

PMU2 had revised the EIA report and submitted it to MOT for approval on May 4, 2010. Following Decision 1214/QD-BGTVT made by MOT's Vice Minister on May 10, 2010, the Appraisal Council of EIA Report for the Project was established on the same day which consists of 9 members. The Appraisal Council had organized a meeting on May 13, 2010 to appraise the EIA Report for the Project.

Based on comments raised by the Appraisal Meeting, PMU2 had revised the EIA Report, and submitted it again to the Appraisal Council on May 24, 2010.

On May 27, 2010, MOT had issued Decision 1420/QD-BGTVT on the approval of the EIA report.

Decision 1420/QD-BGTVT lists up a number of requirements as following for the project owner to obligate.

- a) Apply proper technical and management methods, and organizational arrangement to mitigate adverse impacts to ambient air, soil, surface water, underground water, and ecosystem in the project area;
- b) Closely coordinate with relating agencies to prevent and control unexpected traffic accidents, working accidents, explosion and fire, oil leakage, and other incidents. Carry out proposed measures to restore construction sites, cleansing river beds to ensure safety of the waterways and environmental sanitation of the rivers;
- c) During construction phase, ensure that noise, vibration, dust concentration, exhaust gas and waste water are in compliance with the Vietnam Environmental Standards and Protocols. Properly collect and treat waste water generated from the worker camps;
- d) Properly collect, classify, store, transport and treat domestic wastes, construction wastes, and hazardous wastes generated by the Project in compliance with relevant regulations;
- e) Coordinate with local authorities to implement compensation, resettlement for affected people in compliance with relevant regulations;
- f) Store and handover all documents relating to environment protection of the project to the Highway Management and Operation Agency after completion of the project.

3.4.2. Review and Confirmation of RAP

(1) Review of RAP report

A RAP Report for the Project was prepared as a part (Volume IV: Resettlement Action Plan) of the F/S Report prepared in July 2009 by Vietnam Infrastructure Development and Finance Investment Joint Stock Company (VIDIFI). Hyder Consulting Ltd was in charge of preparation of this RAP.

However, after Prime Minister's decision to transfer the project ownership from VIDIFI to MOT, PMU2 became the body in charge of revising the RAP.

At the time being, as a result of the review of the RAP prepared in July 2009, the Preparatory Survey Team had found several deficiencies in the RAP as described in the following table. Recommendations on necessary actions to revise the RAP are also described.

Table 3.4-2 Result of review of the RAP report prepared in July 2009

Requirements by JBIC	Descriptions in the RAP	Requirement for further actions
1. Introduction		
1.1 Project Scope		
a) Project background b) Objectives of the project c) Project Scope d) Project location map	- Section 1.1 of the RAP includes a brief description on project objectives, project background, scope, location map.	-
1.2 Objectives of Resettlement		
a) Land acquisition and resettlement principles and objectives b) Consideration under the "JBIC Guidelines for Confirmation of Environmental and Social Considerations (2002. 4)" c) Legal framework	a) Lack of relevant description b) Lack of relevant description (Section 1.4 describes about differences between resettlement policies of Vietnam and WB, ADB) c) Section 1.3 & 1.5 include a list of Vietnam legal documents related to land acquisition, compensation and resettlement. However, it lacks of description on recently-issued legal documents (such as Decree 69/2009/ND-CP, decisions issued by Hai Phong City PC)	- Descriptions on Decree 69/2009/ND-CP, decisions recently issued by Hai Phong City PC, and parts of JBIC Guidelines relating to land acquisition, resettlement, etc. should be added.
2. Scope of Land Acquisition and Resettlement		
2.1 Land acquisition		
a) Map of the area and villages affected by land acquisition b) Total land area acquired for the project	a) Lack of administrative maps b) Land areas acquired for the project are described in detail in Section 3.2, 6.4, etc.	- A map showing the administrative boundary of project- affected communes, townlet, district, etc. should be added.
2.2 Population/households affected by land acquisition and resettlement		
a) Total number of PAPs b) Size of relocation (number of population/households to be relocated) c) Size of those who lose their assets d) Size of those whose business, occupation, work are adversely affected	- Scale of land acquisition, affected properties, number of households affected by the project, etc. are described in detail in Chapter 4.	- A detailed Inventory of Losses (IOL) should be carried in the D/D stage to update data on lands, properties, etc, to be affected by the Project.
2.3 Census and Inventory of Losses (IOL)		
a) Demographic, education, income and occupational profiles of PAPs b) Land type and land use (agricultural, residential, commercial land) c) Type of crops and trees d) Buildings type (size, materials used)	- A survey on IOL was carried out during July~August 2008. - The following data on PAHs were collected: legal land-use-right, area of land to be acquired (divided by type of land use), structures to be lost, crops and trees to be lost, graves to be relocated, public structures to be	

Requirements by JBIC	Descriptions in the RAP	Requirement for further actions
<ul style="list-style-type: none"> e) Inventory of common property resources f) Inventory of assets to be acquired g) Existing civic facilities and infrastructure, etc. 	relocated.	
2.4 Information on those without legal title to land or assets	- Information on residents without legal land-use-right was also collected during the IOL survey.	
3. Measures to minimize Land Acquisition and Losses		
3.1 Actions and measures to be conducted for minimizing impact	- Although compensation for losses of land and properties, and allowances for relocation, life stabilization, etc. are described, it lacks descriptions on necessary measures to avoid / mitigate impacts.	- Route alignment should be examined again carefully in the D/D stage with intention to minimize land acquisition and losses.
3.2 Consideration of alternatives with special attention to avoid and minimize involuntary resettlement	- Lacks of description	
4. Socio-Economic Feature of the Project- Affected People		
4.1 Socio-economic profiles of PAPs		
<ul style="list-style-type: none"> a) Size, gender, age, number of school children of each household b) Occupation and means of livelihood c) Income level and economic activities of PAPs, including vulnerable groups d) Race, language, religion e) Social support system, infrastructure of the community f) Needs of PAPs regarding the income restoration program and relocation g) Perception towards the project and resettlement, etc. 	<ul style="list-style-type: none"> - Several key data on current socio-economic conditions of PAHs were collected during the IOL survey. - Socio-economic characteristics of PAHs are described in Chapter 3, including gender characteristic, ages and marital status, education level of head of PAH, mean of livelihood, number of family's member who is in labor age, income level, subsistence level, etc. - It lacks data and information on: (e) social support system, infrastructure of the community (such as schools, hospitals, etc); (f) needs of PAPs regarding the income restoration program and relocation; (g) perception towards the project and resettlement, etc. 	- At least two surveys should be carried out (the first one in the early days of the D/D stage, and the second one at the commencement of the mass resettlement or construction) to collect data and information on socio-economic conditions of PAHs and affected communes.
5. Resettlement Policy and Entitlement		
5.1 Compensation policy	- Compensation policy is described in Section 2.4, 2.5	- Compensation policy should be revised based on Hai Phong City PC's recently-issued decisions, and other relevant legal documents issued by the GOV.
5.2 Eligibility for compensation/assistance/rehabilitation	- PAP's entitlement for compensation was identified based on Vietnam laws (Section 2.3, Entitlement Matrix)	
5.3 Entitlement Matrix	- An Entitlement Matrix was prepared based on Vietnam laws and regulations, and is described in detail in Appendix 1.	
5.4 Assistance, support, compensation	- Additional assistances	

Requirements by JBIC	Descriptions in the RAP	Requirement for further actions
options	(allowances and other measures) for relocation, production stabilization, occupational change, and special assistance for poor and vulnerable PAPs are described briefly in Section 2.6.	
5.5 Cut-off date	- Lacks of description	- Description on the cut-off date should be added.
5.6 Compensation/assistance policy towards those who without legal title	- Compensation/assistance policy towards PAPs who without legal title is described in the Entitlement Matrix	-
6. Resettlement Site		
6.1 Method of site selection and site alternatives	- Lacks of description	- The RAP should be revised in the D/D stage, which should include concrete arrangements for relocation of houses, public structures, graves, etc., and construction plan of resettlement sites.
6.2 Location, layout, and design of resettlement site	- Lacks of description	
6.3 Resettlement site development (infrastructure, social service, etc.)	- Lacks of description	
7. Income Restoration Program		
7.1 Background of Income Restoration	- Lacks of description	- An income/ livelihood restoration program should be prepared in line of Decree 69/2009/ND-CP
7.2 Objective and policy of income restoration	- Lacks of description	
7.3 Income Restoration Program	- Lacks of description	
a) Constraints and opportunities for income generation	- Lacks of description	
b) Analysis of needs, capacity, and existing skills of PAPs	- Lacks of description	
c) Analysis of economic activities of PAPs and communities	- Briefly described (in Section 3.3)	
d) Consultation and participation process	- Lacks of description	
e) On-going income-generating or livelihood development programs (e.g., poverty alleviation) in the project area	- Lacks of description	
f) Provisions for group-specific, targeted income restoration plans (e.g., microcredit or small development)	- Lacks of description	
g) Income restoration options	- Lacks of description	
h) Financial source of income restoration plans	- Lacks of description	
i) Implementing arrangement of the program (e.g., assistance from government agencies, community organizations, NGO, or CBO)	- Lacks of description	

Requirements by JBIC	Descriptions in the RAP	Requirement for further actions
<ul style="list-style-type: none"> j) Consideration of vulnerable people k) Program implementing schedule l) Monitoring 	<ul style="list-style-type: none"> - Lacks of description - Lacks of description - Lacks of description 	
8. Implementation Arrangement		
8.1 Responsibilities and roles of related organization (organizations in charge of Basic Resettlement Plan preparation, resettlement execution, land acquisition, monitoring, consultation, resettlement site preparation, income restoration, etc.)	- Responsibilities and roles of related organizations are described briefly in Chapter 5. However, it should be revised based on the recently-issued Decree 69/2009/ND-CP	- In the D/D stage, the RAP should be revised, and include detailed descriptions on organizations and arrangements for the RAP implementation, as well as roles and participation of local mass organizations and NGOs, etc.
8.2 Description of cooperation between related organization (e.g., coordination between an executing agency and NGO/CBO).	- Roles of local mass organizations (such as Farmers' Unions, Women Union, and other NGOs) are described briefly in Chapter 5.	
9. Implementation Schedule		
9.1 Schedule of resettlement-related activities	- Lacks of description	- It should be added in the revised RAP.
10. Participation and Consultation		
10.1 Policy of participation and consultation	- Objectives of public information and consultation are described in Section 6.1.	- Activities necessary for information dissemination and public consultation and participation should be planned and described in the revised RAP.
10.2 Place, timing, method, topics, meeting memorandum of public consultation meeting held in the past (including PAPs' opinion regarding the project and resettlement)	<ul style="list-style-type: none"> - During the IOL survey, PAP was asked about their preferred mode of compensation (i.e. whether they prefer compensation by cash or by land). - However, no any public consultation meeting has been organized during the preparation of the RAP. 	
10.3 Plan of participation and consultation	- Several activities required for consultation and information disclosure during RAP implementation are proposed briefly in Section 6.3.	
10.4 Leaflet of resettlement distributed to PAPs, including followings: <ul style="list-style-type: none"> - Objectives of the Project - Service area of the Project and Project site - Cost estimation and sources of capital - Project Implementation Planning (i.e., F/S, EIA, and Basic Resettlement Plan preparation) - Project Impact - Definition of Eligibility - Resettlement and compensation 	- Lacks of description (leaflet has not been made yet)	
		- At least, a leaflet should be made in the D/D stage to disseminate information about the Project, its impacts, and proposed mitigation measures.

Requirements by JBIC	Descriptions in the RAP	Requirement for further actions
principles - Compensation policy - Subsidize allowances - Settling complain (Grievance Redress procedure) Note: Leaflet should be attached in the Annexes.		
11. Monitoring and Supervision		
11.1 Monitoring of flowing aspects:		
a) Performance monitoring: physical progress against milestones established in the Resettlement Plan b) Impact monitoring: assessment of the effects of resettlement (effectiveness of the Resettlement Plan and its implementation in meeting the needs of the PAPs)	- Objectives of monitoring and two purposes of monitoring are described in Section 8.1	- A Resettlement Monitoring Plan (including detailed arrangements for internal monitoring and external monitoring) should be prepared and added in the RAP.
11.2 Internal performance monitoring process (method, indicators, period, frequency, implementation arrangement of the monitoring)	- Method, indicators, period, frequency, implementation arrangement of internal monitoring are described briefly in Section 8.2.	
11.3 Methodology for external monitoring	- Methodology, and indicators for external monitoring are described briefly in Section 8.3.	
11.4 Frequency of reporting and content for internal and external monitoring	- These issues are described briefly in Sections 8.2 and 8.3.	
11.5 Evaluation method of monitoring result	- Lacks of description	
11.6 Process for integrating feedback from internal monitoring into implementation	- Lacks of description	
12. Grievance Redress		
12.1 Step-by-step process for registering and addressing grievances and specific details regarding a cost-free process for registering complaints, response time, and communication modes	- A four-stage procedure for redressing grievances is proposed in Section 6.5.	- Procedure for redressing and resolving grievances should be described in more detail.
12.2 Mechanism for appeal	- Only brief description.	
12.3 Provisions for approaching civil courts if other options fail	- Only brief description.	
13. Cost Estimate		
13.1 Statement of financial responsibility and authority	- Lack of description.	- Cost for monitoring (to implement the Resettlement Monitoring Plan) should be estimated and included in the cost for detailed design.
13.2 Source of funds and the flow of funds	- Lack of description.	
13.3 Estimated budget, by cost and by item, for all resettlement costs including planning and implementation, management and administration, monitoring and evaluation and contingencies	- Chapter 7 covers estimation of costs for: (1) compensation for losses of land and structures; (2) compensation for losses of crops and trees; (3) relocation of graves; (4) allowances for relocation, life	

Requirements by JBIC	Descriptions in the RAP	Requirement for further actions
	stabilization, occupational change, etc. (5) administration charges; (6) contingencies. - Cost for monitoring and evaluation is not included.	- Cost estimated for land acquisition, compensation, resettlement, livelihood restoration, monitoring, etc, should be revised.
13.4 Provisions to account for physical and price contingencies	- At the time of RAP implementation, adjustment of prices and costs is recommended.	

Source: Preparatory Study Team, May 2010.

(2) Revision and approval of RAP report

PMU2 had revised the RAP report prepared in July 2009, based on the Preparatory Survey Team's comments, and local residents' opinions raised in the public consultation meeting held on April 28, 2010. The RAP report was also revised in accordance with the decision to consider the plan of railway construction separately from the highway construction plan, and consequently reduce the scale of land acquisition and resettlement.

According to person in charge of PMU2, the revised RAP report was submitted to Hai Phong City PC for approval.

(3) Issues to be improved in RAP report

Table 3.4.3 summarizes major actions those are considered necessary to improve the RAP report.

Table 3.4-3 Required actions to improve the RAP Report

No.	Item	Action		
		PMU2	Preparatory Survey	D/D
Measures to minimized land acquisition and losses				
a	Change route alignment to avoid passing through Trung Hamlet			○
Grasping socio-economic feature of PAP				
b	Conduct two detailed socio-economic surveys in the pre-construction phase			○
Update resettlement policy and entitlement				
c	Update compensation policy based on Hai Phong PC recently-issued decisions	○		○
Resettlement site construction plan				
d	Prepare concrete plan to relocate affected houses, public structures, graves, etc. and to develop resettlement sites			○
Income/livelihood restoration plan				
e	Prepare an income/livelihood restoration plan for PAP			○
Implementation Arrangement				
f	Identify organizational arrangements for RAP implementation	○	○	
g	Work out a schedule of resettlement-related activities	○		○
Public participation and consultation				
h	Prepare a plan for information dissemination and public consultation		○	○
i	Make a leaflet to introduce about the Project			○
Monitoring and supervision				
j	Prepare a RAP Monitoring Plan		○	○
Grievance Redress				
k	Identify procedure for redressing and resolving grievances	○		○
Cost estimation				
l	Revise cost estimation for land acquisition, compensation, resettlement, livelihood restoration, monitoring, and supervision	○	○	○

3.4.3. Recommendations on Socio-Environmental Considerations

(1) Prediction of impacts on ambient air quality by proper method

The Plume Model (when wind velocity is higher than 1.0m/s) is used to predict impact of ambient air quality during operation phase of the Project and the results of prediction are presented in Appendix 7.

According to the prediction results described in Appendix 7, at A1 survey site, where the traffic volume is the highest among the planned highway, even at the survey point located 10m from the road side, the predicted concentrations of SO₂, NO₂, CO and TSP are lower than the maximum allowable values stated by the Vietnam Ambient Air Quality Standard TCVN 5937-2005 (SO₂: 60.7µg/m³, NO₂: 52.7µg/m³, CO : 3,566µg/m³, and TSP : 132.5µg/m³).

In all projected years (2015, 2020, and 2030), at all survey sites (A1, A2, A3, and A4), all predicted concentrations are lower than the maximum allowable values stated by the Vietnamese ambient air quality standard.

It should be noted that there are two constraints in this prediction: (1) due to the lack of data on air pollutants emission by vehicles in Vietnam, the coefficients of air pollutants emitted by moving vehicles using in this study are referred to the ones applied in Japan, and therefore, they may be inconsistent with actual situation in Vietnam; and (2) due to the lack of data on meteorology, the wind velocity (1.7m/s) described in the EIA Report is used for the prediction in this study. It may need to carry out further study with the use of other different data on wind velocity and wind direction to ensure the accuracy of the prediction.

(2) Impacts of noise during operation phase

Road traffic noise prediction model "ASJ RTN-Model 2003" developed by the Acoustical Society of Japan is used to predict impact of noise caused by the Project during operation phase and the results of prediction are presented in Appendix 7.

According to the prediction results described in Appendix 7, at A1 survey site, in 2020, the predicted noise levels at the survey point located 100m from the road side in the midnight is 52.1 dBA, and exceed the maximum allowable level for a business service-shopping-industrial mixed residential area stated by the Vietnam Standard (Acoustics - Noise in public and residential areas, maximum permitted noise level TCVN 5949-1998).

At A1 survey site, in 2020, the predicted noise level at the survey point located 100m from the road side in the midnight is 52.1 dBA, and exceed the maximum allowable level for a business service-shopping-industrial mixed residential area stated by the Vietnam Standard (Acoustics - Noise in public and residential areas, maximum permitted noise level TCVN 5949-1998).

At the A2, A3 and A4 survey sites, in midnight in 2030, the noise levels predicted in the area within 100m from the road side exceed the maximum allowable level for a residential area stated by Vietnam Standard TCVN 5949-1998.

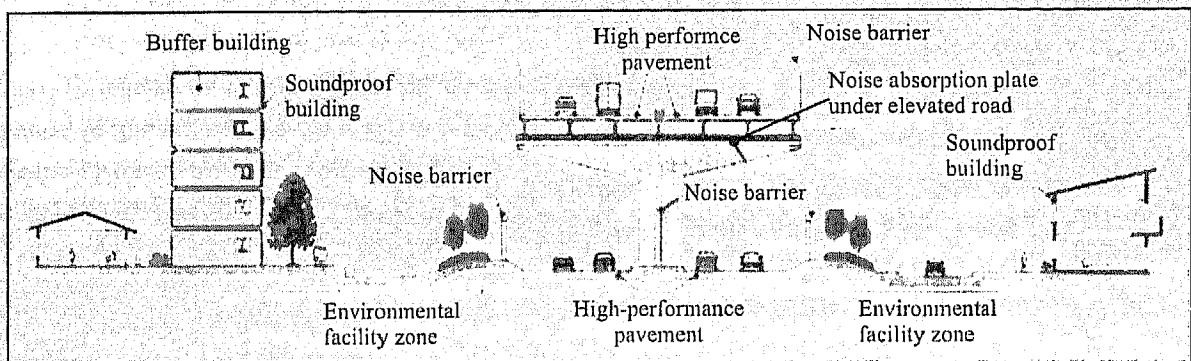
Therefore, along the route close to the residential areas, the proper mitigation measures such as the followings should be introduced.

- Apply high performance pavement
- Install noise barriers
- Install environmental facility zones
- Attach noise absorption plate under elevated road span
- Plant trees along sections of road near the populous residential areas;
- Install warning signs on road for horn bans and speed control at the road sections close to residential areas;
- Regular maintenance on road to keep good road surface condition;
- Respond to monitoring results which show higher noise than projected by the EIA.

Table 3.4-4 shows the functions of the typical noise mitigation measures and their effectiveness.

Table 3.4-4 Typical Noise Mitigation Measures

Mitigation Measure	Function	Effectiveness
High performance pavement	Absorb noise generated by friction between the car tires and road surface.	About 3 dB
Noise barrier	Reduce noise by diffraction	About 10 dB
Environmental facility zone	Reduce noise by distance from noise sources	5~10 dB
Noise absorption plate attached under elevated road span	Reduce noise reflected from the under surface of the elevated road span	2 ~ 5 dB (depends on level of reflected noise)



Source: Translated from the Web Site of Japanese Ministry of Land, Infrastructure, Transportation, and Tourism: <http://www.mlit.go.jp/road/ir/data/souon/souon3.html>.

(3) Survey on ecosystem

Dinh Vu - Cat Hai area is located in the estuary of Bach Dang River, where the land surface is formed by sediments consisting of mud, sand, etc.

In Appendix 3 of the EIA Report of the Tan Vu-Lach Huyen Highway Construction Project (May 2010), there is a description on results of the “Basic Investigation and Assessment of Regional Resources, Ecological Wonders, Geology of Vietnam Seas and Islands”, carried out by Institute of Marine Environment and Resources (IMER/VAST) in November 2007 with supports provided by Belgium Government. According to this description, vegetable covering and land use structure of the area (within the coordinates : 20°47' ~ 20°50' north latitude and

106°45' ~ 106°55' longitude), which covers the study area of Tan Vu – Lach Huyen Highway Construction Project³ are as shown in Figure 3.4.1.

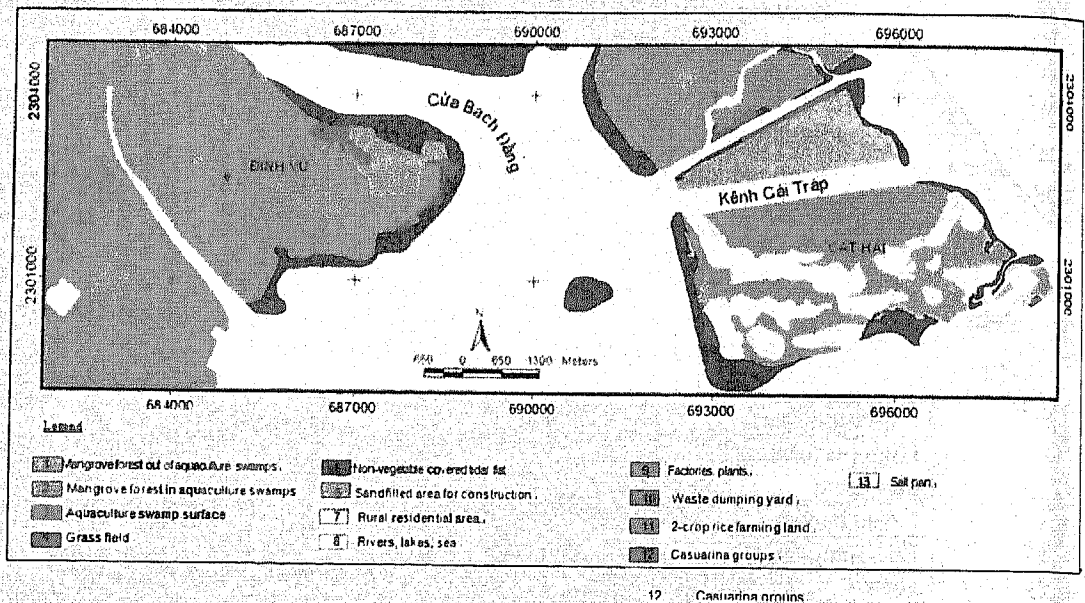


Figure 3.4-1 Distribution of vegetable covering and land use structure of the study area (in 2007)

In the study area, vegetable covering and land use are classified into 13 categories (see Table 3.4.4). Of which, rivers, lakes, sea occupy 77.56% of the study area, following by aquaculture swamps (15.76%) spreading evenly all over the study area. Mangrove forest in aquaculture swamps occupies 1.52%, distributing mainly in Dinh Vu peninsula and partly in Cat Hai Island. Paddy field concentrates in Trang Cat commune and makes up 1.03% of the area. Non-vegetable tidal flat occupies over 1.70% area, locating along the edge of Cat Hai Island and Dinh Vu, and all islands in the middle of Bach Dang River. Salt pan occupies 0.69% area, concentrating in Cat Hai. Sand-filled area for construction locates mainly in the Dinh Vu Industrial Zone. Rural residents concentrate mainly in Cat Hai and occupy 0.52% area. Casuarinas trees are grown in strips along the coast. Sea grass fields are also small and locate along former Cai Trap canal.

³ According to the “Basic Investigation and Assessment of Regional Resources, Ecological Wonders, Geology of Vietnam Seas and Islands”, carried out by Institute of Marine Environment and Resources (IMER/VAST), November 2007, supported by Belgium.

Table 3.4-5 Vegetable covering and land use structure in the study area

Category	Vegetable covering and land use structure	Area (hectare)	Area (%)
1	Mangrove forest in aquaculture swamp	619.40	1.52
2	Mangrove forest out of aquaculture swamp	43.17	0.11
3	Aquaculture swamps	6,442.07	15.76
4	Grass field	73.96	0.18
5	Non-vegetable covered tidal flat	694.69	1.70
6	Sand-filled area for construction	307.97	0.75
7	Rural residential areas	211.79	0.52
8	Rivers, lakes, sea	31,694.26	77.56
9	Factories, plants	18.13	0.04
10	Waste dumping yard	35.44	0.09
11	Paddy field (2-crop rice field)	420.45	1.03
12	Casuarinas groups	20.79	0.05
13	Salt pan	281.94	0.69
	Total	40,864.06	100.00

Source: EIA Report of Tan Vu-Lach Huyen Highway Construction Project, May 5, 2010, Appendix 3.

As shown in Table 3.4.4, ecosystem of the water bodies (including river, lakes, and sea) is the most important in the study area, following by ecosystem of aquaculture swamps, and then ecosystem of non-vegetable covered tidal flats. These main ecosystems in the study area are described and assessed briefly in Section 2.1.5 of the EIA Report of the Tan Vu-Lach Huyen Highway Construction Project, May 2010. In this Section, results of a survey on ecosystem carried out by the Institute of Marine Environment and Resources (IMER/VAST) in 2007 are referred to as followings.

a) Water flora system

- Ephemera flora system: The majority is the species living in the tropical and subtropical warm coast, in which siliceous diatom (Bacillariophyceae) and Giap algae (Diniphyceae) predominate over Kim algae (Dictyochophyceae) and Lam algae (Cynophyceae). Density of the ephemera algae changes obviously under the seasons: density changes 5,000tb/l – 25,000 tb/l in the rainy season, and 1,000 – 10,000 tb/l in the dry season. In Dinh Vu Island, 145 species under 45 branches and 4 classes are discovered. Among the species, the green and indigo-blue algae are the freshwater species from the downstream when the tidal penetration in the estuaries weakens (Nguyen Huy Yet – Hai Phong Sub-Institute of Oceanography).

- Seaweed system: The area of Dinh Vu Island has about 16 species distributing on the tidal area, estuaries, aegiceras field and in the brackish water pond. In the high tidal area, there are often Ulva seaweed, Porphyra jam seaweed, Galidium agar seaweed and Brachytri shiny seaweed...

- Sea-grass plays an important role in the tidal area, so the sea-grass ecosystem is one of the

potential ecosystems about bio-diversification and ecological environment.

b) Water fauna system

In the project area, there are mainly ephemera fauna system and bottom fauna system. The ephemera fauna system includes spawns and young fishes with a large number in March and April. The bottom fauna system in the tidal area has about 538 species with 3 groups of the bottom fauna with a great number of sea-shell, crustaceans and silk worms.

In addition, in the area, there are also a number of fish species and the vertebrate species except fish such as reptile – amphibian, birds and animals.

c) Mangrove forest ecosystem

26 mangrove vegetable species are discovered in Cat Hai and Dinh Vu belonging to 20 families, including all three origin groups: major species group, halophilic-origin species group joining mangrove forest, and migrating inland species group. In which the number of species in Cat Hai (23 species) is more than that in Dinh Vu (17 species). Total number of species discovered in these two locations make up 63% (26/41) compared to total number of species of Hai Phong coastal region, in which Cat Hai makes up 56% (23/41), Dinh Vu takes 41% (17/41). Total number of species of the two studied locations occupies 52% compared to total number of species in the whole Northeast region (26/50), in which Cat Hai makes up 46% (23/50) and Dinh Vu makes up 34% (17/50). The data mentioned above show that Dinh Vu has less species than Cat Hai. It is worth to note that there were 30 mangrove vegetable species identified in Dinh Vu area during a research carried out in 1984, but now there are only 17 mangrove vegetable species identified in this area, so it may conclude that 23 species of mangrove vegetable have lost during about 23 year since 1984.

d) Brackish aquaculture pond ecosystem

In the brackish aquaculture ponds in the study area, there are edible sea species like shrimp, crab, fish, seaweed, especially glacialia sp. Benthos group in aquaculture ponds is determined to include 71 species, less than those in tidal flats.

In conclusion, the studied area is rich in estuary ecosystems, biodiversity, and organism resources, including endemic species. However, the development of shrimp and fish ponds, as well as the urbanization are contributing to the deterioration of the ecosystems of the area. Ecological environment in the study area, especially in Dinh Vu Island, is being severely degraded with the plans to develop large-scale industrial zones in Dinh Vu Island and Cat Hai Island. No protected fauna or flora species are identified. And there was not indication of the existence of valuable nature habitats in the study area.

(4) **Environmental Management Program**

a) Summarization of adverse impact mitigation measures

The following Table 3.4.5 shows a summarization of recommended measures to mitigate

adverse impact described in the approved EIA Report. These measures are designed separately for pre-construction phase, the construction phase, and the operation phase.

Table 3.4-6 Summarization of adverse impact mitigation measures

Item	Mitigation measure
Pre-construction phase	
Land acquisition, relocation, resettlement	<ol style="list-style-type: none"> 1) Inform / involve local stakeholders in the resettlement process from the early stage of the project through informative / discussion meetings in order to understand their needs and to build consensus on resettlement; 2) Carry out a socio-economic survey to collect data and information on project-affected people (PAP), their opinions, their expectations, etc. and to feed back them into the D/D, detailed RAP (Resettlement Action Plan), the livelihood restoration plan, etc. 3) Re-evaluate land price to be used for calculation of compensation (referring to Circular 14/2009/TT-BTNMT issued on October 1, 2009) in order to reasonably adjust compensation price; 4) Revise and update the RAP (including the plan to relocation of graves, and public facilities affected by the project), the livelihood restoration plan (including the vocational trainings, the job promotion activities, etc.) 5) Coordinate with members of the technical design teams to examine and work out the following proposed impact mitigation measures: <ul style="list-style-type: none"> - Shift the route alignment of the section 13K+800 to the North to minimize affects to Trung Hamlet (Đông Bài Commune, Cát Hải District), and consequently minimize number of PAP to be relocated; - Use riprap, or rock to embed slope faces of road embarkment, and/or grass the slope faces to minimize soil runoff by rain; - Plant trees along sections of road near the populous residential areas in Thon Hamlet and Ninh Tiep Hamlet, to mitigate impacts of noise, exhaust gas and dust to local residents; - Construct the separate drainage system along road and bridge sections near aquaculture ponds and salt pans to collect and catch polluted rainwater from road surface in the retention ponds and treat it properly before discharging to surface water body; - Construct several underpass routes at road sections near populous residential areas in Trung Hamlet and Ninh Tiep Hamlet in order to mitigate impacts of split of community; - Construct 2 interchanges at suitable locations near Ninh Tiep Hamlet and Trung Hamlet to improve local residents' accessibility to other cities; - Construct a parking area / service zone near the Cat Hai side-terminal of Got Ferry with an appropriate scale in order to facilitate the implementation of livelihood restoration plan for PAP (i.e peddlers and shopkeepers on Dinh Vu Ferry, at this ferry terminals, people with means of livelihood depending on aquaculture or salt produce affected by the project, shopkeepers along the existing road in Cat Hai Townlet, etc.) - Appropriately design of bridge piers (number of piers, pier shape) and apply proper pier construction method, in order to mitigate impacts of

Item	Mitigation measure
	erosion and sediment of rivermouth bed. 6) Properly relocate and/or repair public facilities (including the banks around Cat Hai island) which are affected by the project; 7) Carry out a survey for unexploded bombs along the project site, properly dismantle and treat the ones after discovered; 8) Carry out monitoring on RAP implementation and livelihood restoration plan implementation to confirm these plans are appropriately carried out; 9) Prepare an HIV/AIDS Prevention Plan in the early days of D/D stage; 10) Entrust a consultant or a NGO to implement the HIV/AIDS Prevention Plan during pre-construction phase and construction phase..
Construction phase	
a) Temporary obstruction of traffic	<ul style="list-style-type: none"> - Carefully prepare the construction plan in order to minimize the area and period of road occupation/ closure, and avoid concentration of construction vehicles; - Prior notice local residents on the road occupation / closure through sign boards and mass media; - Specify road occupation sites, construction sites, etc. to avoid vehicles mistakenly enter the sites; - Allocate personnel at place vulnerable to traffic congestion to instruct detour.
b) Air pollution	<ol style="list-style-type: none"> 1) Carry out monitoring on ambient air quality; 2) Include the following tasks in bidding documents and contracts, and obligate contractors to duly carry out these tasks under supervision of Environmental Supervision Consultant (ESC): <ul style="list-style-type: none"> - Secure distance between construction machinery and construction site boundary as much as possible; - Avoid concentration of construction machinery and vehicles near the populous residential areas; - Use temporary barriers to control noise (and dust) around the construction sites near the populous residential areas; - The asphalt melting station should be equipped with flue gas control device, operation of asphalt melting will be in enclosed mode; cement and concrete will be mixed within an enclosed structure; - Construction roads should be paved with gravel or asphalt to reduce generation of air-borne dust, and mitigate impacts to residential areas, aquaculture ponds, salt pans, etc.; - Provide water spray vehicles to water the unpaved ground, storage piles and other areas where airborne dust may originate. The water spray operation should be carried out in dry and windy day, at least twice a day (morning and afternoon); - Trucks transporting construction materials should meet allowable exhaust gas emission standards (stated in Decision 249/2005/QĐ-TTg on October 1, 2005), and should be carefully covered.
c) Surface water quality	<ol style="list-style-type: none"> 1) Carry out monitoring on surface water quality; 2) Include the following tasks in bidding documents and contracts, and obligate contractors to duly carry out these tasks under supervision of ESC:

Item	Mitigation measure
	<ul style="list-style-type: none"> - Construction of piers should be done by enclosing the site with retaining walls to minimize impact by turbulence; - The material stockpile site, the earthwork sites where exposed land surface is vulnerable to runoff, etc. should be consolidated and/or covered; - The material stockpile site should be far away from surface water body and the area prone to surface run-off. The loose materials should be bagged and covered. Open ditch should be built around the stockpile site to intercept wastewater; - Construction wastes should be collected and re-used wherever possible, otherwise should be disposed in the small deposit area invulnerable to surface run-off, along with soil erosion prevention measures; - Prevent the oil leak from the operation of the machinery by the regular check; - Clean up and restore the temporarily-used construction yards, facilities, etc.
<p>d) Noise / vibration</p>	<ol style="list-style-type: none"> 1) Carry out monitoring on noise and vibration; 2) Include the following tasks in bidding documents and contracts, and obligate contractors to duly carry out these tasks under supervision of ESC: <ul style="list-style-type: none"> - A noise and vibration mitigation plan should be developed by the GC for implementation by the contractors; - On Cat Hai side, construction materials will be transported mainly on the construction road to the construction sites. On Tan Vu side, and Dinh Vu side, transportation will be done on existing road, and transportation schedule should be carefully designed to minimize adverse impact on residents, as well as traffic on the existing road. The transportation vehicles should be required to slow down and banned from honking when passing populous residential areas; - Construction activity near residential areas should be scheduled in daytime only, and the noisy equipment should be prohibited from night operation. During construction in daytime, the construction site will be fenced; - Construction equipment should be well maintained to keep it in a best operating conditions and lowest noise levels; - For workers who must work with highly noisy machines such as piling, explosion, mixing, etc., ear pieces should be provided for noise control and workers protection; - Although construction will be banned in night time some may still occur for technical and other reasons (e.g., bridge piles required continued, around clock concrete pouring). If the work is occurred in the night time and near villages and other residential areas, which would result in particularly significant impacts, special measures (such as use of noise barriers) should be taken into consideration to mitigate impact of noise and vibration; - Notice boards will be erected at all construction sites providing information about the project, as well as contact information about the site managers, environmental staff, telephone number and other contact

Item	Mitigation measure
	information so that any affected people can have the channel to voice their concerns and suggestions.
e) Construction waste	<ul style="list-style-type: none"> - Analysis of toxic material of soil to be excavated; - Utilization of excavated soil through recycling within the project; - Contracting out treatment / dumping / recycling of residual soil depending on soil quality; - Contracting out treatment / dumping / recycling of construction waste; - Measures for treatment / dumping / recycling carried out by the contractors should be monitored and supervised by the ESC.
f) Wastes from worker camps	<ul style="list-style-type: none"> - Obligate contractors to contract out collection of domestic waste from workers residents for appropriate treatment; - Obligate contractors to comply with Vietnamese standards for sewage emission from workers residents; - Obligate contractors to report measures taken for appropriate treatment of waste and sewage from workers residents.
g) Infectious diseases from workers	<ul style="list-style-type: none"> - Obligate contractors to duly implement the HIV/AIDS Prevention Plan during construction stage; - Obligate contractors to prepare and execute the health education plan for construction workers; - Obligate contractors to periodically report about the health education activities carried out by the contractors; - ESC shall monitor execution on health education activities carried out by the contractors; - Periodical reporting and consultation on health education activities to local health authorities.
Operation phase	
a) Ambient air quality	<ul style="list-style-type: none"> - Carry out monitoring of ambient air quality; - Carry out regular maintenance of road and bridge pavement. Spray water regularly on road surface at least 10 days/time in dry season; - Forbid trucks with over-emission from using the road; - Take care of trees and landscape along the road.
b) Surface water quality	<ul style="list-style-type: none"> - Build up two retention ponds nearby the road, one close to the Ninh Tiep Hamlet, and one close to the Trung Hamlet, where polluted water run-off from road and bridge is collected and treated by specific processes before being discharged into the surface water body. Class B of Integrated Standard for Wastewater Discharge QCVN 08:2008/BTNMT will be applied for wastewater discharge into river; - Regularly clean up the road and bridge (about 10 days/time) to mitigate runoff of polluted water to surrounding surface water body; - The leaky or uncovered truck will be forbidden from the road; - The wastewater system installed in the service zone / parking area near the terminal of Got Ferry will be maintained regularly.
c) Noise and vibration	<ul style="list-style-type: none"> - Take care of trees planted along the road, and grasses planted at the road slope surfaces; - Install warning signs on road for honking bans and speed control at the road sections close to residential areas of Trung Hamlet and Ninh Tiep Hamlet;