houses	RR3

[3] Land fund development Centre has functions of creating, developing, managing, exploiting land fund system; implementing the compensation, support and resettlement; doing the work of land use right transfer and other services in the field of land.

RS-3	Lap Le Commune, Thuy Nguyen District	2 ha (among 11 ha)	51 Houses	RR3
RS-4	May Chai Ward, Ngo Quyen District	4 ha (among 10 ha)	98 Houses	Nguyen Trai Bridge * Factories / Companies, such as garment, shoes, taxi, stock yard, etc. are using the site. Enough preparations, such as monitoring any kinds contamination and/or pollution before hand-over

RS-1, RS-2, and RS-3 is using as farming land (paddy field), therefore, it should be examined quality and route of drainage water from the resettlement sites to avoid any critical impact on farming businesses surrounding the area. RS-4 is using as factory area, therefore, it should be careful with land using rights and appropriate compensation / assistance based on land fund development system in Ngo Quyen District. If there is observed risks of land contamination by factories around the area of RS-4, HPPC will survey and take appropriate measures to improve environmental situation up to sound living conditions based on environmental standard of Vietnam. These resettlement sites have to be prepared before resettlement of the project based on both the JICA Environmental Guidelines and the Land Law.

The location of each resettlement site are shown in Figure 8.10-1. These candidate sites are still using by right holders with their own land use purposes, e.g. agriculture, factories, etc., even the lands are already listed as land fund systems.

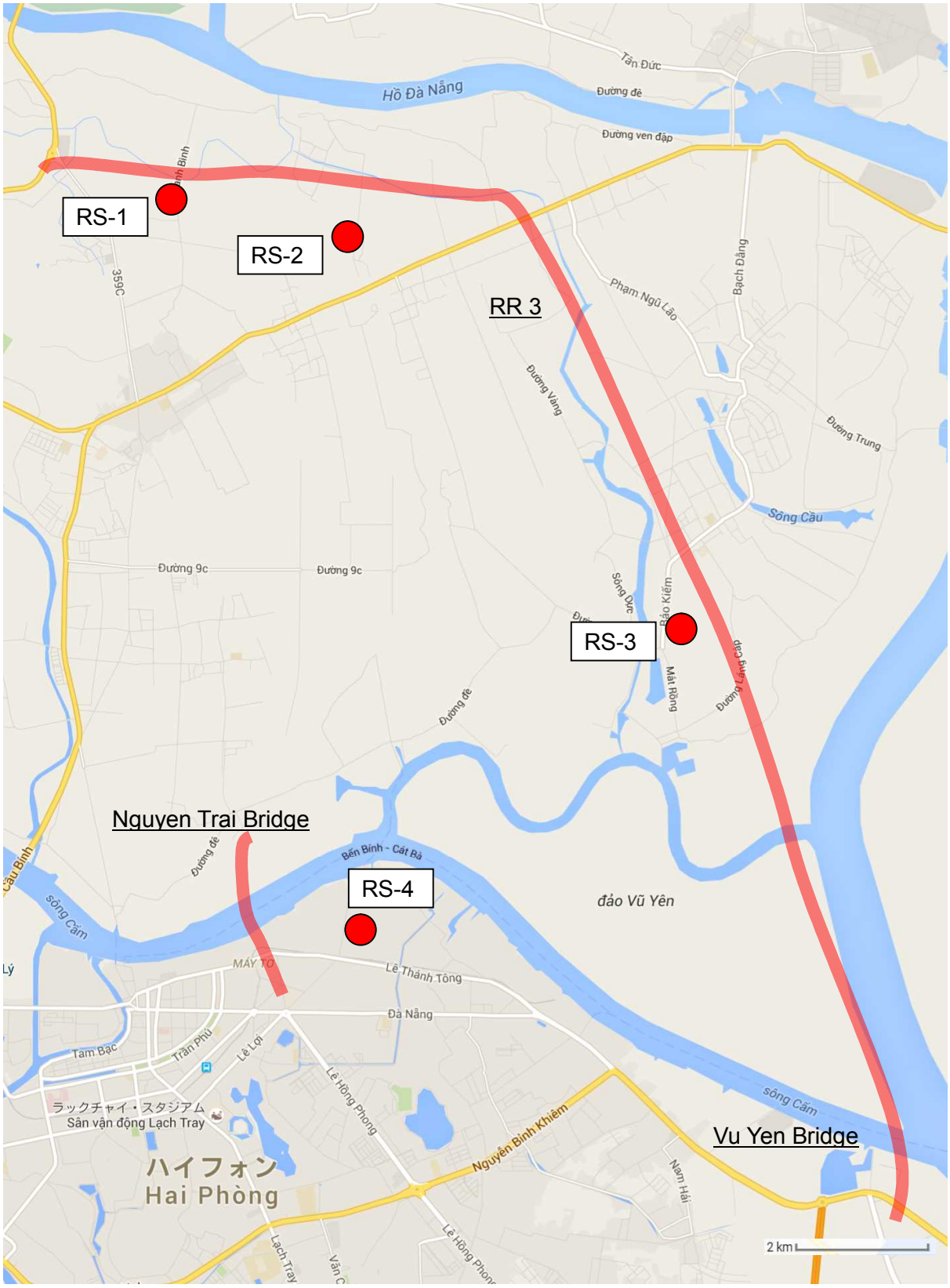

Figure 8.10-1 Location of Candidate Relocation Sites

8.11 Grievance Redress Mechanism (GRM)

8.11.1 General Mechanism

Agencies in charge of implementing the procedure for handling grievance during compensation and land acquisition in the project affected areas should be established as Grievance Redress Committee (GRC). Depending on the functions and tasks at each level, the mechanism for handling complaints by PAPs will be regulated in accordance with legal documents promulgated by the State. Detailed procedures on handling grievances will be established for the Project to ensure that PAPs have the opportunity to present their complaints about compensation and resettlement.

This mechanism will be designed to be simple, understandable, quick and fair. Handling complaints at each Project level will facilitate the smooth implantation of the Project. PAPs who do not agree with the decision on compensation, assistance and resettlement are entitled to raise complaints based on the legal regulations. Handling grievances against compensation, assistance, land acquisition and resettlement decisions and with the responsibility for resolving complaints, and validation and settlement procedures shall be implemented based on relevant laws, such as Land Law and other related Decrees and regulations.

While awaiting settlement of the grievance, PAPs must follow the decision on land acquisition and hand over land on schedule in accordance with the plan decided by competent state agencies. Grievances against administrative decisions on land management shall comply with regulations and laws.

Since grievances are commonly found in any projects related to land acquisition and resettlement, to ensure the grievances are timely and effectively addressed, following general measures could be used;

(1) Grievances/Complaints should be recorded and maintained by both local authority/PMU and internal/external monitoring agency with regular update, to timely and satisfactory solve the grievances.

(2) In case of verbal complaints, GRC should record in written format to follow up the complaints.

8.11.2 Procedure for resolving grievance

PAPs are entitled to file grievance/complaint regarding resettlement procedures, such as compensation policy, compensation unite price, property measurement, and any other issues. PAP's grievance should be presented in written documents, and they can report to People's Committee in each level and/or PMU. GRC is formed in three (3) levels of local authorities, namely, commune, district, and provincial level at the time of the project announcement publicly. At each level, the committee members will include 5-7 representatives from PMU, GRC (1-2 persons at each 3 level of local authorities), civil society (1-2 persons), Lawyer Union/associations, and etc.

If it is impossible to solve their complaints at the commune or ward level, PAPs can take following steps:

(1) Step 1: Persons who are unsatisfied with any issues in the program of economic recovery and resettlement can report verbally or in writing to their Ward/Communal GRC that will be responsible for resolving their complaint in writing within 15 days.

(2) Step 2: Persons who are unsatisfied with the decisions of the ward/communal level in Step 1 can appeal to the District GRC within 15 days of the date of the decision in Step 1. The District GRC will be responsible for resolving the complaint within 15 days.

(3) Step 3: If they are unsatisfied with the decisions at the district level, PAPs may appeal to the Hai Phong City GRC within 15 days of the decision in step 2. The City GRC will give their decision on the complaint within 15 days.

(4) Step 4: If the PAPs are unsatisfied with the decision at the city level, they may present their petition to their district court for a decision within 15 days of the decision by the GRC at the city level.

During above mentioned steps, PAPs filing a complaint will not be charged administration or complaint fees.

8.12 Income Restoration Strategy

The income restoration program (IRP) plays an important role in implementing the RAP when PAPs lose business bases, jobs and other income sources, regardless of whether or not they lose their houses; those who lose both houses and income sources are the Project's highest

risks. Providing measures to restore livelihood and quality of the life are the core target of the RAP. The objective of IRP is to restore the livelihoods of PAPs to the same level or higher than before the Project implementation.

Income restoration plays an important part in the accessibility to improved livelihoods and economic welfare of PAPs and the Project aims to enhance skills and/or create job opportunities, especially for poor and vulnerable households. PMU will coordinate with local authorities at all levels and social organizations such as the Women's Union to support job training and other activities to promote the restoration of the PAPs' income.

8.12.1 Target of IRP and Assistances

Regarding severely affected PAPs losing 30% or more of their productive land/ income-generated assets, they are entitled to the following assistances as income restoration program:

(1) Under 30% (10% for poor and vulnerable households) of their productive land/ income-generated assets will be provided with cash or in-kind assistance equivalent to 30 kg of rice (at current market price) per person per month for 3 months if no relocation, 6 months if relocation, and 12 months if relocation to sites with harsh socioeconomic conditions.

(2) More than 30% to 70% of their productive land/ income-generated assets will be provided with cash or in-kind assistance equivalent to 30 kg of rice (at current market price) per HH member per month for 6 months if no relocation, 12 months if relocation, and 24 months if relocation to sites with harsh socio-economic conditions.

(3) More than 70% of their productive land/ income-generated assets will be provided with cash or in-kind assistance equivalent to 30 kg of rice (at current market price) per HH member per month for 12 months if no relocation, 24 months if relocation, and 36 months if relocation to sites with harsh socio-economic conditions.

(4) For households losing agricultural land, apart from compensation and assistances as described above, they are entitled to job supporting and vocational training policy for people in the working age (Decree 52/2012). Accordingly, PAPs losing agricultural

land will be provided with the following assistances free of charge:

1) Vocational training assistance including: short-term vocational training (primary level and vocational training less than 3 months) or intermediate and college level with one-course fee paid by the State. Vocational training expenditures are included in the total cost of the investment project or approved compensation, assistance and resettlement plan;
2) Job-creation: consulting for vocational training, introducing jobs free of charge at the Job Centers under the Department of Labor, Invalids and Social Affairs (DOLISA). In case a business receives several labors who lose agricultural land to work will be entitled to preferential policies regarding land, credit, and tax according to current regulations.

(5) Severely affected households due to loss of 30% of productive land or more (10% for vulnerable households) are entitled to: (i) provision of replacement land or supporting in buying replacement land; (ii) agricultural input materials to increase productivity on the remaining land area and/or replacement land; and (iii) income restoration programs will be designed and carried out in consultation with the PAPs during the project implementation period.

8.12.2 Needs Analysis and Options

After the decision of land acquisition by HPPC, consultation meeting and needs analysis for IRP will be implemented by the local people's committee and relevant authorities. Based on past project cases in Hai Phong, proposed livelihood restoration program are shown as below;

(1) Vocational Training and Guidance

This measure is job training for the people affected by land acquisition by using vocational training center (VTC) nearby if there is appropriate demands in the target group of PAPs. In the past project cases, the VTCs can provide domestic and industrial garment trade; leather shoe manufacturing; sewing equipment repair; domestic and industrial electricity; electric and welding; cooking; construction; cutting processing; cooling, milling; motorcycle repair, and office informatics. Training fees for each course will be paid by the project budget. The Project is required to coordinate with such VTCs in different districts to organize vocational

training for affected households and/or recruit their children for work in factories.

(2) Job Arrangement

After the job training, according to the list of trainees and demands of each trainee, PMU will coordinate with vocational training centers under the direction of HPPC to work with industrial park zones to introduce jobs to trainees. Or, activities of agricultural and forestry promotions will be discussed to provide knowledge of crops, livestock, fertilizers, technology, productivity growth ... to people with demands.

(3) Loan Program

During implementation phase, PAPs will be interviewed about their demands for credit loan. If do, they will be assist to access some sources of credit loan such as revolving fund organized by Women's Union (WU), credit with low interest organized by local banks.

8.12.3 Institutional Arrangement

The PMU will create a list of people with demands and transfer expenditures to the training organizations. VTCs will organizes training courses for recruits and coordinates with the PMU to arrange/introduce jobs for trainees. Households will participate in surveys, training courses and follow the instructions of the PMU and vocational training center.

8.12.4 Cost and Budget

The cost of IRP will be extracted from the Project's total cost of compensation, assistance and resettlement. Budget for IRP will be prepared from the Government budget, and be included in total compensation costs of the project.

8.13 Monitoring and Evaluation

Resettlement implementation will be monitored and evaluated to ensure appropriateness of activities in the RAP by both internal and independent external monitoring agencies. These monitoring activities will determine the Project's actual progress, the possibility of its success, and any difficulties arising, and facilitate adjustments to the Project implementation as soon as possible.

Monitoring objectives are:

(1) Verifying whether the project activities comply with the plan and are completed efficiently regarding quantity, quality and time.

(2) Covering issues that arise during the Project implementation, proposing resolving countermeasures pursuant to the policy framework, and protecting the interests of affected households.

(3) Assessing if the RAP activities meet the Project's objectives and purposes or not, and in which level these goals are reached.

Appendix A8.2 shows monitoring format for land acquisition and resettlement activities.

8.13.1 Internal Monitoring (IM)

Internal monitoring (IM) of the RAP implementation is the main responsibility of the executing agency (or Internal Monitoring Agency: IMA) in coordination with district and commune PCs. Remarkable findings through IM shall be recorded in regular monitoring reports before being submitted to HPPC and JICA. The objectives of IM are:

(1) Reviewing relevant information on land acquisition and resettlement to find out if the activities are being implemented in accordance with the RAP.

(2) Checking that the RAP is being implemented in accordance with the approved design; technical assistance, relocation, payment, support and allowances are guaranteed; and entitlements to allowances for the recovery of income sources are implemented.

(3) Ensuring the RAP implementation costs are paid on time by PMU and Resettlement Committees at district level

(4) Recording, monitoring and resolving complaints in a timely and efficient manner.

The PMU will submit its internal reports on the RAP implementation as part of the regular reports they are required to submit to JICA. Internal monitoring reports will include the following information:

1) The number of PAPs according to types of impact, and the components and conditions for compensation, relocation and recovery of income for each one.
2) Money distributed for activities or compensation and money disbursed for each activity.
3) Final resolutions of complaints and outstanding issues needing resolutions from

management agencies at all levels.

4) Issues arising during the RAP implementation including grievances
5) Updated the RAP Schedule.

8.13.2 External Monitoring (EM)

An External Monitoring Agency (EMA) will be employed by the PMU to monitor and evaluate the RAP implementation in coordination with IM. EMA should be selected from institutes, research agencies, non-governmental organizations, or any other independent bodies, and they would be specialized in social science and resettlement.

The general objective of independent monitoring is independently review the results of resettlement and periodically supply the findings to the PMU. The IMA will provide information about PAPs including living standard and job changes, income and occupation restoration, social foundations, effectiveness, impacts and the sustainability of characteristics, benefits, and necessary mitigation measures (if any). This information will teach strategic lessons for policy and planning in the next period.

In addition to reviewing information provided in assessment and internal monitoring reports by the PMU, the IMA will conduct a random survey every six months. The survey sample may cover 100% of the physically displaced households, and at least 10% of the remaining households under the RAP in order to:

(1) Determine if procedures for affected household and PAPs participation, compensation and assistance are implemented based on the RAP.
(2) Review the process of project implementation, consultation and information dissemination, and etc.
(3) Gather quantitative indicators of the Project's socio-economic effects on PAPs.
(4) Propose modifications to the the RAP implementation, if necessary, to achieve the principles and objectives of the Policy Framework.
(5) Determine PAP satisfaction with various aspects of the RAP, the operation of the complaint mechanism and the speed of complaint resolution.
(6) Survey trends in living standards record any potential issues regarding recovering living standards.

The IMA must report their findings every three months during first two (2) years, then (or in case, the land acquisition and compensation is basically completed) it might be change to every six (6) month for remaining time, the report will be discussed with PMU prior to submitting to JICA. Methodology of the EM is described as followings.

8.13.3 Socio-Economic Survey and Detailed Measurement Survey (DMS)

Socio-economic survey and DMS will be required after land acquisition notice is issued by HPPC. EMA will monitor the activities implemented by local authorities to confirm appropriate procedures following the RAP and other regulations including the Vietnamese legal framework and the JICA Environmental Guidelines.

8.13.4 Reporting

The EMA will be required to submit the findings of the periodical monitoring every 6 months. These monitoring reports shall be submitted to the PMU, and PMU will submit to JICA.

The report should contain (i) progress of the RAP implementation; (ii) deviations, if any, from the provisions and principles of the RAP; (iii) identification of problem issues and recommended solutions so that implementing agencies are informed about the ongoing situation and can resolve problems in a timely manner; and (iv) progress of the follow-up of problems and issues identified in the previous report.

8.13.5 Evaluation

Evaluation is an assessment of the RAP implementation. The IMA will conduct an assessment of the progress during the period and the timing of 6-12 months after the completion of all resettlement activities. Questions for the assessment will be based on the Project databases and sample questions that were used in the socio-economic surveys and monitoring surveys.

If this evaluation indicates that any PAPs have not recovered their lives according to the Project objectives, additional measures should be established to continue to assist them.

In addition, independent monitoring, as a part of external monitoring, will make an assessment of the resettlement process and impact 6 to 12 months after completion of all resettlement activities, using these questions and samples were used in monitoring activities.

8.14 Cost and Budget

8.14.1 Budgeting

Budget for implementation of actions in the RAP budget shall be secured as a part of the Government's counter-part fund. HPPC will provide this counter-part fund for compensation and resettlement in appropriate fiscal year to implement each activity according to the RAP. The cost regarding land acquisition and resettlement is included in the total investment amount for the Project.

8.14.2 Replacement Cost Survey (RCS)

Replacement Cost Survey (RCS) has been implemented in and vicinity of the project sites in May and June, 2015. Calculation of the full replacement cost is based on the following factors;

(1) the fair market price;

(2) transaction costs;

(3) the benefit generation interest;

(4) cost for changes and recovery; and

(5) other appropriate payments, if any.

This will be achieved through an empirical surveys of the market and/or such other factors as productive capacity, equivalent attributes, value of replacement asset, disadvantage of the PAPs, etc. Simultaneously the unit prices are to be evaluated and compared with unit price legislated by HPPC. RCS determines compensation unit cost / average cost for different types of damages, such as affected land (including homestead land, paddy land, garden land, aquaculture surface water...), damage to the architecture objects (including houses, subordinate facilities, graves...) and fruit trees and crops on the land as follows:

- Determine land price at the same time with RCS's survey.
- Determine current prices of trees and crops at the same time with RCS's survey.
- Determine materials price and labor cost of constructing houses and architectural projects at the same time with RCS's survey.
- Decide options of replacement cost for land, assets, tree, and crops at the same time with RCS's survey.

The summary of the results of RCS are shown as followings, and the full RCS report is

attached as Appendix A8.1. For cost estimation, the highest price and/or the most beneficial evaluation result for PRPs are adopted and recommended to set as final compensation unit price.

(1) Land

1) Residential land

Replacement cost for the residential land was calculated based on actual land transaction of similar transaction cases in and vicinity of the project area or other alternative methods commune by commune. If the result from RCS is higher than government price which is indicated in Decision No. 2680/2014/QD-UBND regarding compensation, assistance, and resettlement in Hai Phong City, the result will be the unit price of replacement cost, or the government price should be modified with coefficiency to increase the price correspondent with replacement cost. If the result from RCS is lower than the price in the Decision, government price in the Decision is recommended to apply as the replacement cost.

Table 8.14-1 Replacement Cost Price List of Residential Land

Unit: 1,000 VND/ m^2

No	Type of land	Compensation price and assistant level of Haiphong City			Market price	Proposed compensation price
		Total	Compensation price at Decision No. 2970*	Assistant level at Decision No. 2680		
I	**Thuy Nguyen District (**)**					
1	Kenh Giang Commune					
	Location 1: New NH10	6,260	3,000	3,260	8,000	8,000
2	Hoa Binh Commune					Price in Decision No. 2970 and assistant level in Decision No. 2680
	Inter-hamlet road	3,580	500	3,080	3,000	
3	Trung Ha Commune					
	Commune axe-road	3,880	800	3,080	3,500	
4	Ngu Lao Commune					
	Location 1, Ben Binh – Pha Rung section on PR359	6,790	3,500	3,290	8,500	8,500
	Inter-commune road	3,880	800	3,080	3,500	Price in Decision No. 2970 and assistant level in Decision No. 2680
	Inter-hamlet road	3,680	600	3,080	3,000	
5	Lap Le Commune					
	Inter-commune road	4,352	1,200	3,152	4,200	
	Commune axe-road	3,880	800	3,080	3,000	
II	**Ngo Quyen Urban District**					
1	Location 1: Nguyen Trai Road	29,780	20,000	9,780	40,000	40,000
2	Location 2: Nguyen Trai Road	18,580	10,000	8,580	30,000	30,000

* 2680/2014/QD-UBND regarding land price (2015-2019) in Hai Phong

(**) Affected land plots in Thuy Nguyen Rural were studied at location 1- by Decision No. 2970

2) Agricultural land / Aquaculture surface water

Replacement cost for the agricultural land was calculated based on actual land transaction of similar transaction cases in and vicinity of the project area or other alternative methods commune by commune. Practically, local transactions of agricultural land are not rather frequently carried out, however, the result of local peoples' interview were same level of land price in the vicinity.

However, according to Decision No. 2680/2014/QD-UBND, the compensation level is equivalent to 5 times (coefficiency of K=5) the price of agricultural land for the total recovered agricultural land, but not to exceed the agricultural land allocation limit at local.

Regarding aquaculture surface water**:** the price that people commonly make in the range of 70,000 – 80,000vnd/ m^2. While compensation price is 48,000vnd/ m^2 in Thuy Nguyen Rural District lower 1.66 times (Coefficiency of K=1.66) than actual prices; and compensation price at Hai An Urban District is 80,000vnd/ m^2 same with the actual price. Table 8.14-2 shows the results of replacement cost on agricultural land and aquaculture surface water.

Table 8.14-2 Results of Agricultural Land Price Survey

Unit: 1,000VND/ m^2

No	Type of land	Land price as Decision No. 2970	Total Received Compensation including assistance, for affected households (*)	Survey land price	Proposed compensation price
1	Paddy and annual crop land	60	360	250-300	Price in Decision No. 2970 and assistant level in Decision No. 2680
2	Aquaculture surface water in Thuy Nguyen District	48		80	80
3	Aquaculture surface water in Hai An District	80		80	Price in Decision No. 2970 and assistant level in Decision No. 2680

(*): Paddy and annual crop land supported 5 times at Decision No. 2680

3) Business land

Vu Yen Bridge component will affect to enterprises of container yards in Nam Hai ward, Hai An District. These yards are belonging to state land, or is capitalized and turned into the company's land use. Becuase there is no transaction contracts in the market regarding the yard area, the proposal unit price for compensation is based on policies of HPPC.

(2) Structures

RCS survey team conducted to interview with the households whose houses have constructed recently, the constructors, and owners of construction material shops. There have not been observed big differences in the price of construction materials among communes/wards and districts.

Construction unite price is in a range of 4,500,000 – 5,500,000 VND/m^2, which is all-in-one price including construction material and labor cost. Official compensation price is declared in Decision No. 324 summarized as below:

– Construction price of 1 story-house in the market is between 4,000,000-5,000,000 VND/ m^2 floor area. The compensation unit rates prescribed by the province ranged from 4,593,892– 5,161,741VND/ m^2 and can be adjusted depending on the type of material used.

– Similarly for the architectural objects with no significant difference between promulgated prices in Decision No. 324/2015/QD-UBND and actual construction cost, therefore absolutely apply these compensation prices for reconstruction affected architectural objects.

Table 8.14-3 Result of Architectural Price Survey

Unit: 1,000VND/ m^2

No	Item	Structure	Decision No. 324	Architectural objects price	Proposed compensation price
1	**1 story-house with the wall-bearing structure; 3.5 m of height; without sanitary block**				
	Wall is constructed by brick 220	Tiles roof, solid brick foundation	5,161,741	5,000,000	Apply the result of Decision No. 324 of Haiphong City
		Metal roof, solid brick foundation	4,658,432	4,500,000	
		Fibrocement roof, solid brick foundation	4,593,892	4,300,000	
		Tiles roof, stone foundation	5,074,334	4,800,000	
	Wall is constructed by brick 110	Tiles roof, solid brick foundation	4,735,018	4,500,000	
		Metal roof, solid brick foundation	4,270,456	4,000,000	
		Fibrocement roof, solid brick foundation	4,205,917	4,000,000	
		Tiles roof, stone foundation	4,686,359	4,400,000	
2	**1 story-house with the wall-bearing structure; 3.5 m of height; with sanitary block**				
	Wall is constructed by brick 220	Tiles roof, solid brick foundation	5,752,275	5,500,000	Apply the result of Decision No. 324 of Haiphong City
		Metal roof, solid brick foundation	5,248,965	5,000,000	
		Fibrocement roof, solid brick foundation	5,184,425	5,000,000	
		Tiles roof, stone foundation	5,664,867	5,500,000	
	Wall is constructed by brick 110	Tiles roof, solid brick foundation	5,328,333	5,200,000	
		Metal roof, solid brick foundation	4,863,573	4,600,000	
		Fibrocement roof, solid brick foundation	4,804,760	4,600,000	
		Tiles roof, stone foundation	5,279,545	5,000,000	
3	**2 story-house; wall-bearing structure; height of the first deck is 3.9 m; second deck is 3.5 m; with sanitary block**				
	Wall first and second deck are constructed by brick 220	Tiles roof, brick foundation	3,725,682	3,500,000	Apply the result of Decision No. 324 of Hai Phong City
		Metal roof, brick foundation	3,512,259	3,500000	
		Fibrocement roof, brick foundation	3,456,847	3,400,000	
		Tiles roof, stone foundation	3,725,682	3,500,000	
		Tiles roof, stone foundation	3,512,259	3,400,000	
	Brick-220 wall of first deck; brick-110 wall of second deck	Tiles roof, brick foundation	3,710,235	3,500,000	According to Decision No. 324 of Hai Phong City
		Metal roof, brick foundation	3,496,824	3,400,000	
		Fibrocement roof, brick foundation	3,442,247	3,400,000	
		Tiles roof, stone foundation	3,664,953	3,500,000	
		Tiles roof, stone foundation	3,455,847	3,300,000	

No	Item	Structure	Decision No. 324	Architectural objects price	Proposed compensation price
4	**3 story-house; height of the first deck is 4.5 m; second deck is 4.1 m; third deck is 3.5 m with sanitary block**				
	Wall-bearing structure; brick-220 wall at first and second deck; brick foundation	Tiles roof, brick-220 wall at third deck	3,803,637	3,600,000	According to Decision No. 324 of Hai Phong City
		Tiles roof, brick-110 wall at third deck	3,550,699	3,500,000	
		Tiles roof, wall at third deck is built by perforated brick with 6 holes, diameter 150.	3,669,761	3,500,000	
		Tiles roof, wall at third deck is built by perforated brick with 6 holes, diameter 110	3,653,752	3,500,000	
		Metal roof, brick-220 wall at third deck	3,656,363	3,500,000	
	Frame, roof and foundation of house is constructed by reinforced concrete	Wall of 3 decks is constructed by brick-220	4,257,965	4,000,000	According to Decision No. 324 of Hai Phong City
		Wall of 3 decks is constructed by brick-110	3,960,518	3,700,000	
		Wall of 3 decks is constructed by as perforated brick with 6 holes, diameter 150 in a straight line	3,911,863	3,700,000	
		Wall of 3 decks is constructed by as perforated brick with 6 holes, diameter 110 in a sloping line	3,839,721	3,600,000	
		Brick-220 wall at first and second deck; and brick-110 wall at third deck	4,100,314	4,000,000	

(3) Graves

- **Earth grave**: compensation price for earth grave is 6,000,000 – 7,500,000 VND/ grave, and survey price also ranges 4,000,000 – 4,500,000 VND/grave (exclude land cost).
- **Built grave:** The price on enumeration areas have fluctuated between 5,000,000 –9,000,000 VND/grave depending on building structure. The compensation unit rates of HPPC is in a range of 6,500,000 – 10,000,000 VND/grave for the earthworks and compensation for construction response based on detail material volume and construction price. Therefore, it can be said that compensation price for architectural objects specified in Decision No.324 can meet market price for new construction and relocation of affected house and architectural objects.

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Table 8.14-4 Result of Grave Removal Survey

Unit: 1,000VND

No	Item	Structure	Decision No. 324/2015/QD-UBND issued by Haiphong CPC			Architectural objects survey cost	Proposed compensation price
			Total	Construction cost	Assistant level (1)		
1	Earth grave		6000 - 7500	2500	3500-5000	4000-4500	Compensation price at Decision No. 324
2	Simple built grave	Volume < 0.4 m^3	6500 - 8000	3000	3500-5000	5000-6000	
		Volume 0.4 – 0.6 m^3	7000 - 8500	3500	3500-5000	6000-7000	
		Volume > 0.6 m^3	8000 - 9500	4500	3500-5000	7000-8000	
3	Special-structural built grave		8000 – 9500 and (2)	4500	3500–5000 and (2)	8000-9000	

(1) Assistant level including:

a. Cost for removal from 1,500,000 - 3,000,000 VND/grave

b. Cost for worship procedures: 2,000,000 VND/grave

(2) Cost for ashlar paving stone are pressed outside the grave

(4) Fruit Trees and Crops

Based on the survey result, trees are usually only grown for family's demand and consumption. Overall survey price showed that compensation rates for fruit trees and subsidiary crops in Decision 58/2015/QD-UBND of HPPC province is almost close to the market price.

Table 8.14-5 Result of Tree and Crop Survey

Unit: 1,000VND

No	Tree, group of tree	Unit	Compensation cost at Decision No. 58	Survey price	Proposed compensation price
I	**Fruit trees**				
1	Graph fruit, age of tree over 5 years, able to harvest	tree	1,200,000	1,000,000	**Decision No. 58 of Haiphong CPC**
2	Lemon big tree, have just harvested	tree	120,000	100,000	
3	Harvested papaya tree	tree	140,000	120,000	
4	Sapodilla tree/ star apple tree/ rose apple tree able to harvest	tree	300,000	300,000	
5	Harvested jackfruit tree	tree	600,000	500,000	
6	Harvested tamarind tree	tree	500,000	500,000	
7	Harvested Carrabolla tree	tree	700,000	500,000	
8	Harvested eggfruit tree	tree	300,000	300,000	
9	Harvested apple tree	tree	240,000	200,000	
10	Harvested guava tree	tree	250,000	250,000	
11	Harvested mango tree	tree	1,000,000	1,000,000	
12	Dracontomelum tree have just taken root	tree	400,000	400,000	
13	Orange or Camborine tree with age of tree over 5 years	tree	400,000	400,000	
14	Harvested Oleaster tree	tree	150,000	150,000	
15	Harvested Longan tree	tree	1,000,000	1,000,000	
II	**Shade tree**				
1	Devil tree	tree	72,000	70,000	**Decision No. 58 of Haiphong CPC**
2	Camphor tree	tree	120,000	100,000	
3	Flamboyant/ Cassia trees	tree	150,000	150,000	
4	Yellow flamboyant/ violet cassia/ queen-tree/ crape myrtle tree	tree	120,000	120,000	
5	Tropical almond tree/ Kapok tree have just taken root	tree	200,000	200,000	
6	Gum tree/ casuarina/ Acacia mangium/ china tree have just taken root (D>30 cm)	tree	120,000	100,000	
7	Conch have just taken root (D=15-40)	tree	300,000	300,000	
8	Coral/ Fig-tree	tree	100,000	100,000	
III	**Annual Crop**				**Decision No. 58 of Haiphong**
1	Paddy	m^2	8,000	6,500	
2	Soybean	m^2	6,000	6,000	

No	Tree, group of tree	Unit	Compensation cost at Decision No. 58	Survey price	Proposed compensation price
3	Water-taro, sweet potato	m^2	4,500	4,000	**CPC**
4	Taro, potato	m^2	8,000	7,000	
5	Corn	m^2	6,000	6,000	
6	Peanut, Sesame	m^2	8,000	8,000	
7	Green bean, Black bean	m^2	6,500	6,500	
8	Tomato	m^2	10,000	8,000	

8.14.3 Cost for Land Acquisition and Resettlement

The estimated resettlement cost based on field surveys includes:

(1) Compensation cost for land and assets affected including incentive bonus

(2) Assistances for specified cases

(3) Resettlement site preparation

(4) Expected surveys in following stages such as Detailed Measurement Survey (DMS)

(5) Administrative costs including management cost, cost of public information and consultation

(6) Internal and external monitoring

(7) Income restoration program

(8) Contingency cost of about 10% of the total cost

Total cost for land acquisition and resettlement of the Project is estimated 2,204,619,083,436 VND (99,084,004 USD, in the case of 1USD=22,250VND) based on the results of field surveys including replacement cost survey which provides unit price for compensation.

Table 8.14-6 shows the summary of figures on estimated compensation and resettlement implementation costs of the Project. The complete breakdown of cost estimation is shown in Appendix 4 of each package of RAP.

Table 8.14-6 Estimated Cost for Land Acquisition and Resettlement

No	Area	Resettlement compensation	Assistances	Cost for relocation site	Other cost and tax	Total
I	Nguyen Trai Bridge	660,766,870,000	37,670,500,000	32,160,000,000	91,090,879,140	821,688,249,140
	Ngo Quyen District	659,504,450,000	32,101,000,000	32,160,000,000	90,257,384,900	814,022,834,900
	Thuy Nguyen District	1,262,420,000	5,569,500,000	-	833,494,240	7,665,414,240
II	Vu Yen Bridge	73,485,500,000	49,180,000,000	0	15,944,191,000	138,609,691,000
	Hai An District	73,485,500,000	49,180,000,000	-	15,944,191,000	138,609,691,000
III	Hai Phong RR3	810,491,368,000	238,977,200,000	56,280,000,000	138,572,575,296	1,244,321,143,296
	Thuy Nguyen District	803,371,368,000	203,377,200,000	56,280,000,000	133,360,735,296	1,196,389,303,296
	Hai An District	7,120,000,000	35,600,000,000		5,211,840,000	47,931,840,000
IV	Resettlement budget (I+II+III)	1,544,743,738,000	325,827,700,000	88,440,000,000	245,607,645,436	2,204,619,083,436

8.15 Schedule

8.15.1 Implementation activities

(1) Step 1: Location Introduction and land acquisition notice

The identification and land acquisition notice is based on the written evaluation letters of land use needs of the DONRE submitted to HPPC for approving and issuing land acquisition notices (including reasons land acquisition, area and location of land recovery on the basis of the existing cadastral or detailed approved construction planning; to assign the district's people committees for land acquisition notification to the public, to guide compensation, assistance and resettlement in the district level to perform inventory tasks, establish compensation plans). DPCs are responsible for directing the widespread policy of land confiscation, the regulations on land acquisition, compensation, resettlement assistance when recover of used land for national defense purposes, security, national interests, public interests and economic development.

WPCs/CPCs responsible to post up a public notice about land acquisition policies in the ward/commune's People's Committee headquarters and in the points of living and residential areas where land is recovered, widely reported on radio system level (in places having radio system).

(2) Step 2: Prepare cadastral for land acquisition site

Based on documents on land acquisition of HPPC, DONRE shall direct the registration office for land use rights in same level to make the preparation of cadastral files.

Revision of the cadastral map to suit the current situation and make extracts of the cadastral map for places which have formal cadastral maps or conduct cadastral measurements for places with no formal cadastral maps;

Complete and make extract from cadastral (land register) to send to the DRC;

Make a list of parcels of land to be recovered with the following contents: number of maps, land parcel numbers, names, land use area of the parcel of land has the same purpose, the purpose of land use.

(3) Step 3: Planning, evaluating and approving the general plan on compensation, assistance and resettlement

The project owner guides the consultant unit to create overall compensation and resettlement

assistance plans (hereinafter called the general plan) based on survey data, field surveys, existing document issued by the DONRE, which had been assessed and approved along with approved investment projects. Comprehensive plan shall contain the following:

- The basis for the plan creation;
- General data on the types of land area and grade land for agriculture, the number of maps, parcel number, estimated value of existing assets on the land;
- General data on the number of households, number of household members, number of employees in the area of land recovery, clearly stating the number of employees in switched careers, resettlement of households;
- Expected level of compensation, support and expected location, land area or areas of resettlement housing and resettlement, the resettlement mode;
- Plan measures to help jobs creation and training plan of job conversion;
- List of works and scope of the work of the State, organizations, religious institutions, residential communities expected to move to relocation sites;
- The number of graves to be removed and proposed sites for relocation;
- Cost estimate to implement the plan;
- Funding sources to implement the plan;
- Progress of implementation plans.

(4) Step 4: Develop a resettlement area.

Based on the planning and economic development of local society, based on planning,
land use plan has been approved by competent authorities, the actual land of the local and specific requirements of the project, DPCs shall work with the project owner to build a resettlement area to meet the demand for resettlement, transfer to the Department of Construction, DONRE, Department of Planning and Investment and other relevant agencies for evaluation and submit to PCs for decision as stipulated.

(5) Step 5: Making the landmarks clearance

After projects are approved by competent authorities, the project owner based on the basic design to conduct the clearance boundary markers, handed over to the PMU for the next steps of site clearance work. In stage of formulation, approval of technical design (or design of construction drawings) if any adjustment on the scope of site clearance, project investors

coordinate with organizations in charge of compensation promptly, accurately and immediately notify the local authority the content adjusted. In addition, widely notify for residence about the project borders, conditions and targeted properties for compensation, land transferring for compensation, assistance, and resettlement work for affected people to implement the land clearance for the project. DONRE and related Ward People's Committee will assign specialist to take part in this work.

(6) Step 6: Determination of compensation prices

The tasks of the determination of compensation prices in the following order: 1. The PMU will hire an independent consultant with appraisal function to examine the market price.

2. Surveying methodology for replacement cost according to the regulations of the government (direct comparison methodology, income methodology, deduction methodology and surplus methodology).

3. Consultant will submit the results of this investigation to the PMU. PMU in consultation with the concerned districts and the affected households to propose compensation prices for the project and submitted to HPPC for approval.

(7) Step 7: Prepare The Compensation, Assistance And Resettlement Plan.

1) Field inspection and enumeration.

Based on the land acquisition policy and the site clearance landmarks of the project, the PMU in charge of compensation prepares the detailed enumeration report for each land acquisition case (called the compensation quantity enumerating report, for short). The report has to present specific contents, including names, places of permanent address registration, places of temporary address registration, current addresses of acquired land owners, the number of household members, the number of laborers and social policy beneficiaries (if any); the area and the location of the acquired land lot; the quantity of crop plants and domestic animals; the shape, the dimension, the quantity, the structure and basic features of assets currently on that land; emerging and underground works associated to the acquired land.

2) Identification of the origin of each acquired land lot.

The PMU in charge of compensation co-operates with the Land Use Rights Registration Office and WPCs to identify the origin of each acquired land lot and the legal owner of the

land lot based on documents related to the land use, cadastral documents, cadastral maps, inventory documents, cadastral books, statistics registration books, monitoring books of land use right certificates granting and tax registers of the acquired land.

3) Preparation of the compensation and assistance plan.

Pursuant to the compensation quantity enumerating report, the origin of each acquired land lot, unit prices and compensation policies as stipulated, the PMU implements the preparation of the compensation and assistance plan with following contents:

- Name and address of the owner of the acquired land;
- Area, type, location and origin of the acquired land;
- Calculation bases for the money amount of compensation and assistance such as the compensated land price, the house price, the compensated works, the number of household members, the number of laborers in the working age, and the number of social benefits beneficiaries;
- Amount of compensation and assistance money;
- Resettlement arrangement;
- Relocation of governmental works, religious organizations and communities;
- Grave displacement.

4) Collection of comments on the CAR Plan.

- The CAR Plan is openly posted at WPC headquarters and at residential activities places where land is acquired so that the land users and relevant people can give comments;
- The posting must be made in written form confirmed by representatives of WPCs, Ward Committees of Fatherland Front and acquired land owners;
- The period of posting and receiving comments lasts at least twenty (20) days as from the date of posting.

5) Finalization of the CAR Plan.

- At the end of the plan posting and comments receiving period, the PMU will be responsible for written synthesis of comments, including a clear statement of agreement, disagreement and other opinions towards the CAR Plan. This organization is also responsible for finalizing the plan and sending the finalized plan and the collection of contributed comments to DONRE for appraisal.

In case there are a lot of disagreement opinions towards the CAR Plan, the PMU will need to clarify or review and adjust the plan before it is sent to DONRE for appraisal.

(8) Step 8: Evaluation and approval of the compensation and supporting plan

- DONRE shall assume the prime responsibility and coordinate with related departments at district level for evaluation of compensation, assistance plan, in accordance with regulation; submission to DPC for approval of the compensation, supporting plan by regulations.

(9) Step 9: Decision on land acquisition and redress grievances against decision on land acquisition.

- Based on the notice of land recovery, competent authority prepare and evaluate the CAR Plan, extraction of the cadastral measurements of land plots. HPPC issues decision on land acquisition for organizations, religious organizations, Vietnamese residing overseas, foreign organizations, foreign individuals. DPC issues decision on land acquisition for a household or an individual, community, Vietnamese residing overseas who are eligible for buying houses associated with land use rights in Vietnam.
- During the implementation of land acquisition, if there is any question or complaint from citizens, the CPC will gather comments and complaints and send to the competent authorities' to consider.

While a decision of grievance redress is pending, decisions on land recovery must be continued. Where State agencies have jurisdiction over complaints concluded the land acquisition is contrary to law, must stop land acquisition, state agencies have issued decision to withdraw the land must make new decision on cancelling the decision issued on land acquisition and must compensate damages from recovery decisions (if any). Where State agencies have jurisdiction over complaints concluded the land acquisition is lawful, the person whose land is recovered to abide by the decision of land recovery.

(10) Step 10: CAR Plan approval and disclosure.

- DPCs approve the CAR Plan according to regulations.
- Within a period not exceeding three (03) days from the date of receipt of the approved CAR Plan, DRCs coordinate with CPC disseminate publicly approval of the CAR Plan in CPC headquarters and at communal activities places in residential areas where land is recovered;

send the decision on compensation, assistance and resettlement to people whose land is recovered, which clearly states the level of compensation, assistance, on land allocation and resettlement (if any), time and place of payment of compensation, assistance time and hand over the land recovered to DRCs.

(11) Step 11: Payment of compensation and resettlement assistance

Compensation, assistance and resettlement committee made payments after the approving decision of the CAR Plan.

(12) Step 12: Approval of the subjects assigned land resettlement and resettlement schemes.

1) Organization responsible for compensation will coordinate with the CPC to perform the following tasks:

- To receive an application asking for land resettlement allocation of people whose land is recovered. CPCs are responsible for certification of the status of housing, residential land of people, whose land is recovered, having application asking for resettlement land allocation;
- Preparation of documents and list of objects eligible for land resettlement allocation, prepare plans for resettlement;
- Publicly post resettlement schemes in the CPC headquarters at the point of living and residential areas where the land is revoked;
- Receipt of comments by people whose land is recovered and the people involved, complete resettlement plan in accordance with regulation, submission to DONRE for evaluation;

2) DONRE shall coordinate with relevant agencies at district level, organize implementation of compensation works and communal People's Committee shall:

- Verification, verification conditions, standards of objects of each case proposed land resettlement allocation following regulations.
- Evaluating the resettlement plan follow regulations.
- Submission to DPC for approval of resettlement plan, resettlement allocation decisions for each subject are reviewed.

3) PMU shall disseminate and publicize the resettlement plan, resettlement, approved

allocation decisions according to regulations.

4) DONRE will coordinate and indemnify the land allocation
5) District Tax department guide for land used payment and other financial obligations of the person assigned to resettlement. District state treasury is responsible for collecting the money follow regulations.

(13) Step 13: Hand over and enforcement of land acquisition

- Within twenty (20) days from the date of payment for compensation and assistance for land acquisition under the approved plan, the person whose land is recovered, is responsible to hand over land to PMU.
- In cases where the people, who land is recovered, is not implement the decision of land acquisition, the competent level people's committee will issue coercive decision for land acquisition.

1) Supplemental Step: Training for staff of resettlement

After Council of compensation, Assistance, Resettlement of each District was established, all responsibility staff on resettlement that belong to PMU, District Council for compensation, assistance, resettlement, staff of ward who take part in the work will be trained by resettlement consultant specialist. PMU will responsible for organizing of training for resettlement. Training topic is including:

+ Objective and Resettlement Plan;

+ Principle, policy and compensation rights which is regulated in RAP;

+ Consulting method and information disclosing;

+ Implementation step, procedure and schedule;

+ Mechanism to solve claim;

+ Obligations and rights of individuals, organizations take part in implement process of resettlement program.

8.15.2 Implementation Schedule

The RAP will be carried out in accordance with project implementation schedule. It has not been officially decided the future project implementation, therefore, implementation schedule would be updated after the investment policy approval.

8.16 Issues to be monitored

8.16.1 RAP Approval Procedures

Approval of the RAP before investment policy approval by the Prime Minister is necessary not due to the Vietnamese legal requirement but JICA's Environmental and Social Guidelines. Drafted the RAP will be examined and approved through the process as described below:

(1) Drafted the RAP is submitted to PMU

(2) PMU reviews and revises the RAP

(3) PMU calls for additional reviewing to relevant authorities, such as Department of Natural Resources and Environment (DONRE) and other concerned divisions in HPPC.

(4) PMU submit to modified the RAP to JICA for reviewing

(5) PMU will ask HPPC for final approval on the RAP reviewed by JICA

The approved the RAP shall be a baseline documents for further land acquisition plan in Vietnamese side in the implementation stages after land acquisition decision is issued by HPPC.

8.16.2 Land Acquisition by Other Projects

There are two areas where other on-going projects are preparing to acquire land prior to the Project. These areas are to be acquired under the revised Land Law and its legal systems and there might be no impact on house structures in the expected project area of the Project. However, it is required to monitor their progress of land acquisition in terms of due diligence for the Project.

(1) VSIP Project (Nguyen Trai Bridge)

The Vietnam Singapore Industrial Park Project (the VSIP Project) was launched in 2010 and adopts a model of an integrated industrial park and township, introducing residential, commercial and industrial mix. Key features of the VSIP Hai Phong would include a central

business district, a four-kilometer stretch of waterfront land, financial and arts districts and convention center. [4]

Some parts of VSIP had been prepared and started to operate factories including Japanese firms. The southern part of the VSIP, where Nguyen Trai Bridge will touch down after crossing the Cam river has not yet developed, however, the North-South road connecting to south part from the center of industrial park in VSIP area is under constructing.

According to the land acquisition plan of VSIP (Figure 8.16-1Figure XXI-1), the area required for Nguyen Trai Bridge will be acquired in 2016 (the area drawn in pink color with a capital "A").

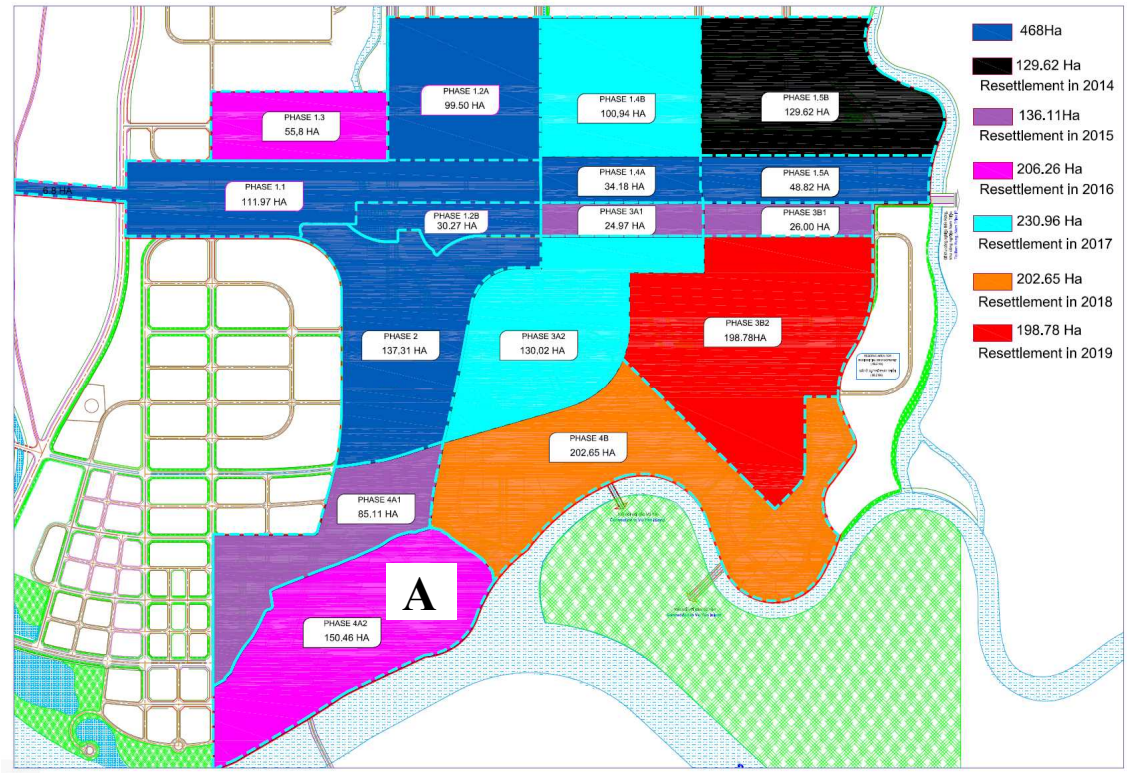


Figure XXI-1 Land Acquisition Plan of VSIP

(2) Vu Yen Island Project (Vu Yen Bridge)

Vin Group, one of the biggest real estate company in Vietnam, is implementing a resort island project off the northern city of Hai Phong. The five-year project will include villas, a golf course, an entertainment park, an eco-park and a cable car service in an area of more than 870

[4] http://www.vsip.com.vn/out-project/industrial-park/vsip-hai-phong-vsip_project-10.html

hectares on Vu Yen island where north approach road of Vu Yen Bridge will touch down on. Before the commencement of work in July, 2015, HPPC issued the announcement of No. 41/TB-UBND dated on February 9, 2015 regarding land acquisition for Vu Yen Island Development Project by Vin Group. The area where Vu Yen Bridge will require is the limited area of eastern part and there is no residential land and properties (only aquaculture ponds).

8.16.3 Road Alignment between Two Villages in Ngu Lao Commune, Thuy Nguyen District

Some residents living in two villages, My Dong Village and Khuong Lu Village, in Ngu Lao Commune, Thuy Nguyen District requested different opinions regarding alignment of the RR3 during the stakeholder meeting, socio-economic surveys, and other opportunities. Based on the common explanation by My Dong Village and Khuong Lu Village, these two small living unit have different customs because of their historical records. My Dong Village which has longer history at the area requested that the road should be located Khuong Lu Village side because there are several structures related to their ancestors affair along the western edge of the My Dong Village. On the other hand, some households in Khuong Lu Village requested that the new alignment of the RR3 should set on the border, exact centerline of existing local road, between My Dong Village and Khuong Lu Village to avoid community separation and unfairness by the RR3.

The PMU and the People's Committees of Thuy Nguyen District and Ngu Lao Commune should continue to explain the land acquisition policy based on the RAP and respect and confirm their opinion carefully in the following project phases with necessary measures. Final alignment will be decided after the public participatory processes and agreement formulation of the stakeholders.

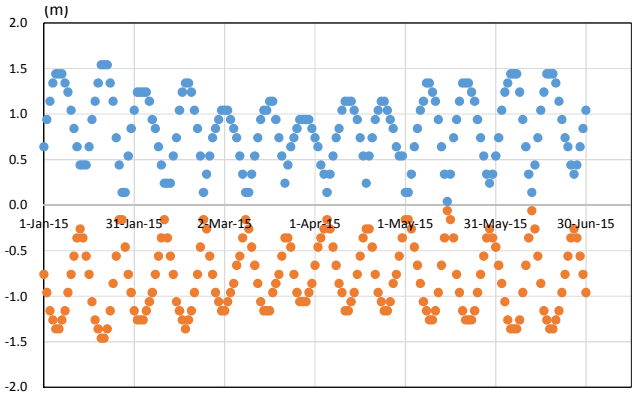
Chapter 9 CONSTRUCTION METHOD

9.1 Construction Plan Concept

Nguyen Trai Bridge and Vu Yen Bridge are constructed on the 350m wide Cam River and composed of PC box and steel arch bridges, approach bridges (Super-T Girders) and ramp way bridges (PC hollow slab girders).

The construction plan concept is as follows:

- At the bridge construction sites close to the river mouth, changes in water level due to rain water and tidal variations occur. The largest tidal variations are ±1.5m (Figure 9.1-1) and the maximum flow rate is 1.0m/sec. For these reasons, tidal variations were considered before making the bridge construction plan.



Source: Pha Rung Shipyard

Figure 9.1-1 Minimum and Maximum Daily Water Levels in Hai Phong (Jan. - Jun 2015)

- Since there are river ports upstream of the bridge construction sites, up to 7,000DWT ships have to be able to navigate there. For this reason, a construction method which minimizes the occupancy frequency and time was chosen.
- A construction method which uses equipment that can be supplied in Vietnam was chosen. Large block erection of arch bridges normally requires a 3,000ton floating crane that may be difficult to supply in Vietnam. For this reason, a construction method which does not require a huge floating crane was chosen.
- The foundation construction method and pile cap construction method require large-scale construction equipment such as pile drivers, crawler cranes, barges, etc. For this reason, a reasonable and efficient procurement and operation plan has been prepared.
- Because most of the construction work involves working at height, appropriate safety plans have been prepared to prevent falls from scaffolding and concrete timbering. Appropriate construction management will be conducted in accordance with Vietnamese environmental standards in consideration of the environmental protection of the region.
- In the section on applying the Prefabricated Vertical Drain (PVD hereinafter) method in soft

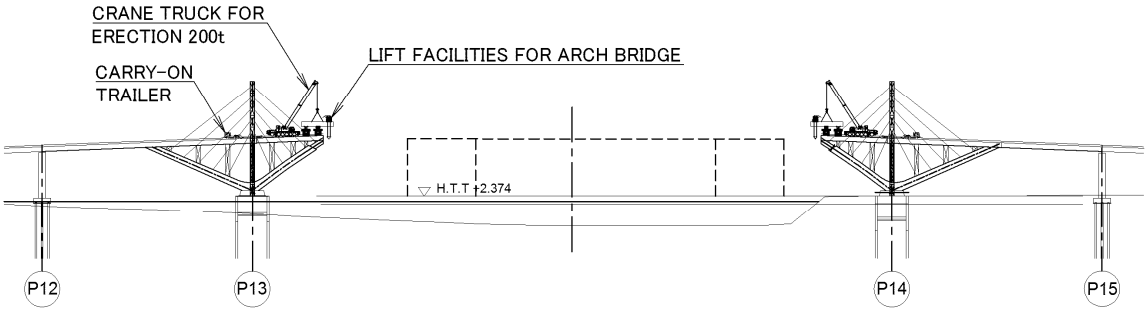
ground areas, the embankment construction speed is 5m per day after using the PVD method. If the embankment on the PVD section is 4m, the shortest required construction period is 400/5 = 80 days. For this reason, the construction time is estimated to be at least 3-4 months.

9.2 Nguyen Trai Bridge

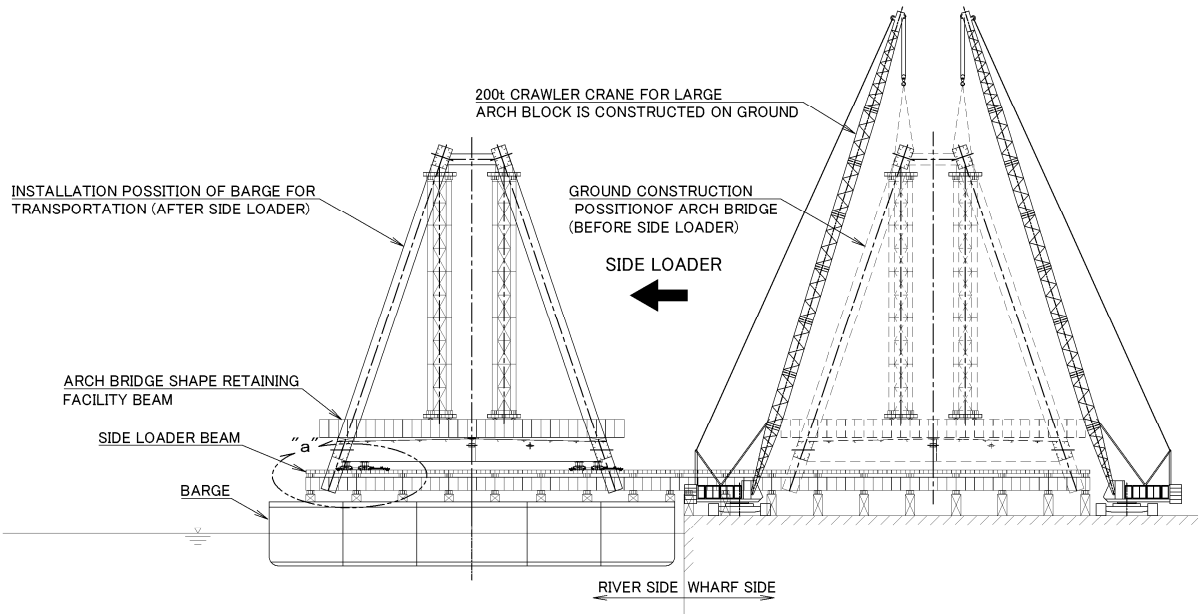
9.2.1 Construction Method for Main Bridge Superstructure

(1) Arch Bridge Side Spans (Steel Structures)

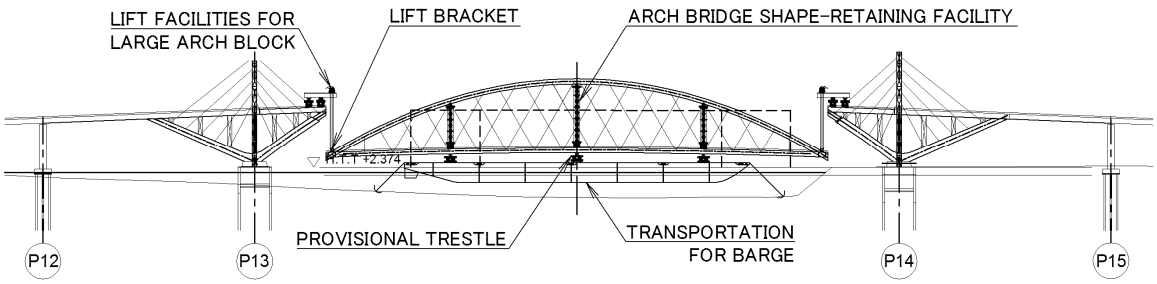
The construction sequence of the arch blocks is shown in Figure 9.2-1. The Lohse arch of the central span is constructed by assembling large arch blocks at a yard close to the wharf. At the time of arch bridge construction, the large arch blocks are transported by barge and the lifting method for erection of the large blocks is planned. This method is suitable for the erection of Nguyen Trai Bridge, because The occupancy time of the river can be minimized. The large blocks can be assembled during construction of the V-shape piers, so construction time can be shortened.



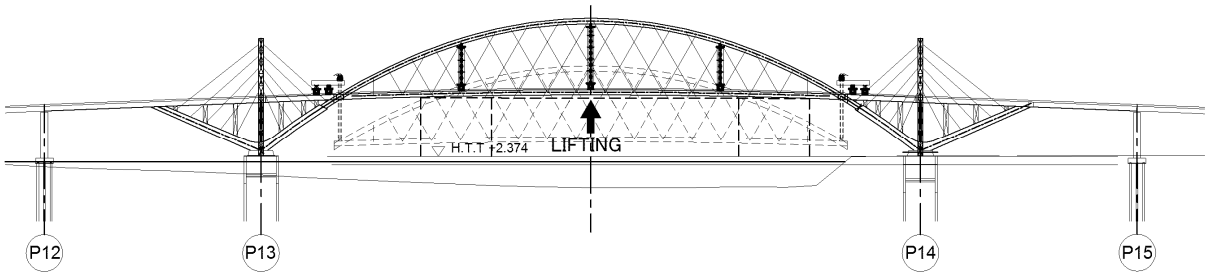
Step-1 Construction of steel girders for upper part of V-shaped arch ribs



Step-2 Loading of large blocks from yard to barges



Step-3 Transportation of arch blocks by barge and installation of lifting jacks



Step-4 Lifting of arch blocks, PC slab construction

Figure 9.2-1 Construction Steps of Center Span Arch Blocks

(2) Arch Bridge Side Spans (PC Box Girders)

For construction of the side spans, the V-shaped arch ribs are constructed by balancing them on both sides of the pylons using a method which does not require the installation of a temporary bent for the center span.

The PC box girders of the arch bridge side spans shall basically be constructed using temporary supports such as a temporary support or bent & truss system (Figure 9.2-2).

The quantity of the segmental concrete to be cast shall be determined in consideration of the capability of the batching plant and the casting method.

Once the compressive strength of the concrete meets requirements, pre-stressing work can be commenced followed by grouting work.

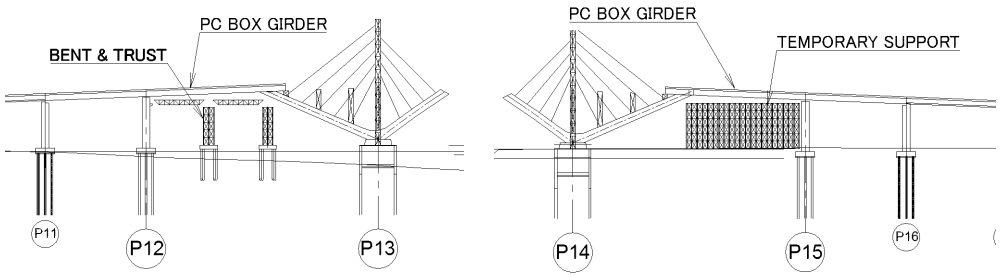


Figure 9.2-2 Construction using Temporary Supports (Pale or Bent & Truss System)

(3) Approach Bridges (Super-T Girders)

The Super-T Girders (L=38.3m and W=Approx. 70 ton) on the approach bridges of Nguyen Trai Bridge shall be appropriately fabricated in accordance with approved shop drawings and be correctly stockpiled at a fabrication yard until commencement of the erection work. Prior to the erection work of the fabricated girders, transportation from the fabrication yard to the designated area at the approach bridges shall be executed by trailers under strict traffic control. The erection work shall be commenced by crawler cranes/erection equipment in due course (refer to the following figures).

After the erection work, the casting concrete work of the deck slab/cross beams on the Super-T Girders shall basically be implemented using concrete pumps and agitator trucks.

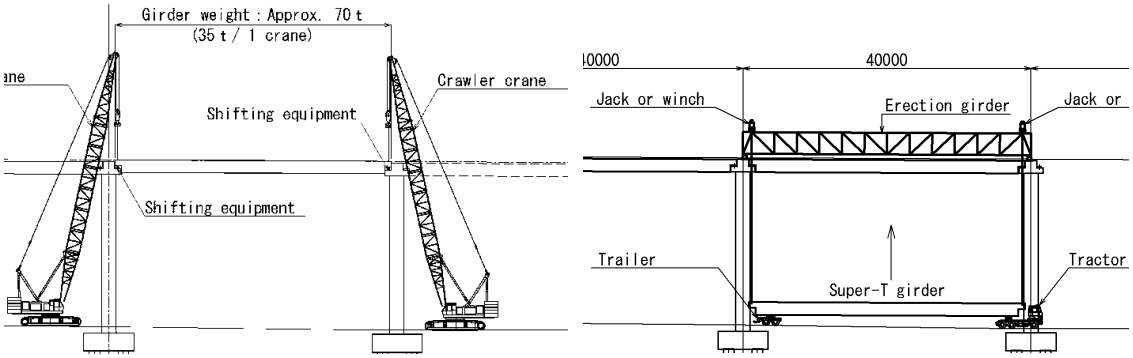


Figure 9.2-3 Erection method by crawler crane or by lifting/shifting equipment

(4) Approach Bridges (Steel Box Girders)

Construction of Steel Box Girders (L=80m) on the approach bridges of Nguyen Trai Bridge shall be applied Track Crane Bent erection method and Launching erection method which is girder slide erection method with minimum bents or without bent.

In the bridge construction work over a railway, Safety First and shortening of working hours is requested from a viewpoint of the importance and stable transportation of railway. In order not to use space under the bridge as work yard for long time, Launching erection method is generary applied for the bridge over railway in Japan.

This project is also applicable according to the operating condition of railway. In case of launching erection method large blocks assembled on next to erected span. At the time of girder construction, the girder made slide to the right position.

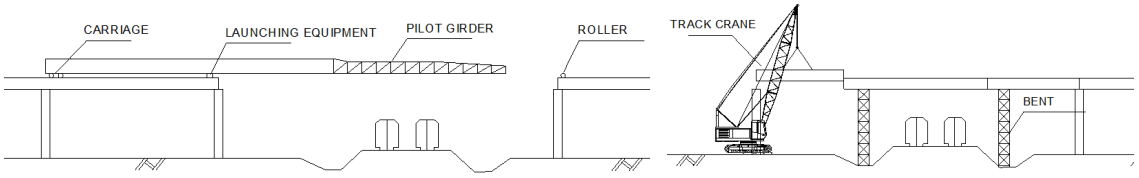


Figure 9.2-4 Erection method by launching equipment or by track crane

(5) Ramp way bridges (PC Hollow slab Girder)

PC hollow slab girders on Ramp-A and B shall be constructed using temporary support (Figure 9.2-5).

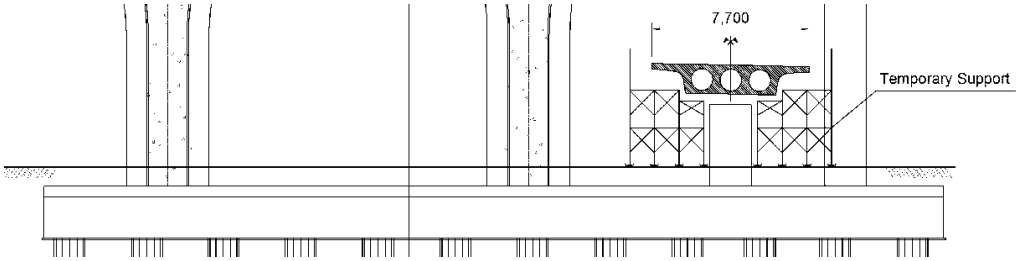


Figure 9.2-5 Construction using Temporary Support

9.2.2 Construction Method of Main Bridge Substructure

(1) In-River SPSP Foundation

Pier number 2P which supports the main span of Nguyen Trai Bridge is located in the Cam River. The distance from the riverbank is around 150m and the riverbed elevation at the pier location is about MSL -6.50 m (water depth around 9.0m). Considering the distance from the riverbank and the water depth, barges should be used for the construction of pier 2P instead of the establishment of temporary staging which surrounds 2P (Figure 9.2-6).

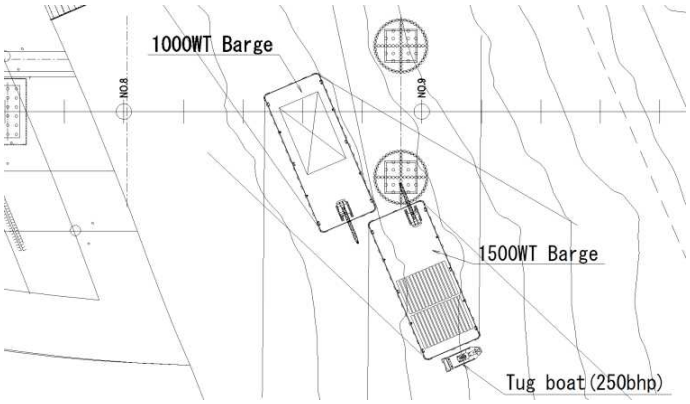
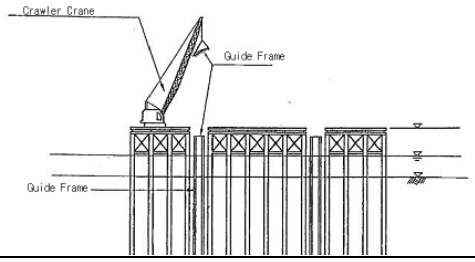
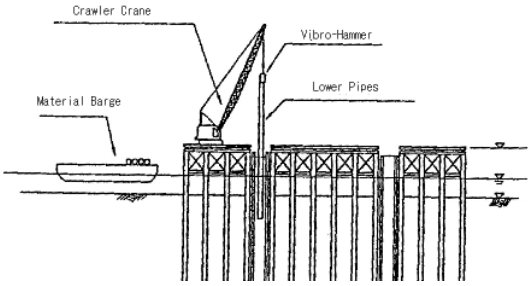
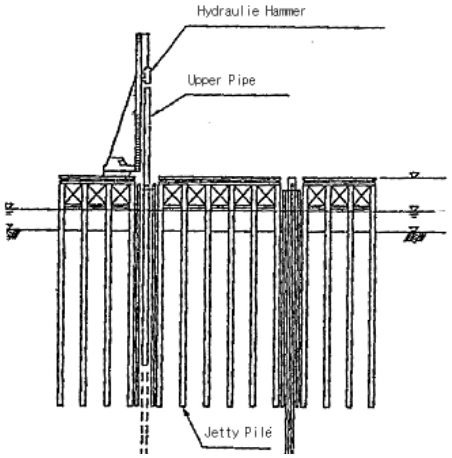
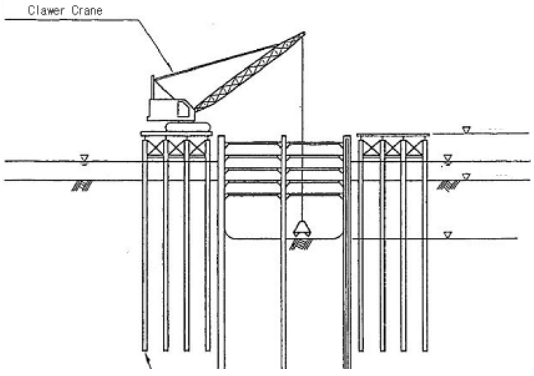


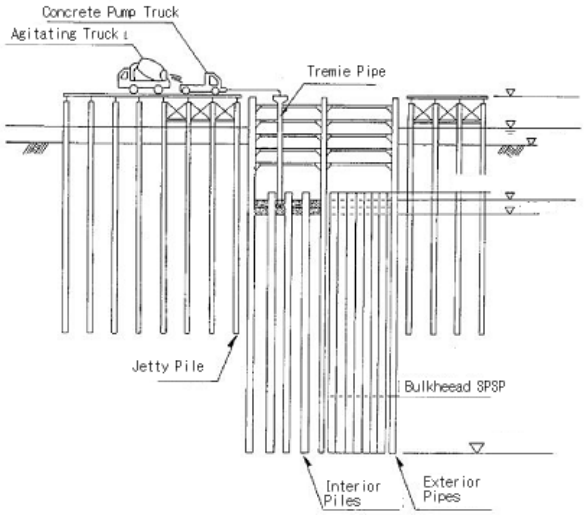
Figure 9.2-6 Construction of In-River SPSP Foundation of Nguyen Trai Bridge

(2) Construction of SPSP Foundation

Some of the key steps of the SPSP foundation is displayed in Table 9.2-1. Descriptions in brackets are applied in case temporary staging is used.

Table 9.2-1 Construction sequence of SPSP

Description	Schematic Diagram
Construction of temporary staging: **Installation of guide piles:** - Guide piles are effectively used for driving steel pile sheet piles in terms of adjusting the pile centers.	
Driving of steel pipe sheet piles (lower pipes): - Vibro-hammers are expected to be used for driving the lower piles. - Care shall be taken when adjusting the pile centers and the vertical inclination of the piles.	
Driving of steel pipe sheet piles (upper pipes): - Welding upper piles to lower piles which have been driven into the ground. - Hydraulic pile drivers are expected to be used for final driving.	
Excavation and timbering work: - Excavation inside the steel sheet pipe piles using clamshell. - Installation of timbering, then dewatering up to the next timber work elevation.	

Casting of bottom concrete (underwater concrete): - The bottom concrete is cast after the spreading of leveling sand. - A tremie pipes shall be used for underwater concrete casting in order to avoid material segregation. **Casting of top slab concrete:** - Dewatering inside the steel pipe sheet piles and cleaning the surfaces of the sheet piles and bottom slabs. - Welding studs onto the interior surfaces of steel pipe piles for forming a connection between the sheet piles and top slabs. - Casting the top slabs using tremie pipes.	

(Source: Japanese Association for Steel Pipe Piles)

The highest yearly water level appears in July and August normally with a water level around MSL+ 2.000m. The highest water level over the last 15 years was MSL +2.370m in 2005. Because of this, it is recommended that the top elevation of the cofferdams should be MSL +3.00m for the study of a construction plan for in-river cofferdams.

(3) Construction Plan for On-Land Substructures

1) Temporary Access to the site

Access roads to the construction site should be established before the commencement of substructure construction work.

Loading/unloading jetties should be constructed on both sides of the Cam River. Assumed locations for the jetties are indicated in the figures below.

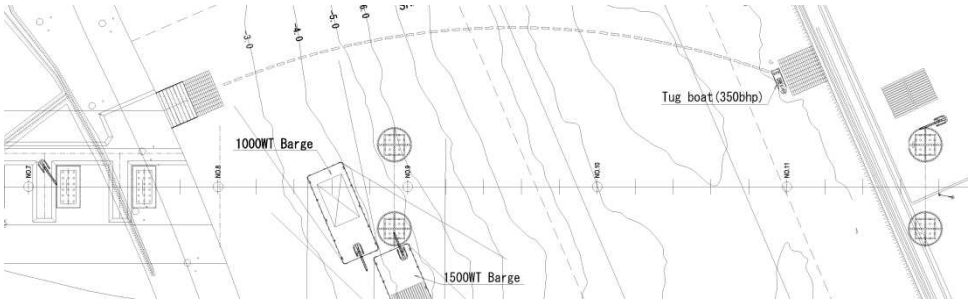


Figure 9.2-7 Example of Loading/Unloading Jetties at Nguyen Trai Bridge

2) Construction Plan for On-Land Substructures

Considering the relatively high ground water elevation and the target excavation depth which will be approximately 4.5 - 5.0m (sum of 2.0m overburden above pile cap and 2.0 - 2.5m pile cap thickness), steel sheet pile cofferdams are required for construction of the substructure. A schematic diagram of the steel sheet pile cofferdam is shown below.

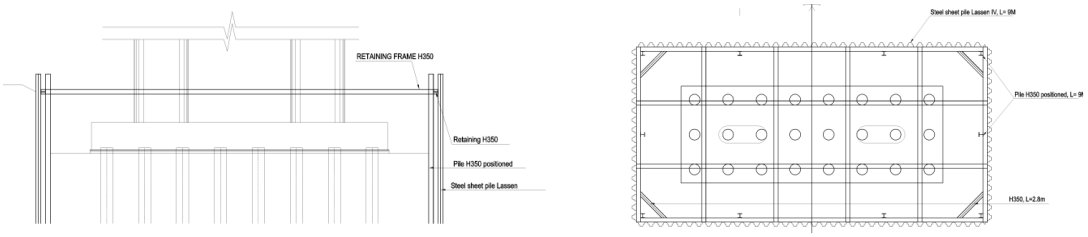


Figure 9.2-8 Schematic Diagram of Steel Sheet Pile Cofferdam

9.2.3 Construction Yard for Nguyen Trai Bridge

The use of a temporary yard is required for the manufacture of super-T girders, stock yards, and assembly of the large arch blocks (Figure 9.2-10). As shown in Figure 9.2-10, the yard used for assembling the large arch blocks must be prepared near the wharf along the Cam River. For this large project, 6 concrete batch plant is assumed for construction of Nguyen Trai bridge and Vu Yen bridge.

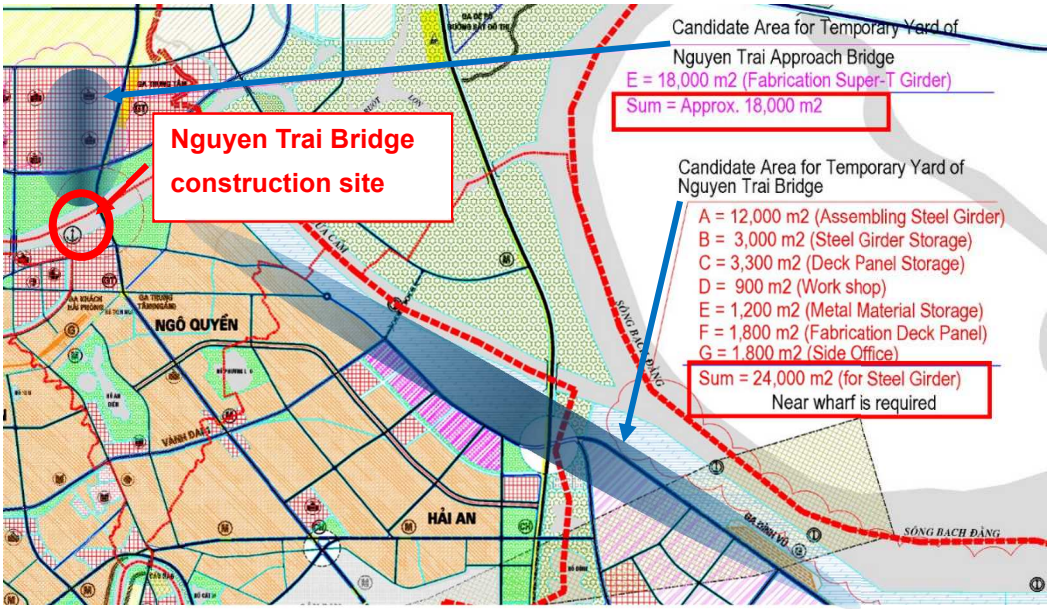


Figure 9.2-9 Presumed Location of Temporary Construction Yard

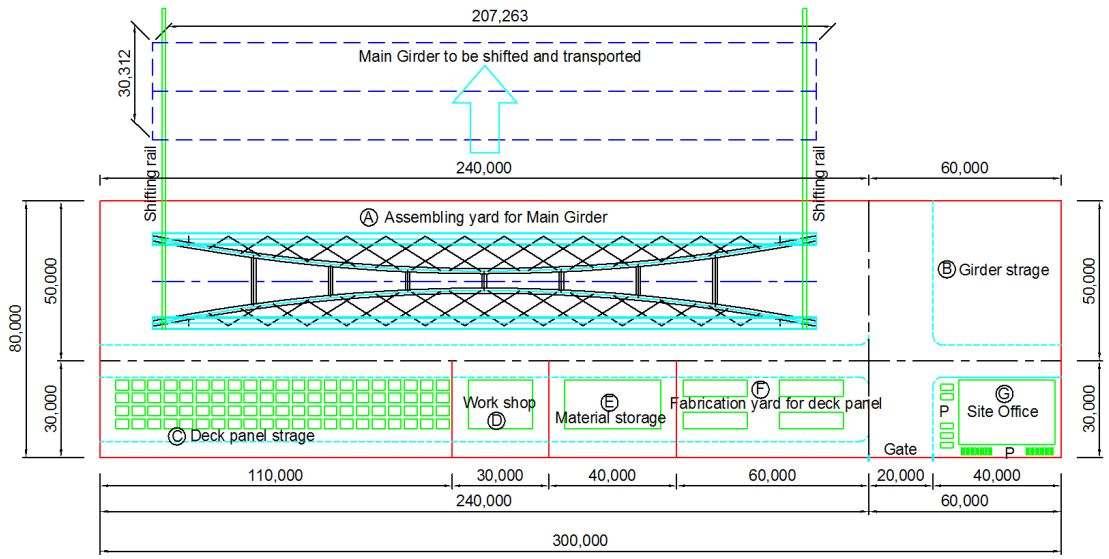


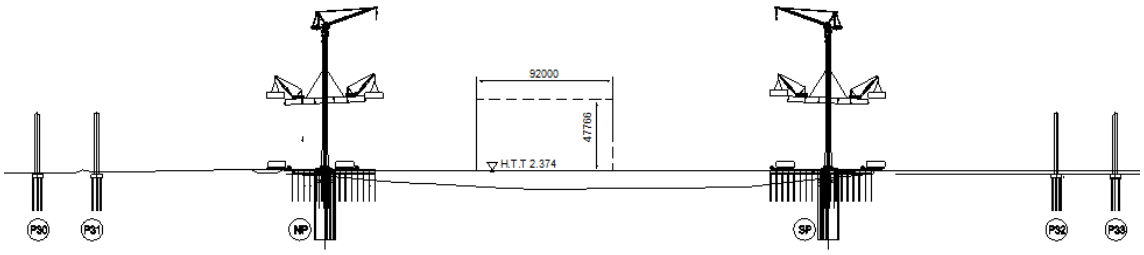
Figure 9.2-10 Assumed Area of Temporary Construction Yard for Arch Fabrication

9.3 Construction Method for Vu Yen Bridge

9.3.1 Construction Plan of Cable Stayed Bridge

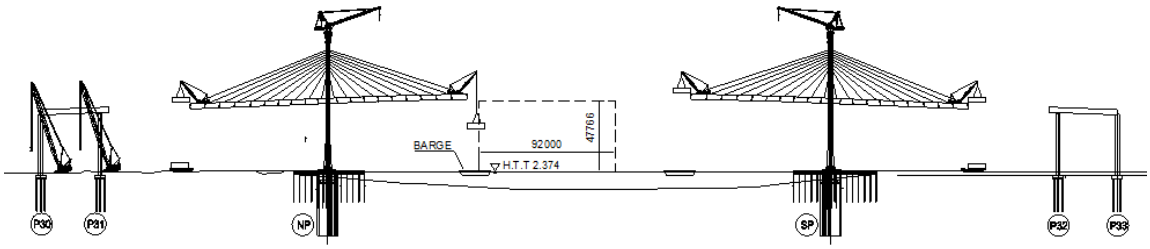
Special issue of construction in Cam River is the same as that of Nguyen Trai Bridge. Compared with Nguyen Trai Bridge, the size of vessel at location of Vu Yen Bridge is large, and it exceeds 40,000DWT at maximum. Therefore, it should be care safety control of construction in a river more strictly.

Since aviation restrictions are as low as 100 m, to use a tower crane etc., it is necessary to discuss with the administrator. And aviation alert system should be accordance with the regulations in Appendix 4 of Decree 20. Construction sequence of cable stayed bridge is shown in following figure.

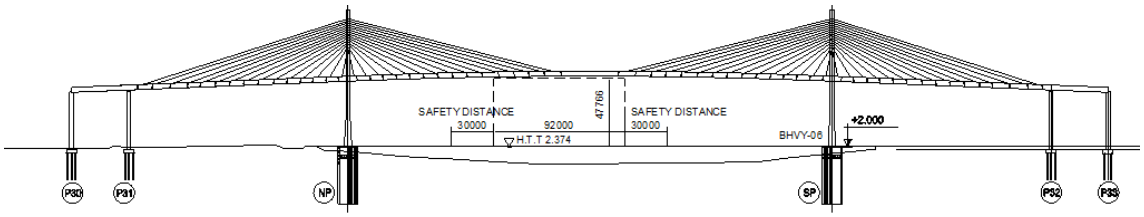


Step 1 Erection of side pier, pylon and tower crane

Step 2 Set 1st block of girder on pylon bent and install of girder and cable



Step 3 Erection of girder and slab by cantilever erection method
Install of stay cable and tension adjustment of top several cable



Step 4 Erection of closure segment and surfacing.

Figure 9.3-1 Construction sequence of Vu Yen Bridge

9.3.2 Construction Yard for Vu Yen Bridge

The use of a temporary yard is required for the manufacture of super-T girders, stock yards, and the assembly of steel girder blocks. The yard used for assembling the steel girder blocks must be prepared near the wharf along the Cam River in order to allow for convenient transportation to the construction site.

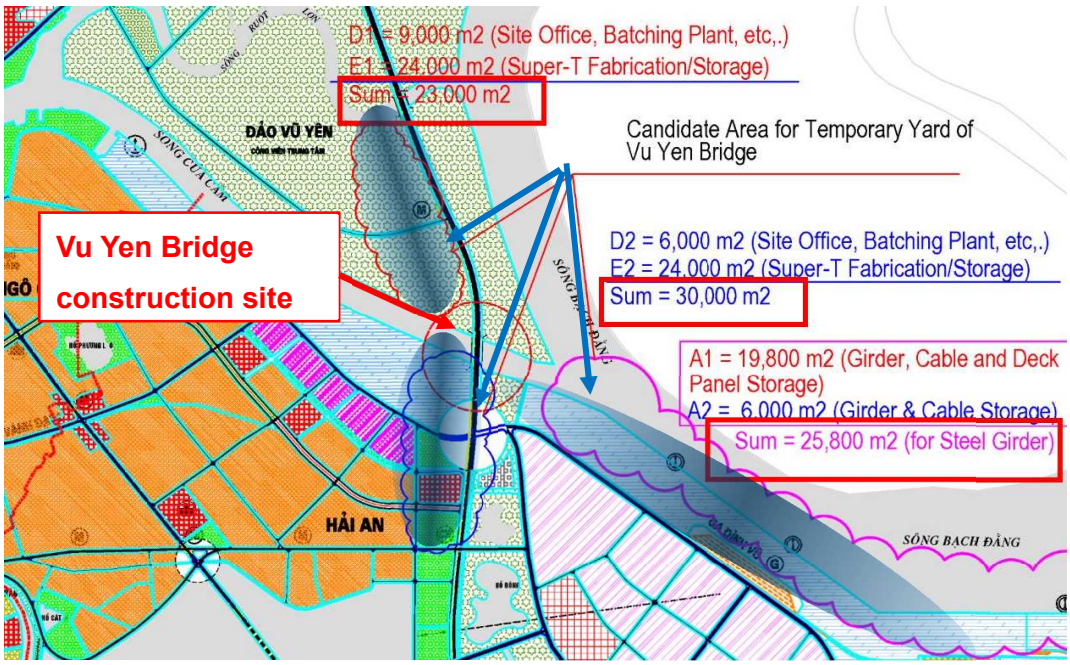


Figure 9.3-2 Presumed Location of Temporary Construction Yard

9.4 Construction Method for Ruot Lon Bridge (PC Box girders)

9.4.1 Construction method of PC Box Girder

The PC box girders on Rout Lon Bridge shall be constructed using the balanced cantilever method (P6 and P7) and the suspended scaffolding system (closure segments at side and center span) shown in the figure below.

First, the pier table of the bridge at P6 and P7 shall be constructed using a bracket support system. After construction of the pier tables, form travelers shall be assembled on the constructed pier tables, and subsequently the cantilever segments shall be constructed.

Second, closure segments shall be constructed using a suspended scaffolding system after completion of the cantilever segments mentioned above.

Once the compressive strength of the concrete meets requirements, pre-stressing work can be commenced followed by grouting work for all segments.

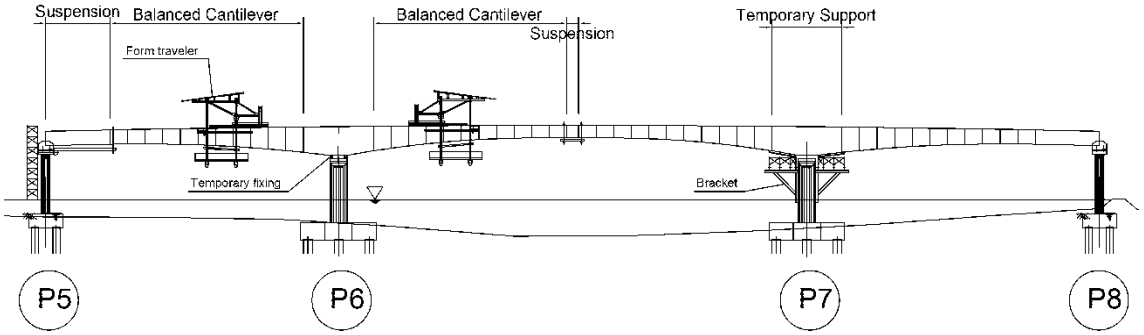


Figure 9.4-1 Construction by balanced cantilever method

9.4.2 Points to consider in PC structure construction

For the construction work of PC box girders, particular attention shall be paid to the following items:

- The capacity of the temporary support system shall be examined by loading tests in accordance with Vietnamese law after the support system assembly work has been completed.
- An appropriate scaffolding system for accessing the pier tops shall be installed in order to avoid incidents such as accidents involving third parties, falls, etc.
- Appropriate tensioning/grouting of PC tendons shall be implemented using protection boards, personal protection equipment (PPE) and related necessary equipment/facilities.
- The capacity of the form traveler, bracket system and suspended scaffolding system shall be confirmed by loading tests.
- Temporary fixing on the pier column shall be carefully designed before construction of the pier table.
- Elevation on the deck slab of the girder shall be carefully calculated/monitored in order to meet the requirements.

- After completion of all the segments, temporary fixing and any other equipment shall be properly dismantled/removed, and any construction holes shall also be treated with suitable material.
- The suspended scaffolding system for closure segments at the side spans may be superseded by a temporary support subject to suitable ground conditions.

9.5 Schedule of construction of Nguyen Trai Bridge and port relocation

Nguyen Trai Bridge is built at the site which Hai Phong Port is relocated. Hai Phong Port will be relocated before construction of the bridge according to the master plan of a Hai Phong city. Relation between the construction schedule of the bridge and relocation of Hai Phong Port is show in Figure 9.5-1. Relocation of the port has been completed at construction start time is desirable, however, when relocation is delayed, part of port functions can be used until it starts the construction in river, as shown in Figure 9.5-1.

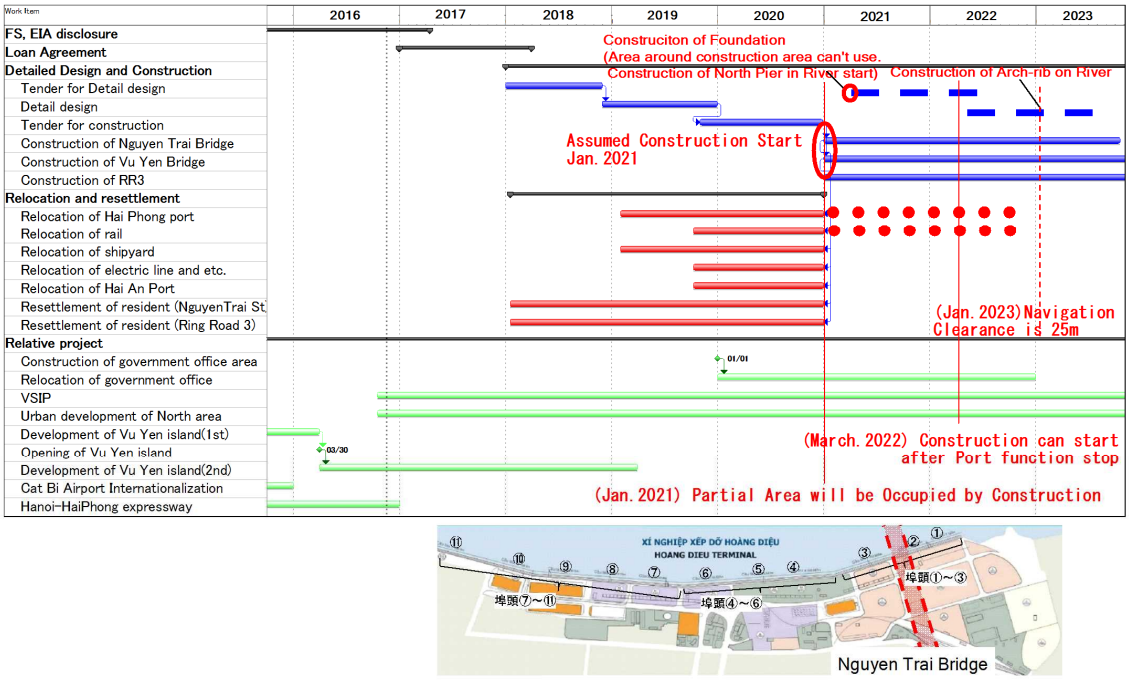


Figure 9.5-1 Construction schedule and port relocation (Tentative)

Chapter 10 COST ESTIMATION

10.1 General Notes

10.1.1 Funding Plan

HPPC has requested a JICA STEP Loan for the bridge construction project (No.123/BQLPTDT-DA dated on 12th August, 2015). Hence, financing for the Project is assumed to be funded through the JICA Special Terms for Economic Partnership (STEP) loan scheme for 100% of the eligible portion. Funds from the state budget of the Government of Vietnam (GOVN) are assumed to be allocated for the non-eligible portion.

10.1.2 Conformity Guidelines for the Project

The calculation summary will use the JICA cost calculation system and cost structure based on the JICA Cost Estimation Manual (March 2009).

10.1.3 Methodology of Cost Estimation

(1) Methodology

The Study Team will use the unit prices of Pay Items used on similar and recent projects in Vietnam. The Pay Items will be adjusted in accordance with the contents of the construction work, location of the sites and construction conditions for measuring the construction work and estimating the construction costs.

The cost estimate will be used for economic analysis and the budget for project implementation. The details of the cost estimation shall therefore be carried out at the detailed design stage for the tender of construction.

(2) Labor, material and construction equipment

The official rates by the People's Committee of Hai Phong City (August 2015) will be used for the labor, material and equipment costs. These costs also include transportation fees.

10.1.4 Structure of Construction Costs

The JICA Cost Estimation Manual is used to formulate the cost items and eligible portion for JICA loan projects. The items are shown in Table 10.1-1.

Table 10.1-1 Cost Items and Eligible Portion

Cost Item	Japanese side	Vietnamese side
Project Management Cost	○	
Initial Cost		
Construction Cost		
Cost on Site	○	
Direct Cost	○	
Indirect Cost	○	
Administrative Cost	○	
Consulting Services		
Detailed Design Cost	○	
Construction Supervision Cost	○	
Contingency		
Price Escalation	○	
Physical Contingency	○	
Preparation Cost		
Land Acquisition	×	○
Compensation		
Compensation Cost	×	○
Relocation Cost	×	○
License Cost of EIA	×	○
Technical Training Cost	×	○
Maintenance Cost	×	○
Tax and Duties		
Value-added Tax	×	○
Customs Duties	×	○
Interest During Construction	○	
Frond End Fee	○	

Source: JICA Cost Estimation Manual

10.1.5 Outline of Construction Work

As shown in Table 10.1-2, the project consists of 3 sections: Nguyen Trai Bridge, Vu Yen Bridge and Ring Road 3.

Table 10.1-2 Outline of Construction Work

Nguyen Trai Bridge	**Type of structure**
Main bridge	Balanced arch girder
Approach bridge (north)	Super-T girder
Approach bridge (south)	Super-T girder
Ramp bridge (south)	Hollow slab girder
Road	-
Vu Yen Bridge	**Type of structure**
Main bridge	Cable-stayed
Approach bridge (north)	Super-T girder
Approach bridge (south)	Super-T girder
Ramp bridge (south)	Hollow slab girder
Road	-
Ring Road 3	**Type of structure**
Road section 1	
Overpass bridge No.1	Super-T girder
Road section 2	
Overpass bridge No.2	Super-T girder
Road section 3	Including Box culvert
Overpass bridge No.3	Super-T girder
Road section 4	Including Box culvert
Ruot Lon Bridge	PC box-girder
Road section 5	

10.2 Procurement Plan

10.2.1 Labor

The skilled labor for the bridge construction work is planned to be assigned from Japan and Vietnam in accordance with the procurement plan.

The following work items require the assignment of Japanese skilled labor who have relevant experience since such work is rarely used on construction projects in Vietnam: cofferdams

combined with steel pipe sheet piles, steel pipe foundations, cable installation for cable-stayed bridges and fabrication of balanced arch bridges.

Vietnamese skilled labor will be assigned for work items such as roads, intersections and Super-T bridge work. Vietnamese labor is expected to be procured in and around Hai Phong City.

10.2.2 Material

The planned procurement sources for major construction materials are shown in Table 10.2-1.

Steel cable products are planned to be imported from Japan since they are not manufactured in Vietnam. Nguyen Trai Bridge will be one of longest span arch bridge among ASEAN countries and the tower height of Vu Yen Bridge is limited by the regulation from an air traffic control compare to the ordinary cable stay bridge. Vast number of ocean going vessel are sailing under the bridges. Therefore, high technologies required for the construction of both bridges and need to ensure they are of good quality. Reinforcing bars may be procured by in Vietnam.

Table 10.2-1 Procurement Sources for Major Construction Materials

Material	Procurement source	
	Vietnam	Japan
Portland cement	○	
Concrete admixture	○	
Asphalt mix	○	
Reinforcing bars		○
Temporary steel		○
Quarry, sand, soil	○	
Steel pipe piles		○
Steel pipe sheet piles		○
PC cables		○
Cables for cable-stayed bridges		○
Bearings		○
Expansion joints		○
Guardrails	○	

10.2.3 Construction Equipment

The planned procurement sources for major construction equipment are shown in Table 10.2-2.

General construction machines are planned to be procured from Vietnam. The both bridge is planned to be constructed on caisson foundations using a steel sheet pipe pile which was developed in Japan. Special piling machine shall be utilized for the foundations. Therefore, the piling machines are planned to be procured from Japan.

Table 10.2-2 Procurement Sources for Major Construction Equipment

Equipment	Procurement source	
	Vietnam	Japan
Excavators	○	
Bulldozers	○	
Tractor shovels	○	
Vibrators	○	
Tire rollers	○	
Road rollers	○	
Stabilizers	○	
Motor graders	○	
Asphalt finishers	○	
Asphalt plants	○	
Diesel pile machines		○
Vibration hammers	○	
Pile drilling machines		○
Motor pumps	○	
Generators	○	
Dump trucks 10t	○	
Tower cranes		○
Barges	○	

10.2.4 Construction Packages

First stage of this study, feasibility of Nguyen Trai Bridge and Vu Yen plus Ring Road 3 are studied. Nguyen Trai Bridge and Vu Yen Bridge and Ring Road 3 are dividing into three packages for the cost estimate because Vu Yen Bridge and Ring Road 3 have different characteristics on the construction, and will be treated as different package at bidding stage.

Taken into consider the characteristics and scale of the structure, two options, Option A and Option B, are studied as alternatives as shown below.

Option A for the division of construction packages is as follows:

Package 1: Nguyen Trai Bridge including main and approach bridges, and road construction

Package 2: Vu Yen Bridge including main and approach bridges

Package 3: The whole of Ring Road 3

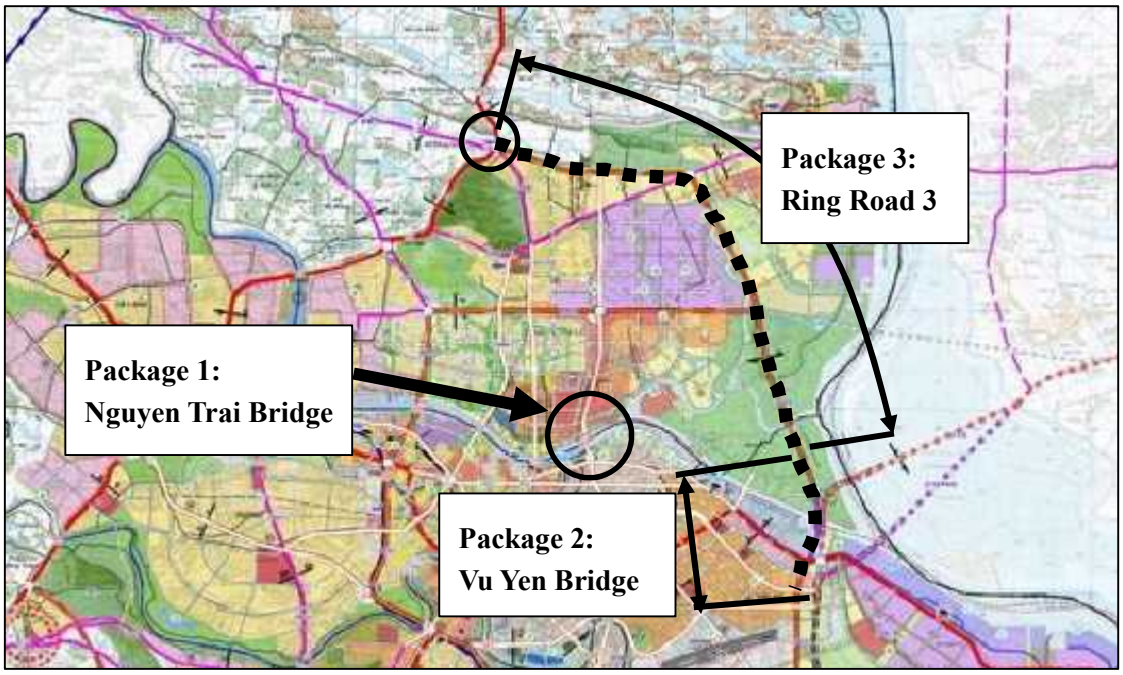


Figure 10.2-1 Schematic Plan View of Option A

Option B for the division of construction packages is as follows:

Package 1: Nguyen Trai Bridge including main and approach bridges, and road construction

Package 2: Vu Yen Bridge including main and approach bridges

Package 3: Section of Ring Road 3 from the starting point to Overpass Bridge No.3

Package 4: Section of Ring Road 3 from Overpass Bridge No.3 to the approach bridge

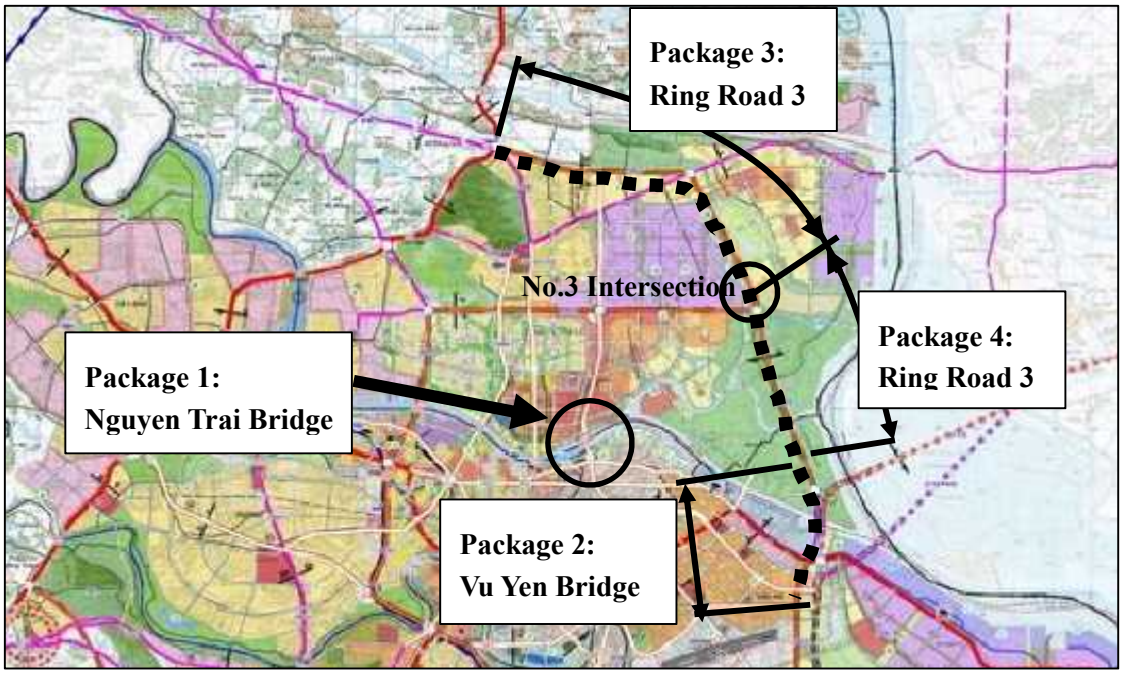


Figure 10.2-2 Schematic Plan View of Option B

Recommendation

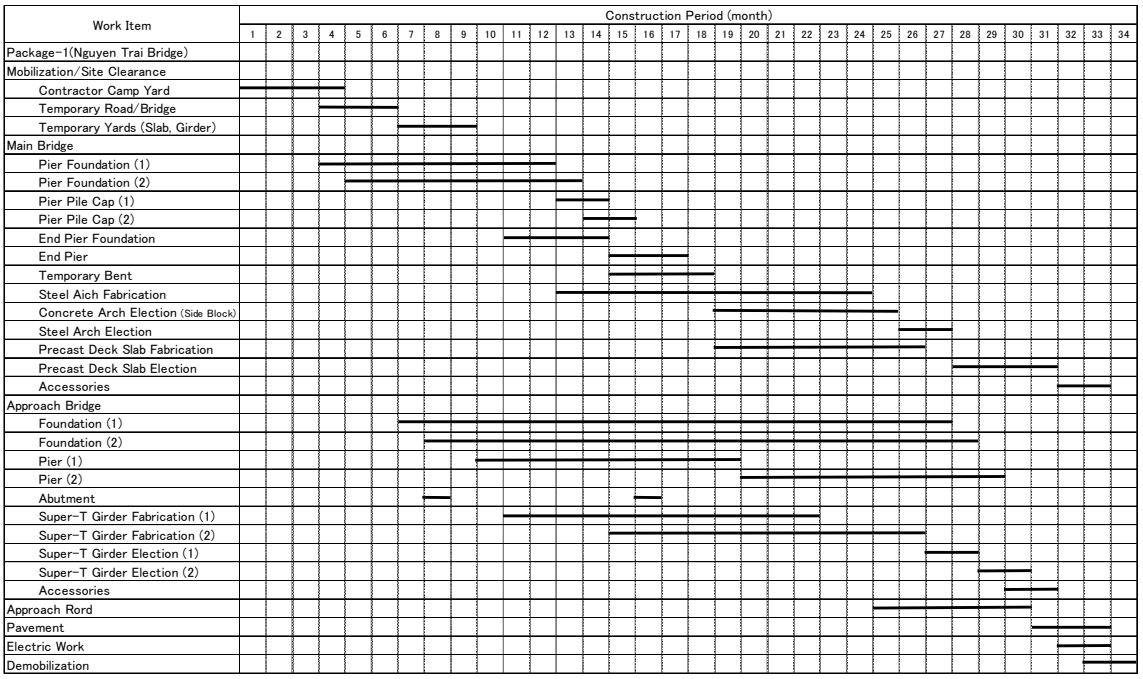
Option A is recommended over Option B in consideration of the construction constraints, construction schedule.

10.3 Project Implementation Schedule

10.3.1 Construction Schedule

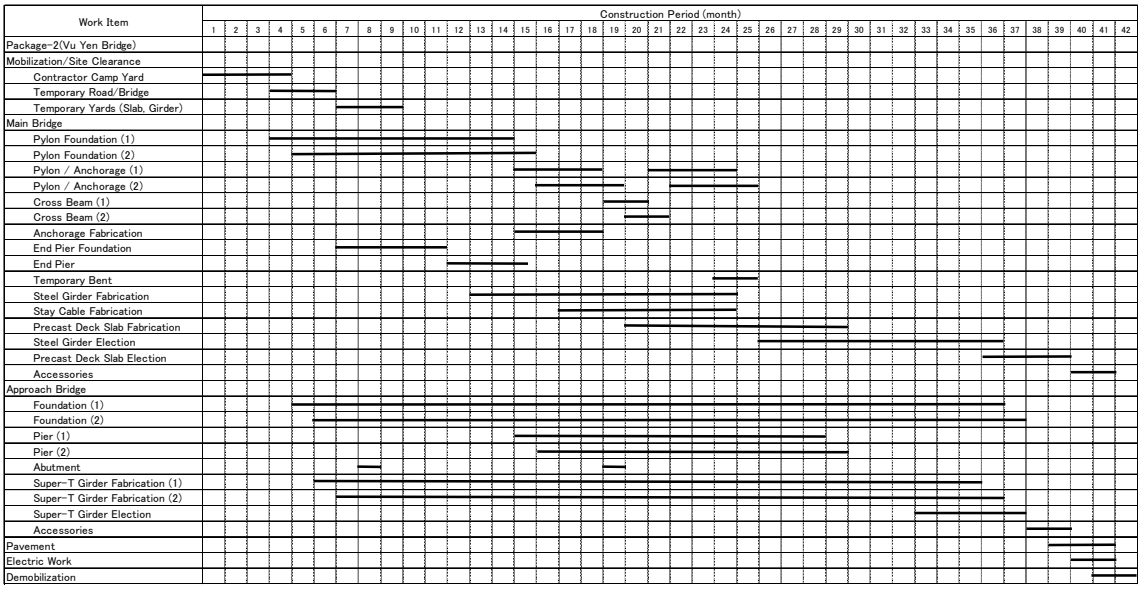
(1) Nguyen Trai Bridge

Table 10.3-1 Construction Schedule of Nguyen Trai Bridge



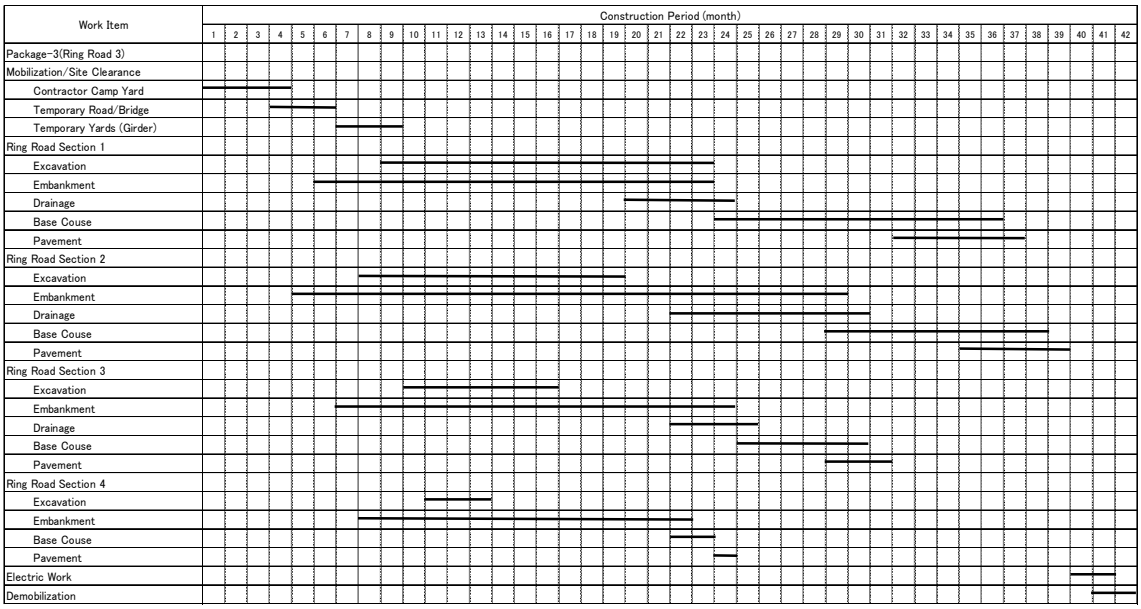
(2) Vu Yen Bridge

Table 10.3-2 Construction Schedule of Vu Yen Bridge



(3) Ring Road 3

Table 10.3-3 Construction Schedule of Ring Road 3



10.3.2 Project Implementation Schedule

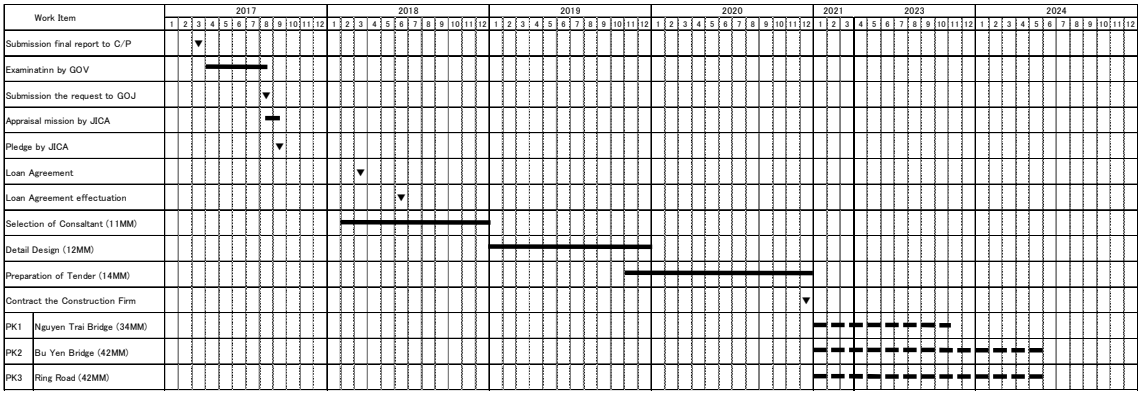
The Study Team has made a tentative implementation schedule for the cost estimation and economic analysis. A more practical schedule is expected as a result of discussions between JICA and the Vietnamese government.

The tentative time schedule and project implementation schedule are as shown in Table 10.3-4 and Table 10.3-5.

Table 10.3-4 Tentative Time Schedule

Work Item	Months
Examination by the Government of Vietnam	5
Selection of consultant	11
Detailed design	12
Preparation of tender	14
Construction of Nguyen Trai Bridge	34
Construction of Vu Yen Bridge	42

Table 10.3-5 Project Implementation Schedule (tentative)



10.4 Conditions of Cost Estimate

10.4.1 Time of Cost Estimate

The time of the cost estimate in the Survey was August 2015 as this was the date of the site survey in Vietnam.

10.4.2 Exchange Rates

The following exchange rates were applied in this Survey. Japanese yen is used as the foreign currency and Vietnamese dong as the local currency for the cost estimation.

VND 1 = 0.00461 JPY

USD 1 = 101.30 JPY

10.4.3 Project Management Cost

The Project Management Cost is defined in Circular No 04/2010/TT-BXD dated May 26, 2010 and issued by MOC. The rate of the Project Management Cost was based on similar projects in Hai Phong City by PMU and determined as 5% of the sum of the construction cost, price contingency, physical contingency, consulting services and environmental management cost.

10.4.4 Price Contingency Rate

The price contingency rates are 1.6% per annum for the Japanese portion (F/C) and 3.8% per annum for the Vietnamese (L/C) portion as instructed by JICA.

10.4.5 Physical Contingency Rate

In accordance with Circular No 04/2010/TT-BXD dated May 26, 2010 issued by the Ministry of Construction, the rate of physical contingency for the project cost was applied as 5% of the construction cost as the implementation period exceeds two years. In this study, the physical contingency rates are 10% for construction and 5.0% for consulting services.

10.4.6 Environmental Management and Monitoring Cost

The environmental management and monitoring cost including land acquisition and compensation cost is described in the chapter on Environmental and Social Considerations.

10.4.7 Value-Added Tax

In accordance with Circular No 30/2008/TT-BTC issued by the Ministry of Finance, 10% of the amount of the construction cost was estimated as value-added tax (VAT) in this Survey.

10.4.8 Import Tax

The rate of import tax for construction materials which require import procedures was assumed to be 3% of the material cost.

10.4.9 Interest during Construction

The following rates for interest during construction were applied in this Survey as instructed by JICA:

Construction Cost: 0.1 % per annum of the disbursed amount

Consulting Services: 0.01 % per annum of the disbursed amount

10.4.10 Front End Free

A Frond End Fee of 0.2% of the commitment amount will be imposed, but a rate of 0.1% will retroactively be applied instead of 0.2% in the event that all disbursement is completed within the original disbursement period.

10.5 Preliminary Cost Estimate

A summary of the estimated project cost of Nguyen Trai Bridge is shown in Table 10.5-1. Project cost of Vu Yen Bridge and Ring Road 3 is shown in Table 10.5.2.

Table 10.5-1 Summary of the Estimated Project Cost of Nguyen Trai Bridge

Item	Amount by Currency		Amount Combined	
	F/C	L/C	F/C	L/C
	Million JPY	Million VND	Million JPY	Million VND
A. JICA finance portion	10,969	2,184,504	21,040	4,563,896
1-1) Nguyen Trai bridge	7,729	1,566,449	14,950	3,242,947
1-2) Vu Yen bridge	0	0	0	0
1-3) Ring Road 3	0	0	0	0
2) Price Escalation	587	295,023	1,947	422,341
3) Physical Contingency	773	156,645	1,495	324,295
4) Consulting Services	1,798	166,387	2,565	556,503
5) Interest during construction	82	0	82	17,811
B. State budget portion	42	1,664,552	7,716	1,673,684
1) Land Acquisition	0	853,394	3,934	853,394
2) Administration Cost	0	269,867	1,244	269,867
3) VAT	0	398,779	1,838	398,779
4) Import Tax (for Civil)	0	59,090	272	59,090
5) Tax (for C/S)	0	83,422	385	83,422
6) Front End Fee	42	0	42	9,132
Total (A+B)	11,011	3,849,057	28,755	6,237,580

Source: Study Team

Table 10.5-2 Summary of the Estimated Project Cost of Vu Yen Bridge and Ring Road 3

Item	Amount by Currency		Amount Combined	
	F/C	L/C	F/C	L/C
	Million JPY	Million VND	Million JPY	Million VND
A. JICA finance portion	22,957	6,418,572	52,546	11,398,346
1-1) Nguyen Trai bridge	0	0	0	0
1-2) Vu Yen bridge	13,243	1,963,191	22,293	4,835,801
1-3) Ring Road 3	2,393	2,428,301	13,587	2,947,339
2) Price Escalation	1,788	1,194,094	7,293	1,581,986
3) Physical Contingency	1,564	439,149	3,588	778,314
4) Consulting Services	3,861	393,837	5,676	1,231,264
5) Interest during construction	109	0	109	23,642
B. State budget portion	105	3,397,133	15,766	3,419,941
1) Land Acquisition	0	1,434,885	6,615	1,434,885
2) Administration Cost	0	640,254	2,952	640,254
3) VAT	0	1,013,970	4,674	1,013,970
4) Import Tax (for Civil)	0	123,449	569	123,449
5) Tax (for C/S)	0	184,575	851	184,575
6) Front End Fee	105	0	105	22,808
Total (A+B)	23,062	9,815,705	68,312	14,818,287

Source: Study Team

10.6 STEP Conditions

10.6.1 Place of Origin

The project is expected to apply the loan scheme of Special Terms for Economic Partnership (STEP). Therefore, the procurement ratio of items expected to be procured from Japan in the construction cost were calculated in this Survey and should be more than 30% of the construction cost of the eligible portion by JICA. Materials, construction equipment and skilled labor to be provided by Japanese firms were calculated in accordance with the procurement plan.

10.6.2 Contractor

Prime contractors are tied to Japanese firms. Joint ventures (JV) with Vietnamese firms are also permitted subject to certain conditions. There are some possibilities that the construction of Ring Road 3 could be constructed by Vietnam construction firm or international firm because it

could be constructed with ordinary construction skill.
The procurement conditions for contractors should meet the requirements in Table 10.6-1.

Table 10.6-1 Procurement Conditions for Contractors

Contractor	Required Conditions
Japanese firm	Registered in Japan as a corporation
	Has equipment and factory for the service in Japan
	Conducts business in Japan
Joint venture of Japanese and Vietnamese firms	Lead partner is Japanese firm
	Over 50% of the share of the work in the JV contract
	Registered in Japan or Vietnam by the partner firm as a corporation
	Has equipment and factory for the service in Japan or Vietnam through the partner firm
	Conducts business in Japan or Vietnam through the partner firm
Affiliated company of Japanese firm in third country	Name of the firm shown in consolidated financial statements of the periodic reports issued by the parent firm
	Registered in the country as a corporation
	Has equipment and factory for the service in the country
	Conducts business in the country

Source: JICA website (April 2013)

10.6.3 Material and Construction Equipment

The material price can be counted in the procurement ratio of the Japanese firm in case:

1) The material or construction equipment procured has been last assembled or fabricated in Japan, or

2) The material or construction equipment procured has been last assembled or fabricated by firms shown in Table 10.6-2.

Table 10.6-2 Conditions for Material Firms

Material firm	Required Conditions
Japanese manufacturer in Vietnam	The share of stocks in the Japanese firm should be more than 10%
	The share of stocks from third countries should not exceed that of the Japanese firm
	Registered in Vietnam as a corporation
	Has equipment and factory for the service in Japan or Vietnam through the partner firm
	Registered in Japan or Vietnam through the partner firm as a corporation
	Conducts business in Japan or Vietnam through the partner firm
Japanese manufacturer in third country	The share of stocks of the Japanese firm should be more than 1/3 in total
	The share of stocks from Japan or the third country should not exceed that of the Japanese firm
	Registered in a country or region on the DAC list
	Registered in the country as a corporation
	Has equipment and factory for the service in the country
	Conducts business in the country
Affiliated company of Japanese firm in advanced country	Name of the firm shown in consolidated financial statements of the periodic reports issued by the parent firm
	Registered in the country as a corporation
	Has equipment and factory for the service in the country
	Conducts business in the country

10.6.4 Service

The cost of services procured from a Japanese firm or affiliated company of a Japanese firm can be counted in the Japanese procurement ratio as items shown in Table 10.6-3.

Table 10.6-3 Items of Service

Item	Specified Item	
Direct cost	Japanese expert cost	
	Design cost by Japanese engineers	
	Subcontract cost	
Indirect cost	Site office overhead	Salary
		Travel cost from Japan
	Temporary construction cost	Transportation cost
		Preparation cost
		Safety cost
		Insurance cost
Administrative cost		

10.6.5 Procurement Ratio from Japan

The procurement ratio from Japan is shown in Table 10.6-4.

Table 10.6-4 Procurement Ratio from Japan (Nguyen Trai)

Construction Cost	**JPY**	%
Steel pipe piles	1,524,465,003	10.2%
Steel pipe sheet piles	878,035,215	5.9%
PC cables	0	0.0%
Stay cables	46,942,223	0.3%
Erection equipment	311,643,854	2.1%
Structural steel SM490	2,742,283,012	18.3%
Elastomeric bearings	166,529,083	1.1%
Bridge joints	203,346,729	1.4%
Metal railing	140,019,552	0.9%
Waterproofing membranes	104,821,211	0.7%
Total	6,118,085,881	40.9%

Source: Study Team

Table 10.6-5 Procurement Ratio from Japan (Vu Yen, Ring Road 3)

Construction Cost	JPY	%
Steel pipe piles	4,152,851,591	11.6%
Steel pipe sheet piles	1,379,955,703	3.8%
PC cables	0	0.0%
Stay cables	536,021,834	1.5%
Erection equipment	74,543,179	0.2%
Structural steel SM490	3,180,014,434	8.8%
Elastomeric bearings	491,784,951	1.4%
Bridge joints	640,442,125	1.8%
Metal railing	127,407,085	0.4%
Waterproofing membranes	358,629,114	1.0%
Total	10,941,650,016	30.4%

Source: Study Team

10.7 Advantage of STEP loan

10.7.1 Technical issue and solution on bridge construction

The project would become eligible for STEP by the procurement plan intending to finance from a STEP loan at the ratio of not less than 30% of the project service cost, plus STEP makes Japanese technologies to be planned to be substantially utilized for the project, weighing on the major economic and technical significance. Two main bridges, *Nguyen Trai Bridge* and *Vu Yen Bridge*, proposed in this report would play a significant role as national key infrastructure in contributing to economic growth and urban area development in Hai Phong City and its neighborhood. It is necessary for them to be built up assuring either the corresponding required quality or level of international engineering standard. Therefore, the project may require international bidders highly talented of practicing multidisciplinary engineering approach with a lot of knowledge and experience to succeed in providing the most competitive design and construction service.

The technology which is expected application of Japanese technology is shown in Table 10.7-1.

Table 10.7-1 Solution and Recommendation by Japanese Technology

Item	Solution and Recommendation by Japanese Technology
Nguyen Trai Bridge	
Design and construction technology of steel arch bridge	Longest steel arch bridge in the Southeast Asia, and 13th longest in the world as arch bridge with steel box arch rib. Japanese contractor have the advanced technology in design and construction for large block lifting construction of arch structure over 3,000 ton weight.
Steel Pipe Sheet Pile (SPSP)	SPSP developed originally by a Japanese company. SPSP proved its performance to ship collision, sewage pollution and reduced cost.
SL (Slip Layer) pile	SL pile developed originally by a Japanese company. Negative friction prevention pile, called SL pile, is good for soft soil layer reinforcement, and leads economical design and construction.
Pavement material produced in Japan	High performance pavement is necessary to improve durability of pavement for heavy vehicle. Japan-made adhesive and waterproof layers in pavement guarantee high durability and quality.
Vu Yen Bridge	
Design and construction of special shape of Cable Stayed Bridge	Ratio of pylon height over main span length is almost equal to 0.15 (normally 0.2-0.25), means to induce large bending moment acting on the stiffening girder. Japanese skilled engineer provide wind resistance and large scale cable design.
Prefabricated Parallel Wire Strand (PPWS)	Indent-processed surface developed by Japanese company contributes to enhancing wind resistance. PPWS is effective for cross-section reduction without decrease of tensile strength and axial stiffness.
High performance steel (SBHS)	SBHS applied to Tokyo gate bridge opened at 2012developed originally by a Japanese company. SBHS with high yield strength is recommended in terms of thickness reduction and weld resistance improvement.
Wind tunnel test	Necessary of high accurate wind tunnel test for long span and special shape bridge.
Steel Pipe Sheet Pile (SPSP), SL (Slip Layer) pile, Pavement material	(Refer to Nguyen Trai bridge)

(1) Nguyen Trai Bridge

1) Arch bridge with steel box arch rib

When the bridge, an arch bridge with steel box arch rib and the length of 280m, is complete, it would become the longest steel arch bridge in the Southeast Asia and be probably ranked as the world's 13th longest arch bridge among arch bridges with steel box arch rib, as listed on Table 10.7-2. To build such a large-scale bridge it requires the advanced technology in construction and

the most reliable approach to design since not found yet are bridges designed with the similar scale in Vietnam. In this sense, it can be expected for a Japanese company to come into practicing the design and construction service, especially with high level of technology about steel structural engineering and manufacturing. In the past projects in Japan, there were many cases of large block lifting construction of arch structure over 3,000 ton weight and the quality of construction and fabrication has been assured consistently. From the above, applying the Japanese technology to the design and construction for the arch bridge is the most appropriate and it also assists Vietnam in pursuing technology advancement in infrastructure industry.

2) Steel Pipe Sheet Pile (SPSP) foundation

The north pier of the bridge will be placed under the river water so that its foundation is recommended to have features of demonstrating greater strength to resist ship collision and environment-friendliness not to produce sewage. This indicates that Steel Pipe Sheet Pile (SPSP) is suggested for foundation structure in which Nhat Tan Bridge already employed. For the foundation of the bridge piers of the Nhat Tan Bridge, the six-span continuous cable-stayed bridge, across the Red River flowing through the capital of Vietnam, steel pipe sheet-pile well foundations were used to reduce cost. The formation of cylindrical well-shaped pile foundations yielded greater bending rigidity and vertical bearing capacity than with normal pile foundations, reducing the size of the foundations, as shown in Figure 10.7-1. SPSP is certainly cost-effective and a well-known Japanese original technology as well.

Table 10.7-2 the World's Steel Arch Bridges with Steel Box Arch Rib

Rank	Name	Span	Year opened	Country
1	Lupu Bridge	550 m	2003	China
2	Mingzhou Bridge	450 m	2011	China
3	Caiyuanba Bridge	420 m	2007	China
4	Fremont Bridge	382 m	1973	United States
5	Bugrinsky Bridge	380 m	2014	Russia
6	Pentele Bridge	308 m	2007	Hungary
7	Van Brienenoordbrug (new, westbound)	305 m	1990	Netherlands
8	Shin Kizugawa Bridge	305 m	1994	Japan
9	Chancheng Dongping Bridge	300 m	2006	China
10	Ohmishima Bridge	297 m	1979	Japan
11	Van Brienenoordbrug (old, eastbound)	287.5 m	1965	Netherlands
12	Second Blue Water Bridge	281 m	1997	United States, Canada
13	**Nguyen Trai Bridge**	**280 m**	**2023**	**Vietnam**

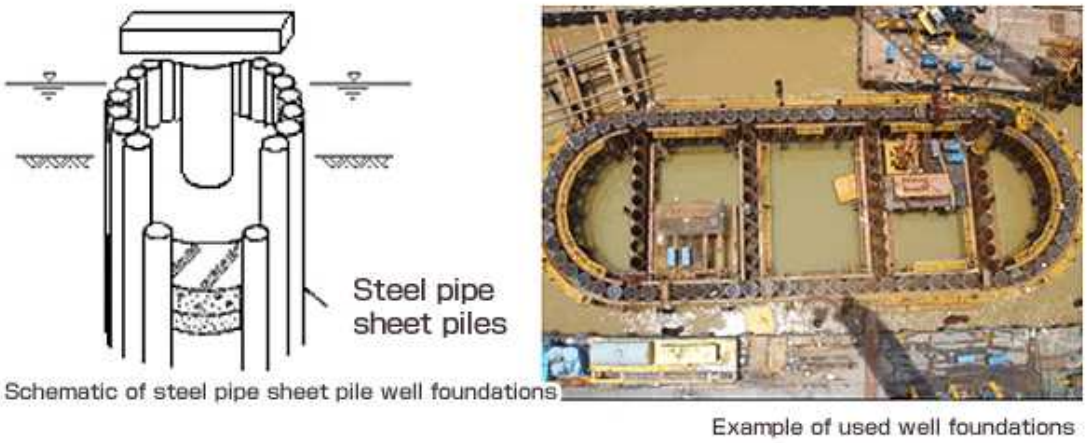


Figure 10.7-1 Steel Pipe Sheet Pile in the foundation of Nhat Tan Bridge
(*Courtesy Sumitomo Mitsui Construction Co. Ltd.*)

(2) Vu Yen Bridge

1) Cable stayed bridge with shallow angle cable

The bridge is supposed to be a long span cable-stayed bridge, particularly subject to pylon height limit so that it may give many challenges and considerations ahead in design and construction. The bridge with the main span of the length of 340m would be cable-stayed in the same way as built so far in the number of cable-stayed bridges in Vietnam. However, this bridge must meet some of critical limits given as an aviation clearance should not be higher than 100m and then a ratio of pylon height over main span length is nearly 0.15, normally from 0.20 to 0.25. Besides, it may become more sizeable than the nearby bridge, Bach Dang Bridge with the main span of the length of 240m. These are likely to demand a highly qualified and most competitive consultancy and construction service that international bidders may be able to practice with their already experienced knowledge in other past projects.

2) Prefabricated Parallel Wire Strand (PPWS) stay cable

According to the trial design, even when employing a light-weight composite girder type, the bridge must have a cable cross-section made of 361 number of strands in dia. 7mm, which would become the biggest cable cross-section among cable-stayed bridges built in Vietnam. Moreover, it needs much efforts and careful consideration to put cables fixed into where to be in the bridge. These implies that stay cable needs to be more compact and lighter to reduce the section. As shown in Figure 10.7-2, the *New Parallel Wire Strand (PWS)* or termed *Prefabricated Parallel Wire Strand (PPWS)* stay cable developed in Japan can be strongly introduced because it leads to a reduction of cross-section not affecting the decrease of the tensile strength and the axial stiffness. And with the relatively narrow area of the surface of the stay cable, it is less affected by wind action and then followed by more economical design. Moreover, the indent-processed surface of the stay cable increases particularly the wind resistance. This kind of stay cable is commonly

composed of more than 100 number of prefabricated parallel wires with individual 7mm size already galvanized before being bundled up.

3) Steel for Bridge High Performance Structure (SBHS)

The stiffening girder would be fabricated with over 50mm thick steel plate because the bridge with the sizable shape is forced to be reinforced sufficiently resist large axial force and bending moment acting on the girder. In such a thick plate, weld defects are likely to occur to affect the durability in an unfavorable way. So it is recommended that *Steel for Bridge High Performance Structure (SBHS)* featuring higher tensile strength and performance than conventional steel be applied. SBHS has been developed in recent years in Japan and resulted in being very effective for a reduction of plate thickness and is an excellent material to weldability, as shown in Figure 10.7-3. Basically SBHS has three types with yield strengths of 400, 500, and 700 N/mm^2, and they are getting unaffected by steel thickness, as shown in Figure 10.7-4.

4) Wind tunnel test

The bridge is probably easy to swing in the vertical and torsional direction due to wind action because the pylon is relatively low. To learn how safe and stable it is aerodynamically, a wind tunnel test is required to be carried out at a high accuracy.

5) Stone Mastic Asphalt (SMA) pavement

When the bridge is complete, heavy vehicle loading on the bridge may become significant. It is necessary to develop the pavement design to resist heavy load efficiently. Especially the adhesive layer between the pavement and the surface of structure, which tends to cause serious damage, needs to convince its quality grade for the required resistance. So it is possible to increase the pavement quality by applying Japan-made products to both adhesive and waterproof layers in Stone Mastic Asphalt (SMA) pavement, as shown in Figure 10.7-5.

6) Negative Friction Prevention pile foundation for soft soil ground

The bridge is located near the river and around the soft soil ground area probably necessary to be reinforced to provide the required bearing force. Normally in the soft soil ground, problems like soil layer settlement and negative friction between the steel pile surface and the face of soil layer occur. A negative friction prevention measure needs to be considered by choosing to use negative friction prevention steel pile; for example, *SL pile*, already used to reinforce soft soil layers in Lach Huyen Port, as shown in Figure 10.7-6. This steel pile product is being rolled out in Vietnam and the quality is being controlled by Japanese manufacturers. Therefore, it is possible to develop more economical design and construction for the bridge.

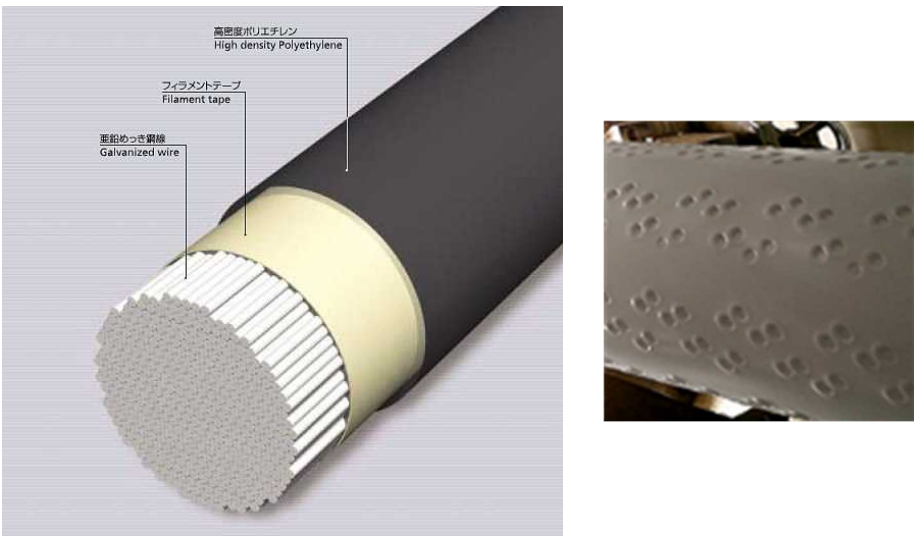


Figure 10.7-2 Prefabricated Parallel Wire Strand (PPWS) and the Indent-Processed Surface

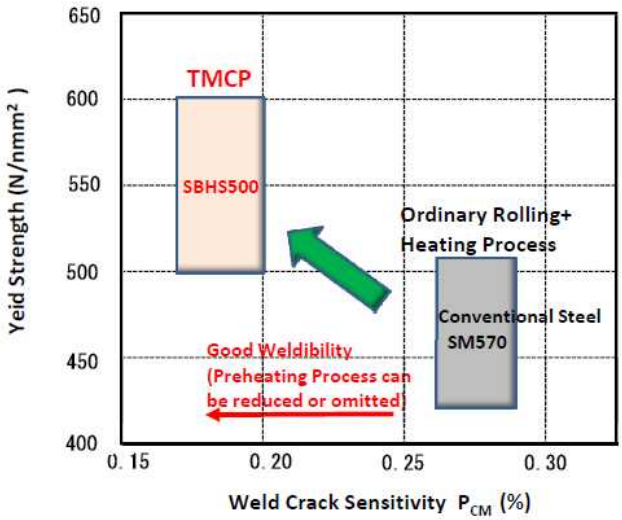


Figure 10.7-3 Relationship between Yield Strength and Weld Crack Sensitivity

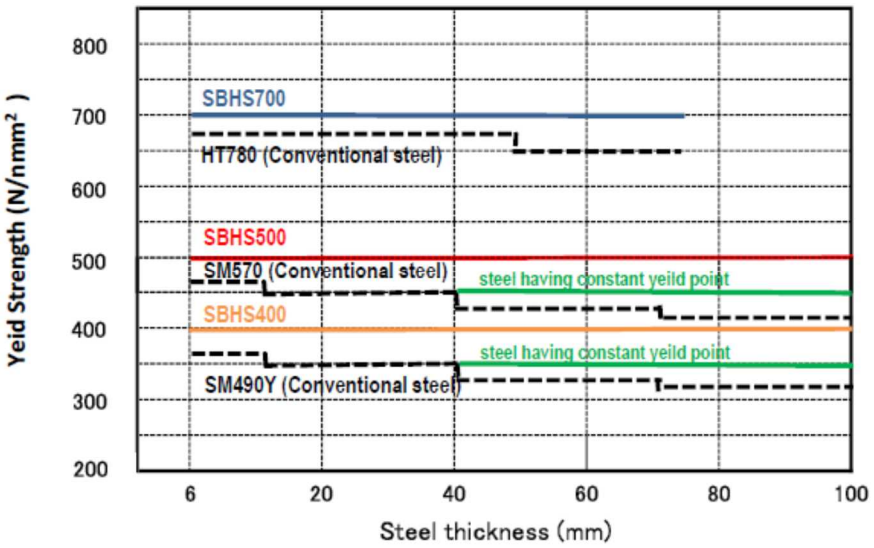


Figure 10.7-4 Yield Strength and Steel Thickness

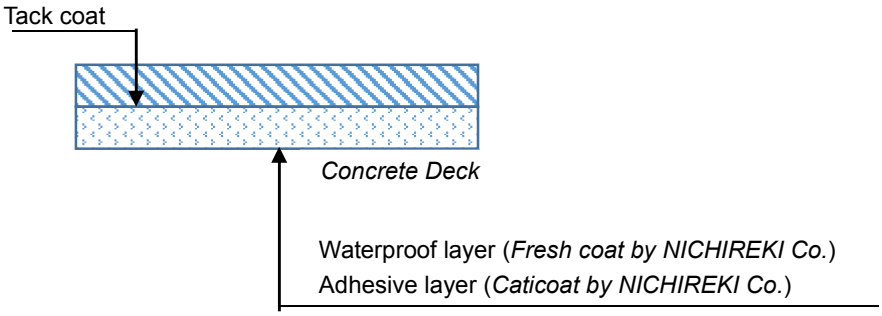


Figure 10.7-5 Stone Mastic Asphalt (SMA) Pavement

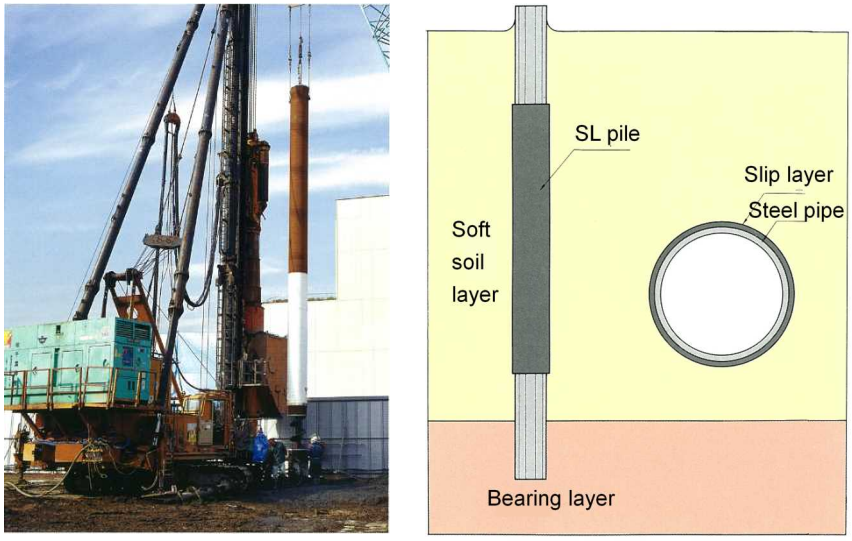


Figure 10.7-6 Negative Friction Prevention Pile (*SL Pile, Courtesy JFE Steel Co.*)

10.7.2 Advantage of terms of STEP loan

In addition to technical advantageous by Japanese technology as mentioned in previous section, there is an advantage which can apply low interest rates in STEP loan. When STEP is applied, profit in the amount of investment to construction is calculated as compared with general ODA by trial calculation.

Terms and condition of ODA load is shown in Table 10.7-3. And comparison result of possible amount of borrowed money by the difference in terms when the total amount of payment including interest is assumed to be the same as shown in Table 10.7-4. From the trial calculation, when the rate of Japanese portion of construction cost is constant replaces to cheap substitute in case of no STEP loan, the advantage of STEP loan is lost at the situation that the substitutes are cheaper an average of about 19.9%.

As mentioned above, STEP has a high advantage as loan conditions.

Table 10.7-3 Terms and Conditions of Japanese ODA Loans (effective from October 1,2015)

	General terms (Vietnam, April 1,2015)	STEP
Interest Rate	1.4 %	0.1 %
Repayment Period	30 years	40 years
Grace period	10 years	10 years

Table 10.7-4 Possible Borrowed JICA Finance Portion by Difference of Terms and Condition

	General terms	STEP	General / STEP
Possible borrowed JICA Finance Portion (million JPY)	17,091	21,342	(0.801)
Total amount of interest	4,785	533	(8.97)
Total amount of Payment (the amount is assumed same)	21,876		(1.00)

Notes, the cost is estimated using draft construction cost of Nguyen Trai Bridge.

10.8 Relevant Information

10.8.1 Standard

The Ministry of Construction has issued a guideline and standard for cost estimation.
The contents of the construction costs and consultant fee are explained using this guideline.

Table 10.8-1 Guideline List

No.	Item	Publisher
1	Guideline for the formulation and management to work construction investment expenditures	Circular No 04/2010/TT-BXD (26 May, 2010) Issued by MOC
2	Project management, consultancy cost and construction buildings	Decision No.957/QD-BXD (29 September, 2009) Issued by MOC

10.8.2 General Unit Costs

The official rates of unit costs of labor, material and construction equipment area published by the People's Committee in Hai Phong City. As for imported material and construction equipment including shipping costs, the unit costs were estimated using quotations from private companies.
The unit costs can be found in the publications listed in Table 10.7-2.

Table 10.8-2 List of General Unit Costs

No.	Item	Publisher
3	Labor cost	Price list issued by the Hai Phong People's Committee
4	Material cost	Announcement No.17/2010/SXD-CBG (8 March, 2010) issued by the Hai Phong People's Committee
5	Construction equipment cost	Decision No.2157/2006/QD-UBND (29 September 2006) issued by the Hai Phong People's Committee
6	Transportation cost	Decision 57/2004/QD-BTC

10.8.3 Labor Law

Labor laws and acts are regulated in the Vietnam Labor Code (Number 10/2012/QH13 dated June 18, 2012) with the latest guideline: Decree No.05/2015/NĐ-CP by the Vietnamese Government.
In the standard, office regulations are prescribed in guidelines for working days and overtime work.

(1) Working days

Normal working hours should not exceed 8 hours per day or 48 hours per week.
Employees who perform extremely heavy, hazardous or dangerous jobs on a list issued by the Ministry of Labor, War Invalids and Social Affairs in coordination with the Ministry of Health should not exceed 6 hours of work per day.

(2) Holiday and Rest Time

- Article 108, Rest time during working hours: 30 minutes / 6 hours or 8 hours
- At night: At least 45 minutes / working time
- Article 115, Public and New Year holidays (fully paid):

  Calendar New Year Holiday: 1 day

  Lunar New Year Holiday: 5 days

  Victory Day: 1 day

  International Labor Day: 1 day

  National Day: 1 day

  Commemorative Celebration of Vietnam's Forefather – Hung Kings: 1 day

- Foreign employees in Vietnam, in addition to the public holidays stipulated in Clause 1 of this Article, are entitled to one traditional New Year holiday and one national day of their country.
- Article 116, Personal leave, unpaid leave:

  Marriage: 3 days

  Marriage of his/her child: 1 day

  Death of a blood parent or a parent of his/her spouse, his/her spouse or child: 3 days

(3) Overtime work

- Not to exceed 50% of the normal working hours per day
- Not to exceed 12 hours per day, 30 hours per month, 200 hours per year

(4) Overtime Wage

Overtime wages are regulated in Decree No.05/2015/ND-CP by the Vietnamese Government.

- On normal days, at least equal to 150%
- On weekends, at least equal to 200%
- On public holidays and paid leave days, at least equal to 300%, excluding the wage for public holidays and paid leave days of employees who receive daily wages.
- Employees who perform night work must be paid an additional amount at least equal to 30% of the wage calculated according to the wage unit or the wage for a job performed during normal workdays.

Chapter 11 MAINTENANCE MANAGEMENT SYSTEM AND CONSTRUCTION MANAGEMENT SYSTEM

11.1 Investigation of Maintenance Management System in Hai Phong

The Study Team has investigated the construction management system and the maintenance management system of Binh Bridge. At present, Binh Bridge is maintained by the Hai Phong Bridge Projects Management Department (HPBPMD) of Hai Phong People's Committee (HPPC), which was formerly responsible for the construction of also Binh Bridge. One of the PMUs or PMDs directly under HPPC is currently responsible for the construction of this project (refer to Fig.11.2-1).

The Study Team investigated also the maintenance management system of Kien Bridge. As Kien Bridge is on National Highway No.10 (NH10), the road including Kien Bridge is maintained by the Bureau of Highway Management No.1 (BHM1) under the Vietnamese Ministry of Transport.

Interviews were conducted with representatives of HPBPMD and BHM1 and the results are as follows.

11.2 Hai Phong People's Committee

Hai Phong People's Committee consists of several departments and the organization chart is shown below. The revenue of HPPC in 2014 was 14,399,357 million VND (=685.684 million USD, 1 USD=21,000VND), and the expenditure was 14,393,174 million VND (=685.389 million USD). Out of this expenditure, 2.612.051 million VND (=124.383 million USD) was used for development.

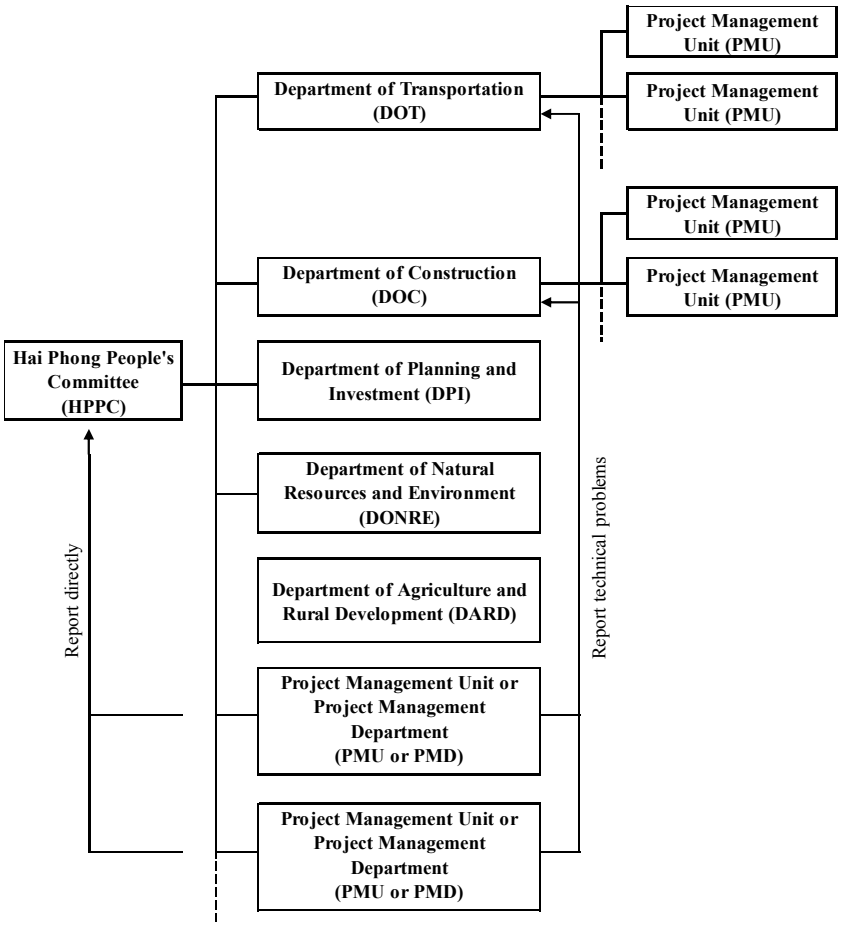


Figure 11.2-1 Organization Chart of Hai Phong People's Committee

11.2.1 Project Management Units and Departments (PMUs and PMDs)

(1) PMUs and PMDs under Hai Phong People's Committee

There are several departments under HPPC, including the Department of Transportation (DOT), Department of Construction (DOC), Department of Planning and Investment (DPI), Department of Natural Resources and Environment (DONRE), Department of Agriculture and Rural Development (DARD), as well as some Project Management Units (PMUs) which are sometimes called Project Management Departments (PMDs), because PMDs are situated in the same position as other Departments. Under DOT and DOC, there are Project Management Units (PMUs) which do not have the same position as the PMDs mentioned above. The PMDs directly under HPPC can report matters concerning their situation and work directly to HPPC, but the PMUs under DOT or DOC cannot report directly to HPPC.

If a PMU is established under DOT or DOC to manage a project, afterwards the PMU will continue to exist permanently. When the project is finished, DOT or DOC will assign new projects to the PMU. Whether these kinds of PMUs will be changed into those directly under HPPC or not, depends totally on the decision of HPPC. In the past, some PMUs have been changed into those directly under HPPC but some have not.

In yet another example, the PMU for the 2nd Rao Bridge was established under HPBPMD but after the bridge had been completed, the PMU was abolished. The Binh Bridge Rehabilitation PMU under HPBPMD was also abolished after project completion.

The assignment of projects for PMUs under DOT or PMDs directly under HPPC depends totally on the decision of HPPC.

(2) Management Unit of Urban Development Construction

At present, a PMD directly under HPPC is assigned for the Hai Phong Arterial Road Construction Project*). This was decided by HPPC and the Director of the PMD, which is called the Management Unit of Urban Development Construction, is Mr. Ta Viet Dong. The decisions of HPPC behind this PMD are as follows:

- Decision No. 1116/QD-UB dated 15 April 2004 of Hai Phong People's Committee (HPPC). Change of the name from "PMU of Public Construction" to "Management Unit of Urban Development Construction (MU of UDC)".

- Decision No. 259/QĐ-UBND dated 31 January 2015 of HPPC.

Transfer MU of UDC under the Department of Construction (DOC) to directly under HPPC.

The organization chart is shown below. The MU of UDC has 48 persons on its staff.

**); Notes, 25th October 2016, HPPC announce that HPBPMD in next page transfer the construction project from MU of UDC.*

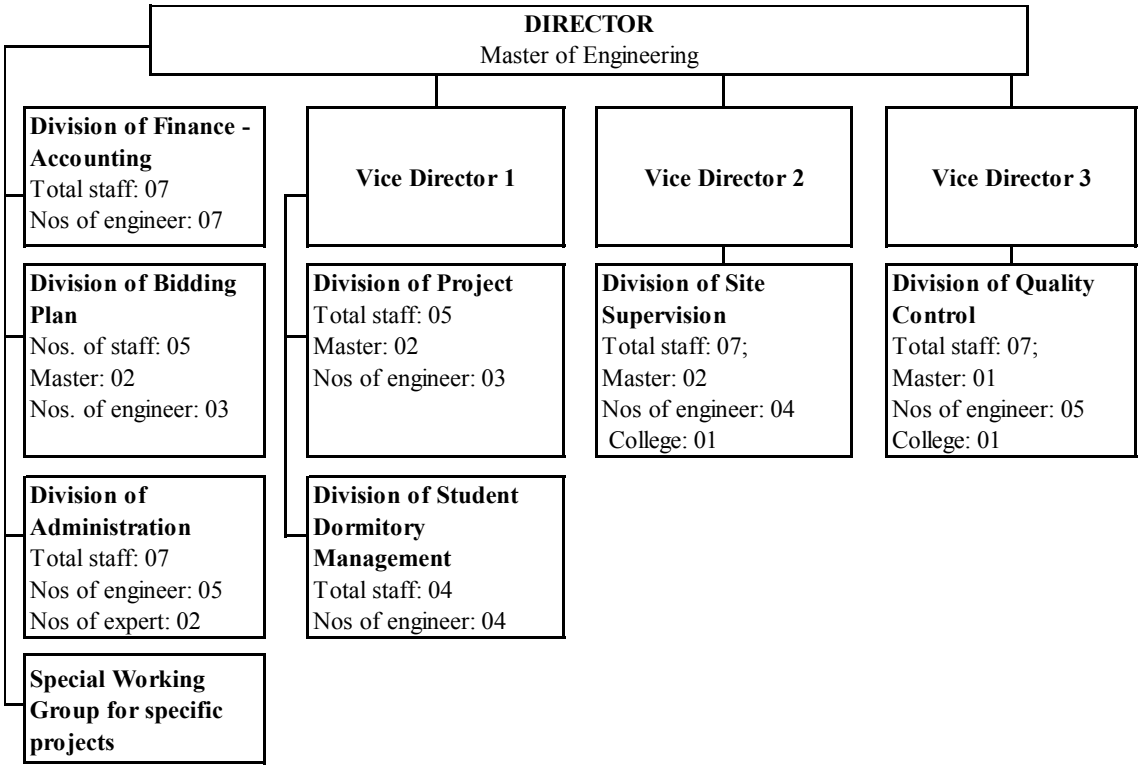


Figure 11.2-2 Organization Chart of Management Unit of Urban Development Construction (MU of UDC)

The past project experience is listed below.

Table 11.2-1 Project Experience

No.	Project Name	Time
1	City Convention Center Construction Project	2005 - 2009
2	5-floor resettlement building Construction Project	2008 - 2011
3	Rehabilitation, renovation of city center line area (Phase I)	2011 - 2014
4	Student dormitory construction Project (Phase I)	2009 - 2013
5	Project on installation of solar panel and LED lighting system	
6	Road Ho Sen – 2nd Rao Bridge construction Project (section Nguyen Van Linh – Cho Con)	2014 - 2017
7	Student dormitory construction Project (Phase II)	
8	Hai Phong DOC head office construction Project	
9	Detail plan of city center line area to 2025 Project (section Tam Ky dam – port gate No.1)	2011 - 2012
10	Housing development program in Hai Phong City Project (Phase 2011 - 2015)	
11	Nguyen Trai Bridge and Vu Yen Bridge Construction Project	From 2015
12	Technical infrastructure of Administrative, Politic Center of Hai Phong City Construction Project	From 2015

(3) HPBPMD

At 25th October 2016, HPPC announce that HPBPMD is assigned for the Hai Phong Arterial Road Construction Project. The Hai Phong Bridge Project Management Department (HPBPMD) is the maintenance management department for Binh Bridge and is also one of the PMDs directly under HPPC. HPBPMD is the representative department of HPPC for ODA construction projects and is responsible for project preparation, project execution, project acceptance and operation, maintenance. The history of HPBPMD is as follows:

On 3 June 1997, HPPC issued Decision No.364/QD-TCCQ to form the Binh Bridge Technical Assistance Management Unit.

On 3 October 1997, HPPC issued Decision No.1750/QD-TCCQ to change the Binh Bridge Technical Assistance Management Unit to the Binh Bridge Construction Project Management Unit.

On 19 November 2001, HPPC issued Decision No.3215/QD-UB to change the Binh Bridge Construction Management Unit to the Binh Bridge Project Management Department. This meant that the maintenance work of Binh Bridge was added to the work of this department.

On 19 November 2003, HPPC issued Decision No.3011/QD-UB to add more duties and to change the name of the Binh Bridge Project Management Department to the Hai Phong Bridge Project

Management Department. This was because the duties to supervise the construction work of Cat Bi Airport, the construction of Rao II Bridge and the construction of Khue Bridge were added. The organization chart with the number of staff of each division is shown in Figure 11.2-3.

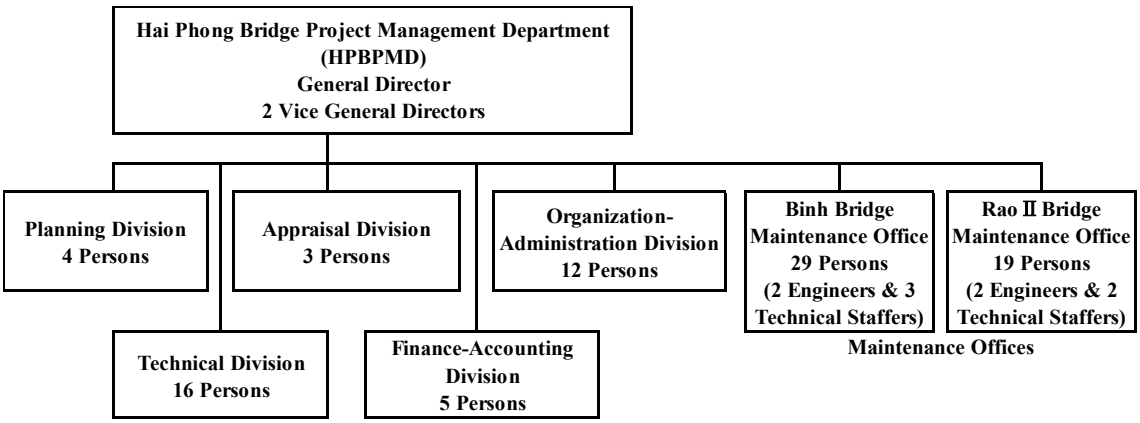


Figure 11.2-3 Organization Chart of HPBPMD

1) Budget of HPBPMD

The budget of HPBPMD is as follows:

Head Office (budget for salaries, office operation and management work)

2014: 238,095 USD (funded by HPPC)

2015: 251,857 USD (funded by HPPC)

The Highway Maintenance Fund of the Vietnamese Government is decreasing because the Government cannot properly collect highway maintenance fees from motorbikes. The fund was only 17,857,142 USD in 2014 and 10,714,285 USD in 2015 from motorbikes (although the estimated value was up to 142,857,142 USD which is equivalent to 45,000,000 motorbikes).

Every year, each city receives only a limited amount from the Highway Maintenance Fund.

In 2015, Hai Phong City had to use the Highway Maintenance Fund mostly for the pavement of National Highway No.5. In 2015, HPBPMD did therefore not receive any financing from the Highway Maintenance Fund of MOT under the Vietnamese Government.

Bridge Maintenance Budget

- **Binh Bridge Maintenance**

2014: 80,095 USD (funded by HPPC) for salaries, office operation and 2,356 USD (funded by HPPC) for tools and operation of maintenance vehicles.

32,857 USD (funded by MOT) for bridge maintenance (Highway Maintenance Fund): repainting of road markings; inspection and cleaning of railings, expansion joints, girders and medians; cleaning of roadsides and abutments.

2015: 76,261 USD (funded by HPPC) for salaries, office operation and 2,180 USD (funded by HPPC) for tools and operation of maintenance vehicles.

No funding from MOT for bridge maintenance (Highway Maintenance Fund).

- **2nd Rao Bridge Maintenance**

2014: 70,655 USD (funded by HPPC) for salaries, office operation and 2,643 USD (funded by HPPC) for tools and operation of maintenance vehicles.

7,619 USD funding from MOT for bridge maintenance (Highway Maintenance Fund): inspection and cleaning of railings, expansion joints, girders and medians; cleaning of roadsides and abutments.

2015: 66,927 USD (funded by HPPC) for salaries, office operation and 1,689 USD (funded by HPPC) for tools and operation of maintenance vehicles.

No funding from MOT for bridge maintenance (Highway Maintenance Fund).

11.2.2 Divisions under HPPC

Other Divisions under HPPC include the Department of Transport (DOT), Department of Construction (DOC), Department of Natural Resources and Environment (DONRE) and Department of Agriculture and Rural Development (DARD).

(1) DOT

The Department of Transport (DOT) is responsible for the management of transportation. DOT is responsible for the city road network, highways, inland waterways, traffic safety in urban areas, etc. When a new road project is planned, the project needs to be approved by DOT, and the Nguyen Trai Bridge and Vu Yen Bridge project therefore also needs to be approved by DOT. DOT constructs city roads by themselves. The divisions and the number of staff are listed below.

Table 11.2-2 Staff Composition and Technical Staff of Hai Phong DOT

Division	Number of staff (graduate engineers)
Director	1(1)
Deputy Director	3(3)
Office Division	16 (9)
Planning – Financing Division	12 (12)
Appraisal Division	6 (6)
Transport Infrastructure Management Division	5 (5)
Transportation Division	5 (5)
Traffic Safety Division	12 (11)
Vehicle & Driver Management Division	18 (17)
Total	78 (69)

(2) DOC

Since the Department of Construction (DOC) is responsible for the total city area planning including road plans, road projects thus need to be approved both by DOT and DOC. DOC is also responsible for the construction of city building projects, industrial park planning, regional planning, water supply, waste water treatment, etc.

(3) DONRE

DONRE is responsible for land owner registration, land acquisition, compensation, resettlement planning, and the estimation of land values and properties. As the project area is located in the Ngo Quyen, Hai An and Thuy Nguyen Districts, DONRE will cooperate with the local People's Committees on issues of land acquisition, compensation and resettlement plans.

(4) DARD

DARD is responsible for the management of mangrove forests. As there are mangrove forests in the project area, DARD needs to be consulted in the future.

11.3 Maintenance System of Binh Bridge

HPBPMD has a total of 91 staff, of which 29 persons are stationed in the Binh Bridge Maintenance Office and 19 persons in the Rao II Bridge Maintenance Office. Among the staff, there are 25 engineers who have graduated from engineering faculties. In the Binh Bridge Maintenance Office, there are 2 engineers and 3 technical staff. For the maintenance of Binh Bridge, they follow a maintenance manual prepared by a Japanese consultant. In the Rao II Bridge Maintenance Office, there are 2 engineers and 2 technical staff. For the maintenance of Rao II Bridge, they follow a maintenance manual prepared by a Finnish consultant.

Although the Study Team asked for the yearly budget amount, there was no clear answer (for reference, the yearly budget of DOT was 5.9 billion VND (271,000 USD) in 2014).

An estimate of the yearly budget is submitted by HPBPMD to HPPC, then appraised and approved by HPPC, and finally allocated to HPBPMD. HPBPMD collected tolls from Binh Bridge after its opening but toll collection stopped from 1 January 2013.

HPBPMD has a long 18-year experience of bridge construction, including Binh Bridge, Rao II Bridge, Khue Bridge, the repair of Binh Bridge, etc. HPBPMD is therefore experienced for the construction of cable-stayed bridges and competent at carrying out such work.

HPBPMD staff conduct weekly visual inspections of Binh Bridge, but 3-month and 6-month inspections are carried out by an outside contractor. HPBPMD does not have any special inspection equipment, but Binh Bridge was equipped with a monitoring system installed by VSL Company. In the first two years after the bridge was opened to traffic, the monitoring system worked well partly due to the maintenance work performed by VSL. But after the first two years, the system stopped working due to malfunctioning software and a shortage of funds. Wind data is not available either as it disappears after only a few months.

HPBPMD has no training programs for young staff, and they are taught through discussions with

more experienced engineers.

11.4 Maintenance System of Kien Bridge

Kien Bridge is on National Highway No.10 (NH10) and the bridge is maintained by the Bureau of Highway Management No.1 under the Ministry of Transportation. The organization chart is shown below.

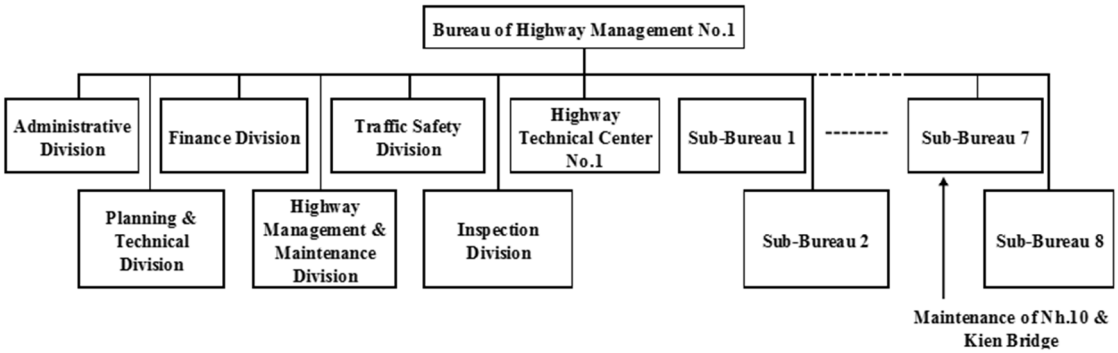


Figure 11.4-1 Organization Chart of Bureau of Highway Management No.1

Vietnam is divided into four regions named Region 1 to Region 4 from the north to the south. The national roads in each region are maintained by each Bureau of Highway Management. The Bureau of Highway Management No.1 maintains the national roads in Region 1 in the north of Vietnam. There are 8 Sub-bureaus under the Bureau of Highway Management No.1 which directly maintain the national roads.

Sub-bureau 7 based in Tai Binh maintains 144km of NH10 including Kien Bridge. Sub-bureau 7 has a total of 18 staff of which all have Bachelor's degrees and 6 are engineers. Sub-bureau 7 consists of 3 teams with 4 to 5 staff members each. One of these has an office near Kien Bridge. The Sub-bureau does not have any special equipment, and they conduct visual inspections of Kien Bridge in accordance with a maintenance manual prepared by the contractor.

The Bureau of Highway Management No.1 may not have a high technical level since during the investigation, they said that proper maintenance of Kien Bridge was difficult since it is not equipped with a high-tech monitoring system. This is unfortunately incorrect, because proper maintenance of the bridge can be achieved even by visual inspections only. If some other advanced equipment is also available, it will help increase the accuracy of the visual inspections, but such high-tech equipment will not ensure proper maintenance.

11.5 Comments on the Maintenance System

Based on the above survey, if monitoring systems for the two future bridges of this project are installed, HPPC should include the maintenance cost of the monitoring systems in their bridge maintenance budget beforehand.

The present organization or company responsible for managing and operating the structural health

monitoring system for the bridge seems to have insufficient capability of performing data analysis and assessment. For this reason, the project needs to give technical assistance to Vietnam in order to provide monitoring data analysis procedures and engineer training courses.

In addition to the efficient use of a monitoring system, it is much more important to develop a comprehensive bridge maintenance and management plan and guidelines specifying periodic/ emergency inspection and repair schemes on a long-term basis.

As for the shortage of the maintenance funds, at least the fund for the engineers' salaries and the office operations is secured every year. This means that the bridges are at least being watched by the staff. This is very important. If something happens they can detect the defects or the damages and they can secure the funds to repair the defects or damages accordingly. This situation actually happened for the ship collision against the Binh Bridge.

11.6 Comments on the Construction Management System of the Project

At this preparatory survey, one PMD; the Management Unit of Urban Development Construction (MU of UDC) directly under HPPC, is assigned for the Hai Phong Arterial Road Construction Project and MU of UDC is headed by Director Mr. Ta Viet Dong.

When PMU which is inexperienced in construction of arch bridge takes charge of construction of the project, it would be better to assign some advisers for them with enough experience of cable stayed bridge construction.

As the Hai Phong Arterial Road Construction Project is a project under HPPC, the construction work of the project will be supervised by the Management Unit of Urban Development Construction of HPPC in the same manner as the Binh Bridge Project was supervised by HPBPMD.

According to the Project Manager of Binh Bridge, when Binh Bridge was constructed, the HPBPMD office had the following members: Director, Vice-Director, 3 administrative staff, 3 financial staff, 4 engineers as well as drivers and guards. Based on this example, approximately the same number of staff may be needed for the Hai Phong Arterial Road Construction Project. However, if two bridges are constructed simultaneously, more staff may be needed.

HPPC will borrow ODA funds from Japan and then pay back the loan in the future, in the same manner as for the Binh Bridge Project. For this purpose, the Ministry of Transport, TCQM (Transport Construction Quality Management) of Vietnam will advise HPPC and approve the bridge project plan. When Binh Bridge was constructed, the State Council of Vietnam sometimes inspected the construction work, and the financial state of HPPC was checked by the State Audit of Vietnam. The PMD responsible for the Hai Phong Arterial Road Construction Project needs to create documents to prepare for visits from these agencies.

Chapter 12 ECONOMIC EVALUATION OF THE PROJECTS

12.1 Methodology and Assumptions

Following the standard method of the benefit-cost analysis, the following projects were evaluated from the economic point of view:

- Construction of Nguyen Trai Bridge
- Construction of Vu Yen Bridge and Ring Road 3

To estimate the economic benefits of a project, two direct effects of the projects were taken into consideration; one was savings in vehicle operating cost (VOC) and the other was savings in travel time cost (TTC). They were measured by the so-called "with-and without" comparison, that is, comparison of the traffic assignment results on a network with the projects and without the projects.

For simplicity and convenience, the following assumptions and standardizations were adopted for the comparison.

1) Starting year of operation is assumed to be the beginning of 2024.
2) Project Life is sixty years after the start of operations. However, due to the difficulty of reliable demand forecasts after 2040, the evaluation period is limited up to 2040. Residual value is considered at 100% for the land acquisition cost and 71.7% (i.e., 43/60) for procurement and construction cost at the last year of the evaluation period (2040).
3) Traffic Assignment was done for the years of 2020, 2030 and 2040. The economic benefits were estimated for these three years and an interpolation was done for intermediate years. The economic benefits have been calculated from the results of the traffic assignment.
4) Three Indicators of Economic Viability have been calculated from the annual cost and benefit streams by the following three factors;
    - EIRR (Economic Internal Rate of Return)
    - BCR (Benefit-Cost Ratio)
    - NPV (Net Present Value)
5) Social Discount Rate was assumed at 12% which is the rate that is generally used in Vietnam.
6) Annual Maintenance Cost of the projects was considered. Details are shown in the cost estimate section of this report.

7) Economic Cost of the projects was calculated by deducting the tax component (VAT and Import Tax) from the total cost.

8) Exchange Rate was set as 0.00461 (JPY/VND). The rate is the same as those used in the cost estimate section of this report.

12.2 Vehicle Operating Costs and Travel Time Costs

As savings in vehicle operating costs (VOC) and travel time costs (TTC) were selected as the economic benefits of the projects, unit costs of VOC and TTC were required to estimate those benefits.

12.2.1 Vehicle Operating Cost

The unit vehicle operating cost (VOC) was taken from the recent JICA study METROS[1] and is shown as follows. For the economic evaluation, the economic VOC was used. It is noted that the VOC is a function of the operating speed of various vehicle types.

[1] Data Collection Survey on Railways in Major Cities in Vietnam (METROS), Japan International Cooperation Agency, 2015.

Table 12.2-1 Unit Vehicle Operating Costs in 2015

Unit: US$/1,000 km

	Speed (km/hr)	Bicycle	Motorcycle	Car	Van/ HOV	Taxi	Minibus	Standard Bus	Small Truck	Big Truck	Trailer
Financial	5	18.9	163.0	925.6	1,492.6	741.6	1,305.8	1,661.0	1,082.5	1,622.1	2,386.0
	10	12.2	95.1	546.8	899.2	445.2	793.7	995.5	617.5	963.1	1,427.6
	15	10.4	77.4	446.9	739.9	366.7	661.6	823.8	498.3	793.3	1,185.5
	20	8.7	59.6	347.0	580.5	288.3	529.4	652.1	379.1	623.6	943.4
	25	8.1	53.6	311.3	510.9	260.5	468.8	595.2	334.2	547.2	826.9
	30	7.6	47.5	275.6	441.2	232.8	408.1	538.3	289.3	470.8	710.3
	35	7.3	44.1	256.8	402.3	218.3	377.5	508.3	269.0	433.2	654.9
	40	6.9	40.8	238.0	363.3	203.8	346.9	478.2	248.7	395.7	599.4
	45	6.9	39.2	228.1	348.1	195.7	334.3	475.0	239.0	381.4	578.1
	50	6.8	37.6	218.1	332.8	187.7	321.6	471.8	229.2	367.0	556.7
	55	7.0	37.5	217.5	329.5	188.0	316.8	486.0	226.5	364.4	551.8
	60	7.2	37.4	216.9	326.2	188.3	312.0	500.2	223.7	361.9	546.8
	65	7.5	37.9	219.5	329.4	191.3	313.9	522.3	224.1	368.9	557.6
	70	7.8	38.3	222.1	332.6	194.3	315.9	544.5	224.4	375.8	568.4
	75	8.2	39.2	226.3	341.5	198.8	323.1	569.3	230.6	391.4	592.7
	80	8.6	40.0	230.5	350.5	203.2	330.3	594.0	236.7	407.1	617.0
	85	9.3	41.3	237.2	364.7	209.9	345.6	616.4	246.2	430.6	654.1
	90	9.9	42.7	243.8	379.0	216.7	360.9	638.8	255.6	454.2	691.2
Economic	5	17.1	146.7	778.5	1,341.6	688.0	1,219.3	1,560.2	1,036.2	1,530.8	2,246.7
	10	11.1	85.6	460.8	808.2	408.2	736.9	928.8	586.9	902.6	1,335.7
	15	9.5	69.6	377.0	665.0	334.6	612.7	766.2	472.0	741.1	1,105.8
	20	7.9	53.7	293.3	521.8	261.0	488.4	603.6	357.1	579.6	875.9
	25	7.4	48.2	263.4	459.2	235.2	432.0	549.8	314.1	507.9	766.8
	30	6.9	42.7	233.5	396.7	209.3	375.5	496.0	271.2	436.2	657.7
	35	6.6	39.7	217.8	361.7	195.9	347.1	467.6	251.6	401.0	605.7
	40	6.3	36.7	202.1	326.8	182.4	318.7	439.3	232.1	365.7	553.7
	45	6.2	35.3	193.9	313.1	175.0	306.8	435.7	222.6	352.0	533.4
	50	6.1	33.9	185.7	299.4	167.5	294.8	432.1	213.1	338.2	513.0
	55	6.3	33.8	185.3	296.4	167.5	290.1	444.5	210.1	335.3	507.8
	60	6.5	33.7	184.9	293.3	167.4	285.4	456.9	207.1	332.5	502.6
	65	6.8	34.1	187.2	296.2	169.8	286.9	476.7	207.1	338.4	511.8
	70	7.1	34.5	189.6	299.0	172.1	288.4	496.4	207.1	344.3	521.1
	75	7.5	35.3	193.3	307.1	175.8	294.8	518.6	212.4	358.1	542.8
	80	7.8	36.0	197.1	315.1	179.5	301.1	540.8	217.7	372.0	564.4
	85	8.4	37.3	203.0	327.9	185.4	314.8	560.9	226.1	393.1	597.8
	90	9.0	38.5	208.9	340.8	191.2	328.6	581.1	234.4	414.2	631.2

Source: METROS Study Team

12.2.2 Travel Time Cost

The travel time cost (TTC) of commercial vehicles (bus and truck) is included in the vehicle operating cost (VOC). Thus the TTC of passengers of private vehicles (bicycle, motorcycle and car) and bus was estimated as follows:

First, the TTC of bicycle, motorcycle and car was estimated as shown below:

Table 12.2-2 Unit Travel Time Cost of Private Vehicles

Mode	Average Wage of Drivers (VND/hr)	Average Occupancy (passengers/vehicle)	Travel Time Cost (VND/vehicle-hour)
Bicycle	18,800	1.12	19,900
Motorcycle	25,100	1.39	30,000
Car	37,500	2.27	61,300

Note: Time value of other passengers excluding drivers was assumed to be 50%.

Source: Private Drivers Interview Survey, 2015

The TTC of bus passengers was assumed to be 1.2 times of bicycle drivers (Source: 2007 World Bank Study's[2] household interview survey), i.e., 18,800 x 1.2 = 22560 VND/hr.). As the average occupancy of buses is 20.64 (Vehicle Occupancy Survey, 2015), the TTC of a bus is 22,560 x 20.64 = 465,638 (VND/vehicle-hour).

These TTCs, however, needs to be adjusted according to the trip purpose composition, because the reduction of TTC does not necessarily show the economic benefit. It was assumed that economic value was taken into account by 100% for "business" trips and by 50% for "to work" and "to home from work" trips in this analysis. Based on the result of the 2007 World Bank Study's household interview survey, the percentage of "business", "to work" and "to home from work" trips was 2.2%, 20.4% and 20.4%, respectively. Thus the total of these figures (43.0%) was multiplied to the TTCs above.

[2] Urban Transport in Vietnam's Medium-Sized Cities, World Bank, December, 2007.

12.3 Evaluation Results

12.3.1 Economic Evaluation

The results of the economic evaluation are summarized in the table below. The proposed projects are highly feasible economically. Particularly, the Nguyen Trai Bridge project shows remarkably high economic performance.

Table 12.3-1 Results of the Economic Evaluation

Project	EIRR (%)	BCR (at 12% p.a.)	NPV (JPY billion at 12% p.a.)
Nguyen Trai Bridge	34.6	5.1	52.9
Vu Yen Bridge + Ring Road 3	20.5	2.1	31.7
Nguyen Trai Bridge + Vu Yen Bridge + Ring Road 3	17.0	1.6	24.8

Source: Study Team

The benefit/cost stream of the proposed projects is presented as follows.

Table 12.3-2 Benefit/Cost Stream of the Projects

Year	Nguyen Trai Bridge			Vu Yen Bridge + Ring Road 3			Nguyen Trai Bridge + Vu Yen Bridge + Ring Road 3		
	Total Benefit (JPY million)	Total Cost (JPY million)	Ben.-Cost (JPY million)	Total Benefit (JPY million)	Total Cost (JPY million)	Ben.-Cost (JPY million)	Total Benefit (JPY million)	Total Cost (JPY million)	Ben.-Cost (JPY million)
2015									
2016		0	0		0	0		0	0
2017		0	0		0	0		0	0
2018		0	0		0	0		0	0
2019		3,609	-3,609		6,348	-6,348		9,957	-9,957
2020		7,724	-7,724		16,929	-16,929		24,653	-24,653
2021		5,954	-5,954		12,258	-12,258		18,212	-18,212
2022		6,118	-6,118		12,619	-12,619		18,737	-18,737
2023		3,063	-3,063		14,657	-14,657		17,720	-17,720
2024	13,928	552	13,376	13,081	1,404	11,677	14,154	1,956	12,198
2025	15,396	22	15,373	14,439	64	14,375	15,693	87	15,606
2026	16,967	22	16,945	15,893	64	15,829	17,340	87	17,254
2027	18,649	22	18,626	17,450	64	17,386	19,103	87	19,017
2028	20,446	22	20,424	19,115	64	19,051	20,988	87	20,902
2029	22,368	22	22,346	20,896	64	20,831	23,003	87	22,916
2030	24,421	22	24,399	22,799	64	22,734	25,155	87	25,069
2031	25,862	22	25,839	24,113	64	24,049	26,600	87	26,513
2032	27,337	22	27,314	25,461	64	25,396	28,079	87	27,993
2033	28,848	22	28,825	26,842	64	26,778	29,594	87	29,508
2034	30,395	22	30,373	28,258	64	28,194	31,146	87	31,059
2035	31,979	22	31,957	29,709	64	29,645	32,734	87	32,648
2036	33,601	22	33,579	31,197	64	31,132	34,361	87	34,274
2037	35,262	22	35,240	32,721	64	32,656	36,026	87	35,939
2038	36,963	22	36,940	34,282	64	34,218	37,731	87	37,644
2039	38,703	22	38,681	35,882	64	35,818	39,476	87	39,389
2040	40,485	-17,712	58,197	37,522	-41,432	78,953	41,262	-59,144	100,405
EIRR(%) =			34.6%	EIRR(%) =		20.5%	EIRR(%) =		17.0%
BCR =			5.10	BCR =		2.07	BCR =		1.58
NPV (JPY million) =			52,937	NPV (JPY million) =		31,716	NPV (JPY million) =		24,799

Source: Study Team

12.3.2 Sensitivity Tests

(1) General Sensitivity against Benefit Decreases and Cost Increases

In order to test the rigidness of the economic performance, a series of sensitivity tests were conducted assuming unfavorable situations in terms of project benefit and cost.

The results are summarized below. The economic performance of the Nguyen Trai Bridge project is quite rigid and the Vu Yen Bridge project (with the Ring Road 3) also shows satisfactory economic feasibility.

Table 12.3-3 Results of the Sensitivity Tests (EIRR)

Benefit	Cost	Nguyen Trai Bridge	Vu Yen Bridge + Ring Road 3	Nguyen Trai Bridge + Vu Yen Bridge + Ring Road 3
Base	Base	34.6%	20.5%	17.0%
-25%	Base	29.5%	16.8%	13.7%
-50%	Base	23.1%	12.3%	9.8%
Base	+25%	30.6%	17.6%	14.4%
Base	+50%	27.5%	15.4%	12.5%
-25%	+25%	25.9%	14.2%	11.5%
-50%	+50%	17.8%	8.6%	6.7%

Source: Study Team

Chapter 13 CONCLUSION AND RECOMMENDATIONS

Based on the examination of the project for the construction of Nguyen Trai Bridge, Vu Yen Bridge and Ring Road No.3 in the feasibility study, the following conclusions and recommendations are made.

13.1 Conclusions

(1) Selection of Optimum Crossing and Route:

1) The three projects shall be coordinated with the Master Plan for the Urban Development of Hai Phong City.

2) Based on the development plan for Hai Phong Port and recommendation from the maritime administration of Hai Phong, the navigation clearance is 25m for Nguyen Trai Bridge and 47.77m for Vu Yen Bridge. The navigation height of Vu Yen Bridge is planned to be the same as the navigation height of Bach Dang Bridge.

3) Bridge and tunnel alternatives are studied through examination of the project as a crossing for the Nguyen Trai Street Route and the Vu Yen Island Route. A bridge shall be used as a measure to cross the Cam River.

4) Since there is a densely populated area along Nguyen Trai Street, the alignment and road way width of the approach road of Nguyen Trai Bridge shall be planned to minimize the effects for the resettlement of the residence.

5) Hai Phong Port is located on the route of Nguyen Trai Bridge and Hai An Port is on the route of Vu Yen Bridge. The relocation of Hai Phong Port and Hai An Port are preconditions for both bridge projects. The relocation of both ports shall be planned quickly and put into practice immediately.

(2) Economic and Financial Analysis:

1) The EIRR of the Nguyen Trai Bridge project is 34.6% and the sensitivity analysis results in 25.9% when the traffic demand decreases by 25% and the project cost increases by 25%. It is therefore concluded that high priority should be given to the construction of Nguyen Trai Bridge.

2) Vu Yen Bridge and Ring Road 3 are considered as one project for the financial analysis because the projects are indivisible. The EIRR of the project is 20.5% and the sensitivity analysis is 14.2% on the same assumption as for Nguyen Trai Bridge. Although this value is not high compared to Nguyen Trai Bridge, it is still high enough for implementing the project for the development of Hai Phong City.

3) The population of the new town hall area is estimated to be 5,000 and the population in the VSIP development area to be 150,000 in the year 2020. Even if the plan for the new town hall is delayed, the economic evaluation for Nguyen Trai Bridge is very small.

13.2 Recommendations

(1) Traffic Demand and Timing of Bridge Opening

1) There are two existing bridges over the Cam River which connect the existing urban area and the north development area. Traffic on Kien Bridge has already reached the capacity of the bridge and Binh Bridge is also expected to reach full capacity in 2018. Therefore, it is recommended that Nguyen Trai Bridge should be opened for traffic in 2022. Considering the time schedule for bridge construction, the project shall be started as soon as possible.
2) Construction of Vu Yen Bridge and Ring Road 3 is also recommended to be started almost with the same timing as Nguyen Trai Bridge, because even if Nguyen Trai Bridge is constructed on schedule, the traffic on the bridge will exceed capacity soon after opening.
3) Traffic demand is forecasted based on the master plan of Hai Phong City. However, there are possible inconsistencies between the actual situation and the plan, and the proponents are therefore advised to monitor the actual traffic volume over the next few years. It is also suggested that further consideration be given to appropriate timing of the preparation of the projects based on the results of the traffic demand monitoring during this period.

(2) Land Acquisition and Resettlement

1) The alignment of the bridge approach roads and Ring Road 3 is planned to minimize the number of houses to be resettled along the road. The affected districts should be informed of the land area necessary for the project including the alignment plan and right-of-way. Since there will likely be some complaints from affected residents, the proponents should carry out an adjustment of differing opinions among affected residents.
2) It will be required to confirm land acquisition by two different projects under VSIP and Vin Group in north approach of Nguyen Trai Bridge and Vu Yen Bridge, whether the process and condition could be fulfill the standard of the JICA's Environmental Guidelines. In case that there have been observed significant gaps between the JICA's Environmental Guidelines and their policies, a corrective action plan should be prepared and implemented to fulfill the gaps after the due diligence survey.
3) A total number of 1,862 households and 7 organizations with 6,184 people could be affected in any way by the project. The figures will be updated when the road alignments are finalized at the detailed design stage.
4) The Resettlement Action Plan (RAP) which was conducted in this feasibility survey is discussed in Chapter 8 and it should be a basis for further plan and preparation of compensation, assistance and resettlement in relevant authorities.

(3) Other Projects Relevant to the Projects

Several other projects are in progress that influence the projects in this study.

1) The improvement of the roundabout on Nguyen Trai Street is being implemented based on the urban road improvement plan of Hai Phong City, and traffic from Nguyen Trai Bridge would have a large impact on the traffic flow in the roundabout. The traffic in the roundabout shall therefore be carefully monitored and studied over the next few years.
2) Development plans for a resort area on Vu Yen Island are in progress by the VIN group. The interchange connecting Vu Yen Bridge and the road planned by the VIN group shall be planned in detail at the detailed design stage.
3) VSIP which is planning the road network in the VSIP industrial zone and new administrative center has agreed to adjust their road alignment in accordance with our project. The crossings should be planned at the detailed design stage.
4) Relocation of Hai Phong Port and Hai An Port by HPPC independently from the project are the pre-conditions for the implementation of the project, and HPPC shall establish a precise relocation plan for the ports including securing the relocation sites and compensation for the relocation cost of the port facilities.

(4) Environmental Impact Assessment (EIA)

1) Based on the results of the EIA, issues affecting the sensitive natural and social environment were identified and impacts of the project against these elements as well as a wide range of secondary, interactive and cumulative impacts were assessed. Effective countermeasures to alleviate the negative impacts are discussed and recommended in Chapter 7 and Chapter 8.
2) Mangrove forests are one of the most precious environmental assets of Hai Phong City that need to be conserved. Reforestation of a mangrove forest area of about 18,000m^2 should be planned in detail in the next stages of the Project as the compensated forest for the mangrove forest lost by the Project. It is recommended that the project proponent shall discuss with Vingroup JSC on the possibility to carry out this reforestation in the eco-logical park planned by Vingroup JSC in the eastern area of Vu Yen Island.
3) In addition, it is recommended that Hai Phong City PC will take into considerations the important role of the mangrove forests for the long-term development of the city in the future, and then make more efforts to push forward the “Forest Protection and Development Plan to 2020”, which includes the activities necessary to promote residents' awareness on the need to protect the mangrove forests.
4) It is also recommended that Hai Phong City PC incorporate the improvement of natural landscape, and water-friendly land use, mangrove forest protection, etc. into the urban planning of the city, especially in the areas in the north of Cam River.

5) Referring to the EIA study implemented in this study, the EIA report should be prepared and submitted by the PMU and needs to be approved by Ministry of Natural Resources and Environment (MONRE) at an appropriate time for implementing the project.

6) As shown in Chapter 7, there are some locations in the city where concentrations of air pollutants had already exceeded the limits set by Vietnamese regulations. In order to conserve the ambient air quality of the city, it is recommended that Hai Phong City shall make efforts to push forward the implementation of the comprehensive plans (such as the Green Growth Promotion Plan of the City of Hai Phong), including the following measures:

- Improve mass transit public transportation infrastructure such as bus, railway, etc.
- Promote modal shift from private motorbikes/cars to public transportation means such as bus.
- Promote the use of low-carbon vehicles (hybrids, electric vehicles, electric motorbikes, etc.) and control exhaust gas from motorbikes and vehicles.
- Develop an air monitoring system to continuously grasp the air pollution situation in the city even after two years of construction completion, and use the collected monitoring data to improve awareness of residents on the needs to protect ambient air quality.
- Others.

(5) Design Conditions and Criteria and Facility Type for Crossing the Cam River

1) Vietnamese design standards and highway design standards are adopted in this project, and a 4-lane carriageway and two motorbike lanes with an 80km design speed is recommended for both crossings.

2) An arch bridge is recommended for Nguyen Trai Bridge and a cable-stayed bridge for Vu Yen Bridge. The process for selecting the bridge types is detailed in Chapter 5.

(6) Project Cost and Implementation Plan

1) The total cost for construction is estimated at 11,026 billion Vietnamese dong (VND), with a breakdown of 3,243 billion VND for Nguyen Trai Bridge, 4,836 billion VND for Vu Yen Bridge and 2,947 billion VND for Ring Road 3. The compensation and resettlement implementation cost of the project is estimated at 1,896 billion VND. This cost does not include the relocation cost of Hai Phong Port and Hai An Port.

2) The preparatory period including the approval of the EIA, detailed design of the project, tender preparation, and selection of the contractor is expected to be 42 months. The construction periods for Nguyen Trai Bridge, Vu Yen Bridge and Ring Road 3 are expected to be 34 months, 42 months and 42 months, respectively. In order to begin the project on schedule, Hai Phong Port and Hai An Port should be relocated to their new

sites before 2020. A project schedule including the relocation of ports and implementation of the projects is shown in Figure 9.5-1.