

# Environmental Supervision Report

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Semi-Annual Report  
January – June 2012

## VIE: Ho Chi Minh City-Long Thanh-Dau Giay Expressway Project

Prepared by the Vietnam Expressway Corporation with Nippon Koei Co., Ltd and TEDI South  
for the Ministry of Transport and the Asian Development Bank.

## **CURRENCY EQUIVALENTS**

(as of 1 July 2012)

|               |   |            |
|---------------|---|------------|
| Currency unit | – | dong (D)   |
| D1.00         | = | \$0.000047 |
| \$1.00        | = | D20,885    |

## **ABBREVIATIONS**

|      |   |  |
|------|---|--|
| ADB  | – | Asian Development Bank                   |
| EMP  | – | environmental management plan            |
| HCMC | – | Ho Chi Minh City                         |
| HLD  | – | HCMC–Long Thanh-Dau Giay                 |
| JBIC | – | Japan Bank for International Cooperation |
| JICA | – | Japan International Cooperation Agency   |
| m    | – | meter                                    |
| VEC  | – | Vietnam Expressway Corporation           |

## **NOTE**

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**THE SOCIALIST REPUBLIC OF VIET NAM**  
**MINISTRY OF TRANSPORT**  
**VIETNAM EXPRESSWAY CORPORATION**  
**HOCHIMINH – LONG THANH – DAU 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 – June 2012)**

**July 2012**

**Consortium of**  
**Nippon Koei Co., Ltd**  
**TEDI South**

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# 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 (July 2011 – December 2011) is to summarize the environmental supervision activities by Construction Supervision Consultants (CS Consultants) during the period of July 2011 – December 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 2012 is described as follows

#### **Package 1a**

##### ***Temporary Works***

###### **Temporary Road:**

All the temporary roads have been completed;

###### **Batching plant:**

The batching plant was normally operated and regularly maintained.

###### **Site Laboratory:**

Carried out related tests for test section of embankment.

Carried out the 07-day and 28-day strength tests for bored piles and ST girders.

Sampled the mobilized construction materials and carried out the regular tests on the samples.

###### **Casting Yard:**

2,262 pieces of precast concrete plank were fabricated in this month. As of now, total 49,123 nos have been fabricated.

25 pieces of parapet fabrication were fabricated in this month. As of now, total 2,001 pieces of parapet have been fabricated.

##### ***Site clearance***

All site clearing works of this project has been completed.

##### ***Road Work***

Sub-base works for approach road have been commenced. As of now, the first layer for right side of section Km4+070~Km4+180 has been completed.

After the girder erection works, RC slab works for right side of approach road are ongoing.

##### ***Bridge Substructure***

###### **Bored Pile:**

Totally 11 piles were carried out Static Loading Test.

Totally 11 piles were carried out PDA Test.

Totally 1,028 piles were carried out Sonic Test.

###### **Substructure:**

Pile cap: 170

Column: 170

Headstock: 168

##### ***Bridge Superstructure***

###### **SPT, Crossbeam, Deck slab, Link Slab**

Super T girders fabricated was completed in May 2012.

60 nos of girder were erected (S79/S80/S81/S82/S83/S84) in this month. Up to now, total 840 nos of girder have been erected.

The crossbeam construction was continued in this month. As of now, total 77.5 spans of crossbeam have been completed.

8 spans of deck slab were casted in this month. Up to now, 76 spans of deck slab works has been completed.

21.5 spans of link slab were casted in this month. As of now, 60.5 spans of link slab works have been completed.

**External /Internal parapet**

Fabrication: 25 nos of external parapet were fabricated in this month. As of now, total 2,001 nos have been fabricated.

Installation of external parapet : 955m of external parapet were installed in last month. As of now, total 3,021m of external parapet have been installed.

Cast-in-situ of external parapet : 481m of external parapet were installed in last month. As of now, total 492m of external parapet have been installed.

573m of internal parapet were casted in last month. As of now, total 927m have been casted.

***Lighting and electrical Works***

The works for base of lighting system have been commenced. As of now, total 133 nos have been casted.

Fabrication of lighting pole : under fabricating by the manufacturer

Installation : not yet carried out

**Package 1b**

**Temporary Works**

**Temporary road and temporary berth, temporary bridges and Truong Luu road**

- Service road and bridge: Maintenance for service road and bridges.
- Truong Luu road: Maintenance for Truong Luu road.

**Site Clearance:**

The works of site clearing on handed over land have been completed 100%.

**Earth Work and Soft Soil Improvement.**

- In this month, unloading work of embankment was finished
- Pile slab construction work was finished in this month, the Contractor now is back filling of sand on pile slab. All of materials and method statement for road work is preparing to submit for Consultant's approval also.

**Bridge Substructure.**

- At T157, T160: Support frames for cast on scaffolding segment was started to install
- The contractor has mobilized 09 construction teams for sub-structure works on site. The completed quantity in Jun as followings:
  - Pile cap: completed 02 nos, up to now 158 nos were completed
  - Pier column: completed 10 nos, up to now 158 nos were completed
  - Headstock: completed 08 nos, up to now 137 nos were completed

**Bridge Superstructure**

- In this month, the Contractor continued the Super Tee girder fabrication at both Casting yard No. 1 and No.2, completed 89 Super T girders. Up to now, 629 girders were fabricated.
- In this month, erection work for 80 Super T girders was done. Up to now, 561 girders were erected.
- Construction works for precast-plank, diaphragm and external parapet are going on. For internal parapet, the contractor is preparing to execute for 40m of trial section and

detail schedule for parapet construction item is also adjusting to ensure that this work shall be finished within contract period.

- Deck slab construction was also continued, in this month 15 single deck slabs were casted. Up to now, 78 single spans was cast.
- At Tac bridge:
  - T158L: Casting concrete for K1 segment
  - T159L: Casting concrete for K0 segment
  - T159R: Casting concrete for K0 segment (stage 01)
  - T160L&R: Casting concrete for pier column

### **Lighting and electrical Works**

Profile document of Subcontractor for Lighting and electrical Works was submitted. The Contractor, Consultant and Client will carry out for inspection and visit for this company before official approval.

## **Package 2**

### ***Works at site***

- Finished pier column at Pier P20 and P26.
- Produce casing for bored pile construction at P23, P24
- Casting 14 girders
- Continue to repair and maintain service road at Dong Nai side and HCM side

### ***Earth Works and Soft Soil Improvement***

- Continue settlement monitoring at approach road to abutment A1.
- Constructing embankment H2

### ***Bridge Substructure***

Waiting for the land to construct pile D1200 at P46 and abutment A2.  
Continue construction of pile cap, column, head stock from P26 to P36.

### ***Bridge Superstructure***

- Casting 14 girders.

### ***Lighting and Electronics Works***

No activity done yet

## **Package 3**

### ***Temporary Works:***

- \* Carry out maintenance of service road on site

### ***Site clearance:***

- \* Site clearing on site all most finished (Except not yet handed over areas)

### ***Earth Work and Soft Soil Improvement***

- \* Carry out installation of PVD material on site is 97.84% completed (alternative DMM section)
- \* Carry out installation of PVD material on site is 100% completed (the original section)
- \* Vacuum application of original section and alternative section is ongoing



- \* Carry out filling material on site
- \* Construction of capping layer on site is ongoing
- \* Drainage construction on site is ongoing
- \* Sand cement stabilized mat construction on site is ongoing

### ***Bridge Substructure***

- \* Ruot Ngua bridge:
  - RC pile driving works is ongoing
  - Driving RC pile for pile slab is completed (possible area for construction)
  - Casting concrete for pile cap P8L and pier column P8L have been completed
- \* Nuoc Trong bridge:
  - RC pile driving works have been completed
  - Casting concrete for pile cap P7 and pile cap P8L have been completed
  - Casting concrete for pile column P7L and pier column P8L have been completed
  - Casting concrete for head stock P09R has been completed
  - Driving RC pile for pile slab is completed (possible area for construction)
- \* Ngon Cung bridge:
  - Casting concrete for pile cap P1L has been completed
  - Casting concrete for pier column P1L and wing and wall of Abutment A1L have been completed
  - Casting concrete for head stock P2R has been completed
  - Driving RC pile for pile slab is completed (possible area for construction)
- \* Hang Dieu Bridge:
  - Casting concrete for pile cap P4R has been completed
  - Casting concrete for head stock P3L has been completed
  - Driving RC pile for pile slab is completed (possible area for construction)
- \* Dong Mon bridge: 100% Completed
- \* IPR 25A:
  - Construction test pile has been completed
- \* Long Thanh flyover:
  - Bored pile construction is ongoing on site
  - Casting concrete for pile cap P5 and pile cap P9 have been completed
  - Casting concrete for pier column P9R has been completed

### ***Bridge Superstructure***

- \* Ruot Ngua bridge:
  - Super T girder production is in progress
- \* Nuoc Trong bridge
  - Super T girder production is in progress

- Launching super T girder work for span P10 and span A2 have been completed
- Casting concrete for deck slab of span P11L, span P5L and span P1L have been completed
- \* Ngon Cung bridge
  - I girder production was completed
- \* Hang Dieu bridge
  - I girder production is in progress

Dong Mon bridge

- Casting concrete for span P7R, span P8 and span P9R have been completed
- Casting concrete for railing is ongoing

Long Thanh fly-over

- Super T girder production is in progress

***Lighting and electrical Works***

- \* No activity

**1.2.2. Change in project scope:**

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

**Pk1b:** no change

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

**Pk3:** no change

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

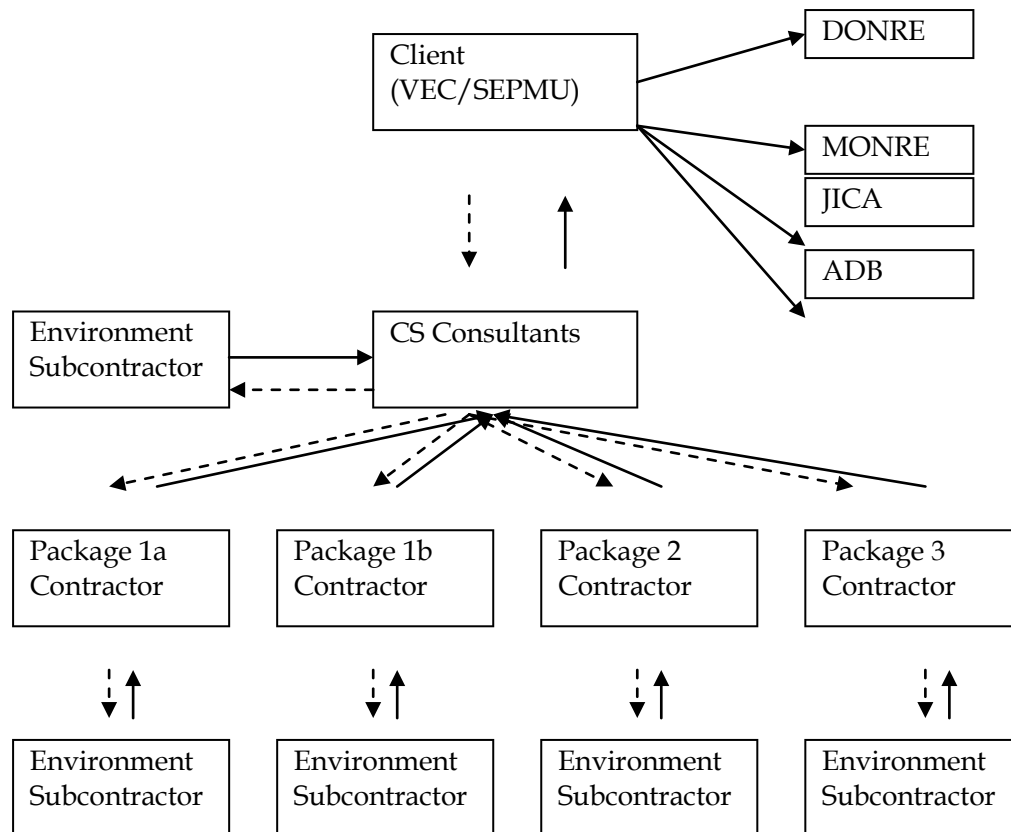
- The Contractor shall submit an Environmental Management Plan detailing how he intends to comply with applicable local laws and regulations concerning protection of the environment and the attached specification for environmental monitoring.
- The contractor shall implement environmental monitoring 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 |
|--|---------------------|---------------------------------------|--------------------------|
| <b>1. Over-all</b><br>Prepare and implement a site-specific EMP  | Good                |                                       |                          |
| <b>2 Air quality</b><br><b>Construction activities</b>   |                     |                                       |                          |
| <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> | Good                |                                       |                          |
| <p><b>Vehicle operation</b></p> <p>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.</p> <p>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 indicated by the accompanying site plan(s).</p> <p>Ensure that vehicles and machinery are used and</p>  | Very Good           |                                       |                          |

| Mitigation Measures   | Compliance Attained | Comment on Reasons for Non-Compliance   | Corrective actions taken  |
|---|---------------------|---|---|
| <p>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><b>Crushing, concrete and asphalt plant operation</b></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>Wastewater in the monitoring in March 2012 contained high amount of coliform. This is mainly due to runoff of rainwater and low hygiene of drainage system</p>           | <p>Contractors cleaned floor of batching plant and drainage system to avoid contamination of coliform</p>   |
| <p><b>3 Water quality</b></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> <p>Drilling solutions for performing the abutment will be processed in a closed system, especially for abutments at</p>  | Fair                | <p>Package 2: on 11<sup>th</sup> July, Bentonite slurry leaking into the river and bentonite sludge on a platform on beams was washed away directly over Dong Nai river</p> | <p>Contractor has corrected bentonite leakage in to river, workers at this area are reminded on the bentonite problem on 26<sup>th</sup> July</p> |

| Mitigation Measures  | Compliance Attained | Comment on Reasons for Non-Compliance                                    | Corrective actions taken                                       |
|--|---------------------|--|--|
| <p>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> |                     | <p>Package 3: on 28<sup>th</sup> May: Service road surface was muddy</p> | <p>The service road was cleaned up by 20<sup>th</sup> June</p> |
| <p><b>4 Loss of water resources</b></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, 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>  | <p>Very good</p>    |  |  |

| Mitigation Measures  | Compliance Attained | Comment on Reasons for Non-Compliance | Corrective actions taken |
|--|---------------------|---------------------------------------|--------------------------|
| <p><b>5 Noise and vibration</b></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> <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> | Good                |                                       |                          |

| Mitigation Measures   | Compliance Attained | Comment on Reasons for Non-Compliance   | Corrective actions taken   |
|---|---------------------|---|--|
| 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><b>6 Waste</b></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>Package 3 on 11<sup>th</sup> July: Haphazard dumping of Package 3 on 11<sup>th</sup> July: trash was dumped haphazardly (Km 14+100 to Km 23+900</p>              | <p>Garbage was collected and garbage was removed to disposal on 13<sup>th</sup> July. The garbage bins were provided on workplaces. workers were prohibited to haphazardly dump on site</p>  |
| <p><b>7 Handling of hazardous and toxic materials</b></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>   | Fair                | <p>Oil/fuel drums were haphazard stored on the deck (Package 2) on 11<sup>th</sup> July</p> <p>Improper fuel storage Km 18 of Package 3 on 11<sup>th</sup> July</p> | <p>The deck was cleaned and empty oil drums were properly removed on 17<sup>th</sup> July</p> <p>The oil tank was covered on the top and on the both side by roof sheet and covered around oil tank by steel net. The bottom of oil tank was put on strong beam made by H steel, the foundation and oil tray the outlet has been casted by concrete to prevent oil leakage on 26/7</p> |
| <p><b>8 Soil</b></p> <p><b>Contamination of soil</b></p> <p>Use good housekeeping practices to avoid any contamination of soil from solid wastes, wastewater and 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</p>   | Good                |   |  |



| Mitigation Measures   | Compliance Attained | Comment on Reasons for Non-Compliance  | Corrective actions taken  |
|---|---------------------|--|---|
| emergency plans for accidents.  |                     |  |   |
| <b>9. Spoils disposal</b><br>Waste from construction activities, including the demolishing of structures before the construction itself begins, must be collected and recycled when possible.<br>Establish hygienic groups to collect waste from construction camp sites and to ensure the cleanliness of the whole construction area.<br>Spoils from the works will only be disposed of in selected locations approved by local authorities.<br>Disposal shall not cause adverse impacts to water and soil quality as well as land use.<br>The locations of spoils disposal sites will be specified by the contractor in the site-specific EMP before the beginning of construction activities.  | Fair                | Pack age 3 on 11th July:<br>Disposed spoil/top soil encroached into the nearby rice paddies, ponds and streams in some cases | the. spoils/top soil which encroached into the nearby rice paddies, ponds and streams in somewhere by disposed were dredged by excavators on 26th July and the contractor will continually check this matter at daily basis |
| <b>10. Erosion</b><br>Provide temporary or permanent drainage to protect sites susceptible to erosion.<br>Stabilize downstream slopes on rivers and streams prone to erosion problems.<br>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.<br>On streams, downstream slopes can be stabilized with concrete, rock gabions or walls as seen necessary.<br>Careful stockpiling of topsoil in suitable locations to prevent these from being washed away.<br>Specify the erosion protection measures to be used in the site-specific EMP   | Good                |  |   |
| <b>11. Loss of vegetation cover</b><br>Minimize the clearing of vegetation for construction activities and borrow areas.<br>Re-vegetate embankment slopes and road cuts.<br>Landscape road verges and plant vegetation to contribute to aesthetic value.<br>Where roadside trees are lost as a result of construction activities, the Contractor shall replant trees as a ratio of one-to-one.<br>Where trees cannot be replaced at the roadside due to a lack of roadside space, the Contractor shall consult with affected residents to determine an appropriate alternative planting location and schedule.<br>The Contractor will be responsible for all works associated with tree planting including maintenance of the trees for a one-year period after planting. | Good                |  |   |
| <b>12. Changes in Hydrological Situation and Irrigation systems</b>   | Good                |  |   |

| Mitigation Measures  | Compliance Attained | Comment on Reasons for Non-Compliance | Corrective actions taken |
|--|---------------------|---------------------------------------|--------------------------|
| <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>   |                     |                                       |                          |
| <p><b>13. Traffic conditions and use of waterways</b></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"> <li>a. General traffic management requirements</li> <li>b. Temporary road works</li> <li>c. Traffic control</li> <li>d. Number of lanes for traffic control</li> <li>e. Half-width construction</li> <li>f. Extraordinary traffic</li> <li>g. Vertical clearance</li> <li>h. Materials for traffic control devices</li> </ul> <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 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</p> | Fair                |                                       |                          |

| Mitigation Measures   | Compliance Attained | Comment on Reasons for Non-Compliance | Corrective actions taken |
|---|---------------------|---------------------------------------|--------------------------|
| <p>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 flagmen</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><b>14. Historic and Cultural Resources</b></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>  | Good                |                                       |                          |
| <p><b>15. Utilities</b></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 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</p> |                     |                                       |                          |

| Mitigation Measures  | Compliance Attained | Comment on Reasons for Non-Compliance  | Corrective actions taken   |
|--|---------------------|--|--|
| <p>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><b>16. Safety</b></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 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> | Fair                | <p>The local road connected to service road near A1 of package 2 on 20<sup>th</sup> Feb.</p> <p>Package 2 Power wires touch water surface may cause electric shock in 15<sup>th</sup> Feb. 2012</p> <p>Barges anchored to temporary bridge package 2 in 17<sup>th</sup> Jan. 2012.</p> | <p>Fence and sign board for warning were installed to protect the construction site on 28<sup>th</sup> Feb</p> <p>stop using the electricity and repair them immediately</p> <p>Contractor corrected the problem within the day. All barges were moored at separate anchor systems satisfying the safety</p> |

| Mitigation Measures   | Compliance Attained | Comment on Reasons for Non-Compliance | Corrective actions taken |
|---|---------------------|---------------------------------------|--------------------------|
| (e) Safety Equipment and Clothing   |                     |                                       |                          |
| <b>17. Social impacts Consultation and Complaints Procedures</b><br>Provide local communities information on upcoming construction related activities and issues related to traffic safety.<br>Record any complaints received and respond to them promptly.<br>Co-operate with local authorities to prevent and solve problems related to environmental issues. | 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”<br>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<br>Nguyen Duy Trinh<br>Str with HLD<br>Expressway | A1           | 6+150 |        |        |        |
| 2. Truong Khanh<br>Shrine (Near<br>Residential Area)              | A2           |       |        | 11+300 |        |
| 3. Long Thanh town<br>near NH51                                   | A3           |       |        |        | 23+300 |
| Surface Water   |              |       |        |        |        |
| 1. Ong Nhieu river<br>(Ong Nhieu<br>bridge)                       | SW1-1, SW1-2 | 7+100 |        |        |        |
| 2. Tac river (Song<br>Tac bridge)                                 | SW2-1, SW2-2 |       | 10+400 |        |        |
| 3.  |              |       |        |        |        |
| 4. Dong Nai river<br>(Long Thanh<br>bridge)                       | SW3-1, SW3-2 |       |        | 12+600 |        |
| 5. Dong Mon bridge<br>(Dong Mon river)                            | SW4-1, SW4-2 |       |        |        | 21+350 |

| Location                                      | Sample No           | Pk1a                     | Pk1b                      | Pk2                        | Pk3                        |
|---|---------------------|--------------------------|---------------------------|----------------------------|----------------------------|
| 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, S2, 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,<br>4+980<br>5+480 | -                         | -                          | -                          |
|   | WW2-1, WW2-2, WW2-3 | -                        | 7+900<br>10+300<br>10+500 | -                          | -                          |
|   | WW3-1, WW3-2, WW3-3 | -                        | -                         | 11+500<br>12+300<br>12+900 | -                          |
|   | WW4-1, WW4-2, WW4-3 | -                        | -                         | -                          | 18+300<br>19+100<br>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<br>(Initial Survey) |                          |                          |                          |
| 2010 | 3     | X/2                     | X /1<br>(Initial Survey) | X /1<br>(Initial Survey) | X /1<br>(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                      |

| Year | Month | Package 1a | Package 1b | Package 2 | Package 3 |
|------|-------|------------|------------|-----------|-----------|
|      | 9     | X/8        | X/7        | X/7       | X/7       |
|      | 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 2012

- *Air quality*: the value of NO<sub>2</sub>, CO, SO<sub>2</sub> and HC: from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009 and QCVN06:2009.

+ The dust content is 2.4 times higher than allowable value

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

+ 6h to 21h: Noise level is higher than allowable value (0.5dBA)

+ 21h to 22h: Noise level is higher than allowable value (14.8dBA)

. Noise level is lower than the last monitoring at Dec, 2011.

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

- *Surface water*:

+ SS value at 3 positions (SW1-1; SW1-3; SW1-4) is higher than allowable value according to QCVN08:2008 (1.08 - 2.2 times). In these positions, the SS contents often are higher than allowable value.

+ COD value at 2 positions (SW1-3 và SW1-4) is higher than allowable value (1.03 -1.14 times).

- *Underground water*:



- + pH level at three underground water samples did not meet QCVN09:2008
- + Coliform value at GW1-1 position is higher than allowable value 1633 times.
- + There is a sign of underground water that is contaminated by Fecal Coliform in all of three samples.

The parameters of pH, Coliform and Fecal Coliform in underground water samples in the region are often out of allowable ranges. However, this underground water is used by the local residents.

- *Soil:*

- + As value is S1-1 position higher than allowable value 1.5 times.
- + Others parameters are meeting the QCVN03:2008.

- *Waste water:* All parameters are meeting the column B, QCVN40:2011.

#### **4.1.2.2. Package 1b**

##### **Result of monitoring in March 2012**

- *Surface water:*

- + DO value at SW2-1 and SW2-3 aren't in allowable limit.
- + Coliform value at SW2-1 and SW2-3 are higher than allowable value (1.5 and 3 times)
- + SS value at SW2-1 is higher than allowable value (1.26 times).

- *Underground water:*

+ Underground water samples GW2-1; GW2-2; GW2-3: Cl<sup>-</sup> is higher allowable value from 2.43 to 4.0 times.

+ Underground water samples GW2-2 and GW2-3: Fe is higher allowable value from 2.44 to 4.4 times.

+ Underground water samples GW2-1; GW2-2 and GW2-3: Mn is higher allowable value from 1.18 to 2.65 times.

+ Coliform at GW2-1 and GW2-3 are higher allowable value from 3666 times and 7.7 times.

+ Water samples in three locations are contaminated by Fecal Coliform.

- *Waste water:* Coliform value are W2-2 and W2-3 higher than allowable limit (1.4 and 6.8 times).

#### **4.1.2.3. Package 2**

##### **Result of monitoring in March 2012**

- *Air quality; Noise and Vibration:* All parameters are meeting the allowable value (except for vibration levels at night)

The noise and vibration levels (at night) are depending on the time of monitoring and number of motorcycles in the area.

- *Surface water:*

+ DO value at SW3-1 and SW3-3 aren't in allowable limit (3.82/4 và 3.63/4).

+ All of others parameters are under according to QCVN08:2008

- *Soil:* All parameters are meeting allowable value.

- *Waste water:* Coliform value are W3-1 and W3-2 samples higher followable limit ( $7.9 \times 10^3/5000$  MPN/100ml and  $7 \times 10^3/5000$  MNP/100ml).

#### **4.1.2.3. Package 3**

##### **Result of monitoring in March 2012**

- *Air quality:* The content of dust is higher allowable value about 5.4 times. The causing may be the monitoring location is near National Highway No.51 where there are many vehicles transporting goods from Vung Tau to industrial parks and on the contrary, in addition, the hot sun and low humidity conditions make more dust in the air environment. - *Noise:* Noise (Leq) level is higher allowable value from 8.1 – 11.3dBA

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

+ 6h to 21h: Vibration level is lower allowable value (17.2dBA)

+ 21h to 22h: Vibration level is higher allowable value (due to the initial level measured on Mar, 2020 is very low).

- *Surface water:*

+ All of DO parameter 's value aren't in allowable limit.

+ SS values at SW4-1 and SW4-3 are higher than allowable limit (128.4/50 và 67.6/50mg/l).

+ Coliform value at SW4-1; SW4-3 and SW4-4 position are higher allowable limit (270000/7500 MPN/100ml; 46000/7500MNP/100ml và 26000/7500 MPN/100ml).

- *Underground water:*

+  $Cl^-$  value at GW3 - 2 is higher allowable value to 1.65 times.

+ Fe value at GW3-2 sample is higher followable value 1.44 times.

+ The Coliform value in all of three underground samples are many times (467 to 153333) higher than allowable value.

+ The Fecal coilorm value in these three underground samples are rather high, from 5MNP/100ml to 110MNP/100ml (the allowable value stated in QCVN09:2008 is 0MNP/100ml)

- *Soil:* All parameters are meeting allowable value.

- *Waste water:*

- + SS value at W4-1 is higher than allowable limit (114.4/100mg/l),
- + Coliform value at W4-1 and W4-3 are higher allowable limit from 4.4 times to 34.7 times.

## 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<br>(3 samples/point)                      | 3 points:<br>Km 4+400<br>Km 6+150<br>Km 7+400 | 2 points:<br>Km 8+000<br>Km 10+600             | 2 points:<br>Km 12+000<br>Km 14+600 | 3 points:<br>Km 23+300<br>Km 22+850<br>Km 16+100                           |
|  | Noise<br>(3 samples/point)                    | 3 points:<br>Km 4+400<br>Km 6+150<br>Km 7+400 | 2 points:<br>Km 8+000<br>Km 10+600             | 2 points:<br>Km 12+000<br>Km 14+600 | 3 points:<br>Km 23+300<br>Km 22+850<br>Km 16+100                           |
|  | Vibration<br>(3 samples/point)                | 3 points:<br>Km 4+400<br>Km 6+150<br>Km 7+400 | 2 points:<br>Km 8+000<br>Km 10+600             | 2 points:<br>Km 12+000<br>Km 14+600 | 3 points:<br>Km 23+300<br>Km 22+850<br>Km 16+100                           |
|  | Surface water<br>quality<br>(2 samples/point) | 3 points:<br>Km 4+440<br>Km 5+480<br>Km 7+100 | 3 points:<br>Km 8+350<br>Km 9+300<br>Km 10+450 | 1 point:<br>Km 12+600               | 5 points:<br>Km 14+600<br>Km 16+100<br>Km 18+300<br>Km 19+200<br>Km 21+250 |
|  | Ground water<br>quality<br>(1 sample/point)   | 1 point:<br>Km 6+200                          | 1 point:<br>Km 7+800                           | 1 point:<br>Km 11+800               | 1 point:<br>Km 23+150  |
|  | Soil quality<br>(1 sample/point)              | 1 point:<br>Km 4+450                          | 1 point:<br>Km 8+000                           | 1 point:<br>Km 11+800               | 1 point:<br>Km 23+150  |
|  | Excavated soil<br>(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**

| <b>Monitoring</b>                                   | <b>Pk1a</b> | <b>Pk1b</b>                                    | <b>Pk2</b> | <b>Pk3</b> |
|---|-------------|--|------------|------------|
| 1 <sup>st</sup> monitoring<br>(Baseline monitoring) | 03/2010     | 06/2010  | 07/2010    | 07/2010    |
| 2 <sup>nd</sup> monitoring                          | 6/2010      | 09/2010  | 10/2010    | 10/2010    |
| 3 <sup>rd</sup> monitoring                          | 9/2010      | 12/2010  | 01/2011    | 01/2011    |
| 4 <sup>th</sup> monitoring                          | 12/2010     | 03/2011  | 04/2011    | 04/2011    |
| 5 <sup>th</sup> monitoring                          | 03/2011     | 06/2011  | 07/2011    | 07/2011    |
| 6 <sup>th</sup> monitoring                          | 06/2011     | 09/2011  | 10/2011    | 10/2011    |
| 7 <sup>th</sup> monitoring                          | 09/2011     | 12/2011  | 01/2012    | 01/2012    |
| 8 <sup>th</sup> monitoring                          | 12/2011     | 03/2012  | 04/2012    | 04/2012    |
| 9 <sup>th</sup> monitoring                          | 03/2012     | 06/2012<br>(the report has not been submitted) | -          | -          |
| 10 <sup>th</sup> monitoring                         | 06/2012     | -  | -          | -          |

## **4.2.2. Monitoring Result**

### **4.2.2.1. Monitoring of package 1a:**

**The monitoring result in March 2012 is summarized as follows:**

Air quality: The concentrations of parameters such as CO, SO<sub>2</sub>, NO<sub>2</sub>, 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.

Noise level: noise level at resting time at Km6+150 was slightly higher than the standard. Other values meet the standard 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 March 2012 was fairly good. All organic parameters (such as DO, COD, BOD) at monitoring locations in both tide periods are lower than the limited values of QCVN 08:2008/BTNMT-level B1. In comparison with the baseline values in pre-construction phase, water quality in March 2012 is much better because monitoring results of organic matter DO, BOD, COD, nutrient pollution in March 2012 are lower than baseline values.

Ground water quality: Groundwater quality at project area measured in construction phase in March 2012 was rather good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT. except parameter Cl<sup>-</sup>.

Soil quality: Heavy metal concentrations of soil are low but some value higher than the baseline value (Cu, Zn, Fe). The results of analysis of pollution indicators in March 2012 satisfied the limited values in the Regulation QCVN 03:2008/BTNMT.

**The monitoring result in June 2012 is summarized as follows:**

Air quality: The concentrations of parameters to assess the pollution such as CO, SO<sub>2</sub>, NO<sub>2</sub> monitored at three sampling positions in three times in construction phase in 06/2012 are a little higher than the results measured in the pre-construction phase but fully satisfy the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.

Noise level: noise level at resting time at Km6+150 was slightly higher than the standard. Other values meet the standard 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: surface water quality at project area in Jun 2012 has signs of organic pollutants and micro pollutants slightly. Most of pollution parameters such as COD, BOD, Coliform at monitoring locations in both tide periods are a little higher than the limited values of QCVN 08:2008/BTNMT-level B1. However, the main cause

is due to the impact of rainwater runoff. In comparison with the baseline values in pre-construction phase, water quality in Jun2012 is much better because monitoring results of organic matter DO, BOD, COD, nutrient pollution in Jun2012 are lower than baseline values..

Groundwater quality: Groundwater quality at project area measured in construction phase in December 2011 is rather good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT. Except Cl<sup>-</sup>.

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 2012 is summarized as follows:**

Air quality: In general, air environment quality in project area is rather good. The concentrations of pollution parameters (such as TSP, SO<sub>2</sub>, NO<sub>2</sub>, CO monitored at two sampling positions in three times in March2012) still fully satisfy the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.

Noise level: some measure values were higher the baseline value but within the standard of the National technical regulation QCVN26:2010/BTNMT

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 2012 has sign of micro-organism pollution. Some of these measurements as DO, SS, lubricant satisfy 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 March2012 still relatively good.

Ground water quality: Groundwater quality at project area measured in construction phase in March 2012 is rather good. Most of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except for Cl (450.1mg/L) and Mn (0.527mg/L).

Soil quality: Heavy metal concentrations of soil are low. All these results are 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 2012 change insignificantly.

#### **4.2.2.3. Monitoring of package 2:**

**The monitoring result in January 2012 is summarized as follows:**

Air quality: In general, environment air quality in project area is rather good. The concentrations of pollution parameters such as TSP, SO<sub>2</sub>, NO<sub>2</sub>, CO monitored at two sampling positions in three times in pre-construction phase still fully satisfy the limited values in National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.

Noise level: some measure values were higher the baseline value but within the standard of the 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 of DongNaiRiver at project area do not meet a part of domestic water supplying purpose. Some monitoring results of BOD, COD, NO<sub>2</sub><sup>-</sup>and Coliform are over the limited values of QCVN 08:2008/BTNMT-Column A2.These demonstrates the operation of the project activity does not significantly affect to the air environment surrounding the project.

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 2012 is summarized as follows:**

Air quality: In general,airenvironment quality in project area is rather good. The concentrations of indicatorspollution parameters such asTSP,SO<sub>2</sub>, NO<sub>2</sub>, COmonitored attwo sampling positions in three times in pre-construction phase still fully satisfy 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 of DongNaiRiver at project area do not meet a part of domestic water supplying purpose. Some monitoring results of BOD,COD, NO<sub>3</sub><sup>-</sup>and Coliform are over the limited values of QCVN 08:2008/BTNMT-Column A2.The cause of such mutations on the results is due the weather conditions, this rainy season should be coming soon with the first rains should lead to many organic substances, and time of monitoring in the construction is concreting at position W8, together with the high tide.These demonstrate the operation of the project activity does not significantly affect to the air environment surrounding the project.

Ground water quality: Groundwater quality at project area is quite good. All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except Coliform ( 4 MPN/100mL).

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 2012 is summarized as follows:**

Air quality: the concentrations of some pollution parameters such as TSP, SO<sub>2</sub>, NO<sub>2</sub>, ... monitored at three sampling positions in six times in January 2012 are higher than results in pre – construction phase. Demonstrates the operation of the project is affect to the air environment surrounding the project. However, all of values meet with the limited values in the Vietnamese Regulation QCVN 05:2009/BTNMT applied for ambient air environment quality and QCVN 06:2009/BTNMT applied for hazardous gases.

Noise level: Noise levels measured were lower than the limit 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 January 2012 has a sign of organic pollution and micro-organism pollution. Some of parameters (such as DO, COD, BOD, SS and coliform) meet the limited values of QCVN 08:2008/BTNMT-level B except coliform result. In comparison with the baseline values in January 2012, these values change insignificantly.

Ground water quality: All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT. Except the values 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 2012 is summarized as follows:**

Air quality: the concentrations of some pollution parameters such as TSP, SO<sub>2</sub>, NO<sub>2</sub>, ... monitored at three sampling positions in six times in April 2012 are higher than in January 2012 and results in pre – construction phase. It shows that the operation of the project is affect to the surrounding air environment. However, all of values meet with the limited values in the Vietnamese Regulation QCVN 05:2009/BTNMT applied for ambient air environment quality and QCVN 06:2009/BTNMT applied for hazardous gases.

Noise level: All 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 2012 has a pollution sign of organic and micro-organism. Some of parameters (such as DO, COD, BOD, SS and coliform) meet the limited values of QCVN 08:2008/BTNMT-level B except coliform result. In comparison with the baseline values in April 2012 these values have change (Surface water quality at project area is little good).

Groundwater quality: All of parameters meet the limited value in National Technical Regulation on ground water quality QCVN 09:2008/BTNMT, except values of



coliform.

Soil quality: Results of soil monitoring in April 2012 are quite good. All of these results meet 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 change insignificantly. This proves the soil quality in the project area is not affected by the activities of the project.

#### **4.3. Assessment of Monitoring Results**

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

In general, the environmental condition measured in monitoring in the last six months did not change considerably in comparison with previous monitoring. Some environmental parameters which did not meet permissible limits are TSP, noise, organic compounds in surface water.

The noise level and dust content increased at intersection with public roads such as Nguyen Duy Trinh road (Pk1a), 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 were higher than standard). This is the common problem in Hochiminh City and Dong Nai province. The noise and dust (TSP) level measured at many places 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. These two parameters are increasing proportionally with increase of vehicles and decrease of road quality. Moreover, the high way No.51 is being upgraded, contributing to increase of pollution to the air quality.

One level of dust level at km 4+400 of package 1a slightly exceeded the standard in the monitoring in December 2011. The reason was attributed to the high wind during the measurement. However, this problem could be avoided with enhancement of spraying water. In the monitoring in March 2012, dust level was within the permissible level.

Surface water especially in rainy seasons, some of parameters (such as DO, COD, BOD, SS, nutrient and coliform) did not meet the standard values of QCVN 08:2008/BTNMT. This is same issue in all monitoring including baseline monitoring.

Most of underground water samples in package 1a, 1b and 3 were contaminated by Cl<sup>-</sup>, 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.

Wastewater in the monitoring in March 2012 contained high amount of coliform. This is mainly due to runoff of rainwater and low hygiene of drainage system.

Other monitoring parameters in general satisfied environmental standards.

## 5. Environmental and Training and Orientation

An 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.

**Table 6: Number of workers participating in environmental and safety trainings**

| Time    | Package 1a |                  | Package 1b |                  | Package 2 |                  | Package 3 |                  |
|---------|------------|------------------|------------|------------------|-----------|------------------|-----------|------------------|
|         | Induction  | Regular training | Induction  | Regular training | Induction | Regular training | Induction | Regular training |
| 01/2012 | 18         |                  |            |                  | 25        | 87               | 4         |                  |
| 02/2012 | 50         |                  |            | 57               | 20        | 32               | 124       | 288              |
| 03/2012 | 0          | 46               | 14         | 117              | 102       | 132              | 85        | 290              |
| 04/2012 | 23         |                  | 32         | 124              | 130       | 148              | 80        | 203              |
| 05/2012 | 10         | 30               |            | 87               | 94        | 127              | 129       | 243              |
| 06/2012 | 5          |                  |            | 83               | 24        | 82               | 49        | 285              |

## 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 issues were recorded including: haphazard dumping of spoil and trash, improper storage of fuel tanks, bentonite leaking into river.

Wastewater in the monitoring in March 2012 contained high amount of coliform. This is mainly due to runoff of rainwater and improper hygiene of drainage system.

## **6.2. Action Taken**

Action taken to mitigate/eliminate the above environmental problems:

- Implementation of necessary measures to avoid environmental issues cited in previous report and suggested by ADB during the mission: proper storage of oil/fuel tanks and drums, prohibition of haphazard dumping of spoil, supply of garbage bins.
- Cleaning floor of batching plant and drainage system to avoid contamination of coliform
- Environmental and safety problems were promptly corrected, especially for safety issue the contractor immediately stopped the work and only resume the work after the problem was solved.

## **6.3. Additional Action Required**

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

- Regular clean of batching plant and drainage system to avoid coliform contamination to treated wastewater.
- Regular spraying water and this practice shall be enhanced in dry day and strong wind
- Safety onsite was not properly implemented. Contractors shall strongly implement safety measures and the consultant shall more closely supervise the site to immediately stop violation of safety.

# **7. Conclusion and Recommendation**

The result of environmental monitoring results 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, COD, BOD).

Concentration of coliform in wastewater was high due to improper maintenance of drainage system. The drainage system shall be regularly checked and cleaned to avoid contamination of waste and run-off water.

There were safety problems due to carelessness and unawareness of workers as well as improper supervision. Training on environment and safety shall be implemented and

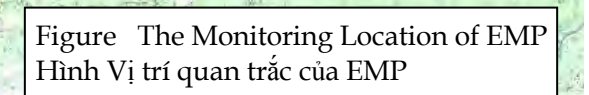
supervised regularly and new construction workers are immediately trained before starting their works onsite. Problems or accidents shall be informed to all contractors as lessons learnt.

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

- Regular clean of batching plant and drainage system to avoid coliform contamination to treated wastewater.
- Regular spraying water and this practice shall be enhanced in dry day and strong wind
- Safety onsite was not properly implemented. Contractors shall strongly implement safety measures and the consultant shall more closely supervise the site to immediately stop violation of safety.



## 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



Ground water sampling, Pk1a



Surface water sampling, Pk1a



Air monitoring, Pk 1b



Surface water sampling Dong Nai River, Pk 2.



Air sampling km 23+150, Pk 3

### Environmental monitoring by contractors



Air sampling at A1, Pk1a (22:00 – 23:00)



Soil sampling, Pk1a



Ground water sampling



Surface water sampling at W8, Pk2



Surface water sampling at W4 (high tide)



Air sampling at NVA-2 (10:00 – 12:00)



### Supervision activities



Oil/fuel drums were haphazard stored on the deck (Package 2)



The deck was cleaned and empty oil drums were properly removed



Haphazard dumping of trash (Km 14+100 to Km 23+900 (Package 3)



Garbage was collected and removed to disposal. The garbage bins were provided on workplaces. workers were prohibited to haphazardly dump on site



Haphazard stored oil/fuel drums Km 18



Oil drums were removed to the storage and will be removed out of the site (return to suppliers)