

Environmental Supervision Report

Semi-Annual Report
July 2011

VIE: Ho Chi Minh City–Long Thanh–Dau Giay Expressway Construction Project

Prepared by Vietnam Expressway Corporation for the Ministry of Transport and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 1 July 2011)

Currency unit	–	dong (D)
D1.00	=	\$0.000048
\$1.00	=	D20,526

ABBREVIATIONS

ADB	–	Asian Development Bank
CSC	–	construction supervision consultants
DONRE	–	Department of Natural Resources and Environment
EIA	–	environmental initial assessment
EMP	–	environmental management plan
GOV	–	Government of Vietnam
h	–	hour
ha	–	hectare
HCMC	–	Ho Chi Minh City
HLD	–	Ho Chi Minh-Long Thanh-Dau Giay
JBIC	–	Japan Bank for International Cooperation
JICA	–	Japan International Cooperation Agency
km	–	kilometer
L	–	liter
m	–	meter
mg	–	milligram
MONRE	–	Ministry of Natural Resources and Environment
TSP	–	total suspended solids
VEC	–	Vietnam Expressway Corporation

NOTE

In this report, "\$" refers to US dollars unless otherwise stated.

This environmental monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.



THE SOCIALIST REPUBLIC OF VIET NAM
MINISTRY OF TRANSPORT
VIETNAM EXPRESSWAY CORPORATION
HOCHIMINH – LONG THANH – DẦU GIAY EXPRESSWAY
PROJECT MANAGEMENT UNIT (HLD EPMU)



North-South Expressway Construction Project
Hồ Chí Minh City - Dầu Giây Section (CS)

LOAN NO. VNXV-1



SEMI-ANNUAL ENVIRONMENTAL SUPERVISION REPORT

(January 2011 – June 2011)

July 2011

Consortium of
Nippon Koei Co., Ltd
TEDI South

TABLE OF CONTENTS

1. Introduction.....	1
1.1. Report purpose.....	1
1.2. Project Implementation Progress and Change in Project Scope.....	2
1.2.1. Implementation Progress.....	2
1.2.2. Changes in project scope.....	3
2. Incorporation of Environmental Requirements into Project Contractual Arrangements.....	4
3. Summary of Environmental Mitigations and Compliance with EMP	6
4. Summary of Environmental Monitoring.....	15
4.1. Environmental Monitoring by CSC.....	15
4.1.1. Monitoring program.....	15
4.1.2. Monitoring Result	19
4.2. Environmental Monitoring by Contractors.....	25
4.2.1. Monitoring Program.....	25
4.2.2. Monitoring Result	26
4.3. Assessment of Monitoring Results	31
5. Environmental and Training and Orientation.....	31
6. Key Environmental Issues	32
6.1. Key Issues Identified	32
6.2. Action Taken	34
6.3. Additional Action Required	34
7. Conclusion and Recommendation	35
Appendix 1. Map of Sampling locations	37
Appendix 2. Photos of Environmental Monitoring and Supervision.....	39

1. Introduction

1.1. *Report purpose*

In the surrounding area of Ho Chi Minh City (HCMC), the traffic volume has long been over the capacity of road. It is foreseen that the demand of traffic in HCMC and Dong Nai area where industrial development has been recently significant with the planned development of industrial zones and the international airport will increase significantly. The Government of Vietnam (GOV) has decided to construct the HCMC – Long Thanh - Dau Giay Expressway (HLD Expressway) with the assistance from Asian Development Bank (ADB) and Japan Bank for International Cooperation (JBIC), which was currently named as Japan International Cooperation Agency (JICA) by integrating with previous JICA. The express way was divided into two portions such as HCMC – Long Thanh funded by JICA and Long Thanh - Dau Giay funded by ADB.

Ho Chi Minh –Long Thanh –Dau Giay Expressway crosses thinly population density areas such as agricultural land and some high population density areas. EIA has been implemented for environmental and social consideration according to the Vietnamese environmental law and regulations and JBIC and ADB guidelines for Environmental and Social Considerations and Regulations.

Implementation of Environmental Management Plan (EMP) during construction and post-construction stages is necessary for sustainable development as well as to ensure the environmental protection in the road construction project.

The main purpose of the environmental supervision report (January 2011 – June 2011) is to summarize the environmental supervision activities by Construction Supervision Consultants (CS Consultants) during the period of January 2011 – June 2011 to support VEC to prepare environmental supervision reports to JICA (previous JBIC), ADB as well as to prepare them to other agencies.

The main objectives of this environmental supervision report are follows;

- Grasp the general environmental condition
- Identify the environmental impacts during the construction period and propose mitigation measures
- Summarize the result of environment inspection during construction period.
- Implementation of environmental monitoring in pre-construction and during construction stages

1.2. Project Implementation Progress and Change in Project Scope

1.2.1. Implementation Progress

The construction progress of each package as of June 2011 is described as follows

Package 1a:

Bored pile construction

- 862 nos of piles were casted (84 % of 1028piles in total)..
- Super T girder fabrication/erection:
- 184 nos were fabricated (22 % of 840 girders in total).
- 70 nos were erected (8.3 % of 840 girders in total).

Pier Construction

- 99 pile caps were casted (58 % of 170 pile caps in total).
- 92 pier columns were casted (54 % of 170 columns in total).
- 43 cross heads were casted (26 % of 168 cross heads in total).

Embankment works from Km4+000 to Km4+231 are on going:

- Approx. 80 % of backfilling completed.
- Surcharge for left side on going. Backfilling 4th layer for right side on going

Package 1b:

Bored pile construction

- D1200: 745 piles were completed (78.9% of 944 piles in total); 91 piles cast in June
- D1500: 31 piles were completed (45.6% of 68 piles in total); 11 plies cast in June

Super T girder fabrication: 29 girders were fabricated (3.7% of 791 girders in total); 10 girders fabricated in June.

Pier construction:

There were total 30.8% of sub-structure completed up to now. The detail as follows:

- Pile cap: 55 nos (33.5% of 164 nos in total); 4 nos cast in June
- Pier column: 54 nos (32.9 of 164 nos in total); 7 nos cast in June
- Crosshead: 45 nos (2.7% of 164 nos in total); 7 nos cast in June

Road works: PVD installation was completed. Sand filling/compaction for embankment and surcharge is going with 3rd layer.

Package 2:

Bored pile construction

- D1200: total 265/444 (60%). HCM: 217/217 (100%). Dong Nai: 48/227 (21%).
- D2000: 10/102 (9.8%)

Super T girder fabrication: HCM: 3/160 (1.8%).

Pier construction:

- Pile cap: 20/48 (42%).
- Pier column: 13/48 (27%).
- Head stock: 11/41 (26.8%).

Embankment works at HCM: Sand blanket=100%. PVD installation=100%.
Embankment for H1 = 11%.

Package 3:

Bridge Works (5 bridges out of 7 bridges are in progress)

- Nuoc Trong Bridge (2nd bridge from beginning point). RC piling works : 307 / 812 piles driven (37.81%)
- Ngon Cung Bridge (3th bridge). RC piling works : 111 / 288 piles driven (38.54%)
- Hang Dieu Bridge (4th bridge). RC piling works : 92 / 212 piles driven (43.40%)
- Dong Mon Bridge (5th bridge): RC piling works : 932 / 932 piles driven (100%), Pile cap : 11 / 32 pile cap casted (34.38%); Pier Column : 11 / 32 pier column casted (34.38%); Head stock : 08 / 28 head stock casted (28.57%); Super T girder : 30/150 super T casted (20.00%)
- Long Thanh Flyover Bridge: Bored pile : 71 / 160 bored piles completed (44.37%); Pile cap : 06 / 26 pile cap casted (23.08%); Embankment works

Embankment (up to working platform elevation for soft soil treatment): 95.3% completed.

VCM trial section: Monitoring is in progress (settlement plates, inclinometers, piezometers).

DMM: (Section 11): 12.769m/147.920 m = 11.32% completed

1.2.2. Changes in project scope

HLD Expressway construction project with total length of about 55km, is divided into

2 parts; Part 1: From An Phu Intersection (beginning point) to Ring Road 2 intersection (Km4+000) will be constructed as urban road. This section is funded by Hochiminh City People Committee; Part 2: From Ring Road 2 intersection (Km4+000) to Dau Giay Intersection (ending point). The Project scope is summarized in following table.

Table 1. Project Scope

Section	Distance (Km)
Ring Road 2 intersection to NH-51 interchange (JICA portion); KM.4+000 to KM.23+900	19.900 km
NH-51 interchange to Dau Giay interchange (ADB portion); KM.23+900 to KM.54+982	31.082 km
Total	50.982 km

Change in project scope:

Pk1a: at approach road, counter berm was changed into reinforced geological cloth

Pk1b: no change

Pk2: Vacuum consolidation method for soft soil in Ho Chi Minh side was changed into PVD and surcharge

Pk3: Change in construction method at soft soil section are under review

The above change do not add more impacts to the environment, therefore supplementary mitigations are not required.

2. Incorporation of Environmental Requirements into Project Contractual Arrangements

Environmental requirements were incorporated into Volume 3. General Specification of contract document. Which requires the construction contractors comply with environmental regulations and protection as summarized below

- The Contractor shall submit an Environmental Management Plan detailing how he intends to comply with applicable local laws and regulations concerning protection of the environment and the attached specification for environmental monitoring.
- The contractor shall implement environmental monitoring program which shall be implemented in two phases: prior to the start of construction and during construction. The first phase is required to provide baseline data on environmental quality in the Project area, in particular for houses adjacent to areas of the works. Monitoring programs in the construction phase are required to collect data and evaluate the impact of the Project and the effectiveness of the Contractor's mitigation measures.

- The Contractor shall strictly comply with Vietnamese Laws and Standards regarding the environment on all works associated with the Contract.
- The Contractor shall be responsible for implementing and managing mitigation measures during the construction of the Works. The recommended mitigation measures including measure for air quality, noise and vibration, water environment, waste management, impacts on traffic.

Implementation arrangement of EMP

The EMP including the explanation of baseline condition at pre-construction and potential impacts and mitigation measures at construction stage and operation stage

EMP has been prepared to monitor the environmental impacts and implement the appropriate mitigation measures during construction and operation stages as required in the EIA. The frameworks of management are described in the following figure.

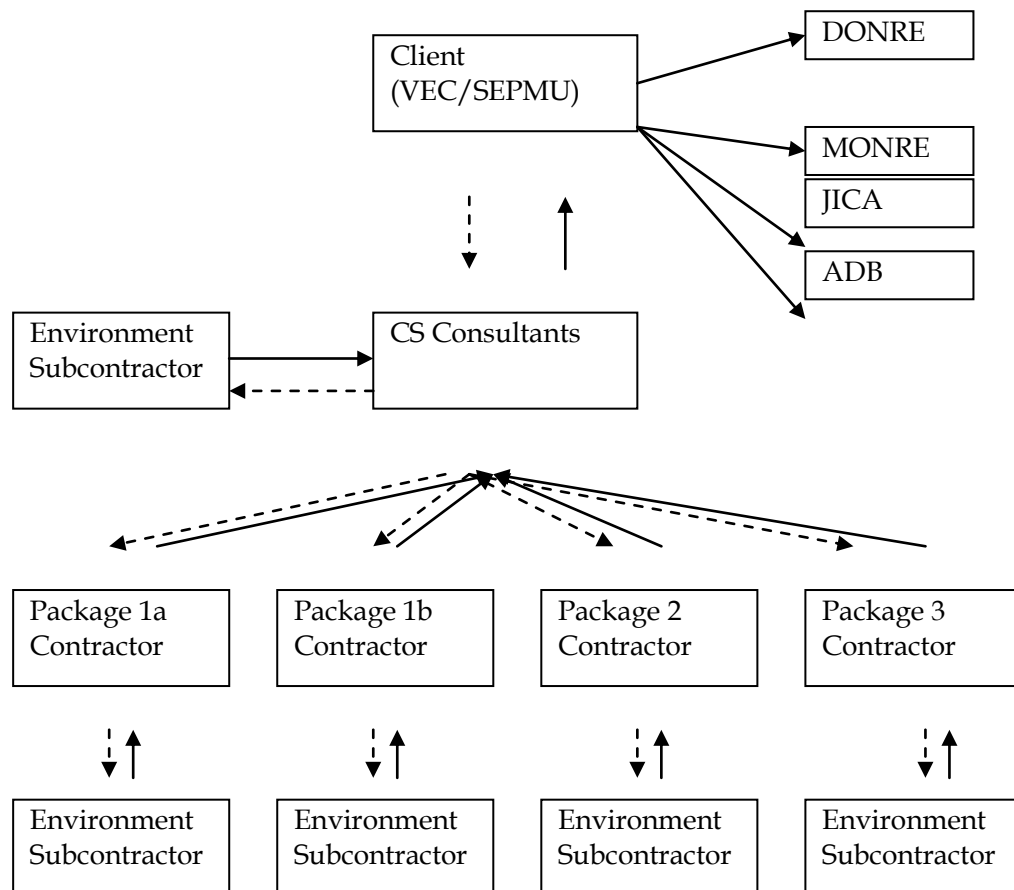


Figure 1. Framework of organizations regarding environmental management

3. Summary of Environmental Mitigations and Compliance with EMP

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
1. Over-all Prepare and implement a site-specific EMP	Fair	Site EMPs were not sufficient	SEMPs were revised and submitted in July 2011 for approval
2 Air quality Construction activities			
<p>No burning of debris or other materials will occur on the site. Dust suppression measures will also be used, including covering and wetting loads, limiting the speed for vehicles transporting construction materials, and watering roads and other open areas regularly. In residential areas, 3m high fences of iron sheets of fibreboards are used around construction sites to minimize dust</p> <p>Dust suppression measures including but not limited to the following will be implemented:</p> <p>Stockpiles of sand and aggregate greater than 20 cubic meters for use in concrete manufacture shall be enclosed on three sides, with walls extending above the pile and two (2) meters beyond the front of the piles. Locations should be indicated by the accompanying site plan(s).</p> <p>Effective water sprays shall be used during the delivery and handling of all raw sand and aggregate, and other similar materials, when dust is likely to be created and to dampen all stored materials during dry and windy weather.</p> <p>Conveyor belts shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. All conveyors carrying materials that have the potential to create dust shall be totally enclosed and fitted with belt cleaners. Locations should be indicated by the accompanying site plan(s).</p> <p>Areas of reclamation shall be completed, including final compaction, as quickly as possible consistent with good practice to limit the creation of wind blown dust.</p> <p>Construction walls will be provided in all locations where strong winds could blow dust and debris. In residential areas, such as An Phu and Long Than towns, build 3m high fences with fiberboards and iron sheets to minimize dust.</p>	Fair	Dust concentration at Truong Luu road and Nguyen Duy Trinh street is high	Truong Luu road was upgraded in January 2011 and water is regularly sprayed to prevent dust
Vehicle operation All roads within the construction areas of the site shall be watered at least twice each day, and more if necessary to control dust to the satisfaction of the ESO. Areas within the site where there is a regular movement of vehicles shall have an acceptable hard surface and be kept clear of loose surface material. Locations should be	Very good		

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
<p>indicated by the accompanying site plan(s).</p> <p>Ensure that vehicles and machinery are used and maintained properly to meet applicable emission standards. Fuel-efficient vehicles shall be preferred.</p> <p>All vehicles, while parked on the site, will be required to have their engines turned off.</p> <p>Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards.</p> <p>Ensure that employees are trained on the proper use and maintenance of machinery and vehicles. Use dust suppression measures: cover and wet loads, limit the speed for vehicles transporting construction materials, select suitable transport routes and vehicles, and water roads and other open areas regularly. Limit traffic congestion through planning of transportations in coordination with local officials.</p> <p>Conduct regular site inspections to ensure the use of best practices and report any complaints from local people.</p>			
<p>Crushing, concrete and asphalt plant operation</p> <p>Dust nuisance as a result of its activities will be avoided. An air pollution control system shall be installed and shall be operated whenever the plant is in operation.</p> <p>Install a three-sided roofed enclosure with a flexible curtain across the entry where dusty materials are being discharged to vehicles from a conveying system at a fixed transfer point. Install exhaust fans for this enclosure and vented to a suitable fabric filter system.</p> <p>Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin in good condition.</p> <p>The concrete batching plant and crushing plant sites and ancillary areas will be frequently cleaned and watered to minimize any dust emissions. The plants shall not be located within 1000 m of settlements, schools, health facilities and other sensitive sites. Provide VEC and PSC a map on the location of plants prior to the beginning of construction works for approval. Dust suppression and other air pollution control measures shall be used in the plants to minimize emission levels</p> <p>Dry mix batching shall be carried out in a totally enclosed area with exhaust to suitable fabric filters.</p> <p>All equipment and machinery on the site will be checked at least weekly and all necessary corrections and or repairs made to ensure compliance with safety and air pollution requirements.</p>	Fair	<p>The concrete batching plan of package 1a is located around 300m from the residential area.</p>	<p>The operation of the batching plant shall be supervised closely to avoid impacts of wastewater on the environment. Corrected day: from June 2011</p>
<p>3 Water quality</p> <p>Wastewater from mixing materials will be drained to a separate collecting system, and processed by sediment traps before release to the public drainage system.</p> <p>Mud from drilling will be collected and processed to avoid pollution of surface water.</p>	Poor	<p>Sedimentation tanks of wastewater treatment facilities were not dredged regularly. That effected the treatment of cement-laden</p>	<p>Sedimentation tanks shall be daily dredged, corrected day from 1 June 2011</p>

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
<p>Drilling solutions for performing the abutment will be processed in a closed system, especially for abutments at the riverbed.</p> <p>Inner-lined drill holes will be used during piling.</p> <p>Proper drainage systems will be provided at all construction, material exploitation, and storage sites. All existing stream courses and drains within, and adjacent to, the site will be kept safe and free from any debris and any excavated materials arising from the works. Chemicals, sanitary wastewater, spoil, waste oil and concrete agitator washings will not be deposited in the watercourses</p> <p>All water and waste products arising on the site will be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance. The Contractor will ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities.</p> <p>Hygiene bathrooms will be set up at all construction camp sites and septic tanks will be used to treat wastewater. Proper drainage will be provided to avoid creation of stagnant water bodies.</p> <p>Extraction of sand and gravel in river beds will be prohibited except (i) where there is no technically and economically feasible alternative, and (ii) provided specific mitigation measures are implemented to minimize impacts on river morphology, water quality (e.g. turbidity), and ecosystems (e.g. reduced extraction during fish spawning period).</p> <p>Equipment and vehicle maintenance area will be provided with adequate drainage facility as well as oil and grease separator to avoid discharge of oil-laden water into the surrounding soil and water courses.</p> <p>Drainage works will be constructed, maintained, removed and reinstated as necessary and all other precautions taken, as necessary, for the avoidance of damage by flooding and silt washed down from the works. Adequate precautions will be taken to ensure that no spoil or debris of any kind is allowed to be pushed, washed down, fallen or be deposited on land adjacent to the site. Stockpiles will not be located near rivers and streams. Dumping of spoils and obstruction of flows along rivers and streams will be avoided.</p> <p>Downstream slopes will be stabilized, where warranted, with concrete, rock gabions or walls to avoid erosion.</p> <p>Prepare emergency response plan in case of fuel and chemical spills</p>		wastewater	
<p>4 Loss of water resources</p> <p>Any source of water (potable or otherwise) for the community, such as wells, ponds or tube wells, accidentally lost will be replaced immediately. The location and sitting of the replaced source of water will be as per design or as directed by the engineer. In general,</p>	Very good		

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
there should be only lateral displacement (of the new site from the old); the replacement will be ready prior to demolition/dismantling of the existing source.			
<p>5 Noise and vibration</p> <p>Vehicles and machinery must be used, maintained and equipped so as to avoid unnecessary noise and vibration.</p> <p>Plants must be located away from sensitive areas and noisy construction work, such as crushing, concrete mixing and batching must be done during daylight hours.</p> <p>Use of machines causing loud noise and vibration (drill, excavator etc.) is prohibited between 23 pm and 5 am. If night-time construction is necessary, the contractor will apply for a permit from local authorities and inform residents about coming works beforehand.</p> <p>At residential areas, temporary noise walls or boards will be used to minimize noise impacts from construction activities near schools, temples, clinics etc. The contractor will specify the locations and type of temporary noise walls before beginning of construction.</p> <p>Ensure that local authorities and residents are notified in advance about disturbing activities, such as blasting operations. The effectiveness of mitigation activities will be monitored regularly through noise level measuring.</p> <p>Be responsible for repairing any damage caused as the result of vibrations generated from or by the use of his equipment, plant, and machinery.</p> <p>Erect temporary noise barriers where schools and other potentially sensitive receptors (as identified during consultation with local residents) are within 50 meters of construction activities. Temporary barriers of sufficient height with skid footings and a cantilevered upper portion will be erected within a short distance from stationary plants, and at practicable distances from mobile plants.</p> <p>The minimum effective height of the noise barriers should be as such that no part of the noise sources associated with the operation of construction machinery should be visible from the target receptors to be protected. The locations of the temporary noise barriers shall be adjusted where and when necessary taking into consideration the locations and type of receptor involved and the machinery intended to be protected. Use of the proposed noise barriers, as other construction site equipment, should take into account the following standard requirements:</p> <p>A minimum of 4.5 meter wide thoroughfare with not less than 4.5 meter vertical clearance to be maintained at all times for the free passage of fire appliances;</p> <p>The barrier shall not be located where it prevents access to community facilities, residential areas, and places of work or access routes.</p> <p>Ensure that the use of noise sources (i.e., aggregate crushers, operators, etc.) will be avoided as much as possible near sensitive receptors. Non-vibratory rollers (for compaction) will be used near sensitive receptors such as schools and cultural resources.</p>	Good		

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
<p>Ensure that all exhaust systems will be maintained in good working order; properly designed engine enclosures and intake silencers will be employed; and regular equipment maintenance will be undertaken.</p> <p>Ensure that stationary equipment will be placed as far from sensitive land uses as practical; selected to minimize objectionable noise impacts; and provided with shielding mechanisms where possible.</p>			
<p>6 Waste</p> <p>Waste from construction activities, including the demolishing of structures before the construction itself begins, must be collected and recycled when possible.</p> <p>The contractor will establish hygienic groups to collect waste from construction camp sites and to ensure the cleanliness of the whole construction area. The contractor will also co-operate with local authorities or companies to organize the waste collection and specify the measures in the site-specific EMP.</p> <p>The EMP will be updated during detailed design and will require that contractors be responsible for spoil disposal in a manner consistent with a site-specific EMP that they will be required to prepare prior to any construction work. Spoils from the works will only be disposed of in selected locations to avoid any adverse impacts to water or soil quality. The locations will be specified by the contractor in the site-specific EMP before the beginning of construction activities. The contractor shall also obtain permission from the authorities to dispose any surplus material or other spoils from the works.</p>	Fair	<p>Construction and domestic wastes were haphazardly dumped in package 1a, 3</p> <p>The construction activities made the intersection with Nguyen Duy Trinh street dirty</p>	<p>The waste were already cleaned and garbage bins were equipped to collect the wastes. Corrected day: 10 June 2011</p> <p>Hygienic workers were arranged to collect waste at this area, from January 2011</p>
<p>7 Handling of hazardous and toxic materials</p> <p>During the construction, fuels, oil, and other dangerous chemical substances will be transported, stored and handled at the site. If adequate mitigation measures are not used, there is a risk of spills into the surrounding area. The contractor will apply for appropriate permits for the transport and handling of hazardous materials and prepare an emergency and contingency plan for fuel and oil spillage. Fuel storage sites will be located away from water bodies on a cement pavement with a surrounding canal leading to an oil and grease separator to facilitate the capture and removal of spilled oil. The contractor also ensures that employees are trained on handling hazardous materials.</p> <p>Fuel storage sites will be located away from water bodies on a cement pavement with embankment. A canal leading to an oil and grease separator will be installed to facilitate the capture and removal of spilled oil.</p> <p>Use and maintain vehicles and machinery properly to avoid accidental spills.</p>	Very good		
<p>8 Soil</p> <p>Contamination of soil</p> <p>Use good housekeeping practices to avoid any contamination of soil from solid wastes, wastewater and</p>			

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
hazardous materials. All wastes shall be disposed in designated disposal sites approved by local authorities. Ensure all workers are aware of the importance of careful handling of hazardous and dangerous materials. Prepare emergency plans for accidents.	Very good		
Spoils disposal Waste from construction activities, including the demolishing of structures before the construction itself begins, must be collected and recycled when possible. Establish hygienic groups to collect waste from construction camp sites and to ensure the cleanliness of the whole construction area. Spoils from the works will only be disposed of in selected locations approved by local authorities. Disposal shall not cause adverse impacts to water and soil quality as well as land use. The locations of spoils disposal sites will be specified by the contractor in the site-specific EMP before the beginning of construction activities.	Poor	Bentonite leaking and excavated material dumped into the rivers occurred	The contractor immediately stopped the disposal into the river. Barges are arranged at construction of bored piles on rivers to collect and transport excavated soil to appropriate places. Corrected day: from 1 June 2011
Erosion Provide temporary or permanent drainage to protect sites susceptible to erosion. Stabilize downstream slopes on rivers and streams prone to erosion problems. Protect sensitive surface/erosion prone sites with vegetation and replace removed trees to ensure interception of rainwater and deceleration of surface runoff as soon as possible after construction works. On streams, downstream slopes can be stabilized with concrete, rock gabions or walls as seen necessary. Careful stockpiling of topsoil in suitable locations to prevent these from being washed away. Specify the erosion protection measures to be used in the site-specific EMP	Very good		
9 Loss of vegetation cover Minimize the clearing of vegetation for construction activities and borrow areas. Re-vegetate embankment slopes and road cuts. Landscape road verges and plant vegetation to contribute to aesthetic value. Where roadside trees are lost as a result of construction activities, the Contractor shall replant trees as a ratio of one-to-one. Where trees cannot be replaced at the roadside due to a lack of roadside space, the Contractor shall consult with	Very good		

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
<p>affected residents to determine an appropriate alternative planting location and schedule.</p> <p>The Contractor will be responsible for all works associated with tree planting including maintenance of the trees for a one-year period after planting.</p>			
<p>1. Changes in Hydrological Situation and Irrigation systems</p> <p>Temporary drainage will be established along the expressway to avoid inundation during construction. The contractor shall ensure that activities shall not cause disruption of irrigation into surrounding croplands and that damaged irrigation facilities shall be repaired immediately.</p> <p>The Contractor shall ensure irrigation channels diverted during the construction phase will be returned to their original status. Where this is not possible, or where channels are irrevocably altered, consultation will be held with landowners to ensure that an adequate redesign is undertaken to ensure that irrigation channels are returned as closely as possible to their former layout. The Contractor will undertake all necessary works to achieve this status, including provision of labor.</p>	Fair	Few sections were mudded in rainy season.	Drainage was made for flowing inundated water and the mud shall be regularly removed. Corrected day: from 10 June 2011
<p>2. Traffic conditions and use of waterways</p> <p>Contractor to formulate and implement a traffic management plan minimizing the disturbance caused by construction activities. The plan shall explain the means and methods to be taken for proper and adequate control of traffic during the course of the Works. This plan shall include but not be limited to the traffic control equipment the Contractor proposes to use for the Works; traffic control signage including location and sign descriptions; how and when the Contractor proposes to use traffic control flag men; traffic control means during no-working periods; and traffic control means and devices for night and off-hour periods.</p> <p>The contractor shall also ensure implementation of the following measures: that the traffic management plan shall comply with the traffic control provisions with regard to:</p> <ul style="list-style-type: none"> a. General traffic management requirements b. Temporary road works c. Traffic control d. Number of lanes for traffic control e. Half-width construction f. Extraordinary traffic g. Vertical clearance h. Materials for traffic control devices <p>In order to facilitate traffic through or around the Works, or wherever ordered by the ESC, the Contractor shall erect and maintain at prescribed points on the Works and at the approaches to the Works, traffic signs, lights, flares, barricades, rubber cones with traffic lamps, temporary signaling stations on river. and other facilities as necessary or required by the ESC for the proper direction</p>	Good		

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
<p>and control of traffic.</p> <p>As necessary for proper control of traffic or when/ where directed by the ESC, the Contractor shall furnish and station competent flagmen whose sole duties shall consist of directing the movement of traffic through or around the Works.</p> <p>Furnish and erect, within or in the vicinity of the project area, such warning and guide signs as may be necessary or ordered by the ESC.</p> <p>In order to minimize disruption to traffic flows the Contractor shall enclose the site with temporary fence to provide a visual barrier between his work and adjacent traffic. The temporary fence shall be two meters high and the movement of men, materials and plant into and out of the barrier area shall be controlled by flagment</p> <p>Organize temporary means of access to avoid such short-term negative impacts. Maintain local roads and bridges used by construction vehicles.</p>			
<p>3. Historic and Cultural Resources</p> <p>Protect sites of known antiquities, historic and cultural resources by the placement of suitable fencing and barriers.</p> <p>Not locate construction camps within 500 meters from cultural resources.</p> <p>Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Vietnam.</p> <p>In the event of unanticipated discoveries of cultural or historic artifacts (movable or immovable) in the course of the work, the Contractor shall take all necessary measures to protect the findings and shall notify the ESC / ESO and concerned provincial-level and central government level representatives. If continuation of the work would endanger the discovery, work shall be suspended until a solution for preservation of the artifacts is agreed upon.</p>	Very good		
<p>13. Utilities</p> <p>Ascertain and take into account, in the method of working, the presence of utility services on and in the vicinity of the site.</p> <p>Take into account the periods required to locate, access, protect, support and divert all utility services, including any periods of notice required to affect such work in consultation with authorities operating such services.</p> <p>Assume all responsibility to locate or to confirm the details and location of all utility services on or in the vicinity of the project site.</p> <p>Exercise the greatest care at all times to avoid damage to or interference with services.</p> <p>The contractor shall assume responsibility for any</p>	Very good		

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
<p>damage and/or interference caused by them, their agents, directly or indirectly, arising from actions taken or a failure to take action, and for full restoration of the damage.</p> <p>Wherever existing ground surfaces are to be disturbed for construction of the works, carry out full and adequate preliminary investigations to locate all services in the area by means of hand-dug trial holes and trenches in combination with electronic and electro-mechanical devices, where appropriate. Each service thus exposed shall be identified. Every service at risk shall be fully exposed and adequately protected and supported in situ or diverted to the satisfaction of the appropriate authority prior to the commencement of such construction.</p> <p>When working in the vicinity of overhead power cables, ascertain and satisfy safety requirements about the safe clearances to be maintained from the power cables in consultation with the authority operating the power line. Where existing overhead power lines, communications cables or other major utilities require relocation, the Contractor will use the services of specialist enterprises with the necessary skills and technology to carry out the work.</p> <p>The Contractor will consult with Provincial Departments of Transportation (PDOTs) to determine the proposed schedule for future utilities works on the Project Road. If such works, i.e. cable laying, is proposed in the near future the Contractor should propose an appropriate works schedule to synchronize such activities and reduce potential disruption.</p>			
<p>14. Safety</p> <p>Ensure that safety, rescue and industrial health matters are given a high degree of publicity to all persons who are regularly or occasionally on the site. Posters, in both Vietnamese and English, drawing attention to site safety, rescue and industrial health regulation shall be made or obtained from the appropriate sources and shall be displayed prominently in relevant areas of the site.</p> <p>Basic medical care shall be provided at camp sites. A fully equipped first aid base shall be set up. Arrangements for emergency medical services shall be made to the satisfaction of the ESC and ESO. Workers shall be provided with potable water supply and appropriate protective equipment. Work camps shall be provided with facilities to ensure the safety of workers, e.g., fire-fighting equipment, adequate storage for hazardous materials, and contingency measures in case of accidents.</p> <p>Borrow pits shall be constructed with proper drainage to prevent the creation of mosquito-breeding sites. Upon completion of extraction activities, the contractor will restore borrow pits through dewatering and installation of fences, as appropriate, to minimize health and safety risks. Borrow pits will be left in a tidy state with stable side slopes and proper drainage in order to avoid creation of stagnant water bodies.</p> <p>Contractors shall ensure that blasting activities shall not cause damage to lives and properties by making sure</p>	Fair	<p>Some workers without PPE were observed on site</p> <p>Few excavated holes in pile construction in package 1a, 1b were not backfilled</p> <p>Safe access way and handrail for workers were</p>	<p>This violation was immediately corrected on site. Corrected day: 1 June 2011 The contractor organized a safety meeting and persons in charges were reminded to closely supervise the safety.</p> <p>The contractors were requested to immediately backfill these holes after finishing pile construction and safety fence was setup around these holes during construction.</p> <p>The contractors were requested to stop the work</p>

Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
<p>that the area is clear, adequately warning people using sirens and other appropriate means, and stopping at a safe distance in case blasting is near the road.</p> <p>Implement a Safety Training Program consisting of:</p> <p>(a) Initial Safety Induction Course</p> <p>(b) Periodic Safety Training Courses</p> <p>(c) Safety Meetings</p> <p>(d) Safety Inspections</p> <p>(e) Safety Equipment and Clothing</p>		not properly set up in package 1a, 1b	immediately (Package 1a on 16 June 2011 and package 1b on 17 ^h March 2011). The contractors only resume the work after proper safe access way and handrail were set up
<p>15. Social impacts Consultation and Complaints Procedures</p> <p>Provide local communities information on upcoming construction related activities and issues related to traffic safety.</p> <p>Record any complaints received and respond to them promptly.</p> <p>Co-operate with local authorities to prevent and solve problems related to environmental issues.</p>	Very good		

Note:

1. Very good: mitigations are fully effective
2. Good: mitigations are generally effective
3. Fair: mitigations are partially affective
4. Poor: mitigations are generally ineffective
5. Very poor: mitigations are completely ineffective

4. Summary of Environmental Monitoring

4.1. Environmental Monitoring by CSC

4.1.1. Monitoring program

(1) Monitoring Items

Monitoring items include air quality, noise, vibration, surface water quality, groundwater quality, soil and wastewater (The detail is described in section 5.1 Environmental Monitoring).

(2) Environmental reference standards

The environmental standards to be referred were updated in line with recent Vietnamese standards from the EMP as follows.

Table 2. Environmental standards

No	Environmental component	Environmental standard
1	Air quality	QCVN 05:2009/BTNMT “ National Technical Regulation on ambient air quality” QCVN 06:2009/BTNMT “ National Technical Regulation on hazardous substances in ambient air”
2	Noise	QCVN 26:2010/BTNMT – National technical regulation on noise
3	Vibration	QCVN 27:2010/BTNMT – National technical regulation on vibration
4	Surface water	QCVN 08:2008/BTNMT “ National Technical Regulation on surface water quality”
5	Ground water	QCVN 09:2008/BTNMT “ National Technical Regulation on groundwater quality”
6	Soil	QCVN 03:2008/BTNMT “ National Technical Regulation on soil quality”
7	Industrial Wastewater	QCVN 24:2009/BTNMT “National Technical Regulation on industrial waste water”
8	Domestic wastewater	QCVN 14:2008/BTNMT “National Technical Regulation on domestic waste water”

(3) Monitoring Locations

Monitoring locations of air, noise, vibration, surface water, groundwater and soil are selected for most affected areas during construction and operation stages. The monitoring of wastewater will be carried out during only construction stages for affected area. The monitoring locations are summarized as following table. Map of sampling location is presented in the Appendix 1.

Table 3. Monitoring locations

Location	Sample No	Pk1a	Pk1b	Pk2	Pk3
Air, Noise, Vibration 1. Intersection Nguyen Duy Trinh Str with HLD Expressway	A1	6+150			

Location	Sample No	Pk1a	Pk1b	Pk2	Pk3
2. Truong Khanh Shrine (Near Residential Area)	A2			11+300	
3. Long Thanh town near NH51	A3				23+300
Surface Water					
1. Ong Nhieu river (Ong Nhieu bridge)	SW1-1, SW1-2	7+100			
2. Tac river (Song Tac bridge)	SW2-1, SW2-2		10+400		
3.					
4. Dong Nai river (Long Thanh bridge)	SW3-1, SW3-2			12+600	
5. Dong Mon bridge (Dong Mon river)	SW4-1, SW4-2				21+350
Groundwater					
1. Tan Dien A Hamlet – Phu Huu (District 9)	GW1-1, GW1-2, GW1-3	5+250			
2. Long Phuoc Ward, near Dong Nai river	GW2-1, GW2-2, GW2-3		10+400		
3. Long Thanh Town	GW3-1, GW3-2, GW3-3				23+300
Soil					
1. Phu Huu Ward, District 9, HCMC (Land bank)	S1-1, S-2, S1-3	4+200			
2. Truong Khanh ward, district 9	S2-1, S2-2, S2-3			11+300	
3. Long Thanh Town	S3-1, S3-2, S3-3				23+300
Wastewater	WW1-1, WW1-2, WW1-3	4+350,	-	-	-

Location	Sample No	Pk1a	Pk1b	Pk2	Pk3
		4+980 5+480			
	WW2-1, WW2-2, WW2-3	-	7+900 10+300 10+500	-	-
	WW3-1, WW3-2, WW3-3	-	-	11+500 12+300 12+900	-
	WW4-1, WW4-2, WW4-3	-	-	-	18+300 19+100 21+350


(4) Monitoring Schedule

The environmental monitoring is quarterly carried out during the construction stage and semiannually during the defect liability period of operation stage. The environmental monitoring schedule described in the EMP is summarized as follows.

Table 4. Monitoring schedule

Year	Month	Package 1a	Package 1b	Package 2	Package 3
2009	12	X/1 (Initial Survey)			
2010	3	X/2	X /1 (Initial Survey)	X /1 (Initial Survey)	X /1 (Initial Survey)
	6	X/3	X/2	X/2	X/2
	9	X/4	X/3	X/3	X/3
	12	X/5	X/4	X/4	X/4
2011	3	X/6	X/5	X/5	X/5
	6	X/7	X/6	X/6	X/6
	9	X/8	X/7	X/7	X/7

Year	Month	Package 1a	Package 1b	Package 2	Package 3
	12	X/9	X/8	X/8	X/8
2012	3	X/10	X/9	X/9	X/9
	6	X/11	X/10	X/10	X/10
	9	X/12	X/11	X/11	X/11
	12	X/12	X/12	X/12	X/12
2013	3	X/13	X/12	X/13	X/13
	9	X/14	X/13	X/14	X/14
2014	3	X/15	X/14	X/15	X/15
	9		X/15	X/16	X/16
2015	3			X/17	X/17

 : Construction period (PK-1a & 1b=32 months, PK-2 & 3= 36 months)

 : Operation period (Defect liability Period=24 months)

X/No : The month when the environmental monitoring will be conducted.

4.1.2. Monitoring Result

4.1.2.1. Package 1a

Result of monitoring in March 2011

- *Air quality:* The content of dust was higher allowable value according to QCVN05:2009 from 5.3 times in the all time (2.3 times higher than previous monitoring's value).

The main reason was due to material transportation in the project site that sweep dust from the surface of the road.

- *Noise:* According to the National technical regulation on noise 26-2010:

+ 6h to 21h: Noise level was higher allowable value (3.3dBA)

+ 21h to 22h: Noise level was higher allowable value (17dBA)

In the night time, although the site was not in working condition but the noise level was also high. The noise was high due to high density of heavy loading trucks for building material transportation in this area

-*Vibration:* According to the National technical regulation on Vibration 27-2010:

- + 6h to 21h: Vibration level was lower allowable value
- + 21h to 22h: Vibration level was higher allowable value compared to the initial level measured on Dec, 2009.
- *Surface water*: All parameters met the allowable levels.
- *Underground water*:
 - + pH level at 3 underground water samples did not meet QCVN09:2008
 - + There was a sign of underground water that was contaminated by Fecal Coliform in all of three samples.
- *Soil*: All parameters satisfied the QCVN03:2008.
- *Waste water*: All parameters satisfied the QCVN24:2009.

Result of monitoring in June 2011

- *Air quality*: was higher allowable value according to QCVN05:2009 from 2.26 times (lower than previous monitoring, 1.6mg/m³ in the package 6).

The main reason was by material transportation in the project site, sweeping dust from the surface of the road. The dust content was lower than value of monitoring No. 6 because the wind velocity of this package was about 0.1 – 1.2m/s compared to the previous monitoring of 0.14 – 3.17m/s. Wind was the cause making dust to be swept by vehicles.

- *Noise*: According to the National technical regulation on noise 26-2010:

- 6h to 21h: Noise level was higher allowable value (2.4dBA)
- 21h to 22h: Noise level was higher allowable value (17dBA)

In the night time, although the site was not in working condition but noise level was also high. The noise was high causing by high density of heavy loading trucks for building material transportation in this area. Private houses living near the road (at distance of 15m) so it was possible for them to have a significant effect of noise

- *Vibration*: According to the National technical regulation on Vibration 27-2010: Vibration level was lower allowable value

- *Surface water*: - The DO contents in SW1-1; SW1-2 and SW1-3 were out of allowable value.

- SS parameter in SW1-3 was 2.3 times higher than allowable value.

- *Underground water*:

- pH level at 3 underground water samples was from 4.62 to 4.89 did not meet QCVN09:2008.

- There was a sign of underground water that was contaminated by Fecal Coliform in all of three samples.

It was not good for using this water directly because it may be harmful for construction machines.

- *Soil*: All parameters satisfied the QCVN03:2008.
- *Waste water*: All parameters satisfied the QCVN24:2009.

4.1.2.2. Package 1b

Result of monitoring in March 2011

- *Surface water*: All parameters satisfied the QCVN08:2008.
- *Underground water*:

As the previous analyzed results, parameters such as Cl-, Mn, Fe, Coliform and Fecal Coliform in the underground water were higher than allowable values.

However, the above fresh water resource was not used for domestic using but only for watering the plants and for washing vehicles...

- *Waste water*: All parameters satisfied the column B1, QCVN24:2009.

Result of monitoring in June 2011

- *Surface water*:
 - The DO contents in SW2-1; SW2-2 and SW2-3 did not meet the allowable value.
 - SS parameter in SW2-1, SW2-2 and SW2-3 were higher than allowable value.
 - All of other parameters satisfied the QCVN08:2008.

In all sites of the project, both of DO and SS contents did not meet the allowable values, this was normal phenomenon of water quality in Dong Nai river. Because of that, the construction activities did not impact on DO and SS contents.

- *Underground water*:
 - Samples GW2-1; GW2-2; GW2-3: Cl⁻ was higher allowable value (2.4 – 3.8 times). The sampled sites often have Cl⁻ content in water higher than allowable value, possibly caused by natural impacts (for salt intrusion and high conductivity).
 - Samples GW2-2 and GW2-3: Fe was higher allowable value (4.4 – 5.8times).
 - Samples GW2-1; GW2-2 and GW2-3: Mn was higher allowable value.
 - Water samples in three locations were contaminated by Fecal Coliform.

Analyzed results of underground water in package 1b showed that the concentrations of Cl⁻, Fe, Mn were always higher than allowable values. The cause may be from natural resources of the underground water in this area.

However, the above fresh water resource was not used for domestic using but only for

watering the plants and for washing vehicles.

- *Waste water*: - At W2-2: SS was higher allowable value 1.14 times.
- All of others parameters satisfied the QCVN24:2009.

4.1.2.3. Package 2

Result of monitoring in March 2011

- *Air quality*: All parameters satisfied the allowable value, except the contents of dust, the analyzed values of samples was higher than allowable values about 2.3 times, the cause may be of dry months and wind sweeps the dust from nearby construction site to monitoring location.
 - *Noise*: According to the National technical regulation on noise 26-2010 (applied for normal areas):
 - + 6h to 21h: Noise level was lower allowable value (11.5dBA)
 - + 21h to 22h: Noise level was higher allowable value (11dBA). Causing: in the time of monitoring, there were 5 motorcycles running near the location (about 50m).
 - *Vibration*: According to the National technical regulation on vibration 27-2010 (applied for a normal area):
 - + 6h to 21h: Vibration level was lower allowable value (30.5dBA)
 - + 21h to 22h: Vibration level was higher allowable value (due to the initial level measured on Mar, 2020 was very low).
- The monitoring location now has little means of transportation at a distance of within 500m. However, it now was not still to be affected by the project's activities. The noise and vibration levels were depending on the time of monitoring and number of motorcycles in the area.
- *Surface water*: All parameters satisfied the QCVN08:2008.
 - *Soil and Waste water*: All parameters satisfied allowable value.

Result of monitoring in June 2011

- *Air quality*: The contents of dust: The analyzed results were approximately with allowable value and lower than the sixth monitoring time.
- *Noise*: According to the National technical regulation on noise 26-2010 (applied for normal areas):
 - 6h to 21h: Noise level was lower allowable value (10.4dBA)
 - 21h to 22h: Noise level was higher allowable value (7.7dBA).
- *Vibration*: According to the National technical regulation on vibration 27-2010 (applied for a normal area):
 - 6h to 21h: Vibration level was lower allowable value (46.4dBA)

- 21h to 22h: Vibration level was lower allowable value (10.2dBA).

The monitoring location now has little means of transportation at a distance of within 500m. However, it now was not still to be affected by the project's activities. The noise and vibration levels were depending on the time of monitoring and number of motorcycles in the area.

- *Surface water*: In sites of SW1-1 and SW1-3: DO and SS contents did not meet the allowable values, however, it was not much higher.

All of other parameters were under according to QCVN08:2008 (Applied column B1: Used for irrigation or other purposes such as water carriage).

- *Soil*: As at S1-2 was not allowable value according to QCVN03:2008, so the cause of high concentration of As in soil may be from natural source of soil.
- *Waste water*: All parameters satisfied allowable value.

4.1.2.3. Package 3

Result of monitoring in March 2011

- *Air quality*: The content of dust was higher allowable value about 2.0 times.
- *Noise*: According to the National technical regulation on noise 26-2010 (applied for a normal area):
 - + 6h to 21h: Noise level was higher allowable value (6.4dBA)
 - + 21h to 22h: Noise level was higher allowable value (22.6dBA)
- *Vibration*: According to the National technical regulation on vibration 27-2010
 - + 6h to 21h: Vibration level was lower allowable value (23.5dBA)
 - + 21h to 22h: Vibration level was higher allowable value (due to the initial level measured on Mar, 2020 was very low).

The monitoring locations always have high dust and noise level than allowable value on both day and night times. This was caused by many means of transportation on the route, mainly heavy trucks (route Vung Tau – TP.HCM).

- *Surface water*: All parameters were under according to QCVN08:2008, except at SW4-4 sample (Coliform parameter was higher allowable value 3.2 times).
- *Underground water*: From many monitoring stages, we comment:
 - + Cl⁻ value at GW3-1 và GW3 - 2 was higher allowable value
 - + At GW3 - 2 and GW3-3: Odor was light
 - + pH value at GW3-1 and GW3-2 : making acidic water
 - + Coliform and Fecal Coliform were higher allowable value in all of three samples.

- *Soil and Waste water*: All parameters satisfied allowable value.

Result of monitoring in June 2011

- *Air quality*: The content of dust was higher allowable value about 3.6 times. The monitoring site often have dust content higher than the allowable value. The causing may be the monitoring location was near National Highway No.51 where there were many vehicles transporting goods from Vung Tau to industrial parks and on the contrary.

- *Noise*: According to the National technical regulation on noise 26-2010 (applied for a normal area):

- 6h to 21h: Noise level was higher allowable value (14dBA)
- 21h to 22h: Noise level was higher allowable value (30dBA)

- *Vibration*: According to the National technical regulation on vibration 27-2010

- 6h to 21h: Vibration level was lower allowable value (25.6dBA)
- 21h to 22h: Vibration level was higher allowable value (due to the initial level measured on Mar, 2010 was very low).

- *Surface water*:

- The SS contents in all sites were from 1.8 – 4 times higher than allowable value.
- The DO content in SW4-3 did not meet the allowable value.
- The Coliform content in SW4-1 was 2 times higher than allowable value.
- All of other parameters was under according to QCVN08:2008 (Applied column B1: Used for irrigation or other purposes such as water carriage).

- *Underground water*: From many monitoring stages, we comment:

- Cl⁻ value at GW3-1 và GW3 - 2 was higher allowable value to 1.56 from 4.2 times.
- pH value at GW3-1 and GW3-3 was not allowable value (making acidic water)
- Fecal Coliform value were higher allowable value in all of three samples.
- Coliform at GW3 - 3 was much higher allowable value ((460 MPN/100ml comparison allowable value: 3 MPN/100ml)

Because this underground water was polluted (acidification, contaminated by Coliform and Fecal Coliform so it was not safe to use this water directly, it may be harmful for construction machines. It need to have suitable treatment before using. The contractor should consider before using this water resource for construction machine washing.

- *Soil*: The analyzed results of environmental parameters satisfied the QCVN03:2008 -

For land of people's livelihood.

- *Waste water*: The SS and Coliform contents in waste water in W4-1 and W4-3 were higher than allowable value.

4.2. Environmental Monitoring by Contractors

4.2.1. Monitoring Program

According to the Clause 2 - Environmental Monitoring - Section 01300 – Volume 3 of Tender Document, the contractor shall implement environmental monitoring work in two phases: prior to the start of construction and during construction.

Table 5. Environmental monitoring plan of contractors

	Item	Pk1a	Pk1b	Pk2	Pk3
	Air (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
	Noise (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
	Vibration (3 samples/point)	3 points: Km 4+400 Km 6+150 Km 7+400	2 points: Km 8+000 Km 10+600	2 points: Km 12+000 Km 14+600	3 points: Km 23+300 Km 22+850 Km 16+100
	Surface water quality (2 samples/point)	3 points: Km 4+440 Km 5+480 Km 7+100	3 points: Km 8+350 Km 9+300 Km 10+450	1 point: Km 12+600	5 points: Km 14+600 Km 16+100 Km 18+300 Km 19+200 Km 21+250
	Ground water quality (1 sample/point)	1 point: Km 6+200	1 point: Km 7+800	1 point: Km 11+800	1 point: Km 23+150

	Item	Pk1a	Pk1b	Pk2	Pk3
	Soil quality (1 sample/point)	1 point: Km 4+450	1 point: Km 8+000	1 point: Km 11+800	1 point: Km 23+150
	Excavated soil (1 sample/point)	1 point	1 point	1 point	1 point

The monitoring of construction contractors is carried out every three months as shown in table 6.

Table 6. Environmental monitoring schedule of contractors

Monitoring	Pk1a	Pk1b	Pk2	Pk3
1 st monitoring (Baseline monitoring)	03/2010	06/2010	07/2010	07/2010
2 nd monitoring	6/2010	09/2010	10/2010	10/2010
3 rd monitoring	9/2010	12/2010	01/2011	01/2011
4 th monitoring	12/2010	03/2011	04/2011	04/2011
5 th monitoring	03/2011	06/2011	07/2011	07/2011
6 th monitoring	06/2011	-	-	-

4.2.2. Monitoring Result

4.2.2.1. Monitoring of package 1a:

The monitoring result in March 2011 is summarized as follows:

- Air quality: The concentrations of parameters such as CO, SO₂, NO₂, Pb monitored in three sampling positions in three times in construction phase changed insignificantly in comparison with those monitored in pre-construction phase and still fully satisfied the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT. However, at A-2 (Km 6+150), TSP exceeded the limited value caused by dry weather, sunshine and circulation of vehicles.
- Noise level: Noise level meet the standard QCVN 26:2010/BTNMT except for one value at Km 6+150.
- Vibration level: All the measured values were much lower than allowable value of standard QCVN 27:2010/BTNMT.

- Surface water quality: surface water quality at project area in March 2011 had a sign of organic pollution. Most of organic parameters (such as DO, COD, BOD) at monitoring locations in both tide periods were higher than the limited values of QCVN 08:2008/BTNMT-level B1, except at Ong Nhieu River at high tide. In comparison with the baseline values in pre-construction phase, water quality in March 2011 seemed to be decreased because monitoring results of organic matter (BOD, COD, nutrient pollution in March 2011 were higher than baseline values.
- Ground water quality: Groundwater quality at project area measured in construction phase in March 2011 was rather good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.
- Soil quality: Heavy metal concentrations of soil were low but some value higher than the baseline value (Cu, Zn, Fe). The results of analysis of pollution indicators in March 2011 satisfied the limited values in the Regulation QCVN 03:2008/BTNMT.

The monitoring result in June 2011 is summarized as follows:

- Air quality: The concentrations of parameters such as CO, SO₂, NO₂ monitored in three sampling positions in three times in construction phase changed insignificantly in comparison with those monitored in pre-construction phase and still fully satisfied the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.
- Noise level: The values at the position A1: Km 4+000 (71.3dBA) and A2: Km 6+150 (70.5dBA) were slightly higher than the standard but the remaining values appropriate in the National technical regulation QCVN 26:2010/BTNMT
- Vibration level: All the measured values were much lower than allowable value of standard QCVN 27:2010/BTNMT.
- Surface water quality: at project area in June 2011 had a sign of organic pollution. Most of organic parameters (such as DO, COD, BOD) at monitoring locations in both tide periods were higher than the limited values of QCVN 08:2008/BTNMT-level B1, except at Ong Nhieu River at high tide. In comparison with the baseline values in pre-construction phase, water quality in June 2011 seemed to be decreased because monitoring results of organic mate DO, BOD, COD, nutrient pollution in June 2011 were higher than baseline values.
- Groundwater quality at project area measured in construction phase in June 2011 was rather good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT except parameters Cl⁻ 265.4 mg/L
- Soil quality: Heavy metal concentrations of soil were low but some value higher than the baseline value (Cu, Zn, Fe). The results of analysis of pollution indicators in June 2011 satisfied the limited values in the Regulation QCVN 03:2008/BTNMT.

4.2.2.2. Monitoring of package 1b:

The monitoring result in March 2011 is summarized as follows:

- Air quality: The concentrations of parameters such as SO₂, NO₂, CO, Pb monitored in two sampling positions in three times in March 2011 still fully satisfied the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT. Except for one value of TSP and SO₂ at Km 8+000.
- Noise level: Noise level (22h00-23h00) were 64.8 dBA at Km 9+000 and 59.5 dBA at Km 10+600 higher than the limited level (55dBA) but comparable with the baseline value.
- Vibration level: All the measured values were much lower than allowable value of standard QCVN 27:2010/BTNMT.
- Surface water quality: surface water quality at project area in March 2011 had a sign of micro-organism pollution. Most of organic parameters (such as DO, BOD, COD) and coliform parameter were of them satisfied the limited values of QCVN 08:2008/BTNMT-level B1. In comparison with the baseline values in pre-construction phase, water quality in March 2011 better signs because monitoring results meet the standard.
- Ground water quality: Groundwater quality at project area measured in construction phase in March 2011 was rather good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except for Cl⁻ and coliform.
- Soil quality: Heavy metal concentrations of soil were low. All these results were within the limited values in the Regulation QCVN 03:2008/BTNMT. In comparison with the survey results in the pre-construction phase most of the results in March 2011 changed insignificantly.

The monitoring result in June 2011 is summarized as follows:

- Air quality: air environment quality in project area was rather good. The concentrations of parameters such as TSP, SO₂, NO₂, CO monitored in two sampling positions in three times in June 2011 still fully satisfied the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.
- Noise level: All the measured values were lower than limit values of National technical regulation QCVN26:2010/BTNMT or baseline values
- Vibration level: All the measured values were lower than allowable value in the National technical regulation QCVN27:2010/BTNMT
- Surface water quality: surface water quality at project area in June 2011 had sign of micro-organism pollution. Some of these measurements as DO, SS, lubricant satisfied the limited values but some location of BOD, COD little higher than the limited values of QCVN 08:2008/BTNMT-level B1. In comparison with the values in pre-construction phase water quality in June 2011 still relatively good.

- Ground water quality: Groundwater quality at project area measured in construction phase in June 2011 was rather good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except for Cl^- (954.9 mg/L).
- Soil quality: Heavy metal concentrations of soil were low. All these results were within the limited values in the Regulation QCVN 03:2008/BTNMT. In comparison with the survey results in the pre-construction phase most of the results in June 2011 changed insignificantly.

4.2.2.3. Monitoring of package 2:

The monitoring result in January 2011 is summarized as follows:

- Air quality: air environment quality in project area was rather good. The concentrations of parameters such as SO_2 , NO_2 , CO, Pb monitored in two sampling positions in three times in pre-construction phase still fully satisfied the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT. However, particulate concentrations at A-6 (Km12+000) exceeded the standard of QCVN 05:2009/BTNMT.
- Noise level: All the measured values were lower than limit values of National technical regulation QCVN26:2010/BTNMT or baseline values.
- Vibration level: All the measured values were lower than allowable value in the National technical regulation QCVN27:2010/BTNMT.
- Surface water quality: monitoring results show that BOD, NO_2^- and Coliform of surface water quality of Dong Nai River were slightly over the limited values of QCVN 08:2008/BTNMT. Other parameters satisfied the standard
- Ground water quality: Groundwater quality at project area was quite good. All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.
- Soil quality: All these results of soil monitoring in construction phase were lower than the limited values in the Regulation QCVN 03:2008/BTNMT.

The monitoring result in April 2011 is summarized as follows:

- Air quality: air environment quality in project area was rather good. The concentrations of parameters such as SO_2 , NO_2 , CO, Pb monitored in two sampling positions in three times in pre-construction phase still fully satisfied the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.
- Noise level: All the measured values were lower than limit values of National technical regulation QCVN26:2010/BTNMT or baseline values.
- Vibration level: All the measured values were lower than allowable value in the National technical regulation QCVN27:2010/BTNMT.

- Surface water quality: in general monitoring results show that surface water quality of Dong Nai River in project meet standards of QCVN 08:2008/BTNMT.
- Ground water quality: Groundwater quality at project area was quite good. All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.
- Soil quality: All these results of soil monitoring in construction phase were lower than the limited values in the Regulation QCVN 03:2008/BTNMT.

4.2.2.4. Monitoring of package 3:

The monitoring result in January 2011 is summarized as follows:

- Air quality: Except one value of TSP at km 23+300 air environment quality in project area was rather good. The concentrations of parameters such as TSP, SO₂, NO₂, CO, Pb monitored in three sampling positions in six times in pre-construction phase still fully satisfied the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT
- Noise level: All the measured values were lower than limit values of National technical regulation QCVN26:2010/BTNMT.
- Vibration level: All the measured values were lower than allowable value in the National technical regulation QCVN27:2010/BTNMT.
- Surface water quality: surface water quality at project area in January 2011 had a sign of organic pollution and micro-organism pollution. Some of parameters (such as DO, COD, BOD, SS and coliform) were higher than the limited values of QCVN 08:2008/BTNMT-level B1. In comparison with the baseline values in pre-construction phase, monitoring results in 01/2011 changed insignificantly.
- Ground water quality: Groundwater quality at project area had a sign of micro-organism pollution. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except for Coliform.
- Soil quality: All these results were than the limited values in the Regulation QCVN 03:2008/BTNMT. In comparison with the survey results in the pre-construction phase, most of the results in this period changed insignificantly. This proves the soil quality in the project area was not affected by the activities of the project.

The monitoring result in April 2011 is summarized as follows:

- Air quality: air environment quality in project area was rather good. The concentrations of parameters such as TSP, SO₂, NO₂, CO, Pb monitored in three sampling positions in six times in pre-construction phase still fully satisfied the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.
- Noise level: All the measured values were lower than limit values of National technical regulation QCVN26:2010/BTNMT.

- Vibration level: All the measured values were lower than allowable value in the National technical regulation QCVN27:2010/BTNMT.
- Surface water quality: surface water quality at project area in April 2011 had a sign of organic pollution and micro-organism pollution. Some of parameters (such as DO, COD, BOD, SS and coliform) were higher than the limited values of QCVN 08:2008/BTNMT-level B1. In comparison with the baseline values in pre-construction phase, monitoring results in 04/2011 changed insignificantly.
- Groundwater quality: All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.
- Soil quality: Results of soil monitoring in 04/2011 was quite good. All these results were than the limited values in the Regulation QCVN 03:2008/BTNMT. In comparison with the survey results in the pre-construction phase, most of the results in this period changed insignificantly. This proves the soil quality in the project area was not affected by the activities of the project.

4.3. Assessment of Monitoring Results

Through the monitoring of CS Consultant and contractors, there are finding as follows:

The noise level and dust content increased at intersection with public roads such as Nguyen Duy Trinh road (Pk1a), Long Phuoc road (Pk2), high way No.51. Although the circulation vehicle in the project were strictly supervised such as limit speed of 5km/h and no horn used, spraying water. Noise and dust level (even in rainy season are higher than standard. This is the common problem in Hochiminh City and Dong Nai province. The noise and dust (TSP) level measured at many place are much higher than standard. This is due to the increase in traffic in these big cities. Noise and dust reducing methods that are suggested in EMP (covering by corrugated iron at sensitive sites, regular machinery maintaining, do not operate all machinery simultaneously) are effectively implemented. Spraying water shall be implemented especially in dry days and at residential areas to avoid impacts on people's health.

In Packages 1b and 3 most of underground water samples are contaminated by chlorine, Fe, Mn and Coliform. It is not possible for workers and households to use this water directly. This may cause infectious disease if there is not treatment before using. If using this water for washing, may be harmful for construction machines (making acidic water).

Surface water especially in rainy seasons, some of parameters (such as COD, BOD, SS and coliform) were higher than the limited values of QCVN 08:2008/BTNMT.

Other monitoring parameters in general satisfied environmental standards.

5. Environmental and Training and Orientation

A Environmental Training Program is required and shall consist of:

- Initial Induction Course: All workmen shall be required to attend a induction

course within their first week on site.

- Periodic Training Courses: Periodic safety course shall be conducted not less than once every six months. All employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the Works. Training courses shall be organized for all workmen on the site and at all levels of supervision and management. Regular environmental and safety meetings will be conducted on a monthly basis and shall require attendance by the ESO and safety representatives of Subcontractors.

(a) Scope of training program:

- Requirements of environmental protection during construction
- Measures to collect, dispose and treat wastes including fuel, oil, grout, concrete, living waste and spoils from equipment repair,...
- Handling procedures in case of chemicals, hazardous substance spills,...
- Occupational safety and health act matters
- How to work in compliance with standard of safety
- Other safety and health management.

(b) Training schedule: every month

(c) Participants: All staff and workers of contractors and subcontractors

(d) Resources trainers/persons: Environmental Specialist and Safety officers of the main Contractor

(e) Training document: site environmental management plans and health and safety plans of contractors, environmental management plan updated June 2010.

6. Key Environmental Issues

6.1. Key Issues Identified

The noise level and dust content increased at intersection with public roads and were higher than allowable values.

Some environmental problems were observed and recorded in the MOU on 03rd June 2011 as follows:

- Batching plant of package 1a is located less than 1000m (required distance specified in EMP June 2010)
- Wastewater treatment facility are not operated and maintained properly: sedimentation tanks contained large amounts of cement sludge and were, therefore, not efficiently treating cement-laden wastewater from operation of the batching plant, equipment washing and surface run-off. (Package 1a, 3)
- The absence of garbage bins at necessary sites and dumping of domestic and construction solid wastes were observed (Package 1a, 3)
- Dumping of excavated spoils from bridge pile works were being directly dumped by

into the river (Package 1b) and leaking bentonite into Dong Nai river (Package 2). Safety: personal wearing protective equipment (PPE) such as hard hats and safety shoes were not implemented at Nuoc Duc river (Package 1b). Safe access way and handrail for workers were not properly set up in package 1a, 1b

- Few excavated holes in pile construction in package 1a, 1b were not backfilled after finishing construction
- The construction activities made the intersection with Nguyen Duy Trinh street dirty
- Dust concentration at Truong Luu road and Nguyen Duy Trinh street is high
- At Km 23+300 (near intersection with Highway 51), on-going site works are located alongside houses such that residents are exposed to safety hazards especially where heavy equipment operation and excavation works are on-going (Package 3) but safety measures for local people was not sufficient.
- Environmental permits: contractors did not submit environmental permits for construction facilities (batching plants, borrow pits, quarries, etc) of contractors.

Flooded agricultural area due to broken dykes in Nhon Trach District (Package 3):

- Summary of the situation: In October 2010, farmers complained about a small portion of a dyke which collapsed due to the expressway civil works. On 25 November a first meeting was held at the commune level (Phuoc Thien commune, Nhon Trach District) with representatives of affected farmers, EPMU and contractor. Commune authorities required repair of the broken dykes to allow farmers to plant winter-spring crops; The contractors refilled the dykes two times however the dyke collapsed again and create more serious damage than previous case; Farmers were unable to plant rice seed for the winter-spring crops; On 24 February 2011, a meeting was held between Phuoc Thien commune's People's Committee and the Contractor (Posco). Phuoc Thien PC requested the contractor to compensate farmers for damage to the crops. On 31 March 2011, during another meeting between Phuoc Thien PC and Contractor, Phuoc Thien PC provided a report from Nhon Trach District PC (Department of Economic) which evaluated the damages. The compensation requested was 1,890,000,000 VND (90,000 USD) plus support and equipment to rebuild the collapsed dyke. The contractor provided one excavator and an a sum of 50,000,000 VND to purchase materials; contractor agreed to support 30% of labor cost for damages. In a meeting on 25th April 2011, Phuoc Thien PC requested the contractor to compensate farmers for an amount of 618,364,800 VND (31,000 USD) after reviewing the former evaluation. On 3rd June 2011, contractor completed the repair of the dykes and handed over to farmers.
- Property damage: A dyke collapsed damaging agriculture land in Nhon Trach District
 - Area cannot be cultivated: 91.4 ha (60 HH)
 - Cultivated area where planting rice was delayed: 22.0 ha (19 HH)
 - Cultivated area where crops was lost: 4.9 ha (1 HH).

- Currently, farmers and the contractor with support of local authorities, EPMU and consultants are negotiating to finalize the compensation for the loss of farmers.
- The dyke brake and flooding did not cause negative impacts on the environment as quality of flooding water from river is rather good (refer to regular monitoring results) and the contractor has already repaired the broken dyke.

6.2. Action Taken

Action taken to mitigate/eliminate the above environmental problems:

- Spraying water and regulation for vehicles of the project are strictly implemented to reduce noise and dust especially at intersection with public roads and residential areas.
- Settling tanks and drainage system are dredged daily to ensure treatment of the wastewater
- Batching plant is regularly cleaned to prevent cement-laden water ponds
- Domestic and construction waste are collected and transported properly.
- Garbage bins were already equipped at necessary places for collection of wastes
- Barges are arranged at construction of bored piles on rivers to collect and transport excavated soil to appropriate places
- Barrier was installed around the construction area at intersection with local roads and residential areas.
- The contractors were requested to stop the work immediately if the construction site was not safe such as improper safe access way and handrail were. Unsafe activities were pointed out in weekly and monthly meetings and regular site inspection was carried out to check the site.
- Construction workers were trained on Environmental and safety provision in Updated EMP June 2010.
- The contractors were requested to immediately backfill these holes after finishing pile construction and safety fence was setup around these holes during construction.
- Hygienic workers were arranged to collect waste from construction activities
- Truong Luu road was upgraded in January 2011 and water is regularly sprayed to prevent dust at intersection with local roads. Contractors have submitted environmental permits for facilities. However, the environmental permits for batching plants are still under application. The application process actually is a complicated issue and takes time.

6.3. Additional Action Required

Although contractors have implemented mitigations, continuous and further actions shall be conducted as follows:

- Closely monitor operation of batching plants especially the plant of package 1a to prevent pollution of surrounding environment by cement-laden wastewater from plants and washing of vehicles.
- Dredging of sedimentation tanks shall be daily implemented.
- In rainy seasons, drainage system on service road and in facilities shall be sufficiently provided to avoid mud which is not hygiene and safe for workers. Other issues are possible erosion at rivers, inundation.
- Supervision onsite shall be closely taken especially at construction areas near watercourses as these places are sensitive to impacts such as bentonite from bored pile construction
- Contractors shall speed up application for environmental permits of batching plants as they committed.

7. Conclusion and Recommendation

The result of environmental monitoring result shows that most of the parameters for air, noise, vibration and surface water, groundwater are under the current Vietnamese standards, except TSP and the noise level at intersection with local roads and some surface water parameters (DO, SS, BOD).

Mitigation measures for reducing TSP and noise level shall be effectively implemented as specified in updated site environmental management plans of contractors.

Environmental issues observed especially issues reported by ADB Mission which were mostly corrected shall be closely monitored, including supervision of operation of batching plants, submission of environmental permits, safety onsite, etc.

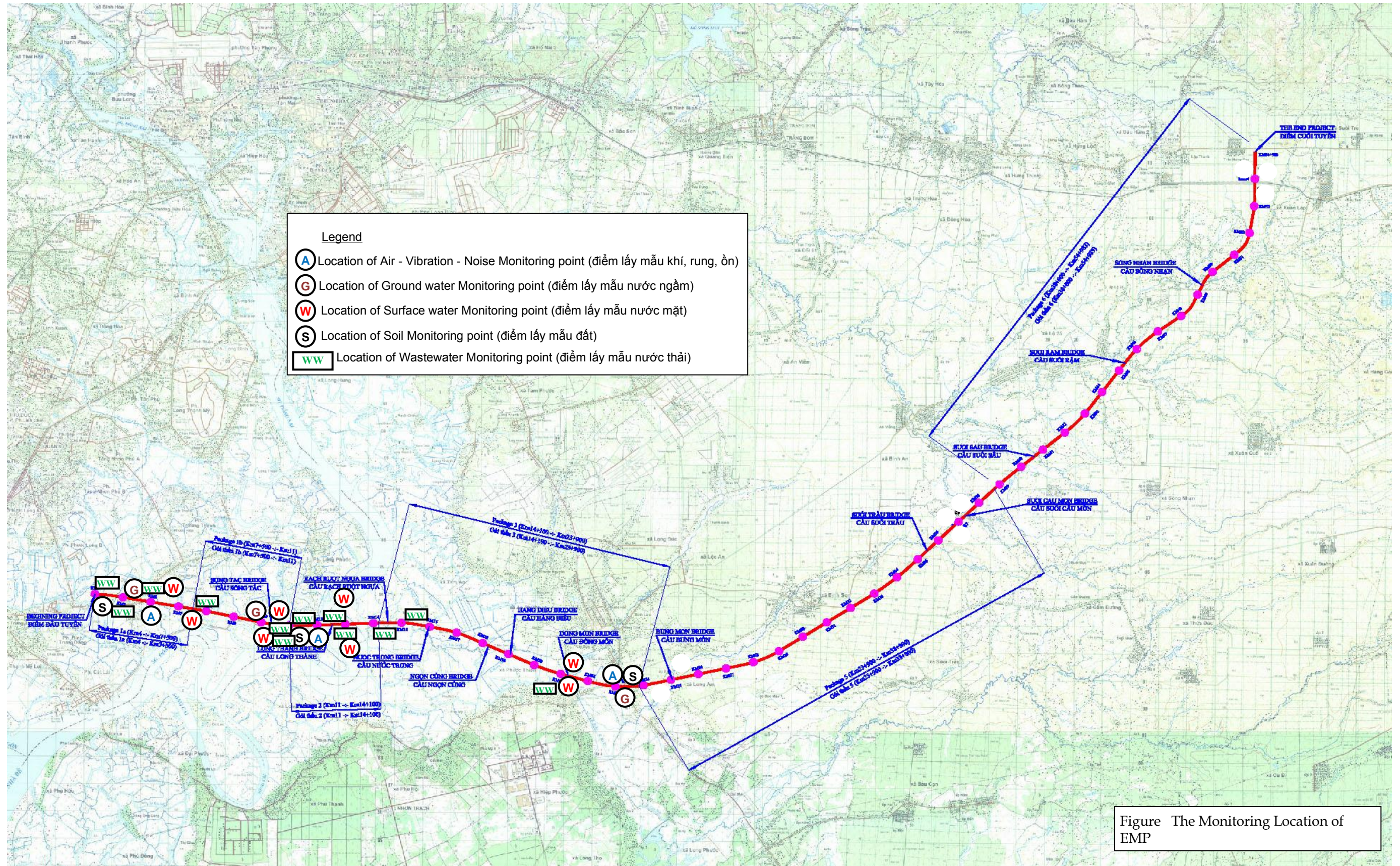
Attention shall be paid to the construction of bored piles on canals or rivers as this construction may release bentonite mud into surface water, affecting water quality and aquatic organism.

From environmental issue described above, workers are not well aware of environmental and safety requirement. Therefore, training on environment and safety shall be implemented regularly and new construction workers are immediately trained before starting their works onsite.

Environmental issues in rainy season shall be paid attention, such as mud condition, inundation, possible erosion at rivers, and flooding at cultivation areas.

Waterway traffic management plan of contractors were prepared, safety measures in this plan shall be implemented in rainy season, in which regulations on circulation barges, boats at construction areas and through temporary bridge are strictly followed.

Appendix 1. Map of Sampling locations



Appendix 2. Photos of Environmental Monitoring and Supervision

Environmental monitoring by CS Consultant



Soil sampling at Km4+200, Pk 1a



Surface water sampling on Ong Nhieu river, Pk 1a



Soil sampling, Pk2



Groundwater sampling, Pk 1b.



Surface water sampling at Km 12+600,
Dong Nai River, Pk 2.



Air, noise, vibration sampling
km 23+150, Pk 3

Environmental monitoring by contractors



Surface water sampling on Ong Nhieu river, Pk 1a



Air, noise and vibration monitoring km 8+000, pk 1b.



Surface water sampling on Dong Nai river
river
Pk 2



Air, noise and vibration monitoring
Km 12+000, Pk 2

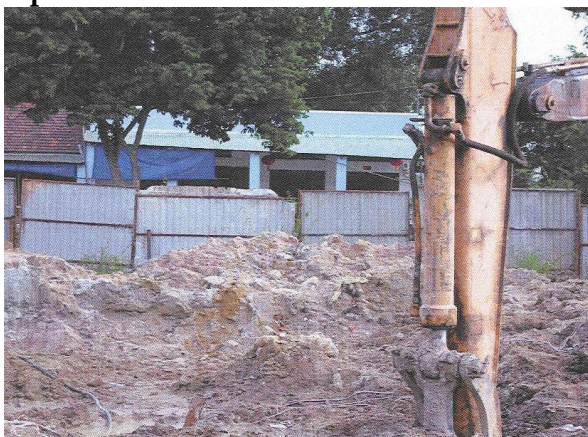


Surface water sampling
Km 23+150, Pk 3



Air, noise, vibration sampling, Pk 3

Supervision activities



Barrier was installed around the construction area, Pk3



Barges are arranged to collect and transport excavated soil, Pk 1b



Garbage bins were equipped for batching plants



Spraying water to prevent dust, Pk 2



Safety sign board was installed to inform unauthorized people not entering the construction area, Pk3



Environmental and safety training