Environmental Monitoring Report

Semi-Annual Report (February to July 2013)
August 2013

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

Package 7, 8, and 9

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

CURRENCY EQUIVALENTS
(as of 1 August 2013)

Currency unit	–	dong (D)
D1.00	=	$0.000047
$1.00	=	D21,145

NOTE

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

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

PACKAGES 7, 8 AND 9

(February 2013 – July 2013)

August 2013

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 (February 2013 –July 2013) is to summarize the environmental supervision activities by Contractors and Construction Supervision Consultants (CS Consultants) during the period of February 2013 –July 2013 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

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

- Package 7 and 8: the commencement date of packages No.7 and No.8 is on 27th February 2013 and construction period is 24 months for each package.
- Package 9: the commencement date of this package is on 02nd 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 been conducted sign 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. Implementation Progress

The construction progress of each package as of July 2013 is described as follows

a. <u>Package 7:</u>

- Preparation of MS and SD
  - Submission of MS and SD is satisfied with construction progress.
- Temporary Work
  - Site office is almost completed;
  - Mobilization of personnel and equipment is satisfied with construction progress.
  - Construction of temporary service road: Completed 47% of work quantity.
- Permanent Work
  - Site clearing and grubbing: Contractor has completed the site clearing and

grubbing at handed-over areas (except obstruction area by local resident)

- Excavation and disposal of topsoil; off site: Completed 77% (An Phu intersection)
- Prefabricated Vertical Drains (PVD) of Station Km0+880-Km1+180: Completed 212.112,9 m
- Bored pile on land of Muong Kenh Bridge: Completed 49 piles this month, 109 piles in total completed.
- RC pile Fabrication: Completed 391 segments 8m of Muong Kenh and Ba Dai bridge

b. Package 8:

- Submission of documents:

Submission of documents had been timely meet the works on site

- Temporary works:
  - Temporary road:
    - ✓ Placing geotextile and sand pumping from Km3+460 to Km3+800.
    - ✓ Removal of topsoil from Km2+740 to Km3+00
  - Mixing plant:

Batching plant has been finalized and come into operation.

  - Site Laboratory:

Site Laboratory is in operation

  - Site office:

The Site offices in operation.

- Site Clearance and removal of topsoil:
  - ➢ Thruway: site clearance and removal of topsoil have been completed
  - ➢ Ramps:
    - ✓ Ramp X1: Completion from Km 0+200 to Km 0+531 and Km0+00 to Km0+60, the remaining part at which cannot carry out the works due to land acquired obstacle.
    - ✓ Ramp Y1: Completion from Km0+000 to Km0+460
- Backfilling and fill as working platform*:* The Contractor completed sand pumping at the following stations:
  - ✓ Km2+00 to Km2+180

✓ Km2+740 to Km3+3.26

✓ KM3+500 to Km4+00

- PVD installation: The Contractor had been mobilized two PVD machines at the end of thruway from station Km3+938 to Km4+00 and from Km3+700 to Km3+838.
- Sub-structure

The Contractor has 6 teams for bored pile works at Pier P13, P14, P10, P8, P7, P6, P5– Do Xuan Hop flyover and Abutment A1, A2 – Ba Hien bridge. Until 20th Jul 2013, the Contractor had constructed 87 bored piles.

c. Package 9:

- Temporary works
  - *Temporary road*: Constructing temporary road for construction work.
  - *Batching plant*: Operated cement concrete batching plant
  - *Site laboratory*: Site laboratory is operating with all approved equipment. Site laboratory is carrying out these following tests:
    + Concrete mix design and sample compressing
    + Soil tests and compaction
    + Reinforcement.
- Site Clearance: Contractor is carrying out the site clearing for area which already hand over to the Contractor.
- Earth work and Soft Soil Improvement: Contractor mobilized 2 road construction team and backfilled 3206 m3, sand backfilled 426.2 m3
- Bridge substructure
  - In this month, Contractor mobilized 8 construction teams for bored pile construction and completed 61 piles. Quantity up to now: 185 piles.
  - Contractor mobilized 7 construction teams for pier construction and completed 11 pile caps, 5 pier column.
- Bridge superstructure: In this month, Contractor fabricated 38 Super T girders. Quantity up to now: 66 nos
- Lighting and Electrical work: Light work has been completed for the project.

1.2.2. 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 including 4 lanes (phase 1) with starting point at An Phu Interchange at District 2 under Ho Chi Minh City (Km0+000) and ending point at Interchange with National Highway 1A at Dau Giay under Dong Nai Province (km54+984), which belongs the center line of North – South expressway.

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) by which 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 hasstarting point at Km2+00, district 2 and ending point at Km4+00 district 9, Ho Chi Minh City, with 2Km length. Designed 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).

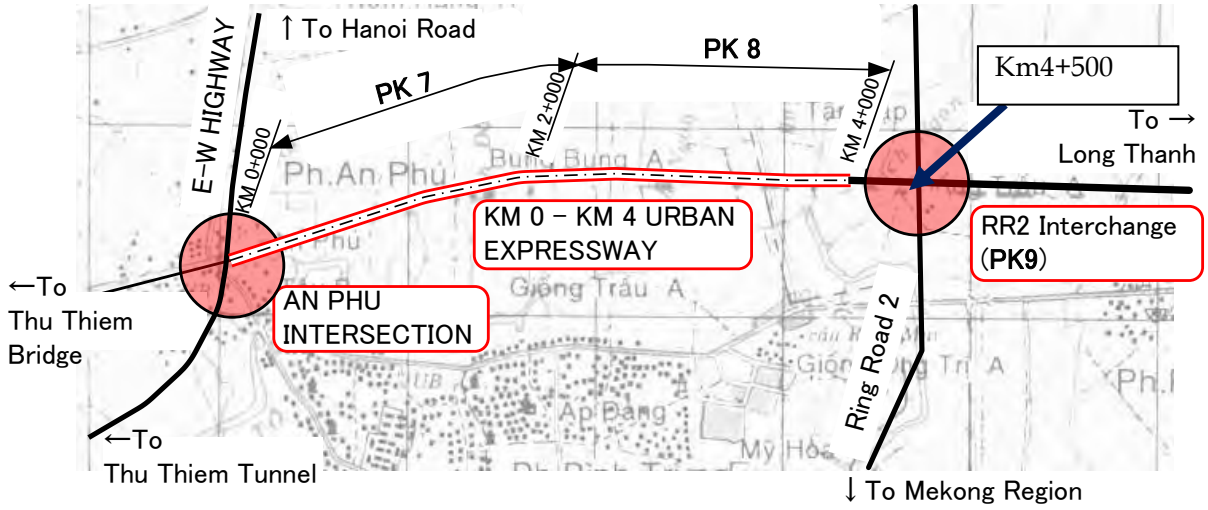


Figure 1. Packages 7, 8 and 9 locations

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.

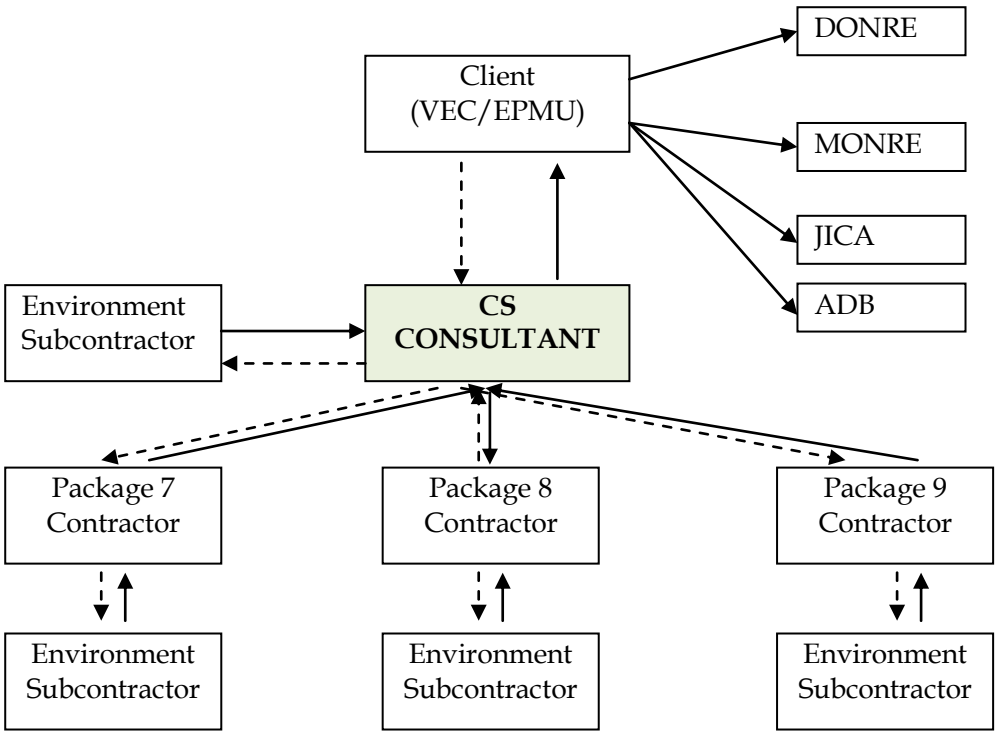


Figure 2. Framework of organizations regarding environmental management

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			
	- No burning of debris or other materials will occur on the site. - 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. - 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. - 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			

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	beyond the front of the piles. Locations should be indicated by the accompanying site plan(s). - 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. - 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.			
2.2	Measures to reduce air pollution and dust caused by the use of vehicles and machinery			
	- All roads within the construction areas of the site shall be watered at least twice each day, and more if necessary to control dust to the satisfaction of the ESO. - Areas within the site where there is a regular movement of vehicles shall have an acceptable hard surface and be kept clear of loose surface material. Locations should be indicated by the accompanying site plan(s). - Ensure that vehicles and machinery are used and maintained properly to meet applicable emission standards. Fuel-efficient vehicles shall be preferred. - All vehicles, while parked on the site, will be required to have their engines turned off. - Any vehicles with an open load carrying area used for moving potentially dust-producing materials shall have properly fitting side and tailboards. - 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. - Conduct regular site inspections to ensure the use of best practices and report any complaints from local people. - 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	Fair	Pk8: There is a lot of mud from Do Xuan Hop Street due to transportation of Pk8 Contractor access to the site in July 2013. This causes dust arising at this area. Pk9: Construction activities were generated a lot of mud and dust on the local roads around Pk9 construction site.	Pk8: The Contractor arranged two workers regularly cleaning and watering on this street. Pk9: the Contractor cleaned all mud on the local road around Pk9 construction site.
2.3	Mitigation measure by crushing, concrete and asphalt			

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	plant operation			
	- An air pollution control system shall be installed and shall be operated whenever the plant is in operation. - 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. - Dry mix batching shall be carried out in a totally enclosed area with exhaust to suitable fabric filters. - 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.	Good		
III.	**Noise and vibration**			
	- Vehicles and machinery must be used, maintained and equipped so as to avoid unnecessary noise and vibration. - 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. - 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. - 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. - 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. - Be responsible for repairing any damage caused as the result of vibrations generated from or by the use of his equipment, plant, and machinery. - The minimum effective height of the noise barriers should be as such that no part of the	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	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. - 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; - The barrier shall not be located where it prevents access to community facilities, residential areas, and places of work or access routes. - 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. - 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. - 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.			
IV.	**Water quality**			
	- Wastewater from mixing materials will be drained to a separate collecting system, and processed by sediment traps before release to the public drainage system. - Mud from drilling will be collected and processed to avoid pollution of surface water. - Drilling solutions for performing the abutment will be processed in a closed system, especially for abutments at the riverbed. - Inner-lined drill holes will be used during piling. - 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	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	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 - The Contractor will ensure that construction camps and other potential sources of secondary impacts are properly sited and provided with drainage and wastewater facilities. - 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. - 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). - 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. - 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. - Downstream slopes will be stabilized, where warranted, with concrete, rock gabions or walls to avoid erosion. - Prepare emergency response plan in case of fuel and chemical spills			
V.	**Loss of water resources**			
	- 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	Very good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	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.			
VI.	**Erosion**			
	- Provide temporary or permanent drainage to protect sites susceptible to erosion. - Stabilize downstream slopes on rivers and streams prone to erosion problems. - Protect sensitive surface/erosion prone site with vegetation and replace removed trees to ensure interception of rainwater and deceleration of surface runoff as soon as possible after construction works. - On streams, downstream slopes can be stabilized with concrete, rock gabions or walls as seen necessary. - Careful stockpiling of topsoil in suitable locations to prevent these from being washed away. Specify the erosion protection measures to be used in the site-specific EMP.	Very good		
VII.	**Changes in Hydrological Situation and Irrigation systems**			
	- 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. - 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.	Good		
VIII.	**Waste and Spoils disposal**			
	- Waste from construction activities, including the demolishing of structures before the construction itself begins, must be collected and recycled when possible. - Establish hygienic groups to collect waste from construction camp sites and to ensure the	Poor	Packages 8 and 9: there was a lot of bentonite mud around bored pile area in July 2013.	The Contractor has collected all bentonite mud and transfer out of the construction

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	cleanliness of the whole construction area. - Spoils from the works will only be disposed of in selected locations approved by local authorities. - Disposal shall not cause adverse impacts to water and soil quality as well as land use. - The locations of spoils disposal sites will be specified by the contractor in the site-specific EMP before the beginning of construction activities.			site to the disposal area.
IX.	**Handling of hazardous and toxic materials**			
	- 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. - The contractor also ensures that employees are trained on handling hazardous materials. - 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. - Use and maintain vehicles and machinery properly to avoid accidental spills.	Good		
X.	**Contamination of soil**			
	- 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 emergency plans for accidents.	Fair		
XI.	**Loss of vegetation cover**			
	- Minimize the clearing of vegetation for construction activities and borrow areas. - Re-vegetate embankment slopes and road cuts. - Landscape road verges and plant vegetation to contribute to aesthetic value. - Where roadside trees are lost as a result of construction activities, the Contractor shall replant trees as a ratio of one-to-one. - Where trees cannot be replaced at the roadside	Very good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	due to a lack of roadside space, the Contractor shall consult with affected residents to determine an appropriate alternative planting location and schedule. - The Contractor will be responsible for all works associated with tree planting including maintenance of the trees for a one-year period after planting.			
XII.	**Safety**			
	- 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. - 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. - 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. - 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. - Implement a Safety Training Program consisting of: a. Initial Safety Induction Course b. Periodic Safety Training Courses c. Safety Meetings d. Safety Inspections	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	e. (e) Safety Equipment and Clothing			
XIII.	Traffic conditions and use of waterways			
	- 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. - 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: a. General traffic management requirements b. Temporary road works c. Traffic control d. Number of lanes for traffic control e. Half-width construction f. Extraordinary traffic g. Vertical clearance h. Materials for traffic control devices - 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. - 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. - 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. - In order to minimize disruption to traffic flows the Contractor shall enclose the site with temporary fence to provide a visual barrier	Good		

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	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 - Organize temporary means of access to avoid such short-term negative impacts. Maintain local roads and bridges used by construction vehicles.			
XIV.	Historic and Cultural Resources			
	- Protect sites of known antiquities, historic and cultural resources by the placement of suitable fencing and barriers. - Not located construction camps within 500 meters from cultural resources. - Adhere to accepted international practice and all applicable historic and cultural preservation requirements of the Government of Vietnam. - 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.	Good		
XV.	**Utilities**			
	- Ascertain and take into account, in the method of working, the presence of utility services on and in the vicinity of the site. - 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. - 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. - Exercise the greatest care at all times to avoid damage to or interference with services. - 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. - Wherever existing ground surfaces are to be disturbed for construction of the works, carry out full and adequate preliminary investigations			

No.	Mitigation Measures	Compliance Attained	Comment on Reasons for Non-Compliance	Corrective actions taken
	to locate all services in the area by means of hand-dug trial holes and trenches in combination with electronic and electro-mechanical devices, where appropriate. Each service thus exposed shall be identified. Every service at risk shall be fully exposed and adequately protected and supported in situ or diverted to the satisfaction of the appropriate authority prior to the commencement of such construction. - 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. - 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.			
XVI.	**Social impacts Consultation and Complaints Procedures**			
	- Provide local community information on upcoming construction related activities and issues related to traffic safety. - Record any complaints received and respond to them promptly. - 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

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 05:2009/BTNMT - National Technical Regulation on ambient air quality. QCVN 06:2009/BTNMT - National Technical Regulation on hazardous substances in ambient air.
2	Noise	QCVN 26:2010/BTNMT – National technical regulation on noise
3	Vibration	QCVN 27:2010/BTNMT – National technical regulation on vibration
4	Surface water	QCVN 08:2008/BTNMT - National Technical Regulation on surface water quality.
5	Ground water	QCVN 09:2008/BTNMT - National Technical Regulation on groundwater quality.
6	Soil	QCVN 03:2008/BTNMT - National Technical Regulation on soil quality.

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)	-	-
		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	GW9-1 GW9-2	-	-	Km4+500

	Interchange under Ho Chi Minh City	GW9-3			
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 live 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			X/9
	6	X/9	X/9	

Year	Month	Package 7	Package 8	Package 9
	12	X/10	X/10	X/10
2016	6	X/11	X/11	X11
	12	X/12	X/12	X/12
2017	4			X/13

: 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. PACKAGE 7

- Monitoring results of Package 7 in March 2013

➢ *Air quality*

The average content of dust from 6:00AM to 21:00PM was approximately 0,39 mg/m^3, this value is about 1,3 times higher than the allowable limits of regulation QCVN05:2009/BTNMT.

The dust content is higher than regulation because it is about 200 meters from the monitoring locations to East-West Highway (heavily-trafficked road).

The remaining parameters such as SO2, NO2, CO, HC measured in the period from 6:00AM to 22:00PM are under the allowable limits of Vietnamese regulation of QCVN05: 2009/BTNMT.

➢ *Noise*

The noise level is compared with regulation of QCVN26:2010/BTNMT. The noise level measured shows that:

- From 6:00AM to 21:00PM: the noise level is under the allowable limit of regulation
- From 21:00PM to 22:00PM: the noise level is about 1,15 times higher than regulation.

➢ *Vibration*

The vibration level is compared with QCVN27:2010/BTNMT. The vibration level monitored from 6:00AM to 21:00PM show that they are under the allowable limit of regulation.

➢ *Surface water*

The surface water is compared with QCVN08:2008/BTNMT - Column B1.

- The surface water quality of Ba Dai canal: almost analyzed samples meet the allowable limits, except:
  + SS content at SW7-4 was 81,6 mg/l. It is about 1,63 times higher than allowable value;
  + PO_4^{3-} content at 3 positions SW7-1, SW7-2, SW7-4 was 0,40 mg/l, 0,32 mg/l and 0,37 mg/l respectively. They are about 1,33 times, 1,07 times, and 1,23 times higher than allowable value;
  + Coliform content at 4 positions SW7-1, SW7-2, SW7-3, SW7-4 was $4,8x10^5$ MPN/100ml, $1,5x10^5$ MPN/100ml, $4,6x10^4$ MPN/100ml, $4,8x10^4$ MPN/100ml respectively. They are about 64 times, 20 times, 6,1 times and 6,4 times higher than allowable value;
- The surface water quality of Kenh Muong canal: almost analyzed samples meet the allowable limits, except:
  + SS content at SW7-4 was 86,8 mg/l. It is about 1,73 times higher than allowable value;
  + PO_4^{3-} content at 3 positions SW7-5, SW7-6, SW7-8 was 0,35 mg/l, 0,37 mg/l and 0,48 mg/l respectively. They are about 1,17 times, 1,23 times and 1,6 times higher than allowable value;
  + Coliform content at 4 positions SW7-5, SW7-6, SW7-7, SW7-8 was $1,1x10^4$ MPN/100ml, $2,4x10^4$ MPN/100ml, $2,4x10^8$ MPN/100ml and $7,5x10^4$ MPN/100ml respectively. They are about 1,47 times, 3,2 times, 320 times, and 10 times higher than allowable value;

➢ *Underground water quality*

The results of ground water quality are compared with QCVN09:2010/BTNMT shows that almost analyzed parameters meet the allowable limit of Vietnamese regulation except:

- Cl^- content at 3 positions GW7-1, GW7-2, GW7-3 was 602,7mg/l, 538,9mg/l

and 368,7mg/l respectively. They are about 2,4 times, 2,1 times and 1,5 times higher than allowable value according to QCVN09:2008/BTNMT;

- Fe content at 2 positions GW7-1, GW7-2 was 38,4mg/l, 10,8mg/l. They are bout 7,7 times, 2,16 times higher than allowable value respectively;
- Coliform value at GW7-1, GW7-2 positions is about 1,3 times, 16 times higher than allowable value respectively;
- Three samples of the underground water were contaminated E.Coli.

➢ *Soil quality*

All parameters meet the regulation of QCVN03:2008/BTNMT.

- **Monitoring results of Package 7 in June 2013**

➢ *Air quality*

All analyzed parameters in all samples from 6:00AM to 22:00PM meet the allowable limits of Vietnamese regulation QCVN 05:2009/BTNMT.

➢ *Noise*

The noise level was monitored from 6:00AM to 21:00PM show that it is higher than baseline date in March 2013 but it is also lower than the allowable limit of regulation. Noise level was monitored from 21:00 to 22:00 show that it is lower than baseline date and Vietnamese regulation – QCVN26:2010/BTNMT.

➢ *Vibration*

Vibration level was monitored from 6:00 to 21:00 and from 21:00 to 22:00 show that they are lower than baseline date and regulation - QCVN27:2010/BTNMT.

➢ *Surface water*

The surface water quality is compared with QCVN08:2008/BTNMT showed that:

- *Ba Dai canal:*
  + COD content at SW7-1 was 31mg/l. It is 1,03times higher than the allowable value.
  + Coliform values at SW7-2, SW7-6 was $14x10^3$MPN/100ml và $11x10^3$MPN/100ml respectively and they are 1,87 and 1,47 times higher than the allowable limit of regulation.
  + All the remaining parameters meet the allowable limits.
- *Muong Kenh canal*

Most analyzed samplings meet the allowable limits, except Coliform at SW7-6, SW7-7 were 11x10^3MPN/100ml and 93x 10^2MPN/100ml respectively. They are 1,47 and 1,24 times higher than the allowable limit of regulation.

➢ *Groundwater quality*

Ground water has been compared with QCVN09:2008/BTNMT showed that the analyzed results meet regulation in most samplings, except Cl^- and Fe content at 3 samples, Mn at GW7-1 and Coliform at GW7-2 exceed regulation but not significantly.

➢ *Soil quality*

All analyzed parameters meet the regulation of QCVN03:2008/BTNMT.

b. PACKAGE 8

- Monitoring results of Package 8 in March 2013

➢ *Air quality*

Analyzed results of SO_2, NO_2, HC, TSP, CO from 6:00AM to 22:00PM meet the allowable limits of regulation - QCVN05:2009/BTNMT.

➢ *Noise*

The noise level is compared with regulation of QCVN26:2010/BTNMT. The noise level measured shows that from 6:00AM to 22:00PM: the noise level is lower than the allowable limit of regulation

➢ *Vibration*

The vibration level is compared with QCVN27:2010/BTNMT. The vibration level was 39,1dB that monitored from 6:00AM to 21:00PM show that they are under the allowable limit of regulation.

➢ *Surface water*

Surface water quality of Ong Cai river is compared with QCVN08:2008/BTNMT – column B1 show that almost analyzed parameters meet regulation except:

- DO content at SW8-1 was 3,05 mg/l. It does not meet allowable limit.
- TSS content at 4 positions SW8-1, SW8-2, SW8-3, SW8-4 was 72,8mg/l, 91,2

mg/l, 62 mg/l and 110 mg/l respectively. They are higher than allowable value 1,46 times, 1,8 times, 1,24 times, and 2,2 times;

- PO43- content at positions SW8-1, SW8-2, SW8-4 was 0,37 mg/l, 0,37 mg/l and 0,41 mg/l respectively. They are about 1,23 times , 1,23 times, and 1,37 times higher than allowable value;

➢ *Underground water quality*

The results of ground water quality are compared with QCVN09:2010/BTNMT shows that almost analyzed parameters meet the allowable limit of Vietnamese regulation except:

- pH value at two positions GW8-1, GW8-3 was 5,43 and 5,28. They do not meet allowable value of QCVN09:2008/BTNMT.
- Coliform value at point GW8-1 was 23 x101 MPN/100ml. It is 7,7 times higher than allowable value;
- Underground water samples at three locations ranged from 3 to 9 MNP/100ml contaminated E. Coli.

➢ *Soil quality*

All parameters meet the regulation of QCVN03:2008/BTNMT.

▪ **Monitoring results of Package 8 in June 2013**

➢ *Air quality*

All parameters were analyzed at samples from 6:00 to 22:00 meet the allowable limits of Vietnamese regulation – QCVN05:2009/BTNMT.

➢ *Noise*

The noise level at two times from 6:00 to 21:00 and from 21:00 to 22:00 were monitored in June 2013 showed that they are lower than baseline date in March 2013 and Vietnamese regulation –QCVN 26:2010/BTNMT

➢ *Vibration*

Vibration level was monitored from 6:00 to 21:00 show that it is higher than baseline date in March 2013 but lower than Vietnamese regulation – QCVN27:2010/BTNMT. However, the vibration level was monitored from 21:00 to 22:00 and it is higher than Vietnamese regulation.

➢ *Surface water*

Surface water quality is compared with QCVN08:2008/BTNMT showed that most parameters were analyzed that meet the allowable limits, except TSS and Coliform content at 3 points SW8-1, SW8-2, SW8-3 exceed the allowable limits of regulation but not significantly.

➢ *Groundwater quality*

Ground water quality at the project area is quite good, except Fe content at GW8-1 is 1,3times higher than regulation. All remaining parameters meet regulation.

➢ *Soil quality*

All analyzed parameters meet the regulation of QCVN03:2008/BTNMT.

c. PACKAGE 9

- **Monitoring results of Package 9 in March 2013**

➢ *Air quality*

Air quality is compared with QCVN05:2009/BTNMT show that almost analyzed parameters from 6:00AM to 22:00PM meet the allowable limit of Vietnamese regulation except dust content was 0,47mg/m^3. It is 1,07 times higher than regulation.

➢ *Noise*

Noise level monitored from 6:00AM to 22:00PM is under the allowable limit of regulation - QCVN26:2010/BTNMT.

➢ *Vibration*

Vibration level monitored from 6:00AM to 22:00PM is also under the allowable limit of regulation - QCVN27:2010/BTNMT.

➢ *Underground water quality*

The results of ground water quality are compared with QCVN09:2010/BTNMT shows that almost analyzed parameters meet the allowable limit of Vietnamese regulation except:

- pH value at location GW9-1 was 4,63. It exceeds allowable limit;

- Cl^- content at 3 locations GW9-1, GW9-2, GW9-3 was 340,3 mg/l, 468mg/l, 347,4 mg/l respectively. They are about 1,36 times, 1,87 times và 1,39 times higher than allowable value;
- Mn content at 3 locations GW9-1, GW9-2, GW9-3 was 0,6 mg/l, 0,67mg/l, 0,63 mg/l respectively. They are about 1,2 times, 1,34 times và 1,26 times higher than allowable value;
- Coliform value at 3 locations GW9-1, GW9-2, GW9-3 was $4,8x10^1$ MPN/100ml, $9,3x10^1$ MPN/100ml, $4,8x10^1$ MPN/100ml respectively. They are about 16 times, 31 times, and 16 times higher than allowable value;
- E.Coli value at 3 locations GW9-1, GW9-2, GW9-3 was 23 MPN/100ml, 48MPN/100ml, 23MPN/100ml respectively. They are higher than allowable value.

➢ *Soil quality*

All parameters meet the regulation of QCVN03:2008/BTNMT.

- **Monitoring results of Package 9 in June 2013**

➢ *Air quality*

All parameters were analyzed in most samples from 6:00 to 22:00 showed that they meet the allowable limits of QCVN26:2010/BTNMT, although dust content was monitored from 6:00 to 21:00 is quite high ($0,244mg/m^3$).

➢ *Noise*

Noise level was monitored from 6:00 to 21:00 and from 21:00 to 22:00 showed that they are lower than baseline date in March and meet the regulation of QCVN26:2010/BTNMT.

➢ *Vibration*

Vibration level was monitored from 6:00 to 21:00 and from 21:00 to 22:00 showed that they are lower than baseline date in March and meet the regulation of QCVN27:2010/BTNMT.

➢ *Groundwater quality*

The results of ground water quality are compared with QCVN09:2010/BTNMT showed that pH is quite low in ground water at project area, all three samples were analyzed showed that pH is lower than

regulation, whereas Cl^- in three samples are higher than regulation and Coliform at GW9-1 slightly exceed regulation. The remaining values meet regulation.

- *Soil quality*

-All analyzed parameters meet the regulation of QCVN03:2008/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: Km 0+100 Km 0+740 Km 1+195	3 points: Km 2+200 Km 3+200 Km 4+000	3 points: Km 0+000 Km 0+800 Km 1+700
2	Noise	3 points: Km 0+100 Km 0+740 Km 1+195	3 points: Km 2+200 Km 3+200 Km 4+000	3 points: Km 0+000 Km 0+800 Km 1+700
3	Vibration	3 points: Km 0+100 Km 0+740 Km 1+195	3 points: Km 2+200 Km 3+200 Km 4+000	3 points: Km 0+000 Km 0+800 Km 1+700
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

TT	Item	Package 7	Package 8	Package 9
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
1st monitoring (Baseline monitoring)	04/2013	04/2013	04/2013
2nd monitoring	05/2013	05/2013	05/2013
3rd monitoring	06/2013	06/2013	06/2013
4th monitoring	07/2013	07/2013	07/2013

4.2.2. Monitoring Result

a. Monitoring results of Package 7

- The monitoring result in April 2013 (the initial environmental monitoring) is summarized as follows:

➢ *Air quality*

Ambient air quality of project area is rather good. The concentrations of pollution parameters such as TSP, SO_2, NO_2, CO monitored at three locations in six times of pre-construction stage meet allowable limit of Vietnamese regulation - QCVN 05:2009/BTNMT.

➢ *Noise*

Noise levels at 3 locations (VT-1, VT-2, VT-3) at 6 monitoring times, these values are lower than the permitted limit value of QCVN 26:2010/BTNMT (70 dBA). The highest noise level is at VT-1.

- Time 1: noise levels ranged from 52.4dBA to 59.1 dBA.
- Time 2: noise levels ranged from 52.1 dBA to 60.4 dBA.
- Time 3: noise levels ranged 49.5 dBA to 58.5 dBA.
- Time 4: noise levels ranged from 47.8dBA to 58.3 dBA.

- Time 5: noise levels ranged from 51.5 dBA to 62.1 dBA.
- Time 6: noise levels ranged from 50.5 dBA to 64.7 dBA.

➢ *Vibration*

The vibration results measured at three monitoring locations VT-1, VT-2 and VT-3 at 06 monitoring times are lower than Vietnamese regulation QCVN 27:2010/BTNMT (75dB).

- Time 1: The vibration results ranged from 41.5dB to 51.7dB.
- Time 2: The vibration results ranged from 42.9dB – 53.8dB.
- Time 3: The vibration ranged from 40.4dB to 50.3dB.
- Time 4: The vibration values ranged from 40.1dB to 49.2dB.
- Time 5: The vibration values ranged from 38.2dB to 53.7dB.
- Time 6: The vibration results ranged from 41.1dB to 54.6dB.

➢ *Surface water*

Surface water monitoring results in pre-construction stage show that surface water quality has been contaminated organic, especially at location W1 was polluted by oil and microbial. Most measured results of BOD, COD, NO2- are higher than regulation of QCVN 08:2008/BTNMT-Column B1.

The other results such as SS, heavy metals, NH4+, PO43- are lower than allowable limit of Vietnamese regulation - QCVN 08:2008/BTNMT-Column B1.

➢ *Underground water*

Groundwater quality at project area has a sign of polluting chloride – The concentration of Chloride exceeds the regulation QCVN 09:2008/BTNMT 6.2 times, in addition, the total solids exceed regulation 1.2 times and hardness level is also slightly exceeds the regulation. The remaining parameters analyzed meet the allowable limit of regulation.

➢ *Soil quality*

Soil quality monitoring results in pre-construction stage at project area shows that they are lower than allowable limit of Vietnamese regulation QCVN 03:2008/BTNMT. This shows that soil quality of this area is quite good.

- The covering monitoring result in May, June and July 2013 of Package 7 is summarized as follows:

➢ *Air quality*

The analyzed results of air quality show that air quality at project area is quite good.

The concentrations of pollution parameters such as TSP, SO2, NO2, CO monitored in three locations at six times in July 2013 are higher than the results in May 2013 and in June 2013 and they are also higher than the baseline values in April 2013. However, all monitoring results meet the limited values of regulation - QCVN 05:2009/BTNMT.

➢ *Noise*

The noise level at 3 monitored locations at six times ranged from 48.9 dBA to 68.2 dBA. The average noise level in July 2013 is 56.3 dBA, this result is higher than the average result of baseline date (54.7 dBA) and it is higher than the average result in June 2013 (55.3 dBA) and May 2013 (54.5 dBA). However, all monitored results are satisfying the allowable limits of regulation - QCVN 26:2010/BTNMT (70 dBA).

➢ *Vibration*

The noise level at 3 monitored locations at six times ranged from 48.9 dBA to 68.2 dBA. The average noise level in July 2013 is 56.3 dBA, this result is higher than the average result in baseline date (54.7 dBA), it is higher than the average result in June 2013 (55.3 dBA) and in May 2013 (54.5 dBA).

All monitored results are satisfying the allowable limits of QCVN 26:2010/BTNMT (70 dBA).

➢ *Surface water*

Monitoring results of surface water in construction stage of package 7 in July 2013 show that surface water quality at location NM1 are fairly good, at location NM2

(Muong Kenh bridge) has polluted nutrient because concentration of NH4+ and NO2- are higher than the regulation. However, surface water quality is quite good if we compare with the results in pre-construction stage and in June 2013 and May 2013.

The remaining parameters analyzed such as BOD5, COD, TSS, DO, Coliform, Oil are also under the limited value of regulation - QCVN 08:2008/BTNMT-Column B1.

➢ *Underground water*

Groundwater quality at project area analyzed show that pH and Cl^- do not meet the allowable regulation in June and July 2013. The remaining of analyzed parameters meet the limited value of QCVN 09:2008/BTNMT.

➢ *Soil quality*

All these results of soil monitoring in construction stage are lower than the limited values in the Regulation QCVN 03:2008/BTNMT.

b. Monitoring results of Package 8

- The monitoring result in April 2013 (the initial environmental monitoring) is summarized as follows:

➢ *Air quality*

Air environment quality in project area is very good. The concentrations of pollution parameters such as TSP, SO2, NOx, CO monitored in three sampling positions in six times in pre-construction phase still fully satisfy the limited values of Vietnamese regulation - QCVN 05:2009/BTNMT.

➢ *Noise*

Noise levels at 3 locations (VT-1, VT-2, VT-3) at 6 monitoring times, these values are lower than the permitted limit value of QCVN 26:2010/BTNMT (70 dBA). Detail monitoring results of the time as follows:

- Time 1: noise level varies within 46.1 to 57.2 dBA. The highest noise level is at VT-3 and the lowest at VT-1.

- Time 2: noise level varies within 47.6 dBA to 55 dBA. The noise level is highest at VT-2 and lowest at VT-1.
- Time 3: noise level varies within 46.7 dBA to 55.3 dBA. The highest noise level is at VT-2 and the lowest at VT-1.
- Time 4: noise level varies within 50.5 dBA to 52 dBA. The highest noise level is at VT-1 and the lowest at VT-3.
- Time 5: noise level varies within 54.5 dBA to 62.7 dBA. The noise level is highest at VT-3 and lowest at VT-1.
- Time 6: noise level varies within 55.9 dBA to 57.7 dBA. The highest noise level is at VT-2 and the lowest at VT-3.

➢ *Vibration*

The results of vibration level at 3 monitoring location (VT-1, VT-2, VT-3) in 6 times in pre-construction phase are in range of 40.2dB to 49.6dB. They fully meet the limited value 75dB of National technical regulation on QCVN 27:2010/BTNMT.

➢ *Surface water*

Monitoring results show that surface water quality in project area is rather good but presenting microorganism. TSS, oil and grease, amoni slightly exceed Vietnamese regulation. The remaining analyzed parameters such as pH, SS, BOD, COD and heavy metal are under the allowable limit of QCVN 08:2008/BTNMT-Column B1.

➢ *Underground water*

Groundwater quality at project area is rather good. All parameters meet the limited value of National Technical Regulation on ground water quality QCVN 09:2008/BTNMT.

➢ *Soil quality*

Results of soil quality in the project area are good. All analyzed parameters are lower than the limited value of the Regulation QCVN 03:2008/BTNMT.

- The covering monitoring result in May, June and July 2013 of Package 8 is summarized as follows:

➢ *Air quality*

Air environment quality in project area is very good. The results of dust monitoring at 3 locations at 06 times in construction phase of May, June and July 2013 is lower than baseline date of April 2013. Average dust content at each time as follows:

- Time 1: average dust content in May, June and July varied within 0,10 – 0,11 mg/m^3 (baseline date in April 2013 was 0,12 mg/m^3);
- Time 2: average dust content in May, June and July varied within 0,12 – 0,16 mg/m^3 (baseline date in April 2013 was 0,16 mg/m^3);
- Time 3: average dust content in May, June and July varied within 0,14 – 0,15 mg/m^3 (baseline date in April 2013 was 0,17 mg/m^3);
- Time 4: average dust content in May, June and July varied within 0,13 – 0,16 mg/m^3 (baseline date in April 2013 was 0,17 mg/m^3);
- Time 5: average dust content in May, June and July varied within 0,13 – 0,15 mg/m^3 (baseline date in April 2013 was 0,18 mg/m^3);
- Time 6: average dust content in May, June and July varied within 0,11 – 0,16 mg/m^3 (baseline date in April 2013 was 0,18 mg/m^3);

The remaining parameters such as SO2, NOx, CO were higher than baseline date, but these parameters meet the limited value of National Technical Regulation on ambient air quality QCVN 05:2009/BTNMT.

➢ *Noise*

The noise level results at 3 monitored locations (VT-1, VT-2, VT-3) at 6 times in July 2013 varied within 47.3 dBA to 61.9 dBA. The highest value of this month at VT2 in time 2 (61.9 dB) because this location is near the construction site and this location is 40 meters from Do Xuan Hop stthо6ngnoise level affected by traffic on this street.

Most analyzed values in July 2013 are lower than the values in June 2013 (47.3dBA to 64.6 dBA) and lower than values in May 2013 (47.6 dBA to 66.1dBA) and they are also lower than values in pre-construction phase (46.1dBA to 62.7dBA), but all these values meet the limited value of National technical regulation on QCVN 26:2010/BTNMT (70dBA).

- *Vibration*

The results of vibration level at 3 monitoring location (VT-1, VT-2, VT-3) in 6 times in July 2013 ranged between 36.1 dB to 44.6 dB. The highest value of this month at VT2 is time 5 (45.2 dB). It is lower than highest value of June 2013 (47.1 dB) and it is also lower than the highest value in pre-construction phase (49.6 dB), but all these values are satisfy of limited value of National technical regulation on QCVN 27:2010/BTNMT (75dB).

- *Surface water*

The monitoring results of surface water quality in July 2013 show that the surface water quality at project area was generally relatively better compared to the previous months.

The results was analyzed in May 2013 show that most parameters meet the allowable limit of regulation, except DO, TSS, Coliform content in Muong Kenh canal do not meet regulation, but they are meet regulation in June and July 2013, PO_4^{3-} content was monitored in June and July exceed slightly of regulation and higher than baseline date in April 2013. The remaining analyzed results meet regulation of QCVN08:2008/BTNMT-Column B1.

- *Underground water*

Groundwater quality at project area is rather good. All parameters meet the limited value of Vietnamese regulation - QCVN 09:2008/BTNMT. The monitoring results did not change much between the months May, June, July and April 2013. This proves that the soil quality in the project area is not affected by the activities of the project.

- *Soil quality*

The analyzed results of soil at project area show that soil quality is quite good. All analyzed parameters in May, June and July 2013 meet the limited values of regulation - QCVN 03:2008/BTNMT and they did not change much compared to pre – construction stage.

c. Monitoring results of Package 9

- The monitoring result in April 2013 (the initial environmental monitoring) is

summarized as follows:

- *Air quality*

  Air environment quality in project area is rather good. The concentration of pollution parameters such as TSP, SO2, NO2, CO, monitored at three sampling positions at six times in pre-construction meet the limited values of Vietnamese regulation - QCVN 05:2009/BTNMT.

- *Noise*

  The results of noise levels measured in 3 sampling positions in pre-construction stage vary within the range of 54,9 – 64,9 dBA all values meet the limited value in the National Technical Regulation on noise QCVN26:2010/BTNMT (70 dBA). The highest noise at time 4 of VT1 64,9 dBA).

- *Vibration*

  The results of vibration level at 3 monitoring location VT-1, VT-2. VT-3 at 6 times in pre-construction stage ranges within 46.8dB to 52.3dB. They meet the limited value of QCVN27:2010 (75 dB).

- *Surface water*

  The analyzed results of surface water quality at project area in pre-construction stage show that some parameters including BOD, COD, NO_2^- and NH_4^+ at NM1 (low tide) and DO, NO_2^-, NH_4^+ and Coliform at NM2 (high tide) are not meet Vietnamese regulation - QCVN 08:2008/BTNMT-Column B1. All remaining parameters meet regulation.

- *Underground water*

  Groundwater quality at project area has a sign of Chloride pollution, Concentration of Chloride is 58 mg/l higher than the limited value of QCVN 09:2008/BTNMT and the remaining parameters meet the limited value of Vietnamese regulation.

- *Soil quality*

  All these results of soil monitoring in pre-construction stage are lower than the limited values of Regulation - QCVN 03:2008/BTNMT.

- The covering monitoring result in May, June and July 2013 of Package 9 is summarized as follows:

➢ *Air quality*

Air environment quality in project area is rather good. The monitored results of TSP, SO2, NO2, CO at three sampling positions at six times in July 2013 have not changed much compared in May, June 2013 and the baseline values. All analyzed values in May, June, July 2013 still meet the limited values of Vietnamese regulation - QCVN 05:2009/BTNMT.

➢ *Noise*

The results of noise levels measured at 3 sampling positions at six times varied within 57,2 – 66,9dBA. In general, noise level in July 2013 was a bit lower than the noise levels in June 2013 (55,3 – 69,9 dBA) and May 2013 (50,8 – 68 dBA) but they are higher than the baseline values (54,9 – 64,9 dBA). The highest noise level at VT-1. Due to operating of machine on the construction site and effected by traffic on Nguyen Duy Trinh Street. However, all these results are lower than the limited value of QCVN26:2010/BTNMT (70 dBA).

➢ *Vibration*

The results of vibration level at 3 monitoring locations (VT-1, VT-2 and VT-3) at 6 times in July varies between 45,3 – 54,5dB. These value are lower than vibration level in June 2013 (46,8 dB – 56,1 dB) and May 2013 (46,9 – 60,8 dB) but they are a bit higher than the baseline value (47,5 – 52,3 dB). However, all values are lower than the limited value of QCVN27:2010/BTNMT (75 dB).

➢ *Surface water*

Generally, monitoring results at project area in July 2013 show that surface water quality at NM1 locations are fairly good, surface water quality at NM2 locations (low tide) has signs of nutrient pollution, because the value of NH4+ and PO43- are higher than the Vietnamese regulation. However, the results of analyzed surface water in July 2013 were better than the results in baseline and results in May 2013, June 2013. Most analyzed values in July 2013 meet the limited values of QCVN 08:2008/BTNMT-Column B1.

➢ *Underground water*

The analyzed results of groundwater quality at project area in May, June and July 2013 are compared with baseline date and Vietnamese regulation show that most of pH value in all analyzed samples does not meet Vietnamese regulation. In addition, the analyzed results of Cl^- and Mn show that only one sampling out of four sampling meets the requirements of applicable regulation, coliform content in June slightly exceed regulation. The remaining parameters meet the limited value of QCVN 09:2008/BTNMT.

➢ *Soil quality*

All the results of soil monitoring at project area in May, June and July 2013 are compared with baseline date and Vietnamese regulation show that they are lower than the limited values of QCVN 03:2008/BTNMT.

4.3. Assessment of Monitoring Results

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

In general, the environmental condition in the first six months of construction phase of Packages 7, 8 and 9 were monitored show that environmental quality of project area did not change considerably in comparison with the initial monitoring. Details are as follows:

- Air, noise and vibration:
  - + Dust content exceeded the allowable limit including baseline monitoring at the monitored area near East-West Highway belong Package 7 and Ring Road No.2 Interchange with Nguyen Duy Trinh street belong Package 9. Dust content meet the allowable limit of Vietnamese regulation at the remaining monitored locations.
  - + The noise level was monitored in three Packages 7, 8 and 9 show that they meet the allowable limit, except the noise level exceed the Vietnamese regulation from 21:00 to 22:00 at monitored location near East-West Highway belong Package 7 due to impacting of traffic on this road.

+ Vibration levels at all measurement points are within the allowed limits.

- Surface water: during the monitored pre-construction as well as construction phase of the canals in project area show that most analyzed parameters meet the allowable limits of regulation of QCVN08:2008/BTNMT, except some parameters often did not meet regulation as follows:
  + Ba Dai Canal: there are some parameters which do not meet the allowable regulation such as: SS, PO_4^{3-} and Coliform in pre-construction phase (April 2013) and COD, Coliform, BOD, DO and NO_2^- in construction phase.
  + Muong Kenh Canal: there are some parameters which do not meet the allowable regulation such as: SS, PO_4^{3-} and Coliform in pre-construction phase (April 2013) and Coliform, NO_2^- and NH_4^+ in construction phase.
  + Ong Cai River: there are some parameters which do not meet the allowable regulation such as: DO, SS, PO_4^{3-}, SS and Coliform in pre-construction phase and SS, amoni, PO_4^{3-} Coliform in construction phase.
- Groundwater: Most samples of Package 7, 8 and 9 were contaminated Cl^-, Fe, Mn and Coliform at both phases – pre-construction phase and construction phase. It is not possible for workers to use this water directly for drinking and cooking. This may cause infectious disease if there is not treatment before using.
- Soil: The analysis results of soil in all monitoring always meet the allowable limit of Vietnamese regulation.

5. EVIRONMENTAL 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 May 2013.

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

Time	Package 7	Package 8	Package 9
	Regular training	Regular training	Regular training
02/2013	-	-	-
03/2013	46	18	-
04/2013	37	34	135
05/2013	65	41	140
06/2013	56	15	160
07/2013	55	23	175

6. KEY ENVIRONMENTAL ISSUES

6.1. Key Issues Identified

a. *Environmental issues through environmental monitoring results:*

- The monitoring results showed that the environment is under certain impacts especially noise and TSP levels in the ambient air at some construction area such as: at construction area of Package 7 near East-West Highway and construction area of Package 9 near Ring Road No.2 Interchange and construction area of Package 8 near Do Xuan Hop Street. Noise level and dust content at these areas always exceed the allowable limits of Vietnamese regulation due to the traffic activities of these roads. Therefore, environmental monitoring results of the beginning of the construction stage showed that there is no significant impact on environment by project activities.
- The monitoring results of surface water quality, soil and ground water at project area do not have any significant changes from pre-construction stage.

b. The environmental issues exit through the site supervisor:

The Contractors are not aware of environmental protection during construction, therefore, they always repeat environmental violations such as: discharge bentonite mud to surrounding area, domestic solid waste was not collected from the camps and disposal accordance with regulation, waste water from batching plant untreated before discharge into environment as Consultant's requirement.

6.2. Action Taken

Implementation of necessary measures to avoid environmental issues cited in previous report: spraying water to reduce dust, regular clean of batching plant and Do Xuan Hop Street at the entrance to Package 8 office to reduce dust, supply of garbage bins, training of workers on environment and safety, etc.

6.3. Additional Action Required

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

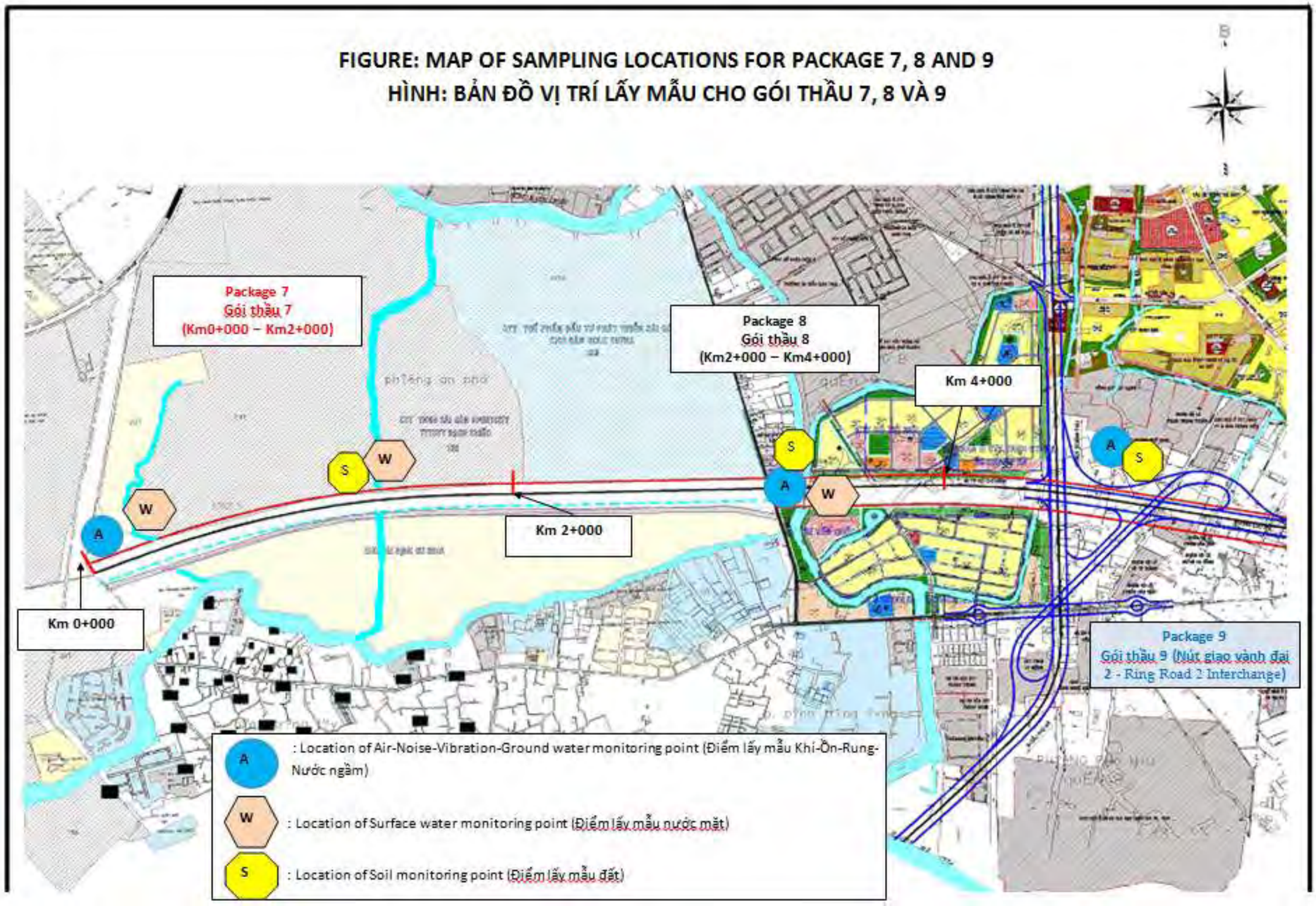
- Regular clean of batching plant and drainage system.
- Regular spraying water and this practice shall be enhanced in dry day and strong wind

- 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

- In this moment, there is no significant environmental impact. The results of the environmental monitoring in the beginning of construction phase showed that no major differences compared with pre-construction phase on air, noise, vibration, surface water quality, ground water quality, soil…. However, it is important to monitor environment periodically and historical data shall be monitored to identify the trend of the baseline environment (under the condition without only this project).
- Attention shall be paid to the construction of bored piles on canals or rivers as this construction may release betonite mud into surface water, affecting water quality and aquatic organism.
- Although the TSP and noise level (night time) at intersection are mainly attributed to increase in circulation of vehicles in the area, contractors shall frequently implement water spray to control dust and minimize noise of vehicles or machine during construction in night time.

Appendix 1. MAP OF SAMPLING LOCATIONS



Appendix 2. PHOTOS OF ENVIRONMENTAL MONITORING AND SUPERVISION

Environmental monitoring by CS Consultant

Noise, air, vibration sampling, Pk 7

Ground water sampling, Pk7

Surface water sampling, Pk8

Soil sampling, Pk 8

Noise, air, vibration sampling, Pk 9	Soil sampling, 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

Construction site was cleared, Pk 7.

Construction site without garbage, Pk7

Bentonite mud was shipping to the truck to carry out of the site, PK8

Cleaning Do Xuan Hop Street, Pk 8

Bentonite was transfered out of the site, Pk 9

Embankment was built around to avoid overflow bentonete surrounding area, Pk9.