Socialist Republic of Vietnam

World Bank

COASTAL CITIES ENVIRONMENTAL SANITATION PROJECT

E1295
VOL. 5

SUMMARY ENVIRONMENTAL ASSESSMENT

MAY 2006

Submitted by:

THE Louis Berger Group, INC.

JV with Nippon Koei CO., LTD
**LIST OF ABBREVIATIONS**

<table>
<thead>
<tr>
<th>ORGANIZATIONS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCESP</td>
<td>Coastal Cities Environmental Sanitation Project</td>
</tr>
<tr>
<td>CPC</td>
<td>City People’s Committee</td>
</tr>
<tr>
<td>DONRE</td>
<td>Department of Natural Resources and Environment</td>
</tr>
<tr>
<td>DUDP</td>
<td>Dong Hoi Urban Development Project</td>
</tr>
<tr>
<td>MOC</td>
<td>Ministry of Construction</td>
</tr>
<tr>
<td>MONRE</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>MoSTE</td>
<td>Ministry of Science, Technology and Environment</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
</tr>
<tr>
<td>PMU</td>
<td>Project Management Unit</td>
</tr>
<tr>
<td>PPC</td>
<td>Provincial People’s Committee</td>
</tr>
<tr>
<td>PPU</td>
<td>Project Preparation Unit</td>
</tr>
<tr>
<td>PWU</td>
<td>Provincial Women’s Union</td>
</tr>
<tr>
<td>URENCO</td>
<td>Urban Environment Company</td>
</tr>
<tr>
<td>UWC</td>
<td>Urban Works Company</td>
</tr>
<tr>
<td>VIWASE</td>
<td>Water Supply and Sewerage Consultant Company</td>
</tr>
<tr>
<td>WB, the Bank</td>
<td>The World Bank</td>
</tr>
<tr>
<td>WSSC</td>
<td>Water supply and sewerage company</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OTHERS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>FS</td>
<td>Feasibility Study</td>
</tr>
<tr>
<td>GOV</td>
<td>Government of Vietnam</td>
</tr>
<tr>
<td>HH</td>
<td>Households</td>
</tr>
<tr>
<td>PIP</td>
<td>Project Implementation Plan</td>
</tr>
<tr>
<td>Pre-FS</td>
<td>Pre Feasibility Study</td>
</tr>
<tr>
<td>RAP</td>
<td>Resettlement Action Plan</td>
</tr>
<tr>
<td>TOR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>WWTP</td>
<td>Waste water treatment plant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UNITS</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USD or US$</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>VND</td>
<td>Vietnamese Dong</td>
</tr>
<tr>
<td>MPN</td>
<td>Most probable number</td>
</tr>
<tr>
<td>mg</td>
<td>Milligram</td>
</tr>
<tr>
<td>m</td>
<td>Meters</td>
</tr>
<tr>
<td>km</td>
<td>Kilometers</td>
</tr>
<tr>
<td>l</td>
<td>Liter</td>
</tr>
<tr>
<td>m³</td>
<td>cubic meters</td>
</tr>
<tr>
<td>T</td>
<td>Ton</td>
</tr>
<tr>
<td>kg</td>
<td>Kilogram</td>
</tr>
<tr>
<td>ha</td>
<td>Hectare</td>
</tr>
</tbody>
</table>
**GLOSSARY**

**Combined Sewers**  
Pipes, drains or culverts that carry both rain water and wastewater which in dry weather only carry wastewater. During heavy rain, they carry a highly diluted mixture of rain water and wastewater.

**Dumpsite**  
A site used to dispose of solid waste without any management and/or environmental controls.

**Healthcare Waste**  
Includes all waste generated by healthcare institutions, research facilities and laboratories.

**Incineration**  
Thermal processing or combustion of waste in a controlled environment used primarily for volume reduction.

**Interceptor Sewers**  
Interceptor sewers are used in conjunction with combined sewer systems to intercept wastewater prior to discharge into lakes, rivers or the ocean (where it would cause pollution.) In dry weather, interceptor sewers transfer all wastewater from combined sewer systems. In wet weather, the highly diluted wastewater discharges to the lakes, etc.

**Leachate**  
Contaminated water which has percolated through waste and typically contains dissolved or suspended solids and/or liquids.

**Sanitary Landfill**  
Properly sited, designed and operated method of disposing waste to land in a manner that protects the environment and public health.

**Separate Sewers**  
Separate systems of sewers have two different pipes that are not interconnected; one for rain water and a separate one for wastewater.

**Septage**  
Sludge that accumulates within septic tanks and must be periodically removed for disposal.

**Transfer Station**  
Facility at which waste collected by small vehicles and push carts is transferred to larger vehicles for economical haulage to treatment / disposal facilities.

**Waste Water Treatment Plant**  
Facility at which wastewater is collected and treated to reduce the amount of pollutants in wastewater.
1 INTRODUCTION

1.2 Purpose of the Summary Environmental Assessment
This document provides a summary of the Environmental Assessments (EAs) of the Coastal Cities Environmental Sanitation Project (CCESP), Phase 1 activities in three Vietnamese coastal cities: Nha Trang, Quy Nhon and Dong Hoi (Figure 1-1). In each city, CCESP proposes to undertake up to six environmental sanitation improvement activities referred to as "Components". The sum of activities in each city is referred to as a "Sub-Project". Activities in each Sub-Project have been devised in accordance with the recommendations of a Feasibility Study (FS) and other preparatory analyses and are detailed in Item 2 below. The Summary EA also presents the Project Framework for Environmental Management (Item 3), the Baseline Conditions in the potentially affected areas (Item 4). Item 5 assesses the potential environmental impacts of the proposed activities and recommends mitigation and monitoring measures to address those that cannot be avoided. Alternatives, a Phase 1 Environmental Management Plan (EMP), recommendations for Environmental Monitoring and Reporting, an assessment of potential Phase 2 Sub-Projects, and the Proposed Budgets are presented in Items 6, 7, 8, 9 and 10, respectively. The Summary EA and supporting Sub-Project EAs have been prepared to meet the requirements of both the Government of Vietnam (GoV) and the World Bank as part of the project preparation process. In addition to the socio-economic impacts addressed herein, the potential resettlement aspects of the proposed Phase 1 activities are separately assessed in an accompanying Resettlement Plan.

1.3 Background
Consistent with the GoV's strategy of developing the sanitation and drainage components of its urban infrastructure during the period of 2001-2010, CCESP builds on recent and on-going projects of the Bank's urban sector portfolio in Vietnam, including the on-going Three Cities Sanitation Project (Loan No. 3211-VN) and previously completed Ho Chi Minh City Sanitation Project and Urban Upgrading Project, among others. CCESP addresses smaller coastal cities with high tourism potential in which the World Bank has been invited to invest in environmental sanitation. The GoV selected the three cities of Nha Trang (Khanh Hoa Province), Quy Nhon (Binh Dinh Province) and Dong Hoi (Quang Binh Province) to participate in the proposed CCESP because they are experiencing higher than average rates of population growth and economic development, and present a need for environmental sanitation investments that are beyond the present resources of the national and local governments to address in the near future.

1.4 Objectives
Within the targeted cities, the primary environmental sanitation objectives of the CCESP are to:

- Reduce the incidence of flooding;
- Construct new wastewater collection, pumping and treatment system and facilities;
- Improve the collection and ensuring the safe disposal of solid waste;
- Establish new and better designed landfill sites
- Strengthen the capacity of the urban environmental companies in each of the three cities to sustain the improvements made.

Meeting these objectives is expected to result in improved public health, especially for poor residents, reversed environmental degradation and improved functioning of sanitation infrastructure. Based on the experiences gained from previous projects, these results are expected to contribute significantly to more sustainable urban environmental sanitation conditions supportive of continued economic growth, particularly from coastal tourism.

2 PROPOSED PROJECT COMPONENTS, PREPARATION & IMPLEMENTATION SCHEDULE
To meet these project objectives, the CCESP will consist of the following six components. Each is described first in programmatic terms, followed by specific activities in each city.

2.1 Component 1 - Flood Control, Drainage and Wastewater Collection
CCESP Component 1 will improve the collection of sewage by building new and rehabilitating existing sewers, intercepting existing combined drains and sewers, and eventually transporting the wastes to new wastewater treatment plants (WWTPs). The WWTPs, however, are defined as Component 2 and will not be built until Phase 2 as will be described below. Existing drains will be rehabilitated and new drains constructed where regular flooding occurs. The capacity of existing flood retention ponds will be enhanced. Existing combined sewer system will be utilized to the greatest extent possible in the central urban core areas with high population densities.Interceptor sewers will be constructed to pick up flows that currently discharge at a number of locations along the sea front or into rivers. In newly developing areas separate or
Coastal Cities Environmental Sanitation Project (CCESP)

combined systems will be constructed, depending on assessments of cost effectiveness. Specific Component 1 activities in each city are as follows.

Figure 2-1  General Locations of CCESP Sub-Project Cities
2.1.1 Nha Trang. In Nha Trang CCESP Component 1, Phase 1 will improve rehabilitate and improve 22 kilometers of the existing drainage and undertake related actions draining catchment areas into three receiving water bodies. The recipient water bodies are:

- **A 1.7-km open channel connecting Canal 1 with the Cai River.** Improvements will be made in the catchment area drained by a canal in the northern part of the city (indicated as Canal 1 on the accompanying map, Figure 2-1). Canal 1 currently drains and will continue to discharge into a 1.7-km open channel connecting with the Cai River. Details of existing land uses and other baseline conditions are provided in Item 4. To improve drainage in the Outlet 1 catchment area CCESP-Phase 1, as currently structured, will:
  - Rehabilitate Canal 1;
  - Dredge the existing 1.7-kilometer open channel;
  - Provide for (but not complete) future connections of households to the collection system to occur in coordination with the development of a WWTP in Phase 2. Connections to the collection system will not be made as part of Phase 1 due to adverse water quality conditions in the open channel which would be exacerbated by doing so. Details and the rationale for disallowing early connections are provided in the following summary of impacts, mitigation and alternatives;
  - Provide "end of the pipe" treatment of discharge from Canal 1 as interim measures, pending the establishment of a full collection system and WWTP in Phase 2;
  - Retain all septic tanks in the catchment area until Phase 2, at which time the septic tanks of all households connected to the collection system will be abandoned upon the completion of the connections;
  - Encourage treatment of waste currently being discharged from the seafood processing factories within the catchment area of the open channel; and
  - Undertake monitoring activities as detailed hereinafter.

- **Cai River.** Drainage in the Son Thuy area near the Thong Nhat Cooperative on the north bank of the Cai River will be improved and discharged to the Cai River near the Tran Phu Bridge via the outlet designated as Outlet 4. Within this area CCESP-Phase 1, as currently structured, will:
  - Rehabilitate/enhance the existing drainage system;
  - Provide for future connections of households to the collection system to occur in coordination with the development of a WWTP in Phase 2. Connections to the collection system will not be made as part of Phase 1 due to adverse water quality conditions in the Cai River which would be exacerbated by doing so;
  - Provide "end of the pipe" treatment of discharge as interim measures, pending the establishment of a full collection system and WWTP in Phase 2;
  - Retain all septic tanks until Phase 2, at which time the septic tanks of all households connected to the collection system will be abandoned upon the completion of the connections; and
  - Undertake monitoring activities as detailed hereinafter.

In addition to the direct discharge from Outlet 4, the Cai River will also receive discharges from Outlet 1 via the open channel discussed above. Cumulative impacts have been considered as will be addressed in the description of potential impacts, Item 5.

- **Quan Truong River:** Improvements will be made to a canal (referred to as the Outlet 2 Canal) along the railroad tracks in the west-central portion of Nha Trang which discharges to Quan Truong River at a point approximately 3.7 km north of its confluence with Tac River. Within the catchment area for Outlet 3 CCESP-Phase 1 as currently as currently structured will:
  - Rehabilitate the Outlet 3 Canal;
  - Provide for (but not complete) future connections of households to the collection system to occur in coordination with the development of a WWTP in Phase 2. Connections to the collection system will not be made as part of Phase 1 due to adverse water quality conditions in the Quan Truong River which would be exacerbated by doing so;
  - Provide "end of the pipe" treatment of discharge from Outlet 3 as interim measures, pending the establishment of a full collection system and WWTP in Phase 2;
  - Retain all septic tanks until Phase 2, at which time the septic tanks of all households connected to the collection system will be abandoned upon the completion of the connections; and
  - Undertake monitoring activities as detailed hereinafter.
FIGURE 2-1: NHA TRANG SUB-PROJECT

MẶT BẰNG VỊ TRÍ CÁC HÀNG MỤC XÂY DỰNG TRONG GIAI ĐOẠN 1
LOCATION PLAN OF WORKS WITH INVESTMENT IN PHASE 1

GHI CHÙ - LEGEND:

- MUTOING XÂY NGOI - NEW BOX CIVILISTICS
- CÔNG TRÌNH NGẢI - NEW COMBINED SEWAGES
- ĐƯỜNG MỚI ĐỘI TRONG NGUY - NEW ROAD NETWORK
- ĐƯỜNG MỚI ĐỘI TRONG NGUY - NEW ROAD NETWORK
- TEAM FROM SOUTH - SOUTH TREATMENT ECONOMIC
- TEAM FROM NORTH - NORTH TREATMENT ECONOMIC
- MƯỜNG ĐỊNH - MƯỜNG ĐỊNH
- NƠI XÂY NẤT - NEW CONSTRUCTION
- PROJECT AREA TO CONSTRUCT IN PHASE 1

Summary Environment Assessment
Coastal Cities Environmental Sanitation Project (CCESP)

**South China Sea**: The South China Sea will eventually receive the discharges related to all drainage improvements in Nha Trang. It will receive direct discharges from:

- **Outlet 2**. An improvement designated as Outlet 2 (Ba Lang Outlet) located along the coast in the northern part of the city drained by the canal indicated as Canal 2 on the accompanying map. Canal 2 discharges directly to the sea north of Cai River. The box sewer which collects wastewater in the area will be rehabilitated.
- **Da Tuong Street Outlet**. A pumping station will be provided to discharge wastewater collected south of the airport and discharge it to the Dong Bo River, then to the sea.

Because of the ability of the receiving water body to absorb the additional discharges without significant adverse impact, new connections will be allowed in the catchment areas for Outlet 2 and the Da Tuong Street Pumping Station as part of CCESP Phase 1. The cumulative impacts on the South China Sea due to all proposed improvements have been taken into account as summarized in the following summary of impacts, mitigation and alternatives.

**2.1.2 Quy Nhơn**. In Quy Nhơn, CCESP Component 1, Phase 1 will improve rehabilitate and improve drainage and combined sewer systems involving five catchment areas of Qui Nhơn City and a total of 4.8 km of pipeline and culverts and total excavation of some 23,163 m$^3$ and undertake related actions in catchments discharging into three receiving water bodies:

- **Phú Hòa Lake**. Phú Hòa Lake ([Figure 2-2]) is located to the west of urban area on the west side of Ba Hòa Mountain and will receive direct discharges the improvement designated as Quy Nhơn Outlet 1.
- **Ha Thanh River**. The Ha Thanh River is located to the northwest of the main urban area and will receive direct discharges from the improvements designated as Quy Nhơn Outlet 2.
- **Thi Nai Lagoon**. The Thi Nai Lagoon defines the northern edge of the urban area. In addition to the indirect receipt of discharges from the other CCESP Phase 1 improvement areas, it will receive direct discharges from the improvements designated as Quy Nhơn Outlet 3.

Because of pollution levels in the recipient water bodies, new connections to the improved draining systems in all Quy Nhơn improvement areas will be provided for but not completed in Phase 1. Preliminary provisions will be made for connections to be made in Phase 2.

**2.1.3 Đồng Hới**. In Đồng Hới, CCESP Component 1, Phase 1 will improve rehabilitate and improve 22 kilometers of the existing drainage and undertake related actions in catchments discharging into two receiving water bodies:

- **Phong Thuy Channel**. The Phong Thuy Channel ([Figure 2-3]) is located to the north of the main urban area and will be the recipient of discharges from improvements made to the area designated as Outlet 1 and Outlet 6.
- **Nhat Le River**. The Nhat Le River defines the eastern edge of Đồng Hới. In addition to receiving the indirect discharges from the improvements designated as Outlets 1 and 6 via the Phong Thuy Channel, it will be the direct recipient of discharges from improvements designated as Outlets 2, 3, 4, 5, 7 and 9.

Because of pollution levels in the recipient bodies, new connections to the improved draining systems in all Đồng Hới improvement areas will be provided for but not completed in Phase 1. Preliminary provisions will be made for connections to be made in Phase 2.

**2.2 Component 2 - Wastewater Treatment Plants (WWTPs)**

No Component 2 activities will be undertaken in Phase 1. Where warranted, new WWTPs will be built during Phase 2 of CCESP to meet Vietnamese national effluent standards. Bio-solids from treatment plants will be disposed of in sanitary landfills after chemical stabilization or anaerobic digestion and drying. The potential for beneficial reuse will be considered during implementation.

**2.3 Component 3 - Solid Waste Management (SWM)**

Solid wastes collection will be improved and the waste will be transported to new or existing sanitary landfills for final disposal. Details will vary from city to city, but in all cities CCESP will finance SWM collection equipment and build transfer stations. The amount and phasing of the SWM equipment will follow demand over the life of the project and will take account of possible private sector participation (PSP) in solid waste collection activities. Specific actions in each city are planned as follows.
FIGURE 2-2: QUY NHON SUB-PROJECT

MAP BÀNG TỔNG THỂ CÁC HÀNG MỤC THỰC HIỆN TRONG GIAI ĐOẠN I - PLAN OF COMPONENTS IN PHASE I

GHI CHU-LEGEND:

- TÔN ĐỊNH CÔNG NGHIỆP HƯNG KIỆN THỰC HIỆN
- ĐỒ HỌA BỘ GIẢI ĐOẠN
- ĐỒ HỌA ĐỔI MỚI
- ĐỒ HỌA DỊCH "C"
- ĐỒ HỌA ĐỘ "A"
- ĐỒ HỌA CẢM TOÀN HƯỚNG HỘI ĐỒ THỰC HIỆN
- ĐỒ HỌA CẢM TOÀN HƯỚNG HỘI ĐỒ HƯỚNG HỘI ĐInforme Services
- THỰC HIỆN KỸ THUẬT THỰC HIỆN MÔ NHIỆM
- THỰC HIỆN KỸ THUẬT THỰC HIỆN MÔ NHIỆM

Summary Environment Assessment
FIGURE 2-3: DONG HOI SUB-PROJECT

**LEGEND:**
- **-** Rehabilitation/Excavation of Cầu Rào River
- **---** Rehabilitation/Excavation of Phong Thuy Channel
- **<>** Combined sewers to be rehabilitated

**REHABILITATION OF:**
- Phong Thuy Channel
- Cầu Rào River
2.3.1 **Nha Trang.** CCESP Phase 1 Component 3 investments in Nha Trang will acquire land for a new sanitary landfill site at Luong Hoa, located approximately 12 kilometers north of the city center in the vicinity of the existing Ru-Ri Dumpsite, close the existing dump site and provide funds for enhanced solid waste collection and equipment. The Luong Hoa site will be developed pursuant to Construction Investment Report prepared in November 2005. To minimize social and cultural impacts, the landfill will include a 300-meter buffer zone around the site and design of the landfill access road to minimize impacts to the Kim Son Pagoda located within the potential impact area. Details are provided in the following summary of proposed mitigation, Item 5.

2.3.2 **Quy Nhon.** Component 3 activities in Quy Nhon will be limited to renewal and improvement of equipment and facilities for solid waste collection, transportation, for repairs and maintenance works and the construction of two solid waste collection points. Based on current practices these are expected to be small facilities for complying wastes from push carts and low volume vehicles for transfer to larger vehicles for transport.

2.3.3 **Dong Hoi.** No Component 3 (Solid Waste Management) activities are proposed in Dong Hoi during Phase 1. It should be noted, however, that the EA investigations indicate that the on-going Dong Hoi Urban Development Project (HUDP) may not have adequate budget remaining to fund the proper closure of Loc Ninh dumpsite as previously expected.

2.4 **Component 4 - Resettlement**
It is anticipated that CCESP activities will necessitate resettlement in two of the Sub-Projects - Nha Trang and Quy Nhon, but not Dong Hoi. In accordance with the Bank’s policy on Involuntary Resettlement (OP/BP 4.12), the EAs for the Nha Trang and Quy Nhon Sub-projects are accompanied by a Resettlement Plans pursuant to OP/BP 4.12.

2.5 **Component 5 - Household and Public Sanitation Program**
Component 5 will provide access to credit to low income households to improve household sanitation facilities and to provide access to safe water and sanitation in public areas, especially in schools. CCESP will establish a household revolving fund and partner with the Women’s Union in each city to provide small loans in accordance with procedures presented in the agreed program manual. CCESP will fund water supply and sanitation facilities at city schools in response to demand from those schools. A limited number of public toilets will be constructed at strategic venues in each city. No Component 5 activities are addressed by the EAs for the CCESP Phase 1 Sub-Projects.

2.6 **Component 6 - Capacity Building and Project Implementation**
CCESP Component 6 will finance consulting services and goods/equipment for capacity building and project implementation. It will provide support to Project Management Units (PMUs), including project management, independent monitoring of World Bank Safeguard Policies and monitoring and evaluation (M&E) activities. It will also support capacity building activities including joint development of a flood management procedures with the Departments of Agriculture and Rural Development (DARDs) and City Planners, preparation and delivery of various public awareness campaigns, and related activities. No Component 6 activities are addressed by the EAs for the CCESP Phase 1 Sub-Projects.

2.7 **Scheduling**
Building on lessons learned from related projects, CCESP preparation and implementation will be phased. Phase 1 is scheduled to be occur mid-2007 to 2011 and Phase 2 will be implemented between early-2008 to 2013 (Figures 2-4 and 2-5). Approximately 60 to 70 percent of the total project investment costs will be made during Phase 2. Nearly 50 percent of the total budget will be absorbed by the Nha Trang Sub-Project, the largest and fastest growing of the three cities.
Figure 2-4: Summary Composition and “Base Cost” Budgets of CCESP Subproject Components Based on Pre-Feasibility Studies

Figure 2.5 Proposed CCESP Implementation Schedule and Key Safeguard Activities

3 PROJECT FRAMEWORK FOR ENVIRONMENTAL MANAGEMENT AND EA

3.2 Government of Vietnam Environmental Laws and Standards
At the national level, environmental management in Vietnam is lead by the Ministry for Natural Resources and Environment (MONRE). At the provincial level, the Department of Natural Resources and Environment (DONRE) is the legal body with responsibility for environmental management, monitoring and enforcement. Key national laws governing environmental management of concern that are directly related to the project include:

- National Law on Environmental Protection (December 27, 1993).
- Decree No. 175-CP (Oct. 18, 1994) on implementing the Law on Environmental Protection.
- Decree 143 / 2004 ND – CP dated July 12, 2004 on amendment of Decree 175 / CP.
- Decree No. 91/2002 (Nov. 11, 2002) on MONRE mandate, organization and functions.
- Decision No. 45/QD-TTg (April. 2, 2003) establishing the provincial DONRE.
- MONRE Decision No. 35 / 2002 / QD-BKHCNMT on standards for preparing an EA.
- Inter-Ministry Instruction requirements for environmental protection for solid waste disposal areas (No. 01 / 2001 / TTLT – BKHCNMT – BXD)
- Decision No. 155/1999/QD-TTg (July 16, 1999) on Hazardous Solid Waste Management; and
- MONRE Regulation TCVN 7222 – 2002 on General Environmental Requirements for Municipal Wastewater Treatment Plants (WWTs)

3.3 World Bank Safeguard Policies Addressed in the EA
The CCESP has been prepared and will be implemented in accordance with the Bank’s environmental safeguard policies. CCESP is classified by the Bank as a Category A type project due to the:
Coastal Cities Environmental Sanitation Project (CCESP)

- Proposed activities, including construction of new WWTPs and sanitary landfill facilities,
- Potentially sensitive sites, which include coastal urban areas bordered by rivers, bays, seasonal wetlands and shorelines increasingly popular for tourism and recreation,
- Potential for significant environmental impact if the proposed activities are not properly assessed, managed and monitored, including linkages and risks to other investment projects.

Based on a review of the Sub-project Areas and proposed activities, the World Bank identified the applicable environmental safeguard policies during the preparation process as follows:

- Environmental Assessment – Operational Procedure / Bank Procedure 4.01 (OP/BP 4.01)
- Natural Habitats (OP 4.04)
- Cultural Resources (draft OP 4.11 – OPN 11.03)

The safeguard policies are addressed herein. As noted above, however, although the involuntary resettlement aspects of the Project are described herein at the level of specificity appropriate to an EA, they are addressed in greater detail by the Project’s Resettlement Policy Framework and Sub-Project Resettlement Plans.

3.4 Stakeholder Consultation

As a Category A project, at least two stages of consultations must be conducted and documented in accordance with the Bank’s Operational Procedure (OP) 4.01. The first stage consultations were conducted during the September / October 2005 collection of environmental and socio-economic data, involving surveys of over 1,600 households living in sub-project affected areas. Second stage stakeholder consultations focused on the findings of the draft EA were conducted in each Sub-Project city in late December 2005 / early January 2006 involving a total of 96 recorded participants. The second stage consultations were supplemented by written questionnaire surveys conducted for Project Affected People (PAPs) near the proposed discharge outlets in each city. Documentation of these consultations is provided in Annex of each Sub-Project EA.

Public Disclosure: As a Category 'A' project, completed EAs must be available made to the public in accordance with BP 17.50. All drafts of the EAs, Resettlement Policy Framework (RPF) and Resettlement Action Plans (RAPs) were disclosed in Washington DC and the Vietnam Development Information Center (VIDC) in Hanoi by January 19, 2006. The Vietnamese translations of Executive Summaries were disclosed by January 13, 2006. All documents were disclosed locally by the Provincial People’s Committee (PPC), the provincial Department of Natural Resources and Environment (DONRE), the Project Preparation Units (PPUs), offices of the Wards in which people will be affected by the project, and were accessible in a form, manner, and language intelligible to local non-government organizations (NGOs) and project affected people (PAPs).

4 BASELINE CONDITIONS

4.1 Summary of Baseline Conditions

The three CCESP Sub-Project cities share many similarities, including key project-related baseline conditions which are detailed in each Sub-Project EA, including the following:

- Each city serves as the capitol city of its province. Each supports a larger hinterland area and visitor populations which exceed the size of the resident population on an annual basis. A summary of their populations, growth rates and economic structures is provided in Tables 4-1 and 4-2.

- The cities have similar environmental sanitation systems consisting of combined sewers that are generally in poor condition or blocked by sediments and debris. Solid waste collection rates average about 70 percent of the generated volumes and existing dumpsites lack basic environmental and public health protective measures, particularly for treatment of leachate and landfill gases as well as proper handling of industrial, hazardous and/or medical wastes.

- Flooding due to poor drainage systems, solid and liquid waste management and related environmental sanitation issues are the major concerns of stakeholders surveyed in each city. These concerns were directly related to the respondents to the concerns for public health, livelihood and general well-being.

- While monitored water quality and other environmental quality levels are generally within acceptable levels in each city, the recorded levels of coliform above nationally and internationally acceptable safe levels highlight the common concerns for improved environmental sanitation, particularly from the
Coastal Cities Environmental Sanitation Project (CCESP)

perspective of sustained tourism.

• The cities share similar climates, with a pronounced rainy season between November-January followed by a prolonged dry season from February-September, resulting in significant fluctuations in river water flows, water quality and dilution capacity. In addition to seasonal variations, most rivers and lakes in these low-laying coastal cities are tidally influenced, which directly affects local drainage, water quality and discharge volumes.

• Each is built over well-drained sandy soils, so most septic tanks directly discharge their effluents, which infiltrate into the shallow water table.

• Institutional capacities of the Project Management Units (PMUs), DONRE and urban environment companies (URENCO) responsible for improving environmental sanitation are in need of strengthening under the project to ensure proper environmental management and monitoring measures are applied and to sustain the expected benefits of the proposed investments.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nha Trang</td>
<td>374,000</td>
<td>275,000</td>
<td>73</td>
<td>1.34</td>
<td>4.97</td>
</tr>
<tr>
<td>Quy Nhon</td>
<td>252,000</td>
<td>231,000</td>
<td>92</td>
<td>1.00</td>
<td>4.03</td>
</tr>
<tr>
<td>Dong Hoi</td>
<td>98,000</td>
<td>58,000</td>
<td>60</td>
<td>1.54</td>
<td>3.83</td>
</tr>
</tbody>
</table>

Details of the relevant baseline conditions in the three Sub-Project Areas are as follows.

4.2 Nha Trang Existing Conditions

Physical Environment. Nha Trang is located in a generally flat coastal area punctuated by abrupt mountainous land forms. Soils are generally sandy. The mountainous outcroppings are steeper, rocky terrain with sandy-rocky soil overlaying clay and bedrock. Soils in the low-lying are largely clays. Air quality is generally reported as meeting national standards. The most significant aspects of its physical environment for the purposes of CCESP Phase 1 are characteristics of the recipient water bodies for CCESP Component 1. They are as follows.

• The 1-7-kilometer Open Channel Connecting Outlet 1 and the Cai River. Although it is a relatively minor waterway within the overall hydrologic regime, the open channel connecting Outlet 1 and the Cai River is important to assessing the impacts of the Project. Before discharging into the Cai River, passes through a low-lying wetland with a one-square kilometer area in the center used for rice farming and fishing. The channel also receives wastewater from two nearby seafood processing factories. The end of the channel is blocked at high tides by a salt water intrusion prevention dam which also blocks discharge when closed (in high tides). Available baseline water quality data is indicated by Table 4-3 for the locations indicated by Figure 4-1. Pollutant levels higher than Vietnamese National Standards (TCVN 542: 1995), Water Quality B are indicated in bold. The data indicates very high levels of COD, BOD and coliform.

<table>
<thead>
<tr>
<th>Sub-Project City</th>
<th>Agriculture, Forestry, Aquaculture</th>
<th>Industry, Capital Construction</th>
<th>Services</th>
<th>Monthly per Capita GDP (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nha Trang</td>
<td>19.4</td>
<td>41.0</td>
<td>39.6</td>
<td>164.0</td>
</tr>
<tr>
<td>Quy Nhon</td>
<td>39.7</td>
<td>26.2</td>
<td>34.1</td>
<td>80.0</td>
</tr>
<tr>
<td>Dong Hoi</td>
<td>32.5</td>
<td>29.3</td>
<td>37.6</td>
<td>69.6</td>
</tr>
</tbody>
</table>

Cai River. The Cai River is a major water body and will receive outfall from both Outlets 1 and Outlet 4 and a total watershed of approximately 1,900 square kilometres. Water flow is strongly influenced by local rainfall upstream and varies widely between the flood and dry seasons. Its average annual flow is
reporting approximately 57 m³/s, corresponding to an estimated flow module of 46 l/s/km² and total flow of nearly two billion m³/year. It reverses flow during high tides and become saline to brackish in water quality. Local flooding is significantly increased when heavy rains occur during high tide periods.

Available baseline water quality data of the greatest relevance for the purposes of CCESP Phase 1 is in water quality. Local flooding is significantly increased when heavy rains occur during high tide periods. Wastewater from Outlet 1 meets the standards for all criteria pollutants with the exceptions of suspended solids in two of six readings and coliform in all (two) readings. Wastewater from Outlet 4) exceed the standard for COD in one of two readings ammonia for one of two readings and coliform in one of three readings. Pollutant levels at the mouth of the river (downstream of discharges from Outlet 4) exceed the standard for COD in two readings and ammonia for one of two readings and coliform in all (two) readings.

### Table 4-4: Baseline Water Quality - Cai River

<table>
<thead>
<tr>
<th>Sampling Site</th>
<th>Date</th>
<th>( \text{BOD}_5 ) mg/l</th>
<th>COD mg/l</th>
<th>DO mg/l</th>
<th>SS mg/l</th>
<th>( \text{NH}_3 ) mg/l</th>
<th>( \text{NH}_4 ) mg/l</th>
<th>( \text{NH}_2 ) mg/l</th>
<th>Coliform MPN/100ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cai River at Railroad Sat Bridge</td>
<td>12 Dec 05</td>
<td>6.0</td>
<td>8.0</td>
<td>8.7</td>
<td>179.0</td>
<td>0.56</td>
<td>1.51</td>
<td>0.12</td>
<td>11.0 x ( 10^3 )</td>
</tr>
<tr>
<td></td>
<td>28 Dec 06</td>
<td>3.0</td>
<td>4.0</td>
<td>6.7</td>
<td>132.0</td>
<td>0.37</td>
<td>&lt;0.01</td>
<td>0.04</td>
<td>46.0 x ( 10^2 )</td>
</tr>
<tr>
<td></td>
<td>11 Jan 06</td>
<td>6.0</td>
<td>12.0</td>
<td>7.5</td>
<td>39.0</td>
<td>0.12</td>
<td>0.12</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 Jan 06</td>
<td>3.0</td>
<td>10.0</td>
<td>7.0</td>
<td>51.0</td>
<td>&lt;0.01</td>
<td>0.04</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>23 Jan 06</td>
<td>4.0</td>
<td>15.0</td>
<td>7.0</td>
<td>39.0</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Feb 06</td>
<td>3.0</td>
<td>15.0</td>
<td>8.5</td>
<td>45.0</td>
<td>0.30</td>
<td>0.40</td>
<td>&lt;0.01</td>
<td>2.4 x ( 10^4 )</td>
</tr>
<tr>
<td>Mouth of Cai River (Outlet 4)</td>
<td>12 Dec 05</td>
<td>8.0</td>
<td>9.8</td>
<td>7.5</td>
<td>68.0</td>
<td>0.31</td>
<td>7.95</td>
<td>2.19</td>
<td>14.0 x ( 10^4 )</td>
</tr>
<tr>
<td></td>
<td>6 Feb 06</td>
<td>8.0</td>
<td>69.0</td>
<td>4.5</td>
<td>69.0</td>
<td>3.01</td>
<td>0.55</td>
<td>0.62</td>
<td>9.1 x ( 10^5 )</td>
</tr>
</tbody>
</table>

**Table 4-5: Baseline Water Quality - Dong Bo River**

<table>
<thead>
<tr>
<th>Sampling Site</th>
<th>Date</th>
<th>( \text{BOD}_5 ) mg/l</th>
<th>COD mg/l</th>
<th>DO mg/l</th>
<th>SS mg/l</th>
<th>( \text{NH}_3 ) mg/l</th>
<th>( \text{NH}_4 ) mg/l</th>
<th>( \text{NH}_2 ) mg/l</th>
<th>Coliform MPN/100ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dong Bo River near</td>
<td>13 Dec 05</td>
<td>6.0</td>
<td>20.0</td>
<td>9.3</td>
<td>94.0</td>
<td>1.26</td>
<td>0.65</td>
<td>0.28</td>
<td>14.0 x ( 10^3 )</td>
</tr>
<tr>
<td>Binh Tan Bridge</td>
<td>28 Dec 05</td>
<td>3.0</td>
<td>30.0</td>
<td>6.1</td>
<td>107.0</td>
<td>0.15</td>
<td>&lt;0.01</td>
<td>0.16</td>
<td>7.5 x ( 10^3 )</td>
</tr>
<tr>
<td>(Outlet 3)</td>
<td>11 Jan 06</td>
<td>6.0</td>
<td>35.0</td>
<td>7.2</td>
<td>145.0</td>
<td>0.16</td>
<td>&lt;0.01</td>
<td>0.23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 Jan 06</td>
<td>3.0</td>
<td>28.0</td>
<td>7.5</td>
<td>232.0</td>
<td>&lt;0.01</td>
<td>0.19</td>
<td>&lt;0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>23 Jan 06</td>
<td>5.0</td>
<td>45.0</td>
<td>6.8</td>
<td>260.0</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Feb 06</td>
<td>4.0</td>
<td>42.0</td>
<td>5.4</td>
<td>99.0</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
<td>4.6 x ( 10^4 )</td>
</tr>
</tbody>
</table>

- **Quan Truong River:** The Quan Truong River lies to the west of the main urban area and receives wastewater from Outlet 3. It is connected to both the Cai River (discussed above) and Dong Bo River (discussed below). Its major flow in the rainy season is to the south where it joins the Tac River to form the Dong Bo. Water flow in the Quan Truong is low to stagnant in the dry season. Available data indicates the outfall characteristics of wastewater from Outlet 3 under current conditions. Given that the Quan Truong is reported to have no water flow in the dry season, these characteristics are assumed to be representative of the river when there is no flow to dilute it. The available data indicates that water quality is within the BOD standards but far in excess of coliform standards.

- **Dong Bo River:** The Dong Bo River lies to the south of the city and is the waterway east of the confluence of the Tac River and Quan Truong River. Floods regularly occur along both banks. It reverses flow during high tides and become saline to brackish in water quality. Local flooding is significantly increased when heavy rains occur during high tide periods. Wastewater from Outlet 3 will eventually flow to the Dong Bo. Baseline monitoring data for the Dong Bo at a point near the Binh Tan Bridge indicates that pollutant levels exceed the standard for COD in three of six readings, suspended sediment in all six readings, ammonia in one of six readings (perhaps an anomaly given the very low values of the other readings) and coliform in one of three readings.
FIGURE 4-1: Baseline Monitoring Locations in Nha Trang

PROJECT LOCATION MAP WITH WATER AND SEDIMENT QUALITY TESTING SITES

Legend:
- ● Locations to be dredged in Phase 1
- ○ Locations of proposed Luong Hoo Landfill
- ▲ Locations of CORP water quality samples
- ■ Locations of CORP sediment quality samples
- ▼ Canal along Railway
- □ Water outlet
- ▼ Location of CORP water quality monitoring station
- ▲ Location of CORP sediment quality monitoring station
- ▼ OUTLET

Summary Environment Assessment
FIGURE 4-2: Baseline Monitoring Locations in Quy Nhon

PROJECT LOCATION MAP WITH WATER AND SEDIMENT QUALITY TESTING SITES
FIGURE 4-3: Baseline Monitoring Locations in Dong Hoi
Coastal Cities Environmental Sanitation Project (CCESP)

- **The South China Sea.** The South China Sea defines the eastern edge of the Study Area. It will eventually receive the outfall from all catchment areas. Under current conditions, muddy discharges of the Cai River create an expansive plume along the main beach of Nha Trang city. During the rainy season, monitoring data indicates that surface water at the outlet along Da Tuong Street (south of the airport) is organic and ammonia contaminated due to upstream sources.

**Biological Environment.** The potentially affected portions of Nha Trang are generally urban and have very limited natural flora. Non-urban lands of the Nha Trang Sub-project Area are widely used for farming, dominated by paddy rice. Steeper slopes are planted with cashews and coconuts. No undisturbed native vegetation or natural habitats is known to remain in the general area. The nearby coastal areas largely consist of sandy to muddy beaches and offshore slopes. The nearest protected area, the World Bank-assisted Hon Mun Marine Park, is located 10-15 km offshore.

**Socio-Economic Environment.** Nha Trang is the southernmost city participating in CCESP and is the capital of Khanh Hoa Province. The province had a 2002 population of 350,000 and an urban population of 270,000. It benefits from a diversified economy with an increasing trend towards an industry and service based economy, largely centered in Nha Trang. As of 2004, slightly less than 20 percent of its employment was attributed to agriculture, with the remaining 80 percent roughly split between the Industry/Capital Construction and the Services sectors. Within the province, particularly in Nha Trang City, tourism is of increasing economic importance. As has occurred elsewhere in tourism booms, it may also be an increasing source of pollution. Recently constructed high-end hotels, however, have reportedly included more complete on-site wastewater treatment facilities. CCESP Phase 1 will directly affect three wards in Nha Trang: Vinh Phuoc, Phuong Sai and, Phuoc Tan. The percentages classified as poor in the three affected wards are reported to be ten, 22 and 44 percent, respectively. The socio-economic characteristics of greatest relevance to CCESP Component 1, Phase 1 activities are those related to:

- **Access to Sanitary Services.** In spite of relatively high poverty rates in some areas, most households surveyed in all three wards (95-100 percent) across all income have a piped water supply and most (90-100) rely on septic tanks for wastewater treatment. Reports indicate, however, that most of the septic tanks are either not designed properly, not functioning adequately or both and that approximately 87 percent of the wastewater penetrates to the surrounding soil. Responses by 481 respondents to the socio-economic survey conducted as part of the EA ranked lack of sewage and drainage system as the most serious environmental issue. The second most serious issue was flooding.

- **Solid Waste Issues.** Reported characteristics of collected solid waste (about 50 percent of which is organic materials) indicate a good potential for waste reduction by common and cost-effective segregation and minimization practices. Solid waste is currently disposed of at the unimproved three-hectare Ru-Ri dumpsite located next to a cemetery and a seasonal stream about 14 km north of the city center. There are no controls on the types of waste dumped and wastes are not buried. The access road is unimproved and there are serious air quality and dust problems. The Ru-Ri dumpsite is reportedly already filled to capacity and no longer actively used for disposal. Leachate openly flows into the neighboring stream, making its water dark-black.

- **Public Health Issues.** Illnesses related to poor environmental sanitation conditions, such as diarrhea and dysentery, are common concerns. In the socio-economic survey, 32 percent of all respondents reported that a member of their household had been sick during the previous month from such an illness related to environment sanitation. To improve sanitation, 87 percent of survey respondents stated that they think it is necessary to connect to the proposed new combined sewers.

**Table 4-6: Socio-Economic Classification of Households in Nha Trang**

<table>
<thead>
<tr>
<th>Ward</th>
<th>Rich</th>
<th>Well-off</th>
<th>Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vinh Phuoc Ward</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income / person / month</td>
<td>&gt;1 million</td>
<td>600,000-1 million</td>
<td>350,000-600,000</td>
<td>&lt;350,000</td>
</tr>
<tr>
<td>% of household</td>
<td>12</td>
<td>22</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>% of HH with piped water supply</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>95</td>
</tr>
<tr>
<td>% of HH with septic tank</td>
<td>100</td>
<td>100</td>
<td>97</td>
<td>95</td>
</tr>
<tr>
<td>2. Phuong Sai Ward</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income / person / month</td>
<td>&gt;10 million</td>
<td>5-10 million</td>
<td>1-5 million</td>
<td>&lt;1 million</td>
</tr>
<tr>
<td>% of household</td>
<td>8</td>
<td>18</td>
<td>52</td>
<td>22</td>
</tr>
<tr>
<td>% of HH piped water supply</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>% of HH with septic tank</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>3. Phuoc Tan Ward</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income / person / month</td>
<td>&gt;2 million</td>
<td>1-2 million</td>
<td>450,000-1 million</td>
<td>&lt;450,000</td>
</tr>
</tbody>
</table>

Summary Environment Assessment
Coastal Cities Environmental Sanitation Project (CCESP)

<table>
<thead>
<tr>
<th>% of household</th>
<th>Rich</th>
<th>Well-off</th>
<th>Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>15</td>
<td>34</td>
<td>44</td>
</tr>
<tr>
<td>% of HH piped water supply</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>% of HH with septic tank</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

### 4.3 Quy Nhon Existing Conditions

#### Physical Environment

Quy Nhon is located in an area with diverse topography, including coastal mountains, hills, peninsula and low lands, which includes a number of marsh and lake areas, rivers and offshore islands. It is divided into two areas: the former city (old city), with many low lying areas subject to flooding, and the new expansion area of Phuong Mai peninsula, a stable sand bank 18 km in length which is not subject to flooding. The predominant soil type is sand, with increasing presence of clay soil along river courses and from marine deposits. Organic soil deposits are common near the Ba Hoa and Vung Chua mountains. In general, air quality is good with the exception of ambient air environment at Long My landfill has been polluted by toxic gases. The most significant aspects of its physical environment for the purposes of CCESP Phase 1 are characteristics of the recipient water bodies for CCESP Component 1. They are as follows.

- **Phu Hoa Lake.** Available water quality data for Phu Hoa Lake is provided by Table 4-7. The data indicates excessive pollutant levels for BOD, ammonia and coliform.

#### Table 4-7: CCESP Water Quality Sampling Results: Phu Hoa Lake

<table>
<thead>
<tr>
<th>Sampling Site</th>
<th>Date</th>
<th>BOD₅ mg/l</th>
<th>COD Mg/l</th>
<th>DO mg/l</th>
<th>SS mg/l</th>
<th>NH₃ mg/l</th>
<th>NH₄ mg/l</th>
<th>NH₂ mg/l</th>
<th>Coliform MPN/100ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet 1 (T5)</td>
<td>17 Dec. 2006</td>
<td>3.6</td>
<td>4.65</td>
<td>3.89</td>
<td>19.0</td>
<td>2.42</td>
<td>3.2</td>
<td>0.179</td>
<td>9.3 x 10⁵</td>
</tr>
<tr>
<td>Table 1-4.3</td>
<td>Estimate</td>
<td>30</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>50 x 10³</td>
</tr>
</tbody>
</table>

**National Standards (TCVN 5945: 1995)**

- Water quality "A" - recreational use / swimming: <4.0 < 20.0 6.0 20.0 0.05 NA NA 5.0 x 10³
- Water quality "B" - agricultural use: <25.0 < 35.0 2.0 80.0 1.00 NA NA 10.0 x 10³

- **Ha Thanh River.** The Ha Thanh River is located to the northwest of the main urban area and will received direct discharges from the improvements designated as Quy Nhon Outlet 2.

#### Table 4-8: CCESP Water Quality Sampling Results: Ha Thanh River

<table>
<thead>
<tr>
<th>Sampling Site</th>
<th>Date</th>
<th>BOD₅ mg/l</th>
<th>COD Mg/l</th>
<th>DO mg/l</th>
<th>SS mg/l</th>
<th>NH₃ mg/l</th>
<th>NH₄ mg/l</th>
<th>NH₂ mg/l</th>
<th>Coliform MPN/100ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet 2 (T2)</td>
<td>Dec. 17, 2006</td>
<td>1.3</td>
<td>1.63</td>
<td>4.79</td>
<td>33.0</td>
<td>0.82</td>
<td>-</td>
<td>0.008</td>
<td>2.4 x 10⁴</td>
</tr>
<tr>
<td>Ha Thanh River</td>
<td>Dec. 27, 2005</td>
<td>0.54</td>
<td>2.2</td>
<td>3.7</td>
<td>127.0</td>
<td>1.33</td>
<td>0.7</td>
<td>0.016</td>
<td>2.4 x 10⁴</td>
</tr>
<tr>
<td>Downstream of Phu Hoa Lake</td>
<td>Jan. 24, 2006</td>
<td>2.7</td>
<td>6.0</td>
<td>5.62</td>
<td>27.0</td>
<td>4.66</td>
<td>0.8</td>
<td>0.007</td>
<td>4.3 x 10³</td>
</tr>
<tr>
<td>Feb. 6, 2006</td>
<td>2.2</td>
<td>4.8</td>
<td>4.78</td>
<td>13.0</td>
<td>4.32</td>
<td>1.1</td>
<td>0.002</td>
<td>2.4 x 10³</td>
<td></td>
</tr>
<tr>
<td>Baseline per Table ES 5</td>
<td>Estimate</td>
<td>10</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>24 x 10³</td>
<td></td>
</tr>
</tbody>
</table>

**National Standards (TCVN 5945: 1995)**

- Water quality "A" - recreational use / swimming: <4.0 < 20.0 6.0 20.0 0.05 NA NA 5.0 x 10³
- Water quality "B" - agricultural use: <25.0 < 35.0 2.0 80.0 1.00 NA NA 10.0 x 10³

- **Thi Nai Lagoon.** The Thi Nai Lagoon defines the northern edge of the urban area. In addition to the indirect receipt of discharges from the other CCESP Phase 1 improvement areas, it will receive direct discharges from the improvements designated as Quy Nhon Outlet 3. The available monitoring data (Table 4-9) indicates coliform levels above national standards.

#### Table 4-9: CCESP Water Quality Sampling Results: Thi Nai Lagoon

<table>
<thead>
<tr>
<th>Sampling Site</th>
<th>Date</th>
<th>BOD₅ mg/l</th>
<th>COD Mg/l</th>
<th>DO mg/l</th>
<th>SS mg/l</th>
<th>NH₃ mg/l</th>
<th>NH₄ mg/l</th>
<th>NH₂ mg/l</th>
<th>Coliform MPN/100ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outlet 3 (T4)</td>
<td>Dec. 17, 2006</td>
<td>3.5</td>
<td>4.68</td>
<td>4.76</td>
<td>26.0</td>
<td>1.31</td>
<td>-</td>
<td>0.144</td>
<td>4.3 x 10⁴</td>
</tr>
<tr>
<td>Thi Nai Lagoon</td>
<td>Estimate</td>
<td>0.027</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.02</td>
</tr>
</tbody>
</table>

**National Standards (TCVN 5945: 1995)**

- Water quality "A" - recreational use / swimming: <4.0 < 20.0 6.0 20.0 0.05 NA NA 5.0 x 10³
- Water quality "B" - agricultural use: <25.0 < 35.0 2.0 80.0 1.00 NA NA 10.0 x 10³

#### Biological Environment

The Quy Nhon Sub-project Area has very limited undisturbed natural flora, fauna
and habitats. Suburban areas are used for farming, dominated by paddy rice. The most common vegetation in unfarmed areas is brush and plantation of gum trees (Eucalyptus). The area is dotted with five small lakes and numerous low-lying marshy areas which have been widely developed for agricultural use. Remnant, secondary growth forests remain along some slopes of the Ba Mountain, in Phu Cat district, but these are considerable distance from the City proper. The Phuong Mai peninsula offers extensive open areas of sparsely vegetated sand dunes and banks. The nearby coastal areas largely consist of sandy beaches and offshore slopes. Coral reefs are not common in the area. Off shore, the Quy Nhon Swamp, a part of the Thi Nai Lagoon system, is listed by the World Conservation Monitoring Centre (WCMC) as a sensitive wetland area. There are several small islands with mangrove forest in the northern part of the swamp. One hundred and thirty-six species of flowering plants and algae have been recorded at the swamp, along with numerous species of phytoplankton including 50 species of Rhodophyta (red algae). The red algae Gracilaria verrucosa is particularly abundant is widely cultivated in the swamp for dried use and export as an emulsifier (agar). Shrimp are also widely cultivated in the swamp.

Socio-Economic Environment. The socio-economic characteristics of greatest relevance to CCESP Component 1, Phase 1 activities are those related to:

- **Access to Sanitary Services**. Access to sanitary services in the affected wards is indicated by Table 4-10. Most of the population has the use of septic tanks, but less so among the poor households.

<table>
<thead>
<tr>
<th>Table 4-10: Socio-Economic Classification of Households in Quy Nhon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ward</strong></td>
</tr>
<tr>
<td>Income/person/month</td>
</tr>
<tr>
<td>Thi Nai Ward</td>
</tr>
<tr>
<td>Hai Cang Ward</td>
</tr>
<tr>
<td>Le Hong Phong Ward</td>
</tr>
<tr>
<td>Quang Trung Ward</td>
</tr>
</tbody>
</table>

- **Solid Waste Issues**. The reported characteristics of collected solid waste in Quy Nhon indicate a good potential to reduce the volume of such wastes by common and cost-effective segregation and minimization practices. 80 percent of survey respondents indicated that they do not currently segregate their solid wastes because they do not know how to segregate (66 percent). Collected wastes are generally transported by push carts and low volume vehicles for transfer to larger vehicles to transport to the dump site. It has been observed that collected wastes are often simply piled uncovered in an open area, creating unsanitary conditions. The existing landfill is still adequate and is operated correctly and no improvements are proposed under Phase 1.

- **Public Health Issues**. Cases recorded by the Binh Dinh Department of Health indicate that Commonly reported illnesses such as diarrhea and dysentery in Quy Nhon are largely related to environmental sanitation conditions.

4.4 Dong Hoi Existing Conditions

**Physical Environment.** Dong Hoi has a complex topography, consisting of steep hilly terrain surrounding flood plains and coastal sand dunes. East of the Nhat Le River, the Bao Ninh peninsula consists of steeply
sloping sand with an average ground elevation of 10 meters. West of the Nhat Le River, the topography is more varied. Most soils in the urban center are sandy. Current air quality in the city's urban environment generally meets national standards while water suffers increasing levels of coliform bacteria.

**Biological Environment.** Quang Binh, the province in which Dong Hoi is located, is within the biological zone with a high level of biodiversity and endemic species, particularly in the Phong Nha - Ke Bang National Park, a UNESCO World Heritage Site located 30-50 km inland from Dong Hoi and extending to the Laos border. The actual Sub-Project areas have very limited natural flora and fauna due to the level of urban development. Non-urban lands of the Sub-Project area are widely used for farming, dominated by paddy rice. No undisturbed native vegetation or natural habitats remains in the general area. The nearby coastal areas largely consist of sandy to muddy beaches and offshore slopes.

**Socio-Economic Environment.** According to 300 respondents to the socio-economic survey conducted as part of the EA, the most serious environmental issue in their area was the lack of sewage and drainage system and the second most serious issue was flooding. Illnesses related to poor environmental sanitation conditions, such as diarrhea and dysentery, are common and apparently increasing in frequency. In the household survey, 60 percent of respondents reported that household members had been sick during the previous month from an environment-related illness.

- **Access to Sanitary Services.** Access to sanitary services in the affected wards is indicated by Table 4-11. All (100 percent) of all respondents report the use of septic tanks. The responses indicate that access to piped water supply and the use of septic tanks varies greatly between the potentially affected wards and between income groups in some (but not all) of the wards.

<table>
<thead>
<tr>
<th>Wards</th>
<th>Rich</th>
<th>Well-off</th>
<th>Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dong My Ward</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly income / person</td>
<td>&gt; 2 million</td>
<td>1 – 2 million</td>
<td>700,000–1,000,000</td>
<td>&lt; 700,000</td>
</tr>
<tr>
<td>% of households</td>
<td>12% = 65HHs</td>
<td>18% = 117 HHs</td>
<td>49% = 318 HHs</td>
<td>23% = 149 HHs</td>
</tr>
<tr>
<td>% of HHs with piped water</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>% of HHs with septic tank</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2. Bac Ly Ward</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly income / person</td>
<td>&gt; 1.5 million</td>
<td>700,000–1,500,000</td>
<td>400,000–700,000</td>
<td>&lt; 400,000</td>
</tr>
<tr>
<td>% of households</td>
<td>9% = 267 HHs</td>
<td>34% = 1007 HHs</td>
<td>47% = 1244 HHs</td>
<td>14% = 415 HHs</td>
</tr>
<tr>
<td>% of HHs with piped water</td>
<td>100</td>
<td>45% using tap water, 10% use dug wells, 45% use drilled wells</td>
<td>30% using tap-water, 50% use dug wells, 20% use drilled wells</td>
<td>0%</td>
</tr>
<tr>
<td>% of HHs with septic tank</td>
<td>100</td>
<td>75%</td>
<td>45%</td>
<td>No septic tanks.</td>
</tr>
<tr>
<td>3. Hai Dinh Ward</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly income / person</td>
<td>&gt; 2 million</td>
<td>1 – 2 million</td>
<td>500,000–1,000,000</td>
<td>&lt; 500,000</td>
</tr>
<tr>
<td>% of households</td>
<td>18% = 150 HHs</td>
<td>30% = 250 HHs</td>
<td>43% = 358 HHs</td>
<td>9% = 75 HHs</td>
</tr>
<tr>
<td>% of HHs with Piped Water</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>% of HHs with septic tank</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>4. Dong Phu Ward:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly income / person</td>
<td>&gt; 2 million</td>
<td>1 – 2 million</td>
<td>400,000–1,000,000</td>
<td>&lt; 400,000</td>
</tr>
<tr>
<td>% of households</td>
<td>20% = 386 HHs</td>
<td>26% = 501 HHs</td>
<td>44% = 849 HHs</td>
<td>10% = 193 HHs</td>
</tr>
<tr>
<td>% of HHs with Piped Water</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>% of HHs with septic tank</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

- **Solid Waste Issues.** The Loc Ninh dumpsite is located about eight km from the City center and has been listed by the government as being in serious violation of environmental regulations and is planned to be closed. This dumpsite covers 13 ha and has been operational since 1995. Deposited wastes are not levelled or well covered. Generated leachate is not properly collected and treated. As a result, the leachate flows directly to nearby surface and ground waters, polluting these water sources. Groundwater from a tested well showed a serious level of pollution that is attributed to these uncontrolled and untreated leachate discharges. Based on the results of a Due Diligence Review conducted as part of the EA process, it appears likely that the on-going Dong Hoi Urban Development Project (DUDP) will not have adequate budget remaining to fund the proper closure of Loc Ninh dumpsite contrary to previous expectations.

- **Public Health Issues.** Survey results indicate that the number of people who reported that they got sick within the preceding month in Dong Hoi was related to their reported income levels. Percent of surveyed households who reported that a family member was sick during the previous month:
Coastal Cities Environmental Sanitation Project (CCESP)

- Poor households: 99 cases of reported illness in the preceding month (33% of surveyed HHs)
- Average income households: 72 cases of reported illness in the preceding month (24%)
- Better-off income households: 7 case of reported illness in the preceding month (2.3%)
- Rich households: 1 case of reported illness in the preceding month (0.3%).

5 POTENTIAL IMPACTS AND MITIGATION

5.2 Summary of Predicted Phase 1 Environmental Impacts

The proposed Phase 1 Sub-Project component activities assessed in the EA process are summarized in Table 5-1.

Table 5-1: Summary of Phase 1 Sub-Project Activities with Potential Environmental Impacts

<table>
<thead>
<tr>
<th>Component 1: Drainage, Flood Control and Wastewater Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehabilitation existing drainage and sewer systems</td>
</tr>
<tr>
<td>New main sewers</td>
</tr>
<tr>
<td>New tertiary and branch lines</td>
</tr>
<tr>
<td>New discharge outlets</td>
</tr>
<tr>
<td>New pumping stations</td>
</tr>
<tr>
<td>New force main pipe lines</td>
</tr>
<tr>
<td>New combined sewer overflows</td>
</tr>
<tr>
<td>Dredge and excavate sludge, reservoir lake and channels</td>
</tr>
<tr>
<td>Street surface repairs after pipeline excavations</td>
</tr>
<tr>
<td>Drainage / sewerage management equipment</td>
</tr>
</tbody>
</table>

| Component 2: Wastewater Treatment Plants (WWTPs): No proposed activities in Phase 1 |

<table>
<thead>
<tr>
<th>Component 3: Solid Waste Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste collection vehicles and equipment</td>
</tr>
<tr>
<td>Solid waste transfer stations</td>
</tr>
<tr>
<td>Public toilets</td>
</tr>
<tr>
<td>Closure of Ru - Ri dumpsite</td>
</tr>
<tr>
<td>Develop new Luong Hoa landfill site, including operational equipment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component 4: Resettlement Site Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development of 5-hectare resettlement site in Dat Lanh Ward</td>
</tr>
<tr>
<td>Development of 5-hectare resettlement site in Nhon Binh Ward</td>
</tr>
</tbody>
</table>

The Sub-Projects are expected to have significant positive benefits for the environment, public health and the tourism-based economy due to reduced frequency and level of flooding in the urban centers, improved collection and handling of liquid and solid wastes, and supportive improvements in sanitation service and capacity. From an assessment of proposed Phase 1 Sub-Project Components, baseline conditions and consultations, supported by the experienced gained from similar types of World Bank-funded projects in Vietnam, the following key sources of potentially adverse environmental impacts were identified.

5.3 Component 1: Flood Control, Drainage and Wastewater Collection

5.2.1 Excavation of Soils

Potential Impacts. In addition to the removal of deposited sludge (discussed below), the estimated volume of material to be excavated during the pipeline works for the three Sub-Projects totals 124,500 m³. The excavated soil materials will consist primarily of sand (the most common soil type in the area) and will be re-used on-site for back-filling of the pipeline trenches once installation is completed. The estimated construction period along each street is in the range of one to two weeks. During this period stockpiles of excavated materials may cause dust (if excavations are conducted during the dry season as recommended) and traffic problems if the excavations are not properly managed. If excavations are made during the November-January rainy season, additional impacts will include increased flooding, soil erosion into drains and adjacent streets, and unsanitary stagnant water filling open trenches.

Mitigation/Monitoring Recommendation. It is anticipated that most excavated soil will be re-used on-site for back-filling of the pipeline trenches once installation is completed. Measures to mitigate impacts due to excavation of soils include the scheduling of the work during the dry season and proper stockpiling practices as detailed by recommended standard operating procedures (SOPs). The EAs and SOPs provide an assessments and mitigation measures for the following common types of construction impacts:

- Dust and air pollution from excavations, levelling and construction vehicles
- Noise and vibration of transport vehicles and other construction equipment.

Summary Environment Assessment
Coastal Cities Environmental Sanitation Project (CCESP)

- Domestic wastes generated during construction
- Leakage of residual grease and oil
- Impacts to traffic.

Site-Specific Mitigation Actions. None warranted other than ensuring that the recommended project-wide mitigation actions are implemented.

5.2.2 Dredging Activities and Sediment Transport and Disposal

Potential Impacts. An estimated 13,000 m$^3$ of deposited sludge and solid wastes in the old pipelines will be transferred to existing landfills for disposal. A total of some 250,000 m$^3$ of silt and organic sediments will be dredged from clogged urban drainage systems which include canals, rivers and lakes. The material to be dredged was tested and determined to be predominantly inorganic. No toxic or potentially toxic material was found in any of the samples in the three Sub-Project Areas. No special treatment handling or disposal is required. The volume of dredging works required is considered limited in potential impacts and will be dispersed over the canal sites and pipeline routes and over a number of years of construction works.

Mitigation/Monitoring Recommendations. To mitigate the impact of dredging activities it is recommended that contracts specify that sludge removed from urban drainage systems shall be directly placed into tanker trucks for transport to the disposal site(s) so that storage time and impacts to the workers and local residents are minimized.

Site-Specific Mitigation Actions. None warranted other than ensuring that the recommended project-wide mitigation actions are implemented.

5.2.3 Increased Discharges to Receiving Water Bodies

Potential Impacts. Receiving water bodies could be impacted if Sub-Project activities results in increased pollutant discharges. Such impacts would be considered significantly adverse if they resulted in violations or exacerbated existing violations of national standards. As noted in the foregoing statement of Baseline Conditions, all pollutant levels in recipient water bodies for Component 1 activities are currently in excess of national standards with the exception of the South China Sea which is the recipient body of Outlet 2 and the Pumping Station Discharge in Nha Trang.

Mitigation/Monitoring Recommendations. To mitigate the adverse effects of existing pollution levels, in addition to disallowing new connections at all locations other than Outlet 2 and the Da Tuong Street Outlet in Nha Trang, the following "end of the pipe" actions are recommended as mitigation measures for all outlets:

- Construction of manholes at outfalls to automatically input disinfections (liquid chlorine) in order to kill pathogen bacteria and permit adequate mixing of the chlorine and wastewater. The liquid chlorine should be stored in plastic drums in a special building constructed for the purpose.
- Placement of coarse screens on the outlets to help remove visible / floating solids.
- Increased water quality monitoring of discharge areas, public awareness programs and signage to alert the public and tourists of any potential health risks in the effluent dispersion areas.
- Information programs with signs along the banks and shore lines of waterways identified as polluted warning about the outlet discharges and potential public health risks of untreated wastewater effluents.

Site-Specific Mitigation Actions. Although the assessment indicates that increased discharges resulting from new connections to the Outlet 2 and Da Tuong Street Outlet are unlikely to violate national standards, a lesser level of impact is likely. To mitigate the potential impacts it is considered essential to extend the pipelines a sufficient distance off-shore and to undertake routine monitoring to ensure that pollution levels are within acceptable standards.

5.2.4 Potential Impacts to Groundwater

Potential Impacts. Studies preparatory to CCESP indicate that most of the population in the affected areas have use of a septic tank, but that most are either not designed properly, not functioning adequately or both and that 87 percent of the wastewater penetrates to the surrounding soil. If so, most wastewater will be lost through the septic tanks to the surrounding ground and very little will be transferred to the treatment plants if the septic tanks are retained in service after the house connections are made. Seepage of untreated wastewater into the groundwater system will continue.

Mitigation/Monitoring Recommendations. Disallowing new connections (except in the areas noted) will delay this potential impact in these areas until Phase 2. In the Nha Trang Outlet 2 and Da Tuong Street Outlet catchment areas, however, the question arises in Phase 1. It is recommended to mitigate the
Potential impact to groundwater by ensuring that existing septic tanks at new connection sites are abandoned as a condition of the connection. Details of recommended procedures are provided by the SOPs.

**Site-Specific Mitigation Actions.** No site-specific mitigation actions are considered warranted, other than ensuring that the recommended actions are taken Nha Trang Outlet 2 and Da Tuong Street Outlet catchment areas in Phase 1 and that similar steps are taken in Phase 2.

5.4 **Component 2: Wastewater Treatment Plants**
No Component 2 (Wastewater Treatment Plants) activities are scheduled as part of Phase 1.

5.5 **Component 3: Solid Waste Management**
Potential impacts and mitigation related to them resulting from Component 3 activities (Solid Waste Management) are highly Sub-Project specific and are foreseen as follows.

5.4.1 **Nha Trang Sub-Project.** Potential impacts due to opening of the new six-hectare sanitary landfill site at Luong Hoa and closing the existing, nearby Ru-Ri dumpsite and recommended monitoring/mitigation actions related to them are as follows.

**Potential Cultural Resource Impacts**

**Potential Impacts.** Site surveys and local consultations at the proposed Luong Hoa landfill site note the four-hectare Kim Son Pagoda property adjacent to the existing access road. The property includes a pagoda (private religious temple) built in 1972 and a primary school for children of poor families. Across the access road from the pagoda is a cemetery which is under the management of two pagodas, the Tinh Xa Ngoc Tong, and Tinh Xa Ngoc Phat. This cemetery was established in 1971 and includes 600 graves. Impacts to these resources could occur due to decisions and in the design process and during construction.

**Mitigation/Monitoring Recommendations.** It is recommended that the site designs be required to provide an access road to the landfill site which avoids adverse impacts to these properties as discussed with the owner's representatives of both cultural properties during the 30 December 2005 public consultations. Special attention will be needed during excavation and dredging activities for possible discovery of unexpected cultural or historical artifacts. Provisions for reporting any discoveries during excavation or dredging works are provided in the proposed Standard Operating Procedures (SOPs) of the Contract Documents.

**Other Site Clearance Considerations**

**Potential Impacts.** Earthworks and levelling activities for the new site will displace the existing vegetation of about six hectares of rocky shrub land, farm plots and cashew trees. Earth works at the site for its initial phase of development is expected to move some 200,000 m$^3$ materials of soil and rock.

**Mitigation/Monitoring Recommendations.** Based on the results of geotechnical investigations, this excavated material will consist primarily of rock and sand which can largely be used on-site for levelling as well as for cover of the Ru-Ri dumpsite during closure.

**Construction Impacts**

**Potential Impacts.** Potential impacts due to construction of the New Luong Hoa Landfill Site will include:

- **Air Quality Impacts.** Dust and noise are the main types of air pollution generated during the construction phase due to:
  - Dust emission generated from site activities of filling, material transport and excavation.
  - Dust, SO$_x$, NO$_x$, CO and other pollutants generated by construction equipment and transport vehicles
  - Noise and vibration due to operation of construction equipment.

- **Water Quality Impacts.** Wastewater pollution generated during the construction phase includes:
  - Domestic Wastewater: Domestic wastewater generated from the estimated, 100 workers who may be involved during construction sanitation is about 2.5 m$^3$/day and will contain high SS, BOD, nutrients (N, P) and pathogens.
  - Run-off Stormwater: During the rainy season, run-off storm water passing through the construction site contains grit and suspended solids (SS) with estimated concentrations of 500 - 5000 mg/l.

- **Solid Waste:** Construction wastes, such as sand, waste concrete, wood and steel, can be collected and
reused or sold, so the impacts of these waste is not significant. About 35 kg of solid wastes per day may be generated by the estimated 100 workers at the site, which will need to be properly collected on-site into the waste bins and transported to the Ru Ri landfill by URENCO or by the constructor.

Mitigation/Monitoring Recommendations. Construction impacts can be avoided by the incorporation of appropriate conditions in bid and contract documents such as requirements for temporary septic tanks to address on-site sanitation needs.

Operational Impacts

Potential Impacts. Potential impacts associated with the operation of the new landfill will include:

- **Transport Impacts.** Initial solid waste volumes to be transferred from the existing Ru-Ri dumpsite and handled by the new landfill site are in the projected range of 400-500 m$^3$ per day, which will involve an estimated 50-100 vehicle trips per day to transport. The volume of landfill traffic will continue to increase with projected increases in solid waste volumes to be transported which may create future impacts to traffic flows and public safety, particularly at the intersection of the landfill access road and National Highway 1A.

- **Wastewater Impacts.** There is no perennial surface water, lake or river in the proposed landfill area and the site is located more than four km from the coast. A seasonal creek passes through the landfill area. It originates near the existing Ru-Ri dumpsite and its intermittent flows are seriously contaminated by leachate, as indicated by December 2005 and February 2006 test results showing COD concentrations at 244 mg/l compared to national standards of < 35 mg/l and total nitrogen concentrations ranging from 19-26.5 mg/l compared to national standards of 1 mg/l.

- **Domestic Wastewater:** Approximately 0.5 m$^3$ of domestic wastewater will be generated by the estimated 20 workers who may be employed during landfill operations. Adequate on-site sanitation facilities are provided in the basic design of the landfill facilities, including toilet facilities with septic tanks, the effluent from which will discharge to leachate treatment ponds.

- **Leachate:** Wastewater will be produced from two sources: (1) from landfill cells and (2) from the cleaning of solid waste trucks and platforms. The volume of leachate will increase during the wet season as rain passes through the landfill cells and will greatly decrease during the dry season. The peak amount of leachate is estimated at 1,133 m$^3$ and will be treated on-site through a progressive series of ponds described as follows:
  - Pond No. 1 - 19,000 m$^3$ (anaerobic)
  - Pond No. 2 - 16,000 m$^3$ (aerobic)
  - Pond No. 3 - 13,000 m$^3$ (polishing pond)

  The leachate will be treated to meet the national standard TCVN 5945: 1995 (limit for BOD$_5$ of < 50 mg/l) prior to discharge to the seasonal stream course that crosses the landfill site. The assessment indicates that these procedures will avoid the potential for significant adverse impacts.

- **Landfill Gases:** Landfill gas (biogas) is a typically a mixture of about 45-60% methane and 40-60% carbon dioxide in addition to trace amounts of other gases depending on the actual solid waste composition. Landfill gas can have a direct impact on the landfill area. It is inflammable and can lead to a smouldering fires inside the waste body or cause explosions. These gases can also impact the growth of nearby vegetation. More importantly, methane and carbon dioxide are strong greenhouse gases.

- **Air emissions by vehicles / equipment used in the landfill operation:** Total running time of all vehicles ranges from 9 – 11 hour every day. The key components of predicted air emissions are total particulate matter (TPM), sulphur dioxide (SO$_2$), nitrogen oxides (NO$_x$), carbon monoxide (CO), volatile organic carbon (VOC).

- **Odor:** The odor-causing components are mainly hydrogen sulfide (H$_2$S), ammonia and VOC such as mercaptan. The odor problem is generally one of the most serious impacts to people living near a landfill site. This impact is avoided by the lack of residents near the landfill site and the provision of a 300-meter buffer zone around the facility.

- **Noise:** Noise will be generated from landfill transport and operational vehicles, such as garbage trucks, bulldozer, and compactor. Average noise level of this works ranges from 75 – 85 dB.
Mitigation/Monitoring Recommendations. Operational impacts can be avoided by the incorporation of appropriate training in the operation of such facilities as part of the CCESP activities.

Closure of the Existing Ru-Ri Dumpsite

Potential Impact. Proper closure of the existing Ru-Ri dumpsite will provide significant environmental benefits, particularly the elimination of additional untreated leachate and landfill gas flows. Design measures to collect and flare or utilize existing landfill gases are included in the closure recommendations and the proposed budget. If successfully implemented, these measures will minimize current and future impacts from release of 500-700 m³ per hour of methane (a powerful "greenhouse" gas). While full closure of the Ru-Ri dumpsite can only occur once the new Luong Hoa landfill is ready for operation in 2008, the existing dumpsite is already filled to capacity and no longer actively used for disposal. It is anticipated that sub-areas will be progressively sealed as soon as possible to eliminate the potential for additional leachate generation, thereby avoiding additional impacts. Detailed procedures for sealing and closure of the Ru-Ri dumpsite provided in the Inter-Ministry Instructions on Regulation on Environment Protection for Solid Waste Management (SWM) Disposal Areas (No. 01/2001/TTLT-BKHCNMT-BXD) will be followed. It must be noted, however, that closure of the dumpsite will not, in and of itself, eliminate the potential for adverse impacts due to leachate currently being generated from previous disposal activities. Potential adverse impacts related thereto warrant consideration and mitigation actions. Interim actions to accommodate waste disposal until the Luong Hoa Landfill becomes available are also required to avoid adverse impact.

Mitigation/Monitoring Recommendations. Current and future development activities on the site of the Ru-Ri Dumpsite should be restricted by enforceable land use controls devised in consultation with the Executing Agency and provincial authorities. In addition to the design measures included in the recommended closure procedures and the requirements of the Inter-Ministry Instructions on Regulation on Environment Protection for Solid Waste Management (SWM) Disposal Areas (No. 01/2001/TTLT-BKHCNMT-BXD), a structured and well documented determination of current groundwater contamination due dumpsite activities is recommended. If determined warranted by the analysis of the findings, full consideration should be given to a containment program for leachate currently in the groundwater and surface water to mitigate potential risks to local resident. If the findings of the analysis determine that such actions are warranted, the design of the recommended course of action should include a monitoring program able to pinpoint any risks and provide a feedback mechanism for management (not just data collection).

Impacts to Informal Waste Sorters

Potential Impacts. The estimated 200 informal waste sorters (scavengers) who often work at the existing Ru-Ri dumpsite are expected to be displaced from their current sources of livelihood once this dumpsite is closed.

Mitigation/Monitoring Recommendations. As discussed during public consultations, additional project consideration should be given to the potential impacts on informal waste sorters in accordance with the Bank's social safeguard policies. These recommended project considerations will need to be detailed in the separately prepared Resettlement Plan.

5.4.2 Quy Nhon Sub-Project

Potential Impacts. Component 3 activities in Quy Nhon will be limited to renewal and improvement of equipment and facilities for solid waste collection, transportation, for repairs and maintenance works; and the construction of two solid waste collection points. Based on current practices these are expected to be small facilities for complying wastes from push carts and low volume vehicles for transfer to larger vehicles to transport to the dump site.

Mitigation/Monitoring Recommendations. The reported characteristics of collected solid waste indicate a good potential to reduce the volume of such wastes by common and cost-effective segregation and minimization practices. 80 percent survey respondents indicated that they do not currently segregate their solid wastes because they do not know how to segregate (66 percent). Recycling initiatives are recommended to mitigate future impacts and over burdening of the SWM system.

5.4.3 Dong Hoi Sub-Project

Potential Impacts. No Component 3 activities are proposed in Dong Hoi during Phase 1. It should be noted, however, that the EA investigations indicate that the on-going Dong Hoi Urban Development Project (DUDP) may not have adequate budget remaining to fund the proper closure of Loc Ninh dumpsite as previously expected.
Mitigation/Monitoring Recommendations. The circumstances of the Dong Hoi Urban Development Project should be clarified and appropriate steps taken to mitigate future impacts and over burdening of the SWM system.

5.6 Component 4: Resettlement
Potential impacts due to Component 4 activities and mitigation related to them are separately addressed in the accompanying Resettlement Policy Framework and Sub-Project Resettlement Plans.

5.7 Component 5: Household and Public Sanitation Program
Potential Impact: Component 5 will provide access to credit to low income households to improve their household sanitation facilities and to improve access to safe water and sanitation in public areas, especially in schools. A limited number of public toilets will be constructed at strategic venues in each city. Additional wastes collected as a result of these activities are incorporated in the calculation of treatment facility requirements.

Mitigation/Monitoring Recommendations. None warranted.

5.8 Component 6: Capacity Building and Project Implementation
Potential Impacts. CCESP Component 6 will finance consulting services and goods/equipment for capacity building and project implementation, including support for Project Management Units responsible for implementing CCESP, the development of an Industrial Pollution Control program, training of healthcare providers, development of healthcare waste management plan and similar activities.

Mitigation/Monitoring Recommendations. None warranted.

5.9 Review of Applicable Safeguard Policies
Adherence to the applicable World Bank Environmental Safeguard Policies is assessed as follows.

5.8.1 Environmental Assessment (OP 4.01)
The environmental assessment requirements of OP 4.01 are provided herein.

5.8.2 Natural Habitats (OP 4.04)
Potential Impacts. Potential impacts to natural habitats are assessed as follows:

- **Nha Trang.** The proposed sub-project area primarily involves urban or sub-urban areas of Nha Trang City. Non-urban lands of the sub-project area are widely used for rice farming and fish ponds. The nearby coastal areas largely consist of sandy beaches and offshore slopes. The nearest protected area, the World Bank-assisted Hon Mun Marine Park, is located 10-15 km offshore, and hosts the highest level of recorded coral biodiversity in Vietnam. Proposed project activities will improve the environmental sanitation management for the many visitors to this well-known protected area.

- **Quy Nhon.** The Quy Nhon Sub-Project Area primarily involves urban or suburban areas. On-urban lands are widely used for farming and eucalyptus (gum tree) plantations. The Quy Nhon area includes five shallow lakes that total approximately 100 ha in area. The lakes are used as discharge sites for the City's combined sewer systems and reclamation projects. As a result, these lakes are eutrophic and highly silted. Proposed Sub-project activities will restore lake storage capacity and improve current water quality and flows. The nearby coastal areas largely consist of sandy beaches and offshore slopes. Coral reefs and mangroves are not common in the area, but are not expected to be adversely affected by CCESP activities.

- **Dong Hoi.** The Dong Hoi Sub-project area primarily involves urban or sub-urban areas. Non-urban lands in the area are widely used for farming and tree plantations. The nearby coastal areas largely consist of sandy beaches and offshore slopes. The natural lakes which are present in near the project area serve as part of the City's drainage and wastewater discharge system. Coral reefs and mangroves are not common in the coastal area of Dong Hoi. Karst Phong Nha-Ke Bang National Park, a UNESCO World Heritage Site, is located 30-50 km inland from Dong Hoi and outside the potential impact area.

Mitigation/Monitoring Recommendations. None warranted except as already noted.

5.8.3 Cultural Resources (OP 4.11)
Potential Impacts. Potential impacts to cultural resources are assessed as follows:

- **Nha Trang.** The proposed Phase 1 Nha Trang Sub-Project sites do not include any known physical...
cultural resources with the exception of the four-hectare Kim Son Pagoda property located adjacent to the Luong Hoa landfill site as discussed above. Potential impacts to the Kim Son Pagoda should be avoided as detailed above. It should be noted, however, that the cultural history of the general area is significant. As result, special attention will needed during all proposed excavation and dredging activities for possible unexpected discovery of cultural or historical artifacts.

- **Quy Nhon.** The proposed Phase 1 Quy Nhon Sub-project sites do not include any known physical cultural resources. The cultural history of the general area is significant and dates back to the Champa Culture in the 11th century. Special attention will need to be given during excavation and dredging activities for possible discovery of cultural or historical artifacts. Provisions for reporting any discoveries during excavation or dredging works are provided in the proposed Standard Operating Procedures (SOPs) of the Contract Documents.

- **Dong Hoi.** The proposed Dong Hoi Sub-project sites do not include any known physical cultural resources, with the noted exception of the 200 year old Quang Binh Citadel which is currently being renovated by the Department of Culture and Information, including non-CCESP drainage improvements to help protect the building from floods. Proposed CCESP drainage works in the Citadel area are, however, located more then 150 meters away from the historic structure. The cultural history of the general area is significant. Special attention will need to be given during proposed excavation and dredging activities for possible discovery of cultural or historical artifacts. Provisions for reporting any discoveries during excavation or dredging works are provided in the proposed SOPs of the Contract Documents.

**Mitigation/Monitoring Recommendations.** In addition to the mitigation actions recommended at the Kim Son Pagoda, provisions for reporting any discoveries during excavation or dredging works are recommended and provided in the proposed SOPs of the Contract Documents.

**5.8.4 Involuntary Resettlement (OP 4.12)**

Potential Impacts. The Involuntary Resettlement impacts of the CCESP Phase 1 for the Sub-projects generating such impacts are addressed in separate Resettlement Reports.

Mitigation/Monitoring Recommendations. Mitigation and monitoring pursuant to the requirement of OP4.12 are provided in the separate Resettlement Reports.

**6 ALTERNATIVES**

6.2 The "Without Project" Alternative

World Bank procedures for category A projects require the consideration of the "without project" situation. In the absence of funding from the World Bank, other multilateral development bank or bilateral aid organization, it is likely assumed that GoV would be unable to make the investments needed to improve environmental sanitation in the near future, if at all. Public health risks and costs would increase. Economic development lead by tourism would be threatened. The decline in environmental sanitation conditions and related institutional capabilities would be exacerbated by:

- Population increases. In contrast to recorded (1992 - 2002) annual population growth rate of 1.5 percent, the official projection for 2003 - 2020 range is nearly five percent.
- Increased generation of pollutants. The generation and management requirements of liquid and solid wastes are expected to increase at even higher rates due to improving per capita economic conditions.

Delays in implementing the project could also lead to increased costs and social impacts at a later date. Current facility sites and needed right-of-way (ROW) areas might no longer be available. In light of these considerations, the "without project" alternative is seen as neither prudent nor in the best interest of the potentially affected population.

6.3 Alternatives Related to Components 1 and 2

Alternatives related to Components 1 and 2 include the following.

**6.2.1 Scheduling Options for Household Connections to the New Sewer System**

The possibility of connecting households in Phase 1 before the wastewater treatment plants are completed in Phase 2 was considered. Doing so would result in varying volumes of untreated wastewater discharged to the receiving waters thereby increasing.
Coastal Cities Environmental Sanitation Project (CCESP)

- Pollution levels in the receiving water bodies.
- Exposure of human and livestock to polluted water.
- The risk of waterborne diseases - diarrhea, cholera, typhoid and dysentery.

If this option were selected, household connections to the new sewer system would be made during construction of the sewer and before the proposed WWTPs are operational in year 2 or 3 of Phase 2. The results of the assessment and hydraulic modelling calculations of this option are provided in main report and indicate that for the most part, the incremental effect of the new connections would be relatively small. Combined with the existing conditions as described above, however, the dilution and dispersion capacity of the receiving water bodies, with the possible exception of Nha Trang Outlet 2 and Pumping Station Outlet, are not adequate to assimilate current discharge levels within national water quality standards. Disallowing new household connections in all other areas is therefore incorporated in project design as a mitigation measure in lieu of this alternative.

6.2.2 Retaining versus Abandoning Existing Septic Tanks

The question of whether to retain existing septic tanks in service after connections to the collection system, to retain the newer ones, or to completely abandon all in Phase 1 arises only in regard to Outlet 2. The issue will arise in all catchment areas, however, in Phase 2.

Studies preparatory to CCESP indicate that most septic tanks in the Project Area are either not designed properly, not functioning adequately or both and that 87 percent of the wastewater penetrates to the surrounding soil. If so, unless actions are taken to rehabilitate the septic tanks, most wastewater will be lost through the septic tanks to the surrounding ground and very little will be transferred to the treatment plants if they are retained in service after the house connections are made. The alternative of retaining the septic tanks and instituting a program for or mandating their rehabilitation has been considered as an alternative. If retained, all should be 100% watertight with confirmation by appropriate and recognized tests undertaken by CCESP. The decision to retain should not be based on the age – i.e. whether recently constructed or not, or whether likely to leak or not but rather that they are currently watertight and are more than likely to remain so. Doing so would be costly and is considered unwarranted if the WWTPs are designed for domestic wastewater consistent with direct connection to the system. Accordingly the alternative of retaining the septic tanks has been considered but is not recommended. The abandonment of septic tanks at the time of connection has been proposed as integral aspect of the project as a means of mitigating impacts to groundwater quality.

6.4 Alternatives Related to Component 3: Solid Waste Management

Alternatives to proposed actions to create the Luong Hoa Sanitary Landfill were assessed by the International Consultant during the preparation of the FS for the proposed new Luong Hoa sanitary landfill facility. In addition to the final land fill recommendations of the study, alternatives considered included: incineration; pyrolysis (the use of heat to break down complex chemical substances into simpler substances), recycling, and composting. A summary of this alternatives analysis and relative costs per ton of wastes is provided in Table 6-1.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Technology</th>
<th>Cost per Ton of Waste (US $)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sanitary Landfill Site</td>
<td>15-20</td>
<td>Cheapest solution but land consuming</td>
</tr>
<tr>
<td>2</td>
<td>Waste Incineration</td>
<td>100</td>
<td>Expensive solution, suitable for big cities, maintenance and spare parts intensive, landfill site necessary for ash (10%)</td>
</tr>
<tr>
<td>3</td>
<td>Composting</td>
<td>90</td>
<td>Recommendable only if there is demand for soil conditioner, Landfill site necessary (for about 20% of the waste)</td>
</tr>
<tr>
<td>4</td>
<td>Recycling</td>
<td>+/- 0</td>
<td>Should be promoted, but is not a complete solution. For 85 to 90 % of the waste a landfill site is needed</td>
</tr>
<tr>
<td>5</td>
<td>Waste Pyrolysis</td>
<td>100-150</td>
<td>Technology is not reliable, expensive and very maintenance and spare parts intensive</td>
</tr>
</tbody>
</table>

Further attention to the potential for solid waste minimization / segregation during implementation is recommended. Based on the characteristics of collected solid waste in Nha Trang, important opportunities appear to be present to further reduce current and projected volumes of solid waste, particularly of recyclable and organic materials.

6.5 Alternatives Related to Component 4: Resettlement

Alternative courses of action in regard to resettlement are separately addressed by the accompanying Resettlement Policy Framework and Sub-Project Resettlement Plans.
Coastal Cities Environmental Sanitation Project (CCESP)

7 ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR PHASE 1

The environmental management plan (EMP) consists of the set of mitigation, monitoring, and institutional measures to be applied during implementation and operation to eliminate or minimize adverse environmental impacts. In accordance with the Bank's OP 4.01, the EMP serves to:

(a) Identify the set responses to potentially adverse impacts;
(b) Determine requirements for ensuring that responses are made effectively and timely, and
(c) Describe the means for meeting those requirements.

Based on the predicted Phase 1 environmental Impacts, appropriate mitigation measures are identified and described for each of the key project stages and types of impacts, including detailed design, construction and operations as follows.

7.2 Mitigation Measures During Detailed Design

Proposed impact mitigation measures include general design considerations, supported by specific design measures to mitigate environmental impacts of:

- Drainage and sewerage systems in all three cities,
- Sludge dredging and excavations in Quy Nhon and Dong Hoı,
- New Luong Hoa sanitary landfill and closure of existing Ru-Ri dumpsite in Nha Trang,
- Solid waste transfer stations and public toilets in Quy Nhon, and
- Resettlement sites in Nha Trang and Quy Nhon.

The more specific mitigation measures can be draft describe as follows:

**Drainage and Sewers:** In the design of drainage and sewerage, attention has to be paid to preventing the possibility of contaminating the domestic water supply. Special attention has to be paid to the possible crossing of water pipes and sewers. For this purpose, it will not be allowed to have water pipes going through the same drainage manholes or box culverts. Discharging points of the drainage system have to be selected so that the adverse impact is minimized and the back flow of drainage water to pipes is prevented or minimized.

**Resettlement Site Development:** The resettlement site needs to be planned as a complete residential area with sufficiently functions according to Vietnam planning standards and the Nha Trang Master Plan. The design of the resettlement site will apply current design standards and regulations for new urban areas. Site planning will include a reserved buffer zone between new settlement areas and proposed WWTP site to minimize any future

7.3 Mitigation Measures During Construction

Proposed mitigation measures include general considerations and required measures during construction work supported by specific mitigation measures during excavation, landfill development. Detailed standard operating procedures (SOPs) for impact mitigation measures at the contractor- and construction site-level are provided as proposed Contract Document amendments if such provisions are lacking in the proposed contracts. The general mitigation measures during construction are summarized in Table 7-1.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Mitigation Measures</th>
</tr>
</thead>
</table>
| Noise, Odour, Litter and Dust         | - The maximum permitted noise level is given in the Vietnamese standard TCVN 5949-1998. The strongest limitations are from 10 pm to 6 am in the vicinity of hospitals, libraries and kindergartens where maximum noise level is 40 dB.  
- Air quality and dust emissions are mitigated through dust suppression measures compliance with TCVN 5937-1995.  
- To minimise the odour nuisance especially the dredging works have to be carried out during dry season.  
- Appropriate equipment has to be used to prevent overloading of trucks. Accidental spills, sludge, oils and lubricants from equipment etc. have to be absorbed and collected immediately.  
- In the construction site dust, litter and public inconvenience has to be minimised by good construction management and site supervision. It is recommended to sprinkle the street in the vicinity of construction sites to minimise dust.  
- Solid and liquid wastes should be collected to transfer stations established to the construction sites and transported to the landfill.  
- Waste and disposal of excavated material are disposed at the sites, which are agreed with URENCO. |
| Health and Safety                     | - The Contractor is responsible to provide appropriate equipment, tools and protective clothing to the workers and ensure that appropriate working methods are applied.  
- During dredging and transportation of dredged material the Contractor has to follow strictly safety and health regulations. The dredging has to be organised so that the need to go to the water is minimised. Special attention has to be paid to avoid the direct contact with sludge. The Contractor has to provide... |
Standards for Making Households Connections: Based on the Final Report (January 2006) for the World Bank’s Household Connections Mission, there is a recognized need to prepare project-specific standards for making household connections to the improved wastewater collection systems. Such standards are needed to ensure that when the household connections are allowed to be made, these connections will be made in a uniform manner that minimizes impact during installation and allows for proper maintenance. These connection standards will be prepared during the Project’s detailed design stage by the National Consultant, working in close cooperation with the URENCO and WSSC (who will be in charge of maintaining the sewerage network) and with the Ministry of Construction and the Bank who will need to approve the standards. It is expected that these connection standards shall provide a clear definition of:

- Agreed procedures for making connections
- Possible connection points to the tertiary network (manholes, chamber or straight to pipe);
- Materials to be used, minimum and recommended pipe diameters and slopes;
- Number, placement and detailed design of any required special appurtenances.
- Retaining or deleting the septic tanks after the house connections are made.
- If the septic tanks are retained the condition for retention should be stated.
- If the septic tanks should be abandoned the method of abandoning should be stated.

Specific Mitigation Measures during Dredging Activities: The current estimate of the total volume of dredged material is 226,800 m³. Based on the results of sediment testing conducted as part of the EA in February 2006, this dredged sediment is expected to consist primarily of organic materials which could be re-used locally without further treatment for agricultural and landscaping purposes. The amount of dredged material will be clarified during the detailed design and more detailed instructions will be included in the Contract Documents. Specially, the contractors will be required to use special vehicles (tankers) for sludge transport to any off-site disposal area(s) to minimize leakage of sludge materials.

Any dredge sediments which are later found to be contaminated or not suitable for agricultural or landscaping use will be disposed of in the landfill site. Prior to disposal, the sediment can be dried out for use as covering layer at the dump site. Such disposal will need to be agreed with PMU, DONRE and URENCOs. To avoid public disturbance during dredging works, it is extremely important to inform the local people and traditional users of the water body in advance about the dredging schedule and work plan, including information on any proposed sludge dewatering and/or on-site storage activities.

7.4 Mitigation Measures During Operation
Proposed mitigation measures include consideration of drainage and sewerage systems, landfill site and solid waste transfer stations: and environmental sanitation requirements of the resettlement site.

Untreated household connection discharges from combined sewer systems: As described in Sub-Project EAs, the most effective impact mitigation measure is to postpone the household connections until the WWTPs are operational or advance the schedule for constructing WWTP to provide treatment earlier in the project period so that these project components are more closely linked. However, if it is agreed and locally approved to allow some household connections to the combined sewer system prior to completion of the
Coastal Cities Environmental Sanitation Project (CCESP)

WWTPs, limited mitigation measures for "end of the pipe" treatments to reduce impacts and potential health risks are recommended.

Although the characteristics and flow at the various outlets are dissimilar we are proposing the same mitigation at each outlet for the following reasons:

- The current characteristics were determined from limited sampling over a short period that did not include all the seasons. It is possible, indeed likely that these characteristics will change. Therefore we believe it is prudent to be conservative and design for the worst case. An indication of the worst case can be established by reviewing the result of all the outlets.
- If there are changes in the characteristics for even a short period a conservative design will mitigate the impact.
- The equipment for the different outlets will be standardized, parts will be interchangeable and unit cost will be reduced.
- To propose individual mitigation for what is essentially the same impact or could be the same would be tantamount to micro-managing without considering the possibility or likelihood of changes.

The end of pipe treatment to be employed at the outlets includes:

- Chlorination treatment of the untreated effluents within the pipelines to reduce pathogens and health risks.
- Placement of coarse screens on the outlets to help remove visible / floating solids.
- Increased water quality monitoring of discharge areas, public awareness programs and signage to alert the public and tourists of any potential health risks in the effluent dispersion areas.
- Dredging and maintenance of open channels to which many outlets discharge, converting these channels into covered box culverts and extending outlets offshore as underwater outfalls.

Septic Tanks: The majority of the septic tanks are either poorly designed, leaking, in need of major repairs or not functioning properly. If any is retained in service the long term integrity should be convincingly established by appropriate tests. This will be difficult, expensive and inconvenient. (Septic tanks are usually tested before placing in service). They will serve no useful purpose after the house connections are installed. They should be abandoned completely at the same time the house connections are made. The procedure to be followed to abandon these tanks are:

a) Empty the tank completely
b) Pressure wash the inside of the tank
c) Disinfect the inside using a strong disinfectant
d) Punch holes in the bottom to permit future use or accumulation of water.
e) Backfill the tank, and soak away pit with compacted sand, gravel, and/or limestone
f) If necessary install house connection pipe through backfilled tank
g) Test house connection for water-tightness
h) Restore ground or floor to match surrounding areas.

8 ENVIRONMENTAL MONITORING AND REPORTING

Building on the experienced gained on similar projects, environmental monitoring will be conducted during construction and operations at the following four (4) levels:

- Monitoring of project performance indicators;
- Monitoring of implementation of mitigation measures done by the Contractor;
- Community based monitoring; and
- Overall regulatory monitoring of the project.

A set of monitoring indicators is proposed to assess the implementation at various project stages. These performance monitoring indicators will be agreed in the final EA report, EMP and Project Implementation Plan (PIP) as well as the findings and recommendations of the Independent Safeguards Monitoring (ISM) Consultant to be appointed under the project. Combined with other qualitative and quantitative parameters of project performance, these indicators will be used as a tool for impact / benefit evaluation and analysis at various project stages and will be presented in reports of the PMU and ISM Consultant.

The PMU will be responsible for preparing to the Bank bi-annual performance monitoring reports, which will detail project progress with respect to agreed targets. These targets and reporting requirements will include the following environmental project performance indicators:
Coastal Cities Environmental Sanitation Project (CCESP)

- Contractor compliance to impact mitigation measures and procedures (SOPs)
- Health indicators
- Flooding situation
- Wastewater and sanitation environment
- Community stakeholder participation

Community Based Monitoring: Based on the experience gained in implementing the World Bank-funded Ho Chi Minh Environmental Sanitation Project, the ISM Consultant will play a lead role in organizing local community stakeholders to be actively involved in sub-project planning, implementation and monitoring activities, particularly at the tertiary and household connection levels where they are most affected. Within each of these areas (wards), the local stakeholders, residents and businesses will be provided an orientation and invited to actively participate in the monitoring of key environmental parameters; such as water supply quality, drainage, dust, noise, air pollution and public safety. The communities would also be trained to notice the indicators and risks of environmental pollution during project construction and operation.

Overall Regulatory Monitoring: During operation of the related components, the URENCO (to whom the completed facilities have been turned over to) will be responsible for sustaining the established air, water and sediment quality monitoring and reporting program to the DONRE and the Bank.

8.2 Project Organization for Environmental Management System

The Draft Final EA recommends an organizational and systematic approach towards environmental management involving the following key project stakeholders and responsibilities:

- **Project Management Unit (PMU):** The PMU has the overall responsibility to implement and monitor the EMP. Assisted by the ISM and CMC consultants, the PMU will monitor and report on the implementation of mitigation measures during the constrctor's construction works. The PMU will closely integrate project implementation and monitoring with local People's Committee (PC) to promote the participation of the community during the project planning, implementation and operation stages. The PMU is also responsible for reporting EMP implementation to the Bank and DONRE based on their field observations, meeting results and monthly progress reports provided by the contractors, CMC / ISM consultants and community based monitors. The proposed PMU staffing organization will include at least one environmental mitigation and monitoring specialist.

- **Community Representatives:** At the sub-project's tertiary and household connection levels, community representatives will be encouraged to participate in monitoring the environmental sanitation conditions in their community through their representatives to the PMU and local executive offices (PCs of wards, communes and district). Direct community involvement will take part prior to and during construction to support implementation monitoring of required impact mitigation measures and other assisting to address related community issues. These community-based monitoring measures will be supported by the project's ISM Consultant.

- **Construction Management Consultant (CMC):** The main tasks of CMC are monitoring basic construction practices and procedures, including Standard Operating Procedures (SOPs) for mitigating environmental impacts as described in the draft EA. These tasks will be stipulated in detail in the Terms of Reference (TOR) for the CMC and contract with the PMU, both of which are subject to Bank reviews for issuance of a No Objection Letter (NOL).

- **Independent Safeguards Monitoring (ISM) Consultant:** The ISM will be responsible for monitoring EMP implementation activities and ensuring that agreed environmental and social safeguard policies of the GoV and the Bank are applied and monitored.

8.3 Capacity Development and Training

Needed environmental training on how to implement effective environmental monitoring, mitigation and reporting measures and systems will be provided to key stakeholders based on the actual project needs, roles and responsibilities, focusing on:

- **PMU:** Person(s) in charge of environmental issues will be trained to supervise environmental monitoring and reporting, in accordance with the Bank's safeguards policies and GoV requirements.

Summary Environment Assessment
Contractors: will be trained how to identify and mitigate potential impacts, including requirements and SOPs specified in their Contract Documents, how to monitor implementation of mitigation measures and how to complete monitoring reports.

Workers: will be trained how to prevent pollution and environmental sanitation on the site of construction, how to respond will with emergency cases.

Community representatives: will be trained on how to participate in on-site, community-based impact observing and monitoring during planning, construction and operation of sub-project components. Proposed training activities will focus on agreed monitoring measures to be observed and reported by community members, including dust, noise, tidiness of streets, frequency / duration of flooding and sanitary condition of solid waste transfer stations and public toilets.

Proposed monitoring measures and training activities are summarized in Tables 8-2 and 8-3.

<table>
<thead>
<tr>
<th>Performance Indicator to be Monitored</th>
<th>Frequency</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health indicators</td>
<td>Twice per year</td>
<td>PMU collects</td>
</tr>
<tr>
<td>Percentage of collected solid waste</td>
<td>Twice per year</td>
<td>PMU collects</td>
</tr>
<tr>
<td>Water quality: BOD₅, COD, SS, coliform, total nitrogen,</td>
<td>Twice per year</td>
<td>ISM with assistance of</td>
</tr>
<tr>
<td>total phosphate, oil &amp; grease (3 sampling points)</td>
<td></td>
<td>Environmental Laboratory</td>
</tr>
<tr>
<td>Sediment quality monitoring: Pb, Cu, Fe, (2 sampling points)</td>
<td>Twice per year</td>
<td></td>
</tr>
<tr>
<td>Air quality and noise monitoring: SO₂, CO, NOₓ, TSP, noise (3</td>
<td>In response to</td>
<td></td>
</tr>
<tr>
<td>sampling points)</td>
<td>complaints</td>
<td></td>
</tr>
<tr>
<td>Monitoring implementation of mitigation measures during</td>
<td>Monthly</td>
<td>CMC under ISM guidance</td>
</tr>
<tr>
<td>construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community based monitoring of tertiary and household connection</td>
<td>Weekly / monthly</td>
<td>Communities observes</td>
</tr>
<tr>
<td>sub-project levels</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The locations to be sampled in the respective cities (Nha Trang, Quy Nhon, Dong Hoi) are named and detailed in the EIA reports for the city.

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Number of Courses</th>
<th>Course Duration (days)</th>
<th>Number of Participants per Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMU: Environmental monitoring and reporting</td>
<td>1</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Contractors: Implementing mitigation measures and SOPs</td>
<td>3</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Workers: Safety and environmental sanitation</td>
<td>3</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Community Representatives: On-site observing and monitoring</td>
<td>3</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>

Summary Environment Assessment: 35


8.4 Public Consultation and Disclosure
A summary of public consultation and disclosures is provided as in Table 8-4.

9 PHASE 2 SUB-PROJECTS AND POTENTIAL ENVIRONMENTAL IMPACTS

9.1 Description of CCESP Phase 2 Activities
The Phase 2 of CCESP will be implemented from mid-2008 to 2013 and will constitute approximately 60 – 70 % of the total project investments. Under Phase 2, the CCESP sub-project components initiated under Phase 1 will be continued with the significant addition of Component 2 involving the Construction and operation of the project’s wastewater treatment plants (WWTPs). These Component 2 investments will be complimented by the Phase 2 separation of drainage and sewer systems, proper treatment of collected wastewater, and extension of these systems to service urban areas outside of the city centers. In addition to expansion of the new Luong Hoa sanitary land fill in Nha Trang, limited Phase 2 investments will also be made in Quy Nhon and Dong Hoi to improve management and handling of hazardous and medical solid waste.

9.2 Summary of Phase 2 Impacts and Safeguard Issues to be Addressed in EA
Proposed Phase 2 investments will extend and expand the positive benefits to the environmental sanitation conditions in the three (3) sub-project cities initiated under Phase 1. A summary of key Phase 2 component activities which may be a potential source of environmental impact and will be addressed in the Phase 2 EAs are summarized in Table 9-1.

Summary of Predicted Phase 2 Negative Environmental Impacts: Based on the available information, Phase 2 investments will result in the conversion of 26 ha of existing paddy rice, shrimp ponds and plantation forest for the construction of 7 wastewater treatment plants (WWTPs) with a total treatment capacity of 124,500 m³. Of the total 114.2 ha area for WWTPs, 88.2 ha will be acquired and reserved as buffer areas as required under Vietnamese regulations. The selected sites do not include any known critical natural habitats or physical cultural resources, which will be further assessed in the Phase 2 EA.

Predicted construction impacts will increase in Phase 2 due to the scale of Component 1 and 2 civil works and extended construction periods (about 2 years) for a typical WWTP. Proposed Phase 2 construction works will include an estimated 327.6 km of improved or new pipelines and culverts, among it, about 118 km is tertiary pipe, and will involve a total of 595,041 m³ of excavation and dredging works. Following completion of the WWTPs in 2010 - 2011, existing untreated wastewater discharges will be collected and treated to national effluent standards which closely correspond to international standards. The discharge of these treated WWTP effluents is predicted to improve the baseline conditions of the receiving water bodies. A key issue which will need to be resolved are measures for controlling or eliminating future use of septic tanks after household connections are made to new sewer systems and WWTPs to protect ground water resources in sewered areas.
## Table 8-4: Summary of Public Consultation and Disclosure

<table>
<thead>
<tr>
<th>City</th>
<th>Nha Trang</th>
<th>Dong Hoï</th>
<th>Quy Nhơn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach</td>
<td>Included in socio-economic surveys, including questionnaires and group discussion</td>
<td>Included in socio-economic surveys, including questionnaires and group discussion</td>
<td>Included in socio-economic surveys, including questionnaires and group discussion</td>
</tr>
<tr>
<td>Number Surveyed</td>
<td>461 HHs</td>
<td>300</td>
<td>426</td>
</tr>
<tr>
<td>Main issues and suggested discussions</td>
<td>- Lack of sewage and drainage system - Flooding during rainy season - Air polluted by exhausts or dust - Pollution by wastewater</td>
<td>- Lack of sewage and drainage system - Flooding during rainy season - Air polluted by exhausts or dust - Lack of hygienic toilet</td>
<td>- Lack of sewage and drainage system - Flooding during rainy season - Air polluted by exhausts or dust - Pollution by wastewater</td>
</tr>
<tr>
<td>Approach</td>
<td>Group discussion and questionnaire</td>
<td>Group discussion and questionnaire</td>
<td>Group discussion and questionnaire</td>
</tr>
<tr>
<td>Number Surveyed</td>
<td>27</td>
<td>40</td>
<td>43</td>
</tr>
<tr>
<td>Main issues and suggested discussions</td>
<td>- At outlet 1, two main issues are pollution from open channel and dust pollution from the earth road along the channel. The impacts of pollutant concentration and odors can be acceptable if appropriate mitigation measures are applied. - At outlet 4, the main problem is pollution from existing open channel. The suggested mitigation measures are converting this channel to box culvert, dredging the channel, developing solid waste collection.</td>
<td>- The HHs at all outlets share the main concern of existing impacts reported at all 3 outlets. - The recommended mitigation measures are covering the open channel/box culvert, a proper treatment of wastewater before discharge to the lake, a regular dredging of culverts and outlets.</td>
<td>- English version of draft EA report - Vietnamese version of executive summary of EIA report - Infoshop - VDIC - PPU - DONRE - City People’s Committee</td>
</tr>
<tr>
<td>Date</td>
<td>Jan., 2006</td>
<td>Jan., 2006</td>
<td>Jan., 2006</td>
</tr>
<tr>
<td>Location</td>
<td>Infoshop - VDIC - PPU - DONRE - City People’s Committee</td>
<td>Infoshop - VDIC - PPU - DONRE - City People’s Committee</td>
<td>Infoshop - VDIC - PPU - DONRE - City People’s Committee</td>
</tr>
<tr>
<td>Date</td>
<td>Feb., 2006</td>
<td>Feb., 2006</td>
<td>Feb., 2006</td>
</tr>
<tr>
<td>Documents</td>
<td>Vietnamese version of draft EIA report</td>
<td>Vietnamese version of draft EIA report</td>
<td>Vietnamese version of draft EIA report</td>
</tr>
<tr>
<td>Location</td>
<td>PPU - DONRE</td>
<td>PPU</td>
<td>DONRE</td>
</tr>
</tbody>
</table>

Summary Environment Assessment
Table 9-1  Summary of Phase 2 Sub-project Activities with Potential Environmental Impacts

Component 1: Drainage, Flood Control and Wastewater Collection

<table>
<thead>
<tr>
<th>Component</th>
<th>Activity</th>
<th>Nha Trang, Quy Nhon</th>
<th>All three cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component 1</td>
<td>Rehabilitate existing drainage and sewer systems</td>
<td>Nha Trang, Quy Nhon</td>
<td>All three cities</td>
</tr>
<tr>
<td></td>
<td>New main sewers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New tertiary and branch lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New discharge outlets</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New pumping stations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New force main pipe lines</td>
<td>Nha Trang, Quy Nhon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New combined sewer overflows</td>
<td>Quy Nhon, Dong Hoi</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dredge and excavate sludge, reservoir lake and channels</td>
<td>Quy Nhon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Street surface repairs after pipeline excavations</td>
<td>All three cities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drainage / sewerage management equipment</td>
<td>Nha Trang, Quy Nhon</td>
<td></td>
</tr>
</tbody>
</table>

Component 2: Wastewater Treatment Plants (WWTPs)

| Component 2 | WWTP of South Site, capacity of 59,000 m³ / day, Oxidation ditch | Nha Trang |
| | WWTP at North Site, capacity of 19,000 m³ / day, Oxidation ditch | Nha Trang |
| | Nhon Binh WWTP (1B), 21,500 m³ / day, CEPT (if GEF grant funding approved) | Quy Nhon |
| | Phu Hoa WWTP (1c), 14,900 m³ / day, Oxidation ditch | Quy Nhon |
| | Bau Lac WWTP (2a), 8,200 m³ / day, Oxidation ditch | Quy Nhon |
| | Duc Loi WWTP, capacity of 8,000 m³ / day, Oxidation ditch | Dong Hoi |
| | Rehabilitate WWTP in Vietnam - Cuba Hospital, capacity of 300 m³ / day, Lagoon system | Dong Hoi |

Component 3: Solid Waste Management

| Component 3 | Waste collection vehicles and equipment | All three cities |
| | Solid waste transfer stations | All three cities |
| | Island community and ship slud waste management measures | All three cities |
| | Public toilets | Quy Nhon |
| | Develop new Luong Hoi landfill cell, including operational equipment | Nha Trang |
| | Ly Tran landfill cell development and equipment | Dong Hoi |
| | Hazardous waste collection & treatment (incinerator & equipment) | Dong Hoi |
| | Vehicle repair workshop and equipment | Nha Trang |

Component 4: Resettlement Site Development

| Component 4 | Development of resettlement site | Dong Hoi |

Component 1 (Drainage, Flood Control and Wastewater Collection)

In addition to the environmental impact and safeguard issues assessed and addressed under Phase 1, the Phase 2 EA for Component 1 will include:

- Site selection, design, construction impacts and operation of proposed activities (Table 6 -2).
- Expansion of drainage and sewer systems to urban areas outside of the city center
- Alternative options for existing septic tank systems within serviced areas.

Table 9-2  Summary Quantities of Key Phase 2 Component 1 Physical Investments – Component 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Nha Trang</th>
<th>Qui Nhon</th>
<th>Dong Hoi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage and sewerage (km)</td>
<td>50.0</td>
<td>18.0</td>
<td>67.0</td>
</tr>
<tr>
<td>Force main sewer pipelines (km)</td>
<td>6.6</td>
<td>12.0</td>
<td>55.0</td>
</tr>
<tr>
<td>Tertiary pipeline (km)</td>
<td>8.0</td>
<td>75.0</td>
<td>35.0</td>
</tr>
<tr>
<td>Pumping stations</td>
<td>12</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Number of households connecting to the sewer system</td>
<td>16,000</td>
<td>14,500</td>
<td>8,494</td>
</tr>
<tr>
<td>Estimated volume of excavation and dredging (m³)</td>
<td>205,041</td>
<td>145,000</td>
<td>250,000</td>
</tr>
</tbody>
</table>

Component 2 (Wastewater Treatment)

Environmental impact and safeguard issues to be assessed and addressed in the Phase 2 EA for Component 2 will include:

- Site selection, design, construction impacts and operation of proposed WWTPs which are summarized in Table 5 -3.
- Conversion of existing land uses to WWTP sites
- Design and planning for required WWTP buffer zones
- Modelling of treated effluent discharges
- Alternative options for utilization and/or disposal of WWTP sludge and treated effluents, including application of effluent polishing such as through constructed wetlands
- Handling and treatment of septage (biosolids)
Table 9-3 Summary of Phase 2 Component 2 Investments (Wastewater Treatment)

<table>
<thead>
<tr>
<th>City</th>
<th>WWTP Site</th>
<th>Location Description</th>
<th>Area (ha)</th>
<th>Buffer area</th>
<th>Treatment Capacity (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nha Trang</td>
<td>South site</td>
<td>South of Cai River (shrimp pond area)</td>
<td>8.5</td>
<td>22</td>
<td>59,000</td>
</tr>
<tr>
<td></td>
<td>North site</td>
<td>North of airport (paddy rice area)</td>
<td>3</td>
<td>7.3</td>
<td>19,000</td>
</tr>
<tr>
<td>Quy Nhon</td>
<td>1 C</td>
<td>Phu Hoa (plantation forest)</td>
<td>3.1</td>
<td>24</td>
<td>14,900</td>
</tr>
<tr>
<td></td>
<td>2 A</td>
<td>Bau Lac (plantation forest)</td>
<td>2.1</td>
<td>16.8</td>
<td>8,700</td>
</tr>
<tr>
<td></td>
<td>1 B</td>
<td>Ha Thanh</td>
<td>3.3</td>
<td>12.1</td>
<td>6,000</td>
</tr>
<tr>
<td>Dong Hai</td>
<td>Duc Loi</td>
<td>Duc Loi commune (rice paddy area)</td>
<td>6.0</td>
<td>6.0</td>
<td>16,000</td>
</tr>
<tr>
<td></td>
<td>VN-Cuba Hospital</td>
<td>Vietnam - Cú Ba hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: WWTP 1B in Quy Nhon is proposed for GEF grant funding under a Belgium government sponsored project. CETP = Chemically Enhanced Treatment Process.

Key EA considerations in evaluating each WWTP site will include:

- Impacts on any critical natural habitats, physical cultural resources and/or settlements.
- Impacts of treated effluent discharges and sludge disposal
- Air quality impacts during operation
- Capability of accommodating a single WWTP facility for a projected 15 year flow, and with room for expansion of equal capacity to avoid future impacts and costs of expansion.
- Access for construction, influent and effluent pipelines and public utilities
- Adequate elevation and soil conditions to minimize fill requirements and avoid flooding risks and disruptions during WTP operation.
- Consistency with approved development master plans

Component 3 (Solid Waste Management)
The Phase 2 EA for Component 3 will assess the site selection, design, construction impacts and operation of the following:

- Development of additional 6 ha cell area within the Luong Hoa land fill site (Nha Trang)
- Closure of Luong Hoa Cell 1 developed under Phase 1
- Hazardous and medical waste incinerator within the 10 ha Ly Trach land fill site (Dong Hoi)
- Island community and ship solid waste management measures in all three cities
- Solid waste transfer stations in all three cities
- Public toilets in Quy Nhon

Component 4 (Resettlement Site Development)
The Phase 2 EA will assess three (3) alternative sites currently proposed in Dong Hoa:

- Nam Truong area, along Tran Hung Dao Street (capacity for 200 households)
- Cho Ga to Le Loi Streets (capacity for 400 households)
- Ly Thuong Kiet Street from Hospital Bridge to Loc Linh (capacity for 400 households)

9.3 Proposed Process for Phase 2 EA
Based on the experience gained in during Phase 1 preparation, the proposed EA process and schedule for Phase 2 is presented in Table 9-4. Similar to Phase 1, separate EAs will be prepared for each of the three (3) sub-projects and will be subject to reviews and approvals by the Bank, and respective PPU and DONRE (or MONRE). Detailed guidance on the agreed process for preparing the Phase 2 EAs will be provided by the Environmental Guidelines for Phase 2, the draft version of which was separately submitted to Bank in January 2006 as pre-requisite for project appraisal. The summary contents of the draft Environmental Guidelines is provided in Table 9-5. A key output of the Phase 2 EA process will be the updating and expansion of the Phase 1 EMP to address issues and impacts directly related to the WWTP construction and operation.
Figure 9.1 Project Location Map – Nha Trang Sub-Project Phase 2

PROPOSED DRAINAGE AND SEWERAGE SYSTEM IN NHA TRANG CITY (DIAGRAM 1) TO CHOOSE - FOR 2 PHASES
Figure 9.2 Project Location Map – Qui Nhon Sub-Project Phase 2
Figure 9.3  Project Location Map – Dong Ho Sub-Project Phase 2

GENERAL LAYOUT OF STORM WATER SYSTEM

TIÊU DỤA AN DÔNG HỘI - DÔNG HỘI CITY SUB-PROJECT

BIỂN DỒNG - giai đoạn II - phase II (2008-2012)

GHI CHÚ-LEGEND:

Cống thoát nước giai đoạn đến 2012
Storm water sewer in stage to 2012
Cống thoát nước 2006-2008
Storm water sewer 2006-2008
Cống thoát nước con gìn hiệu cố
Existing combined drainage
Mương thoát nước giai đoạn đến 2008
New channel storm water in stage to 2008
Figure 9.4  Project Location Map – Dong Ho Sub-Project Phase 2

GENERAL LAYOUT OF WASTEWATER SYSTEM
TIÊU ĐỨC ĐÔNG HỘI - DONG HOI CITY SUB-PROJECT
giai đoạn II - phase II (2008-2012)

GHI CHỮ-LEGEND:
- Pipe in phase II (2008-2012)
- Existing concrete pipe
- Existing stone pipe
- Wastewater treatment plant
- Wastewater pumping station

D300-L505
Diameter (mm) - Length (m)

TRANG KÍCH VIÊN THÔNG THÔNG
WASTEWATER TREATMENT PLANT NO1
9.4 Public Consultations

The Phase 2 environmental consultants will be responsible for assisting the PPU / PMU of each of the three (3) sub-project cities to carry out two (2) stages of public consultations for the proposed Phase 2 investments and corresponding EA process. These public consultations will focus on environmental issues and will directly involve PAPs and representatives of local non-government organizations (NGOs) who are involved in activities or areas related to the proposed Phase 2 investments.

The documented results and recommendations of these public consultations will be included in the EA Reports for Phase 2. Based on current information, the key focus of Phase 2 public consultations will include PAPs who reside or earn their livelihood near the proposed WWTP sites, effluent discharge outlet areas and proposed hazardous waste incinerator within the Ly Tranch landfill site. Additional consultations will be held and documented as part of the RAPs to be conducted for all proposed resettlement sites and activities in accordance with the Bank’s safeguard policies.

9.5 Public Disclosure

In accordance with Bank Procedure (BP) 17.50, the draft and final EAs for Phase 2 will be publicly disclosed. Similar to Phase 1, the PPU / PMU will approve the release of the draft and final EA Reports for display at the Bank’s Vietnam Development Information Center (VDIC) in Hanoi and at the InfoShop website (www.worldbank.org).

Table 9-5 Summary Contents of the Environmental Guidelines for Phase 2

| 1. Introduction |
| 2. Project-Related Environmental Laws, Decrees and Standards of Vietnam |
| 3. World Bank Safeguard Policies to be Addressed in the EA |
| 4. Environmental Screening |
| 5. Sub-Project Specific Screening Requirements |
| 6. Environmental Assessment (EA), Public Consultation and Disclosure Requirements |
| 7. Institutional Arrangements |
| 8. Environmental Clearance Process for all CCESP Sub-projects |
| Annex 1: Requirements for collection of environmental baseline data |
| Annex 2: Environmental Screening Matrix |

10 PROPOSED BUDGETS

A summary of the proposed budgets for recommended CCESP environmental management, mitigation and monitoring measures is presented in Table 10-1 which provides sub-total budgets for each phase and sub-project for the following key EMP implementation activities:

- Implementation of mitigation measure by contractors during construction
- Environmental training
- Independent safeguards monitoring (ISM)
- Environmental monitoring by the Construction Management Consultant (CMC)
- EMP administration and management responsibilities of the PMU

Table 10-1 Estimated Budget Costs for EMP Implementation (in USD)

<table>
<thead>
<tr>
<th>Description</th>
<th>Nha Trang</th>
<th>Quy Nhon</th>
<th>Dong Hoi</th>
<th>Source of Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>Phase 2</td>
<td>Total</td>
<td>Phase 1</td>
<td>Phase 2</td>
</tr>
<tr>
<td>1 Implementation of Mitigation Measures</td>
<td>Costs included in construction contracts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Environmental Training of PMUs, communities etc</td>
<td>17,000</td>
<td>12,000</td>
<td>29,000</td>
<td>17,000</td>
</tr>
<tr>
<td>3 Independent Safeguards Monitoring (ISM)</td>
<td>23,000</td>
<td>55,000</td>
<td>78,000</td>
<td>23,500</td>
</tr>
<tr>
<td>4 Environmental Monitoring by CMC</td>
<td>Costs included in Supervision Contract</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 EMP Administration &amp; Management by PMU</td>
<td>Costs included in PMU operating costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40,000</td>
<td>67,000</td>
<td>107,000</td>
<td>40,500</td>
</tr>
</tbody>
</table>

Note: Proposed budget costs exclude VAT, contingency and escalation costs.
<table>
<thead>
<tr>
<th>Table 9-2 Proposed Phase 2 Environmental Assessment (EA) Process and Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Phase 2 Environmental Assessment (EA) Process</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Disclose Summary EA and Draft Environmental Guidelines for Phase 2</td>
</tr>
<tr>
<td>Finalize Summary EA and Environmental Guidelines for CCESP Phase 2</td>
</tr>
<tr>
<td>Prepare TOR for Phase 2 based on Final Summary EA and Environmental Guidelines</td>
</tr>
<tr>
<td>Appoint / Mobilize Phase 2 Environmental Consultants</td>
</tr>
<tr>
<td>Conduct Orientation Meetings with each Subproject PPU, DONRE and the World Bank</td>
</tr>
<tr>
<td>Conduct Environmental Screening of Proposed Phase 2 Subproject Components</td>
</tr>
<tr>
<td>Draft TOR for EA Reports based on Environmental Screening Process</td>
</tr>
<tr>
<td>Conduct Initial Stage of Public Consultations to Present Draft EA TOR</td>
</tr>
<tr>
<td>Prepare / Submit Draft Environmental Screening Report for each Subproject</td>
</tr>
<tr>
<td>Finalize Environmental Screening Report based on Review Comments</td>
</tr>
<tr>
<td>Design / Conduct Baseline Data Collection and Detailed Studies</td>
</tr>
<tr>
<td>Prepare / Submit Draft EA Report for each Subproject to PPU and the Bank</td>
</tr>
<tr>
<td>Organize / Conduct Second Stage of Public Consultations for each Subproject</td>
</tr>
<tr>
<td>Revise Draft EA based on Results of Second Stage Consultations</td>
</tr>
<tr>
<td>Prepare Draft EMP for Phase 2 to Support EA Implementation</td>
</tr>
<tr>
<td>Prepare Draft TOR for Phase 2 EMP, including Integrated Safeguards Consultant (ISM)</td>
</tr>
<tr>
<td>Prepare Draft Training Plan for Phase 2 EMP Implementation</td>
</tr>
<tr>
<td>Submit Draft EA and EMP to PPU for DONRE and Bank Review and Public Disclosure</td>
</tr>
<tr>
<td>Support Environmental Reviews of Detailed Design Work</td>
</tr>
<tr>
<td>Support PPU in DONRE / Bank Review and Environmental Certification Process</td>
</tr>
<tr>
<td>Finalize / Submit EA and EMP based on PPU, DONRE and Bank Review Comments</td>
</tr>
<tr>
<td>Organize / Conduct EA / EMP Implementation Workshops for each Subproject</td>
</tr>
<tr>
<td>Public Disclosure of Final EA and EMP</td>
</tr>
<tr>
<td>World Bank issues a NOL to PPU with copy to CPC / PPC for Phase 2 Implementation</td>
</tr>
</tbody>
</table>

Summary Environment Assessment
TABLE OF CONTENTS

1. INTRODUCTION........................................................................................................................................... 2
2. PROJECT-RELATED ENVIRONMENTAL LAWS, DECREES AND STANDARDS OF VIETNAM.................................................. 2
3. WORLD BANK SAFEGUARD POLICIES TO BE ADDRESSED IN THE EA................................................................. 3
4. ENVIRONMENTAL SCREENING ............................................................................................................................... 5
5. ENVIRONMENTAL ASSESSMENT (EA) ....................................................................................................................... 9
6. INSTITUTIONAL ARRANGEMENTS ............................................................................................................................ 10
7. ENVIRONMENTAL CLEARANCE PROCESS FOR ALL CCESP SUB-PROJECTS ............................................................... 11

LIST OF TABLES

Table 1: Summary of National Standards that will be followed in the ................................................................. 4
Preparation of an Environmental Assessment (EA) ................................................................................................. 4
Table 2: Baseline Data Requirements for Environmental Screening and EA............................................................ 6
Table 3: Summary of Phase 2 Sub-Project Components for Environmental Screening ............................................. 6
Table 4: Key Phase 2 Sub-project Components Requiring Screening and EA ......................................................... 8
Table 5: Environmental Clearance Procedure .......................................................................................................... 11
Environmental Guidelines for Phase 2 of the Coastal Cities Environmental Sanitation Project (CCESP)

1. Introduction

This document was prepared to guide the environmental impact screening and assessment of Phase 2 of the CCESP. For this purpose, this document is organized as follows:

1. Introduction
2. Project-Related Environmental Laws, Decrees and Standards of Vietnam
3. World Bank Safeguard Policies to be Addressed in the EA
4. Environmental Screening
5. Sub-Project Specific Screening Requirements
6. Environmental Assessment (EA), Public Consultation and Disclosure Requirements
7. Institutional Arrangements
8. Environmental Clearance Process for all CCESP Sub-projects

The CCESP was proposed and designed to help address existing and serious urban environmental sanitation problems, to help sustain the economic development of each sub-project, including their potential attraction to and benefits from tourism, which in turn is dependent on environmental conditions.

The environmental guidelines for Phase 2 of CCESP build upon the experience gained during Phase 1 as well as from various related Bank and other donor funded projects. Based on all available reports, projects such as the CCESP have been highly positive and beneficial in terms of environment and social impact as well as in terms of sustainable economic development in the targeted cities. These reported findings of the overall positive impact for such environmental sanitation projects are also expected for Phase 2 of the CCESP. An important objective of the overall CCESP is to help improve environmental conditions in the three target cities of Nha Trang, Quy Nhon and Dong Hoi by supporting needed improvements in sanitation and waste management infrastructure and systems.

2. Project-Related Environmental Laws, Decrees and Standards of Vietnam

The Ministry of Natural Resources and Environment (MONRE) is the government body responsible for exercising the state function of management over land and water resources, minerals, environment, meteorology, hydro-geography, national-level surveys and mapping; governance over these public services and representative of the owner of state capital in enterprises using state budgets relating to natural resources of land, water, minerals, environment, meteorology, hydro-geography, surveys and mapping in accordance with national legislation, including but not limited to the following:
Coastal Cities Environmental Sanitation Project (CCESP)

- National Law on Environmental Protection (December 27, 1993).
- Decree No. 175-CP (October 18, 1994) on implementing the Law on Environmental Protection.
- Decree No. 143/2004/ND-CP on amendment of article 14 of Decree No. 175/CP.
- Decree No. 91/2002 (Nov. 11, 2002) on the Mandate, Organization and Functions of MONRE.
- Decision No. 45/QD-TTg (April 2, 2003) to establish provincial Department of Natural Resources and Environment (DONRE).
- Inter-Ministry Instruction on Regulation of Environmental Protection for Solid Waste Disposal Areas (No. 01 / 2001 / TTLT – BKHCNMT – BXD).
- Decision No. 155/1999/QD-TTg (July 16, 1999) on hazardous solid waste management.

According to the Decision No. 35 / 2002 / QD-BKHCNMT, the minimum standards that must be applied during preparation of an Environmental Assessment (EA) are summarized in Table 1.

Proposed closure of any existing dumpsites and opening of any new sanitary landfills can carry special environmental risks that may need to be carefully addressed in the EA. Detailed guidance on assessing and ensuring the environmental protection of solid waste management and disposal sites is provided by Inter-ministry Instruction on Regulation on Environment Protection for Solid Waste Management (SWM) Disposal Areas No: 01/2001/TTLT-BKHCNMT-BXD.

3. World Bank Safeguard Policies to be Addressed in the EA

In additional to environmental review and approval procedures of the Government of Vietnam, the proposed CCESP has been classified as a Category A type project based on World Bank environmental assessment (EA) categories. The CCESP was classified as a Category A project based on the:

- Type of proposed activities (particularly the construction of new wastewater treatment and landfill facilities),
- Potential sensitivity of the proposed sub-project sites (primarily involving coastal urban areas bordering various rivers and potential wetland areas) and the
- Potential to cause significant environmental impact if the proposed activities are not properly assessed, managed and monitored.
Table 1: Summary of National Standards that will be followed in the Preparation of an Environmental Assessment (EA)

<table>
<thead>
<tr>
<th>Number of National Standard</th>
<th>Name / Description of National Standard for the Preparation of an Environmental Assessment (EA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCVN 5948:1999</td>
<td>Allowed limitation values for road motor vehicle noise</td>
</tr>
<tr>
<td>TCVN 5949:1998</td>
<td>Allowed limitation values for noise in public and residential areas</td>
</tr>
<tr>
<td>TCVN 5942:1995</td>
<td>Surface water quality standard</td>
</tr>
<tr>
<td>TCVN 5943:1995</td>
<td>Water quality – Coastal water quality standard</td>
</tr>
<tr>
<td>TCVN 5944:1995</td>
<td>Ground water quality standard</td>
</tr>
<tr>
<td>TCVN 5945:1995</td>
<td>Industrial wastewater – Discharge standards</td>
</tr>
<tr>
<td>TCVN 6772:2000</td>
<td>Water quality – Domestic wastewater standards</td>
</tr>
<tr>
<td>TCVN 6773:2000</td>
<td>Water quality – Water quality guidelines for irrigation</td>
</tr>
<tr>
<td>TCVN 6774:2000</td>
<td>Water quality – Fresh water quality guidelines for protection of aquatic sites</td>
</tr>
<tr>
<td>TCVN 6980:2001</td>
<td>Water quality – Standards for industrial effluents discharged into rivers used for domestic water supply</td>
</tr>
<tr>
<td>TCVN 6982:2001</td>
<td>Water quality – Standards for industrial effluents discharged into rivers used for water sports and recreation</td>
</tr>
<tr>
<td>TCVN 6984:2001</td>
<td>Water quality – Standards for industrial effluents discharged into rivers used for protection of aquatic life</td>
</tr>
<tr>
<td>TCVN 6986:2001</td>
<td>Water quality – Standards for industrial effluents discharged into coastal waters using for protection of aquatic life</td>
</tr>
<tr>
<td>TCVN 6987:2001</td>
<td>Water quality – Standards for industrial effluents discharged into coastal waters using for water sports and recreation</td>
</tr>
<tr>
<td>TCVN 7222:2002</td>
<td>Water quality – General environmental requirements for central domestic (municipal) wastewater treatment plants</td>
</tr>
<tr>
<td>TCVN 6962:2001</td>
<td>Vibration and shock – Vibration emitted by construction works and factories – Maximum permitted levels in public and residential areas</td>
</tr>
<tr>
<td>TCVN 5298:1995</td>
<td>Requirements on the use of wastewater and their sludge for watering and fertilizing purpose</td>
</tr>
<tr>
<td>TCVN 5524:1995</td>
<td>General requirements for protecting surface water against pollution</td>
</tr>
<tr>
<td>TCVN 5525:1995</td>
<td>General requirements for protection of underground water</td>
</tr>
</tbody>
</table>
Coastal Cities Environmental Sanitation Project (CCESP)

Similar to Phase 1, the preparation of Phase 2 of the CCESP will involve national and international Environmental Consultants (ECs) who will prepare all necessary reports and supporting information to meet the funding requirements of the World Bank’s policies on environmental safeguards. The ECs will be contracted and under the guidance of the respective provincial Project Management Unit (PMU) and their environmental studies and reports will be subject to review and appraisal by the respective provincial Department of Environment and Natural Resources (DONRE). The respective responsibilities of the national and international ECs are summarized in the following Table.

Based on the proposed Phase 2 sub-project activities, the following key safeguard policies of the World Bank may apply and will need to be addressed through the EA to be prepared for each of the three (3) Phase 2 sub-project cities:

- Environmental Assessment (OP / BP 4.01)
- Natural Habitats (OP / BP 4.04)
- Physical Cultural Property (OP 4.11 – OPN 11.03)

Full compliance with any environmental safeguard triggered by Phase 2 sub-project activities is a prerequisite to the Bank’s review and approval of such sub-project activities.

4. Environmental Screening

The ECs will be responsible for confirming the environmental information and initial analysis provided as part of the Phase 1 Feasibility Studies (FS) and Environmental Assessments prepared for each sub-project city. Based on a review of each FS and EA, and related CCESP loan agreements and Bank Aide Memoire, the ECs will be responsible for compiling all baseline environmental data needed to support the environmental screening of the Phase 2 of each sub-project city and approved component as summarized in Table 2. Guidance on the collection of required environmental baseline data in accordance with these prevailing Vietnamese standards is provided in Annex 1.

The purpose of this environmental screening is to identify as early as possible all potentially significant issues and/or impacts for each of the sub-project components so that such impacts can be avoided and/or addressed during the detailed preparation of Phase 2. The basis for this environmental screening will include the guidance provided by the national MONRE and provincial DONRE.

Building on work completed during Phase 1, this Phase 2 environmental screening will focus on four (4) proposed component activities for which there is a significant potential for environmental impacts:

- Component 1: Drainage and wastewater collection
- Component 2: Wastewater treatment
- Component 3: Solid waste management
- Component 4: Resettlement
A summary of the proposed Phase 2 sub-project components is provided in Table 3.

Table 2: Baseline Data Requirements for Environmental Screening and EA

<table>
<thead>
<tr>
<th>No.</th>
<th>Description of Baseline Data</th>
<th>Available from Phase 1 FS / EAs</th>
<th>To be Collected / Updated for Phase 2 EAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Location Descriptions</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>I.1</td>
<td>Component 1: Drainage and Wastewater system</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>I.2</td>
<td>Component 2: Wastewater Treatment Plants</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>I.3</td>
<td>Component 3: Solid Waste Management</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Climate Conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Topography and Soil Conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III.1</td>
<td>General topography and soil conditions</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>III.2</td>
<td>Component 1: Drainage and Wastewater System</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>III.3</td>
<td>Component 2: Wastewater Treatment Plants</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>III.4</td>
<td>Component 3: Solid Waste Management</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>III.5</td>
<td>Component 4: Resettlement</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Flora and Fauna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV.1</td>
<td>General Information</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>IV.2</td>
<td>Component 1: Drainage and Wastewater System</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>IV.3</td>
<td>Component 2: Wastewater Treatment Plants</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>IV.4</td>
<td>Component 3: Solid Waste Management</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>IV.5</td>
<td>Component 4: Resettlement</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Coastal and River Conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.1</td>
<td>Tidal Regime</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>V.2</td>
<td>Sea water quality</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>V.3</td>
<td>Site Specific Sampling / Modeling of WWTP Effluent Discharge Areas</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>V.4</td>
<td>River water quality</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>V.5</td>
<td>Site Specific Sampling / Modeling of WWTP Effluent Discharge Areas</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Population and Socio-economic Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI.1</td>
<td>General Population Parameters</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>VI.2</td>
<td>Public Health and Safety</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>VI.3</td>
<td>Economic Structure</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>VI.4</td>
<td>Tourism</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>VI.5</td>
<td>Site Specific Socio-Economic Surveys</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Summary of Phase 2 Sub-Project Components for Environmental Screening

<table>
<thead>
<tr>
<th>No.</th>
<th>Proposed Phase 2 Components</th>
<th>Nha Trang</th>
<th>Quy Nhon</th>
<th>Dong Hoi</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drainage &amp; Wastewater Collection</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Wastewater Treatment</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Solid Waste Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Solid Waste Collection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2</td>
<td>Sanitation Landfill</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.3</td>
<td>Transfer Station</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.4</td>
<td>Equipment</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Resettlement</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This environmental screening will be conducted for each candidate sub-project proposed for Phase 2 as determined by the CCESP Project Preparation Unit (PPU) / Project Management Unit (PMU) and the World Bank. This environmental screening will include but not be limited to the following concerns:

- The site of the proposed sub-project (such as a wastewater treatment plant) or sanitary landfill facility, particularly if the proposed site involves:
  - a significant conversion or degradation of a critical natural habitat,
  - is a cultural heritage site, or
  - a location and design elevation that may subject to flooding or other natural hazard that may present environmental risks.
- Compliance of any proposed effluent or leachate discharges with prevailing environmental standards and regulations of the Government of Vietnam and the respective province in which the proposed sub-project is located.
- Hydraulic mixing and dilution capacity of the water bodies where any effluents will be discharged.
- Air quality, noise and induced traffic impacts to sensitive receptors.
- Types of impacts that may occur during construction as well as operations and maintenance.
- Potential reputational risks or conflicts with related projects funded by other sources and for which a due diligence review will need to be conducted as part of the EA.

During the Phase 2 environmental screening and EA process, the ECs will give particular attention to effluent discharges, air quality, storm overflows, dredge spoils, pipeline sludge and biosolids management, hazardous and medical solid waste management, mine / un-exploded ordinance risks and construction impacts on natural habitats, public health and environmental sanitation as summarized in Table 4.

The results of the ECs environmental screening will be documented for each sub-project city and submitted as a draft Environmental Screening Report in English and Vietnamese to the respective PPU / PMU, DONRE and the World Bank. Following their reviews, the ECs will be responsible for finalizing the Screening Report which will be resubmitted to serve as the basis for each EA.

---

1 Significant conversion is the elimination or severe diminution of the integrity of a critical or other natural habitat caused by a major, long-term change in land or water use. Significant conversion may include, for example, land clearing; replacement of natural vegetation; permanent flooding; drainage; dredging, filling, or channelization of wetlands; or surface mining.

2 Critical natural habitats are:

   (i) existing protected areas and areas officially proposed by governments as protected areas (e.g. reserves that meet the criteria of the World Conservation Union (IUCN) classifications, areas initially recognized as protected by traditional local communities (e.g. sacred groves), and sites that maintain vital for the viability of these protected areas (as determined by the EA process); or

   (ii) sites identified on supplementary lists prepared by the Bank. Such sites may include areas recognized by traditional local communities (e.g. sacred groves); areas with known high suitability for biodiversity conservation; and sites that are critical for rare, vulnerable, migratory, or endangered species. Listings are based on systematic evaluations of such factors as species richness; the degree of endemism, rarity, and vulnerability of component species; representativeness; and integrity of ecosystem processes.
Table 4: Key Phase 2 Sub-project Components Requiring Screening and EA

### Nha Trang

**Component 1: Drainage, Flood Control and Wastewater Collection**
- Drainage systems (main channel and culverts)
- Equipment for cleaning streets and drains
- New main sewers, pumping stations, pressure pipe lines and branch sewers

**Component 2: Wastewater Treatment Plant (WWTP)**
- WWTP at South Site, capacity of 59,000 m³/day, discharge to Cai River
- WWTP at North Site, capacity of 19,000 m³/day, discharging to Quan Trong River

**Component 3: Solid Waste Management**
- Vehicles, equipment, transfer stations and public toilets
- Develop new Luong Hoa landfill site
- Vehicle repair workshop and equipment

### Quy Nhon

**Component 1: Drainage, Flood Control and Wastewater Collection**
- Rehabilitation, new construction of drain lines
- Rehabilitation of existing sewers and new outlets
- Excavation of Ban Sen Lake
- Gravity sewer, force main pipe, combined sewer overflows and outflows
- Wastewater pumping stations
- Secondary and tertiary lines (to be identified)

**Component 2: Waste Water Treatment Plants (WWTP)**
- Nhon Binh WWTP (Site 1b) capacity of 21,500 m³/day, CEPT (if GEF grant funding approved)
- Phu Hoa WWTP (Site 1c), capacity of 14,900 m³/day, Oxidation ditch, discharging to lake outlet
- Bau Lac WWTP (Site 2a), capacity of 8,200 m³/day, Oxidation ditch, discharging to Dinh stream

**Component 3: Solid Waste Management**
- Vehicles and equipment
- Transfer stations / Public toilet
- Development of additional cells within existing Long My land fill and new equipment

### Dong Hoi

**Component 1: Drainage, Flood Control, and Wastewater Collection**
- New drains, interceptor pipes, separated and tertiary sewers for other wards
- Street surface and pavement improvement
- Pumping stations and public toilets

**Component 2: Wastewater Treatment Plant (WWTP)**
- Duc Ninh WWTP, capacity of 8,000 m³/day, discharging to Duc Ninh field (in East Buc Ninh ward)
- Rehabilitation of WWTP in Vietnam - Cuba Hospital, capacity of 300 m³/day

**Component 3: Solid waste management**
- Solid waste collection equipment
- Ly Trach landfill development and equipment
- Hazardous waste collection & treatment (centralized incinerator & equipment)
5. Environmental Assessment (EA)

The ECs will conduct a comprehensive and separate EA for each of the three (3) Phase 2 sub-project cities based on the environmental screening results and review comments to their Environmental Screening Report. This EA process will be conducted in full accordance with the World Banks' OP / BP 4.01 and Vietnamese national standards and requirements. As a result of this EA process, the ECs will produce in English and Vietnamese a “stand alone” EA report for each of the three (3) Phase 2 sub-project cities which will provide the following key information:

PART 1 ENVIRONMENTAL ASSESSMENT (EA)
1. Introduction and Project Description
2. Environmental Policies and Legislation
3. Project Background and Planning Framework
4. Existing Environmental Conditions and Baseline Data
5. Alternatives to the Project
6. Identification of Predicted Impacts

PART 2 ENVIRONMENTAL MANAGEMENT PLAN (EMP)
7. Mitigation Measures
8. Environmental Monitoring and Reporting
9. Capacity Development and Training
10. Project Organization for Environmental Management
11. Budget Requirements for Environmental Management

The detailed outline of the Phase 2 EA Report will be based on the approved Phase 1 EA report and will include the following considerations:

- During preparation of the EA, the EC is expected to work in close cooperation with the Engineering Consultant who would carry out various surveys in the sub-project cities and sites which are of importance to the EA. This close cooperation will further provide feed-back to the sub-project planning and design work to integrate environmental issues into the overall project cycle.

- The EA Report will include the results of the environmental screening of the proposed sub-project site, construction and operation. In addition, the EA Report will include discussions about other criteria or alternative considerations on the sub-project.

- The EC will treat the listed environmental impacts in the screening outline as examples, and will make the necessary modifications, if necessary, based on his judgment in accordance with the Environmental Guidelines for Phase 2.
The EC will assist the PPU / PMU of each of the three (3) sub-project cities to carry out two (2) stages of public consultations that will involve representatives of local NGOs and communities directly affected by the proposed sub-project activities. The documented results and recommendations of these public consultations will be included in the EA Reports. These consultations will focus on sub-project related environmental issues, impacts and concerns.

The EC will submit the draft sub-project EA Report, in English and Vietnamese, to the PPU / PMU and the Bank for their review and comment. After making any needed amendments or corrections in both language versions, the revised reports will be sent to the PPU / PMU for submission to the Bank and the Provincial DONRE for their review, appraisal and submission to the respective Provincial People’s Committee (PPC) for approval.

After appraisal and clearance by the Bank and the Provincial DONRE, the EC will finalize the EA Report after incorporating all review comments. The Final EA Report will be submitted in both English and Vietnamese to the PPU / PMU for official transmission to the World Bank, PPC and DONRE.

To comply with the World Bank safeguard policies, the EA Report will be publicly disclosed. The PPU / PMU will confirm with the World Bank the location and time of disclosure of the draft EA Report (in Vietnamese) to the public. The PPU / PMU will also confirm the release of the final EA Report for display at the Vietnam Development Information Center (VDIC) in Hanoi and at the InfoShop in Washington, D.C (www.worldbank.org). The draft EA documents will be made publicly available and displayed within each sub-project city by the respective PPU / PMU prior to the sub-project appraisal.

6. Institutional Arrangements

During the Phase 2 sub-project preparation, the overall responsibility for full compliance with the requirements of these Environmental Guidelines lies with the PPU / PMU. The ECs to be engaged by the PPU / PMU under Phase 2 of the CCESP will conduct the sub-project screening and prepare the sub-project EAs according to these requirements.

The PPU / PMU in each province will ensure an active and effective participation and support of the community during preparation and implementation of the EA. In order to build local ownership, the PPU will also manage the interaction with the Provincial DONRE, and the disclosure activities.

Funds for implementing the environmental mitigation measures, monitoring plans, and institutional strengthening activities will be included in Phase 2 sub-project costs.
# Environmental Clearance Process for all CCESP Sub-projects

The environmental clearance process for CCESP Phase 2 sub-projects is outlined in Table 5.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The ECs hired by the PPU / PMU complete an environmental screening for all sub-projects with supporting baseline data and the first stage of consultations.</td>
</tr>
<tr>
<td>2</td>
<td>The ECs informs the PPU / PMU of the screening results and identifies any sub-project for which the risk of serious environmental impact supports a recommendation that all activities on that sub-project should be stopped unless he / she hears otherwise from the PPU / PMU.</td>
</tr>
<tr>
<td>3</td>
<td>The ECs prepares the draft EA Report for each project phase and city, including screening and EA study results for all sub-projects proposed for funding.</td>
</tr>
<tr>
<td>4</td>
<td>As part of the EA preparation, public consultation is conducted based on the main findings of the draft EA. This public consultation is organized in cooperation with the PPU / PMU.</td>
</tr>
<tr>
<td>5</td>
<td>The ECs forwards the draft EA to PPU / PMU for their comments. After incorporation of their comments, the revised draft is sent by the PPU / PMU to the Provincial DONRE for review and comments with a copy to the World Bank.</td>
</tr>
<tr>
<td>6</td>
<td>The Provincial DONRE appraises and comments on the adequacy of the draft EA Report.</td>
</tr>
<tr>
<td>7</td>
<td>The ECs finalize the EA Report incorporating the comments received and submits it to the PPU / PMU which checks that all requested corrections have been properly made and resubmits it to the Provincial DONRE.</td>
</tr>
<tr>
<td>8</td>
<td>If the EA Report is found to be adequate, the Provincial DONRE provides the Environmental Certificate for the sub-project to the PPU / PMU.</td>
</tr>
<tr>
<td>9</td>
<td>PPU / PMU submit the final EA Report to the World Bank for issuance of a No Objection Letter (NOL) with a copy to the Provincial and City's People's Committee (PPC / CPC).</td>
</tr>
<tr>
<td>10</td>
<td>Disclosure of the EA Report as per World Bank requirements.</td>
</tr>
<tr>
<td>11</td>
<td>World Bank issues a NOL to the PPU / PMU with copy to PPC / CPC.</td>
</tr>
<tr>
<td>12</td>
<td>PPU / PMU obtains endorsement from the PPC for sub-project implementation and site clearance.</td>
</tr>
</tbody>
</table>
Annex 1: Guidance on the Collection of Required Baseline Data for Environmental Assessment (EA)

Depending on the type of proposed subproject, the following environmental baseline data is required to be collected, following existing Vietnamese standards for specific methods for each type of data collection. For any proposed wastewater treatment plant (WWTP) or sanitary landfill sites, the following baseline data should be provided for the:

- Within the specific site (within the proposed property)
- Within the required buffer zone of the proposed facility
- Within the receiving water body for proposed WWTP effluent discharge sites
- Within areas downstream of proposed sanitary landfill sites (see Annex 2 for more detailed guidance on sanitary landfill requirements)

I. Air quality

Samples should be taken at each main pipeline, at least at the starting point and the end point. For long pipelines, more samples should also be taken (at the intersection between main pipeline and the branches or at the specific points such as at front of industrial zone, school, service center, densely populated residential area...). The air quality parameters to be collected and analyzed are: CO, SO2, total suspended dust, and noise.

II. Surface water quality

The sample of surface water should be taken at every outlet, at the main drainage canal of the city and at downstream of the intersection point between the main drainage canal and/or the river or sea (if any). If there are lakes or ponds or drainage canals to be dredged in phase 1, the water quality of these lakes and ponds should also be collected.

The parameters to be analyzed for the samples taken from the main drainage canal, lakes and ponds are: temperature, pH, total suspended solid (TSS), BOD5, COD, DO, coliform, NO3-, PO3-. For rivers, these parameters are: river width, river depth, max. water level, average water level, minimum water level, maximum flow, average flow, minimum flow, TSS, BOD5, COD, DO, NO3-, PO3-, oil, coliform. These data should be collected for both dry and wet weather. For estuarine areas, these parameters are: maximum water level, average water level, minimum water level, maximum flow, average flow, minimum flow, pH, TSS, BOD5, COD, DO, NO3-, PO4-, oil, coliform. For the coastal areas, these parameters are: flow / current patterns, salt, pH, TSS, BOD5, COD, DO, NO3-, PO3-, oil, coliform.
Coastal Cities Environmental Sanitation Project (CCESP)

III. Groundwater parameters: pH, Cu, total Fe, Mn, hardness.

IV. Ecology, including description of:
1. Existing and proposed land use
2. Fauna (common terrestrial and aquatic animals; any rare or endangered animals)
3. Flora (common terrestrial and aquatic vegetation; any rare or endangered plants)
4. Ecology - if the drainage effluent is discharged to an estuary or the sea, it will be necessary to collect the following information;
   - Biological diversity
   - Endemic or migratory organisms, including fish
   - Mangrove, seaweed and/or coral cover and distribution
   - other unique features known to the area

V. Sludge quality
   - Amount of dredged sludge from the main drainage canal
   - Sludge quality: volatile solids (%), total solids (%), Pb, Cu, Ni

VI. Cultural property
   - Cultural property
   - Historical property
   - Archeological site
   - Religious property
   - Graves

VII. Socio-economy
1. Population and Socio-economic Situation
   a. Population, including description of:
      - Total households and population recorded in latest census
      - Average person / household
      - Population growth level
      - Presence and percentage of population who are recognized as ethnic minorities or indigenous people
   b. Occupation (The occupation of residents in the project area: percentage of farmers, workers, office staff, dealers, services, others)
   c. Household income (average and range of monthly income and sources of income)
   d. Environmental health, including description of the total number of people that are affected by infectious, acute, chronic or occupational diseases, particularly diseases related to environmental sanitation conditions.
2. Public works and infrastructure (description and composition of existing public works and facilities, including schools, clinics, markets, cemeteries, temples, churches)
   a. Roads (description and composition of existing roads)
   b. Public water, drainage and power supplies, including description of:
      - Number of households with water supply and type of water supply.
      - Number of households with electricity supply.
      - Number of households connected to the drainage system.
      - Number of public toilets.
   c. Solid waste collection and treatment, including description of:
      - Number of households with solid waste collection.
      - The method of handling the solid waste for the households that lack solid waste service.

VIII. Other Baseline Data Requirements
1. Maps showing exact locations of existing (DONRE, etc) environmental quality sampling stations in each sub-project city
2. Summary of related / proposed development projects in the sub-project area that may influence environmental conditions and quality
3. For proposed WWTP effluent discharge sites, identify the existing main sources of liquid / solid waste in the area (such as factories, etc) and the classification / current uses of these receiving water bodies.
4. Representative photographs of each proposed subproject site (please list the location name and date of each photograph)

IX. Due Diligence Reviews
As part of the baseline data collection, impact screening and assessment, all other related projects and investments in each sub-project city will be identified and assessed for the linkage to and impact to / from the proposed CCESP sub-project investment. This “due diligence review” process will assess and document the following key project inter-relationships:

- What are the main environmental risks between the two respective projects?
- Are the mitigation measures and monitoring program adequate?
- Have the stakeholders been consulted and have their concerns been incorporated sufficiently in the EA and EMP?
- What is the environmental management capacity of the other projects’ implementing agency?
- What are the reputational risks to the Bank and recommended appropriate mitigation measures and actions to avoid or minimize such risks?
Coastal Cities Environmental Sanitation Project (CCESP)

Annex 2 Environmental Impact Screening Matrix

<table>
<thead>
<tr>
<th>Potential Impact Source</th>
<th>Water Quality</th>
<th>Air Quality</th>
<th>Land Use</th>
<th>Flora and Fauna</th>
<th>Cultural &amp; Socio-Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Project</td>
<td>Specific Alternative Site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Component</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Drainage &amp; Wastewater Collection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Wastewater Treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Solid Waste Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Resettlement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+ Positive impact: + Negative impact: ○ + Severe: ◊ + Medium: ○ + Light: ☐