

Environmental Monitoring Report

Monthly Report
June 2010

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

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

CURRENCY EQUIVALENTS

(as of 31 May 2010)

Currency unit	–	dong (D)
D1.00	=	\$0.000052
\$1.00	=	D19,020

ABBREVIATIONS

ADB	–	Asian Development Bank
BOD	–	biological oxygen demand
CASE	–	Center for Analytical Services and Experimentation of Ho Chi Minh City
CEPT	–	center for environmental protection in transportation
COD	–	chemical oxygen demand
JICA	–	Japan International Cooperation Agency
km	–	kilometer
m	–	meter
m ³	–	cubic meter
mg	–	milligram
MONRE	–	Ministry of Natural Resources and Environment
SS	–	suspended solids
VEC	–	Vietnam Expressway Corporation

NOTE

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

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PREFACE

Highway 1A length of Ho Chi Minh City - Dong Nai Province and Highway 51 is one of the most important centre lines in region. From 1997 to 2000, highway 1A from Ho Chi Minh City to Bien Hoa Province was recovered, improved and widened with scale of 4 to 6 traffic lanes. Highway 51 was upgraded into four traffic lanes. However, according to statistic, traffic survey to 2005, highway 1 will be overload, no-responses inter-regional traffic demand, effects to regional development. To build new express highways to serve future traffic demand in compass of priority economic region is very necessary.

The express highway of Ho Chi Minh city - Long Thanh - Dau Giay was approved Pre-feasibility Research Report in June 2002 by The Government, Prime Minister approved project's contents by document No 56/TTg-CN issued in 10, January 2007 and Ministry of Communications made a decision No 334/QD – BGTVT in 13, February 2007 for ratifying project investment. This express highway will recover only way position and share transport flow of highway 1A and 51. The route has important meaning in promoting development and stability of Southern priority economic region, especially three-cornered economic region of Ho chi Minh city-Dong Nai- Ba Ria Vung Tau.

The way run through regions having sparse population density, essential floristic composition along roadside are fruit-trees planted in garden and some industrial crops such as coffee tree, rubber and flood rice in depression areas. Some dense residential quarter concentrates in the townships, towns and big interchanges such as An Phu, Long Thanh, Dau Giay, line research almost run through spacious area, sparse population density area and non-important project area. The most geologic of the way lies on weak area. Some rivers and canals break the flat terrain.

Vietnam Expressway Corporation (VEC) has been established as state enterprise belonging to Ministry of Transport. In this HLD expressway project, VEC is responsible for conducting the project and official connection with related Ministries and local authorities as well as ADB and JICA. VEC will authorize the rights of project's management to the Southern Expressway Project Management Unit (SEPMU).

Scientific technological center for environmental protection in transportation (CEPT) in co-operation with Center of analytical services and experimentation of. Ho Chi Minh city (CASE) to conduct the environmental monitoring for construction phase for package 1a (No3) and packages 1b, 2, 3, on dated to 29 from 30 June and 1st July 2010. These works were conducted to evaluate the environmental quality when the project is in the construction phase then to specify whether the construction activities may affect the local environment or not.

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PREFACE

CHAPTER 1: INTRODUCTION

1.1. Introduction

In the surrounding areas of Ho Chi Minh City, the traffic density has been increased more than circulation capacity of roads. There is a prediction that the circulation demand in Ho Chi Minh City and Dong Nai province, where the industrial development recently becomes very important in accordance with the development planning of industrial parks and international airports, will be noticeably increased.

Vietnam government has decided to conduct an expressway construction project Ho Chi Minh City - Long Thanh - Dau Giay (HLD Expressway) with the financial supports from Asia Development Bank (ADB) and Japanese International Corporation Agency (JICA).

VEC is responsible for conducting the project HLD. VEC will authorize the rights of project's management to the Southern Expressway Project Management Unit (SEPMU).

The project building expressway Ho Chi Minh - Long Thanh - Dau Giay with total length of 51km, is divided into 2 parts:

- Part 1: From Ring Road 2 intersection (beginning point of Package 1a; Km4+000) to the National Highway No.51 (end point of Package 3; Km 23+900). This section is designed in accordance with expressway standards of TCVN5729-97, grade A, designed speed of 120km/h with 4 lanes. Long Thanh bridge is partly designed to allow a speed up to 100km/h.

- Part 2: From the National Highway No.51 interchange (ending point of Package 3/ beginning point of Package 5; Km23+900) to Dau Giay interchange (ending point of Package 6; Km54+982).

1.2. Scope of work

- To conduct environmental monitoring: Air quality, noise, vibration, surface water quality, underground water quality, waste water and soil.

- Scope of work: The specified sites of package 1a, 1b, 2 and 3 belonging the project.

1.3. Work plan.

- * *Execution agent:* Scientific technological center for environmental protection in transportation (CEPT) and Center of analytical services and experimentation of Ho Chi Minh city (CASE)

- * *Plan for implementation:*

Table 1. Plan for implementation

<div style="text-align: right;">Date</div> <div style="text-align: left;">Work</div>	To 29 from 30 June and 1 st July 2010	To 2 nd from 22 th July	25 th July	4 th August
Monitoring and sampling at sites	X			
Analyzing		X		
Draft reports			X	
Completed reports				X

CHAPTER II: BACKGROUND CONDITIONS

2.1. Site and location of the project.

- Location of the project: the beginning of Package - 1a (Km. 4+00) to the end of Package - 3 (Km. 23 + 900, the National Highway intersection) in which the construction cost is financed by JICA.

- Distance: 19.9Km.

Table 2. Detailed plan for sampling

No	Detailed contents	Site	Package	Location	Sign
29th June, 2010					
1	Air quality	Intersection Nguyen Duy Trinh str with HLD expressway	1a	6+150	A ₁
2	Noise	Intersection Nguyen Duy Trinh str with HLD expressway	1a	6+150	N ₁
3	Vibration	Intersection Nguyen Duy Trinh str with HLD expressway	1a	6+150	V ₁
4	Surface water	Ong Nhieu river (Ong Nhieu bridge)	1a	7+100 (up stream)	SW1-1; SW1-2
		Ong Nhieu river (Ong Nhieu bridge)	1a	7+100 (down stream)	SW1-3; SW1-4
5	Underground water	Tan Dien A Hamlet, Phu Huu (District 9)	1a	5+250	GW1-1; GW1-2; GW1-3
6	Soil quality	Phu Huu Ward, District 9 (Land bank)	1a	4+200	S1-1; S1-2; S1-3
7	Waste water		1a	4+350; 4+980; 5+480	WW1-1; WW 1-2; WW1-3
30th June					
1	Air quality	Truong Khanh Temple (near residential area)	2	11+300	A2
2	Noise	Truong Khanh Temple (near residential area)	2	11+300	N2
3	Vibration	Truong Khanh Temple (near residential area)	2	11+300	V2

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4	Surface water	Long Thanh bridge	2	12+600 (up stream)	SW3-1; SW3-2
		Long Thanh bridge	2	12+600 (down stream)	SW3-3; SW3-4
		Song Tac bridge	1b	10+400 (up stream)	SW2-1; SW2-2
		Song Tac bridge	1b	10+400 (down stream)	SW2-3; SW2-4
5	Underground water	Long Phuoc ward (near Dong Nai river)	1b	10+400	GW2-1; GW2-2; GW2-3
6	Soil quality	Truong Khanh temple	2	11+300	S2-1; S2-2; S2-3
7	Waste water	-	1b	7+900; 10+300; 10+500	W2-1; W2-2; W2-3;
		-	2	11+500; 12+300; 12+900	W3-1; W3-2; W3-3;
1 st July					
1	Air quality	Long Thanh town, near the national highway No.51.	3	23+300	A3
2	Noise	Long Thanh town, near the national highway No.51.	3	23+300	A3
3	Vibration	Long Thanh town, near the national highway No.51.	3	23+300	A3
4	Surface water	Dong Mon bridge	3	21+350 (up stream)	SW4-1; SW4-2
		Dong Mon bridge	3	21+350 (down stream)	SW4-3; SW4-4
5	Underground water	Long Thanh town	3	23+300	GW3-1; GW3-2; GW3-3
6	Soil quality	Long Thanh town	3	23+300	S3-1; S3-2; S3-3
7	Waste water	-	3	18+300; 19+100;	W4-1; W4-2;

				21+350	W4-3.
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2.2. Status of the project

In the package 1a: Temporary road construction, batching plant/site laboratory/precast Yard construction, embankment/PVD construction, 2nd Non-working test pile, preparation for bored pile construction (working pile), preparation work for super T girder.

In the packages 1b: Building and mobilization equipment for site laboratory, construction of temporary road and temporary bored piles.

In the packages 2: Trial drilling test hole, construction service road and temporary culvert, site clearance, building batching plant and gather material for construction drilling bored pile, building site laboratory

In the packages 3: building the site office, site clearance from Km18+000 to 22+600.

2.3. Previous and trend of environmental conditions

*** Previous conditions:**

According to the Second Environmental Monitoring (March 2010) as below:

a). Package 1a

- Air quality:

+ The content of SO₂ at 10h - 12h and 14h - 18h is higher the allowable values in QCVN05:2009 (1.91 times).

+ The content of dust is higher the allowable values in QCVN05:2009 (3.74 times).

+ The contents of NO₂, CO and HC: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values.

Causing of high concentration of TSP and SO₂ in some periods of time: There were many vehicles, especially trucks for waste and construction materials transportation (because the area is being enlarged so the urbanization speed is so high). The temperature at the sampling time was high, in addition the high speed of wind (0.3 - 1.7m/s) make the high content of dust).

- *Noise and vibration* are meeting the allowable levels.

- *Surface water:* All parameters are meeting the allowable levels according to QCVN08:2008

- *Underground water:*

+ pH level at 3 underground water samples did not meet QCVN09:2008 that is from 5.5 to 8.5. (pH level is defined to 4.54 from 4.70)

+ There is a signal of contamination of Fecal Coliform in 03 underground water samples.

Causing: Water in the area has a slight signal of contamination of acids and microorganisms. Almost of wells in the area are drilled by households so there is no suitable treatment for these wells.

- *Soil*: The analyzed results of environmental parameters are meeting the QCVN03:2008.

- *Waste water*:

+ BOD₅ values at *WW1-1* is higher than allowable value (3.16 times)

+ The content of Coliform in the 3 samples are from 9.6 to 1860 times higher than allowable value (the content of coliform in sample *WW1-3* is $9.3 \cdot 10^6$).

Cause: The high content of coliform is caused by dead water (caused by sand and nylon bags logging water flows). The wastewater is not much but the dead water makes lack of DO and this condition is suitable for coliform to develop, the highest content of coliform is the sample taking from this dead water. So it is very important for the constructor to clean the duct to reduce this dead water area.

b). Package 1b

- *Surface water*: All parameters are meeting the allowable levels according to QCVN08:2008

- *Underground water*:

+ The underground water sample *GW2-2*: There was a light smell caused by high content of Cl⁻ in the sample. In addition, the content of Fe is 12.6 times higher than allowable value; 1.04 times higher for Mn. These bored wells are not to be treated before using.

+ There is a signal of contamination of Fecal Coliform in 02 underground water samples.

c). Package 2

- *Air quality*:

+ The content of dust is higher the allowable values in QCVN05:2009 (2 times).

+ The contents of NO₂, CO and HC: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values.

There were not households and vehicles in the area but vacant lands causing wind that sweep dust making high content of TSP in this area.

- *Noise and vibration* are meeting the allowable levels.

- *Surface water*: All parameters are meeting the allowable levels according to QCVN08:2008

- *Soil*: The analyzed results of environmental parameters are meeting the QCVN03:2008.

d). Package 3

- Air quality:

- + The content of dust is higher the allowable values in QCVN05:2009 (4.84 times).
- + The contents of NO₂, CO and HC: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values.

The cause of high content of TSP exceeding the allowable value: There were many circulated vehicles in this area, especially trucks, containers for goods transportation and materials from Vung Tau to Ho Chi Minh city and conversely.

- Noise and vibration:

- + Vibration is meeting the allowable levels.
- + The noise levels from 6pm - 10pm: are 5dBA higher than allowable values caused by high density of vehicle circulation in this area in night-time and the use of air horn.

- Surface water:

- + SW4-3: There are some parameters that did not meet the QCVN08:2008 are: DO, SS.
- + NH₄⁺ at (SW4-1, SW4-2, SW4-3, SW4-4) is higher allowable value

The cause of high content of amonie may be from domestic wastewater, breeding wastewater or agricultural fertilizers of the nearby households. The surface water contains some contaminants so the DO level does not meet the allowable value.

- Underground water:

- + pH value at GW3-1 and GW3 is not allowable value.
- + Cl⁻ value at GW3-1 và GW3 - 2 is higher allowable value to 1.3 from 1.45 times.
- + There is a slight smell and signal of contamination of Fecal Coliform in 03 underground water samples.

Causing: Water in the area has a slight signal of contamination of acide and microorganisms. Almost of wells in the area are drilled by households so there is no suitable treatment for these wells.

- Soil: The analyzed results of environmental parameters are meeting the QCVN03:2008.

*** Trend of environmental:**

The monitoring comparison of inveronmental status between the second and third times are showed in the bellow diagram.

CHAPTER 3: METHODOLOGY OF ENVIRONMENTAL MONITORING

3.1. Air quality

* Methodology: According to the requirements of the control equipments and standard methods of MONRE for air sampling, sample analyzing and writing report under the adjustment of National Environmental Monitoring System (NEMS), application of ambient air quality standards (QCVN 05 : 2009 and QCVN 06 : 2009).

* Parameters for monitoring :

- TSP, HC, CO, SO₂, NO₂ and microclimate conditions (temp., air pressure, wind velocity, wind direction, humidity).

* Frequency:

The monitoring will be conducted in one day, making 8 measurements in one position within 16 hours (from 6 am to 10 pm).

* Equipment for monitoring:

Equipment: DustScan Scout Aerosol Monitor, USA.

* Methods for analyzing:

Table 5. Methods for analyzing

No	Parameters	Methodology
1	Air temp.	Microclimate machine (3733 /2002/QĐ-BYT)
2	Humidity	
3	Air pressure	
4	Wind direction	
5	Wind velocity	
6	SO ₂	TCVN 5971-1995 (ISO 6767:1990)
7	NO ₂	TCVN 6137-96 (ISO 6768:1985)
8	HC	Ref. TCVN 7558-1:2005
9	Dust	MicroDust_Pro-880nm, (Casella)
10	CO	Ref. TCVN 7242:2003

3.2. Noise

* Methodology: The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS .

- Standards for reference: TCVN 5949:1998 (Acoustics - Noise in public and residential areas).

* Parameters for monitoring :

- Leq, Lmax, L50

* Frequency: The monitoring will be conducted in one day, making 3 measurements per hour within 16 hours (from 6 am to 10 pm) for one position.

* Equipment for monitoring:

Noise meter Rion NL-21, Japan.

3.3. Vibration

* Methodology:

- The sampling and analyzing sample shall be carried out based on the standard method for sampling according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS.

- Standards for reference: TCVN 6962: 2001 (Vibrations and seismic - Vibrations caused by construction and industrial production activities - Permitted maximum levels for the environment of public places and populated areas).

* Parameters for monitoring:

- Lveq and Leq

* Frequency:

The monitoring will be conducted in one day, making 3 measurements per hour within 16 hours (from 6 am to 10 pm) for one position.

* Equipment for monitoring:

- Japanese Rionvibro model VM53 RION. The product is calibrated before using.

3.4. Surface water quality

* Methodology:

- The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS.
- Standard for reference: QCVN 08:2008/BTNMT- B1: (National technical regulation on surface water quality).

** Parameters for monitoring:*

- pH, temp., turbidity, conductivity, DO, BOD, COD, SS, T-N, T-P, Cu, Zn, Pb, As, Hg, Cd, grease, lubricant, NO_3^- , CN^- , coliform.

** Frequency:*

The monitoring will be conducted in a day, taking 2 samples a day (in the morning and in the afternoon) for each position.

** Equipment for monitoring:*

- All of parameters such as pH, temp., conductivity, DO will be measured at sites by the equipment of YSI, USA.

- Other parameters such as SS, BOD5, Coli form, grease, Cu, Fe... will be sampled, stored and analyzed in lab. All of these equipments are also calibrated before measuring.

** Analysis methods (shown in table 6)*

3.5. Underground water quality monitoring

** Methodology:*

- The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS.

- Standard for reference: QCVN 09:2008/BTNMT (National technical regulation on underground water quality).

Parameters for monitoring:

- Temp., pH, color, odor, conductivity, turbidity, hardness, Mn, Fe, coli form, NO_3^- , Cl^- , SO_4^{2-} , Cd, Pb, Zn as well as underground water levels and dynamic of flows.

** Frequency:*

The monitoring will be conducted in a day, taking 3 samples a day

** Equipment for monitoring:*

- Equipments: All of parameters such as pH, temp., conductivity, DO will be measured at sites by the equipment of YSI, USA. Other parameters such as SS, Coli form, grease, Cu, Fe... will be sampled, stored and analyzed in lab. All of these equipments are also calibrated before measuring.

* *Analysis methods (shown in table 6)*

3.5. Waste water

** Methodology:*

- The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE) with calibrated equipments.

- Sampling position will be marked by GPS.

- Standard for reference: QCVN 24:2009/BTNMT (National technical regulation on Industrial Wastewater).

** Parameters for monitoring:*

Temp, pH, BOD₅, COD, DO, SS, NH₄⁺, ΣN, ΣP, oil and grease, Coliform

** Frequency:*

The monitoring will be conducted in a day, taking 3 samples a day

** Equipment for monitoring:*

- Equipments: All of parameters such as pH, temp, DO will be measured at sites by the equipment of YSI, USA. Other parameters such as Coli form, grease, ΣN, ΣP....will be sampled, stored and analyzed in lab. All of these equipments are also calibrated before measuring.

** Analysis methods*

Table 6. Analysis methods

No	Parameters	Methodology
1	As	TCVN 6626-2000
2	Cd, Fe, Mn, Pb, Zn, Cu	EPA-Method 200.7
3	CN ⁻	TCVN 6181-96
4	Hg	Varian AA-38
5	Coliforms	ISO 9308-2:1990
6	pH	AOAC 973.41
7	Temp	TCVN 4557-88
8	Dust	TCVN 6184-96 (ISO 7027:1990)
9	Conductivity	Ref. AOAC 973.40
10	Cl ⁻	TCVN 6194-1996 (ISO 9297:1989 E)
11	SO ₄ ²⁻	ASTM D516-90
12	NO ₃ ⁻	TCVN 6180-96 (ISO 7890-3:1988 E)

13	DO	TCVN 7325: 2004 (ISO 5814-1990)
14	BOD	SMEWW 5210.D
15	COD	TCVN 6491-99 (ISO 6060:1989)
16	SS	TCVN 6625-2000 (ISO 11923:1997)
17	T-N	TCVN 6624-2:2000 (ISO 11905-2:1997)
18	T-P	TCVN 6202: 2008 (ISO 6878-1:2004)
19	Color	TCVN 6185-96.(ISO 7887: 1985 (E))
20	Odor	Ref.TCVN 2653-78
21	Hardness	AOAC 973.52
22	NH ₄ ⁺	TCVN 6179-1: 1996 (ISO)
23	Fecal Coliform	Ref. ISO 9308-1:2000

3.7. Soil

** Methodology:*

- The sampling will be carried out at site and analyzed in lab with the calibrated equipments.

- Sampling position will be marked by GPS.

- The sampling and analyzing sample shall be carried out based on the standard method for sampling and lab analyzing according to the requirements of (MONRE). The thickness of sampling will be from 20 to 30 cm from the ground.

- Standard for reference: QCVN 03:2008/BTNMT (National technical regulation on permitted concentration of heavy metals in soil) and QCVN 15:2008/BTNMT (National technical regulation on the pesticide residues in the soil).

** Parameters for monitoring:*

- pH, organic compounds, Total N, Total P, Cl⁻, SO₄²⁻, Cu, Zn, Cd, Pb, Hg, As, Fe.

** Frequency:*

The monitoring will be conducted in a day, taking 3 samples a day

** Analysis methods*

Table 7. Analysis methods

No	Parameters	Methodology
1	pH	TCVN 5979: 95
2	TOC	TCVN 6642-2000 (ISO 10694:1995)
3	Total N	Ref. AOAC 993.13, 2002

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4	Total P	Ref. AOAC 990.08
5	Cl ⁻	Ref. TCVN 6194: 96
6	SO ₄ ²⁻	Ref. TCVN 6656 : 2000
7	As	AOAC 990.08
8	Cd	AOAC 990.08
9	Cu	AOAC 990.08
10	Fe	AOAC 990.08
11	Hg	Varian AA-72
12	Pb	AOAC 990.08
13	Zn	AOAC 990.08

CHAPTER IV: RESULT OF ENVIRONMENTAL MONITORING

4.1. Package 1a

4.1.1. Air quality

- Location monitoring: Intersection Nguyen Duy Trinh str with HLD expressway (Km6+150) - Lot 1a.
- Time: From 6h to 22h. Date: June, 29/2010.
- Positions: N 10°47'43,1" ; E 106°48'18,1"
- Climate condition: Sunny, light wind
- Other conditions: There were much participated vehicles.
- Result monitoring (average):

Table 8. Measurement results on micro climate at projected area

No	Time	Temperature °C	Moisture content %	Wind speed m/s	Pressure mB	Wind direction
1	A1 (6h-22h)	30.7	65.0	0.1 - 1.4	1005.8	W, SW

Note: Please refer the detail information of the survey, analysis in appendix section

Table 9: Measurement results on air environmental quality

Standard	Time	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
Average	6h - 22h	None MLOD =0.03	0.036	None MLOD =1.0	0.33	2.83
QCVN05:2009	Average 1h	0.35	0.2	-	0.3	30
	Average 24h	0.125	0.1	-	0.2	5
TCVN5938:2005				5		

Note: - Please refer the detail information of the survey, analysis in appendix section
 - The measured values are in average per 1 hour

- Comments:

+ The contents of NO₂, CO: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009.

+ The contents of SO₂ and HC: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are midget nearly none.

+ The content of dust is higher the allowable values in QCVN05:2009 (0.03 mg/m³) this cause by vehicles transporting building materials at the construction site.

4.1.2. Noise and vibration

- Location, time and position monitoring as the same air quality.

Table 10: Noise monitored results

Average	Time	Result monitoring			Standard: TCVN 5949 - 1998
		<i>L_{eq}</i>	<i>L_{max}</i>	<i>L₅₀</i>	
	Day	68.5	87.1	63.7	75
	Night	68.1	85.5	64.0	70

Note: Please refer the detail information of the survey, analysis in appendix section

- Comments:

According to the average value in daytime (from 6am to 6pm) and in nighttime (from 6pm to 10pm), the noise level is under allowable value according to TCVN 5949-1998 (column 3: Applied for Maximum limits in the environment of public and residential areas). The noise in night time (68.1dBA) is approximate in day time (68.5 dBA) and lower than Monitoring before (in March, 2010: 69.7 dBA)

In the monitoring time, the construction have been testing for static loading of bored pile, however the noise level was lower.

There were some vehicles that used horn so the noise level is sometimes higher at partial time.

*** Vibration:**

Table 11: Vibration monitored results

Average	Time	Result monitoring		Standard: TCVN 7210:2002
		Leq	Lveq	
	Day	56.6	42.5	From 6h to 22h: 70dBA
	Night	55.6	44.6	

Note: Please refer the detail information of the survey, analysis in appendix section

* Comments: The vibration result shows that, recent vibration level is under allowable value according to TCVN 7210:2002 - Maximum limits in the environment of public and residential areas.

The vibration result this monitoring is higher than monitoring before about 12 dBA, causing by high density of heavy loading trucks for building material transportation.

4.1.3. Surface water quality

- Location monitoring:	Ong Nhieu river (Ong Nhieu bridge) - Intersection Nguyen Duy Trinh str with HLD expressway
- Position:	SW1-1: N 10°47'40,1" ; E 106°48'49,4" (10h35 - 10h45) SW1-2: N 10°47'30" ; E 106°48'52,2" (15h00 - 15h05) SW1-3: N 10°47'30,1" ; E 106°48'52,2" (10h50 - 11h00) SW1-4: N 10°47'27,5" ; E 106°48'48,0" (15h09 - 15h15)
Time:	June, 29 th 2010

- Results on measuring, monitoring the surface water at upstream and downstream (Shown in appendix)

* Comments:

- Applied column B1, QCVN08:2008 : Used for irrigation or other purposes such as water carriage

- At the sites SW1-1; SW1-2: DO did not meet QCVN08:2008 ($\geq 4\text{mg/l}$). Others parameters is under allowable value.

- At the sites SW1-3; SW1-4: DO and COD did not meet QCVN08:2008. Others parameters is under allowable value.

Both of high temperature in water (31°C) and high chemical oxygen demand (COD) make the DO content lower than allowable value.

4.1.4. Underground water quality

- Location monitoring:	Number home 51B ; 55 ; 75 Bung Ong Thoan Street - Tan Dien Hamlet - Phu Huu - District 9
- Position:	GW1-1 (51B) : N 10°47'47" ; E 106°47'47,3" GW1-2 (55) : N 10°47'44,7" ; E 106°47'48,3" GW1-3 (75) : N 10°47'49,9" ; E 106°47'53,1"

- Results on measuring, monitoring the underground water (Shown in appendix)

*** Comments:**

- pH level at 3 underground water samples did not meet QCVN09:2008 that is from 5.5 to 8.5. (pH level is defined to 4.63 from 4.80)

- There is a signal of contamination of Fecal Coliform in 03 underground water samples.

- All of other parameters are meeting the allowable levels according to QCVN09:2008

4.1.5. Soil

- Location monitoring:	Lot 1a, Phu Huu - District 9 (behind of consultant office)
- Position:	S1-1: N 10°47'48" ; E 106°47'24" S1-2: N 10°47'45" ; E 106°47'24" S1-3: N 10°47'50" ; E 106°47'14,6"

- Results on measuring, monitoring the underground water (Shown in appendix)

*** Comments:**

- The area for soil sampling was a swamp previously so it is not possible to cultivate. This area now is filled up by sand and leveled for municipal areas, so we apply the QCVN03:2008

- For land of people's livelihood.

- The analyzed results of environmental parameters are meeting the QCVN03:2008.

4.1.6. Waste water

- Location monitoring:	Km4+350; Km4+980; Km5+480
- Position:	WW1 - 1 : N 10°47'51,6" ; E 106°47'22,8" WW1 - 2 : N 10°47'49,7" ; E 106°47'40,9" WW1 - 3 : N 10°47'42,8" ; E 106°48'15,9"

- Results on measuring, monitoring the waste water (Shown in appendix)

*** Comments:**

The analyzed wastewater sample values will be compared to QCVN24:2009 (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving waterbodies not using for domestic water supply).

All parameters are meeting the QCVN24:2009.

4.2. Package 1b

4.2.1. Surface water

- Location monitoring:	Tac bridge
- Position:	SW2-1: N 10°47'28,1" ; E 106°50'49,4" (10h05 - 10h15) SW2-2: N 10°47'28,1" ; E 106°50'49,4" (15h15 - 15h20) SW2-3: N 10°47'22,2" ; E 106°50'43,0" (09h55 - 10h00) SW2-4: N 10°47'22,2" ; E 106°50'43,0" (15h25 - 15h30)
Time:	30 th , June 2010
Climate condition:	Sunny, light wind

- Results on measuring, monitoring the surface water at upstream and downstream (Shown in appendix)

*** Comments:**

Applied column B1, QCVN08:2008 : Used for irrigation or other purposes such as water carriage

- At the sites SW2-1; SW2-2; SW2-3; SW2-4: DO did not meet QCVN08:2008 (DO level is defined to 2,26 - 2,49mg/l)

- At the sites SW2-2; SW2-4: SS is higher allowable value (1.5 – 1.84 times). The reason is flood tide making higher content of turbidity and suspended solid in water.

- At the site SW2-3: Coliform is higher allowable value (1.5 times)

4.2.2. Underground water

- Location monitoring:	Long Phuoc ward (near Dong Nai river)
- Position:	GW2-1 : N 10°47'28,3" ; E 106°51'03,5" GW2-2 : N 10°47'32,3" ; E 106°49'14,8" GW2-3 : N 10°47'30,2" ; E 106°49'13,5"

- Results on measuring, monitoring the underground water (Shown in appendix)

*** Comments:**

- Underground water samples GW2-1; GW2-2; GW2-3: Cl⁻ is higher allowable value (2.5 - 4.76 times). The high Cl⁻ concentration is possibly caused by natural impacts (for salt intrusion, acidic water and high conductivity). If this water will be used as fresh water, it is necessary to check the organic compounds in water because this redundant chlorine will combine with organic matter producing a very poisonous chemicals.

- Underground water samples GW2-2 và GW2-3: Fe is higher allowable value (At water sample GW2-3 is higher allowable value about 2.08 times).

- Underground water samples GW2-1 và GW2-3: Fe is higher allowable value (1.78 – 2.16 times).

To reduce the content of Mn and Fe in fresh water, the simple way of treatment is to expose water in the air and to oxidize these elements then filtration water by sand or grave.

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

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

4.2.3. Waste water

- Location monitoring:	Km7+900; Km10+300; Km10+500
- Position:	WW2 - 1 : N 10°47'26,0" ; E 106°50'46,3" WW2 - 2 : N 10°47'16,2" ; E 106°50'41,7" WW2 - 3 : N 10°47'34,6" ; E 106°49'10,8"

- Results on measuring, monitoring the waste water (Shown in appendix)

*** Comments:**

The analyzed wastewater sample values will be compared to QCVN24:2009 (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving waterbodies not using for domestic water supply).

All parameters are meeting the QCVN24:2009.

4.3. Package 2

4.3.1. Air quality

- Location monitoring: Truong Khanh Temple (near residential area)
- Time: From 6h to 22h. Date: June, 30th 2010.
- Positions: N 10°47'13,9" ; E 106°51'05,7"
- Climate condition: Sunny, light wind
- Other conditions: Quiet area, there is not many means of transportation
- Result monitoring (average):

Table 12. Measurement results on micro climate at projected area

<i>No</i>	<i>Time</i> <i>°C</i>	<i>Temperature</i> <i>%</i>	<i>Moisture content</i> <i>m/s</i>	<i>Wind speed</i> <i>mB</i>	<i>Pressure</i>
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A2 (6h-22h)	32.7	57.3	0.2 - 2.3	1005	SE, SW
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Note: Please refer the detail information of the survey, analysis in appendix section

Table 13: Measurement results on air environmental quality

Standard	Time	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
Average	6h - 22h	None MLOD = 0.03	0.029	None MLOD =1.0	0.055	1.650
QCVN05:2009	Average 1h	0.35	0.2	-	0.3	30
	Average 24h	0.125	0.1	-	0.2	5
TCVN5938:2005				5		

Note: - Please refer the detail information of the survey, analysis in appendix section
- The measured values are in average per 1 hour

- Comment:

+ The contents of SO₂, NO₂, CO and dust: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009.

+ The contents of HC: Because this content of HC is not specified in QCVN05:2009 so we use TCVN5938:2005 to compare. The analyzed result is under the allowable value.

4.3.2. Noise and vibration

- Location, time and position monitoring as the same air quality.

Table 14: Noise monitored results

Average	Time	Result monitoring			Standard: TCVN 5949 – 1998
		<i>L_{eq}</i>	<i>L_{max}</i>	<i>L₅₀</i>	
	Day	47.2	64.5	43.5	75
	Night	47.2	66.1	41.4	70

Note: Please refer the detail information of the survey, analysis in appendix section

- Comment:

According to the average value in daytime (from 6am to 6pm) and in nighttime (from 6pm to 10pm), the noise level is under allowable value according to TCVN 5949-1998 (column 3: Applied for Maximum limits in the environment of public and residential areas).

*** Vibration:**

Table 15: Vibration monitored results

Average	Time	Result monitoring		Standard: TCVN 7210:2002
		Leq	Lveq	
	Day	50.4	43.7	From 6h to 22h: 70dBA
	Night	43.5	39.4	

Note: Please refer the detail information of the survey, analysis in appendix section

* Comments: The vibration result shows that, recent vibration level is under allowable value according to TCVN 7210:2002 - Maximum limits in the environment of public and residential areas.

4.3.3. Surface water quality

- Location monitoring:	Long Thanh bridge
- Position:	SW3-1: N 10°46'58,4" ; E 106°51'46,9" (10h43 - 10h48) SW3-2: N 10°46'58,4" ; E 106°51'46,9" (15h54 - 16h00) SW3-3: N 10°47'14,3" ; E 106°51'46,0" (10h55 - 10h55) SW3-4: N 10°47'14,3" ; E 106°51'46,0" (16h03 - 16h08)
- Time:	30 th June 2010
- Climate condition:	Sunny, light wind.

- Results on measuring, monitoring the surface water at upstream and downstream (Shown in appendix)

* Comments:

- At the sites: SW3-1; SW3-2; SW3-3; SW3-4: DO did not meet allowable value.

- Others parameters is under according to QCVN08:2008 (Applied column B1: Used for irrigation or other purposes such as water carriage).

4.3.4. Soil

- Location monitoring:	Truong Khanh Temple
- Position:	S2-1: N 10°47'13,7" ; E 106°51'06,0" S2-2: N 10°47'14,0" ; E 106°51'07,7" S2-3: N 10°47'15,3" ; E 106°51'08,7"

- Results on measuring, monitoring the underground water (Shown in appendix)

*** Comments:**

The analyzed results of environmental parameters are meeting the QCVN03:2008 - For land of people's livelihood, except As content in soil of sample S2-2 (14.8mg/kg) is higher than allowable value (12mg/kg).

As is very poisonous chemical, 5 – 10% of As content in soil will dissolve in underground water and causing As contamination in water. As content in soil at this location need to be checked in the next monitoring.

4.3.5. Waste water

- Location monitoring:	Km11+500; Km12+300; Km12+900
- Position:	WW3 - 1 : N 10 ⁰ 47'11,8" ; E 106 ⁰ 51'43,4" WW3 - 2 : N 10 ⁰ 47'11,8" ; E 106 ⁰ 51'43,4" WW3 - 3 : N 10 ⁰ 47'19,2" ; E 106 ⁰ 51'23,5"

- Results on measuring, monitoring the waste water (Shown in appendix)

*** Comments:**

The analyzed wastewater sample values will be compared to QCVN24:2009 (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving waterbodies not using for domestic water supply).

All parameters are meeting the QCVN24:2009.

4.4. Package 3

4.4.1. Air quality

- Location monitoring: Long Thanh town (Near the National Highway No 51)
- Time: From 6h to 22h. Date: July, 1st 2009.
- Positions: N 10⁰46'03,2" ; E 106⁰57'44,7"
- Climate condition: Sunny, light wind
- Other conditions: There are many rollers, cranes and trucks and the use of air horn.

Result monitoring (average):

Table 16. Measurement results on micro climate at projected area

No	Time ^o C	Temperature %	Moisture content m/s	Wind speed mB	Pressure
A3 (6h-22h)	27.2	84.1	0.1 - 1.9	1005.8	SE, SW

Note: Please refer the detail information of the survey, analysis in appendix section

Table 17: Measurement results on air environmental quality

Standard	Time	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
Average	6h - 22h	None MLOD = 0.03	0.06	None MLOD = 1.0	0.21	3.23
QCVN05:2009	Average 1h	0.35	0.2	-	0.3	30
	Average 24h	0.125	0.1	-	0.2	5
TCVN5938:2005				5		

Note: - Please refer the detail information of the survey, analysis in appendix section

- The measured values are in average per 1 hour

- Comments:

+ The contents of SO₂, NO₂, CO and dust: The analyzed values of samples from 6am to 10pm, in average per 1 hour, are under the allowable values in QCVN05:2009.

+ The contents of HC: Because this content of HC is not specified in QCVN05:2009 so we use TCVN5938:2005 to compare. The analyzed result is under allowable value.

4.4.2. Noise and vibration

- Location, time and position monitoring as the same air quality.

Table 18 : Noise monitored results

Average	Time	Result monitoring			Standard: TCVN 5949 – 1998
		<i>L_{eq}</i>	<i>L_{max}</i>	<i>L₅₀</i>	
	Day	71.5	87.1	68.5	75
	Night	72.6	86.7	70.3	70

Note: Please refer the detail information of the survey, analysis in appendix section

- Comments:

The average value in daytime (from 6am to 6pm) and in nighttime (from 6pm to 10pm) according to TCVN 5949-1998 (column 3: Applied for Maximum limits in the

environment of public and residential areas): The noise level is approximate allowable value in daytime and in nighttime is higher allowable value about 2.6dBA.

Vehicles are increased in the night time because all of heavy loading trucks are allowed to operate after 8 PM (route Vung Tau – TP.HCM).

*** Vibration:**

Table 19: Vibration monitored results

Average	Time	Result monitoring		Standard: TCVN 7210:2002
		Leq	Lveq	
	Day	50.4	43.7	From 6h to 22h: 70dBA
	Night	43.5	39.4	

Note: Please refer the detail information of the survey, analysis in appendix section

* Comments: The vibration result shows that, recent vibration level is under allowable value according to TCVN 7210:2002 - Maximum limits in the environment of public and residential areas.

4.4.3. Surface water quality

- Location monitoring:	Dong Mon bridge
- Position:	SW4-1: N 10°46'06,9" ; E 106°56'41,1" (10h15 - 10h25) SW4-2: N 10°46'06,9" ; E 106°56'41,1" (16h30 - 16h45) SW4-3: N 10°46'07,1" ; E 106°52'24,3" (10h40 - 10h50) SW4-4: N 10°46'07,1" ; E 106°52'24,3" (16h10 - 15h25)
Time:	1 st July 2010

- Results on measuring, monitoring the surface water at upstream and downstream (Shown in appendix)

* Comments:

- At the site SW4-1: DO, SS did not meet allowable value (SS is higher allowable value 2.58 times).
- At the site SW4-2: SS (56.4 mg/l) is higher allowable value (Permit standard is 50mg/l).
- At the site SW4-3: DO, SS and Coliform did not meet allowable value
- At the site SW4-4: COD (34.9 mg/l) is higher allowable value (Permit standard is 30mg/l).

The high content of suspended solid (SS) in water is one of reason making low DO content by reducing the sunlight in the water for photosynthesis of aquatic plants.

4.4.4. Underground water

- Location monitoring:	Long Thanh residential area
- Position:	GW3 - 1 : N 10°45'59,2" ; E 106°57'22,3" GW3 - 2 : N 10°45'58,3" ; E 106°57'20,9" GW3 - 3 : N 10°46'00,9" ; E 106°57'20,3"

- Results on measuring, monitoring the underground water (Shown in appendix)

*** Comments:**

- Cl⁻ value at GW3-1 và GW3 - 2 is higher allowable value to 1.3 from 2.9 times.
- There is a signal of contamination of Fecal Coliform in 03 underground water samples, except GW3-3 sample that has been contaminated by *Coliform*
- NO₃⁻ value at GW3-3 is higher allowable value 6.58 times, that may cause by various reasons such as redundant pesticide, chemical substance, litter,... that will soak into soil and underground water.
- pH value at GW3-1 and GW3-3 is not allowable value (making acidic water)

4.4.5. Soil

- Location monitoring:	Long Thanh town
- Position:	S3 - 1: N 10°45'59,3" ; E 106°57'22,3" S3 - 2: N 10°45'58,3" ; E 106°57'20,8" S3 - 3: N 10°45'01,0" ; E 106°57'20,5"

- Results on measuring, monitoring the underground water (Shown in appendix)

*** Comments:**

The analyzed results of environmental parameters are meeting the QCVN03:2008 - For land of people's livelihood.

4.4.6. Waste water

- Location monitoring:	Km18+300; Km19+100; Km21+350
- Position:	WW4 - 1 : N 10°46'13,4" ; E 106°56'22,7" WW4 - 2 : N 10°46'39,5" ; E 106°55'14,8" WW4 - 3 : N 10°46'47,5" ; E 106°54'55,6"

- Results on measuring, monitoring the waste water (Shown in appendix)

*** Comments:**

The analyzed wastewater sample values will be compared to QCVN24:2009 (column B - The maximum allowable value of contaminants in Industrial wastewater when the receiving waterbodies not using for domestic water supply).

All parameters are meeting the QCVN24:2009.

4.5. Comparison of environmental trend between two monitoring times 2 & 3.

4.5.1. Air quality.

The environmental quality of the two monitoring times are showed in the bellow table:

Package	No	SO ₂	NO ₂	HC	Dust	CO
		mg/m ³	mg/m ³	mg/m ³	mg/m ³	mg/m ³
Package 1a	No 2	0.066	0.138	None	1.12	3.61
	No 3	None	0.036	None	0.33	2.83
Package 2	No 2	None	0.041	None	0.603	2.83
	No 3	None	0.029	None	0.055	1.65
Package 3	No 2	0.081	0.091	None	1.45	4.49
	No 3	None	0.06	None	0.21	3.23
QCVN05:2009		0.35	0.2	-	0.3	30
TCVN5938:2005				5		

* Comment:

- Package 1a: The dust content reduces from 1.12mg/m³ to 0.33mg/m³. The SO₂ content in the third time is undetectable.

In general, the air quality in the third time is better than the second time of monitoring.

- Package 2 & 3: The content of dust, SO₂, NO₂ and CO are lower in comparison with the second time, the reason may cause by the third time in raining season making better air quality.

4.5.2. Noise and vibration.

Noise and vibration of the two monitoring times are showed in the bellow table:

Package	No	Noise (dBA)		Vibration (dBA)	
		Day	Night	Day	Night
Package 1a	No 2	69.3	69.7	44.2	42.9
	No 3	68.5	68.1	56.6	55.6

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Package 2	No 2	50.2	53	37	34.2
	No 3	47.2	47.2	50.4	43.5
Package 3	No 2	74.8	74.9	35.1	28.6
	No 3	71.5	72.6	50.4	43.5
TCVN 5949 - 1998		75	70		
TCVN 7210:2002				70	

* Comment:

- The noise level in three packages have the same value between the two times of monitoring.

- Vibration level: Vibration level in the third time are higher than the first and second times causing by increase density operation of heavy loading trucks.

4.5.3. Surface water quality.

We compare only some main parameters between the two monitoring times that are showed in the bellow table:

Package		Parameters											
		No 2						No 3					
		<i>pH</i>	<i>DO</i>	<i>BOD5</i>	<i>COD</i>	<i>SS</i>	<i>Coliform</i>	<i>pH</i>	<i>DO</i>	<i>BOD5</i>	<i>COD</i>	<i>SS</i>	<i>Coliform</i>
			mg/l	mg/l	mg/l	mg/l	MPN/100ml		mg/l	mg/l	mg/l	mg/l	MPN/100 ml
Pack age 1a	SW1-1	6,86	4,41	4,2	< 30	36,2	2,8x10 ³	6,72	2,03	10,1	< 30	26,4	9,3x10 ¹
	SW1-2	6,89	4,92	5,3	< 30	18,6	7,5x10 ²	6,81	2,61	9,5	< 30	39,2	4,6x10 ²
	SW1-3	6,9	4,43	3,9	< 30	23,2	9,3x10 ¹	6,84	2,43	11,8	33,0	35,0	2,1x10 ²
	SW1-4	6,9	4,43	4,2	< 30	20,6	9,3x10 ²	6,86	2,49	10,8	32,2	43,6	2,4x10 ²
Pack age 1b	SW2-1	6,83	4,46	3,9	<30	39,0	0,5	6,78	2,49	10,7	< 30	22,2	2,4x10 ³
	SW2-2	6,83	4,71	3,9	<30	20,0	1,2x10 ¹	6,77	2,26	11,2	< 30	75,8	4,8x10 ²
	SW2-3	6,81	4,49	4,2	< 30	65,4	9	6,76	2,91	11,2	< 30	23,0	1,1x10 ⁴
	SW2-4	6,88	4,93	5,9	< 30	17,2	1,7x10 ¹	6,75	2,29	11,5	< 30	91,8	9,3x10 ²
Pack age 2	SW3-1	6,80	4,64	3,4	< 30	17,2	1,4x10 ¹	6,80	2,47	10,7	< 30	26,4	2,4x10 ²
	SW3-2	6,83	5,18	5,1	< 30	12,6	9,3x10 ¹	6,79	2,59	7,6	< 30	18,6	2,4x10 ²
	SW3-3	6,81	4,88	5,3	< 30	15,4	1,1x10 ¹	6,88	3,00	11,8	< 30	16,6	1,5x10 ²
	SW3-4	6,85	5,19	7,9	< 30	16,4	2,1x10 ¹	6,71	2,60	9,5	< 30	31,4	1,1x10 ³
Pack	SW4-1	6,17	4,41	11,8	< 30	39,2	9,4x10 ²	6,22	2,96	14,0	< 30	129,2	4,6x10 ²

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Package		Parameters											
		No 2						No 3					
		<i>pH</i>	<i>DO</i>	<i>BOD5</i>	<i>COD</i>	<i>SS</i>	<i>Coliform</i>	<i>pH</i>	<i>DO</i>	<i>BOD5</i>	<i>COD</i>	<i>SS</i>	<i>Coliform</i>
			mg/l	mg/l	mg/l	mg/l	MPN/100ml		mg/l	mg/l	mg/l	mg/l	MPN/100 ml
age 3	SW4-2	6,18	4,38	5,9	< 30	18,2	9,2x10 ²	6,21	5,16	13,5	< 30	56,4	2,4x10 ²
	SW4-3	6,07	7,9	10,9	< 30	91,6	3,5x10 ²	6,28	3,09	12,6	< 30	52,4	2,4x10 ⁴
	SW4-4	6,26	5,0	7,9	< 30	20,0	5,4x10 ³	6,16	4,64	14,6	34,9	47,8	2,4x10 ²
QCVN 08:2008		5.5 - 9	≥ 4	15	30	50	7500	5.5 - 9	≥ 4	15	30	50	7500

* Comment:

- Package 1a: The DO content of the second time is lower than the third time that making higher content of related parameters such as BOD₅, COD and SS.

- Package 1b, 2 and 3: As the same as the package 1a, DO content of Package 1b, 3 and 3 are lower than the second time and allowable value. Coliform content of the third time is higher than the second time.

4.5.4. Underground water quality.

We compare only some main parameters between the two monitoring times that are showed in the bellow table:

Package		Parameters									
		No 2					No 3				
		<i>pH</i>	<i>Cl</i>	<i>Fe</i>	<i>Mn</i>	<i>Fecal coliform</i>	<i>pH</i>	<i>Cl</i>	<i>Fe</i>	<i>Mn</i>	<i>Fecal coliform</i>
			mg/l	mg/l	mg/l	MPN/100ml		mg/l	mg/l	mg/l	MPN/100ml
Package 1a	GW1-1	4.54	115.7	0,29	0,045	< 0.1	4,64	118,4	0,20	0,049	< 03
	GW1-2	4.7	159.8	0,41	0,053	< 0.1	4,63	96,4	0,13	0,071	< 03
	GW1-3	4.61	88.8	0,48	0,042	< 0.1	4,80	92,2	1,27	0,092	< 03
Package 1b	GW2-1	7,49	199,5	0,044	0,063	< 0.1	7,22	629,6	0,12	0,89	< 03
	GW2-2	6,23	330,2	63,2	0,52	< 0.1	6,62	1191	10,4	0,48	< 03
	GW2-3	6,53	231	0,56	0,42	< 0.1	5,95	950,1	5,26	1,08	< 03
Package 3	GW3-1	5,07	325,2	0,24	0,094	< 0.1	5,40	323,5	3,90	0,14	< 03
	GW3-2	5,67	362,8	3,09	0,085	< 0.1	5,62	716,1	12,7	0,14	< 03
	GW3-3	4,63	24,9	0,04	0,021	< 0.1	5,84	112,7	0,43	0,19	< 03
QCVN09:2008		5.5 – 8.5	250	5	0.5	None	5.5 – 8.5	250	5	0.5	None

* Comment:

- In three packages, the Fecal coliform content have fluctuation and increase in value. This figure in the second time is lower than 01 MPN/100ml and the third time is lower than 03 MPN/100ml.

- There is an increase in Cl⁻ content at three packages, especially in the package 1b with the Cl⁻ content is 3-6 times higher than the second time. In the package 1b, it is necessary to pay attention about Fe and Mn contents because their concentration now are about the same or higher than the allowable values.

4.5.4. Soil

We compare only some main parameters between the two monitoring times that are showed in the bellow table:

Package		Parameters									
		No 2					No 3				
		Organic	SO ₄ ²⁻	As	Cu	Pb	Organic	SO ₄ ²⁻	As	Cu	Pb
		%	%	mg/kg	mg/kg	mg/kg	%	%	mg/kg	mg/kg	mg/kg
Package 1a	S1-1	2.83	0.005	9,8	12,2	20,3	1,53	0,009	5,72	11,4	12,5
	S1-2	5.97	0.044	6,0	27,1	18,7	5,95	0,083	7,32	30,0	19,5
	S1-3	9.52	0.047	5,1	29,1	22,6	4,86	0,130	14,3	30,0	29,2
Package 1b	S2-1	16,0	0.056	6,0	28,4	14,1	17,3	0.12	9,18	31,5	17,5
	S2-2	12,0	0.042	6,9	20,5	15,0	13,4	0.2	14,8	32,1	18,2
	S2-3	8,13	0.013	None	35,5	13,9	6,99	0.025	6,33	32,8	13,9
Package 3	S3-1	0,44	None	None	7,7	4,9	0,53	0,004	9,55	0,68	7,87
	S3-2	1,08	None	None	5,6	5,6	0,54	0,004	4,43	0,76	9,08
	S3-3	0,63	None	None	3,3	4,5	0,75	0,004	6,68	0,47	3,98
QCVN03:2008		-	-	12	70	120	-		12	70	120

* Comment:

- The above soil analyzed figures have no significant fluctuation and they are under the allowable values in the both monitoring times.

CHAPTER V. CONCLUSION AND RECOMMENDATION

1. Conclusion

a). Package 1a

- *Air quality:* The content of dust is higher the allowable values in QCVN05:2009 (0.03 mg/m^3) this cause by vehicles transporting building materials at the construction site.

- *Noise and vibration* are meeting the allowable levels. However, the vibration result this monitoring is higher than monitoring before about 12 dBA, causing by high density of heavy loading trucks for building material transportation.

- *Surface water:*

: + At the sites SW1-1; SW1-2: DO did not meet allowable value. (Permit standard $\geq 4 \text{ mg/l}$).

+ At the sites SW1-3; SW1-4: DO and COD did not meet allowable value.

Both of high temperature in water (31°C) and high chemical oxygen demand (COD) make the DO content lower than allowable value.

- *Underground water:* pH, Fecal coliform at 3 underground water did not meet allowable value according to QCVN09:2008. pH level is defined to 4.63 from 4.80

- *Soil:* The area for soil sampling was a swamp previously so it is not possible to cultivate. This area now is filled up by sand and leveled for municipal areas, so we apply the QCVN03:2008 - For land of people's livelihood. The analyzed results of environmental parameters are meeting the QCVN03:2008.

- *Waste water:* All parameters are meeting the column B, QCVN14:2008.

b). Package 1b

- *Surface water:*

+ At the sites SW2-1; SW2-2; SW2-3; SW2-4: DO did not meet allowable value, DO level is defined to 2.26 from 2.49 mg/l.

+ Vị trí SW2-2; SW2-4: SS is higher than allowable value (1.5 - 1.84 times). The reason is flood tide making higher content of turbidity and suspended solid in water.

+ Vị trí SW2-3: Coliform is higher than allowable value (1.5 times).

- *Underground water:*

+ Underground water samples GW2-1; GW2-2; GW2-3: Cl^- is higher allowable value (2.5 - 4.76 times). The high Cl^- concentration is possibly caused by natural impacts (for salt intrusion, acidic water and high conductivity). If this water will be used as fresh water, it is necessary to check the organic compounds in water because this redundant chlorine will combine with organic matter producing a very poisonous chemicals.

+ Underground water samples GW2-2 và GW2-3: Fe is higher allowable value (At water sample GW2-3 is higher allowable value about 2.08 times).

+ Underground water samples GW2-1 và GW2-3: Fe is higher allowable value (1.78 – 2.16 times).

To reduce the content of Mn and Fe in fresh water, the simple way of treatment is to expose water in the air and to oxidize these elements then filtration water by sand or grave.

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

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

- *Waste water*: All parameters are meeting the column B, QCVN14:2008.

c). Package 2

- *Air, Noise and Vibration*: All parameters are meeting the allowable value, because there are many trees and far away from road, distance to the construction about 500m.

- *Surface water*: DO did not meeting allowable value all the site.

- *Soil*: As content in soil of sample S2-2 (14.8mg/kg) is higher than allowable value (12mg/kg).

As is very poisonous chemical, 5 – 10% of As content in soil will dissolve in underground water and causing As contamination in water. As content in soil at this location need to be checked in the next monitoring

- *Waste water*: All parameters are meeting the column B, QCVN14:2008.

d). Package 3

- *Air and Vibration*: All parameters are meeting the allowable value.

- *Noise*: The noise level is approximate allowable value in daytime and in nighttime is higher allowable value about 2.6dBA.

Vehicles are increased in the night time because all of heavy loading trucks are allowed to operate after 8 PM (route Vung Tau – TP.HCM).

- *Surface water*:

+ At the site SW4-1: DO, SS did not meet allowable value (SS is higher allowable value 2.58 times).

+ At the site SW4-2: SS (56.4 mg/l) is higher allowable value

+ At the site SW4-3: DO, SS and Coliform did not meet allowable value

+ At the site SW4-4: COD (34.9 mg/l) is higher allowable value

The high content of suspended solid (SS) in water is one of reason making low DO content by reducing the sunlight in the water for photosynthesis of aquatic plants.

- *Undeground water:*

+ Cl^- value at GW3-1 và GW3 - 2 is higher allowable value to 1.3 from 2.9 times.

+ There is a signal of contamination of Fecal Coliform in 03 underground water samples, except GW3-3 sample that has been contaminated by *Coliform*

+ NO_3^- value at GW3-3 is higher allowable value 6.58 times, that may cause by various reasons such as redundant pesticide, chemical substance, litter,... that will soak into soil and underground water.

+ pH value at GW3-1 and GW3-3 is not allowable value (making acidic water)

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

2. Recommendation

Through the three times of monitoring, we have some recommendations as below:

- Package 1a: The dust content at sampled sites often be higher than allowable value so it is necessary to have some minimizing methods during construction periods such as watering, covering.... to reduce this dust content in the construction site.

- Package 1b: Most of underground water samples are contaminated by chlorine, Fe, Mn and Coliform... so it is necessary to recommend the workers not to use this water resource for domestic using.

- Package 2: It is necessary to pay attention about As content in the next monitoring times.

- Package 3: Because the project location is near the National highway so the noise levels always be high in both night time and day time. So it is necessary to obey noise reducing methods that are suggested in EMP (covering by corrugated iron at sensitive sites, regular machinery maintaining, do not operate all machinery simultaneously, do not operate in the night time....).

The most important matter for the 4 packages are the quality of underground water and some main parameters in surface water such as DO and SS. All of construction activities

in the water surface must be strictly complied with minimizing methods that have been suggested by the consultant and in the EMP to reduce impacts on water environment.

APPENDIX

APPENDIX 1: MANPOWER MOBILIZED AT SITE

APPENDIX 2: RESULTS MONITORING AND ANALYSIS

APPENDIX 3: PICTURES AT SAMPLING SITES

APPENDIX 4: CHECKING EQUIPMENT AND PERSONNEL SITE

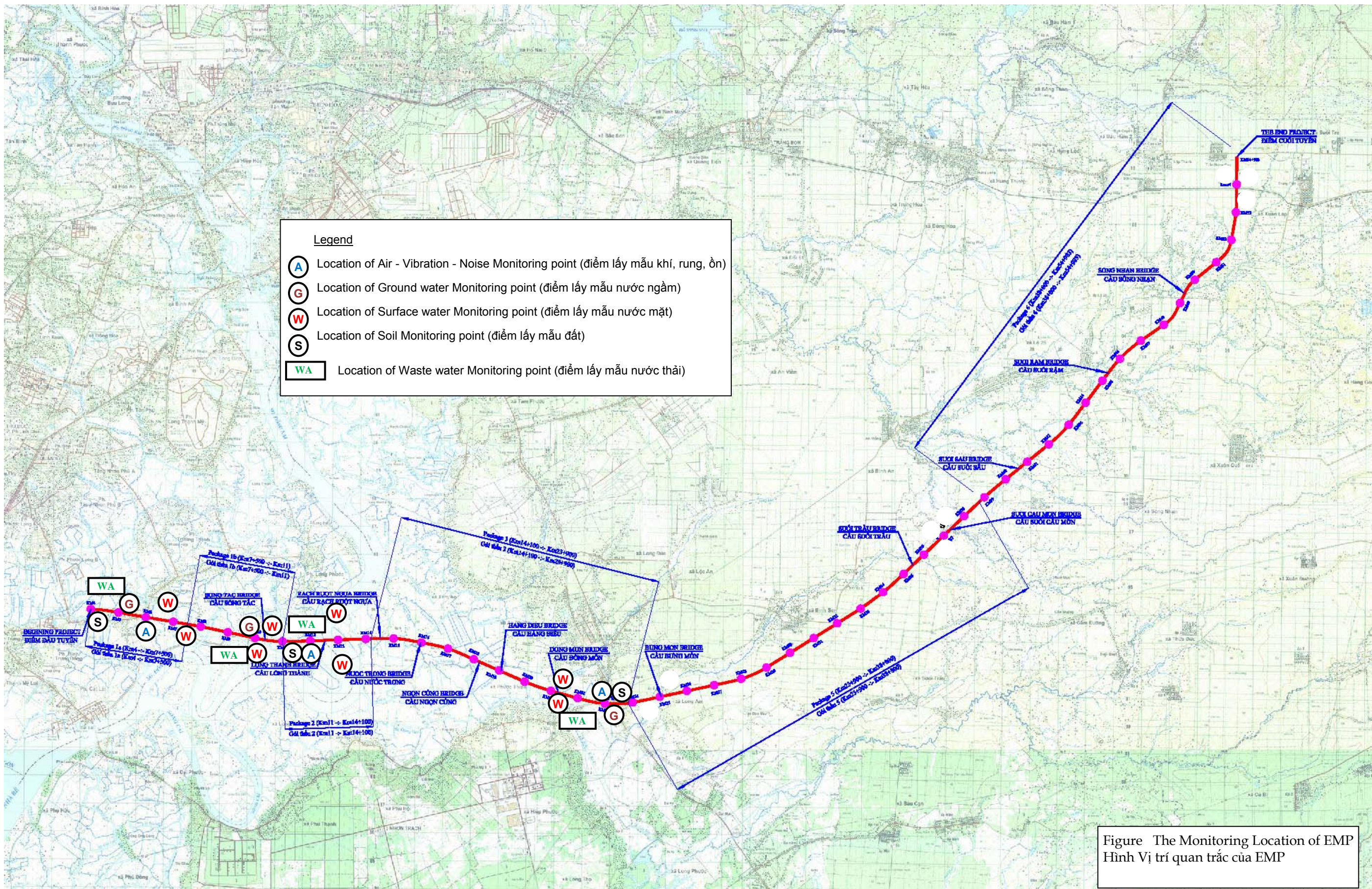


Figure The Monitoring Location of EMP
Hình Vị trí quan trắc của EMP

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RESULT OF NOISE MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring site: **PACKAGE 1A, - INTERSECTION NGUYEN DUY TRINH WITH
HLD EXPRESS**

Co-ordinate: N 10⁰47'43,1" ; E 106⁰48'18,1"

Time of monitoring: **29/6/2010 (06h - 22h)**

Surrounding conditions: There are many means transportation.

Staff: Q.T.Thanh Mai - Tran.T.Kim Vui - Doan Thi Boi Hanh

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10070978	N1-1.1(6h-7h)	68,1	87,3	64,7
02	mm10070979	N1-1.2(6h-7h)	65,9	82,1	64,0
03	mm10070980	N1-1.3(6h-7h)	67,4	87,3	65,0
04	mm10070981	N1-2.1(7h-8h)	68,7	79,3	67,3
05	mm10070982	N1-2.2(7h-8h)	66,9	78,2	65,0
06	mm10070983	N1-2.3(7h-8h)	67,2	82,1	64,7
07	mm10070984	N1-3.1(8h-9h)	68,1	84,3	64,2
08	mm10070985	N1-3.2(8h-9h)	68,4	86,3	63,7
09	mm10070986	N1-3.3(8h-9h)	69,6	92,8	64,4
10	mm10070987	N1-4.1(9h-10h)	69,1	92,3	63,8
11	mm10070988	N1-4.2(9h-10h)	68,5	84,4	64,9
12	mm10070989	N1-4.3(9h-10h)	65,9	85,5	61,9
13	mm10070990	N1-5.1(10h-11h)	68,6	86,8	63,0
14	mm10070991	N1-5.2(10h-11h)	70,0	92,9	61,8
15	mm10070992	N1-5.3(10h-11h)	67,4	82,2	64,3
16	mm10070993	N1-6.1(11h-12h)	66,9	82,9	63,6
17	mm10070994	N1-6.2(11h-12h)	66,7	84,6	62,9
18	mm10070995	N1-6.3(11h-12h)	70,0	85,6	65,5
19	mm10070996	N1-7.1(12h-13h)	69,3	89,3	64,0
20	mm10070997	N1-7.2(12h-13h)	74,8	101,6	63,3
21	mm10070998	N1-7.3(12h-13h)	71,5	89,6	63,9

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22	mm10070999	N1-8.1(13h-14h)	68,0	87,4	62,2
23	mm10071000	N1-8.2(13h-14h)	68,3	88,2	62,2
24	mm10071001	N1-8.3(13h-14h)	69,6	88,8	64,6
25	mm10071002	N1-9.1(14h-15h)	71,7	99,2	64,0
26	mm10071003	N1-9.2(14h-15h)	67,8	82,4	64,1
27	mm10071004	N1-9.3(14h-15h)	67,0	84,1	61,9
28	mm10071005	N1-10.1(15h-16h)	66,0	82,5	62,0
29	mm10071006	N1-10.2(15h-16h)	67,4	84,2	62,4
30	mm10071007	N1-10.3(15h-16h)	75,7	103,4	60,2
31	mm10071008	N1-11.1(16h-17h)	68,2	87,9	62,6
32	mm10071009	N1-11.2(16h-17h)	68,1	84,4	64,1
33	mm10071010	N1-11.3(16h-17h)	67,3	84,4	63,5
34	mm10071011	N1-12.1(17h-18h)	67,7	85,6	64,3
35	mm10071012	N1-12.2(17h-18h)	65,4	85,7	63,7
36	mm10071013	N1-12.3(17h-18h)	69,9	91,3	64,7
37	mm10071014	N1-13.1(18h-19h)	71,0	91,1	64,4
38	mm10071015	N1-13.2(18h-19h)	68,9	87,9	65,5
39	mm10071016	N1-13.3(18h-19h)	69,7	89,4	66,3
40	mm10071017	N1-14.1(19h-20h)	68,4	85,6	65,7
41	mm10071018	N1-14.2(19h-20h)	67,8	86,6	63,1
42	mm10071019	N1-14.3(19h-20h)	65,5	80,8	62,7
43	mm10071020	N1-15.1(20h-21h)	67,8	87,2	63,3
44	mm10071021	N1-15.2(20h-21h)	68,3	87,1	63,0
45	mm10071022	N1-15.3(20h-21h)	68,0	86,0	63,2
46	mm10071023	N1-16.1(21h-22h)	68,9	87,0	64,1
47	mm10071024	N1-16.2(21h-22h)	67,3	85,1	62,8
48	mm10071025	N1-16.3(21h-22h)	65,4	72,0	64,2

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RESULT OF VIBRATION MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring site: **PACKAGE 1A, - INTERSECTION NGUYEN DUY TRINH WITH
HLD EXPRESS**

Co-ordinate: N 10⁰47'43,1" ; E 106⁰48'18,1"

Time of monitoring: **29/6/2010 (06h - 22h)**

Surrounding conditions: There are many means transportation.

Staff: Q.T.Thanh Mai - Tran.T.Kim Vui - Doan Thi Boi Hanh

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10071026	V1-1.1(6h-7h)	54,1	42,1
02	mm10071027	V1-1.2(6h-7h)	47,1	41,9
03	mm10071028	V1-1.3(6h-7h)	53,1	43,7
04	mm10071029	V1-2.1(7h-8h)	55,0	41,8
05	mm10071030	V1-2.2(7h-8h)	53,6	43,0
06	mm10071031	V1-2.3(7h-8h)	51,5	42,1
07	mm10071032	V1-3.1(8h-9h)	55,3	42,0
08	mm10071033	V1-3.2(8h-9h)	57,0	42,7
09	mm10071034	V1-3.3(8h-9h)	54,2	39,7
10	mm10071035	V1-4.1(9h-10h)	59,2	40,4
11	mm10071036	V1-4.2(9h-10h)	58,0	42,0
12	mm10071037	V1-4.3(9h-10h)	53,4	42,1
13	mm10071038	V1-5.1(10h-11h)	56,9	42,8
14	mm10071039	V1-5.2(10h-11h)	56,2	41,8
15	mm10071040	V1-5.3(10h-11h)	57,7	41,7
16	mm10071041	V1-6.1(11h-12h)	58,4	42,4
17	mm10071042	V1-6.2(11h-12h)	54,5	40,4
18	mm10071043	V1-6.3(11h-12h)	55,9	40,6
19	mm10071044	V1-7.1(12h-13h)	56,5	44,3
20	mm10071045	V1-7.2(12h-13h)	58,3	44,5
21	mm10071046	V1-7.3(12h-13h)	55,9	42,3
22	mm10071047	V1-8.1(13h-14h)	58,3	41,5

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23	mm10071048	V1-8.2(13h-14h)	59,0	46,8
24	mm10071049	V1-8.3(13h-14h)	59,0	46,8
25	mm10071050	V1-9.1(14h-15h)	56,6	42,8
26	mm10071051	V1-9.2(14h-15h)	57,3	37,7
27	mm10071052	V1-9.3(14h-15h)	57,5	39,2
28	mm10071053	V1-10.1(15h-16h)	56,9	42,5
29	mm10071054	V1-10.2(15h-16h)	57,6	38,3
30	mm10071055	V1-10.3(15h-16h)	56,3	41,8
31	mm10071056	V1-11.1(16h-17h)	65,3	43,6
32	mm10071057	V1-11.2(16h-17h)	57,6	46,4
33	mm10071058	V1-11.3(16h-17h)	70,9	44,9
34	mm10071059	V1-12.1(17h-18h)	58,2	40,8
35	mm10071060	V1-12.2(17h-18h)	53,1	45,6
36	mm10071061	V1-12.3(17h-18h)	53,8	45,7
37	mm10071062	V1-13.1(18h-19h)	57,5	46,5
38	mm10071063	V1-13.2(18h-19h)	56,5	46,0
39	mm10071064	V1-13.3(18h-19h)	57,0	46,6
40	mm10071065	V1-14.1(19h-20h)	55,4	44,6
41	mm10071066	V1-14.2(19h-20h)	55,9	48,0
42	mm10071067	V1-14.3(19h-20h)	53,9	46,9
43	mm10071068	V1-15.1(20h-21h)	57,6	42,7
44	mm10071069	V1-15.2(20h-21h)	53,0	39,0
45	mm10071070	V1-15.3(20h-21h)	55,4	43,5
46	mm10071071	V1-16.1(21h-22h)	55,3	42,3
47	mm10071072	V1-16.2(21h-22h)	51,4	47,5
48	mm10071073	V1-16.3(21h-22h)	56,1	42,1

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RESULT OF AIR QUALITY MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring site: **PACKAGE 1A, - INTERSECTION NGUYEN DUY TRINH WITH
HLD EXPRESS**

Co-ordinate: N 10⁰47'43,1" ; E 106⁰48'18,1"

Time of monitoring: **29/6/2010 (06h - 22h)**

Surrounding conditions: There are many means transportation.

Staff: Q.T.Thanh Mai - Tran.T.Kim Vui - Doan Thi Boi Hanh

1. Results of microclimate parameters:

No	Code	Sign	Temp °C	Humidity %	Wind velocity m/s	Pressure mB	Wind direction
1	mm10071266	A1-1 (06h-08h)	31,0	69,0	0,2 – 0,6	1006,5	W
2	mm10071267	A1-2 (08h-10h)	31,0	65,4	0,3 – 0,9	1007,3	W
3	mm10071268	A1- 3 (10h-12h)	30,9	62,2	0,2 – 1,1	1006,9	SW
4	mm10071269	A1-4 (12h-14h)	33,1	53,6	0,6 – 1,4	1005,7	SW
5	mm10071270	A1-5 (14h-16h)	32,1	62,5	0,5 – 1,3	1005,8	SW
6	mm10071271	A1-6 (16h-18h)	30,1	62,8	0,5 – 0,9	1004,5	SW
7	mm10071272	A1-7 (18h-20h)	29,2	68,0	0,2 – 0,4	1004,3	SW
8	mm10071273	A1-8 (20h-22h)	28,3	76,2	0,1 – 0,3	1005,2	SW

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2. Result of air quality parameters:

No	Code	Sign	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
1	mm10071266	A1-1 (06h-08h)	None MLOD = 0,03	0,06	None MLOD = 1.0	0,16	2,2
2	mm10071267	A1-2 (08h-10h)	None MLOD = 0,03	0,05	None MLOD = 1.0	0,19	2,8
3	mm10071268	A1- 3 (10h-12h)	None MLOD = 0,03	0,05	None MLOD = 1.0	0,18	3,2
4	mm10071269	A1-4 (12h-14h)	None MLOD = 0,03	0,04	None MLOD = 1.0	0,24	3,6
5	mm10071270	A1-5 (14h-16h)	None MLOD = 0,03	0,03	None MLOD = 1.0	0,11	3,6
6	mm10071271	A1-6 (16h-18h)	None MLOD = 0,03	0,02	None MLOD = 1.0	0,17	2,4
7	mm10071272	A1-7 (18h-20h)	None MLOD = 0,03	0,01	None MLOD = 1.0	0,81	2,7
8	mm10071273	A1-8 (20h-22h)	None MLOD = 0,03	0,03	None MLOD = 1.0	0,75	2,1

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RESULT OF SURFACE WATER MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway

Monitoring site: Package 1A, Ong Nhieu river (Ong Nhieu bidge) – intersection Nguyen Duy Trinh with HLD express

Co-ordinate: **SW1-1:** N 10°47'40,1" ; E 106°48'49,4" (10h35 - 10h45)
SW1-2: N 10°47'30" ; E 106°48'52,2" (15h00 - 15h05)
SW1-3: N 10°47'30,1" ; E 106°48'52,2" (10h50 - 11h00)
SW1-4: N 10°47'27,5" ; E 106°48'48,0" (15h09 - 15h15)

Time of monitoring: **29/6/2010**

Weather condition: Sunny, breeze

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

1. Results on measuring, monitoring the surface water at upstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-1 mm10071290	SW1-2 mm10071291	Column A2	Column B1
1	pH	-	6,72	6,81	6 – 8,5	5,5 - 9
2	Temp.	oC	31,0	31,5	-	-
3	TDS	NTU	22,1	37,6	-	-
4	Conductivity	µS/cm(25 ⁰ C)	5200	4820	-	-
5	DO	mg/l	2,03	2,61	≥ 5	≥ 4
6	BOD ₅	mg/l	10,1	9,5	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	26,4	39,2	30	50
9	T-N	mg/l	1,17	1,31	-	-
10	T-P	mg/l	0,07	0,09	-	-
11	As	mg/l	None MLOD= 0,0002	None, MLOD= 0,0002	0,02	0,05
12	Cd	mg/l	None, MLOD = 0,0006	None, MLOD = 0,0006	0,005	0,01
13	CN ⁻	mg/l	None, MLOD= 0,007	None, MLOD= 0,007	0,01	0,02

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-1 mm10071290	SW1-2 mm10071291	Column A2	Column B1
14	Cu	mg/l	0,005	0,004	0,2	0,5
15	Hg	mg/l	None, MLOD=0,0005	None, MLOD=0,0005	0,001	0,001
16	Pb	mg/l	None, MLOD = 0,006	None, MLOD = 0,006	0.02	0,05
17	Zn	mg/l	0,005	0,014	1,0	1,5
18	NO ₃ ⁻	mg/l	2,07	2,78	5	10
19	Oil and grease	mg/l	None, MLOD=0,04	None, MLOD=0,04	0,02	0,1
20	Coliform	MPN/100ml	9,3x10 ¹	4,6x10 ²	5000	7500

2. Result on measuring, monitoring the surface water at downstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-3 mm10071292	SW1-4 mm10071293	Column A2	Column B1
1	pH	-	6,84	6,86	6 – 8,5	5,5 - 9
2	Temp.	oC	30,9	31,0	-	-
3	TDS	NTU	29,1	37,6	-	-
4	Conductivity	μS/cm(25 ⁰ C)	5310	4900	-	-
5	DO	mg/l	2,43	2,49	≥ 5	≥ 4
6	BOD ₅	mg/l	11,8	10,8	6	15
7	COD	mg/l	33,0	32,2	15	30
8	SS	mg/l	35,0	43,6	30	50
9	T-N	mg/l	1,25	1,03	-	-
10	T-P	mg/l	0,09	0,07	-	-
11	As	mg/l	0,0008	0,0007	0,02	0,05

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW1-3 mm10071292	SW1-4 mm10071293	Column A2	Column B1
12	Cd	mg/l	None, MLOD = 0,0006	None, MLOD = 0,0006	0,005	0,01
13	CN ⁻	mg/l	None, MLOD= 0,007	None, MLOD= 0,007	0,01	0,02
14	Cu	mg/l	0,004	0,004	0,2	0,5
15	Hg	mg/l	None, MLOD=0,0005	None, MLOD=0,0005	0,001	0,001
16	Pb	mg/l	None, MLOD = 0,006	None, MLOD = 0,006	0,02	0,05
17	Zn	mg/l	0,004	0,007	1,0	1,5
18	NO ₃ ⁻	mg/l	2,31	Không phát hiện, MLOD = 0,05	5	10
19	Oil and grease	mg/l	None, MLOD=0,04	None, MLOD=0,04	0,02	0,1
20	Coliform	MPN/100ml	2,1x10 ²	2,4x10 ²	5000	7500

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RESULT OF UNDERGROUND WATER MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: 51B ; 55 ; 75 Bung Ong Thoan- Tan Dien- Phu Huu- 9 district
Co-ordinate: **GW1-1 (51B) : N 10°47'47" ; E 106°47'47,3"**
GW1-2 (55) : N 10°47'44,7" ; E 106°47'48,3"
GW1-3 (75) : N 10°47'49,9" ; E 106°47'53,1"
Time of monitoring: **29/6/2010**
Weather condition: Sunny
Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW1-1 mm10071306	GW1-2 mm10071307	GW1-3 mm10071308	
1	pH		4,64	4,63	4,80	5,5 – 8,5
2	Temp.	°C	29,9	30,0	29,7	-
3	TDS	NTU	0,78	0,72	9,50	-
4	Conductivity	µS/cm(25°C)	527,0	484,0	467,0	-
5	Colour	Pt/Co	0	0	0	-
6	Odor		0	0	0	-
7	Hardness level	mgCaCO ₃ /l	11,3	22,5	26,8	500
8	Cl ⁻	mg/l	118,4	96,4	92,2	250
9	SO ₄ ²⁻	mg/l	50,6	59,7	53,2	400
10	NO ₃ ⁻	mg/l	0,13	None MLOD=0,04	0,13	15
11	As	mg/l	None, MLOD= 0,0002	None, MLOD= 0,0002	None, MLOD= 0,0002	-
12	Cd	mg/l	None, MLOD = 0,0006	None, MLOD = 0,0006	None, MLOD = 0,0006	0,005
13	CN ⁻	mg/l	None, MLOD= 0,007	None, MLOD= 0,007	None, MLOD= 0,007	0,01
14	Fe	mg/l	0,20	0,13	1,27	5

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No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			<i>GW1-1</i> mm10071306	<i>GW1-2</i> mm10071307	<i>GW1-3</i> mm10071308	
15	Mn	mg/l	0,049	0,071	0,092	0,5
16	Pb	mg/l	None, MLOD = 0,006	None, MLOD = 0,006	None, MLOD = 0,006	0,01
17	Zn	mg/l	0,023	0,027	0,028	3,0
18	Coliform	MPN/100ml	< 03	< 03	< 03	3
19	Fecal coliform	MPN/100ml	< 03	< 03	< 03	None

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RESULT OF SOIL MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway

Monitoring site: Package 1A, - Phu Huu – dis. 9

Co-ordinate: **S1-1:** N 10⁰47'54,3" ; E 106⁰47'16,9"
S1-2: N 10⁰47'51,1" ; E 106⁰47'17,5"
S1-3: N 10⁰47'54,5" ; E 106⁰47'18,2"

Time of monitoring: **29/6/2010**

Weather condition Sunny

Staff: Nguyen Le Phuong-Nguyen Tuan Vu

No	Analysis criteria	Unit	Result analysis			QCVN 03:2008/BTN MT
			<i>S1-1</i> mm10071327	<i>S1-2</i> mm10071328	<i>S1-3</i> mm10071329	
1	pH	-	7,00	5,03	6,27	-
2	Organic	%	1,53	5,95	4,86	-
3	Total N	%	0,11	0,18	0,18	-
4	Total P	%	0,091	0,079	0,11	-
5	Cl ⁻	mg/kg	68,8	826,8	910,4	-
6	SO ₄ ²⁻	%	0,009	0,083	0,130	-
7	As	mg/kg	5,72	7,32	14,3	12
8	Cd	mg/kg	None, MLOD = 0,15	None, MLOD = 0,15	None, MLOD = 0,15	5
9	Cu	mg/kg	11,4	30,0	30,0	70
10	Fe	%	2,90	4,73	4,86	-
11	Hg	mg/kg	None, MLOD = 0,03	0,11	0,12	-
12	Pb	mg/kg	12,5	19,5	29,2	120
13	Zn	mg/kg	42,1	79,8	64,6	-

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RESULT OF ANALYSIS WASTE WATER

Name of project Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring sites: Package 1a

Co-ordinate: WW1 - 1 : N 10⁰47'51,6" ; E 106⁰47'22,8"

 WW1 - 2 : N 10⁰47'49,7" ; E 106⁰47'40,9"

 WW1 - 3 : N 10⁰47'42,8" ; E 106⁰48'15,9"

Time of monitoring: 29/6/2010

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN24: 2009/BTNMT
			WW1-1 mm10071315	WW1-2 mm10071316	WW1-3 Mm10071317	
1	pH	-	6,68	6,70	6,68	5,5-9
2	Temp.	°C	30,6	30,6	31,6	40
3	BOD ₅	mg/l	9,5	8,4	7,6	50
4	COD	mg/l	< 30	< 30	< 30	100
5	DO	mg/l	4,96	3,26	3,22	-
6	SS	mg/l	17,0	41,2	12,6	100
7	NH ₄ ⁺	mg/l	None MLOD=0,01	None MLOD=0,01	None MLOD=0,01	10
8	ΣN	mg/l	1,10	1,12	1,11	30
9	ΣP	mg/l	0,14	0,34	0,19	6
10	Oil and grease	mg/l	None MLOD=0,04	None MLOD=0,04	None MLOD=0,04	5
11	Coliform	MPN/100ml	2,4x10 ²	1,5x10 ³	1.5x10 ³	5.000

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RESULT OF SURFACE WATER MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: PACKAGE 1B – SONG TAC BIDGE
Co-ordinate: **SW2-1:** N 10°47'28,1" ; E 106°50'49,4" (10h05 - 10h15)
SW2-2: N 10°47'28,1" ; E 106°50'49,4" (15h15 - 15h20)
SW2-3: N 10°47'22,2" ; E 106°50'43,0" (09h55 - 10h00)
SW2-4: N 10°47'22,2" ; E 106°50'43,0" (15h25 - 15h30)
Time of monitoring: 30/6/2010
Weather condition: Sunny, breeze
Staff: Nguyen Le Phuong – Nguyen Tuan Vu

1. Results on measuring, monitoring the surface water at upstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-1 mm10071294	SW2-2 mm10071295	Column A2	Column B1
1	pH	-	6,78	6,77	6 – 8,5	5,5 – 9
2	Temp.	oC	31,0	31,5	-	-
3	TDS	NTU	13,4	90,7	-	-
4	Conductivity	μS/cm(25 ⁰ C)	3420	3670	-	-
5	DO	mg/l	2,49	2,26	≥ 5	≥ 4
6	BOD ₅	mg/l	10.7	11,2	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	22,2	75,8	30	50
9	T-N	mg/l	1,26	1,02	-	-
10	T-P	mg/l	0,07	0,27	-	-
11	As	mg/l	None, MLOD= 0,0002	0,001	0,02	0,05
12	Cd	mg/l	NONE MLOD = 0,0006	NONE MLOD = 0,0006	0,005	0,01

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-1 mm10071294	SW2-2 mm10071295	Column A2	Column B1
13	CN ⁻	mg/l	NONE MLOD = 0,007	NONE MLOD = 0,007	0,01	0,02
14	Cu	mg/l	0,004	0,004	0,2	0,5
15	Hg	mg/l	NONE MLOD = 0,0005	NONE MLOD = 0,0005	0,001	0,001
16	Pb	mg/l	NONE MLOD = 0,006	NONE MLOD = 0,006	0,02	0,05
17	Zn	mg/l	0,012	0,014	1,0	1,5
18	NO ₃ ⁻	mg/l	1,64	2,59	5	10
19	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	0,02	0,1
20	Coliform	MPN/100ml	2,4x10 ³	4,8x10 ²	5000	7500

2. Result on measuring, monitoring the surface water at downstream (morning & afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-3 mm10071296	SW2-4 mm10071297	Column A2	Column B1
1	pH	-	6,76	6,75	6 – 8,5	5,5 – 9
2	Temp.	oC	31,0	31,5	-	-
3	TDS	NTU	19,5	88,0	-	-
4	Conductivity	μS/cm(25 ⁰ C)	3140	3720	-	-
5	DO	mg/l	2,91	2,29	≥ 5	≥ 4
6	BOD ₅	mg/l	11,2	11,5	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	23,0	91,8	30	50

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW2-3 mm10071296	SW2-4 mm10071297	Column A2	Column B1
9	T-N	mg/l	1,24	1,01	-	-
10	T-P	mg/l	0,10	0,21	-	-
11	As	mg/l	NONE MLOD = 0,0002	NONE MLOD = 0,0002	0,02	0,05
12	Cd	mg/l	NONE MLOD = 0,0006	NONE MLOD = 0,0006	0,005	0,01
13	CN ⁻	mg/l	NONE MLOD = 0,007	NONE MLOD = 0,007	0,01	0,02
14	Cu	mg/l	0,004	0,005	0,2	0,5
15	Hg	mg/l	NONE MLOD = 0,0005	NONE MLOD = 0,0005	0,01	0,001
16	Pb	mg/l	NONE MLOD = 0,006	0,073	0,02	0,05
17	Zn	mg/l	0,013	0,032	1,0	1,5
18	NO ₃ ⁻	mg/l	1,86	2,21	5	10
19	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	0,02	0.1
20	Coliform	MPN/100ml	1,1x10 ⁴	9,3x10 ²	5000	7500

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RESULT OF UNDERGROUND WATER MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: PACKAGE 1B – LONG PHUOC DISTRICT RESIDENTIAL AREA
Co-ordinate: **GW2-1** : N 10°47'28,3" ; E 106°51'03,5"
GW2-2 : N 10°47'32,3" ; E 106°49'14,8"
GW2-3 : N 10°47'30,2" ; E 106°49'13,5"
Time of monitoring: 24/03/2010
Weather condition: Sunny
Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis criteria	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW2-1 mm10071309	GW2-2 mm10071310	GW2-3 mm10071311	
1	pH	-	7,22	6,62	5,95	5,5 – 8,5
2	Temp.	°C	30,1	29,4	31,7	-
3	TDS	NTU	0,95	122	21,3	-
4	Conductivity	μS/cm(25°C)	2500	4390	3420	-
5	Colour	Pt/Co	0	5	5	-
6	Odor	mg/l	0	0	0	-
7	Hardness level	mgCaCO ₃ /l	417,0	395,0	121,0	500
8	Cl ⁻	mg/l	629,6	1191	950,1	250
9	SO ₄ ²⁻	mg/l	23,7	17,2	33,2	400
10	NO ₃ ⁻	mg/l	0,21	0,53	None, MLOD = 0,05	15

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11	As	mg/l	None, MLOD= 0,0002	0,003	0,002	-
12	Cd	mg/l	NONE MLOD = 0.0006	NONE MLOD = 0.0006	NONE MLOD = 0.0006	0,005
13	CN ⁻	mg/l	NONE MLOD = 0.007	NONE MLOD = 0.007	Không phát hiện, MLOD= 0,007	0,01
14	Fe	mg/l	0,12	10,4	5,26	5
15	Mn	mg/l	0,89	0,48	1,08	0,5
16	Pb	mg/l	NONE MLOD = 0.007	NONE MLOD = 0.007	NONE MLOD = 0.007	0,01
17	Zn	mg/l	0,015	0,015	0,023	3,0
18	Coliform	MPN/100ml	< 03	< 03	< 03	3
19	Fecal coliform	MPN/100ml	< 03	< 03	< 03	None

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RESULT OF ANALYSIS WASTE WATER

Name of project Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring sites: Package 1b

Co-ordinate: **WW2 - 1** : N 10⁰47'26,0" ; E 106⁰50'46,3"

WW2 - 2 : N 10⁰47'16,2" ; E 106⁰50'41,7"

WW2 - 3 : N 10⁰47'34,6" ; E 106⁰49'10,8"

Time of monitoring: 30/6/2010

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN24: 2009/BTNMT
			WW2-1 mm10071318	WW2-2 mm10071319	WW2-3 Mm10071320	
1	pH	-	6,78	6,78	6,82	5,5-9
2	Temp.	°C	31,0	31,4	32,9	40
3	BOD ₅	mg/l	10,7	9,0	10,1	50
4	COD	mg/l	< 30	< 30	< 30	100
5	DO	mg/l	2,59	4,19	5,52	-
6	SS	mg/l	19,4	28,4	15,0	100
7	NH ₄ ⁺	mg/l	None MLOD=0,01	None MLOD=0,01	None MLOD=0,01	10
8	ΣN	mg/l	1,09	1,10	0,82	30
9	ΣP	mg/l	0,09	0,14	0,05	6
10	Oil and grease	mg/l	None MLOD=0,04	None MLOD=0,04	None MLOD=0,04	5
11	Coliform	MPN/100ml	4,6x10 ²	1,5x10 ²	2,4x10 ³	5.000

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RESULT OF NOISE MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
 Monitoring site: PACKAGE 2 – TRUONG KHANH PAGODA
 Co-ordinate: N 10⁰47'13,9" ; E 106⁰51'05,7"
 Time of monitoring: 30/6/2010 (06h - 22h)
 Surrounding conditions: Quite area
 Staff: Q.T.Thanh Mai – Tran.T.Kim Vui – Doan Thi Boi Hanh

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10071074	N2-1.1(6h-7h)	50,4	72,8	48,1
02	mm10071075	N2-1.2(6h-7h)	53,9	74,9	47,3
03	mm10071076	N2-1.3(6h-7h)	49,2	60,0	48,1
04	mm10071077	N2-2.1(7h-8h)	47,3	55,1	47,0
05	mm10071078	N2-2.2(7h-8h)	48,9	62,2	47,5
06	mm10071079	N2-2.3(7h-8h)	50,9	74,3	44,1
07	mm10071080	N2-3.1(8h-9h)	48,5	66,6	45,1
08	mm10071081	N2-3.2(8h-9h)	53,9	60,8	52,6
09	mm10071082	N2-3.3(8h-9h)	53,1	76,3	47,9
10	mm10071083	N2-4.1(9h-10h)	47,7	62,1	46,3
11	mm10071084	N2-4.2(9h-10h)	48,9	59,6	48,2
12	mm10071085	N2-4.3(9h-10h)	47,6	67,7	40,6
13	mm10071086	N2-5.1(10h-11h)	44,7	54,2	41,8
14	mm10071087	N2-5.2(10h-11h)	42,5	56,9	40,6
15	mm10071088	N2-5.3(10h-11h)	45,8	63,8	41,4
16	mm10071089	N2-6.1(11h-12h)	45,1	66,8	41,5
17	mm10071090	N2-6.2(11h-12h)	47,9	69,0	44,4
18	mm10071091	N2-6.3(11h-12h)	46,4	63,9	44,1
19	mm10071092	N2-7.1(12h-13h)	49,5	62,9	46,9
20	mm10071093	N2-7.2(12h-13h)	49,1	66,9	46,9
21	mm10071094	N2-7.3(12h-13h)	50,8	72,1	43,3
22	mm10071095	N2-8.1(13h-14h)	43,9	57,1	42,7

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23	mm10071096	N2-8.2(13h-14h)	40,8	64,4	37,0
24	mm10071097	N2-8.3(13h-14h)	45,8	68,1	39,1
25	mm10071098	N2-9.1(14h-15h)	44,3	60,8	41,9
26	mm10071099	N2-9.2(14h-15h)	39,6	57,5	36,1
27	mm10071100	N2-9.3(14h-15h)	34,7	40,8	33,9
28	mm10071101	N2-10.1(15h-16h)	49,7	72,2	42,9
29	mm10071102	N2-10.2(15h-16h)	44,3	58,9	40,9
30	mm10071103	N2-10.3(15h-16h)	50,2	74,5	43,7
31	mm10071104	N2-11.1(16h-17h)	44,6	60,6	41,6
32	mm10071105	N2-11.2(16h-17h)	47,1	73,1	42,4
33	mm10071106	N2-11.3(16h-17h)	60,4	80,8	54,2
34	mm10071107	N2-12.1(17h-18h)	43,1	60,8	37,0
35	mm10071108	N2-12.2(17h-18h)	45,1	61,6	40,2
36	mm10071109	N2-12.3(17h-18h)	42,9	61,3	40,1
37	mm10071110	N2-13.1(18h-19h)	45,4	65,9	41,1
38	mm10071111	N2-13.2(18h-19h)	42,9	56,3	40,7
39	mm10071112	N2-13.3(18h-19h)	44,1	69,7	40,6
40	mm10071113	N2-14.1(19h-20h)	43,8	61,6	40,9
41	mm10071114	N2-14.2(19h-20h)	52,1	75,0	43,4
42	mm10071115	N2-14.3(19h-20h)	44,6	63,3	41,6
43	mm10071116	N2-15.1(20h-21h)	40,1	58,7	38,4
44	mm10071117	N2-15.2(20h-21h)	59,8	80,8	42,6
45	mm10071118	N2-15.3(20h-21h)	56,1	78,3	41,9
46	mm10071119	N2-16.1(21h-22h)	46,2	59,8	43,4
47	mm10071120	N2-16.2(21h-22h)	47,6	62,7	42,7
48	mm10071121	N2-16.3(21h-22h)	43,8	61,6	39,5

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RESULT OF VIBRATION MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: PACKAGE 2 – TRUONG KHANH PAGODA
Co-ordinate: N 10⁰47'13,9" ; E 106⁰51'05,7"
Time of monitoring: 30/6/2010 (06h - 22h)
Surrounding conditions: Quite area
Staff: Q.T.Thanh Mai – Tran.T.Kim Vui – Doan Thi Boi Hanh

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10071218	V2-1.1(6h-7h)	55,6	47,1
02	mm10071219	V2-1.2(6h-7h)	49,6	45,5
03	mm10071220	V2-1.3(6h-7h)	47,1	44,3
04	mm10071221	V2-2.1(7h-8h)	52,2	43,5
05	mm10071222	V2-2.2(7h-8h)	45,8	43,1
06	mm10071223	V2-2.3(7h-8h)	51,5	43,1
07	mm10071224	V2-3.1(8h-9h)	51,9	44,6
08	mm10071225	V2-3.2(8h-9h)	52,0	43,5
09	mm10071226	V2-3.3(8h-9h)	52,4	44,8
10	mm10071227	V24.1(9h-10h)	51,9	44,7
11	mm10071228	V2-4.2(9h-10h)	51,4	44,0
12	mm10071229	V2-4.3(9h-10h)	64,7	46,3
13	mm10071230	V2-5.1(10h-11h)	52,7	46,2
14	mm10071231	V2-5.2(10h-11h)	53,1	47,4
15	mm10071232	V2-5.3(10h-11h)	54,7	51,3
16	mm10071233	V2-6.1(11h-12h)	51,9	50,5
17	mm10071234	V2-6.2(11h-12h)	74,2	50,6
18	mm10071235	V2-6.3(11h-12h)	38,6	37,5
19	mm10071236	V2-7.1(12h-13h)	40,1	38,6
20	mm10071237	V2-7.2(12h-13h)	43,4	40,2
21	mm10071238	V2-7.3(12h-13h)	39,4	37,6
22	mm10071239	V2-8.1(13h-14h)	51,7	38,1
23	mm10071240	V2-8.2(13h-14h)	38,7	37,3

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24	mm10071241	V2-8.3(13h-14h)	46,7	45,8
25	mm10071242	V2-9.1(14h-15h)	47,1	45,5
26	mm10071243	V2-9.2(14h-15h)	47,4	46,3
27	mm10071244	V2-9.3(14h-15h)	47,4	46,2
28	mm10071245	V2-10.1(15h-16h)	68,7	47,7
29	mm10071246	V2-10.2(15h-16h)	66,1	36,0
30	mm10071247	V2-10.3(15h-16h)	38,9	35,8
31	mm10071248	V2-11.1(16h-17h)	37,9	34,5
32	mm10071249	V2-11.2(16h-17h)	38,3	36,1
33	mm10071250	V2-11.3(16h-17h)	61,3	53,1
34	mm10071251	V2-12.1(17h-18h)	50,4	49,3
35	mm10071252	V2-12.2(17h-18h)	50,0	49,1
36	mm10071253	V2-12.3(17h-18h)	50,6	36,3
37	mm10071254	V2-13.1(18h-19h)	36,9	35,3
38	mm10071255	V2-13.2(18h-19h)	38,0	35,9
39	mm10071256	V2-13.3(18h-19h)	37,1	35,0
40	mm10071257	V2-14.1(19h-20h)	37,5	35,9
41	mm10071258	V2-14.2(19h-20h)	50,3	37,9
42	mm10071259	V2-14.3(19h-20h)	40,3	39,6
43	mm10071260	V2-15.1(20h-21h)	40,2	39,4
44	mm10071261	V2-15.2(20h-21h)	40,4	39,5
45	mm10071262	V2-15.3(20h-21h)	51,9	45,9
46	mm10071263	V2-16.1(21h-22h)	53,0	44,7
47	mm10071264	V2-16.2(21h-22h)	46,2	42,2
48	mm10071265	V2-16.3(21h-22h)	50,1	41,5

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KẾT QUẢ QUAN TRẮC CHẤT LƯỢNG KHÔNG KHÍ

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
Monitoring site: PACKAGE 2 – TRUONG KHANH PAGODA
Co-ordinate: N 10⁰47'13,9" ; E 106⁰51'05,7"
Time of monitoring: 30/6/2010 (06h - 22h)
Surrounding conditions: Quite area
Staff: Q.T.Thanh Mai – Tran.T.Kim Vui – Doan Thi Boi Hanh

1. Results of microclimate parameters:

No	Code	Sign	Temp °C	Humidity %	Wind velocity m/s	Pressure mB	Wind direction
1	mm10071274	A2-1 (06h-08h)	28,8	71,4	0,2 -0,7	1006,9	SW
2	mm10071275	A2-2 (08h-10h)	32,9	53,6	0,2 – 0,6	1007,0	SE
3	mm10071276	A2- 3 (10h-12h)	33,2	49,4	0,2 – 0,8	1006,5	
4	mm10071277	A2-4 (12h-14h)	36,2	45,0	0,4 – 1,1	1005,5	SE
5	mm10071278	A2-5 (14h-16h)	34,8	49,8	0,4 - 1,5	1003,1	W
6	mm10071279	A2-6 (16h-18h)	34,3	50,2	0,2 – 1,2	1002,8	SE
7	mm10071280	A2-7 (18h-20h)	31,3	65,2	0,3 – 2,3	1003,1	SW
8	mm10071281	A2-8 (20h-22h)	29,8	73,5	0,4 – 2,1	1004,8	SE

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2. Result of air quality parameters:

No	Code	Sign	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
1	mm10071274	A2-1 (06h-08h)	NONE MLOD = 0.03	0,05	NONE MLOD = 1.0	0,11	1,1
2	mm10071275	A2-2 (08h-10h)	NONE MLOD = 0.03	0,04	NONE MLOD = 1.0	0,05	1,2
3	mm10071276	A2-3 (10h-12h)	NONE MLOD = 0.03	0,02	NONE MLOD = 1.0	0,03	1,5
4	mm10071277	A2-4 (12h-14h)	NONE MLOD = 0.03	0,04	NONE MLOD = 1.0	0,04	2,1
5	mm10071278	A2-5 (14h-16h)	NONE MLOD = 0.03	0,04	NONE MLOD = 1.0	0,07	2,2
6	mm10071279	A2-6 (16h-18h)	NONE MLOD = 0.03	0,02	NONE MLOD = 1.0	0,06	1,5
7	mm10071280	A2-7 (18h-20h)	NONE MLOD = 0.03	0,01	NONE MLOD = 1.0	0,03	2,1
8	mm10071281	A2-8 (20h-22h)	NONE MLOD = 0.03	0,01	NONE MLOD = 1.0	0,05	1,5

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Result of surface water monitoring

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway
 Monitoring site: PACKAGE 2 – LONG THANH BIDGE
 Co-ordinate: **SW3-1:** N 10°47'00,1" ; E 106°51'40,3" (10h43 - 10h48)
 SW3-2: N 10°47'00,1" ; E 106°51'40,3" (15h54 - 16h00)
 SW3-3: N 10°47'20,1" ; E 106°51'38,5" (10h55 - 10h55)
 SW3-4: N 10°47'20,1" ; E 106°51'38,3" (16h03 - 16h08)
 Time of monitoring: 30/6/2010
 Weather condition: Sunny
 Staff: Nguyen Le Phuong - Nguyen Tuan Vu.

1. Results on measuring, monitoring the surface water at upstream (morning and afternoon):

TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-1 mm10071298	SW3-2 mm10071299	Column A2	Column B1
1	pH	-	6,80	6,79	6 – 8,5	5,5 – 9
2	Temp.	oC	30,9	31,3	-	-
3	TDS	NTU	20,0	16,2	-	-
4	Conductivity	μS/cm(25 ⁰ C)	3720	3430	-	-
5	DO	mg/l	2,47	2,59	≥ 5	≥ 4
6	BOD ₅	mg/l	10,7	7,6	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	26,4	18,6	30	50
9	T-N	mg/l	1,26	1,28	-	-
10	T-P	mg/l	0,10	0,08	-	-
11	As	mg/l	0,0008	NONE, MLOD = 0,0002	0,02	0,05

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TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-1 mm10071298	SW3-2 mm10071299	Column A2	Column B1
12	Cd	mg/l	NONE MLOD = 0,0006	NONE MLOD = 0,0006	0,005	0,01
13	CN ⁻	mg/l	NONE MLOD = 0,007	NONE MLOD = 0,007	0,01	0,02
14	Cu	mg/l	NONE MLOD = 0,002	NONE MLOD = 0,002	0,2	0,5
15	Hg	mg/l	NONE MLOD = 0,0005	NONE MLOD = 0,0005	0,001	0,001
16	Pb	mg/l	NONE MLOD = 0,006	NONE MLOD = 0,006	0,02	0,05
17	Zn	mg/l	0,006	0,008	1,0	1,5
18	NO ₃ ⁻	mg/l	1,40	3,00	5	10
19	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	0,02	0,1
20	Coliform	MPN/100ml	2,4x10 ²	2,4x10 ²	5000	7500

2. Results on measuring, monitoring the surface water at downstream (morning& afternoon):

TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-3 mm10071300	SW3-4 mm10071301	Column A2	Column B1
1	pH	-	6,88	6,71	6 – 8,5	5,5 – 9
2	Temp.	oC	31,3	31,1	-	-
3	TDS	NTU	12,4	23,8	-	-
4	Conductivity	μS/cm(25 ⁰ C)	2720	2900	-	-
5	DO	mg/l	3,00	2,60	≥ 5	≥ 4
6	BOD ₅	mg/l	11,8	9,5	6	15
7	COD	mg/l	< 30	< 30	15	30

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TT	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW3-3 mm10071300	SW3-4 mm10071301	Column A2	Column B1
8	SS	mg/l	16,6	31,4	30	50
9	T-N	mg/l	1,25	1,23	-	-
10	T-P	mg/l	0,07	0,13	-	-
11	As	mg/l	NONE MLOD = 0,0002	NONE MLOD = 0,0002	0,02	0,05
12	Cd	mg/l	NONE MLOD = 0,0006	NONE MLOD = 0,0006	0,005	0,01
13	CN ⁻	mg/l	NONE MLOD = 0,007	NONE MLOD = 0,007	0,01	0,02
14	Cu	mg/l	NONE MLOD = 0,002	NONE MLOD = 0,002	0,2	0,5
15	Hg	mg/l	NONE MLOD = 0,0005	NONE MLOD = 0,0005	0,01	0,001
16	Pb	mg/l	NONE MLOD = 0,006	NONE MLOD = 0,006	0,02	0,05
17	Zn	mg/l	0,005	0,005	1,0	1,5
18	NO ₃ ⁻	mg/l	2,18	2,70	5	10
19	Oil and grease	mg/l	NONE MLOD=0,04	NONE MLOD=0,04	0,02	0.1
20	Coliform	MPN/100ml	1,5x10 ²	1,1x10 ³	5000	7500

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RESULT OF ANALYSIS WASTE WATER

Name of project Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring sites: Package 2

Co-ordinate: **WW3 - 1** : N 10⁰47'11,8" ; E 106⁰51'43,4"
WW3 - 2 : N 10⁰47'11,8" ; E 106⁰51'43,4"
WW3 - 3 : N 10⁰47'19,2" ; E 106⁰51'23,5"

Time of monitoring: 30/6/2010

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN24: 2009/BTNMT
			WW3-1 mm10071321	WW3-2 mm10071322	WW3-3 Mm10071323	
1	pH	-	6,82	6,73	6,77	5,5-9
2	Temp.	°C	31,1	31,2	31,2	40
3	BOD ₅	mg/l	9,5	8,4	9,6	50
4	COD	mg/l	< 30	< 30	< 30	100
5	DO	mg/l	2,56	2,65	2,71	-
6	SS	mg/l	13,2	24,8	26,6	100
7	NH ₄ ⁺	mg/l	None MLOD=0,01	None MLOD=0,01	None MLOD=0,01	10
8	ΣN	mg/l	1,18	1,13	1,14	30
9	ΣP	mg/l	0,05	0,12	0,13	6
10	Oil and grease	mg/l	None MLOD=0,04	None MLOD=0,04	None MLOD=0,04	5
11	Coliform	MPN/100ml	1,1x10 ³	9,3x10 ¹	2,4x10 ²	5.000

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RESULT OF SOIL MONITORING

Name of project: Ho Chi Minh – Long Thanh – Dau Giay Expressway

Monitoring site: PACKAGE 2 – TRUONG KHANH PAGODA

Co-ordinate: S2-1: N 10°47'13,7" ; E 106°51'06,0"

S2-2: N 10°47'14,0" ; E 106°51'07,7"

S2-3: N 10°47'15,3" ; E 106°51'08,7"

Time of monitoring: 30/6/2010

Weather condition: Sunny

Staff: Nguyen Le Phuong-Nguyen Tuan Vu

No	Analysis criteria	Unit	Result analysis			QCVN 03:2008/BTN MT
			S2-1 mm10071330	S2-2 mm10071331	S2-3 mm10071332	
1	pH	-	3,71	3,60	4,11	-
2	Organic	%	17,3	13,4	6,99	-
3	Total N	%	0,19	0,18	0,17	-
4	Total P	%	0,068	0,065	0,057	-
5	Cl ⁻	mg/kg	1296.0	1208.0	732.5	-
6	SO ₄ ²⁻	%	0.120	0.200	0.025	-
7	As	mg/kg	9,18	14,8	6,33	12
8	Cd	mg/kg	NONE MLOD = 0.15	NONE MLOD = 0.15	NONE MLOD = 0.15	5
9	Cu	mg/kg	31,5	32,1	32,8	70
10	Fe	%	1,94	4,44	3,06	-
11	Hg	mg/kg	0,10	0,093	0,089	-
12	Pb	mg/kg	17,5	18,2	13,9	120
13	Zn	mg/kg	24,2	33,8	45,5	-

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RESULT OF NOISE MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
 Monitoring site: Package 3 – Long Thanh town (Near point NR51)
 Co-ordinate: N 10⁰46'03,2" ; E 106⁰57'44,7"
 Time of monitoring: 01/7/2010 (06h - 22h)
 Surrounding conditions: There are many means transportation and the use of air horn
 Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Đoàn Thi Boi Hanh

No	Code	Sign	Result (dBA)		
			Leq	Lmax	L ₅₀
01	mm10071170	N3-1.1(6h-7h)	69,4	84,8	67,3
02	mm10071171	N3-1.2(6h-7h)	70,5	82,7	68,1
03	mm10071172	N3-1.3(6h-7h)	69,2	89,8	66,3
04	mm10071173	N3-2.1(7h-8h)	69,2	86,0	66,3
05	mm10071174	N3-2.2(7h-8h)	70,4	84,9	67,8
06	mm10071175	N3-2.3(7h-8h)	69,0	83,0	66,6
07	mm10071176	N3-3.1(8h-9h)	71,4	93,9	67,6
08	mm10071177	N3-3.2(8h-9h)	72,4	94,1	67,7
09	mm10071178	N3-3.3(8h-9h)	71,2	87,9	67,9
10	mm10071179	N3-4.1(9h-10h)	70,7	81,3	68,8
11	mm10071180	N3-4.2(9h-10h)	69,9	85,9	67,4
12	mm10071181	N3-4.3(9h-10h)	70,5	90,0	68,0
13	mm10071182	N3-5.1(10h-11h)	70,8	83,0	68,8
14	mm10071183	N3-5.2(10h-11h)	71,5	89,4	68,2
15	mm10071184	N3-5.3(10h-11h)	71,7	83,8	69,4
16	mm10071185	N3-6.1(11h-12h)	69,4	82,0	66,8
17	mm10071186	N3-6.2(11h-12h)	72,2	87,3	70,8
18	mm10071187	N3-6.3(11h-12h)	70,9	87,0	68,9
19	mm10071188	N3-7.1(12h-13h)	72,8	81,8	71,3
20	mm10071189	N3-7.2(12h-13h)	70,7	80,9	68,5
21	mm10071190	N3-7.3(12h-13h)	71,5	82,2	69,1
22	mm10071191	N3-8.1(13h-14h)	71,6	83,8	68,6

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23	mm10071192	N3-8.2(13h-14h)	71,9	87,4	67,9
24	mm10071193	N3-8.3(13h-14h)	71,3	88,3	69,4
25	mm10071194	N3-9.1(14h-15h)	72,7	93,1	69,2
26	mm10071195	N3-9.2(14h-15h)	71,1	85,9	67,9
27	mm10071196	N3-9.3(14h-15h)	73,7	96,6	69,1
28	mm10071197	N3-10.1(15h-16h)	73,7	90,9	70,1
29	mm10071198	N3-10.2(15h-16h)	70,8	82,4	68,6
30	mm10071199	N3-10.3(15h-16h)	71,7	88,2	69,4
31	mm10071200	N3-11.1(16h-17h)	72,8	93,7	68,9
32	mm10071201	N3-11.2(16h-17h)	70,1	84,0	68,7
33	mm10071202	N3-11.3(16h-17h)	72,7	85,3	70,5
34	mm10071203	N3-12.1(17h-18h)	76,1	91,0	68,9
35	mm10071204	N3-12.2(17h-18h)	70,8	82,9	68,4
36	mm10071205	N3-12.3(17h-18h)	76,4	100,5	70,2
37	mm10071206	N3-13.1(18h-19h)	73,6	91,9	70,9
38	mm10071207	N3-13.2(18h-19h)	72,6	82,4	71,2
39	mm10071208	N3-13.3(18h-19h)	72,3	84,4	71,0
40	mm10071209	N3-14.1(19h-20h)	72,5	85,7	69,9
41	mm10071210	N3-14.2(19h-20h)	73,2	90,2	71,2
42	mm10071211	N3-14.3(19h-20h)	72,3	84,9	71,5
43	mm10071212	N3-15.1(20h-21h)	72,9	83,6	71,0
44	mm10071213	N3-15.2(20h-21h)	72,3	79,4	71,2
45	mm10071214	N3-15.3(20h-21h)	74,5	99,1	70,2
46	mm10071215	N3-16,1(21h-22h)	72,4	83,4	70,4
47	mm10071216	N3-16,2(21h-22h)	70,0	89,3	66,5
48	mm10071217	N3-16,3(21h-22h)	72,0	86,6	68,2

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RESULT OF VIBRATION MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
Monitoring site: Package 3 – Long Thanh town (near point NR51)
Co-ordinate: N 10⁰46'03,2" ; E 106⁰57'44,7"
Time of monitoring: 01/7/2010 (06h - 22h)
Surrounding conditions: There are many means transportation
Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Đoàn Thi Boi Hanh

No	Code	Sign	Result (dB)	
			Leq	Lveq
01	mm10071218	V3-1.1(6h-7h)	55,6	47,1
02	mm10071219	V3-1.2(6h-7h)	49,6	45,5
03	mm10071220	V3-1.3(6h-7h)	47,1	44,3
04	mm10071221	V3-2.1(7h-8h)	52,2	43,5
05	mm10071222	V3-2.2(7h-8h)	45,8	43,1
06	mm10071223	V3-2.3(7h-8h)	51,5	43,1
07	mm10071224	V3-3.1(8h-9h)	51,9	44,6
08	mm10071225	V3-3.2(8h-9h)	52,0	43,5
09	mm10071226	V3-3.3(8h-9h)	52,4	44,8
10	mm10071227	V34.1(9h-10h)	51,9	44,7
11	mm10071228	V3-4.2(9h-10h)	51,4	44,0
12	mm10071229	V3-4.3(9h-10h)	64,7	46,3
13	mm10071230	V3-5.1(10h-11h)	52,7	46,2
14	mm10071231	V3-5.2(10h-11h)	53,1	47,4
15	mm10071232	V3-5.3(10h-11h)	54,7	51,3
16	mm10071233	V3-6.1(11h-12h)	51,9	50,5
17	mm10071234	V3-6.2(11h-12h)	74,2	50,6
18	mm10071235	V3-6.3(11h-12h)	38,6	37,5
19	mm10071236	V3-7.1(12h-13h)	40,1	38,6
20	mm10071237	V3-7.2(12h-13h)	43,4	40,2
21	mm10071238	V3-7.3(12h-13h)	39,4	37,6
22	mm10071239	V3-8.1(13h-14h)	51,7	38,1
23	mm10071240	V3-8.2(13h-14h)	38,7	37,3

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24	mm10071241	V3-8.3(13h-14h)	46,7	45,8
25	mm10071242	V3-9.1(14h-15h)	47,1	45,5
26	mm10071243	V3-9.2(14h-15h)	47,4	46,3
27	mm10071244	V3-9.3(14h-15h)	47,4	46,2
28	mm10071245	V3-10.1(15h-16h)	68,7	47,7
29	mm10071246	V3-10.2(15h-16h)	66,1	36,0
30	mm10071247	V3-10.3(15h-16h)	38,9	35,8
31	mm10071248	V3-11.1(16h-17h)	37,9	34,5
32	mm10071249	V3-11.2(16h-17h)	38,3	36,1
33	mm10071250	V3-11.3(16h-17h)	61,3	53,1
34	mm10071251	V3-12.1(17h-18h)	50,4	49,3
35	mm10071252	V3-12.2(17h-18h)	50,0	49,1
36	mm10071253	V3-12.3(17h-18h)	50,6	36,3
37	mm10071254	V3-13.1(18h-19h)	36,9	35,3
38	mm10071255	V3-13.2(18h-19h)	38,0	35,9
39	mm10071256	V3-13.3(18h-19h)	37,1	35,0
40	mm10071257	V3-14.1(19h-20h)	37,5	35,9
41	mm10071258	V3-14.2(19h-20h)	50,3	37,9
42	mm10071259	V3-14.3(19h-20h)	40,3	39,6
43	mm10071260	V3-15.1(20h-21h)	40,2	39,4
44	mm10071261	V3-15.2(20h-21h)	40,4	39,5
45	mm10071262	V3-15.3(20h-21h)	51,9	45,9
46	mm10071263	V3-16.1(21h-22h)	53,0	44,7
47	mm10071264	V3-16.2(21h-22h)	46,2	42,2
48	mm10071265	V3-16.3(21h-22h)	50,1	41,5

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RESULT OF AIR QUALITY MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
Monitoring site: Package 3 – Long Thanh town (near point NR51)
Co-ordinate: N 10⁰46'03,2" ; E 106⁰57'44,7"
Time of monitoring: 01/7/2010 (06h - 22h)
Surrounding conditions: There are many means transportation
Staff: Q.T.Thanh Mai - Tran.T.Kim Vui – Doan Thi Boi Hanh

1. Result of Microclimate parameters:

No	Code	Sign	Temp °C	Humidity %	Wind velocity m/s	Pressure mB	Wind direction
1	mm10071282	A3-1 (06h-08h)	26,6	86,1	0,3 – 0,8	1006,2	SE
2	mm10071283	A3-2 (08h-10h)	28,7	77,3	0,2 – 1,2	1006,2	S
3	mm10071284	A3- 3 (10h-12h)	30,9	67,2	0,5 – 1,9	1006,3	S
4	mm10071285	A3-4 (12h-14h)	29,1	77,4	0,1 – 0,7	1005,6	SE
5	mm10071286	A3-5 (14h-16h)	26,0	84,4	0,4 – 1,2	1005,3	SW
6	mm10071287	A3-6 (16h-18h)	25,6	92,7	0,4 – 1,0	1005,2	SW
7	mm10071288	A3-7 (18h-20h)	25,4	93,5	0,2 – 0,5	1005,7	SW
8	mm10071289	A3-8 (20h-22h)	25,2	94,0	0,2 – 0,4	1006,2	SW

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2. Result of air quality parameters:

No	Code	Sign	SO ₂ mg/m ³	NO ₂ mg/m ³	HC mg/m ³	Dust mg/m ³	CO mg/m ³
1	mm10071282	A3-1 (06h-08h)	None MLOD = 0,03	0,06	None MLOD = 1.0	0,10	2,8
2	mm10071283	A3-2 (08h-10h)	None MLOD = 0,03	0,07	None MLOD = 1.0	0,17	3,8
3	mm10071284	A3- 3 (10h-12h)	None MLOD = 0,03	0,14	None MLOD = 1.0	0,20	4,2
4	mm10071285	A3-4 (12h-14h)	None MLOD = 0,03	0,11	None MLOD = 1.0	0,13	4,2
5	mm10071286	A3-5 (14h-16h)	None MLOD = 0,03	0,02	None MLOD = 1.0	0,26	3,6
6	mm10071287	A3-6 (16h-18h)	None MLOD = 0,03	0,03	None MLOD = 1.0	0,20	3,0
7	mm10071288	A3-7 (18h-20h)	None MLOD = 0,03	0,02	None MLOD = 1.0	0,34	2,2
8	mm10071289	A3-8 (20h-22h)	None MLOD = 0,03	0,02	None MLOD = 1.0	0,31	2,0

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RESULT OF SURFACE WATER MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
 Monitoring site: Package 3 – Dong Mon bridge
 Co-ordinate: **SW4-1:** N 10°46'16,3" ; E 106°56'22,0" (10h15 - 10h25)
SW4-2: N 10°46'16,3" ; E 106°56'22,0" (16h30 - 16h45)
SW4-3: N 10°46'07,1" ; E 106°56'24,3" (10h40 - 10h50)
SW4-4: N 10°46'07,1" ; E 106°56'24,3" (16h10 - 15h25)
 Time of monitoring: 01/7/2010
 Weather condition: Sunny
 Staff: Nguyen Le Phuong - Nguyen Tuan Vu

1. Results on measuring, monitoring the surface water at upstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-1 mm10071302	SW4-2 mm10071303	Column A2	Column B1
1	pH	-	6,22	6,21	6 – 8,5	5,5 - 9
2	Temp.	oC	28,8	28,0	-	-
3	TDS	NTU	202	58,1	-	-
4	Conductivity	μS/cm(25 ⁰ C)	270,0	213,0	-	-
5	DO	mg/l	2,96	5,16	≥ 5	≥ 4
6	BOD ₅	mg/l	14,0	13,5	6	15
7	COD	mg/l	< 30	< 30	15	30
8	SS	mg/l	129,2	56,4	30	50
9	T-N	mg/l	3,32	3,19	-	-
10	T-P	mg/l	0,59	0,27	-	-
11	As	mg/l	0,001	None, MLOD = 0,0002	0,02	0,05
12	Cd	mg/l	None MLOD = 0,0006	None MLOD = 0,0006	0,005	0,01

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-1 mm10071302	SW4-2 mm10071303	Column A2	Column B1
13	CN ⁻	mg/l	None MLOD = 0,007	None MLOD = 0,007	0,01	0,02
14	Cu	mg/l	0,005	0,004	0,2	0,5
15	Hg	mg/l	None MLOD = 0,0005	None MLOD = 0,0005	0,001	0,001
16	Pb	mg/l	None MLOD = 0,006	None MLOD = 0,006	0,02	0,05
17	Zn	mg/l	0,020	0,005	1,0	1,5
18	NO ₃ ⁻	mg/l	8,69	4,03	5	10
19	Oil and grease	mg/l	None MLOD=0,04	None MLOD=0,04	0,02	0,1
20	Coliform	MPN/100ml	4,6x10 ²	2,4x10 ²	5000	7500

2. Result on measuring of monitoring surface water at the downstream (morning and afternoon):

No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-3 mm10071304	SW4-4 mm10071305	Column A2	Column B1
1	pH	-	6,28	6,16	6 – 8,5	5,5 – 9
2	Temp.	oC	29,5	28,1	-	-
3	TDS	NTU	96,9	61,5	-	-
4	Conductivity	μS/cm(25 ⁰ C)	418,0	223,0	-	-
5	DO	mg/l	3,09	4,64	≥ 5	≥ 4
6	BOD ₅	mg/l	12,6	14,6	6	15
7	COD	mg/l	< 30	34,9	15	30

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No	Analysis critetia	Unit	Result analysis		QCVN 08:2008/BTNMT	
			SW4-3 mm10071304	SW4-4 mm10071305	Column A2	Column B1
8	SS	mg/l	52,4	47,8	30	50
9	T-N	mg/l	2,38	2,77	-	-
10	T-P	mg/l	0,35	0,26	-	-
11	As	mg/l	0,001	None, MLOD = 0,0002	0,02	0,05
12	Cd	mg/l	None MLOD = 0,0006	None MLOD = 0,0006	0,005	0,01
13	CN ⁻	mg/l	None MLOD = 0,007	None MLOD = 0,007	0,01	0,02
14	Cu	mg/l	0,005	0,006	0,2	0,5
15	Hg	mg/l	None MLOD = 0,0005	None MLOD = 0,0005	0,001	0,001
16	Pb	mg/l	None MLOD = 0,006	None MLOD = 0,006	0,02	0,05
17	Zn	mg/l	0,027	0,038	1,0	1,5
18	NO ₃ ⁻	mg/l	3,61	4,45	5	10
19	Oil and grease	mg/l	None MLOD=0,04	None MLOD=0,04	0,02	0,1
20	Coliform	MPN/100ml	2,4x10 ⁴	2,4x10 ²	5000	7500

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RESULT OF UNDERGROUND WATER MONITORING

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
 Monitoring site: PACKAGE 3 – **LONG THANH TOWN A**
 Co-ordinate: **GW3 - 1** : N 10°45'59,2" ; E 106°57'22,3"
GW3 - 2 : N 10°45'58,3" ; E 106°57'20,9"
GW3 - 3 : N 10°45'57,2" ; E 106°57'19,7"
 Time of monitoring: 01/7/2010
 Weather condition: Sunny
 Staff: Nguyen Le Phuong - Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN 09: 2008/BTNMT
			GW3-1 mm10071312	GW3-2 mm10071313	GW3-3 mm10071314	
1	pH	-	5,40	5,62	5,84	5,5 – 8,5
2	Temp.	°C	28,6	28,6	29,1	-
3	TDS	NTU	6,38	117	7,48	-
4	Conductivity	μS/cm(25 ⁰ C)	1131	2240	778,0	-
5	Colour	Pt/Co	0	5	5	-
6	Odor	mg/l	0	0	0	-
7	Hardness level	mgCaCO ₃ /l	56,8	44,5	50,5	500
8	Cl ⁻	mg/l	323,5	716,1	112,7	250
9	SO ₄ ²⁻	mg/l	11,4	7,0	13,4	400
10	NO ₃ ⁻	mg/l	1,46	9,46	98,7	15

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11	As	mg/l	None, MLOD= 0,0002	0,001	0,001	-
12	Cd	mg/l	None MLOD = 0,0006	None MLOD = 0,0006	None MLOD = 0,0006	0,005
13	CN ⁻	mg/l	None MLOD = 0,007	None MLOD = 0,007	None MLOD = 0,007	0,01
14	Fe	mg/l	3,90	12,7	0,43	5
15	Mn	mg/l	0,14	0,14	0,19	0,5
16	Pb	mg/l	None MLOD = 0,006	None MLOD = 0,006	None MLOD = 0,006	0,01
17	Zn	mg/l	0,024	0,17	0,13	3,0
18	Coliform	MPN/100ml	< 03	< 03	4,8x10 ¹	3
19	Fecal coliform	MPN/100ml	< 03	< 03	04	None

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RESULT OF ANALYSIS WASTE WATER

Name of project Ho Chi Minh - Long Thanh - Dau Giay Expressway

Monitoring sites: Package 3 – Long Thanh town

Co-ordinate: **WW4 - 1** : N 10°46'13,4" ; E 106°56'22,7"

WW4 - 2 : N 10°46'39,5" ; E 106°55'14,8"

WW4 - 3 : N 10°46'47,5" ; E 106°54'55,6"

Time of monitoring: 01/7/2010

Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis critetia	Unit	Result analysis			QCVN24: 2009/BTNMT
			WW4-1 mm10071324	WW4-2 mm10071325	WW4-3 Mm10071326	
1	pH	-	5,76	6,60	6,26	5,5-9
2	Temp.	°C	29,3	31,7	30,4	40
3	BOD ₅	mg/l	12,1	10,9	8,7	50
4	COD	mg/l	64,7	< 30	< 30	100
5	DO	mg/l	2,63	3,10	2,37	-
6	SS	mg/l	105,8	41,2	41,4	100
7	NH ₄ ⁺	mg/l	0,37	0,32	0,31	10
8	ΣN	mg/l	2,81	1,06	0,96	30
9	ΣP	mg/l	0,48	0,18	0,18	6
10	Oil and grease	mg/l	None MLOD=0,04	None MLOD=0,04	None MLOD=0,04	5
11	Coliform	MPN/100ml	9,3x10 ²	4,8x10 ¹	9,3x10 ²	5.000

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RESULT ANALYSIS OF SOIL

Name of project: Ho Chi Minh - Long Thanh - Dau Giay Expressway
Monitoring site: PACKAGE 3 – LONG THANH TOWN
Co-ordinate: **S3 - 1:** N 10°45'59,2" ; E 106°57'22,3"
S3 - 2: N 10°45'58,3" ; E 106°57'20,9"
S3 - 3: N 10°45'57,2" ; E 106°57'19,7"
Time of monitoring: 01/7/2010
Weather condition: Sunny
Staff: Nguyen Le Phuong – Nguyen Tuan Vu

No	Analysis criteria	Unit	Result analysis			QCVN 03:2008/BTN MT
			S2-1 mm10071330	S2-2 mm10071331	S2-3 mm10071332	
1	pH	-	7,29	6,46	7,34	-
2	Organic	%	0,53	0,54	0,75	-
3	Total N	%	0,11	0,08	0,07	-
4	Total P	%	0,082	0,089	0,11	-
5	Cl ⁻	mg/kg	65,2	117,1	43,0	-
6	SO ₄ ²⁻	%	0,004	0,004	0,004	-
7	As	mg/kg	None MLOD = 2,5	None MLOD = 2,5	None MLOD = 2,5	12
8	Cd	mg/kg	None MLOD = 0,15	None MLOD = 0,15	None MLOD = 0,15	5
9	Cu	mg/kg	3,98	4,43	6,68	70
10	Fe	%	0,68	0,76	0,47	-
11	Hg	mg/kg	Mark (0,069) MLOQ=0,090	Mark(0,077) MLOQ=0,090	Mark (0,078) MLOQ=0,090	-
12	Pb	mg/kg	7,87	9,08	9,55	120
13	Zn	mg/kg	12,6	7,66	22,9	-

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