

Environmental Monitoring Report

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Viet Nam: Central Region Small and Medium Towns Development

Prepared by the Center for Environmental Monitoring for the Ministry of Construction and the Asian Development Bank.

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MINISTRY OF CONSTRUCTION – DEPARTMENT OF TECHNICAL
INFRASTRUCTURE
MANAGEMENT UNIT OF THE TECHNICAL INFRASTRUCTURE
DEVELOPMENT PROJECT

2012 MONITORING REPORT

**INDEPENDENT MONITORING CONSULTANT OF
ENVIRONMENT MANAGEMENT**

**CENTRAL REGION SMALL AND MEDIUM TOWNS
DEVELOPMENT PROJECT**

(ADB Loan 2272-VIE (SF))

Prepared by:

CENTER FOR ENVIRONMENTAL MONITORING

ABBREVIATIONS

ADB	Asian Development Bank
LS	Labor safety
MM	Mitigation measures
PPMU	Provincial Project Management Unit (sub-project)
PCU	Project Coordination Unit
CEMP	Community-based Environmental Management Plan
CMC	Construction Management Consultant
SP	Safety policy
DONRE	Department of Natural Resources and Environment
EIA	Environment Impact Assessment
EMC	Independent Monitoring Consultant of Environment Management Plan
EMP	Environmental Management Plan
GOV	Government of Viet Nam
GP	Guidance Practice
OP	Operational policy
PAHs	Project Affected Households
HSET	Health, Environment sanitation and Traffic management
SEMP	On-site Environmental management plan
TOR	Terms of Reference
ES	Environmental sanitation
PC	People's Committee
LA	Local Authority
ES	Environmental supervision

Table of Contents

CHAPTER 1 - OVERVIEW	4
1.1. General introduction	4
1.2. Implementation progress of the project	5
CHAPTER 2 – A SUMMARY OF MONITORING ACTIVITIES	7
2.1 Monitoring the compliance with EMP	8
2.2 The environmental monitoring activities	19
2.2.1 General information on environment monitoring	19
2.2.2. Evaluating the results of environment monitoring	21
CHAPTER 3 – COMMUNITY CONSULTATION	42
3.1 Community consultation method	42
3.2 Consultation results	42
CHAPTER 4 – MAIN ENVIRONMENTAL ISSUES	49
CHAPTER 5 – CONCLUSION AND RECOMMENDATIONS	54
APPENDIX	56
Appendix 1: Some pictures on environmental supervision activities	56

CHAPTER 1 - OVERVIEW

1.1. General introduction

The Project Coordination Unit (PCU) and Environmental Monitoring Center (EMC) signed a consultancy contract on August 3rd 2012 on consultancy provision for the service of “Independent Monitoring Consultant of Environment Management Plan” of Central Region Small and Medium Towns Development Project, with implementation period of 16 months from 3rd August 2012 to 31th December 2013.

This service aims to enhance the environmental management of the project, ensure sustainable development in accordance with ADB policy to ensure the environmental safety and Vietnamese Law on Environmental Protection.

Environmental Monitoring Consultant (EMC) started the service on 3rd August 2012. Since that, EMC has implemented activities as following:

- From 3rd to 14th August 2012, EMC prepared inception report and submitted to the PCU;
- In September 2012, EMC has implemented the first monitoring mission in the area of 05 sub-projects. At the time of monitoring, all 15 construction packages of the 05 sub-projects were in the early stages of construction phase;
- In December 2012, EMC implemented the second monitoring mission in the area of 05 sub-projects. At the time of monitoring, most of the construction packages were in the acceleration phase of construction, some others even were ahead of schedule. However, some packages were still behind schedule.

The objectives of the monitoring missions conducted in 2012 are:

- (i) to enhance the environmental managing and monitoring capacity of staffs working for environmental monitoring system of subprojects, including environmental staff of Project management unit (PMU), monitoring consultants, construction entities;
- (ii) to raise awareness of environment and environmental protection for local communities in the sub-project locations
- (iii) to provide necessary recommendations and warnings of environmental safeguards and compliance with mitigation measures (MM) during construction to contractors and other stakeholders;
- (iv) to assess the performance effectiveness of the community monitoring system; to share experience from previous activities of the project, and to enhance the effectiveness of next phase of project;
- (v) to train, support and guide PMU staffs, contractors and monitoring consultants on how to make a monthly report (for contractors) and every 3 months (for PMU).

At the end of each monitoring mission, preliminary findings and assessments will be presented by EMC in the conclusion meetings with the participation and agreement of relevant parties. All achieved outputs and results as well as assessment analysis and recommended solutions will be described in detail within this report.

Monitoring report of 2012 will focus on general assessment of the implementation of EMP by Contractors, main findings, monitoring results, monitoring indicators and the environmental management status.

1.2. Implementation progress of the project

At the end of 2nd monitoring mission (2nd – 4th December 2012), the progress of work contracts in 5 sub-projects are presented in the following table:

Table 1: Synthesis and assessment of the project implementation progress

No	Subproject	Amount %	Progress assessment
1	Dak Nong sub-project		
	Rainwater and wastewater discharge system in Gia Nghia	15%	Construction progress is behind schedule due to the change in human resource, difficulty in financial access, the ground restructuring and the impact of long rainy season.
	Water supply system in Gia Nghia	36,4%	Construction progress is behind schedule. However Contractor committed to ensure construction progress because the work has been in motion.
	Solid waste landfill in Gia Nghia Town	40%	Construction progress is behind schedule; Contractor is applying for construction extension to July 2013.
2	Binh Thuan sub-project		
	Wastewater discharge and surrounding sewer system	48,1%	Construction meets the scheduled progress.
	Wastewater treatment plant and pumping stations	18%	Construction progress is behind schedule because work items of this package are related to works of other packages. However Contractor is currently speeding up the construction.
	Pipeline level III, public toilets, small sewer	95,42%	Construction is ahead of schedule.

	connecting households		
3	Ninh Thuan sub-project		
	Water discharge system in Thap Cham City	45%	Construction meets the scheduled progress.
	Water supply system in Ca Na town	50%	Construction meets the scheduled progress.
4	Khanh Hoa sub-project		
	Rainwater and wastewater discharge system in Cam Ranh	11%	Construction progress is behind schedule due to the weather condition (long rainy season). Contractor is currently speeding up the construction.
	Water supply system in Ninh Hoa town	99%	Construction is ahead of schedule. The package is waiting for supplemented funding to continue a number of work items.
	Solid waste landfill in Cam Ranh	30%	Construction progress is behind schedule due to the weather condition (long rainy season). Contractor is currently speeding up the construction.
5	Phu Yen sub-project		
	Wastewater discharge system in Tuy Hoa City	20%	Construction progress is behind schedule. Contractor is currently waiting for plan approval of reinforcement raising of wastewater treatment system before continue construction.
	Water discharge system in Tuy Hoa city	60%	Construction meets the scheduled progress.. Contractor is currently speeding up the construction.
	Solid waste landfill in Song Cau town	44%	Construction progress is behind schedule due to the weather condition (long rainy season). Contractor is currently speeding up the construction.
	Water discharge system in Song Cau town	73%	Construction meets the scheduled progress. Contractor is currently waiting for approval of work items adjustment plan before continue coonstruction.

CHAPTER 2 – A SUMMARY OF MONITORING ACTIVITIES

In the mission process, EMC has deployed 02 periodic monitorings in the third quarter and the fourth quarter of 2012 in 15 packages of 05 sub-projects. After that EMC built 02 periodic monitoring reports and submitted them to the PCU. In addition, EMC has done some activities of exchanging and strengthening capability, examining and evaluating the role and participation of related parties.

In each mission, EMC carried out monitoring activities as follows:

- (i) Supervision of compliance of the sub-project: aiming to assess contractors' compliance with standard operating procedures, the national standard of environment, and technical instructions. Results of monitoring are assessed based on established criteria.
- (ii) Supervision of environmental impacts caused by sub-project activities: aiming to assess the environmental impact level during the construction phase of sub-projects.

Implementation framework for 2 monitoring missions in the subprojects includes these activities:

Prepare work plan: EMC created detailed plan for each quarterly monitoring mission, contacted MABUTIP and PPMU to arrange the working schedules.

Inception meeting at PPMU: in each sub-project, EMC arranged meetings with PPMU and contractors in order to: (i) inform the purposes and activities of EMC in each monitoring mission, (ii) get consensus in required contents of periodic reports, (iii) check and collect profiles, relevant materials relating to work progress, i.e. main work items finished, under construction or going to be constructed in each bidding package; (iv) discuss on the implementation of EMP in each bidding package; (v) guide related people to implement measures to minimize the impacts on environment and people's health and safety, and (vi) prepare detailed field survey plan and community consultation.

Field survey: with the coordination of PPMU, Contractors, CMC and safeguards policy staff in all packages, EMC conducted periodic field survey (in quarter III and IV – 2012) to monitor the compliance of Contractors with environment requirements prescribed in the bidding documents and EMP and EIA (Environmental impact assessment) reports. Monitoring details focused on: the implementation of regulations on labor safety and sanitation in the construction camp (water, solid waste dump, aid means ...), the implementation of measures to mitigate the social problems arising due to the large number of workers, the implementation of measures to minimize the impact of construction activities (dust, noise, water quality, vibration) in residential areas, and the implementation of measures to avoid affecting culture and history.

Monitoring environmental quality: EMC took sampling measure to monitor the environment quality (water, air, noise and solid waste) and ensure Contractors' full compliance with the EMP.

Community consultation in localities: EMP conducted community consultation to find out the problems rising or remaining during construction process of the packages.

Capacity building and technical support for environmental management: EMC provided practical training for PPMU and key personnel of the Contractors to enhance their capacity of environmental management, provided guidance and practical training for technicians and environment monitoring staffs on environmental mitigation measures, and set up guidance manual on the implementation and periodic reporting.

Conclusion meeting at PPMU with the participation of relating parties: EMC held conclusion meeting with the participation of PPMU and contractor's representatives to preliminarily inform the main findings, to get comments and agreements, and propose the recommendations for environmental impact mitigation.

2.1 Monitoring the compliance with EMP

Table 2: Summary of monitoring, mitigation measures and effectiveness of mitigation measures

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
1. Noise and vibration generating - Monitoring the current status of machinery, equipment and vehicles used for construction work; - Checking certificate of machinery quality and documents on noise levels; - Monitoring the implementation of regular working/resting time in local area; - Monitoring the maintenance of machinery and construction equipments regularly (every 3 months); - Collecting feedback of local people on the rise in noise and vibration in their resting time.	- All locations under construction in the 5 subprojects - All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Using machines still within their working life. - Stopping construction (by cutting road and stopping transportation vehicles) in local's resting time to minimize noise and vibration. - Carrying the maintenance of construction machinery.	-The strict observance of rules in resting time minimized the negative influence on local residents in their resting time.	- Using machines still within their working life would qualify for a few noise-regulation requirements. However, documents on standards of the discharge, noise and vibration were not presented. - Machinery and equipment maintenance takes effect in ensuring machine quality and reducing noise and vibration during construction. However, maintenance was not as regular as required (every 3 months/)	

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
2.Dust arising - Inspecting the Contractor's appropriate measures for dust mitigation. - Monitoring the status of waste soil; frequency of non-reuse soil transportation; location of temporary disposal area; and status of landfills. - Checking the location and condition of the material storage, volume of fine particle construction materials on the site. - Monitoring the frequency of road watering; its implementation and efficiency; and the number of roads watered. - Monitoring the coverage status of transportation vehicles, soil spillage during transportation and the probability of dust arising. - Monitoring the speed of	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Waste soil management: arranging temporary disposal area, transporting non-reusable soil to the landfill. - Setting up speed limit signs on construction routes. - Watering on construction routes.		- Transporting wastes to the temporary disposal area takes effect; however, it would be more effective if implemented more frequently. - Contractor placed speed limitation signs on the road, but not frequently reminded the drivers of strict compliance with the rule. - Watering on the construction road and the surrounding area were useful but not regularly as regulated.	The contractor arranged materials warehouse, however, the conditions of the warehouse has not ensured compliance with regulations such as: roof, no encroachment on roads, and not gathering closely to road surface affecting local traffic.

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
vehicles on the site and on the route of the town; - Monitoring construction of speed limit signs and Contractor's regulations on the speed.						
3. Smell arising - Monitoring volume and types of wastes; - Monitoring the frequency of waste collection; - Checking collection tool availability at the construction site and at workers' camp site. - Monitoring the condition of existing sewerage system in residential areas; - Collecting comments of local people; - Monitoring construction method	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Carrying out dredging of mud and other construction material deposition to reduce wastewater stagnant in the construction site.	- Contractor effectively conducted management of current wastewater discharge system in residential area; this consequently minimizes smell at construction area.	Dredging of mud and other construction material deposition took effects in reduction of wastewater stagnant in the construction site, which should be regularly conducted.	- Contractor has not equipped collecting domestic waste tools at the worker's camp site. - Contractor has not seriously monitored the amount of waste, type of waste and frequency of collection in the camp area, so there exist smell arising in this area, affecting worker's living conditions.
4. Traffic obstruction - Monitoring the status of	- All locations	- Interview	- Building temporary roads for the affected	- Contractor effectively	- Mitigation measures were not implemented	- Contractors prepared the traffic

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
<p>road system and number of roads in the residential area and in locations where temporary road for those affected needs building.</p> <ul style="list-style-type: none"> - Monitoring traffic improvement - Monitoring the preparation of traffic signs and road block signs. - Monitoring the compensation level, contractor's liability extent, and satisfaction of the affected households - Monitoring the location and condition of material storages - Monitoring the availability of protective barriers and appropriation when using them - Monitoring the Contractor's information publication about the construction schedule. - Level of local people's understanding of that 	under construction in the 5 subprojects	w/ Direct observation / Community consultation	<p>households.</p> <ul style="list-style-type: none"> - Installing traffic signs and road block signs. - Informing local communities about the schedule of construction activities. 	<p>implemented temporary roads construction for those affected by construction activities.</p>	<p>seriously and thoroughly, therefore did not take best effects. Specifically:</p> <ul style="list-style-type: none"> - Contractor has published information about the construction schedule. However, in many areas where the construction schedule changed or prolonged, the contractor did not notice and explain to the surrounding residents about the changes, leading to their reaction, annoyance and other negative impact on their traveling for a long time. - The contractor has used protection barrier, however in some areas, the use of which did not fit the city 	<p>signs and road block signs, however did not utilized those during the construction process. Specifically, Contractor did not install the signs in the regulated place and distance, or still leave fallen, tilted signs during construction process;</p> <ul style="list-style-type: none"> - Many kinds of material gathered at roadside untidily, obstructing traffic and affecting the life of people near the construction area.

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
information.					landscape, or was inappropriate and improper in term of barrier structure.	
5. Impact on surface water quality - Conditions and location of materials and chemicals storage. - Check the available ditches and their capacity. - Monitoring volume and status of sediment transport. - Monitoring the status and frequency of wastewater collection - Monitoring conditions and position for machinery and equipment maintenance. - Amount of existing grease and wastewater from construction. - Checking understanding of workers and the littering at right place. - The number of employed	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Using grooves to direct the rainwater flow out of construction site. - Creating employment opportunities for local people, reducing the installation of camps and the amount of waste on the site. - Arranging the storage location for construction materials and chemicals. - Training for employees on compliance with environmental protection requirements.	- Using local employees helped to reduce the number of camps and the amount of waste on the site, and as a result, reduce impact on surface water.	- The measure of using grooves to direct the rainwater flow out of construction site was effective in preventing water stagnant on the site and runoff carrying waste from affecting surface water. - Contractor arranged materials and chemicals storage; however those positions have not been designed as requirements specified for roof, floor liners, should not raise efficiency.	- EMC tested the knowledge of workers about the proper disposal regulations; however, the majority of workers are not aware of compliance with the requirements at the construction site and the camp site. - Contractor has not well controlled the amount of oil and grease arising from construction activities.

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
local people and their contributions.						
6. Local flooding - Monitoring the volume of solid waste, location for gathering garbage and frequency of waste moving. - Flooding status, rainwater drainage measures in case of flood and damages caused by flood. - Water drainage status in ditches; - Recommendations of local people - Construction methods.	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Gathering solid waste arising from construction activities to temporary disposal area before moving waste to prescribed landfill. - Checking the status of the wastewater flow to the cultivation areas around wastewater treatment plants.	- Flood has not occurred in construction sites thank to very effective measures.		
7. Health and safety of construction workers and the surrounding community - Monitoring the availability of labor safety clothes and percentage of workers equipped with labor safety clothes; - Monitoring the source and quality of water supplied to	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Ensuring clean water for daily use - Providing and maintaining lighting system, safety barriers and danger signs where necessary, at the same time to reducing the noise level under standard	- The measure of ensuring clean water for daily use was effectively implemented.	- The contractor's measures partially helped to ensure the health and labor safety for workers and surrounding community. Specifically, the contractor equipped workers with protective	- In most camp areas, workers are not supplied with medical equipments to protect health safety in case of necessity.

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
<p>the camp site.</p> <ul style="list-style-type: none"> - Availability of safety equipment; - Requests/complaints from local people about the danger. 			TCVN 5949:1998.		clothing, however incompletely. Most workers if having protective clothing has not yet seriously follow regulations, leading to low efficiency of the measure.	
<p>8. Impact on the underground works</p> <ul style="list-style-type: none"> - Result/survey record - The survey results are recorded in form of text in the working plan; - The damaged underground works - Alternative proposal and uniform level of agencies and contractors. - The affected works; compensation situation and existing works that have been compensated 	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	<ul style="list-style-type: none"> - Conducting a survey of existing underground works (water supply pipes, cables, etc.) in construction sites - Planning to fix problems affecting underground works if any. 	- Checking on survey record together with monitoring in the construction sites showed that there was no case of construction affecting underground works.		

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
9. Affect road and bridge works - Status of bridge/road works; - Available information; - Means of transport used in the construction process and transportation frequency; - Road status, compensation for road surface layer and satisfaction of local authorities; - Damage types; compensation and satisfaction of local authorities and people.	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Controlling trucks carrying waste and construction materials into/out the site to prevent damages for bridges and roads. - The position cut for pipeline installation was restored after installation completed.	- Contractor has well controlled means of transport used during construction and their frequency.	- Such measures helped to minimize influences on bridge and road works in the site.	- The road surface was not immediately restored to the primary status. This delay would affect surrounding current bridge and road works.
10. Power management in the construction site - Status of power cables and electrical equipments - The understanding level and compliance of the workers as well as working conditions at the site.	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Tightly controlling electrical equipments such as generators, temporary electric conductors which can be dangerous for workers and the community. - Training and enhance awareness of	- Contractor well managed the power near construction area, leaving no dangerous situation at the construction site.	- The training on LS awareness for the workers was not best effective due to lack of frequent training and lack of observance reminders after training.	

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
			workers about labor safety.			
11. Lack of social order issue - Workers' temporary residence registration with local authorities and conflicting situation between local residents and workers in construction site. - Workers' understanding of local culture and behavior; - Worker training period of contractor.	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Registering temporary residence for workers with local authorities - Training workers on labor safety in construction site.	- In most locations, social order has been well controlled by contractor so there was no conflict between workers and residents, no increase in social evils and infectious diseases either in construction site or in camp site.		- Slow progress affects the daily life of the people living in the construction area, so a number of people reacted with labor workers (in package "Water discharge system in Tuy Hoa city" of Phu Yen sub-project).

Monitoring activity	Time and venue	Method	Contractor's conducted mitigation measures	Effectiveness of mitigation measures		
				Very effective	Effective	Ineffective
12. Management of waste soil - Monitoring licensing status and checking licensing documents/dossiers - Availability of embankments and warning signs; landfill status including mud dropping and sewage runoff; - Status of the truck in a landfill; - Availability of water spray; its frequency and Contractor's extent of liability.	- All locations under construction in the 5 subprojects	- Interview w/ Direct observation / Community consultation	- Applying for official license by local authority of the landfill area (in Gia Nghia town). - Constructing wall and signs around the landfill to avoid mud dropping as well as to keep people out.	- Contractors seriously follow regulations on applying for local authorities' official permits of landfill areas.	- Waste soil has been controlled effectively. - Other measures might enhance effectiveness, such as: spraying water during waste transportation, adequately addressing increased air pollution when there are complaints about; and well covering trucks either in transportation or in landfill site.	

2.2 The environmental monitoring activities

In December 2012, EMC implemented monitoring program through sampling to control the environment quality (water, air and noise), and to ensure that contractors comply fully with the Environmental Management Plan. To implement the monitoring, EMC cooperated closely with PPMUs, and Contractors to design monitoring programs on the basis of sampling for water, air, and noise quality monitoring in the project area. EMC carried out monitoring activities as agreed in the consultancy contract for “Independent Monitoring Consultant of Environment Management Plan” including: monitoring parameters, sampling locations, frequency of sampling, methodologies of data analysis and reporting. Before sampling, EMC drafted the sampling plan on the basis of the entire approved sampling/monitoring program and of the actual situation of the project.

2.2.1 General information on environment monitoring

a. Regulations on ambient monitoring in Vietnam

The monitoring processes and methodology comply with Circular no 28/2011/TT-BTN & MT 1st August, 2011 regulating the air and noise monitoring, Circular no 29/2011/TT-BTN & MT 1st August 2011 regulating technical process of continental surface water environment monitoring and Circular no 30/2011/TT-BTN & MT 1st August, 2011 regulating technical process of groundwater environment monitoring.

b. Monitoring method in the field

❖ Water Environment Monitoring

Monitoring site selection

- The lakes, rivers and streams around the construction area.
- The outlet area receiving rain water, waste water after handling the project.
- Well of households located near the training area sewer project.
- The proposed construction.
- Region harnessing of surface water and groundwater for the project.

Sampling method

Sampling was implemented under Vietnamese standards TCVN 6663-6:2008 (ISO 5667-6:2005) for surface water environment and Vietnamese standards TCVN 6663-11:2011 (ISO 5667-11:2009) for underground water environment.

Sampling tools:

- GPS Navigator Garmin eTrex Legend HCx (Taiwan)
- Plastic buckets with a capacity of 20 liters
- Buckets and containers must be washed and rinsed with the sample water before storing samples.

Sampling procedure: taking water from 20 cm under water surface, then dividing sample into 3 containers (one two-liter container preserved cold, 01 one-liter container preserved with HNO₃, 01 one-liter container preserved with H₂SO₄), a (glass) sample bottle for microbiological analysis, a (glass) sample bottle preserved with H₂SO₄ for oil and fat analysis.

Preservation method:

All water samples were kept in the ice barrel (about 4°C) instantly during the time of taking from sampling locations to the laboratory (lab). In the lab, sample containers are stored in a refrigerator until analysis.

Field measurements:

Parameters: Temperatures, pH, and DO were measured at the sampling location with a portable measure instrument Hach HQ40d, USA with calibration due in March 2013. Measurement was taken by Firstly, dip directly the electrodes into water samples, wait for stable status, read the measured values in the computer screen and write them into sampling record sheet.

Analytical method in the laboratory:

Table 3: Information on analytical method

No	Parameter	Analytical method
1	pH	Measured under Vietnamese standard TCVN 4559-1998; TCVN 6492:1999. pH metal electrode method APHA 4500-H ⁺ B.
2	DO	TCVN 7325:2004 (ISO 5814:1990): water quality – determination of dissolved oxygen - Electrochemical probe method
3	TSS	SMEWW 2540 (D)-Solids:2005 (*)
4	COD	SMEWW 5220 (B):2005
5	BOD ₅	SMEWW 5210 (B):2005
6	NH ₄ ⁺ -N	SMEWW 4500-NH ₃ (F): 2005
7	NO ₃ ⁻ -N	TCVN 6180: 1996
8	Coliform	SMEWW 9221 (B):2005 (*)
9	Heavy metals (Fe, Mg,)	SMEWW 3500-Fe (B):2005
10	Total oil and grease	SMEWW5520 (B):2005

Note: SMEWW: Standard Methods for Examination of Water and Wastewater, Published by American Public Health Association, 22nd Edition 2012;

ISO: International Organization for Standardization;

TCVN: Vietnamese Standard.

❖ Air and noise environment monitoring

Monitoring site selection

- Construction area
- Residential area nearby

Sampling and measurement methods:

- Microclimatic parameters were measured at the field with various equipments, specifically humidity/temperature measuring instrument TESTO 635, made in Germany; wind direction and wind speed measuring instrument YOUNG, USA and noise measuring instrument Extech Integrating Sound Level data logger Model 407 780, UK.
- The parameters of the ambient air environment were measured by quick measuring device Graywolf equipped in PC originating from the U.S

Table 4: Parameters

Parameter	Measurement interval (ppm)	Detection limit (ppm)
Sulfur Dioxide (SO ₂)	0.0 to 20	0.2
Nitrogen Dioxide (NO ₂)	0.0 to 20	0.1
Carbon Monoxide (CO)	0.0 to 500	1.0
Oxygen (O ₂)	0.0 to 25%	0.2%

2.2.2. Evaluating the results of environment monitoring

Table 5: Evaluating the results of environment monitoring

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
1.	Dak Nong sub-project				
Water supply system in Gia Nghia	1st Monitoring mission (Sep 2012)	<p>- Sampling location is in Dak Tih Lake. EMC took 02 surface water samples (in raw water area of Dak Tih Lake and Dak Tih Lake area near the raw water treatment plant.</p> <p>- Analysis of pH, TSS, COD and BOD₅ show that these parameters in two surface water monitoring points were within requirements of QCVN 08-2008, column B2. Only coliform parameter excess allowed limit of QCVN 08-2008, A2 column. This is mainly because this area receives a portion of the surrounding residential wastewater, leading to biological pollution of surface water.</p>	<p>- EMC took 01 groundwater sample (from drilling wells inside the water treatment plant.</p> <p>- Analysis of ground water sample shows that coliform concentration is higher than allowed limit of QCVN 08-2008, A2 column. This is explainable by the location that receives a portion of the surrounding residential wastewater, then wastewater and other waste absorbed into the ground, leading to biological contamination of groundwater.</p>	<p>- EMC took 2 air sample and noise at pumping station no. 2 and supply water treatment station 12000 m3/full day</p> <p>- Monitoring result shows that only location of pumping station no. 2 has noise level slightly higher than requirement; all other locations have pollutant concentration (CO, NO₂, and SO₂) and TSS concentration far below the standard QCVN 05:2009.</p>	<p>In general progress of the project only at the construction stage of water treatment tank should not affect the water quality around the project area. The excess of coliform parameter out of the regulation is not related to the implementation of construction packages. Noise pollution takes place in a short time and can be easily improved.</p>

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
	2nd Monitoring mission (Dec 2012)	<p>- Sampling area is in the Dak Tih reservoir area, located near the pumping station of the project, with the fish cages around.</p> <p>- EMC took 02 surface water samples (in raw water area of Dak Tih Lake and Dak Tih Lake area near the raw water treatment plant.</p> <p>- Analysis shows that parameters of pH, TSS, COD, BOD₅ and coliform were within requirements of QCVN 08-2008, column A2.</p> <p>Total oils and grease was higher than allowed limit of QCVN 08-2008, column A2 (0.02 mg/L).</p> <p>Total oils and grease analyzed here include oil derived from the mechanical equipment, from animals, plants, etc. At the sampling time, there were no construction works; therefore pollution did not come from construction works, but from the</p>	<p>- EMC took 01 groundwater sample (from drilling wells inside the water treatment plant.</p> <p>- Analysis of water sample showed that all indicators were within the requirements of QCVN 09-2008.</p>	<p>- EMC took 2 air sample and noise at pumping station no. 2 and supply water treatment station 12000 m3/full day</p> <p>- The monitoring results show that the concentration of pollutants (CO, NO₂, SO₂) was much lower than the requirement of QCVN 05: 2009/BTNMT. Noise level in pumping station no. 2 (70.7 dBA) was a little bit higher than requirement of QCVN 26: 2010/BTNMT (70 dBA).</p>	<p>As of 12/2012, construction process has not affected the quality of surface and groundwater in surrounding area. The noise generated from mechanical machinery put a negative effect on the environment, but compared to the result of the first monitoring, the level of noise pollution was essentially improved because the contractor has effectively applied mitigation measures.</p>

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		fish cages around (from fish feeds and fish waste).			
Solid waste landfill in Gia Nghia Town	1st Monitoring mission (Sep 2012)	<p>Sampling area was near the stream that receives leachate from old landfill and Dak Mung stream near the project area.</p> <ul style="list-style-type: none"> - EMC took 02 surface water samples: from stream receiving landfill leachate of the old landfill and Dak Mung stream nearby. - Monitoring results show that the pH, TSS and total coliform values are within the requirement of QCVN 08-2008. COD and BOD5 parameters are many times higher than Vietnamese standard. Specifically, the stream receiving landfill's leachate has COD concentration 4 times higher and BOD5 concentration 6 times higher than limits of QCVN 08-2008, A2 column. This can be explained that this stream is receiving leachate without treatment of old landfill near the 	<ul style="list-style-type: none"> - EMC took 01 groundwater sample from the well of Mr. Phu Dinh Van near the landfill area. - Monitoring results show that parameters are within the allowed limits of QCVN 09-2008. Only coliform value exceeds QCVN 08-2008, B1 column. This can be explained by the influence of old landfill near project area. 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise at the gate of solid waste landfill and the residential area at 200m from the landfill. - Monitoring results show that both sample locations have concentrations of pollutants (CO, NO2, and SO2) and TSS less than standard of QCVN 05:2009. 	<ul style="list-style-type: none"> - Project construction process does not affect the quality of surface water, groundwater, air and noise of the surrounding area.

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		project area.			
	2nd Monitoring mission (Dec 2012)	EMC did not carry out environment monitoring here because construction activities did not affect the quality of surrounding environment.			
Rainwater and wastewater discharge system in Gia Nghia	1st Monitoring mission (Sep 2012)	EMC did not carry out environment monitoring here because Contractor did not have much construction activities, leaving no impact on the quality of surrounding environment.			
	2nd Monitoring mission (Dec 2012)	<ul style="list-style-type: none"> - Sampling area is in the stream right beside construction area, on Le Loi and Le Thanh Ton street. - EMC took 02 surface water samples in stream nearby construction site on Le Loi street and stream nearby construction site on Le Thanh Tong street. - Analysis results show that, compared to the A2 column of QCVN 08-2008, parameters of pH, TSS, DO, COD and BOD₅ concentration are within requirements. Coliform values at spring location on Le Loi Street is 	<ul style="list-style-type: none"> - EMC took 01 ground-water sample (from the drilled well on Le Loi road. - The result shows that they meet the requirements of QCVN 09-2008. 	<ul style="list-style-type: none"> - EMC took 02 air and noise samples at water discharge system at household no. 9, group 5 – block 6, water discharge system on Nguyen Van Troi street. - The monitoring results show that the concentration of pollutants was much lower than the requirement of QCVN 05: 2009/BTNMT. Suspended dust level in water discharge system at household no. 9, group 5 – block 6 and on Nguyen Van 	<ul style="list-style-type: none"> - In general, the construction process has not affected the quality of surface and groundwater in the project construction area. - The dust and noise criteria are beyond the standard due to the impact of the construction packages and other external factors such as the operation of vehicles

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		slightly higher than QCVN 08-2008 A2 column because this area receives a portion of wastewater and waste of the surrounding residential area, leading to biological contamination of surface water.		Troi Street was slightly higher than the requirement of QCVN 05: 2009/BTNMT (0.3 mg/m ³). This is caused by the construction process combined with the operation of vehicles along the route. - Noise level in water discharge system at household no. 9, group 5 – block 6 (71.9 dBA) was a little bit higher than requirement of QCVN 26: 2010/BTNMT (70 dBA).	along the route. However, contractor should thoroughly apply mitigation measures to this situation.
2.	Binh Thuan sub-project				
Wastewater discharge and surrounding sewer system	1st Monitoring mission (Sep 2012)	<ul style="list-style-type: none"> - The sampling area is at the outlets along the irrigation channel and the Ca Ty River around the project area. - EMC took 02 surface water samples at the outlet on Tran Hung Dao and Vo Thi Sau Streets - Compare to QCVN 08-2008, the value of pH, COD, BOD₅ are within requirements. The outlet on 	<ul style="list-style-type: none"> - EMC took 01 groundwater sample at the well of no.252 Vo Thi Sau, near construction area. - Monitoring results show that the analytical parameters are within the limits of QCVN 09-2008; only coliform 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise at Phu Thinh and Trung Trac. - Monitoring results show that, the noise level at Phu Thinh is higher than requirement QCVN 26:2010, caused by great noise emitted from construction equipment operating. All 	<ul style="list-style-type: none"> - In general, the construction process has not affected the quality of surface and groundwater in the project construction area. Noise pollution is temporary only because of short-term

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		<p>Vo Thi Sau street has quite high TSS concentration, higher than required by QCVN 08-2008 B1 column. This is due to the sampling location on the Ca Ty River downstream and in the flood season, TSS concentration in the water would increase.</p> <p>- The 02 monitoring locations have Coliform in excess of the permitted limit of QCVN 08-2008 B1 column about 1.4 - 2 times. This is because the sampling area receives rain water from project area at the same time with wastewater of the surrounding residents, should coliform concentration in the wastewater be high.</p>	exceeds the allowed limit of QCVN 08-2008, B1 column.	other pollutants (CO, NO2, and SO2) and dust level in the positions are much lower than the regulations.	construction and could be easily improved.
	2nd Monitoring mission (Dec 2012)	EMC did not carry out environment monitoring here because construction activities did not affect the quality of surrounding environment.			

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
Pipeline level III, public toilets, small sewer connecting households	1st Monitoring mission (Sep 2012)	EMC did not carry out environment monitoring here because Contractor did not have much construction activities, leaving no impact on the quality of surrounding environment.			
	2nd Monitoring mission (Dec 2012)	<ul style="list-style-type: none"> - The sampling area is in the sewer constructed of the project. - EMC took 02 surface water samples in front of the household no. 24 and 278 Nguyen Trai. - Compare column QCVN 08-2008 B2, the value of pH, COD, BOD₅, and coliform are lower than the allowed limit. Particularly TSS concentration is slightly higher than B2 column QCVN 08-2008 due to sewer construction that created mud spilling into the water and TSS concentration increasing. 	EMC assessed that the package has no construction activities that affect groundwater quality, so did not take monitoring.	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise in the sewage in front of household no. 21 and 194 Nguyen Trai Street, and in public toilet in Nguyen Trai Street. - Monitoring results show that the value of suspended solids and other pollutants NO₂, SO₂ and CO are below QCVN 05:2009/MONRE. The noise level in all points exceeded QCVN 26:2010/BTNMT, specifically: in sewage at 21 Nguyen Trai (75.6 dBA); sewage at 194 Nguyen Trai (70, 9 dBA); public toilet in Nguyen Trai (78.1 dBA). Noise pollution is caused by machinery and transportation during 	- In general, the construction process has caused noise and high TSS level in the area. But contractors could improve these problems if they strictly apply mitigation measures.

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
				construction.	
Wastewater treatment plant and pumping stations	1st Monitoring mission (Sep 2012)	EMC did not carry out environment monitoring here because Contractor did not have much construction activities, leaving no impact on the quality of surrounding environment.			
	2nd Monitoring mission (Dec 2012)	EMC did not carry out environment monitoring here because Contractor did not have much construction activities, leaving no impact on the quality of surrounding environment.			
3.	Ninh Thuan sub-project				
Water discharge system in Phan Rang - Thap Cham City	1st Monitoring mission (Sep 2012)	<ul style="list-style-type: none">- The sampling area is at the outlets along the canal, where receives a portion of the surrounding residential wastewater.- EMC took 02 surface water samples (at the outlet no. 3 of and No. 2 of the drainage system).- The analysis results show that pH, COD, BOD₅ parameters are within requirements of QCVN 08-2008. Concentrations of TSS and Coliform at both locations exceed QCVN due to waste of residential	<ul style="list-style-type: none">- EMC took 01 groundwater sample at well of Mr. De Vo Van at no. 149A 21/8 Street.- The analysis show that most of the indicators are within the requirement of QCVN 09-2008. Coliform parameter exceeds limit of QCVN 08-2008, column B1 due to waste of residential areas along the canal absorbing into	<ul style="list-style-type: none">- EMC took 01 sample of air and noise on the road 21/8.- The measurements show that the parameters of air pollutants (CO, NO₂, and SO₂) and noise are within requirements (QCVN 05:2009 / MONRE and QCVN 26: 2010 / MONRE).	Project just started construction, should not affect the surface water, groundwater, as well as air and noise quality.

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		areas along the canal.	the soil and affecting groundwater quality.		
	2nd Monitoring mission (Dec 2012)	<ul style="list-style-type: none"> - Sampling area is at the outlet along the canal, where receives a portion of the surrounding residential wastewater. - EMC took 02 surface water samples (from Outlet no. 3 and No. 2 of the drainage). - Compare analysis results with column B1 of QCVN 08-2008, the value of pH, TSS, COD, and BOD₅ at 02 locations are within permitted limits. - Oils and grease concentration is 0.8 mg/l, 8 times higher than QCVN 08-2008 column B1 (0.1 mg/l) due to waste from the surrounding residential area; sampling report sheet also recorded oil scum and grease at the monitoring sites. - Coliform values in both observation points are more than 3.2 times higher than the standard, 	<ul style="list-style-type: none"> - EMC took 01 groundwater sample (from the well of Mr. Tuan Nguyen Ba at no. 18 Ha Huy Tap Street. - Monitoring results show that almost all parameters are within allowed limits of QCVN 09-2008. Only coliform exceeds the standard. 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise at the drainage of 21/8 street (including old and new routes). - Monitoring results show that the value of TSS and pollutants NO₂, SO₂ and CO are below the limits of QCVN 05:2009/BTNMT. The highest TSS observed in drainage of 21/8 (old route) is 0.294 mg/m³, below the allowed limit of 0.3 mg/m³. - The noise level slightly exceeds QCVN 26: 2010/BTNMT (70 dBA), specifically 71.8 dBA at old drainage of 21/8 Street and 70.8 dBA at the new one. 	<ul style="list-style-type: none"> - Project construction does not affect the quality of environment except for noise pollution, oils and grease and coliform criteria. However, the cause of oil pollution and coliform is not the package activities but wastewater from the surrounding residential areas flowing through the outlets. Noise pollution takes place in a short time and can be overcome if mitigation measures are seriously applied by the contractors.

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		due to waste from residential area along the irrigation channel.			
Water supply system in Ca Na town	1st Monitoring mission (Sep 2012)	EMC realized that package had not had activities affecting the surface water quality, so it did not implement monitoring in the first mission.	<ul style="list-style-type: none"> - EMC took 01 sample from the well of Mrs. Nhi Nguyen Thi Mong (near the booster pumping station). - Monitoring results show that most parameters are within requirements of QCVN 09-2008, only coliform exceeds QCVN 08-2008, B1 column. This is explained that daily activities of people created wastewater, which was not collected, overflowing, and leaching to ground and cause negative impact to groundwater quality. 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise at Ca Na booster pump station, and at transmission pipeline D280. - Monitoring results show that the levels of pollutants (CO, NO₂, and SO₂) and noise are below the allowed standard. 	The project just started the construction, should not affect groundwater quality, as well as air and noise.
	2nd Monitoring mission	- Monitoring area is surrounded by salt fields, near the sea inlet, ongoing construction of booster	- EMC took 01 sample from the well of Mrs. Nhi Nguyen Thi Mong	- EMC took 02 samples of air and noise at Ca Na booster pump station, and at	- At the time of monitoring, the project was implementing

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
	(Dec 2012)	<p>pumping station.</p> <ul style="list-style-type: none"> - EMC took 04 surface water samples (from the port behind pumping station, the Lake in front of pumping station, Lake at 300m from pumping station, and near the pipeline of pumping station). - Compare with QCVN 08-2008, the value of pH, DO, TSS, BOD₅, coliform, and E. coli bacteria are within permitted limits. Particularly 01 sample in front of the booster pump station has COD slightly higher than required in B2 column, QCVN 08-2008. However, this area is near the fishing port and receives residential wastewater, which makes COD value quite high. 	<p>(near the booster pumping station).</p> <ul style="list-style-type: none"> - Monitoring results show that most parameters are within requirements of QCVN 09-2008, only coliform exceeds QCVN 08-2008, B1 column. This is explained that daily activities of people created wastewater, which was not collected, overflowing, and leaching to ground and cause negative impact to groundwater quality. 	<p>residential area near water supply station of Ca Na commune.</p> <ul style="list-style-type: none"> - Monitoring results show that the levels of TSS and pollutants (CO, NO₂, and SO₂) are within the requirements of QCVN 05: 2009/BTNMT. - The noise level during construction is within requirement of QCVN 26:2010/BTNMT (70 dBA). 	<p>construction of booster pumping station, should not affect the environment due to not spreading construction area.</p>
4.	Khanh Hoa sub-project				
Water supply system in Ninh Hoa	1st Monitoring mission (Sep 2012)	<ul style="list-style-type: none"> - EMC took 02 surface water samples (raw water pumping station and irrigation channel along the pipelines of water plant in Ninh Hoa town (An Ninh 	<ul style="list-style-type: none"> - EMC took 02 samples from the well of Mr. Pham Minh Vu (near the raw water treatment (village 4, Ninh Son 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise at the gate of raw water pumping station and at water supply 	<ul style="list-style-type: none"> - Project construction does not affect the quality of environment. The oil pollution is due to

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
town		<p>commune area).</p> <ul style="list-style-type: none"> - Compared to QCVN 08-2008, the value of pH, TSS, COD, and BOD₅ are within permitted limits. - Total oils and grease in raw water pumping station in Ninh Hoa water plant is rather high, 40 times higher than QCVN 08-2008, A2 column (0.8 mg/L compared to 0.02 mg/l of Vietnamese standard). That is because equipments of raw water pumping station were being installed; leaving oil on the ground brought out by the rain, affecting the environment. - Total coliform values exceed A2 column, QCVN 08-2008 because residents along irrigation canals (monitoring point NH-NM-02) discharge wastes into the environment. 	<p>commune).</p> <ul style="list-style-type: none"> - Monitoring results show that most parameters are within requirements of QCVN 09-2008, only coliform exceeds QCVN 09-2008 (43 MPN/100 ml compared to 03 MPN/100 mL in QCVN). This is explained that daily activities of people created wastewater, which was not collected, overflowing, and leaching to ground and cause negative impact to groundwater quality. 	<p>treatment station.</p> <ul style="list-style-type: none"> - Monitoring results show that the levels of pollutants (CO, NO₂, and SO₂) and noise are below the allowed standard. 	<p>equipment installation and operation, however takes place in a short time and can be improved.</p>
	2nd Monitoring mission	<p>EMC did not carry out environment monitoring here because construction activities did not affect the quality of surrounding environment.</p> <p>Particularly for oil pollution, (seen in the first monitoring mission) by visual assessment of EMC during the 2nd</p>			

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
	(Dec 2012)	monitoring, the equipment installation and operation ended, so, pollution is also improved.			
Rainwater and wastewater discharge system in Cam Ranh	1st Monitoring mission (Sep 2012)	<ul style="list-style-type: none"> - EMC took 02 surface water samples (at pipeline No. 10 next to household no. 214 and pipeline no. 13 next to the household no. 74, 30/4 Street, Cam Ranh City). - Monitoring results show that most of the indicators are below QCVN, except for TSS and Coliform concentration higher than the allowed standard. That's because this area receives a portion of wastewater from the surrounding residents, leading to surface water pollution. 	<ul style="list-style-type: none"> - EMC took 01 groundwater sample from the well of household Nguyen Bac, Cam Thuan ward, Cam Ranh (near construction area) - Monitoring results show that all parameters are within limits of QCVN 09-2008. 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise at water discharge system of Phan Boi Chau Street and water discharge system of Cam Trinh residential area. - Monitoring results show that the levels of pollutants (CO, NO₂, and SO₂) and noise are below the allowed standard of QCVN 26:2010. 	- The construction has increased the amount of TSS concentration in surface water, but this is a small impact and in a short time. So, in general, the construction process does not significantly affect the quality of the surrounding environment.
	2nd Monitoring mission (Dec 2012)	<ul style="list-style-type: none"> - Sampling area is along streams around project area, where receives a portion of waste water from surrounding residential area. - EMC took 02 surface water samples (from sewer under Ba Thiem Bridge, Phan Boi Chau Street and 22/8 Road sewers). - Both locations have high level of 	<ul style="list-style-type: none"> - EMC took 01 groundwater sample from the well of Mr. Ngoc Vo Van, Phan Boi Chau Street nearby construction site. - Monitoring results show that all parameters are within limits of QCVN 09-2008. 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise at waste water treatment plant in Cam Ranh City and water discharge system in Phan Boi Chau Street. - Monitoring results show that the levels of TSS and pollutants (CO, NO₂, and SO₂) are within the 	- Project construction does not affect the quality of environment. The TSS pollution happening in the 1 st monitoring (Sep 2012) has been improved by Contractor with effective mitigation

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		coliform, excess 1.4 – 32 times the requirement of QCVN 08-2008. This is explainable by discharging rainwater and household waste water at the same time, leading to polluted surface water in surrounding area. All other parameters of pH, DO, TSS, COD, and BOD ₅ are within requirements of QCVN 08-2008.	Construction of sewers therefore does not affect ground water quality.	requirements of QCVN 05:2009/BTNMT. The noise level is within requirement of QCVN 26:2010/BTNMT.	measures.
Solid waste landfill in Cam Ranh	1st Monitoring mission (Sep 2012)	<ul style="list-style-type: none"> - EMC took 02 surface water samples (from downstream and upstream flowing through the landfill). - Monitoring results show that all indicators of pH, TSS, COD and BOD₅ in both locations are below QCVN, QCVN 08-2008 B2. 	<ul style="list-style-type: none"> - EMC took 01 ground water sample at household of Mr. Ngoc Tran Van, Cam Thinh Commune, Cam Ranh City (near the landfill). - Monitoring results show that most of the indicators are below QCVN, except for Coliform concentration 150 times higher than the allowed standard. But the pollution is not due to construction 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise from Cam Thinh Dong landfill and from Hoa Duyen residential area at 1.5km to the landfill. - Monitoring results show that the levels pollutants (CO, NO₂, and SO₂) are within the requirements. The noise level in Hoa Duyen residential area was (74.8 dAB) slightly higher than QCVN 26:2010. 	<ul style="list-style-type: none"> - In general construction does not affect surrounding environment, except for noise pollution. Contractor therefore needs to immediately improve the noise generation in the construction site.

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
			package.		
	2nd Monitoring mission (Dec 2012)	EMC did not carry out environment monitoring here because construction activities did not affect the quality of surrounding environment.			
5.	Phu Yen sub-project				
Wastewater discharge system in Tuy Hoa City	1st Monitoring mission (Sep 2012)	<ul style="list-style-type: none">- EMC took 02 surface water samples (at Bo Lake where wastewater was received for central wastewater treatment facility (TH-NM-01) and at 100m from there toward the upstream of Bo Lake.- Excavation during construction combined with rain has increased TSS concentrations in surface water higher than requirement of QCVN 08-2008.- The other analyzed indicators are within permitted limits of QCVN 08-2008.	<ul style="list-style-type: none">- EMC took 02 groundwater samples from the well in front of wastewater treatment plant.- Analysis shows that most indicators are within the requirements, except for Fe parameter at 15.1 mg/L or 3 times higher than the limit of regulation of QCVN 09-2008. However this is a characteristic of groundwater in this location.	<ul style="list-style-type: none">- EMC took 02 samples of air and noise from the gate of wastewater treatment plan and at 500m from that gate.- Monitoring results show that the levels of TSS and pollutants (CO, NO₂, and SO₂) are within the requirements of QCVN 05: 2009/BTNMT and the noise level is within requirement of QCVN 26:2010.	<ul style="list-style-type: none">- In general, the construction process does not significantly affect the surrounding environment quality, except for slightly high TSS concentration. However this is a minor impact, could not affect surface water quality.
	2nd Monitoring	<ul style="list-style-type: none">- Sampling area is near construction site of outlet of waste	<ul style="list-style-type: none">- EMC took 01 ground water sample at the well	<ul style="list-style-type: none">- EMC took 02 samples of air and noise from the	<ul style="list-style-type: none">- In general, the construction process

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
	mission (Dec 2012)	<p>water treatment plant, surrounded by rice fields ongoing draining for the season. The treatment pond was being constructed; however construction paused at the time of monitoring.</p> <ul style="list-style-type: none"> - EMC took 02 surface water samples (at Bo Lake where wastewater was received for central wastewater treatment facility (TH-NM-01) and at 100m from there toward the upstream of Bo Lake. - Monitoring results show that all indicators of pH and BOD₅ are below requirements, but TSS, COD and coliform are higher than Vietnamese standard. However the reasons for these do not come from package construction. 	<p>in front of wastewater treatment plant.</p> <ul style="list-style-type: none"> - Analysis shows that most indicators are within the requirements, except for Fe parameter at 9.66 mg/L or nearly twice higher than the limit of regulation of QCVN 09-2008. However this is a characteristic of groundwater in this location. 	<p>wastewater treatment plan and water discharge system of Le Loi street.</p> <ul style="list-style-type: none"> - Monitoring results show that the concentrations of pollutants (CO, NO₂, and SO₂) are within the requirements of QCVN 05: 2009/BTNMT. TSS concentration at water discharge system of Le Loi Street is 0.357mg/m³, higher than allowed limit of QCVN 05: 2009/BTNMT. - The noise at water discharge system of Le Loi Street is (83.3 dBA) exceeds the requirement of QCVN 26:2010 (70 dBA) because of equipments with great noise under operation. 	<p>does not significantly affect the surrounding environment quality. Compared to the first monitoring, surface water pollution by TSS has been completely improved. However, in some locations, dust and noise issues should be cared by the contractor and thoroughly improved, prevent negative impact on local communities.</p>
Water discharge system in Tuy Hoa	1st Monitoring mission (Sep 2012)	<ul style="list-style-type: none"> - EMC took 02 surface water samples at drainage discharge point of Nguyen Thi Dinh Street and rainwater drainage discharge 	<ul style="list-style-type: none"> - EMC took 01 ground water sample at the well of Mr. Nguyen Van Vu, 3/2 Street, Phu Thanh 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise from water discharge system on 3/2 Street, and rainwater 	<ul style="list-style-type: none"> - The construction process does not affect the quality of water environment.

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
city		<p>point of Lac Long Quan Street.</p> <p>- Monitoring results show that most of the indicators are below QCVN 08-2008, except for BOD₅, TSS and Coliform concentration higher than the allowed standard. That's because this area receives a portion of wastewater from the surrounding residents, leading to high level of coliform.</p>	<p>ward nearby construction site</p> <p>- Analysis shows that pH parameter is lower than requirement of QCVN 09-2008, NO₂ is slightly higher than QCVN 09-2008 (19.8 mg/L compared to 15 mg/L in QCVN). However this is a characteristic of groundwater in this location not because of construction activities.</p>	<p>discharge system along the coast.</p> <p>- Monitoring results show that the levels of TSS and pollutants (CO, NO₂, and SO₂) are within the requirements of QCVN 05:2009/BTNMT.</p> <p>- The noise levels in both locations are higher than limit of QCVN 26:2010. Specifically, noise level in rainwater discharge system along the coast is 72.8 dBA) and in water discharge system at Le Loi Street is 77.4 dBA compared to standard of 70 dBA. This is due to operating construction equipments.</p>	<p>However, it is necessary to improve the noise increasing to avoid affecting the daily life of surrounding area.</p>
	2nd Monitoring mission (Dec 2012)	<p>- Monitoring area is the lake area, where receives waste water of the surrounding residential area, also the future outlet area</p> <p>- EMC took 02 surface water</p>	<p>- EMC took 01 ground water sample at the well of Mr. Nguyen Van Vu, Phu Thanh ward nearby construction site.</p>	<p>- EMC took 02 samples of air and noise from water discharge system on 3/2 Street, and rainwater discharge system along the</p>	<p>- The construction process does not affect the quality of water environment.</p> <p>For air environment,</p>

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		<p>samples at drainage discharge point of Nguyen Thi Dinh Street and rainwater drainage discharge point of Lac Long Quan Street.</p> <p>- Compared to QCVN 08-2008, the value of pH, TSS, and BOD₅ are within permitted limits. COD and Coliform values exceed QCVN 08-2008, not because of construction process but wastes discharged from surrounding residents, causing biological pollution in this area.</p>	<p>- Analysis shows that all parameters meet the requirements of QCVN 09-2008. This indicates that construction has not affected much to ground water environment.</p>	<p>coast.</p> <p>- Monitoring results show that the air environment is fairly clean. The levels of pollutants (CO, NO₂, and SO₂) are within the requirements of QCVN 05:2009/BTNMT.</p> <p>- The noise level in rainwater discharge system along the coast is 76.7 dBA, higher than limit of QCVN 26:2010 (70 dBA). This is because operating construction equipments create great noise.</p>	<p>Contractor has not improved the noise pollution happening at construction site in the 1st monitoring. Contractor need to seriously implement mitigation measures for noise problem to avoid negative impact on residents.</p>
Solid waste landfill in Song Cau town	1st Monitoring mission (Sep 2012)	<p>- EMC took 02 surface water samples from upstream of the spring running through the landfill and the spring behind Dinh Ba, residential area nearby the landfill construction.</p> <p>- Analysis shows that all parameters meet the requirements of column A2, QCVN 08-2008</p>	<p>- EMC took 01 ground water sample at the well of Dinh Ba, residential area near the landfill construction.</p> <p>- Analysis shows that nearly all parameters meet the requirements of QCVN 09-2008.K Only</p>	<p>- EMC took 02 samples of air and noise from the gate of solid waste landfill and residential area at 1.5km from solid waste treatment plan.</p> <p>- Monitoring results show that the levels of TSS and pollutants (CO, NO₂, and</p>	<p>- The construction process does not affect the quality of surface water, ground water and air environment.</p>

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
			coliform parameter exceeds the limit of QCVN 09-2008 (240 MPN/100 ml compared to 03 MPN/100 ml as required). This pollution is not caused by the package because the package is just under construction.	SO ₂) are within the requirements of QCVN 05: 2009/BTNMT and the noise level is within requirement of QCVN 26:2010.	
	2nd Monitoring mission (Dec 2012)	EMC did not carry out environment monitoring here because construction activities did not affect the quality of surrounding environment.			
Water discharge system in Song Cau town	1st Monitoring mission (Sep 2012)	<ul style="list-style-type: none"> - EMC took 02 surface water samples from (receiving point of Water discharge system in Song Cau town (Ong Tho Bridge area) and the draindage of Water discharge system in Song Cau town, Le Loi road. - Analysis shows that nearly all parameters of pH, TSS, COD, BOD₅ and coliform are below the limits of column B1, QCVN 08- 	<ul style="list-style-type: none"> - EMC took 01 ground water sample at the well near the receiving point of Water discharge system in Song Cau town (Ong Tho Bridge area). - Analysis shows that all parameters meet the requirements of QCVN 09-2008 	<ul style="list-style-type: none"> - EMC took 02 samples of air and noise from the road to the west of central park and La Loi route. - Monitoring results show that the levels of TSS and pollutants (CO, NO₂, and SO₂) are within the requirements of QCVN 05: 2009/BTNMT and the noise level is within requirement 	<ul style="list-style-type: none"> - In general, the construction process does not affect the quality of surrounding environment.

Package	Monitoring time	Surface water quality	Ground water quality	Air and noise quality	General assessment
		2008. Only coliform parameter at the receiving point of Water discharge system in Song Cau town (Ong Tho Bridge area) is slightly higher than the limit of QCVN 08-2008 (9000 MPN/100ml compared to 7500 MPN/100ml as required). This surface water pollution is caused by a portion of wastewater from surrounding residents.		of QCVN 26:2010.	
	2nd Monitoring mission (Dec 2012)	EMC did not carry out environment monitoring here because construction activities did not affect the quality of surrounding environment.			

CHAPTER 3 – COMMUNITY CONSULTATION

3.1 Community consultation method

The local community consultation is one of the important contents implemented by EMC in each monitoring mission during construction activities of bidding packages in five central provinces subprojects.

In the 2nd monitoring mission from 2nd December 2012 to 14th December 2012, EMC conducted community consultation by two methods of direct interview and questionnaires to those mostly affected by project activities.

Interview method is implemented as follows:

- EMC randomly selected subjects to be interviewed with the diversity of gender (male, female), age, and occupation, those living in the area of construction projects and around the construction area.
- Providing the preliminary information of the construction project to be subjects to investigation, and interviews.
- Directly interviewing and passing questionnaires to selected objects;
- Collecting information and synthesize the recommendations of the community for each construction package.

3.2 Consultation results

In the two periodic monitoring missions, EMC receives many comments and recommendations of local communities surrounding construction area. Most are support and readiness for help or support such that construction activities can take place smoothly. Besides, for some bidding packages, some responses require contractors to implement measures to minimize negative impacts in surrounding residents. Details are as follows:

Table 6: Community consultation in bidding packages of 5 sub-projects

No.	Community comments	Monitoring location	Level of implementation of mitigation measures	Proposed improving measures	Implementation liability and period
1	In term of project information				
	<ul style="list-style-type: none"> - Contractors have sent the information about the project, the starting date, the construction schedule to the local authorities and communities. However, when construction schedule changes (shortened or extended, changes in construction plans, etc.), contractors did not specifically re-inform community about such changes so local people do not have the exact details of the construction. - For each category of construction, contractors did not inform the local community about the possible negative impact on the environment and the remedies. 	<ul style="list-style-type: none"> - This problem exists in almost every package of 5 subprojects. 	<ul style="list-style-type: none"> - Contractor has not yet informed community of detailed schedule of work items; possible negative impacts on the environment and the remedial measures. 	<ul style="list-style-type: none"> - Information disclosure should be organized with full participation of PMU, Contractor, Women's Union, Youth Union, and Community. - Contractor should inform local community of construction activities, detailed schedule of work items; possible negative impacts on the environment, environment management activities and the use of public complaint line. 	<ul style="list-style-type: none"> - Contractors have responsibility to carry out improving measures as soon as possible (right after the second monitoring mission by EMC) and maintain measures until the end of project.
2	In term of construction progress of work items in the project				
	<ul style="list-style-type: none"> - Too slow construction progress in some packages has caused noise 	<ul style="list-style-type: none"> - By the end of November 2012, 	<ul style="list-style-type: none"> - Contractor has not applied strictly stepwise 	<ul style="list-style-type: none"> - Contractor should strictly apply stepwise construction method for 	<ul style="list-style-type: none"> - Contractors have

No.	Community comments	Monitoring location	Level of implementation of mitigation measures	Proposed improving measures	Implementation liability and period
	pollution, suspended dust, traffic obstruction and sanitation issue, directly affecting nearby residents' living.	the package "Rainwater and wastewater discharge system in Gia Nghia" finished 15% of the total work items, package "wastewater treatment plants and pumping stations" of Binh Thuan sub-projects finished 18%, and package "Rainwater and wastewater discharge system in Cam Ranh", Khanh Hoa sub-project finished 11%.	construction method, leading to slow progress of construction work.	pipelines to prevent causing traffic obstruction, noise and dust. - Contractor needs to quickly restore the road surface after construction to minimize impacts on people's living in construction area and surrounding area. - Contractor needs to speed up construction progress, avoid delay in construction and negative impact on local residents' health and life.	responsibility to carry out improving measures as soon as possible (right after the second monitoring mission by EMC) and maintain measures until the end of project.
3	Responsibility to receive feedback from the local community				

No.	Community comments	Monitoring location	Level of implementation of mitigation measures	Proposed improving measures	Implementation liability and period
	- Contractor needs to inform surrounding community of the staff in-charge of receiving residents' response of construction status and his contacts.	- This problem exists in most of the packages in 5 subprojects.	- Contractor has not assigned staff in-charge of receiving nearby community's response of construction activities, especially nearby the street locations, where might cause direct impacts on surrounding residents. - PMU has not established a public complaint line yet.	- Establish a public complaint line with members from PPMU, Contractor and community, in which PMU have responsibility to answer community's questions, complaints or concerns about construction works in local area.	- Contractors have responsibility to carry out improving measures as soon as possible (right after the second monitoring mission by EMC) and maintain measures until the end of project.
4	In term of construction material storage				
	- Contractors have not strictly implemented tidy storage of construction materials as regulation, especially in construction site nearby transportation routes, with high transportation density and public buildings (like schools and offices),	- This problem exists in most of the packages in 5 subprojects.	- Construction materials has not been tidily gathered but are spreading and encroaching on the road, causing obstruction to traffic and danger to	- Contractors should regularly reminds workers to arrange materials tidily, not to scatter them on the roadway obstructing traffic; - Carefully cover fine particle construction materials in the storage. Limit vehicle speed when	- Contractors have responsibility to carry out improving measures as soon as possible

No.	Community comments	Monitoring location	Level of implementation of mitigation measures	Proposed improving measures	Implementation liability and period
	which cause negative impact on people's and public activities.		pedestrians; fine particle construction materials has not been covered and speed limit signs have not been installed so dust has not been minimized at the construction area.	traveling through the construction area. Regularly do cleaning on construction site, clean materials dropping around in order to minimize the dust that can affect the health of students and school activities.	(right after the second monitoring mission by EMC) and maintain measures until the end of project.
5	Dust arising problem				
	- Dust and air pollution arising from material transport have affected the residents living along the construction route, especially the households in the construction area.	- This problem exists in most of the packages in 5 subprojects.	- Contractor has not regularly watered the construction routes. - Contractor has not reminded their drivers to strictly implement speed limit when traveling through residential area, affecting people's health and activities along construction route. - Materials that are easily dispersed in the air (soils and sand) are	- Regularly spray water on the construction roads, especially in dry and windy weather. - Carefully cover the trucks carrying soil, sand and other materials that are easily dispersed to prevent material dropping on the road. - Contractor should remind truck drivers to obey regulations on speed (9km/h) when traveling through residential area.	- Contractors have responsibility to carry out improving measures as soon as possible (right after the second monitoring mission by EMC) and maintain measures until

No.	Community comments	Monitoring location	Level of implementation of mitigation measures	Proposed improving measures	Implementation liability and period
			spreading during transportation.		the end of project.
6	Noise and vibration problem				
	- In the construction area, Contractors use many machines that create much noise and vibration, affecting surrounding residents.	- This problem exists in most of the packages in 5 subprojects.	- Contractor uses machinery without certification of emission standard, noise and vibration as regulations. - Contractor has not regularly implemented maintenance for construction equipments.	- Contractor needs to use modern machinery to meet emission, noise and vibration standards due to government regulations. The bidder should submit proofs that all construction vehicles, machinery and equipment have been tested and meet the current standards of Vietnam TCVN 5949:1998 about noise and TCVN 6962: 2001 about vibration arising from construction activities; - Contractor should regularly implement maintenance for construction equipments every 3 months. - Stop the vehicles and cut the road to avoid noise and vibration during local resting time, from 18:00 to 7:00 the following day, around residential areas.	- Contractors have responsibility to carry out improving measures as soon as possible (right after the second monitoring mission by EMC) and maintain measures until the end of project.

No.	Community comments	Monitoring location	Level of implementation of mitigation measures	Proposed improving measures	Implementation liability and period
				- Inform local communities about the schedule of construction activities.	
7	Traffic obstruction problem				
	- Some construction items taking in transportation routes may cause traffic congestion and obstruction.	- This problem exists in most of the packages in 5 subprojects.	<ul style="list-style-type: none"> - Construction materials have not kept orderly in prescribed place. - Materials and waste are still dropped and dispersed during transportation, therefore affecting the traffic. - Stepwise construction method has not strictly applied, leading to delay and obstruction of the traffic. 	<ul style="list-style-type: none"> - Actual implementation of construction of any works may affect local activities in varying degrees. For example construction package on the transportation routes, more or less, would affect the public transport. Therefore, contractors need to implement measures to minimize these impacts. Specifically: <ul style="list-style-type: none"> - Keep construction materials orderly in prescribed place. - Ensure all trucks carrying materials and waste that are easily dispersed carefully covered. Clean the waste on the road. - Apply stepwise method and speed up construction to avoid traffic obstruction. 	- Contractors have responsibility to carry out improving measures as soon as possible (right after the second monitoring mission by EMC) and maintain measures until the end of project.

CHAPTER 4 – MAIN ENVIRONMENTAL ISSUES

As presented in the project progress, almost all sub-projects are under the construction phase; therefore, the Consultant focuses on the supervision of on-site compliance with commitments of the Environment Management Plan. Findings in this phase aim to supervise then provide guidance and forecast levels of potential environmental impacts during the construction phase of contractors, from which to propose remediation methods.

In the second monitoring mission (December 2012), EMC realize that some packages in the five sub-projects perform very slow construction progress, leaving many working items uncompleted.

Up to monitoring time, the package "Rainwater and wastewater discharge system in Gia Nghia" in Dak Nong subproject, implemented from 05th November 2012, reached only 15% of its total workload and package "Water treatment plant and pumping stations" in Binh Thuan subproject, implemented from 19th December 2012, reached 18%. Many working items have not been carried out; consequently not many environmental issues arise. Therefore bidding packages need to speed up construction to meet the commitment as contracted.

Through two missions of monitoring the EMP implementation of the packages in 05 sub-projects, EMC has discovered a number of major environmental issues in each package. These findings were presented in detail at the 1st and the 2nd periodic monitoring reports.

EMC identified 05 major groups of environmental problems in both monitoring mission. After the first monitoring mission, EMC has made specific recommendations on mitigation measures and responsibility for implementation of each package. The actual survey results and monitoring results show that these environmental issues have been improved in different levels by contractors of the 05 sub-projects. However, due to lack of frequency and regularity in implementation of contractors, the negative effects on the construction area environment and surrounding people have not been thoroughly resolved.

In the final report in 2012, EMC would generalize the main environmental findings by groups of problems, offer solutions to minimize their negative effect and clearly define responsibilities, implementation funding and time. The analysis in this section is general, showing the major problems of the entire project.

Key issues in sub-projects are presented in the following table:

Table 7: Some main issues at sub-projects

Main environmental issues	Locations detected	Proposed recommendations	Implementation responsibility	Implementation time	Funding for implementation
1. Noise and vibration generation	Dak Nong sub-project: “Rainwater and wastewater discharge system in Gia Nghia”; “Water supply system in Gia Nghia”; “Solid waste landfill in Gia Nghia Town”.	- Contractors need to hand in EMC with full proof that all equipments have been tested and meet current requirements of Vietnamese standards (TCVN 5949:1998 on noise level and TCVN 6962:2001 on vibration level during construction progress.);	- Contractors of the packages in subprojects.	- Implement complementary measures immediately after the 2nd monitoring mission of EMC, finish before the 3rd mission in March 2013, and maintain measures during construction process.	- Included in construction cost of Contractor
	Binh Thuan sub-project: “Wastewater discharge and surrounding sewer system”.	- Machinery and vehicles need to be maintained periodically every 3 months.			
	Ninh Thuan sub-project: “Water discharge system in Thap Cham City”.	- Establish public complaint line with participation of PMU, Contractor and community, having responsibility of answer community’s questions and concerns about issues related to construction activities in the area.			
	Phu Yen sub-project: “Water discharge system in Tuy Hoa city”				
2.Dust generation	Dak Nong sub-project: “Rainwater and wastewater discharge system in Gia Nghia”; “Water supply system in Gia Nghia”; “Solid waste landfill in Gia Nghia Town”.	- Contractor should strictly follow coverage and storage of fine particle construction materials in the warehouse as regulated to prevent their spreading into the air. - Contractor should seriously and thoroughly implement stepwise method	- Contractors of the packages in subprojects.	- Implement complementary measures immediately after the 2nd monitoring mission of EMC, finish before the	- Included in construction cost of Contractor

Main environmental issues	Locations detected	Proposed recommendations	Implementation responsibility	Implementation time	Funding for implementation
	Binh Thuan sub-project: “Wastewater discharge and surrounding sewer system”; “Pipeline level III, public toilets, small sewer connecting households”.	<p>of construction.</p> <ul style="list-style-type: none"> - Contractor has watered the road surface, however, not frequently as regulated, resulting limited effect. Contractor should regularly perform this work in construction site. - Contractor need to complete the installation of speed limit signs at the construction location and shall be responsible for reminding drivers to comply with these regulations, including speed limit of 5km/h when passing through construction sites and local traffic regulations. 		3rd mission in March 2013, and maintain measures during construction process.	
	Ninh Thuan sub-project: “Water discharge system in Thap Cham City”.				
	Khanh Hoa sub-project: “Hệ thống thoát nước mưa và nước thải tại TP Cam Ranh”; “Solid waste landfill in Cam Ranh”				
	Phu Yen sub-project: “Water discharge system in Tuy Hoa city”				
3. Smell arising	Dak Nong sub-project: “Rainwater and wastewater discharge system in Gia Nghia”; “Water supply system in Gia Nghia”.	- Install enough waste baskets in the camp site and collect the waste from workers’ activities.	- Contractors of the packages in subprojects.	- Implement complementary measures immediately after the 2nd monitoring mission of EMC, finish before the 3rd mission in	- Included in construction cost of Contractor

Main environmental issues	Locations detected	Proposed recommendations	Implementation responsibility	Implementation time	Funding for implementation
				March 2013, and maintain measures during construction process.	
4. Traffic obstruction	Dak Nong sub-project: “Rainwater and wastewater discharge system in Gia Nghia”.	<ul style="list-style-type: none"> - Constructor needs to store materials orderly in the designated area to avoid encroachment into the road. - Contractor needs to quickly return the way for the affected households after completion of the construction work. - Contractor need to regularly maintain the protection barriers for the entire construction sites that indicate the boundary between construction area and roads. 	- Contractors of the packages in subprojects.	- Implement complementary measures immediately after the 2nd monitoring mission of EMC, finish before the 3rd mission in March 2013, and maintain measures during construction process.	- Included in construction cost of Contractor
	Binh Thuan sub-project: “Wastewater discharge and surrounding sewer system”; “Pipeline level III, public toilets, small sewer connecting households”.				
	Ninh Thuan sub-project: “Water discharge system in Thap Cham City”.				
	Khanh Hoa sub-project: “Hệ thống thoát nước mưa và nước thải tại TP Cam Ranh”				
	Phu Yen sub-project: “Water discharge system in Tuy Hoa city”				

Main environmental issues	Locations detected	Proposed recommendations	Implementation responsibility	Implementation time	Funding for implementation
5. Impact on the health and safety of workers and surrounding community	Dak Nong sub-project: “Rainwater and wastewater discharge system in Gia Nghia”; “Water supply system in Gia Nghia”; “Solid waste landfill in Gia Nghia Town”.	- Contractor needs to ensure labor safety clothes such as gloves, waterproof boots and hard hats and comply with labor safety regulations for workers and subcontractors. Contractor needs to seriously remind and monitor the workers’ observance, as well as regulate punishment for violation.	- Contractors of the packages in subprojects.	- Implement complementary measures immediately after the 2nd monitoring mission of EMC, finish before the 3rd mission in March 2013, and maintain measures during construction process.	- Included in construction cost of Contractor
	Binh Thuan sub-project: “Wastewater discharge and surrounding sewer system”; “Pipeline level III, public toilets, small sewer connecting households”; “Wastewater treatment plant and pumping stations”.				
	Ninh Thuan sub-project: “Water discharge system in Thap Cham City”.				
	Khanh Hoa sub-project: “Hệ thống thoát nước mưa và nước thải tại TP Cam Ranh”				
	Phu Yen sub-project: “Water discharge system in Tuy Hoa city”.				

CHAPTER 5 – CONCLUSION AND RECOMMENDATIONS

Monitoring results of EMP implementation in packages of 5 subprojects show that Contractors have consciously complied with the regulations of Vietnamese Environmental Protection Law and environmental policy of ADB. After periodic monitoring missions, EMC identified 5 groups of major environmental problems in the packages of 05 sub-projects as follows:

- The problem of noise and vibration;
- The dust and gas emissions;
- Smell problem at the construction site and the worker's camp area;
- Traffic obstruction problem at the construction site and surrounding area;
- The issue of compliance with labor safety regulations and sanitation at construction site and worker's camp site.

These problems exist mainly because Contractors have not fully and seriously implemented the mitigation measures and consequently have not completely improved negative impacts of the project.

Through 02 first monitoring missions, EMC identified and limited some basic environmental impacts caused during construction. Environmental monitoring results in packages of 05 sub-projects also show that there are dust pollution and noise in most packages. However, such problems are temporary and could be overcome if the contractors correctly, sufficiently, seriously and thoroughly implement the mitigation measures. With respect to water environment, surface and groundwater have not been negatively affected by the project activities. Some parameters of water quality are found higher than the standard, but these results do not come from the construction activities of the project, but from objective causes of local area.

Basing on results of the 1st and 2nd monitoring, EMC will not carry out environmental quality monitoring activities for 03 sub-projects in Phu Yen, Khanh Hoa and Ninh Thuan, but will continue monitoring two sub-projects in Binh Thuan and Dak Nong in the next monitoring mission.

In order to resolve the above environmental problems, EMC proposes a number of specific recommendations as follows:

- **For PPMU:** Firstly, PPMU should have supplying responsibility of the implementation of EMP during construction of the packages in sub-projects. Secondly, they should ensure adequate project budget and reasonably allocate resources for EMP implementation. Thirdly, they need to support contractors on EMP implementation. Fourthly, they must periodically or irregularly hold inspection and monitoring of environmental issues during construction. Fifthly, they should make the environmental reports summarizing the sub-projects activities as required. Sixthly, they must periodically submit the synthesis of reports from the contractor (every 1 month) and synthesis of every 3 months to the central PMU.

- **For the Contractor:** draft detailed On-site Environmental Management Plan (SEMP) as required by the EMP. Train workers on the environmental related issues. Fully implement the assigned tasks under the EMP on construction sites and other subproject's EMP related issues. Propose new or improved mitigation measures in case the contractor finds that the mitigation measures in the SEMP have been made but not effective. Allocate appropriate resources to meet the requirements and obligations under the subproject's EMP.
- **For the Construction Monitoring Consultant (CMC):** Periodically monitor the compliance of the contractors. Complete periodic short reports on the EMP at construction site, send them to EMC and PMU, and propose improvement measures.
- **For the Environmental Monitoring Consultant (EMC):** carefully and periodically monitor the compliance of the CMC and contractors by records checking and field surveys. Carry out Environmental monitoring program by sampling method. Complete periodic environmental reports and submit them to the PMU.

Thus, by the time of 2012 report (December 2012), EMC had fulfilled the responsibility to support the PPMU in EMP monitoring through the development and implementation of information collecting system, sampling program, data analysis and reporting regime during the implementation of Central region small and medium towns Development Project, on the basis of compliance with the provisions of the Vietnamese Law on Environmental protection and ADB's Environmental policy

APPENDIX

Appendix 1: Some pictures on environmental supervision activities



Figure 1.1a. Meeting and information exchange at Dak Nong PPMU



Figure 1.1b. Site visit at “Wastewater discharge and surrounding sewers system”



Figure 1.1c. Site visit at “Rainwater and wastewater discharge system in Cam Ranh”



Figure 1.1d. Environmental monitoring at Phu Yen subproject



Figure 1.1e. Community consultation at Ninh Thuan sub-project



Figure 1.1f. Conclusion meeting at Cam Ranh PPMU