

# Environmental Monitoring Report

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Semi-Annual Report (July - December 2014)  
January 2015

## VIE: Ho Chi Minh City-LongThanh-Dau Giay Expressway

Packages 7, 8 and 9

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

## **CURRENCY EQUIVALENTS**

(as of 1 January 2015)

Currency unit	–	dong (D)
D1.00	=	\$0.0000468
\$1.00	=	D21,385

## **NOTE**

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

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THE SOCIALIST REPUBLIC OF VIET NAM  
MINISTRY OF TRANSPORT  
VIETNAM EXPRESSWAY CORPORATION

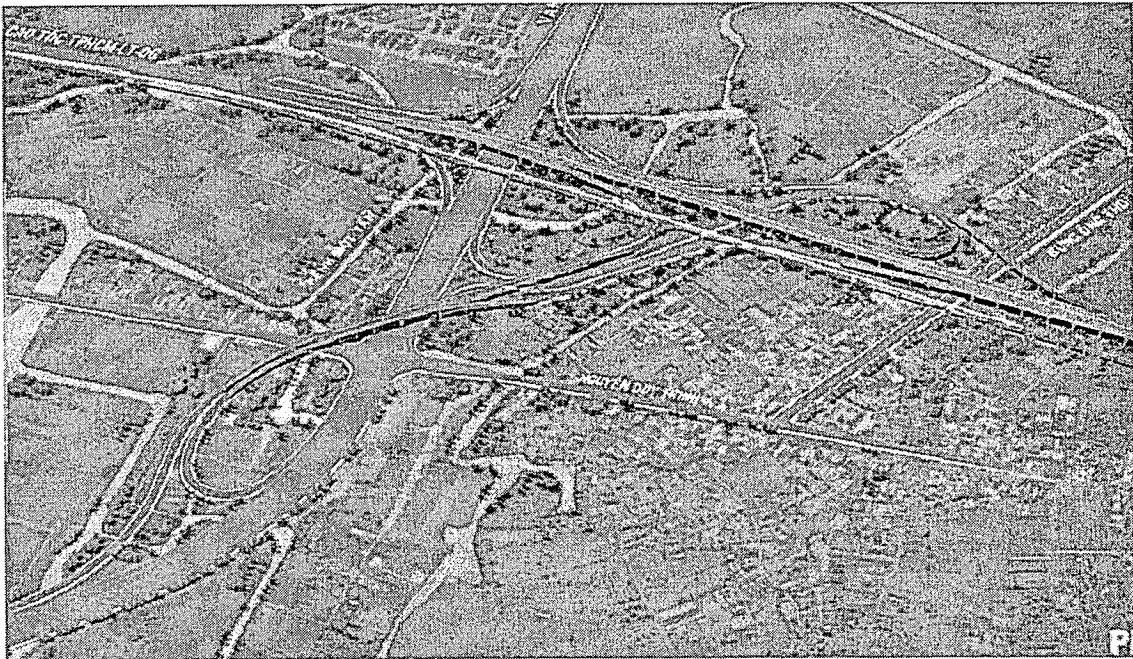
HOCHIMINH – LONG THANH – DAU GIAY EXPRESSWAY

PROJECT MANAGEMENT UNIT (HLD EPMU)



NORTH-SOUTH EXPRESSWAY CONSTRUCTION PROJECT  
HO CHI MINH CITY – DAU GIAY SECTION (CS)

LOAN NO. VNXV-1



SEMI-ANNUAL ENVIRONMENTAL SUPERVISION REPORT

CONSTRUCTION STAGE

PACKAGES 7, 8 AND 9

(July 2014 – December 2014)

JANUARY 2015

Consortium of  
Nippon Koei Co., Ltd  
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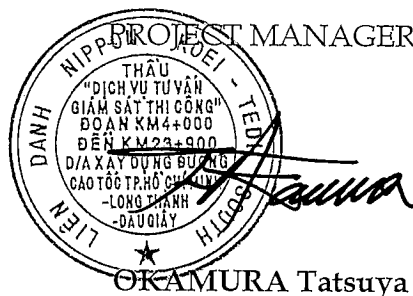


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CONSTRUCTION STAGE  
PACKAGES 7, 8 AND 9  
(JULY– DECEMBER 2014)

Consortium of NIPPON KOEI & TEDI SOUTH



JANUARY 2015

Consortium of  
Nippon Koei Co., Ltd  
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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 2014 –December 2014) is to summarize the environmental supervision activities by Contractors and Construction Supervision Consultants (CS Consultants) to support VEC to prepare environmental supervision reports to JICA, 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*

Packages 7, 8 and 9 have been proceed for the commencement date for each package as follows:

- Package 7 and 8: the commencement date of packages No.7 and No.8 is on 27<sup>th</sup> February 2013 and construction period is 24 months for each package.
- Package 9: the commencement date of this package is on 02<sup>nd</sup> April 2013 and construction period is 24 months.

Environmental management plan was submitted by the Contractor and they were approved. The site batching plan, site laboratories, casting yard...were completed and stable in operation.

The Contractors have entered into the contract with environmental monitoring sub-contractor. The initial environmental monitoring was carried out in April 2013.

And environmental monitoring was carried out for the initial monitoring by the CS Consultant in March 2013.

#### 1.2.1. Scope of project

Ho Chi Minh City – Long Thanh – Dau Giay Section is of great importance under North – South Expressway Construction Project. The Project, which goes through districts 2 and 9 under Ho Chi Minh City and Long Thanh, Nhon Trach, Cam My and Thong Nhat Districts under Dong Nai Province.

Total length of the project is 54.98 km with 4 lanes (phase 1) from starting point at An Phu Interchange at District 2 under Ho Chi Minh City (Km0+000) to ending point at Interchange with National Highway 1A at Dau Giay under Dong Nai Province (km54+984).

The Project section is divided into 9 civil works packages (1a, 1b, 2, 3, 5, 6, 7, 8 and 9) and one ITS work Package (4). This report covers Package 7 with total length 2Km, Package 8 with total length 2Km and Package 9 is interchange with Ring road No.2 under Ho Chi Minh City. Specifically as follows:

- Package 7 has beginning point at Km0+000 and ending point at Km2+000, with total length 2Km, and 02 bridges. Design speed 80Km/h
- The Package 8 has starting point at Km2+00, district 2 and ending point at Km4+00 district 9, Ho Chi Minh City, with 2Km length. Design speed is 80 km/h according to Vietnamese Standard TCXDVN 104-2007, HL93 design loading.
- Package 9 includes Ring Road 2 Interchange Km 4+514 (excluding main road Interchange expressway). 8 Ramps with design speed 40 Km/h (except Ramp A1; D1 with design speed 60 Km/h).

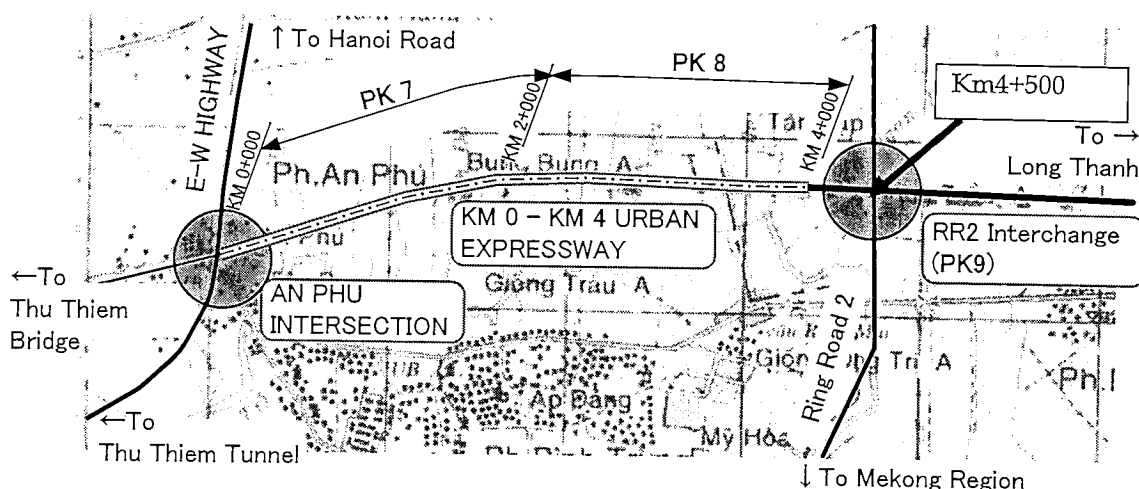


Figure 1. Packages 7, 8 and 9 locations

### 1.2.2. Implementation Progress

The construction progress of each package as of December 2014 is described as follows

#### ✚ PACKAGE 7

- Excavation and disposal of topsoil; off site, Prefabricated Vertical Drains (PVD), VCM, Surcharge, Capping layer, Aggregate Sub-Base, Aggregate Base: completed
- Asphalt Concrete: Construction 17,266 m<sup>2</sup> in Dec 2014
- Bored pile, Construction of pile cap, pier column and headstock, Manufacturing of Super-T girder for Muong Kenh Bridge and girder I for Ba Dai Bridge, Launching of Super-T girder for Muong Kenh Bridge and girder I for Ba Dai Bridge, Precast concrete pile (30x30 cm): completed

#### ✚ PACKAGE 8

- Backfilling and Working Platform Filling: completed.
- Painting island: Completed soil replacement work. Ramp Y2, Y3, DXH: The Contractor's plan to construct in the next month.
- PVD installation, VCM Application, Surcharge work, Removal of surcharge, Thruway and Ramp way: completed 100%
- Construction of capping layer: Carrying out construction of capping layer at Block 2 (Km2+248-Km2+495) accomplishment quantity in this month is 401m<sup>3</sup>. Block 3 (Km2+495 to Km3+740) accomplishment quantity in this month is 160m<sup>3</sup>.
- Construction of Sub-base layer: Construction of Sub-base layer at Block 2 (Km2+248-Km2+495) accomplishment quantity in this month is 1,069m<sup>3</sup>. Block 3 (Km2+495 to Km2+740) accomplishment quantity in this month is 1,305m<sup>3</sup>. Block 4&5 (Km2+740 to Km3+001) accomplishment quantity in this month is 328m<sup>3</sup>. Block 7 (Km3+435 to Km3+636) accomplishment quantity in this month is 505m<sup>3</sup>.



- Construction of Base Course layer: Construction of Base Course layer at Block 1 (Km2+00 to Km2+248) accomplishment quantity in this month is 1,074m<sup>3</sup>. Block 2 (Km2+248-Km2+495) accomplishment quantity in this month is 941m<sup>3</sup>. Block 3 (Km2+495 to Km2+740) accomplishment quantity in this month is 776m<sup>3</sup>.
- Construction of Asphalt treated base: Construction of Asphalt treated base at Block 1 (Km2+00-Km2+248).Accomplishment quantity in this month is 571m<sup>2</sup>. Block 7 (Km3+435-Km3+636) accomplishment quantity in this month is 3,288m<sup>2</sup>. Block 8 (Km3+636-Km3+815) accomplishment quantity in this month is 3,739m<sup>2</sup>. Block 9 (Km3+939-Km4+11) accomplishment quantity in this month is 3,321m<sup>2</sup>.
- Construction of asphalt concrete binder course: Construction of Asphalt concrete binder course at Block 7 (Km3+435-Km3+636) accomplishment quantity in this month is 3,223m<sup>2</sup>. Block 8 (Km3+636-Km3+815) accomplishment quantity in this month is 3,131m<sup>2</sup>. Block 9 (Km3+636- Km3+815) accomplishment quantity in this month is 3,298m<sup>2</sup>.
- Installation of curb: Installation of curb at Block 1, 2 &3 (Km2+00-Km2+740) accomplishment quantity in this month is 500m. Block 7&8 (Km3+415-Km3+837) accomplishment quantity in this month is 408m. Block 9 (Km3+915-Km4+11) accomplishment quantity in this month is 180m.
- Installation of guardrail: Installation of guardrail at Block 1, 2 &3 (Km2+00-Km2+740) accomplishment quantity in this month is 200m. Block 4&5 (Km2+740-Km3+001) accomplishment quantity in this month is 432m. Block 7&8 (Km3+415-Km3+837) accomplishment quantity in this month is 290m.
- Sub-structure, Bored pile, Sub-structure Work, Do Xuan Hop Flyover, Ba Hien's Bridge: Completed 100%.
- Superstructure: Do Xuan Hop Flyover hollow slab girders Fabrication and erection completed 100%.
- Deck slab and link slab100% completion. In this month the Contractor completed 930md railing, equivalent to 100% completion; Ba Hien Bridge: Completed girder fabrication and erection. Deck slab and link slab 100% completion. In this month the Contractor completed 172md railing, equivalent to 100% completion.
- Approach Slab: RC pile fabrication, RC pile driving: 100% completion.

#### ✦ PACKAGE 9

All works is completed in November 2014. Therefore implementation progress is presented following to date November 2014.

- Earth work and Soft Soil Improvement: The contractor is carrying out the construction of ramp A1, D1, B1, C2, Sub-Base: 554m<sup>3</sup> (completed), Base: 1536 m<sup>3</sup> (Completed), ATB : 6815m<sup>2</sup>, Completed, ACB: 9757 m<sup>2</sup>, (Completed), ACS: 16000 m<sup>2</sup> up to now 51088m<sup>2</sup> ( All ramp)

- Bridge substructure: completed
- Bridge superstructure: In this month, Contractor Completed 9m Expansion Joint at Ramp C2 up to now 252m.
- Lighting and Electrical work: Construction of Lighting and electrical was completed and the two Ramps A1 & D1 were put into operation. Installation 0 nos for Road Lighting , up to now 157 nos ( Style 11m: 81 nos; Style 12m: 76 nos; Style 25m: 09 nos ) for Road and Bridge. Completion 03 Substation, Lighting Cable Style 4C-10mm2: 507m; Sytle 4C-16mm2: 1283m , Sytle 4C-25mm2: 4198m and 4C-35mm2: 288m.
- Works Other: Slope Protect for Road ( SP1): 6790m2 up to now 18359m2; installation 1612m Guardrail, up to now 10745m; Fence 1216m up to now 4516m; RC Slab 0 nos, up to now 09 nos; Pipe culvert 0 nos up to now 06 nos; Box culvert 0 nos, up to now 08 nos.

## 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 shall 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.

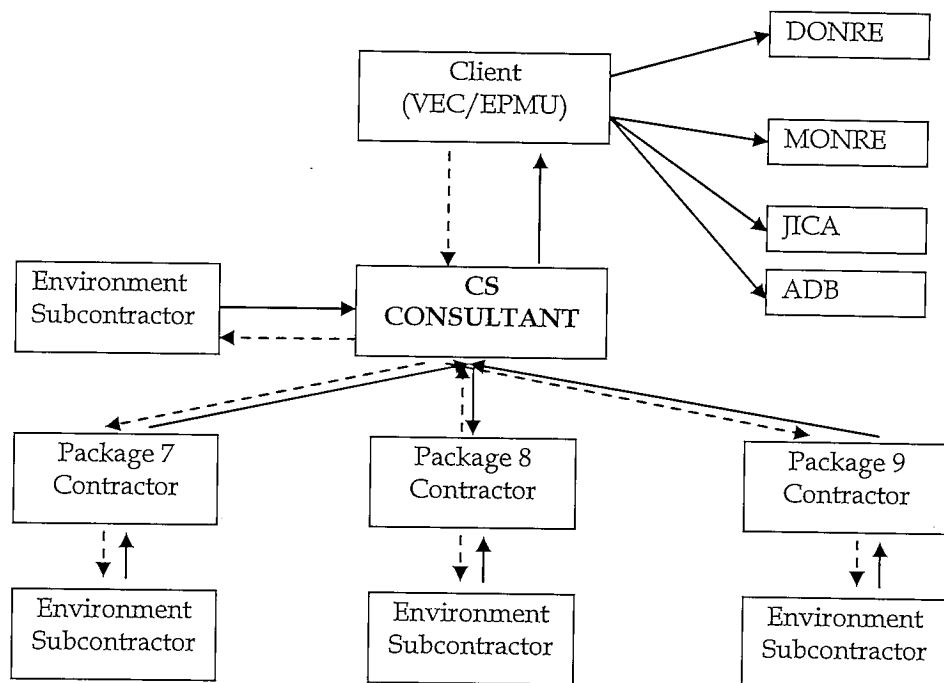


Figure 2. Framework of organizations regarding environmental management

### 3. SUMMARY OF ENVIRONMENTAL MITIGATIONS AND COMPLIANCE WITH EMP

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
I.	Over-all	Good		
	Prepare and implement a site-specific EMP			
II.	Air quality			
2.1	Construction activities			
	<ul style="list-style-type: none"> <li>- No burning of debris or other materials will occur on the site.</li> <li>- For material transportation: prevent dust by covering and wetting loads, limiting the speed for vehicles transporting construction materials, and watering roads and other open areas regularly.</li> <li>- Construction walls will be provided in all locations where strong winds could blow dust and debris. In residential areas, such as An Phu build 3m high fences with fiberboards and iron sheets to minimize dust and noise.</li> <li>- Stockpiles of sand and aggregate greater than 20 cubic meters for use in concrete manufacture</li> </ul>	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>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> <ul style="list-style-type: none"> <li>- 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.</li> <li>- All equipment on the site will be checked at least every week and remodeling necessary to ensure compliance with safety requirements and avoid air pollution.</li> </ul>			
2.2	Measures to reduce air pollution and dust caused by the use of vehicles and machinery			
	<ul style="list-style-type: none"> <li>- 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.</li> <li>- 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).</li> <li>- Ensure that vehicles and machinery are used and maintained properly to meet applicable emission standards. Fuel-efficient vehicles shall be preferred.</li> <li>- All vehicles, while parked on the site, will be required to have their engines turned off.</li> <li>- Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards.</li> <li>- 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.</li> <li>- Conduct regular site inspections to ensure the use of best practices and report any complaints from local people.</li> <li>- 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</li> </ul>	Fair	There are much dust arising from temporary road of Packages 7, 8, especially Nguyen Thi Dinh Street at Pk7 area and Do Xuan Hop Street at Pk8 area always arising much dust due to constructor's vehicle transfer material to the site.	The Contractor had arranged the workers to clean up the road and water for dust control

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
2.3	Mitigation measure by crushing, concrete and asphalt plant operation			
	<ul style="list-style-type: none"> <li>- An air pollution control system shall be installed and shall be operated whenever the plant is in operation.</li> <li>- 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.</li> <li>- Dry mix batching shall be carried out in a totally enclosed area with exhaust to suitable fabric filters.</li> <li>- 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.</li> </ul>	Good		
III.	Noise and vibration			
	<ul style="list-style-type: none"> <li>- Vehicles and machinery must be used, maintained and equipped so as to avoid unnecessary noise and vibration.</li> <li>- Plants must be located away from sensitive areas and noisy construction work, such as crushing, concrete mixing and batching plan must be done during daylight hours.</li> <li>- 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.</li> <li>- 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.</li> <li>- 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.</li> <li>- Be responsible for repairing any damage caused as the result of vibrations generated from or by the use of his equipment, plant, and machinery.</li> <li>- The minimum effective height of the noise barriers should be as such that no part of the</li> </ul>	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>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 standard requirements.</p> <ul style="list-style-type: none"> <li>- 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;</li> <li>- The barrier shall not be located where it prevents access to community facilities, residential areas, and places of work or access routes.</li> <li>- 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.</li> <li>- 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.</li> <li>- 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.</li> </ul>			
IV.	Water quality			
	<ul style="list-style-type: none"> <li>- Wastewater from mixing materials will be drained to a separate collecting system, and processed by sediment traps before release to the public drainage system.</li> <li>- Mud from drilling will be collected and processed to avoid pollution of surface water.</li> <li>- Drilling solutions for performing the abutment will be processed in a closed system, especially for abutments at the riverbed.</li> <li>- Inner-lined drill holes will be used during piling.</li> <li>- 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</li> </ul>	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>materials arising from the works. Chemicals, sanitary wastewater, spoil, waste oil and concrete agitator washings will not be deposited in the watercourses</p> <ul style="list-style-type: none"> <li>- The Contractor will ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities.</li> <li>- 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.</li> <li>- 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).</li> <li>- 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.</li> <li>- 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.</li> <li>- Downstream slopes will be stabilized, where warranted, with concrete, rock gabions or walls to avoid erosion.</li> <li>- Prepare emergency response plan in case of fuel and chemical spills</li> </ul>			
V.	Loss of water resources			
	<ul style="list-style-type: none"> <li>- Any source of water (potable or otherwise) for the community, such as wells, ponds or tube wells, accidentally lost will be replaced immediately.</li> <li>- 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</li> </ul>	Very good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	displacement (of the new site from the old); the replacement will be ready prior to demolition/dismantling of the existing source.			
VI.	<b>Erosion</b>			
	<ul style="list-style-type: none"> <li>- Provide temporary or permanent drainage to protect sites susceptible to erosion.</li> <li>- Stabilize downstream slopes on rivers and streams prone to erosion problems.</li> <li>- Protect sensitive surface/erosion prone site with vegetation and replace removed trees to ensure interception of rainwater and deceleration of surface runoff as soon as possible after construction works.</li> <li>- On streams, downstream slopes can be stabilized with concrete, rock gabions or walls as seen necessary.</li> <li>- 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.</li> </ul>	Very good		
VII.	<b>Changes in Hydrological Situation and Irrigation systems</b>			
	<ul style="list-style-type: none"> <li>- 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.</li> <li>- 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.</li> </ul>	Good		
VIII.	<b>Waste and Spoils disposal</b>			
	<ul style="list-style-type: none"> <li>- Waste from construction activities, including the demolishing of structures before the construction itself begins, must be collected and recycled when possible.</li> <li>- Establish hygienic groups to collect waste from construction camp sites and to ensure the cleanliness of the whole construction area.</li> <li>- Spoils from the works will only be disposed of in selected locations approved by local</li> </ul>	Poor	Contractor of Package 7, 8 have not collected garbage regularly and disposal at approval area. Garbage is still	Sedimentation has been dredged and collect garbage when CS Consultant's requirement



No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>authorities.</p> <ul style="list-style-type: none"> <li>- Disposal shall not cause adverse impacts to water and soil quality as well as land use.</li> <li>- The locations of spoils disposal sites will be specified by the contractor in the site-specific EMP before the beginning of construction activities.</li> </ul>		burn on the site.	
<b>IX.</b>	<b>Handling of hazardous and toxic materials</b>			
	<ul style="list-style-type: none"> <li>- 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.</li> <li>- The contractor also ensures that employees are trained on handling hazardous materials.</li> <li>- 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.</li> <li>- Use and maintain vehicles and machinery properly to avoid accidental spills.</li> </ul>	Good		
<b>X.</b>	<b>Contamination of soil</b>			
	<ul style="list-style-type: none"> <li>- Use good housekeeping practices to avoid any contamination of soil from solid wastes, wastewater and hazardous materials.</li> <li>- All wastes shall be disposed in designated disposal sites approved by local authorities.</li> <li>- Ensure all workers are aware of the importance of careful handling of hazardous and dangerous materials. Prepare emergency plans for accidents.</li> </ul>	Good		
<b>XI.</b>	<b>Loss of vegetation cover</b>			
	<ul style="list-style-type: none"> <li>- Minimize the clearing of vegetation for construction activities and borrow areas.</li> <li>- Re-vegetate embankment slopes and road cuts.</li> <li>- Landscape road verges and plant vegetation to contribute to aesthetic value.</li> <li>- Where roadside trees are lost as a result of construction activities, the Contractor shall replant trees as a ratio of one-to-one.</li> <li>- 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.</li> </ul>	Very good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	- The Contractor will be responsible for all works associated with tree planting including maintenance of the trees for a one-year period after planting.			
<b>XII.</b>	<b>Safety</b>			
	<ul style="list-style-type: none"> <li>- 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.</li> <li>- 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.</li> <li>- 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.</li> <li>- 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.</li> <li>- Implement a Safety Training Program consisting of: <ul style="list-style-type: none"> <li>a. Initial Safety Induction Course</li> <li>b. Periodic Safety Training Courses</li> <li>c. Safety Meetings</li> <li>d. Safety Inspections</li> <li>e. (e) Safety Equipment and Clothing</li> </ul> </li> </ul>	Good		
<b>XIII.</b>	<b>Traffic conditions and use of waterways</b>			
	- Contractor to formulate and implement a traffic management plan minimizing the disturbance caused by construction activities. The plan shall	Very good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>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> <ul style="list-style-type: none"> <li>- 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: <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> </li> <li>- 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.</li> <li>- 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.</li> <li>- 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.</li> <li>- 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</li> <li>- Organize temporary means of access to avoid</li> </ul>			

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	such short-term negative impacts. Maintain local roads and bridges used by construction vehicles.			
XIV.	Historic and Cultural Resources			
	<ul style="list-style-type: none"> <li>- Protect sites of known antiquities, historic and cultural resources by the placement of suitable fencing and barriers.</li> <li>- Not located construction camps within 500 meters from cultural resources.</li> <li>- Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Vietnam.</li> <li>- 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.</li> </ul>	Good		
XV.	Utilities			
	<ul style="list-style-type: none"> <li>- Ascertain and take into account, in the method of working, the presence of utility services on and in the vicinity of the site.</li> <li>- 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.</li> <li>- 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.</li> <li>- Exercise the greatest care at all times to avoid damage to or interference with services.</li> <li>- 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.</li> <li>- 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</li> </ul>	Very good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	<p>diverted to the satisfaction of the appropriate authority prior to the commencement of such construction.</p> <ul style="list-style-type: none"> <li>- When working in the vicinity of overhead power cable, 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.</li> <li>- The Contractor will consult with local area 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.</li> </ul>			
XVI.	<b>Social impacts Consultation and Complaints Procedures</b>			
	<ul style="list-style-type: none"> <li>- Provide local community information on upcoming construction related activities and issues related to traffic safety.</li> <li>- Record any complaints received and respond to them promptly.</li> <li>- Co-operate with local authorities to prevent and solve problems related to environmental issues.</li> </ul>	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

###### a. Monitoring Items:

Monitoring items include air quality, noise, vibration, surface water quality,

groundwater quality and soil.

b. *Environmental reference standards:*

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

Table 2. Environmental standards

No	Environmental component	Environmental regulation
1	Air quality	QCVN 05:2013/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.

c. *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 locations are summarized as following table. Map of sampling location is presented in the Appendix 1.

Table 3. Monitoring locations

No.	Location	Sign for monitoring sample	Package 7	Package 8	Package 9
I.	AIR, NOISE AND VIBRATION				
1	An Phu intersection with HLD expressway	A7	Km0+200	-	-
2	Phu Huu Ward	A8	-	Km3+200	-
3	Ring road No.2 Interchange under Ho Chi Minh City	A9	-	-	Km4+500
II.	SURFACE WATER				
1	Ba Dai canal	SW7-1 SW7-2	Km0+346 (Upstream)	-	-

No.	Location	Sign for monitoring sample	Package 7	Package 8	Package 9
		SW7-3 SW7-4	Km0+346 (Downstream)	-	-
2	Muong Kenh canal	SW7-5 SW7-6	Km1+150 (Upstream)	-	-
		SW7-7 SW7-8	Km1+150 (Downstream)	-	-
3	Ong Cai river	SW8-1 SW8-2	-	Km3+380 (Upstream)	-
		SW8-3 SW8-4	-	Km3+380 (Downstream)	-
III.	GROUND WATER				
1	An Phu Ward	GW7-1 GW7-2 GW7-3	Km0+200	-	-
2	Residential of Phu Huu Ward	GW8-1 GW8-2 GW8-3	-	Km3+200	-
3	Residential live around Ring road No.2 Interchange under Ho Chi Minh City	GW9-1 GW9-2 GW9-3	-	-	Km4+500
IV.	SOIL				
1	Near Muong Kenh canal	S7-1 S7-2 S7-3	Km1+150	-	-
2	Near Ong Cai river	S8-1 S8-2 S8-3	-	Km3+380	-
3	Residential living around Ring road No.2 Interchange under Ho Chi Minh City	S9-1 S9-2 S9-3	-	-	Km4+500

*d. 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 7	Package 8	Package 9
2013	3	X/1 (Initial Survey)	X/1 (Initial Survey)	X/1 (Initial Survey)
	6	X/2	X/2	X/2
	9	X/3	X/3	X/3
	12	X/4	X/4	X/4
2014	3	X/5	X/5	X/5
	6	X/6	X/6	X/6
	9	X/7	X/7	X/7
	12	X/8	X/8	X/8
2015	3			
	6	X/9	X/9	X/9
	12	X/10	X/10	X/10
2016	6	X/11	X/11	X/11
	12	X/12	X/12	X/12

: Construction period (PK7, 8 and 9 =24 months)

: Operation period (Defect liability Period=24 months)

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

#### 4.1.2. Monitoring Result

##### a. AIR QUALITY

##### ✚ PACKAGE 7

No.	Monitoring at Package 7 area	SO2	NO2	HC	TSP	CO
		mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
1	September 2014	0,06	0,049	0,66	0,15	2,69
2	December 2014	0,07	0,056	0,97	0,22	3,45
3	Baseline data (03/2013)	<b>0,065</b>	<b>0,1</b>	<b>0,85</b>	<b>0,39</b>	<b>7,08</b>
QCVN 05:2013/BTNMT		<b>0,35</b>	<b>0,2</b>	-	<b>0,3</b>	<b>30</b>
QCVN 06:2009/BTNMT				<b>5</b>		
Evaluation		Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

##### Remark:

Most of the parameters recorded during the last 6 months of 2014 (September and December 2014) showed that the concentration of dust and toxic gases such as SO2, NO2, CO and HC



are in the allowable limits of regulations QCVN 05: 2013 / BTNMT, QCVN 06: 2009/BTNMT and these values are lower than the baseline data (March 2013). Construction activities in this period did not effect on the surrounding.

#### ✶ PACKAGE 8

No.	Monitoring at Package 8 area	SO2	NO2	HC	TSP	CO
		mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
1	September 2014	0,08	0,07	1,07	0,22	5,70
2	December 2014	0,08	0,07	1,25	0,29	4,68
3	Baseline data (03/2013)	0,01	0,05	0	0,13	3,10
QCVN 05:2013/BTNMT		0,35	0,2	-	0,3	30
QCVN 06:2009/BTNMT				5		
Evaluation		See below	See below	See below	See below	See below

#### Remark:

For environmental area of Package 8 in last 6 months of 2014 (September and December 2014) showed that most of the recorded parameters of toxic gases and dust were higher than baseline data in March 2013. This is shown that construction activities during this stage was impact on ambient air of this area but not significantly due to all these parameters still meet the allowable limits of regulations of QCVN 05: 2013/BTNMT, QCVN 06: 2009/BTNMT. In addition this effect is not only affected by the project activities but also due to the operation of traffic on Do Xuan Hop Street.

#### PACKAGE 9

No.	Monitoring at Package 9 area	SO2	NO2	HC	TSP	CO
		mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
1	September 2014	0,06	0,05	1,02	0,16	3,39
2	December 2014	0,07	0,05	0,70	0,16	2,94
3	Baseline data (03/2013)	0,09	0,06	0	0,28	2,90
QCVN 05:2013/BTNMT		0,35	0,2	-	0,3	30
QCVN 06:2009/BTNMT				5		
Evaluation		Acceptable	Acceptable	Acceptable	See below	Acceptable

**Remark:**

Most monitored parameters in ambient air at project area in the last 6 months in 2014 (September and December 2014) were lower than baseline data in March 2013 and all of them are lower than the allowable limits of regulations QCVN 05: 2013/BTNMT, QCVN 06: 2009 / BTNMT. This proves that the construction activities of this stage were impact on surroundings.

**b. NOISE AND VIBRATION LEVEL**

**\* PACKAGE 7**

No.	Monitoring at Package 7 area	Noise level (dBA)		Vibration level (dB)	
		6-21h	21-22h	6-21h	21-22h
	September 2014	64,8	60,2	51,3	45,6
	December 2014	64,4	60,5	51,2	47,2
	Baseline data (03/2013)	58,3	63,5	54,1	58,5
	QCVN 27:2010/BTNMT	-	-	75	Baseline value shall be applied for allowable value
	QCVN 26:2010/BTNMT	70	55	-	-
	Evaluation	See below	Acceptable	Acceptable	Acceptable

**Remark:**

- Noise level: noise levels during period of time from 06:00 to 21:00 are higher than baseline data and they still meet the allowable limits of regulation QCVN 26: 2010/BTNMT. This demonstrates that construction activities were cause of the noise in the area but these noise levels are still under control. During the period of time from 21:00 to 22:00, noise levels are higher than the allowable limits of regulation but they still lower than baseline data. This is also shown that this area has been affected by traffic of existing road before construction project.
- Vibration level: vibration levels recorded during two periods of times in the last 6 months of 2014 are lower than baseline data and they are also lower than the allowable limits of regulation QCVN 26: 2010 / BTNMT.

#### ✦ PACKAGE 8

No.	Monitoring at Package 8 area	Noise level (dBA)		Vibration level (dB)	
		6-21h	21-22h	6-21h	21-22h
	September 2014	62,9	50,9	48,7	37,5
	December 2014	61,8	65,1	47,9	38,4
	Baseline data (03/2013)	54,6	51,6	39,1	26,5
	QCVN 27:2010/BTNMT	-	-	75	Baseline value shall be applied for allowable value
	QCVN 26:2010/BTNMT	70	55	-	-
	Evaluation	See below	See below	See below	See below

#### Remark:

- Noise level: noise levels were recorded in the last 6 months of 2014 in the construction stage (September and December 2014) showed that they are 7 and 8 dBA higher than baseline respectively, but these noise levels are still lower than the allowable limits of regulations several times.

Noise levels during the period of time from 21: 00 to 22: 00 in September 2014 meet the allowable limits of regulation and they are also lower baseline data but noise levels in December 2014 are higher than the allowable limits of regulation and baseline data. Noise level is higher than baseline data due to the impact from operation of existing traffic and partly due to the impact of the project activities.

- Vibration levels: vibration levels in the last 6 months of 2014 during two periods of time (06: 00-21: 00 and 21:00 to 22:00) are higher baseline data and allowable limits of regulations. This proves that the construction activities of package 8 during this stage impacted surroundings. However, they are still under control.

#### ✦ PACKAGE 9

No.	Monitoring at Package 9 area	Noise level (dBA)		Vibration level (dB)	
		6-21h	21-22h	6-21h	21-22h
	September 2014	65,0	58,4	46,7	40,4
	December 2014	59,5	56,5	44,4	40,4
	Baseline data (03/2013)	51,3	53,4	47,2	47,1

No.	Monitoring at Package 9 area	Noise level (dBA)		Vibration level (dB)	
		6-21h	21-22h	6-21h	21-22h
	QCVN 27:2010/BTNMT	-	-	75	Baseline value shall be applied for allowable value
	QCVN 26:2010/BTNMT	70	55	-	-
	Evaluation	See below	See below	Acceptable	Acceptable

**Remark:**

- Noise level: noise levels are higher than baseline data during period of time (6:00 am to 9:00 p.m.) in the last 6 months of 2014 the background monitoring. This demonstrates that high noise level at project area is due to impacting by construction activities of project but they are still under control because they are still lower than the allowable limits of regulations QCVN 26: 2010/BTNMT. Noise levels recorded during the previous of time from 21:00 to 22:00 are higher than baseline data and regulation. This effect is not only construction activities of project but also affect by operations of existing traffic (monitoring locations is near Nguyen Duy Trinh Street - traffic density of this area is always high).
- Vibration level: Vibration levels are lower than baseline data and the allowable limits of regulations in at during two periods of time in the last 6 months of 2014.

**c. SURFACE WATER QUALITY**

**✦ PACKAGE 7**

No.	Monitoring locations of Ba Dai and Muong Kenh Canal	pH	SS (mg/l)	BOD <sub>5</sub> (mg/l)	COD (mg/l)	Coliform MPN/100ml
<b>I.</b>	<b>PACKAGE 7</b>					
1.1	<b>Ba Dai canal</b>					
	September 2014					
	SW7-1	6,22	24	12	22	1300
	SW7-2	6,16	29	10	19	410
	SW7-3	6,14	25	13	25	630
	SW7-4	6,19	30	10	19	270
	December 2014					
	SW7-1	6,37	27	10	18	930
	SW7-2	6,26	31	8	15	270
	SW7-3	6,28	5	9	17	1100
	SW7-4	6,32	7	9	16	760

No.	Monitoring locations of Ba Dai and Muong Kenh Canal	pH	SS (mg/l)	BOD <sub>5</sub> (mg/l)	COD (mg/l)	Coliform MPN/100ml
	<b>Baseline data ( March 2013)</b>					
	SW7-1	6,78	44,0	4,8	<30	480000
	SW7-2	6,84	33,2	4,6	<30	150000
	SW7-3	6,95	28,0	4,3	<30	46000
	SW7-4	7,03	81,6	3,9	<30	48000
1.2	Muong Kenh canal					
	September 2014					
	SW7-5	6,31	24	9	16	390
	SW7-6	6,15	26	7	13	1200
	SW7-7	6,23	28	9	17	1500
	SW7-8	6,45	29	8	16	490
	December 2014					
	SW7-5	6,43	31	8	15	490
	SW7-6	6,29	14	12	22	230
	SW7-7	6,34	17	12	21	150
	SW7-8	6,48	9	10	18	940
	<b>Baseline data ( March 2013)</b>					
	SW7-5	6,83	34,4	4,5	<30	11000
	SW7-6	6,92	27,2	5,0	<30	24000
	SW7-7	6,97	13,6	4,6	<30	240000
	SW7-8	6,86	86,8	4,9	<30	75000
QCVN 08:2008/ BTNMT		5,5 - 9	50	15	30	7500
Evaluation		Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

**Remark:**

Surface water samples were taken from Ba Dai and Muong Kenh channel in the last 6 months of 2014 (September and December 2014). They were analyzed and showed that all parameters meet the allowable limits of regulations QCVN 08: 2008 / BTNMT column B1 and mostly lower than baseline data in March 2013.

**⚡ PACKAGE 8**

No.	Monitoring locations of Ong Cai River	pH	SS (mg/l)	BOD <sub>5</sub> (mg/l)	COD (mg/l)	Coliform MPN/100ml
	September 2014					
	SW8-1	6,16	52	7	13	2100
	SW8-2	5,55	44	9	16	390
	SW8-3	6,18	48	10	19	230
	SW8-4	6,21	43	8	16	1100
	December 2014					

No.	Monitoring locations of Ong Cai River	pH	SS (mg/l)	BOD <sub>5</sub> (mg/l)	COD (mg/l)	Coliform MPN/100ml
	SW8-1	6,32	34	8	15	430
	SW8-2	6,40	8	10	18	210
	SW8-3	6,45	42	8	14	490
	SW8-4	6,43	21	7	13	930
	<b>Baseline data ( March 2013)</b>					
	SW8-1	6,85	72,8	5,2	<30	4600
	SW8-2	6,86	91,2	4,7	<30	4800
	SW8-3	6,92	62,0	4,6	<30	460
	SW8-4	6,91	110,0	5,1	<30	2400
<b>QCVN 08:2008/ BTNMT</b>		<b>5,5 - 9</b>	<b>50</b>	<b>15</b>	<b>30</b>	<b>7500</b>
<b>Evaluation</b>		Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

**Remark:**

Analysis results of pollution parameters in 04 samples of surface water of Ong Cai River (Ong Cai Bridge) in the last 6 months of 2014 (September and December 2014) are shown that most analysis parameters are lower than baseline data and they are lower than permitted values of regulation QCVN 08: 2008 / BTNMT column B1.

**d. GROUND WATER QUALITY**

No.	Locations	pH	Cl <sup>-</sup> (mg/l)	Hardness (mg/l)	Mn (mg/l)	Coliform MPN/100ml
<b>I.</b>	<b>PACKAGE 7</b>					
	<b>September 2014</b>					
	GW7-1	5,47	139,5	88,4	0,085	2
	GW7-2	5,61	169,5	74,8	0,082	KPH
	GW7-3	5,83	152,5	79,6	0,113	KPH
	<b>December 2014</b>					
	GW7-1	6,25	155,1	40,8	0,103	KPH
	GW7-2	6,03	154,1	26,7	0,116	3
	GW7-3	5,96	143,7	38,5	0,107	KPH
	<b>Baseline data (March 2013)</b>					
	GW7-1	5,92	602,7	185	0,37	4
	GW7-2	6,01	538,9	190	0,25	48
	GW7-3	6,02	368,7	50,0	0,15	< 03
<b>II.</b>	<b>PACKAGE 8</b>					
	<b>September 2014</b>					
	GW8-1	5,91	153,1	25,2	0,137	KPH
	GW8-2	5,74	137,1	24,4	0,106	KPH
	GW8-3	5,62	128,1	22,8	0,115	KPH
	<b>December 2014</b>					

No.	Locations	pH	Cl <sup>-</sup> (mg/l)	Hardness (mg/l)	Mn (mg/l)	Coliform MPN/100ml
	GW8-1	6,47	147,8	35,6	0,104	KPH
	GW8-2	6,51	153,6	31,7	0,112	3
	GW8-3	6,38	137,2	34,5	0,109	KPH
	<b>Baseline data (March 2013)</b>					
	GW8-1	5,43	117,7	15,0	0,079	23
	GW8-2	5,59	19,9	3,5	0,014	< 03
	GW8-3	5,28	109,2	11,0	0,063	< 03
<b>III.</b>	<b>PACKAGE 9</b>					
	<b>September 2014</b>					
	GW9-1	5,53	156,1	58,8	0,108	KPH
	GW9-2	5,61	176,1	76,4	0,112	KPH
	GW9-3	5,72	138,4	47,6	0,159	KPH
	<b>December 2014</b>					
	GW9-1	6,21	125,7	33,2	0,127	KPH
	GW9-2	6,19	104,7	31,8	0,093	KPH
	GW9-3	6,23	143,2	37,4	0,115	2
	<b>Baseline data (March 2013)</b>					
	GW9-1	4,63	340,3	39,0	0,60	48
	GW9-2	5,75	468,0	136	0,67	93
	GW9-3	5,96	347,4	118	0,63	48
<b>QCVN 09:2008/BTNMT</b>		<b>5,5 -8,5</b>	<b>250</b>	<b>500</b>	<b>0,5</b>	<b>3</b>
<b>Evaluation</b>		<b>Acceptable</b>	<b>Acceptable</b>	<b>Acceptable</b>	<b>Acceptable</b>	<b>Acceptable</b>

**Remark:**

All parameters were analyzed in 03 samples of groundwater which taken from the project area in September 2014 and December 2014 of Packages 7, 8 and 9 meet the allowable limits of regulations QCVN 09: 2008/BTNMT. Most of the analytical results of Packages 7 and 9 is lower than baseline data, but the pH and concentration of Cl, Mn and hardness are higher than baseline data but they still meet the allowable limits of regulations

**e. SOIL QUALITY**

No.	Location	pH	As mg/kg	Cd mg/kg	Cu mg/kg	Pb mg/kg
<b>I.</b>	<b>PACKAGE 7</b>					
	<b>September 2014</b>					
	S7-1	5,14	1,85	KPH	2,97	11,35
	S7-2	5,27	1,63	KPH	3,44	12,75
	S7-3	5,38	1,52	KPH	3,85	11,56
	<b>December 2014</b>					
	S7-1	5,32	2,48	KPH	4,52	14,73
	S7-2	5,85	1,54	KPH	3,18	13,66
	S7-3	5,04	2,14	KPH	3,51	14,67
	<b>Baseline data (March 2013)</b>					

No.	Location	pH	As mg/kg	Cd mg/kg	Cu mg/kg	Pb mg/kg
	S7-1	4,41	NTD	NTD	17,1	8,4
	S7-2	4,82	NTD	NTD	18,3	12,5
	S7-3	6,49	NTD	NTD	21,4	7,5
II.	<b>PACKAGE 8</b>					
	<b>September 2014</b>					
	S8-1	5,71	1,14	KPH	4,62	13,58
	S8-2	5,06	0,424	KPH	2,61	10,17
	S8-3	5,36	0,749	KPH	5,36	14,15
	<b>December 2014</b>					
	S8-1	4,92	2,36	KPH	2,82	14,73
	S8-2	5,14	0,864	KPH	2,25	12,43
	S8-3	5,25	0,833	KPH	3,15	11,98
	<b>Baseline data (March 2013)</b>					
	S8-1	5,23	NTD	NTD	21,4	7,5
	S8-2	5,13	NTD	NTD	21,0	8,4
	S8-3	6,16	NTD	NTD	9,2	3,5
III.	<b>PACKAGE 9</b>					
	<b>September 2014</b>					
	S9-1	6,15	0,831	KPH	5,92	12,56
	S9-2	5,27	0,639	KPH	4,86	14,93
	S9-3	5,46	0,758	KPH	7,14	13,15
	<b>December 2014</b>					
	S9-1	5,63	1,28	KPH	4,72	13,26
	S9-2	5,54	0,924	KPH	4,16	15,38
	S9-3	5,11	1,12	KPH	5,87	10,76
	<b>Baseline data (March 2013)</b>					
	S9-1	6,14	NTD	NTD	18,7	13,6
	S9-2	4,54	NTD	NTD	21,7	11,1
	S9-3	5,76	NTD	NTD	20,4	12,2
<b>QCVN 03:2008/BTNMT</b>		-	12	5	70	120
<b>Evaluation</b>		Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

**Remark:**

Most of the analysis results of groundwater quality at project area is lower than baseline data in March 2013, except concentration of As and Pb are higher than baseline data at all three packages but all of them are lower than the allowable limits of regulations of QCVN 03: 2008/BTNMT.

**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

TT	Item	Package 7	Package 8	Package 9
1	Air	3 points: VT1: Km 0+100 VT2: Km 0+740 VT3: Km 1+950	3 points: VT1: Km 2+200 VT2: Km 3+200 VT3: Km 4+000	3 points: VT1: Km 1+700 VT2: Km 0+000 VT3: Km 0+800
2	Noise	3 points: VT1: Km 0+100 VT2: Km 0+740 VT3: Km 1+950	3 points: VT1: Km 2+200 VT2: Km 3+200 VT3: Km 4+000	3 points: VT1: Km 1+700 VT2: Km 0+000 VT3: Km 0+800
3	Vibration	3 points: VT1: Km 0+100 VT2: Km 0+740 VT3: Km 1+950	3 points: VT1: Km 2+200 VT2: Km 3+200 VT3: Km 4+000	3 points: VT1: Km 1+700 VT2: Km 0+000 VT3: Km 0+800
4	Surface water quality	2 points: Ba Dai bridge Muong Kenh bridge	1 point: Ong Cai river	1 point: Mot Tan canal
5	Ground water quality	1 point: Km 0+800	1 point: Km 4+000	1 point: Km 0+000
6	Soil quality	1 point: Km 1+950	1 point: Km 3+200	1 point: Km 1+700

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

Table 6. Environmental monitoring schedule of contractors

Monitoring	Package 7	Package 8	Package 9
1 <sup>st</sup> monitoring (Baseline monitoring)	04/2013	04/2013	04/2013
2 <sup>nd</sup> monitoring	05/2013	05/2013	05/2013
3 <sup>rd</sup> monitoring	06/2013	06/2013	06/2013
4 <sup>th</sup> monitoring	07/2013	07/2013	07/2013
5 <sup>th</sup> monitoring	08/2013	08/2013	08/2013
6 <sup>th</sup> monitoring	09/2013	09/2013	09/2013
7 <sup>th</sup> monitoring	10/2013	10/2013	10/2013
8 <sup>th</sup> monitoring	11/2013	11/2013	11/2013
9 <sup>th</sup> monitoring	12/2013	12/2013	12/2013
10 <sup>th</sup> monitoring	01/2014	01/2014	01/2014

Monitoring	Package 7	Package 8	Package 9
11 <sup>th</sup> monitoring	02/2014	02/2014	02/2014
12 <sup>th</sup> monitoring	03/2014	03/2014	03/2014
13 <sup>th</sup> monitoring	04/2014	04/2014	04/2014
14 <sup>th</sup> monitoring	05/2014	05/2014	05/2014
15 <sup>th</sup> monitoring	06/2014	06/2014	06/2014
16 <sup>th</sup> monitoring	07/2014	07/2014	07/2014
17 <sup>th</sup> monitoring	08/2014	08/2014	08/2014
18 <sup>th</sup> monitoring	09/2014	09/2014	09/2014
19 <sup>th</sup> monitoring	10/2014	10/2014	10/2014
20 <sup>th</sup> monitoring	11/2014	11/2014	11/2014
21 <sup>st</sup> monitoring	12/2014	12/2014	12/2014

#### 4.2.2. Monitoring Result

The covering monitoring result from July to December 2014 of Packages 7, 8 and 9 are summarized as follows:

##### a. PACKAGE 7

##### ▪ Air quality

Monitoring results of parameters of SO<sub>2</sub>, NO<sub>2</sub>, CO during from July to December 2014 are shown that most monitoring results are higher than baseline data but they are lower than the allowable values of National technical regulation on ambient air quality (QCVN 05:2013/BTNMT).

As for dust content at location VT3 (Km1+950) recorded in months are high. Dust content at this area in July to December 2014 at hot, sunny weather (08:00 to 14:00) exceeded the allowable limit of regulations QCVN05:2013/BTNMT. Average dust concentration of the last 6 months of the year is higher than average dust concentration of baseline data. Analysis results of TSP in the months as follows:

- July 2014: dust content ranged from 0,065 – 0,348 mg/m<sup>3</sup>. Average dust concentration in January was 0,169 mg/m<sup>3</sup>. Dust content at VT3 exceeded the allowable regulations and baseline data at the time of 08:00 – 10:00 and 10:00 – 12:00
- August 2014: dust content ranged from 0,058 – 0,347 mg/m<sup>3</sup>. Average dust concentration in this month was 0,172 mg/m<sup>3</sup>. Dust content at VT3 exceeded the allowable regulations

and baseline data at the time of 08:00 – 10:00 and 10:00 – 12:00

- September 2014: dust content ranged from 0,072 – 0,301 mg/m<sup>3</sup>. Average dust concentration in this month was 0,158 mg/m<sup>3</sup>. Dust content at VT3 exceeded the allowable values of regulations and baseline data at the time of 12:00 – 14:00.
- October 2014: dust content ranged from 0,083 – 0,324 mg/m<sup>3</sup>. Average dust concentration in this month was 0,202 mg/m<sup>3</sup>. Dust content at VT3 exceeded the allowable value of regulations and baseline data at the time of 08:00 – 10:00 and 12:00 – 14:00.
- November 2014: dust content ranged from 0,065 – 0,317mg/m<sup>3</sup>. Average dust concentration in this month was 0,187mg/m<sup>3</sup>. Dust content at VT3 exceeded the allowable value regulations and baseline data at the time of 10:00 – 12:00.
- December 2014: dust content ranged from 0,086 – 0,308 mg/m<sup>3</sup>. Average dust concentration in this month was 0,196mg/m<sup>3</sup>. Dust content at VT3 exceeded the allowable value of regulations and baseline data at the time of 12:00 – 14:00.

Average dust concentration in October is highest and average dust concentration in September is lowest. Average dust concentration in October is greater than December and greater than November and greater than August and greater than July and greater than September 2014.

#### ▪ Noise

Noise level monitoring at three locations in six times in the last six months of 2014 meet the allowable limits of QCVN 26:2010/BTNMT. Noise level recorded in months are shown that most of monitoring noise level are higher than baseline data. Average noise level of six months is higher than average noise level of baseline data in April 2013 (average noise level: 54,7dBA. They ranged from 47,8 – 64,7dBA) as follows:

- July 2014: noise level ranged from 52,1 – 68,9dBA. Average noise level is 56,9dBA.
- August 2014: noise level ranged from 50,1 – 65,2dBA. Average noise level is 57,1dBA.
- September 2014: noise level ranged from 51,3 - 68,5 dBA. Average noise level is 60,4dBA.
- October 2014: noise level ranged from 49,1 – 70,7 dBA. Average noise level is 58,6dBA.
- November 2014: noise level ranged from 50,6 – 64,2dBA. Average noise level is 57,6dBA.
- December 2014: noise level ranged from 51,2 - 68,8 dBA. Average noise level is 59,9dBA.

▪ Vibration

Vibration level monitoring at three locations in six times in the last six months of 2014 meet the allowable limits of QCVN 27:2010/BTNMT. Vibration level recorded in months are shown that most of monitoring noise level are higher than baseline data. Average vibration level of six months is higher than average vibration level of baseline data in April 2013 (average noise level: 45,1BA. They ranged from 38,2 – 54,6dBA) as follows:

- July 2014: vibration level ranged from 46,3 – 54,1dB. Average vibration level is 47,4dB.
- August 2014: vibration level ranged from 45,2- 54,8 dB. Average vibration level is 49,0dB.
- September 2014: vibration level ranged from 45,8-53,8dB. Average vibration level is 50,4dB.
- October 2014: vibration level ranged from 46,2 -51,5dB. Average vibration level is 49,4dB.
- November 2014: vibration level ranged from 44,5 -51,7dB. Average vibration level is 48,3dB.
- December 2014: vibration level ranged from 45,2 - 51,8dB. Average vibration level is 48,1dB.

▪ Surface water

Analysis results of surface water quality of Ba Dai Canal and Muong Kenh Canal at project area in construction stage of the last six months of 2014 (from July to December 2014) are shown that most analysis results meet the allowable limits of QCVN 08:2008/BTNMT – Column B1, except TSS content of samplings of Muong Kenh Canal in August 2014 is 1,24 times higher than the allowable limit of regulation and  $\text{NH}_4^+$  content in samples of Ba Dai and Muong Kenh Canal are 1,24 and 1,14 times higher than the allowable limits of regulation. These values are higher than baseline data. All remaining results meet the allowable limits of regulations.

Concentration of  $\text{NO}_2^-$  (N), Cd, Pb, Hg and oils and grease were not detected at all samplings during the last series of monitoring.

▪ Underground water

Most analysis results of ground water quality in the last six months of 2014 of construction stage (from July to December 2014) are shown that almost pollution concentration in groundwater at this area are higher than baseline data but they meet the allowable values of QCVN 09:2008/BTNMT. Except,  $\text{Cl}^-$  content of samples in July and November 2014 are

higher than the allowable limits of regulations several times. Concentration of  $\text{NO}_2^-$ ,  $\text{NH}_4^+$ ,  $\text{CN}^-$ , Cd, As, Pb và E. Coli were not detected at all samplings during the last series of monitoring.

▪ Soil quality

Analysis results of soil quality in the last six month of 2014 (from July to December 2014) at Project area are shown that there are not change much compared to the baseline data and they meet the allowable values of QCVN 03:2008/BTNMT.

b. PACKAGE 8

▪ Air quality

Monitoring results of air quality at project area at three locations at six times in the last six months of 2014 are shown that almost parameters of  $\text{SO}_2$ ,  $\text{NO}_2$ , CO fluctuated during baseline data, except dust content at location VT1 (km2+200) at the time of 14:00 – 16:00 in August 2014 was 0,307mg/m<sup>3</sup> and dust content VT2 (Km3+200) at the time of 16:00 – 18:00 in November was 0,302mg/m<sup>3</sup>. These dust content are slightly higher than the allowable values of regulations of QCVN05:2013/BTNMT but not significantly.

▪ Noise and vibration

Monitoring results of noise and vibration level at project area in the last six months of 2014 at three locations at six times are shown that most monitoring results during construction stage are higher than baseline data but they are also lower than the allowable values of regulations several times. Vibrations levels during this time are also the same noise level that means vibration level do not have a big difference. Detailed as follows:

- July 2014: noise level ranged from 48,2 – 68,2dBA. Vibration level ranged from 46,3 – 55,8d
- August 2014: noise level ranged from 50,2 – 66,5 dBA. Vibration level ranged from 46,3 – 54,1dB.
- September 2014: noise level ranged from 51,3 – 68,4 dBA. Vibration level ranged from 46,2 – 54,6dB.
- October 2014: noise level ranged from 50,2 – 68,1 dBA. Vibration level ranged from 46,5 – 53,4dB.

- November 2014: noise level ranged from 50,8 – 68,7 dBA. Vibration level ranged from 45,4 – 53,4dB.
- December 2014: noise level ranged from 50,1 – 66,5 dBA. Vibration level ranged from 44,6 – 51,9dB.

▪ Surface water

Analysis results of surface water of Ong Cai River in project area in the last six months of 2014 are shown that surface water quality is relatively good. Analysis results of surface water (upstream and downstream) in Ong Cai River during six months meet the allowable values of regulations of QCVN 08:2008/BTNMT – Column B1 although most analysis results of these parameters are higher than baseline data, except TSS content in September and October 2014 is slightly higher than baseline data and higher than the allowable limits of regulation but not much.

▪ Underground water

Most analysis parameters of groundwater at project area in the last six months of 2014 are shown that ground water quality at this area is quite good. Most analysis parameters meet the allowable values of national technical regulation on ground water quality QCVN 09:2008/BTNMT. These values ranged from baseline data. This proves that construction activities during last time were not affect to groundwater quality.

▪ Soil quality

Analysis results of soil quality in the last six month of 2014 at Project area are shown that soil quality of this area is still quite good. All analysis parameters during this time are slightly higher than baseline data but they meet the allowable values of QCVN 03:2008/BTNMT.

c. PACKAGE 9

▪ Air quality

Monitoring results of air quality at project area at three locations at six times in the last six months of 2014 are shown that all parameters of SO<sub>2</sub>, NO<sub>2</sub>, CO and dust fluctuated in baseline data and they are lower than the allowable limits of regulations of QCVN05:2013/BTNMT. Dust content in months ranged as follows:

- April 2014 (pre-construction stage): dust content ranged from 0,147 – 0,237mg/m<sup>3</sup>. Average dust during this period was 0,182mg/m<sup>3</sup>. Average dust at location VT1 was 0,199 mg/m<sup>3</sup>, VT2 was 0,165 mg/m<sup>3</sup> and VT3 was 0,182 mg/m<sup>3</sup>.
- July 2014: dust content ranged from 0,119 – 0,271mg/m<sup>3</sup>. Average dust during this period was 0,176mg/m<sup>3</sup>.
- August 2014: dust content ranged from 0,127 – 0,281mg/m<sup>3</sup>. Average dust during this period was 0,206mg/m<sup>3</sup>.
- September 2014: dust content ranged from 0,117 – 0,247mg/m<sup>3</sup>. Average dust during this period was 0,177mg/m<sup>3</sup>.
- October 2014: dust content ranged from 0,109 – 0,262 mg/m<sup>3</sup>. Average dust during this period was 0,181mg/m<sup>3</sup>.
- November 2014: dust content ranged from 0,129 – 0,251 mg/m<sup>3</sup>. Average dust during this period was 0,171mg/m<sup>3</sup>.

▪ Noise

Monitoring results of noise level at project area in the last six months of 2014 at three locations at six times are shown that most monitoring results meet the allowable values of regulations QCVN 06:2010/BTNMT. Average noise level is not much difference between months.

- July 2014: Average noise level was 61,16dBA
- August 2014: Average noise level was 60,68dBA
- September 2014: Average noise level was 58,98dBA
- October 2014: Average noise level was 61,17dBA
- November 2014: Average noise level was 61,20dBA

▪ Vibration

Most vibration monitoring results during in the last six months at project area at six times at three locations VT1, VT2 and VT3 are higher than baseline data (49,1dB) but they meet the allowable values of regulations of QCVN 27:2010/BTNMT (75dB) as follows:

- July 2014: Average vibration level was 50,6dB
- August 2014: Average vibration level was 50,7dB
- September 2014: Average vibration level was 49,1dB
- October 2014: Average vibration level was 49,9dB
- November 2014: Average vibration level was 49,8dB

▪ Surface water

Analysis results of surface water quality at project area (Mot Tan canal: high tide and low tide) in construction stage of the last six months of 2014 are shown that most analysis results are lower than baseline data and meet the allowable limits of QCVN 08:2008/BTNMT – Column B1, except TSS content of samples at low tide is slightly higher than the allowable values of regulation but not much. This proves that surface water quality is still good.

▪ Underground water

Most analysis results of ground water quality in the last six months of 2014 of are shown that all analysis results meet the limit values of the National technical regulation QCVN 09: 2008/BTNMT. These results are in range of baseline data.

▪ Soil quality

Analysis results of soil quality in the last six month of 2014 at Project area are shown that although concentration of pollution parameters during construction stage is higher than pre-construction stage but they meet the allowable values of QCVN 03:2008/BTNMT. This proves that soil quality in this area is good.

#### 4.3. Assessment of Monitoring Results

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

In general, the environmental condition monitored during construction stage of the last six months 2014 (from July to December 2014) of Packages 7, 8 and 9 as follows:

- Air quality: All toxic gases and most of dust content meet the allowable limits of regulation, except dust content at VT3 (Km1+950) of Pk7 in July 2014 and dust content at VT1(Km2+200) of Pk8 in August 2014 and VT2 (Km3+200) of Pk8 in November 2014 are higher than the allowable limits of regulations QCVN 05:2013/BTNMT.
- Noise and vibration level: noise and vibration level of all Packages meet the allowable limit of regulations of QCVN 26:2010/BTNMT and QCVN 27:2010/BTNMT.
- Surface water quality: Most analysis parameters meet the allowable limits of regulation, except TSS content of Muong Kenh canal in August 2014 and  $\text{NH}_4^+$  content of Ba Dai and Muong Kenh canal in September 2014 are higher than the allowable limits of regulation but not significantly.
- Ground water: Ground water quality is still good. All analyzed parameters meet the



allowable limits of regulation.

- Soil: Analysis results of soil quality at construction site of three Packages are still good. All analyzed parameters meet the allowable limits of regulations.

## 5. GRIEVANCE REDRESS

Currently the project is basically completed most the main works, the Contractors are rushing to complete the remaining works. During the construction stage of the first 6 months of 2014, there are 17 households near Pk7 complaints on damages of their house because of construction work of Pk7 Contractor. All these households agree that compensation will be paid after the completion of the construction project. So now the contractor is under working for completing the remaining work in order to pay for these household.

## 6. 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 an 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.

Training program, schedule, participants and documents as follows:

- *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.
- *Training schedule:* every month
- *Participants:* All staff and workers of contractors and subcontractors

- *Resources trainers/persons:* Environmental Specialist and Safety officers of the main Contractor.
- *Training document:* site environmental management plans and health and safety plans of contractors, environmental management plan updated in December 2014.

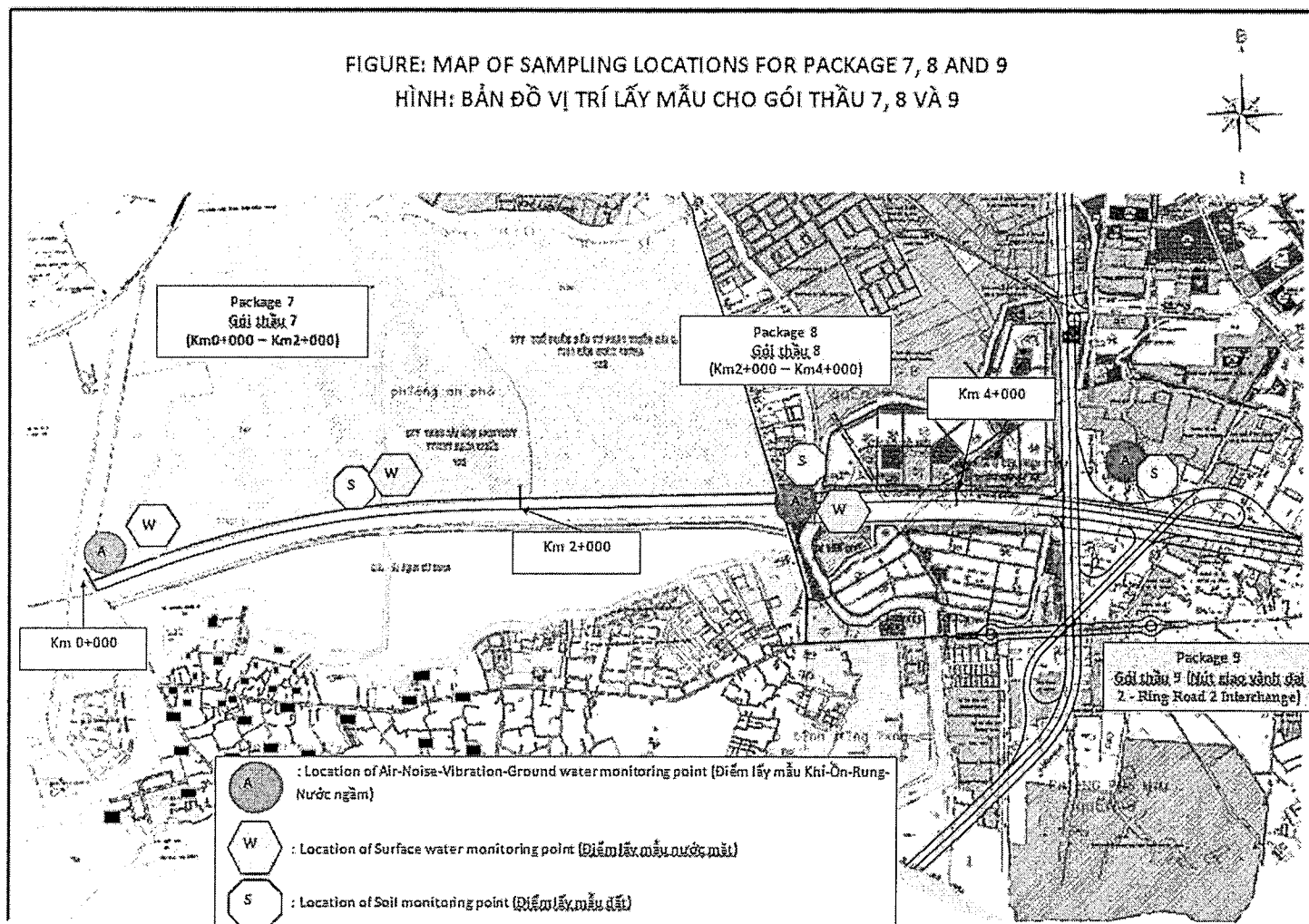
Table 7: Number of workers participating in environmental and safety trainings

Time	Package 7	Package 8	Package 9
	Regular training	Regular training	Regular training
07/2014	11	6	-
08/2014	8	10	-
09/2014	15	10	-
10/2014	-	-	-
11/2014	-	-	-
12/2014	-	-	-

## 7. CONCLUSION AND RECOMMENDATION

- Until now, although the high concentration of dust and noise at Phu intersection area of Package 7 and the area around Do Xuan Hop Street Pk8 but they are still under control, there was no serious effect on surface water, groundwater and soil.
- Currently, the construction of the main works has completed so ambient air, surface water, groundwater has not impacted by construction activities but the contractor shall regularly collect garbage to avoid affecting on surroundings.

## Appendix 1. MAP OF SAMPLING LOCATIONS



## Appendix 2. PHOTOS OF ENVIRONMENTAL MONITORING AND SUPERVISION

### Environmental monitoring by CS Consultant



Figure 1: Air, noise, vibration monitoring and sampling of surface water of Muong Kenh canal- Pk 7

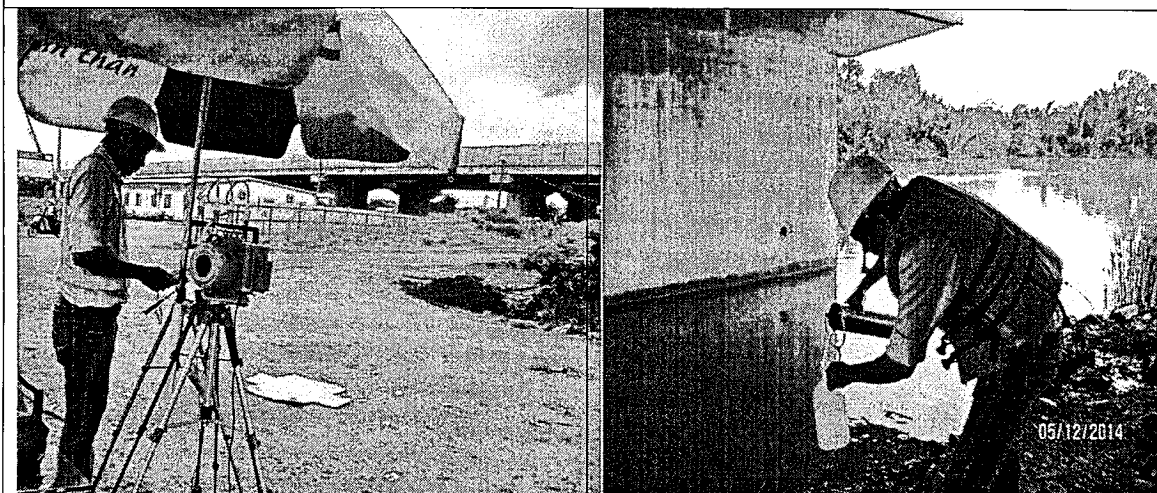


Figure 2: Air, noise, vibration monitoring and sampling of surface water of Ong Cai River- Pk 8

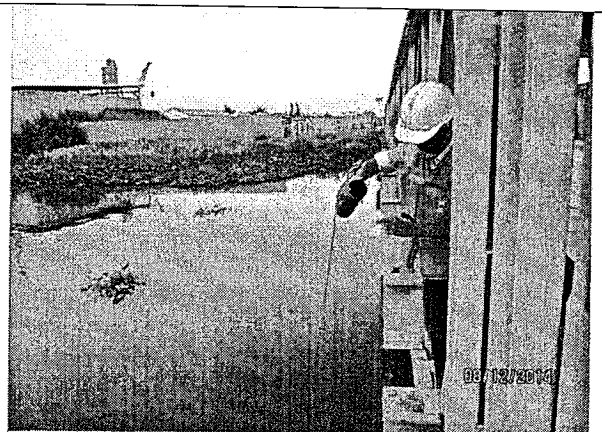


Figure 3: Air, noise, vibration monitoring and sampling of ground water- Pk 9

**Environmental monitoring by contractors**



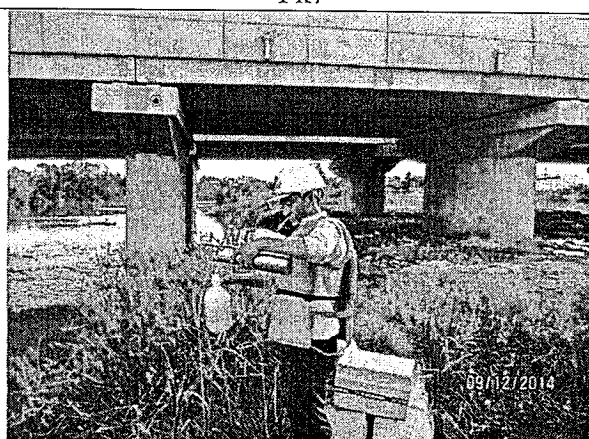
Air, noise, vibration monitoring, Pk 7



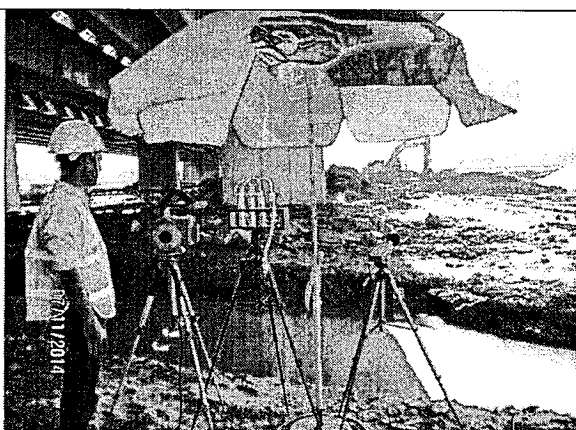
Surface water sampling at Muong Kenh canal, Pk7



Air, noise, vibration monitoring, Pk8



Surface water sampling at Ong Cai River, Pk8



Air, noise, vibration monitoring, Pk9



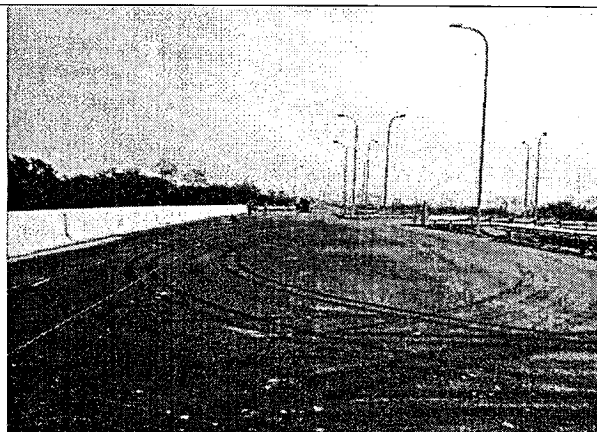
Ground water sampling, Pk9



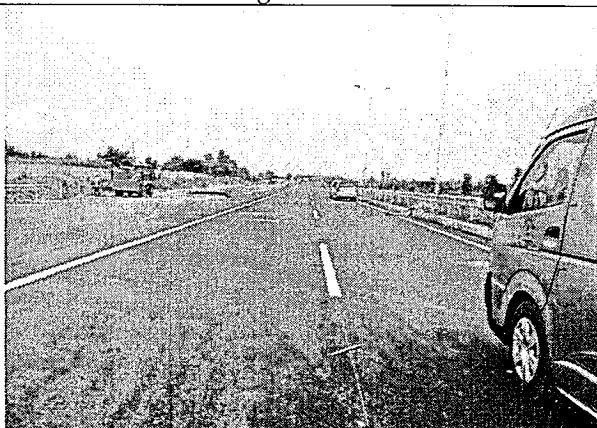
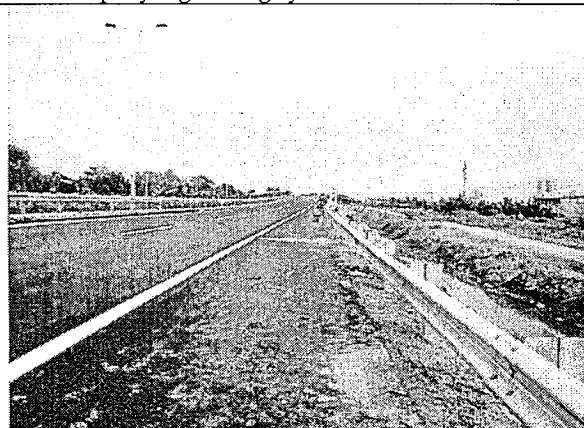
### Supervision activities



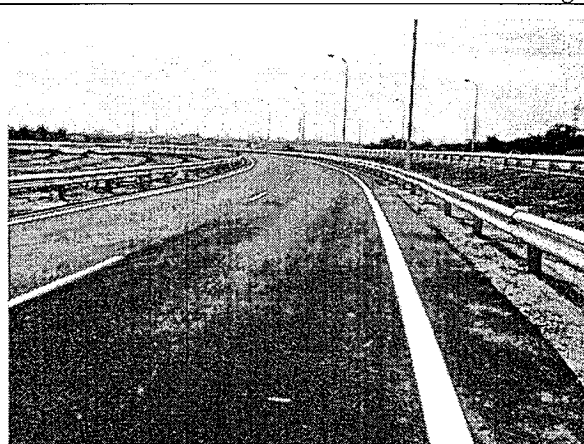
Water spraying on Nguyen Thi Dinh Street, Pk 2.



The status of Package 7 in late December 2014



The status of Package 8 in late December 2014



The status of Package 9 in late December 2014