Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

QUANG TRI DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT
QUANG TRI PROVINCE HAZARDOUS PROJECT MANAGEMENT UNIT
(WB5/VN-HAZ)

ENVIRONMENTAL MANAGEMENT PLAN

SUBPROJECT: UPGRADING TRIEU THUONG 1, 2 RESERVOIR SYSTEM
PROJECT: VIETNAM MANAGING NATURAL HAZARDS (VN – HAZ/WB5)

LOCATION: TRIEU THUONG COMMUNE, TRIEU PHONG DISTRICT
QUANG TRI PROVINCE

Quang Tri, July 2013
ENVIRONMENTAL MANAGEMENT PLAN

SUB-PROJECT
UPGRADING TRIEU THUONG 1,2 RESERVOIR SYSTEM

PROJECT
VIETNAM MANAGING NATURAL HAZARDS
(VN – HAZ/WB5)

LOCATION
TRIEU THUONG COMMUNE, TRIEU PHONG DISTRICT,
QUANG TRI PROVINCE

QUANG TRI PROVINCE VN-HAZ/WB5 PROJECT MANAGEMENT UNIT
VINACONTROL ENVIRONMENTAL CONSULTANCY AND APPRAISAL JOINT STOCK COMPANY

Quang Tri, July 2013
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CURRENCY EQUIVALENTS
USD = Viet Nam Dong (VND)
US$1 = 20,870 VND

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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CARB</td>
<td>Compensation, Assistance and Resettlement Board</td>
</tr>
<tr>
<td>CMO</td>
<td>Community-based Monitoring Organisation</td>
</tr>
<tr>
<td>CPC</td>
<td>Commune People's Committee</td>
</tr>
<tr>
<td>CPO</td>
<td>Central Project Office</td>
</tr>
<tr>
<td>CPMO</td>
<td>Central Project Management Office</td>
</tr>
<tr>
<td>CSC</td>
<td>Construction Supervising Consultant</td>
</tr>
<tr>
<td>DONRE</td>
<td>Department of Natural Resources and the Environment</td>
</tr>
<tr>
<td>DPC</td>
<td>District People’s Committee</td>
</tr>
<tr>
<td>DSR</td>
<td>Dam Safety Report</td>
</tr>
<tr>
<td>ECOP</td>
<td>Environmental Code of Practices</td>
</tr>
<tr>
<td>EF</td>
<td>Environmental Faculty</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>EMC</td>
<td>Environmental Management Consultant</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>ESMF</td>
<td>Environmental and Social Management Framework</td>
</tr>
<tr>
<td>GoV</td>
<td>Government of Vietnam</td>
</tr>
<tr>
<td>IOC</td>
<td>Infrastructures on Canal</td>
</tr>
<tr>
<td>MONRE</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>MPI</td>
<td>Ministry of Planning and Investment</td>
</tr>
<tr>
<td>NTR/QCVN</td>
<td>National Technical Regulation</td>
</tr>
<tr>
<td>NWL</td>
<td>Normal Water Level</td>
</tr>
<tr>
<td>OP</td>
<td>Operation Policy (of WB)</td>
</tr>
<tr>
<td>PAP</td>
<td>Project Affected people</td>
</tr>
<tr>
<td>PPC</td>
<td>Province People's Committee</td>
</tr>
<tr>
<td>PPC</td>
<td>Province People’s Committee</td>
</tr>
<tr>
<td>PPMU</td>
<td>Province Project Management Unit</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>RAP</td>
<td>Resettlement Action Plan</td>
</tr>
<tr>
<td>RPF</td>
<td>Resettlement Policy Framework</td>
</tr>
<tr>
<td>TT 1 or 2 R</td>
<td>Trieu Thuong 1 or 2 Reservoir</td>
</tr>
<tr>
<td>UXO</td>
<td>Unexploded Ordnance</td>
</tr>
<tr>
<td>VIECA</td>
<td>Vinacontrol Environmental Consultant and Appraisal</td>
</tr>
<tr>
<td>VN-Haz</td>
<td>Vietnam Managing Natural Hazards Project</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WL</td>
<td>Water Level</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

**Background:** Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”, being conducted in Trieu Thuong commune, Trieu Phong district, Quang Tri province, belongs to Vietnam Natural Hazards Managing Project VN-Haz/WB05. The foremost purpose of the subproject is to repair and upgrade the Trieu Thuong 1, 2 reservoir system that has been degraded. The subproject aims to prevent floods, mitigate negative impacts of natural Hazards, protect human lives and property of local communities, as well as supply irrigation and conditions to develop aquaculture.

**Subproject Description:** Subproject contains reparation and upgrade construction works of the Trieu Thuong 1, 2 reservoir system, including: reservoirs, main dams, auxiliary dams, inlets, spillways and canal system; build new site-offices and dam safety corridor. The subproject is designed, planned and implemented according to the Environmental and Social Management Framework and Dam Safety Policy of World Bank, as well as regulations by Socialist Republic of Vietnam. The impacts arose in preconstruction, construction and operation phases of the subproject have to be identified, managed and monitored by specific plans and periodically reported to responsible organisations.

**Impacts and Mitigations:** The subproject potentially has impacts, including both positive and negative, on the local environment, economy and society. All the negative impacts are mitigable and have had plans to reduce in magnitude and scale. Negative impacts are generated from 3 processes: (i) Land acquisition and site clearance, (ii) Construction works, and (iii) Operation of the system. This subproject does not relate to resettlement, ethnic minority groups and cultural, historical and religious issues.

During pre-construction phase of the subproject, negative impacts potentially arise in the execution of land acquisition and compensation. These impacts can be mitigated by (i) communication, information dissemination with local authorities and communities, (ii) implement correctly, legally and promptly. Construction works may create adverse impacts on atmospheric environment, water, soil and the society, however, these impacts are only temporary, discontinuing, affecting small area. Mitigations proposed for these impacts are: (1) Comply with the Environmental Management Plan (EMP) prepared for the subproject, (2) Consult local authorities and local communities at early stage in preconstruction phase and continue throughout the construction and operation processes of the subproject, and (3) Monitor and manage the works thoroughly and closely.
This EMP document aims to specifically plan the execution procedure of the subproject “Upgrading Trieu Thuong 1, 2 Reservoir System” with the purposes of ensuring environmental and social qualities affected by the subproject. EMP contains a detailed action plan, timeframe and fund allocation. The entire process of the subproject implementation will be strictly supervised by Quang Tri Province Project Management Unit (PPMU), consultant units, construction supervisors and local people. The monitoring plan will be documented and reported publicly and periodically.

**Activities to be conducted:** In order to minimise the negative impacts throughout subproject implementation, these following mitigations have to be implemented sufficiently and effectively, collaborate with opened and continual public consultation with local authorities and communities, especially with affected households:

1. Ensure all environmental standards covered in the bidding contracts and explained clearly to contractors
2. Implement sufficiently and effectively all mitigations; monitor and adjust the plan commensurate with actual situations to maximise effectiveness of the mitigations.
3. Strictly monitor and supervise implementation of mitigation measures to ensure they are fully complied with and have adequate effects in reducing negative impacts
4. Have plan and fully conduct public consultation throughout the subproject.

**Responsibilities:** At Project level, CPMO is responsible to monitor all subprojects and supervise implementation progress of the subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”, including implementation of environmental protection as proposed in EMP document.

At subproject level, Quang Tri Province Project Management Unit (PPMU) is responsible to prepare bidding documents, choose capable contractors, prepare contracts to ensure effective implementation and strictly monitor EMP implementation of the subproject. Contractors are responsible to implement the subproject precisely as planned and report periodically to PPMU. PPMU will collaborate with local authorities to effectively consult the locals and improve effectiveness of mitigation measures. Quang Tri Department of Natural Resources and the Environment (DONRE) is responsible for monitoring subproject’s compliance to environmental regulation of the Government of Vietnam.
Budget Allocation: The subproject expenses source from ODA by WB and reciprocal capital of Quang Tri province with total investment of 75,856,664,000 VND. EMP costs include (i) costs of mitigation measures implementations, (ii) costs of safeguard training and capacity building: (iii) costs of environmental management consultant, (iv) assistance for community-based monitoring organisation and (v) EMP management.
1. **INTRODUCTION**

Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System” is one out of six (06) subprojects in Quang Tri province, belong to Project Vietnam Managing Natural Hazards VN-Haz/WB5. This subproject is part of Component 4: Investments to reduce risks of natural hazards for prior subprojects.

Environmental Management Plan (EMP) for this subproject is prepared to be compatible with the Environmental and Social Management Framework (ESMF) (CPO, 2012). All required screening and scoping methods have been performed in order to identify all potential impacts of the subproject, therefore, propose appropriate mitigation measures in compliance with World Bank’s Safeguards Policies. This document also attaches an Environmental Codes of Practice (ECOP) for the subprojects in the Vietnam Managing Natural Hazards Project. These codes will be included in the bidding documents, construction contracts and implementation arrangement.

2. **POLICY, REGULATION AND INSTITUTIONAL FRAMEWORKS**

2.1. **Legislations by the Government of Vietnam**

**Laws**

- The law on fire prevention and fire fighting: No 27/2001/QH10 of the National Assembly, approved on June 29th, 2001
  - Land Law approved by the National Assembly on November 26th, 2003 and promulgated by Order No. 1 3/2003/QH11 on December 10, 2003 by the President, with effect from July 1st, 2004.
  - The Law on Environmental Protection, No 52/2005/QH11 approved by the National Assembly on November 29th, 2005, promulgated on December 12th, 2005 with effect from July 1st, 2006;
  - The Law on Water Resources, No 17/2012/QH11, approved by the National Assembly on June 21st, 2012

**Decrees**

- Decree No 80/2006/ND-CP August 9th, 2006 on detailed regulation and guidelines on implementation of some articles in Environmental Protection Law.
- Decree No 59/2007/ND-CP April 9th, 2007 of the Government about solid waste management;
- Decree No 21/2008/ND-CP February 28th, 2008 on updates of Decree No 80/2006/ND-CP August 9th, 2006 on detailed regulation and guidelines on implementation of some articles in Environmental Protection Law.

- Decree No 117/2009/MONRE December 31st, 2009 about Violations in Environmental Protection;


Circular

- Circular No 02/2005/MONRE June 24th, 2005 by MONRE, guiding the implementation of decree no 149/2004/ND-CP July 27th, 2004 by the Government, regulating permissions on reconnaissance, exploitation and use of water resources and wastewater discharge;


- Circular No 16/2009/MONRE October 7th, 2009 about National Technical Regulation;

- Circular No 02/2009/MONRE March 19th, 2009 by MONRE about assessment of wastewater receiving capacity of water sources;


- Circular No 28/2011/MONRE by MONRE August 1st, 2011 about Regulation of Air quality and Noise Monitoring


Decisions

- Decision No 172/2007/QD-TT November 16th, 2007 about approval of National Strategy on Prevention and Mitigation of Natural Hazard to Year 2020;

- Decision No 19/2012/QD-PPC December 28th, 2012 by Quang Tri PPC about regulation on land pricing and urban classification in Quang Tri province 2013;
- Decision No 06/2013/QD-PPC February 5th, 2013 by Quang Tri PPC about regulation on compensation of land acquisition and resettlement support in Quang Tri province;
- Decision No 01/2013/QD-PPC January 2nd, 2013 by Quang Tri PPC about regulation of properties and crop prices in Quang Tri province.
- Decision No 1370/QD-BNN-HTQT on June 11th, 2012 by MARD about approval investment for Vietnam Managing Natural Hazard Project (VN-Haz/WB5) funded by WB.

**Other official papers**

- National Strategy on Prevention and Mitigation of Natural Hazard to Year 2020, approved by the Minister on November 16th, 2007;
- Scheme of ODA funding projects detailed for the project Natural Hazard Management (VN-Haz) WB5 by CPO December 2010;
- Official paper No 4376/BNN-HTQT by MARD to MPI about list of ODA debts for the project VN-Haz/WB5 on December 31, 2010;
- Official paper No 319/BTC-QLN by Ministry of Finance to MPI about comments on the project scheme on March 15, 2011;
- Environmental Impact Report, prepared by Consultancy and Technological Transfer joint-stock company of Water Resources University, March 2012;
- Conference on Dam Safety in Da Nang city by WB Appraisal Team for VN-Haz/WB5 project with related departments on March 15, 2012.

### 2.2. Applicable World Bank Safeguards Policies

Beside decision-making process of the Government of Vietnam, the subproject “Upgrading Trieu Thuong 1, 2 Reservoir System” in Trieu Thuong Commune, Trieu Phong district, Quang Tri province also have to comply with World Bank (WB) safeguard policies. The policies applicable for this subproject particularly are:

**Table 2.1 World Bank Safeguards Policies triggered**

<table>
<thead>
<tr>
<th>Policy</th>
<th>Trigger</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>OP/BP 4.01 – Environmental Assessment</td>
<td>• The proposed construction works are likely to have potential adverse environmental risks and impacts in the subproject area because it involves significant</td>
<td>• To ensure the environmental and social soundness and sustainability of investment projects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• To provide decision</td>
</tr>
</tbody>
</table>
| OP/BP 4.11 – Physical Cultural Resources | excavations, transportation and use of machineries. | makers with information on potential environmental and social impacts related to the project  
• To enhance the transparency and participation of affected communities into the decision making process |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• The subproject location does not locate in or in the vicinity of a physical cultural resources site recognised by the Government of Vietnam so this safeguard policy is not triggered but there still exists chance of finding during excavations. As a result, Chance find procedure is required.</td>
<td>• The policy aims to avoid, or mitigate, adverse impacts on cultural resources which are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices, including graves and graveyards. The policy provide guideline to ensure that (a) Physical cultural resources are identified and protected in the project and (b) National legislations on Physical Cultural Resources Protection are fully complied with.</td>
<td></td>
</tr>
<tr>
<td>OP/BP 4.12 - Involuntary Resettlement</td>
<td>• The subproject involves involuntary taking of land: (i) permanently acquired area due to expansion of constructions; and (ii) temporarily acquired land to facilitate construction works, transportation and material exploitation.</td>
<td>• To ensure that the following policies will be applied: (a) Avoid or minimize involuntary resettlement and impacts on economic activities, including loss of livelihoods; (b) Provide transparent compensation procedures during involuntary taking of land and other assets;</td>
</tr>
</tbody>
</table>
(c) Provide sufficient investment resources to enable the persons displaced by the project to share in project benefits (implemented through the Resettlement Action Plan); (d) Restore and improve the standards of living of persons affected by the project; and (e) Provide prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project. Development of Resettlement Plan and mitigation measures must be carried out based on consultation with affected populations and participatory approaches.

| OP/BP 4.37 - Safety of Dams | • Construction works include dam construction (main dams and saddle dams of Trieu Thuong 1 and Trieu Thuong 2 reservoirs). Irrigation, water supply and flood diversion will depend on the storage and operation of the dams under construction. | • To ensure that dam safety issues are adequately addressed, especially for high and/or risky dams; The policy applied to new dams, existing dams, and/or dams under construction that are related to infrastructure to be financed by WB. |

2.3. Environmental Standards

Standards for Air Quality
- (QCVN) 05: 2009/MONRE - National Technical Regulation on ambient air quality.

Standards for Noise and Vibration
- QCVN 26:2010/MONRE – National technical regulation on level of noise
Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

- QCVN 27:2010/MONRE – National technical regulation on level of vibration

Standards for Water Quality
- QCVN 08:2008/MONRE – National technical regulation on surface water quality
- QCVN 09:2008/MONRE – National technical regulation on underground water quality
- QCVN 14:2008/MONRE – National technical regulation on domestic wastewater

Standards for Soil Quality
- QCVN 03:2008/MONRE – National technical regulation on allowable limits of heavy metals in the soils

3. SUBPROJECT DESCRIPTION

3.1. Subproject General Information
- **Subproject Name:** “Upgrading Trieu Thuong 1, 2 Reservoir System”
- **Investment Method:** upgrade and repair
- **Investment Owner:** Quang Tri Province Department of Agriculture and Rural Development
- **Executional Unit:** Quang Tri Province VN-Haz Project Management Unit
- **Location:** The subproject’s construction works are conducted at Trieu Thuong 1, 2 Reservoir System (Figure 3.1.) of Trieu Thuong commune, bordering with 4 communes: Trieu Thanh commune (East), Ba Long commune (West), Ai Tu town (North) and Quang Tri commune (South). The centres of the reservoirs’ coordination are:
  - Trieu Thuong Reservoir 1: 16043’48” N, 107009’12” E
  - Trieu Thuong Reservoir 2: 16047’00”N, 107000’40” E
3.2. Aims and Duties

Overall, subproject aims to enhance capabilities in preventing and mitigating impacts of natural hazards at all institutional levels. The long-term goals include:

- Enhance capabilities of natural Hazard prevention and mitigation at province level and lower; Strengthen community-based natural Hazard reactions; Improve weather forecasting and early warning abilities; Reduce negative impacts of natural Hazard for the Province individually and contribute to the National Strategy.

- Improve the Hazard management system of Vietnam; Introduce Hazard mitigation methods and scenarios in responding to climate change; Enhance institutional capacity in dealing with natural Hazard in order to support the vulnerable regions in short and long term, reduce loss of life and properties in Hazard.

- Enhance the management capacity at above-province levels.
In addition, there are also short-term goals:
- Repair and upgrade the reservoir system with the purpose of preventing floods for the nearby and downstream areas; Reduce negative impacts of natural Hazard.
- Reduce vulnerability sourced from objective elements, such as droughts, floods, erosion; Enhance water level controlling ability, hence directly protect 8,870 residents in the nearby areas.
- Create opportunities to develop agricultural, forestry and aquatic productions; Create employment opportunity; Increase labour productivity and crop yields; Improve clean water supply, therefore improve living quality for over 6,500 people in downstream; Contributing to local economic and social development.
- Increase underground water table in the region, create favourable conditions for plants; Improve environmental quality; Harmonise local climate.
- Improve local road system, support rescuing procedures in storm season.

Specific duties of each component in the subproject are listed in Table III.1.

### Table 3.1 Subproject Duties

<table>
<thead>
<tr>
<th>Duties</th>
<th>Overall reservoir system</th>
<th>Trieu Thuong 1 Reservoir</th>
<th>Trieu Thuong 2 Reservoir</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide water for irrigation and other uses actively</td>
<td>268 ha paddy</td>
<td>150 ha paddy</td>
<td>118 ha paddy</td>
</tr>
<tr>
<td></td>
<td>320 ha non-paddy</td>
<td>160 ha non-paddy</td>
<td>160 ha non-paddy</td>
</tr>
<tr>
<td>Land protection</td>
<td>2,569 ha</td>
<td>1,839 ha</td>
<td>730 ha</td>
</tr>
<tr>
<td>Protect residents downstream</td>
<td>8,870 people</td>
<td>5,870 people</td>
<td>3,000 people</td>
</tr>
<tr>
<td>Improve regional environmental health</td>
<td>All contributes to create accumulated effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop industrial plants on hilly regions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create favourable conditions for freshwater fish raising</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 3.3. Construction Works

The Trieu Thuong 1, 2 Reservoir System consists of 06 components: reservoir, main dam, auxiliary dam, inlet, spillway and canal system. Construction plans are summarised in Table 3.2.
Table 3.2 Construction Works to Upgrading Trieu Thuong 1, 2 Reservoir System

<table>
<thead>
<tr>
<th>Work Items</th>
<th>Current State</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Main dam and auxiliary dam</td>
<td>2 dam faces and top of main and auxiliary dam that were eroded, subsided and absorbed through two dam shoulders when the water level had risen</td>
<td>Repair and upgrade</td>
</tr>
<tr>
<td>2. Spillway</td>
<td>Spillway was made of soil, not consolidated</td>
<td>Consolidate</td>
</tr>
<tr>
<td>3. Inlet</td>
<td>Degraded severely</td>
<td>Construct new one</td>
</tr>
<tr>
<td>4. Main channel and infrastructure on main channel</td>
<td>Lower than local demands</td>
<td>Strengthen</td>
</tr>
<tr>
<td>5. Site-offices</td>
<td>Non-exist</td>
<td>Construct new one</td>
</tr>
<tr>
<td>6. Constructing and managing routes</td>
<td>Low quality. Some are degraded</td>
<td>Upgrade existing roads Construct some new ones</td>
</tr>
</tbody>
</table>

Details of construction works, scale and design of each items are listed in Table 3.3 with illustrations in Figure 3.2-3.5. Spatial locations of construction works and transporting routes are demonstrated in Figure 3.6.

Table 3.3 Scale of Construction Works of Trieu Thuong 1, 2 Reservoirs

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Unit</th>
<th>Trieu Thuong 1 reservoir</th>
<th>Trieu Thuong 2 reservoir</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Reservoir</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Catchment area</td>
<td>km²</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>2</td>
<td>Standard flow:</td>
<td>Q₀</td>
<td>m³/s</td>
<td>0.197</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W₀</td>
<td>10⁶ m³</td>
<td>6.22</td>
</tr>
<tr>
<td>3</td>
<td>Probability, p=85%:</td>
<td>Q₈₅%</td>
<td>m³/s</td>
<td>0.108</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W₈₅%</td>
<td>10⁶ m³</td>
<td>3.411</td>
</tr>
<tr>
<td>4</td>
<td>Flood probability, P=1.5%:</td>
<td>Q₁·₅%</td>
<td>m³/s</td>
<td>72.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W₁·₅%</td>
<td>10⁶ m³</td>
<td>1.58</td>
</tr>
<tr>
<td>5</td>
<td>Check flood probability, p=0.5%:</td>
<td>Q₀·₅%</td>
<td>m³/s</td>
<td>82.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>W₀·₅%</td>
<td>10⁶ m³</td>
<td>1.75</td>
</tr>
</tbody>
</table>
# Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2
Reservoir System”

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Trieu Thuong 1 reservoir</td>
</tr>
<tr>
<td>6</td>
<td>Check flood probability, ( p=0.01% ): ( Q_{0.01%} )</td>
<td>( m^3/s )</td>
<td>114.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>( 10^6 m^3 )</td>
<td>2.34</td>
</tr>
<tr>
<td>7</td>
<td>Normal water level (NWL)</td>
<td>m</td>
<td>15.6</td>
</tr>
<tr>
<td>8</td>
<td>Max. water level, ( p=1.5% )</td>
<td>m</td>
<td>16.32</td>
</tr>
<tr>
<td>9</td>
<td>Check flood water level, ( p=0.5% )</td>
<td>m</td>
<td>16.37</td>
</tr>
<tr>
<td>10</td>
<td>Check flood water level, ( p=0.01% )</td>
<td>m</td>
<td>16.58</td>
</tr>
<tr>
<td>11</td>
<td>Water level at death storage</td>
<td>m</td>
<td>10.4</td>
</tr>
<tr>
<td>12</td>
<td>Flood storage capacity</td>
<td>( 10^6 m^3 )</td>
<td>0.773</td>
</tr>
<tr>
<td>13</td>
<td>Area of water surface (NWL)</td>
<td>ha</td>
<td>96</td>
</tr>
<tr>
<td>14</td>
<td>Death storage capacity, WC</td>
<td>( 10^6 m^3 )</td>
<td>0.268</td>
</tr>
<tr>
<td>15</td>
<td>Storage capacity at NWL</td>
<td>( 10^6 m^3 )</td>
<td>2.661</td>
</tr>
<tr>
<td>16</td>
<td>Storage at check flood probability, ( p=1.5% )</td>
<td>( 10^6 m^3 )</td>
<td>3.381</td>
</tr>
<tr>
<td>17</td>
<td>Storage at check flood probability, ( p=0.5% )</td>
<td>( 10^6 m^3 )</td>
<td>3.434</td>
</tr>
<tr>
<td>18</td>
<td>Storage at check flood probability, ( p=0.01% )</td>
<td>( 10^6 m^3 )</td>
<td>3.657</td>
</tr>
</tbody>
</table>

## B Main dam

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Earth dam, back-fill to existing downstream dam slope</td>
</tr>
<tr>
<td>1</td>
<td>Type of dam</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Elevation of parapet</td>
<td>m</td>
</tr>
<tr>
<td>3</td>
<td>Elevation of earth dam crest</td>
<td>m</td>
</tr>
<tr>
<td>4</td>
<td>Total length of dam surface</td>
<td>m</td>
</tr>
<tr>
<td>5</td>
<td>Total length of parapet</td>
<td>m</td>
</tr>
<tr>
<td>6</td>
<td>Max. height of dam</td>
<td>m</td>
</tr>
<tr>
<td>7</td>
<td>Width of dam surface</td>
<td>m</td>
</tr>
<tr>
<td>8</td>
<td>Upstream dam slope coefficient</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Downstream dam slope coefficient</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Strengthening to protect the upstream dam slope</td>
<td>* from +14.6 till dam toe: Substantially remain the</td>
</tr>
</tbody>
</table>
### C Saddle dams

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Unit</th>
<th>Trieu Thuong 1 reservoir</th>
<th>Trieu Thuong 2 reservoir</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of dam</td>
<td></td>
<td>Earth dam, back-filling to downstream of existing dam slope</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Elevation of parapet crest</td>
<td>m</td>
<td>13.4</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Elevation of dam crest</td>
<td>m</td>
<td>17.8</td>
<td>12.8</td>
</tr>
<tr>
<td>4</td>
<td>Total length of dam surface</td>
<td>m</td>
<td>363</td>
<td>365</td>
</tr>
<tr>
<td>5</td>
<td>Total length of parapet</td>
<td>m</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Max. height of dam</td>
<td>m</td>
<td>3.3</td>
<td>6.1</td>
</tr>
<tr>
<td>7</td>
<td>Width of dam surface</td>
<td>m</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Upstream dam slope coefficient</td>
<td></td>
<td>2.5</td>
<td>2.0</td>
</tr>
<tr>
<td>9</td>
<td>Downstream dam slope coefficient</td>
<td></td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>10</td>
<td>Strengthening to protect the upstream dam slope</td>
<td></td>
<td>strengthen cast-in place RC</td>
<td>Remaining unchanged</td>
</tr>
<tr>
<td>11</td>
<td>Strengthening the protection works of downstream slope</td>
<td>Grass growing</td>
<td>Grass growing</td>
<td></td>
</tr>
</tbody>
</table>

### D Flood spillway

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Unit</th>
<th>Trieu Thuong 1 reservoir</th>
<th>Trieu Thuong 2 reservoir</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of spillway</td>
<td></td>
<td>Free flow on natural rock/soil ground</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Elevation of spillway sill</td>
<td>m</td>
<td>15.6</td>
<td>10.8</td>
</tr>
</tbody>
</table>
### No | Parameter | Unit | Value
--- | --- | --- | ---
3 | Design water head of spillway | m | Trieu Thuong 1 reservoir: 0.72 | Trieu Thuong 2 reservoir: 0.73
4 | Width of sill | m | 35 | 35
5 | Design discharge flow (P=1.5%) | m³/s | 34.1 | 34.9
6 | Conveyance canal behind the spillway, trapezium shape | m | B<sub>bottom</sub>=20m; m=1.5 | B<sub>bottom</sub>=35m; m=1.5

### E Intake

1 | Type, structure of intake | | Steel pipe covered with RC, pressurized operation
2 | Elevation of entrance | m | +6.8 | +5.94
3 | Dimension of pipe | mm | Φ600 | Φ600
4 | Length of pipe | m | 56.3 | 36.0
5 | Design irrigation discharge | m³/s | 0.333 | 0.280
6 | Slope of pipe | | i = 0.005 | i = 0.005
7 | Operating by valve in downstream | | 2 valves, Φ 600 mm (1 valve for repair, 1 service valve)

### F Main canals + on-main canal structures

#### I Main canals

1 | Length | m | 5,743.0 (repairing 1,400m) | 1,998.0
2 | Design irrigation discharge | m³/s | 0.333 | 0.280

#### II On-main canal structures

1 | Regulators on canals | unit | 6.0 | -
2 | Intake gates on canal + off-takes | unit | 17.0 | 11.0
3 | Drainage sluices | unit | 1.0 | -
4 | Aqueducts | unit | 1 (new construction) | 1 existing aqueduct (repair)
5 | On canal side-spillway | unit | - | 1.0
6 | Under-road culverts + simple bridge | unit | 17.0 | 1.0

### G Management house

1 | Type of construction | | New construction, grade IV.
### Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Unit</th>
<th>Trieu Thuong 1 reservoir</th>
<th>Trieu Thuong 2 reservoir</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Construction area</td>
<td>m²</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td><strong>H</strong></td>
<td><strong>Construction cum management road</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Connecting from right bank of spillway on Trieu Thuong 2 reservoir to left bank of main dam of Trieu Thuong 1 reservoir</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Structure of road pavement, B=3.5m</td>
<td></td>
<td>concrete M200, 20cm thick</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Length of road</td>
<td>m</td>
<td>1,718.0</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>Width of road base</td>
<td>m</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Road connecting from main dam to saddle dam (Trieu Thuong 1, Trieu Thuong 2 reservoirs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Structure of road pavement, B=3.5m</td>
<td></td>
<td>concrete M200, 20cm thick</td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>Length of road</td>
<td>m</td>
<td>1,500.0</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Width of road base</td>
<td>m</td>
<td>5.0</td>
<td></td>
</tr>
</tbody>
</table>

Construction materials, including filling soil, cement, stone, sand, steel, wood and gravel, are exploited or transported from:

(i) 3 material sources – located in the subproject area (these areas are a part of the system, reserved for material exploitation when maintain and upgrade construction works)

(ii) Dau Mau commune: Rock borrow pit – distanced 45 km from subproject area (Material transporting routes 1)

(iii) Thach Han town: The supply of sand, gravel – distanced 5km from subproject area (Material transporting routes 2)

(iv) Dong Ha town: The supply of cement, iron, steel – distanced 16km from subproject area (Material transporting routes 3)

Transporting routes from external material supplies are illustrated in Figure 3.7.

Spoils, including excavated weathered layers, leftover and waste materials (bricks, stones, sands,...), are transported from construction sites to landfill located next to Trieu Thuong 2 Reservoir main dam.
Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

Figure 3.2 Design for Main Dam of Trieu Thuong 1 Reservoir
Figure 3.3 Design for Main Dam of Trieu Thuong 2 Reservoir
Figure 3.4 Design for Auxiliary Dam for Trieu Thuong 1 Reservoir
Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

Figure 3.5 Design for Auxiliary Dam for Trieu Thuong 2 Reservoir
Figure 3.6 Subproject Construction Works
Figure 3.7 Material transporting Routes
### 3.4. Budget Allocation

- Total investment: **75,856,664,000 VND**, in which:

#### Table 3.4 Total Investment and Fund Allocation of the Subproject

<table>
<thead>
<tr>
<th>No</th>
<th>Category</th>
<th>TT1R</th>
<th>TT2R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>30,828,585,000</td>
<td>22,331,611,000</td>
</tr>
<tr>
<td>1</td>
<td>Construction Cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Main Dams</td>
<td>12,369,589,000</td>
<td>6,947,365,000</td>
</tr>
<tr>
<td>3</td>
<td>Auxiliary Dams</td>
<td>3,406,561,000</td>
<td>1,965,610,000</td>
</tr>
<tr>
<td>4</td>
<td>Inlets</td>
<td>3,014,576,000</td>
<td>1,324,304,000</td>
</tr>
<tr>
<td>5</td>
<td>Spillways</td>
<td>2,473,226,000</td>
<td>788,427,000</td>
</tr>
<tr>
<td>6</td>
<td>Main canal and infrastructures on canal</td>
<td>9,271,276,000</td>
<td>5,150,831,000</td>
</tr>
<tr>
<td>7</td>
<td>Site offices</td>
<td>293,357,000</td>
<td>342,151,000</td>
</tr>
<tr>
<td>8</td>
<td>Roads for construction and management</td>
<td>-</td>
<td>5,800,705,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Compensation and assistance for land acquisition</td>
<td>1,801,771,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management Cost</td>
<td>881,084,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction consultant cost</td>
<td>8,601,689,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other costs</td>
<td>2,526,242,000</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contingencies</td>
<td>8,885,682,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td><strong>75,856,664,000</strong></td>
<td></td>
</tr>
</tbody>
</table>
4. ENVIRONMENTAL BACKGROUND

4.1. Environmental Settings

4.1.1. Natural Environment

- **Location, topography and geology**

  The subproject “Upgrading Trieu Thuong 1, 2 Reservoir System” is executed at Trieu Thuong commune, Trieu Phong district, South of Quang Tri Province. The province belongs to the North region of the Middle of Vietnam, extending from 16°018’N to 17°010’N and 106°32”E to 107°24”E, shares border with Quang Binh province (North), Thua Thien – Hue province (South), Dong Sea (East) and Democratic Republic of Laos (West). In West-East direction, the province stretches over 52.2km at the narrowest point and up to 75.4km at the widest. It has a 75-kilometre-coastline and area of almost 474.5ha (474.414.87ha). The terrain varies between 3 types: mountainous and hilly regions (78%), delta (14.5%) and coastal dunes (7.5%). Province’s topography is heavily dissected by mountain ranges and rivers.

  The Trieu Thuong 1, 2 Reservoir System is situated in the hilly region in the Southern of Quang Tri province. Geographical location of the subproject is illustrated in Figure 3.2. below. Total area of Trieu Thuong commune is 6.744,36ha. The terrain includes hilly regions (73%) and delta (27%). Hills and low mountains (hilly midlands) create slightly sloppy strips, wavy and average to deep cleavage. The area has geology made up of 2 basalt blocks: Gio Linh – Cam Lo block with elevation of about 100-250m, semi-plain with thick crust and Vinh Linh block located close to the coast with altitude from 50-100m.

- **Climate**

  The subproject area generally has the same climatic attributes as the whole Quang Tri province, hence has tropical monsoon climate with clearly defined rainy and dry seasons. The dry season begins at March and ends around August, characterised by low humidity and high temperature. In contrast, the period from September to February has relatively high precipitation; especially the last quarter has high concentration of rain and storms which creates floods and soil erosions. The temperature varies greatly, averaged approximately 26 degree C with highest figure of up to 39.4 degree C and lowest record of 9.8 degree C. Whereas, humidity stays at high levels around the year, from 70% to about 90% .

- **Hydrology**

  Quang Tri province has a relatively large river system, average density 0.8 - 1 km/km2. Due to the narrow width of the terrain, with the Truong Son Mountains in the west, rivers in Quang Tri Province is characterized by short and
steep. The province has three main river systems are the Ben Hai River, Thach Han river and O Lau River (My Chanh) with 12 major tributaries.

Quang Tri oceans have semi-diurnal tidal regime. Most days of month have 2 high tides and 2 low tides a day. The difference between water levels is significant. In high water season, tide magnitude in Cua Tung may exceed 0.4m.

The Trieu Thuong 1, 2 Reservoir System is not directly affected by local river system. Water capacity mainly depends on precipitation and irrigation/drainage scheme. Water level in the system rises and falls as in wet or dry seasons, there are considerable differences between different seasons' water level.

### Table 4.1 Hydrology of Trieu Thuong Reservoir System

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Unit</th>
<th>Trieu Thuong 1</th>
<th>Trieu Thuong 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Area</td>
<td>Km²</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>2</td>
<td>Typical flow</td>
<td>$Q_0$</td>
<td>m³/s</td>
<td>0.196</td>
</tr>
<tr>
<td></td>
<td>$W_0$</td>
<td>$10^6$m³</td>
<td>6.18</td>
<td>6.18</td>
</tr>
<tr>
<td>3</td>
<td>Frequency $P = 85%$</td>
<td>$Q_{0.85%}$</td>
<td>m³/s</td>
<td>0.108</td>
</tr>
<tr>
<td></td>
<td>$W_{0.85%}$</td>
<td>$10^6$m³</td>
<td>3.411</td>
<td>3.411</td>
</tr>
<tr>
<td>4</td>
<td>Flood frequency $P = 1.5%$</td>
<td>$Q_{1.5%}$</td>
<td>m³/s</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>$W_{1.5%}$</td>
<td>$10^6$m³</td>
<td>1.524</td>
<td>1.524</td>
</tr>
<tr>
<td>5</td>
<td>Flood frequency $P = 0.5%$</td>
<td>$Q_{0.5%}$</td>
<td>m³/s</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>$W_{0.5%}$</td>
<td>$10^6$m³</td>
<td>1.704</td>
<td>1.704</td>
</tr>
<tr>
<td>6</td>
<td>Flood frequency $P = 0.01%$</td>
<td>$Q_{0.01%}$</td>
<td>m³/s</td>
<td>133.13</td>
</tr>
<tr>
<td></td>
<td>$W_{0.01%}$</td>
<td>$10^6$m³</td>
<td>2.72</td>
<td>2.72</td>
</tr>
</tbody>
</table>

- **Natural Resources**

  **Land**: Quang Tri province has total land area of 474,669.11 ha, consists of components as listed in Table 4.1.

### Table 4.2 Land use in Quang Tri Province, 2012

<table>
<thead>
<tr>
<th>Land use</th>
<th>Area (ha)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>301,993.75</td>
<td>63.62</td>
</tr>
<tr>
<td>Non-agricultural</td>
<td>41,421.31</td>
<td>8.73</td>
</tr>
</tbody>
</table>
Biodiversity: Quang Tri province has high level of biodiversity, the subproject area has relatively low number of vegetation species, contains only 3 main groups: woody plants, industrial plants and shrubs. Furthermore, due to high level of human activities, terrestrial animals exist in a very limited number, only a few kinds of aves, some mammals, reptiles and insects. Aquatic ecosystem includes a small number of native flora and fauna in the reservoirs naturally and largely freshwater species serving local aquatic production in the lake system and Thach Han river.

- Natural Hazards

Storms and floods often occur between September and November, concentrate mostly in September and October. Storm season is often the same as rain season. Storm normally comes with high tides and sea level rise, brings floods that affect agricultural activities and seriously affect lives of Quang Tri population.

Floods in the downstream area of the reservoir system are prevented and mitigated by efficient operation of the system. However, after years of operating (since 1980), the system now has deteriorated, many proportions have broken and can not meet the minimum technical requirements.

4.1.2. Economy and Society

- Economy

Major economic activities of Trieu Thuong commune are agriculture, livestock and small businesses. Over 90% of the population live on agriculture. Farmland extends over 700 ha with a large variety of paddy and non-paddy vegetation, including about 350 ha paddy plants, over 80 ha corn, 73 ha cassava, 85 ha green bean, approximately 10 ha chilly, 44 ha peanut,… Besides, rubber covers 250 ha, in which 30 ha has been exploited. Livestock sector is also fairly developed: 126 buffaloes, 1,214 cattle, 3,000 pigs and 30,000 poultry. Acknowledging the advantages of large water surface, Trieu Thuong has focused on development of freshwater fish raising, contributes a considerable proportion to farmer’s income. Nevertheless, aquatic productions only use fairly simple tools, produce at small scale. Forestry has begun to receive attentions. More than 4,300 ha of forestry is made up of 300 ha protection forest and almost 2,300 ha production forest. Cover rate recorded at 69%.

Industries, handicrafts and trades develop in multiple directions. Productions of construction materials, mechanics repairing and transportation are
in the lead. Though wood-processing industry is still young and small, it has created stable jobs for more than 600 employees.

- **Society**

  *Demography:* Trieu Thuong commune is home for 6,948 people, belong to 1,599 households, divided into 9 hamlets. Natural increase rate in 2012 was 1.12%.

  *Social security and national defence:* generally, Trieu Thuong commune society is secured, low rate of incidents, conflicts and violations of legislation. National defence is also maintained.

  *Infrastructures:*

  - Education: 2 kindergartens, 2 elementary schools and 1 secondary school.
  
  - Health care: Since 2006, 1 healthcare centre, sized over 1,000m², has functioned and served over 4,000 patients a year.
  
  - Road network: there are over 56 km of roads, including concreted road (width of 2-2.5m), aggregated and infield roads. However, several parts of them have deteriorated to below safety standards.
  
  - Electricity: Since 1994, 99% of households in commune has had safe electricity access, distributed by 8 substations.

- **Assessment of Socioeconomic state**

  In general, Trieu Thuong commune is still in developing phase. Society is secured, low crime rate. However, the economy is still green, livelihood has not been diverse. Main income is from agriculture, generating income per capita fluctuated around average level (about 21.4 million VND/year). Agricultural production highly rely on nature. Infrastructures and public assets for developments of economy, culture, education, healthcare and evacuation need to be upgraded to rise in both quantity and quality. As a result, implementation of this subproject has vital roles in reduce natural hazard risks, enhance agriculture and aquaculture, thereby, improve local economy, as well as living standards of population in Trieu Thuong commune.

  *Source: Trieu Thuong CPC, 2012; Quang Tri PPC, 2013*

4.2. **Existing environment**

The environmental health is reflected by parameters of soil, water and atmospheric quality. Sampling was carried out at typical points in the project area. These results will be recorded as treated as baseline data to assess the project’s impacts on the local environment. This process is critical in order to
To monitor impacts of constructions and operational activities, surveys are conducted as shown in Table 4.2 and sampling locations are illustrated on Figure 4.1.

**Table 4.3 Monitoring requirements for pre-project environmental quality**

<table>
<thead>
<tr>
<th>Environmental Components</th>
<th>Indicators to be monitored</th>
<th>Investigation Method</th>
<th>Sampling locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmosphere</td>
<td>Temperature, Air pressure, Wind speed, Dust, Concentration of NO₂, Concentration of SO₂, Concentration of CO, Noise, Vibration</td>
<td>Measure and sample in the same day. Sampling, surveying, measuring and analysing methods are conducted according to the latest Vietnamese National Technical Regulations.</td>
<td>9 locations - TT1R main and auxiliary dams - TT2R main and auxiliary dams - Residential area close to TT1R - Residential area close to TT2R - 3 material sources</td>
</tr>
<tr>
<td>Soil</td>
<td>Nutritional indicators, Total N, Total P. Heavy metal indicators, Cd, Pb, As, Zn, Cu</td>
<td>-</td>
<td>6 locations - Main dam, auxiliary dam and main canal of TT1R and TT2R</td>
</tr>
<tr>
<td>Surface Water</td>
<td>Temperature, pH, DO, COD, BOD₅, NO₃, Cd, Pb, Fe, Hg, As, Coliform</td>
<td>-</td>
<td>4 locations - Main canal of TT1R and TT2R - Shared canal - Intersection between irrigation areas and Thach Han river</td>
</tr>
<tr>
<td>Underground</td>
<td>pH</td>
<td>-</td>
<td>3 locations</td>
</tr>
<tr>
<td>Water</td>
<td>COD</td>
<td>Ammonia</td>
<td>Cl⁻</td>
</tr>
<tr>
<td>-------</td>
<td>-----</td>
<td>---------</td>
<td>-----</td>
</tr>
</tbody>
</table>

- Residential area close to TT1R
- Residential area close to TT2R
- Residential area in irrigation of the whole reservoir system
Figure 4.1 Sampling locations for investigating pre-project environmental quality
• Environmental Investigation and Results

Through process of sampling and investigating at critical and representative points in subproject area, the state of each environmental components are identified and will be treated as baseline data for the subproject monitoring phase.

*Air Quality*

**Table 4.4 Air Quality Sampling Locations**

<table>
<thead>
<tr>
<th>No</th>
<th>Location</th>
<th>Point</th>
<th>Coordination (Projection: VN 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TT1R auxiliary dam</td>
<td>K1</td>
<td>X: 596026, Y: 1849302</td>
</tr>
<tr>
<td>2</td>
<td>Material source 2</td>
<td>K2</td>
<td>X: 596181, Y: 1849751</td>
</tr>
<tr>
<td>3</td>
<td>Material source 1</td>
<td>K3</td>
<td>X: 595909, Y: 1850610</td>
</tr>
<tr>
<td>4</td>
<td>Residential area near TT1R main dam</td>
<td>K4</td>
<td>X: 597428, Y: 1850210</td>
</tr>
<tr>
<td>5</td>
<td>TT1R main dam</td>
<td>K5</td>
<td>X: 596159, Y: 1850288</td>
</tr>
<tr>
<td>6</td>
<td>TT2R main dam</td>
<td>K6</td>
<td>X: 596532, Y: 1851839</td>
</tr>
<tr>
<td>7</td>
<td>Residential area near TT2R main dam</td>
<td>K7</td>
<td>X: 597553, Y: 1851222</td>
</tr>
<tr>
<td>8</td>
<td>Material source 3</td>
<td>K8</td>
<td>X: 596983, Y: 1852537</td>
</tr>
<tr>
<td>9</td>
<td>TT2R auxiliary dam</td>
<td>K9</td>
<td>X: 596883, Y: 1853019</td>
</tr>
</tbody>
</table>
# Table 4.5 Results of Air Quality monitoring

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Unit</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>K4</th>
<th>K5</th>
<th>K6</th>
<th>K7</th>
<th>K8</th>
<th>K9</th>
<th>QCVN 05-2009 (1hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Microclimate</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Temperature</td>
<td>°C</td>
<td>27.5</td>
<td>27.8</td>
<td>28.0</td>
<td>28.2</td>
<td>28.4</td>
<td>28.5</td>
<td>28.5</td>
<td>28.3</td>
<td>28.6</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Humidity</td>
<td>%</td>
<td>81</td>
<td>83</td>
<td>82</td>
<td>83</td>
<td>85</td>
<td>84</td>
<td>82</td>
<td>85</td>
<td>84</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Wind direction</td>
<td>WS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Wind speed</td>
<td>m/s</td>
<td>3.0</td>
<td>3.2</td>
<td>3.4</td>
<td>3.3</td>
<td>3.6</td>
<td>3.3</td>
<td>3.4</td>
<td>3.5</td>
<td>3.2</td>
<td>-</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SO₂</td>
<td>µg/m³</td>
<td>21.2</td>
<td>22.4</td>
<td>21.6</td>
<td>21.4</td>
<td>24.6</td>
<td>23.2</td>
<td>20.7</td>
<td>21.3</td>
<td>21.1</td>
<td>350</td>
</tr>
<tr>
<td>6</td>
<td>NO₂</td>
<td>µg/m³</td>
<td>16.8</td>
<td>17.4</td>
<td>19.6</td>
<td>15.3</td>
<td>16.4</td>
<td>18.5</td>
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<td>17.2</td>
<td>16.8</td>
<td>200</td>
</tr>
<tr>
<td>7</td>
<td>CO</td>
<td>µg/m³</td>
<td>2390</td>
<td>2120</td>
<td>3480</td>
<td>6240</td>
<td>2728</td>
<td>2455</td>
<td>7309</td>
<td>3189</td>
<td>2893</td>
<td>30,000</td>
</tr>
<tr>
<td>8</td>
<td>TSP</td>
<td>µg/m³</td>
<td>12.6</td>
<td>14.2</td>
<td>15.3</td>
<td>18.6</td>
<td>17.6</td>
<td>19.2</td>
<td>14.4</td>
<td>12.1</td>
<td>12.7</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>Noise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Lₚₑq</td>
<td>dBA</td>
<td>34.3</td>
<td>32.4</td>
<td>35.1</td>
<td>31.7</td>
<td>33.4</td>
<td>32.8</td>
<td>31.6</td>
<td>34.2</td>
<td>35.1</td>
<td>70</td>
</tr>
<tr>
<td>10</td>
<td>L₁₀₀</td>
<td>dBA</td>
<td>35.2</td>
<td>33.5</td>
<td>36.1</td>
<td>32.4</td>
<td>35.6</td>
<td>34.7</td>
<td>32.6</td>
<td>36.2</td>
<td>34.5</td>
<td>70</td>
</tr>
<tr>
<td>11</td>
<td>L₉₀₀</td>
<td>dBA</td>
<td>32.3</td>
<td>31.4</td>
<td>32.2</td>
<td>30.5</td>
<td>32.1</td>
<td>31.3</td>
<td>30.1</td>
<td>32.4</td>
<td>31.6</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Vibration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Vibration Acceleration</td>
<td>m/s²</td>
<td>42.6</td>
<td>42.3</td>
<td>42.2</td>
<td>42.4</td>
<td>43.1</td>
<td>44.4</td>
<td>43.5</td>
<td>42.3</td>
<td>43.1</td>
<td>75</td>
</tr>
</tbody>
</table>

Source: Vinacontrol Environmental Consultancy and Appraisal Joint Stock Company (sampled and analysed on March 26th, 2013)
According to the results, all atmospheric indicators show values within QCVN approved level. The amount of CO ranges from just over 2000µg/m³ to 7300µg/m³, significantly lower than the allowable limits of the QCVN 05-2009. NO₂ concentration in the air exists between 15.3 and 19.6µg/m³, the highest concentration recorded is still 10 times less than the standard. Maximum TSP values at 19.2µg/m³, significantly smaller than standard level of 300µg/m³. Noise levels at sampling points are generally low and have very small or no change between times of day.

Generally, the air quality in subproject area is good, clean and has not been polluted at any level.

Water Quality

Table 4.6 Surface Water Sampling Locations

<table>
<thead>
<tr>
<th>No</th>
<th>Location</th>
<th>Point</th>
<th>X</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TT2R main canal</td>
<td>NM1</td>
<td>597243</td>
<td>1852243</td>
</tr>
<tr>
<td>2</td>
<td>TT1R main canal</td>
<td>NM2</td>
<td>596634</td>
<td>1850235</td>
</tr>
<tr>
<td>3</td>
<td>Shared canal of the reservoir system</td>
<td>NM3</td>
<td>598384</td>
<td>1852976</td>
</tr>
<tr>
<td>4</td>
<td>Intersection between irrigating area and Thach Han river</td>
<td>MN4</td>
<td>597584</td>
<td>1852968</td>
</tr>
</tbody>
</table>

Table 4.7 Results of Surface Water Survey

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Unit</th>
<th>NM1</th>
<th>NM2</th>
<th>NM3</th>
<th>NM4</th>
<th>QCVN 08: 2008/MONRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Temperature</td>
<td>°C</td>
<td>19.5</td>
<td>19.2</td>
<td>19.6</td>
<td>20.1</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>pH</td>
<td>-</td>
<td>6.8</td>
<td>6.7</td>
<td>6.6</td>
<td>7.1</td>
<td>5.5 – 9</td>
</tr>
<tr>
<td>3</td>
<td>DO</td>
<td>mg/l</td>
<td>6.6</td>
<td>6.2</td>
<td>5.6</td>
<td>5.8</td>
<td>≥4</td>
</tr>
<tr>
<td>4</td>
<td>COD</td>
<td>mg/l</td>
<td>7.4</td>
<td>7.3</td>
<td>12.5</td>
<td>14.4</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>BOD5</td>
<td>mg/l</td>
<td>4.81</td>
<td>4.73</td>
<td>9.5</td>
<td>9.6</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>NO₃⁻</td>
<td>mg/l</td>
<td>4.2</td>
<td>3.7</td>
<td>5.6</td>
<td>7.3</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>TSS</td>
<td>mg/l</td>
<td>25</td>
<td>28</td>
<td>31</td>
<td>37</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Cd</td>
<td>mg/l</td>
<td>NF</td>
<td>NF</td>
<td>NF</td>
<td>NF</td>
<td>0.01</td>
</tr>
<tr>
<td>8</td>
<td>Pb</td>
<td>mg/l</td>
<td>NF</td>
<td>NF</td>
<td>NF</td>
<td>NF</td>
<td>0.05</td>
</tr>
<tr>
<td>9</td>
<td>Fe</td>
<td>mg/l</td>
<td>0.32</td>
<td>0.28</td>
<td>0.19</td>
<td>0.04</td>
<td>1.5</td>
</tr>
</tbody>
</table>
### Table 4.8 Underground Water Sampling Locations

<table>
<thead>
<tr>
<th>No</th>
<th>Location</th>
<th>Coordination (Projection: VN 2000)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Y</td>
</tr>
<tr>
<td>1</td>
<td>Residential area near TT1R main dam</td>
<td>NN1</td>
<td>597703</td>
</tr>
<tr>
<td>2</td>
<td>Residential area near TT2R main dam</td>
<td>NN2</td>
<td>597761</td>
</tr>
<tr>
<td>3</td>
<td>Residential area in irrigation area of the</td>
<td>NN3</td>
<td>598845</td>
</tr>
<tr>
<td></td>
<td>system</td>
<td></td>
<td></td>
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</tbody>
</table>

### Table 4.9 Results of Underground Water Survey

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Unit</th>
<th>NN1</th>
<th>NN2</th>
<th>NN3</th>
<th>QCVN 09: 2008/MONRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pH</td>
<td>-</td>
<td>6.5</td>
<td>6.4</td>
<td>6.3</td>
<td>5.5 – 8.5</td>
</tr>
<tr>
<td>2</td>
<td>COD</td>
<td>mg/l</td>
<td>3.6</td>
<td>2.4</td>
<td>3.6</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Ammonia</td>
<td>mg/l</td>
<td>0.05</td>
<td>0.02</td>
<td>0.04</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>Cl⁻</td>
<td>mg/l</td>
<td>86</td>
<td>92</td>
<td>104</td>
<td>250</td>
</tr>
<tr>
<td>5</td>
<td>NO₂⁻</td>
<td>mg/l</td>
<td>0.002</td>
<td>0.008</td>
<td>0.005</td>
<td>0.1</td>
</tr>
<tr>
<td>6</td>
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<td>mg/l</td>
<td>0.001</td>
<td>0.005</td>
<td>0.003</td>
<td>0.05</td>
</tr>
<tr>
<td>7</td>
<td>Fe</td>
<td>mg/l</td>
<td>6</td>
<td>6.5</td>
<td>7.2</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Mn</td>
<td>mg/l</td>
<td>0.05</td>
<td>0.08</td>
<td>0.06</td>
<td>0.5</td>
</tr>
<tr>
<td>9</td>
<td>E. coli</td>
<td>MPN/100ml</td>
<td>NF</td>
<td>NF</td>
<td>NF</td>
<td>NF</td>
</tr>
<tr>
<td>10</td>
<td>Coliform</td>
<td>MPN/100ml</td>
<td>NF</td>
<td>NF</td>
<td>NF</td>
<td>3</td>
</tr>
</tbody>
</table>

*NF = Not Found

Source: Vinacontrol Environmental Consultancy and Appraisal Joint Stock Company (sampled and analysed on March 26th, 2013)
Survey results of surface and underground water are summarised in Table 4.7. and 4.8. Overall the area where subproject located has good water quality. There has been no pollution or abnormality detected.

**Soil Quality**

**Table 4.10 Soil Sampling Locations**

<table>
<thead>
<tr>
<th>No</th>
<th>Location</th>
<th>Point</th>
<th>Coordination (Projection: VN 2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TT1R main dam</td>
<td>Đ1</td>
<td>596813 1851922</td>
</tr>
<tr>
<td>2</td>
<td>TT2R main dam</td>
<td>Đ2</td>
<td>596396 1850204</td>
</tr>
<tr>
<td>3</td>
<td>Residential area</td>
<td>Đ3</td>
<td>597698 1851188</td>
</tr>
</tbody>
</table>

**Table 4.11 Results of Soil Survey**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>Đ1</th>
<th>Đ2</th>
<th>Đ3</th>
<th>QCVN03:2008/MONRE (for agricultural soil)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>QCVN03:2008/MONRE (for agricultural soil)</td>
</tr>
<tr>
<td><strong>1. Nutrition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>QCVN03:2008/MONRE (for agricultural soil)</td>
</tr>
<tr>
<td>Total N</td>
<td>mg/100g</td>
<td>14.2</td>
<td>14.3</td>
<td>14.1</td>
<td>-</td>
</tr>
<tr>
<td>Total P</td>
<td>mgP₂O₅/100g</td>
<td>15.8</td>
<td>14.1</td>
<td>15.0</td>
<td>-</td>
</tr>
<tr>
<td><strong>2. Heavy Metals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>QCVN03:2008/MONRE (for agricultural soil)</td>
</tr>
<tr>
<td>Cd</td>
<td>mg/kg</td>
<td>0.025</td>
<td>0.021</td>
<td>0.028</td>
<td>2</td>
</tr>
<tr>
<td>Pb</td>
<td>mg/kg</td>
<td>0.75</td>
<td>0.65</td>
<td>0.72</td>
<td>70</td>
</tr>
<tr>
<td>As</td>
<td>mg/kg</td>
<td>0.015</td>
<td>0.016</td>
<td>0.018</td>
<td>12</td>
</tr>
<tr>
<td>Zn</td>
<td>mg/kg</td>
<td>1.4</td>
<td>8.9</td>
<td>6.6</td>
<td>200</td>
</tr>
<tr>
<td>Cu</td>
<td>mg/kg</td>
<td>2.2</td>
<td>1.8</td>
<td>3.3</td>
<td>50</td>
</tr>
</tbody>
</table>

Levels of N and P found in the samples are relatively low, in other words, soil in this area has low nutritious values. At the same time, there are very small amounts of heavy metals detected, many times lower than the allowed concentration by QCVN. Therefore, soil quality here can be considered in good condition and has not been polluted by human activities.
5. POTENTIAL IMPACTS OF THE SUBPROJECT

5.1. Potential Positive Impacts

Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System” aims to strengthen dam system, spillways and canal system for the Trieu Thuong reservoir system, thereby:

- Improve community-based natural hazard prevention and response
- Reduce adverse impacts by natural hazards for local area specifically and Quang Tri province generally; contributes to the National Strategy.

The subproject also strengthen institutional capacity and arrangement to better meet the short-term and long-term demands of vulnerable areas, whilst, enhance weather forecasting and early warning ability to timely and efficiently response to hazardous incidents, reduce loss of lives and property.

Implementation of the subproject will bring these following positive impacts specifically:

- Secure reservoir safety, directly protect 8,870 residents, 2,569 ha land and other infrastructures on land, such as houses, hospital, schools, roads and traffic assets.
- Reduce vulnerability due to subjective causes such as floods, droughts and erosions
- Increase ability to regulate floods
- Actively provide irrigation for 268 ha rice field and 240 ha secondary crops
- Improve local bio-environmental condition
- Create favourable conditions to develop agricultural and forestry in hilly regions
- Create favourable conditions to develop fresh-water-fish-farming
- Improve local traffic system, thereby enhance trading and services, as well as increase efficiency of evacuation in storm season.

5.2. Potential Negative Impacts

During subproject implementation, there are some potential negative impacts on both the environment and the society from multiple sources. Impacts on natural environmental elements include impacts on the atmosphere, water, soil and organisms, which arise mainly in construction phase. On the other hand, social impacts are generated from (i) land acquisition and compensation process, and (ii) social changes in construction period due to temporary presence of
workers with different culture and norms. Details on potential negative impacts of the subproject are presented in Table 5.1 below.
### Table 5.1 Potential Negative Impacts of the Subproject

<table>
<thead>
<tr>
<th>No</th>
<th>Works</th>
<th>Potential Negative Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Pre-construction Phase</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Land acquisition: Subproject requires acquisition of 10.92 ha (2.58 ha permanently and 8.34 ha temporarily) of agricultural land, aquacultural ponds and gardens.</td>
<td>Impact: 59 households (271 people) have lands and assets on land acquired, therefore, have their production, income level and life affected.</td>
</tr>
<tr>
<td>2</td>
<td>Compensation</td>
<td>● Conflicts within communities and between communities and authorities in case of unsatisfactory compensation and assistance in land acquisition (amount, method and timing).</td>
</tr>
<tr>
<td>3</td>
<td>Construction site preparation: Clearance of about 5,000 Acacia individuals (2 years old and 2-5 years old), 150 gum trees (2 years old), some other vegetation and crops; 3,000m² fish pond affected.</td>
<td>● Lose habitats of some animals. The subproject area has poor animal biodiversity. Animals habituated here are a few species of small reptiles and birds in small quantity. There is no rare or endangered species in the affected area. ● Noise, vibration and emission from clearance activities.</td>
</tr>
<tr>
<td>4</td>
<td>UXO : search and remove/destroy unexplored ordinates in the subproject area</td>
<td>● Noise, vibration and emission from using clearance activities. ● Workers and local people may have injury due to explosion and accident.</td>
</tr>
<tr>
<td>II</td>
<td>Construction Phase</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Transportation of materials and spoils</td>
<td>● Noise and vibration</td>
</tr>
<tr>
<td></td>
<td>Construction works</td>
<td>● Air pollution from emissions</td>
</tr>
<tr>
<td></td>
<td>Working and living activities of workers</td>
<td>● Surface water pollution</td>
</tr>
<tr>
<td>III III Operation phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Flood discharge in emergency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Floods in dam safety corridor, where local people plants Acacia trees and gum trees for timber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Risk of reservoir zone erosions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Affect construction quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Shorten construction lifetime</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Generally, the subproject potentially has several negative impacts on the environment and society of the area. However, these impacts are local, preventable and mitigable. In term of impacts on environmental components, majority of impacts are generated in the construction phase due to use of vehicles and machines in transportation and construction works. On the other hand, the subproject’s impacts on the socio-economic environment significantly arise in the pre-construction phase, specifically in the process of lands acquisition. Land acquired permanently and temporarily to facilitate implementation of the subproject are mostly agricultural land, therefore, affected people will have their production interrupted and income affected. Other remarkable social impacts are related to the presence of about 50 employees working in construction period (22 months). There are potential social and cultural conflicts that threaten local social secure. At the same time, concentration of workers might increase rate of social evils, gambling, prostitution and drug uses. As a result, to ensure social security and economic performance of Trieu Thuong commune, EMP is responsible to develop corresponding preventative and mitigation measures.

6. NEGATIVE IMPACTS AND REQUIRED MITIGATION MEASURES

Majority of negative impacts of the subproject “Upgrading Trieu Thuong 1, 2 Reservoir System” as discussed in Chapter 5 are temporary, preventable and reducible. Table 6.1. below summaries all the adverse impacts of the subproject and proposes corresponding mitigation measures.
### Table 6.1 Subproject’s negative impacts and mitigation measures

<table>
<thead>
<tr>
<th>No</th>
<th>Source of Impact</th>
<th>Affected Elements</th>
<th>Negative Impacts</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Pre-construction Phase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Land acquisition</td>
<td>- Land owners</td>
<td>- Loss of production land</td>
<td>- Information dissemination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Land and assets on land</td>
<td>- Loss of crops on lands</td>
<td>- Public consultation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Occupation change</td>
<td>- Acquire land precisely as planned</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Affect incomes and livelihood</td>
<td>- Assistance to restore income and create employment opportunity. Encourage contractors to employ local people in doing unskilled labour works in construction</td>
</tr>
<tr>
<td>2</td>
<td>Compensation and assistance payment</td>
<td>- People receiving compensation and assistance</td>
<td>- Conflicts due to unsatisfactory compensation</td>
<td>- Calculate and pay compensation and assistance according to legal framework, timely and fairly (details on compensation methods, assistances and payment procedure are represented in RAP document for the subproject)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Local security</td>
<td>- Conflicts due to late payment of compensation</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>UXO</td>
<td>- Living organisms</td>
<td>- Increase human activities</td>
<td>- Notify and evacuate all people in the nearby areas before conducting clearance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Local communities</td>
<td>- Noise and vibration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Safety and life of workers and local people</td>
<td>- Hire competent unit of local army section to conduct clearance</td>
</tr>
<tr>
<td>4</td>
<td>Land clearance</td>
<td>- Plants and animals in</td>
<td>- Habitat loss</td>
<td>- Clear only required areas</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Environmental changes</td>
<td>- Strictly forbid illegal deforestation</td>
</tr>
<tr>
<td>No</td>
<td>Source of Impact</td>
<td>Affected Elements</td>
<td>Negative Impacts</td>
<td>Mitigation Measures</td>
</tr>
<tr>
<td>----</td>
<td>------------------</td>
<td>-------------------</td>
<td>------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cleared areas</td>
<td>- Changes in scenery</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Scenery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Construction Phase</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Transportation of materials and disposal of excavated weathered layers and Construction works</td>
<td>Air quality</td>
<td>- Dust&lt;br&gt;- Air pollution&lt;br&gt;- Noise and vibration</td>
<td>• Transportation&lt;br&gt;- Water road surface (4 times/day)&lt;br&gt;- Transport within allowed capacity&lt;br&gt;- Fully cover materials on vehicles&lt;br&gt;- Wash vehicles before leaving material source&lt;br&gt;- Use only those meeting the requirements of QCVN 6439-2001 and having quality certificate by Vietnam Register Department.&lt;br&gt;- Discard degraded vehicles&lt;br&gt;- Regularly maintain vehicles&lt;br&gt;• Construction&lt;br&gt;- Prepare dust fences&lt;br&gt;- Water construction fields and material mixing areas (4 times/day)&lt;br&gt;- Use modern machineries with approved standards (certificated by Vietnam Registry Department) (including standards on allowed level of emission and noise)&lt;br&gt;- Regularly check and maintain machineries and vehicles</td>
</tr>
<tr>
<td>No</td>
<td>Source of Impact</td>
<td>Affected Elements</td>
<td>Negative Impacts</td>
<td>Mitigation Measures</td>
</tr>
<tr>
<td>----</td>
<td>------------------</td>
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<td>--------------------</td>
</tr>
</tbody>
</table>
|    | Water            |                  | - Water pollution from running water polluted by road surface (mainly dropping materials) | - Wash construction machines  
|    |                  |                  | - Water pollution due to domestic wastewater from living activities of workers, rainwater runoff and construction wastewater  
|    |                  |                  | - Water pollution due to leaks of petroleum and oil from machineries | - Prepare noise fences  
|    |                  |                  | - Water pollution due to leaks of petroleum and oil from machineries | • Transportation  
|    |                  |                  |                      | - Clean up transportation routes at the end of each working day  
|    |                  |                  |                      | • Construction  
|    |                  |                  |                      | - Equip worker’s camps with toilets, bathrooms and kitchens with competent wastewater collecting and managing system  
|    |                  |                  |                      | - Arrange mobile toilets in construction fields  
|    |                  |                  |                      | - Construct runoff collecting system  
|    |                  |                  |                      | - Construct wastewater from washing vehicles separately  
|    |                  |                  |                      | - Check and arrange dredging sewage system  
|    |                  |                  |                      | - Wasted oil or leaks have to be collected into separated specialised tanks for hazardous substances to prevent  
|    | Soil             |                  | - Soil pollution due to dropping materials  
|    |                  |                  | - Soil pollution due to solid waste from construction works and workers’ living activities.  
|    |                  |                  | - Soil disorder due to | • Transportation  
|    |                  |                  |                      | - Clean up road surfaces  
|    |                  |                  |                      | • Construction  
|    |                  |                  |                      | - Fully cover all transportation vehicles  
|    |                  |                  |                      | • Construction  
<p>|    |                  |                  |                      | - Equip rubbish bins with cover |</p>
<table>
<thead>
<tr>
<th>No</th>
<th>Source of Impact</th>
<th>Affected Elements</th>
<th>Negative Impacts</th>
<th>Mitigation Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>excavation, filling and construction</td>
<td>- Arrange waste collection periodically</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Soil erosion</td>
<td>- Solid wastes from construction works and leftover materials will be collected and dumped in designed locations. Recycle and reuse if applicable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Cover material sources and stockpiles to prevent erosion and wash off by stormwater.</td>
</tr>
<tr>
<td></td>
<td>Local community</td>
<td></td>
<td>- Impacts on health (by dust and polluted air)</td>
<td>- Transportation</td>
</tr>
<tr>
<td></td>
<td>Living organisms</td>
<td></td>
<td>- Obstruct to living and production activities</td>
<td>- Plan appropriate transportation schedule</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Impacts on living condition</td>
<td>- Notify local community</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Conflicts with workers</td>
<td>- Process precisely as planned</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Increase social evil rate</td>
<td>- Construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Accidents on construction sites</td>
<td>- Plan appropriate work schedule to reduce impacts on local community’s life</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Notify local community in advance of conducting major construction works</td>
</tr>
<tr>
<td></td>
<td>Traffic</td>
<td></td>
<td>- Traffic congestions</td>
<td>- Supervise and manage workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Degrade road quality</td>
<td>- Establish working and living policies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Traffic accidents</td>
<td>- Closely supervise and check implementation of these policies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Plan appropriate transportation schedule (night time and off-peak hours)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Use only vehicles with allowed capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Prepare traffic signs on all transportation routes</td>
</tr>
<tr>
<td>No</td>
<td>Source of Impact</td>
<td>Affected Elements</td>
<td>Negative Impacts</td>
<td>Mitigation Measures</td>
</tr>
<tr>
<td>----</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Strictly follow traffic regulation and traffic safety</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Only use vehicles and machines when needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Clean up and return temporarily acquired lands to the same states as pre-project</td>
</tr>
<tr>
<td>Scenery</td>
<td></td>
<td>Change in scenery due to fencing systems, increase presence of vehicles and machineries,…</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transporting routes</td>
<td>Road damages due to overuse and overweight vehicles</td>
<td>Schedule transportation to balance road uses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Only use trucks with load capacity up to 16 tonnes&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Strictly manage vehicle load, ensure loads within capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Supervise to identify any road damage to timely repair</td>
</tr>
<tr>
<td>2.</td>
<td>Risks and incidents, such as fire, earthquake and other incidents</td>
<td>- Workers (in construction phase)</td>
<td>Impacts on health and life threatens: burns, injuries and death</td>
<td>Develop fire prevention policy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Equip 2 fire-extinguishes for each workers’ accommodation. Place at easy-accessible locations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Inspect and maintain fire fighting facilities every 2 months in rainy season and once a month in dry season</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Training and capacity building for workers and staffs in emergency and evacuating procedure to minimise damages on lives and properties.</td>
</tr>
</tbody>
</table>

### III Operation Phase

1. **Flood discharge**
   - **Dam safety**
   - **Flooding in downstream**
   - Prepare flood maps for downstream areas

---

<sup>1</sup> Based on type and condition of roads in transporting routes, this is the allowable weight of vehicles.
<table>
<thead>
<tr>
<th>No</th>
<th>Source of Impact</th>
<th>Affected Elements</th>
<th>Negative Impacts</th>
<th>Mitigation Measures</th>
</tr>
</thead>
</table>
| 1  | (into area reserved for emergency flood discharge) | corridor - Downstream areas | area, affecting agricultural and aquacultural production, transportation, trades and other living activities | - Notify and build capacity for local communities to react to floods  
- Prepare safety corridor for flood discharge based on calculated spatial impacts in case of dam breakdown.  
Local community has to be informed about flood discharge plan at least 2 weeks in advance  
- Regularly check major construction works |
| 2  | Erosions in reservoir zones and construction works | - Construction quality  
- Construction lifetime | - Reduce lifetime of construction works | - Regularly investigate construction works to identify weak spots exposed to erosion risks to maintain and repair. |

*Note: Dam safety measures are represented separately in Dam Safety Report of the Subproject.*
7. EMP MONITORING PROGRAM

This section proposes monitoring program for implementation of EMP of the subproject Upgrading Trieu Thuong 1, 2 Reservoir System. This program aims to ensure that (i) required prevention and mitigation measures are fully implemented and comply with ECOP for the subproject; and (ii) quality of ambient natural and social environment.

7.1. Mitigation Measure Monitoring

To ensure all proposed mitigation measures in Chapter 6 are conducted sufficiently and effectively, the implementation procedure of the Subproject will be closely monitored. In different phases of the subproject, problems have to be supervised differ, as well as investigation methods and responsible units. Aims of the monitoring of mitigation implementation is to qualitative investigate the presence or absence of mitigation measures. However, in order to ensure effectiveness of EMP implementation, efficiency of mitigations has to be measured qualitatively, including environmental and social investigation. Details on what, how and when to supervise are shown in Table 7.1. below.
**Table 7.1 Mitigation Measure Monitoring Program**

<table>
<thead>
<tr>
<th>No</th>
<th>Element to monitor</th>
<th>Where to monitor</th>
<th>Responsible to monitor</th>
<th>Indicators to monitor</th>
<th>Monitoring method</th>
<th>Monitoring frequency</th>
</tr>
</thead>
</table>
| 1  | Information disclosure                  | Trieu Thuong commune community | PPMU Trieu Thuong CPC CMO EMC | - Do local communities, both affected and non-affected people receive information on the subproject?  
  - Are subproject affected people received sufficient information on land acquisition plan, compensation and assistance mechanism?  
  When?  
  - Publication of reports on the subproject | - Observe  
  - Survey  
  - Interview | - Monthly survey and interview local community |
| 2  | Land acquisition and compensation payment | Area to be acquire Affected households and people | PPMU CMO EMC | - Only required areas are acquired  
  - Compensation and assistance are paid in the right amount (as regulated | - Examine records of land acquisition execution and compensation payment (bills, | - Weekly during land acquisition period |
<table>
<thead>
<tr>
<th>No</th>
<th>Element to monitor</th>
<th>Where to monitor</th>
<th>Responsible to monitor</th>
<th>Indicators to monitor</th>
<th>Monitoring method</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>by the Government of Vietnam and WB) and at the right time.</td>
<td>certificates,…))</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Survey and interview local people</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>UXO</td>
<td>All subproject area</td>
<td>PPMU EMC</td>
<td>- Execution of UXO clearance</td>
<td>- Examine records of UXO clearance work</td>
<td>- Once, before construction commence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Safety of site upon completion</td>
<td>- Field survey</td>
<td></td>
</tr>
</tbody>
</table>

**II Construction Phase**

<p>| 1. | Dust | All subproject area and ambient environment Transporting routes | CSC CMO EMC | - Surface watering frequency and schedule | - Observe (daily by CSC and CMO) | - Sample air quality (every 3 months by EMC) |
|    |      |                                                                  |            | - Transporting vehicle coverage |                                       |                     |
| 2. | Emission, noise and vibration | All subproject area and ambient environment Transporting | CSC CMO EMC | - Certificates of vehicles and machines | - Examine all vehicles and machines’ certificate (once before first use by CSC) | - Examine records of maintenance (every 6 months by EMC) |</p>
<table>
<thead>
<tr>
<th>No</th>
<th>Element to monitor</th>
<th>Where to monitor</th>
<th>Responsible to monitor</th>
<th>Indicators to monitor</th>
<th>Monitoring method</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>routes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 3. | Wastewater        | All subproject area and ambient environment | CSC CMO EMC | - Presence and function of wastewater collecting and treating systems for construction sites and worker’s camps  
- Presence of mobile toilets on sites in use  
- Collection and treatment of hazardous substances | - Observe (daily by CSC and CMO)  
- Examine construction records (every 3 months by EMC)  
- Water quality sample (every 3 months by EMC) |                     |
| 4. | Solid waste       | All subproject area and ambient environment Transporting | CSC CMO EMC | - Solid waste collection schedule  
- Location of landfill  
- Quantity and quality | - Observe (daily by CSC and CMO)  
- Examine construction records (every 3 months by EMC)  
- Field survey (every 3 months by EMC) |                     |
<table>
<thead>
<tr>
<th>No</th>
<th>Element to monitor</th>
<th>Where to monitor</th>
<th>Responsible to monitor</th>
<th>Indicators to monitor</th>
<th>Monitoring method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>routes</td>
<td>Worker’s camps</td>
<td>of rubbish bins</td>
<td>EMC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Site clean-up schedule</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Work safety</td>
<td>Construction sites</td>
<td>CSC Contractors EMC</td>
<td>- Quantity, quality and usage of work safety equipment</td>
<td>- Quality and quantity checks of protection equipment (once before construction commence)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Establish and dissemination of working policy</td>
<td>- Observe (daily by CSC and CMO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Examine construction records (every 3 months by EMC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Field survey (every 3 months by EMC)</td>
</tr>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>Local traffic and road degradation</td>
<td>Transporting routes and adjacent roads</td>
<td>CSC CMO EMC</td>
<td>- Traffic flow</td>
<td>- Observe (daily by CSC and CMO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Road condition</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>- Repair roads after use (if required)</td>
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</tr>
<tr>
<td>No</td>
<td>Element to monitor</td>
<td>Where to monitor</td>
<td>Responsible to monitor</td>
<td>Indicators to monitor</td>
<td>Monitoring method</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------</td>
<td>-------------------------------------------</td>
<td>------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>7.</td>
<td>Site recovery and return</td>
<td>All subproject areas</td>
<td>CSC</td>
<td>- Conditions of area after construction phase</td>
<td>- Observe (daily during site recovery period by CSC and CMO)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Temporarily acquired areas for construction works</td>
<td>CMO</td>
<td>- Site clean-up effectiveness</td>
<td>- Field survey and work records examination (at the end of site recovery period by EMC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EMC</td>
<td>- Replant vegetation on cleared areas</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Workers’ health</td>
<td>Worker’s camp</td>
<td>CSC</td>
<td>- Water supply, energy supply, hygiene, wastewater and solid waste collection and treatment in worker’s camps</td>
<td>- Facility check of worker’s camps (monthly by CSC, every 3 months by EMC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EMC</td>
<td>- Health check of workers</td>
<td>- Examine records of health check for workers (yearly)</td>
</tr>
<tr>
<td>9.</td>
<td>Social environment</td>
<td>Worker’s camps</td>
<td>CSC</td>
<td>- Establish and application of labour working and living policies</td>
<td>- Security check at worker’s camps (weekly by CSC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Trieu Thuong commune</td>
<td>CMO</td>
<td>- Amount and frequency of conflicts within workers and between workers and</td>
<td>- Examine records of incidents (every 3 months by EMC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EMC</td>
<td></td>
<td>- Survey and interview local community (every 3 months by EMC)</td>
</tr>
</tbody>
</table>
## Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

<table>
<thead>
<tr>
<th>No</th>
<th>Element to monitor</th>
<th>Where to monitor</th>
<th>Responsible to monitor</th>
<th>Indicators to monitor</th>
<th>Monitoring method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>local people</td>
<td>- Examine equipment (once before construction commence)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Rate of crime and social evil (drug use, prostitution, gambling,…</td>
<td>- Examine emergency plan (once before construction commence)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Examine training records (yearly by EMC)</td>
</tr>
<tr>
<td>10.</td>
<td>Risk and incident preparation</td>
<td>All subproject areas Worker’s camps</td>
<td>CSC EMC</td>
<td>- Equipment of fire extinguish, emergency kits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Establish of emergency evacuation plan</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Training for response in case of emergency</td>
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</tr>
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<td></td>
</tr>
</tbody>
</table>

### III Operation Phase

<p>| 1.  | Construction quality          | Construction works                      | PPMU EMC Contractors   | - Quality and function of construction works                                            | - Field surveys every 6 months                                                  |
|     |                                |                                         |                        | - Any issues and damages                                                               |                                                                                  |
| 2.  | Operation plan (water regulation, flood discharge, dam breakdown) | Site offices Trieu Thuong commune       | PPMU EMC                | - Operation plan according to agricultural production                                  | - Examine reports of operation, flood discharge and evacuation plans.          |
|     |                                | community                               |                        | - Flood discharge plan.                                                                | Yearly                                                                          |</p>
<table>
<thead>
<tr>
<th>No</th>
<th>Element to monitor</th>
<th>Where to monitor</th>
<th>Responsible to monitor</th>
<th>Indicators to monitor</th>
<th>Monitoring method</th>
<th>Monitoring frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>response,…)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 3. | Risk and incident response | Site offices | PPMU EMC              | Preparation of flood map.  
- Evacuation plan in case of emergency  
- Presence and function of fire extinguish and emergency kit  
- Response and evacuation plan in case of emergency | - Examine flood map  
- Examine sites  
- Examine evacuation plan | Once before the construction operates. |
7.2. Environmental Quality Monitoring

Beside program to monitor implementation of mitigation measures, quality of the environment at subproject is also required to be monitored. Table VII.4 shows monitoring program for environmental elements that are potentially affected by construction works of the subproject. These investigations are conducted by EMC – hired by the PPMU to separately supervise and monitor the implementation of the subproject.

Table 7.2 Environmental Quality Monitoring Program

<table>
<thead>
<tr>
<th>Environmental Components</th>
<th>Indicators to be monitored</th>
<th>Investigation Method</th>
<th>Sampling locations</th>
</tr>
</thead>
</table>
| Air Quality              | Dust Concentration of NO₂ | Measure and sample in the same day. Sampling, surveying, measuring and analysing methods are conducted according to the latest Vietnamese National Technical Regulations. | 9 locations  
- TT1R main and auxiliary dams  
- TT2R main and auxiliary dams  
- Residential area close to TT1R  
- Residential area close to TT2R  
- 3 material sources |
|                          | Concentration of SO₂      |                     |                    |
|                          | Concentration of CO       |                     |                    |
| Noise and Vibration      | Noise level               |                     | Same as air quality sampling locations |
| Surface Water            | pH                        |                     | 4 locations  
- Main canal of TT1R and TT2R  
- Shared canal  
- Intersection between irrigation areas and Thach Han river |
|                          | DO                        |                     |                    |
|                          | COD                       |                     |                    |
|                          | BOD₅                      |                     |                    |
|                          | NO₃                      |                     |                    |
|                          | Coliform                  |                     |                    |
Figure 7.1 Sampling locations in construction phase
8. INSTITUTIONAL ARRANGEMENT

8.1. Roles and Responsibilities

Table 8.1 Roles and Responsibilities

<table>
<thead>
<tr>
<th>Unit</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| CPMO                   | - Periodically monitor and supervise implementation of safeguard policies for the Subproject  
|                        | - Representatives in communication with WB                                       
|                        | - Provide guidelines for safeguard policies implementation                        
|                        | - Responsible for training and capacity building for all staffs and consultants of the Subproject  
|                        | - Prepare monitoring report and submit to WB                                     |
| Quang Tri DONRE        | - Ensure the subproject implementation’s compliance to regulations and policies of the Government of Vietnam  
|                        | - Monitor environmental aspect of subproject implementation                       |
| Quang Tri PPMU         | - Responsible for overall management of the project, including management of EMP; coordinating and managing the implementation EMP of the subproject, including prepare detailed guidelines for EMP implementation and monitoring  
|                        | - Prepare bidding documents with details on required mitigations as proposed in EMP, ensure inclusion of ECOP in contracts  
|                        | - Assist contractors in implementation of EMP                                    
|                        | - Conduct EMP monitoring to ensure contractors’ compliance with environmental covenants in the awarded contracts and environmental quality  
|                        | - Collaborate with Trieu Thuong CPC, Trieu Phong DPC and Quang Tri PPC to address grievances.  
<p>|                        | - Prepare periodical monitoring report to Quang Tri DONRE, CPMO and WB.          |</p>
<table>
<thead>
<tr>
<th>Unit</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractors</td>
<td>- Responsible to carry out construction works, fully comply with the approved EMP document and ECOP; apply all required mitigation measures.</td>
</tr>
<tr>
<td></td>
<td>- Prepare SEMP if required.</td>
</tr>
<tr>
<td></td>
<td>- Adopt appropriate mitigations to prevent and minimise potential negative impacts; propose adjustment/replacement of mitigation measure if needed.</td>
</tr>
<tr>
<td></td>
<td>- Actively communicate with local people and take action to prevent the negative impacts caused in construction works.</td>
</tr>
<tr>
<td></td>
<td>- Ensure that all construction activities meet the legal basics and have approvals from the relevant authorities</td>
</tr>
<tr>
<td></td>
<td>- Report to PPMU about difficulties encountered and proposed solutions</td>
</tr>
<tr>
<td></td>
<td>- Report to local authorities and PPMU in cases of environmental incidents and collaborate with other agencies and stakeholders to address these issues</td>
</tr>
<tr>
<td></td>
<td>- Address grievance related to construction works and workers’ activities.</td>
</tr>
<tr>
<td>Environmental Management Consultant (EMC)</td>
<td>- Assist PPMU in arrangement and implementation of EMP, ensure efficiency of mitigation measures and environmental protection.</td>
</tr>
<tr>
<td></td>
<td>- Guide and monitor EMP implementation of contractors. Train and build capacity on safeguard policies for construction staffs.</td>
</tr>
<tr>
<td></td>
<td>- Periodically report to PPMU</td>
</tr>
<tr>
<td>Construction Supervising Consultant (CSC)</td>
<td>- Assist PPMU in supervising implementation of EMP and ECOP by contractors</td>
</tr>
<tr>
<td></td>
<td>- Periodically report results of monitoring and keep in touch with local communities</td>
</tr>
<tr>
<td>Community-based</td>
<td>- Have rights and responsibilities to frequently</td>
</tr>
</tbody>
</table>
Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

<table>
<thead>
<tr>
<th>Unit</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring Organisation (CMO)</td>
<td>supervise environmental compliance during construction.</td>
</tr>
<tr>
<td></td>
<td>- Supervise efficiency of mitigation measures applied by contractors and PPMU</td>
</tr>
<tr>
<td></td>
<td>- Receive grievances and complaints from community and report to PPMU</td>
</tr>
<tr>
<td></td>
<td>- Supervise construction quality</td>
</tr>
</tbody>
</table>

8.2. Report Procedure

Table 8.2 Reporting Procedure in EMP

<table>
<thead>
<tr>
<th>No</th>
<th>Prepared by</th>
<th>Report on</th>
<th>Report to</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CSC</td>
<td>EMP compliance of construction works</td>
<td>Contractors</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Progress of construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Contractors</td>
<td>Progress of the subproject implementation and</td>
<td>PPMU</td>
<td>Once in prior to commence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EMP implementation</td>
<td></td>
<td>construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Monthly during construction</td>
</tr>
<tr>
<td>3</td>
<td>CMO</td>
<td>Complaint or grievance</td>
<td>PPMU</td>
<td>When there is complain or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>grievance from community</td>
</tr>
<tr>
<td>4</td>
<td>EMC</td>
<td>Safeguard policies and EMP compliance</td>
<td>PPMU</td>
<td>Every 3 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subproject progress</td>
<td></td>
<td>At the end of each stage</td>
</tr>
<tr>
<td>5</td>
<td>PPMU</td>
<td>Project progress</td>
<td>Quang Tri</td>
<td>Every 6 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quality of constructions</td>
<td>DONRE and CPMO</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental states</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CPMO</td>
<td>Subproject progress</td>
<td>WB</td>
<td>Every 6 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safeguard policies and EMP compliance</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.3. Safeguard Training and Capacity Building

To maximise EMP implementation effectiveness, working and managing capacities of all levels should be consolidated and improved. All those responsible for the management, implementation and operation of any aspect of the EMP shall be adequately trained for their role. Training records shall be maintained on site, for each employee, to provide references when needed and evidence for auditing/inspection purposes.

Based on scale and requirements of the subproject, 01 major safeguard training campaign is required:
- **Timing:** at least 1 week in prior of construction commence
- **Contents:** provide knowledge and procedure of WB’s safeguard policies and environmental policies of the Government of Vietnam; potential negative impacts on the environment and society of the subproject and mitigation measures to be implement; monitoring methods and procedure; and detailed guidelines for all stages of EMP implementation.
- **Participants:** representatives of PPMU, DONRE, CSC, contractors, Trieu Phong DPC, Trieu Thuong CPC and CMO.

Contractors will be responsible for organising trainings for staffs and workers in construction to ensure understandings of EMP procedure and implementation of mitigation measures.

8.4. Public Consultation and EMP Disclosure

8.4.1. Public Consultation

As required by WB and the GOV, the subproject is required to conduct at least 01 consultation with the local actors, including the community. During the EMP preparation for the subproject, there are 2 major consultation campaigns on April and July 2013. On each campaign, consultant unit held a public meeting at Trieu Thuong commune with participants of:
- **Local authorities:**
  - CPC
  - Fatherland Front
  - Cadastral representatives
- **Social associations:**
  - Women's Union
  - Farmer's Union
- Representatives of local communities: including both affected households and non-affected households.

**Consultation Method:**
- Discussion between consultant unit, PPMU and local authorities and communities
- Q&A

**Campaign 1: Consult the residents on the subproject implementation areas – consulted at 8.30am on April 01st, 2013**

Consultation is done immediately after distributing the information of project VN-Haz/WB05 and the subproject “Upgrading Trieu Thuong 1, 2 Reservoir System” (carried out in the period of 6 months since October 2012). EMP consultants, collaborated with PPMU, held a public meeting with participants include:

- Project information, especially information about the potential impacts (both positive and negative) and mitigation plans, has been provided to local and affected people. This information was also presented in detail in the public meeting. Government and local people's comments were received openly and documented (details on content of this public consultation in Appendix 3).

- **Received comments:**
  o Local authorities, as well as local people were fully aware of the necessity of the subproject in preventing and reducing natural hazard risks for Trieu Thuong commune and An Don precinct, as well as the benefits of having a stable water supply and expanding water surface area for aquacultural production.
  
  o The implementation plan was approved by the local government and people. In general, the subproject suited the needs and wants of local people.
  
  o Local community requested for additional information on land acquisition and compensation plans.

- **Responses:**
  o On April 7th, 2013, consultant unit had sent to Trieu Thuong CPC documents on (i) WB’s resettlement action framework, (ii) Quang Tri province’s regulation on compensation and assistance methods when acquire lands in the Province, (iii) compensation rates for lands and (iv) compensation rates for assests on land; with a detailed entitlement matrix prepared for the subproject based on primary surveys.

**Campaign 2: Consultation on the EMP draft – consulted at 8.30am on July 22nd, 2013**
After receiving public comments in the first consultation, the EMP consultant unit had revised and completed the EMP draft. The EMP draft was provided for the PPMU, Quang Tri PCP, Trieu Thuong CPC, Trieu Phong DPC and has been available to the public since July 8th, 2013. 02 weeks after publication of the EMP draft, EMP consultant unit held the second public meeting, consulted local communities on:

(i) Negative impacts of the subproject and proposed mitigation measures corresponding to each negative impact

(ii) Implementation arrangement, including responsibilities of stakeholders, monitoring program and capacity building plan

(iii) Other comments and proposals to Investment owner, CPMO, PPMU and contractors.

- Received comments:
  o The participants in the meeting on July 22nd, 2013 are all consented and satisfied with the list of negative impacts of the subproject and agree with proposed mitigation measures.
  o In term of impacts of land acquisition, Mister Phan Van Khoa (Vice president of Trieu Thuong CPC) commented that impacts from this process will not be significant since major part of the acquired lands is garden land and will not affect any accommodation or production land.
  o Implementation arrangement of EMP also received consensus by local authorities and communities.
  o Local authorities would like to have more details on responsibilities and duties of the CMO. Beside, they would also like to receive training and capacity building program for the CMO in order to better serve the designed duties, ensuring environmental protection and maintain social security.

- Responses:
  o Responsibilities of CMO were rewritten more specifically in Table 8.1.
  o Add CMO’s representatives to participants in safeguard training and capacity building program.

8.4.2. EMP Disclosure

EMP report after approved by Project Province and WB will be published in both Vietnamese and English at Trieu Thuong CPC and Trieu Phong DPC as hard copies, e-version will also be public on official website of Quang Tri province and WB’s for the public and interest parties to have access, follow the subproject progress and involve in the monitoring process of EMP.
8.5 Funding Allocation for EMP

Funds for the implementation of EMP will be allocated as following:

Table 8.3 Funding Allocation for EMP Implementation

<table>
<thead>
<tr>
<th>EMP components</th>
<th>Source of fund</th>
<th>Cost (VND)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of mitigation measures</td>
<td>Part of construction fee in the subproject budget (WB)</td>
<td>Included in contracts with contractors</td>
</tr>
<tr>
<td>Costs of safeguard training and capacity building programs include costs for expert hiring, materials and facilities for training and assistance for participants</td>
<td>Reciprocal capital of Quang Tri province</td>
<td>46,500,000</td>
</tr>
<tr>
<td>Costs of Environmental Management Consultant: include budget for monitoring and reporting</td>
<td>Reciprocal capital of Quang Tri province</td>
<td>138,805,000</td>
</tr>
<tr>
<td>Assistance for community-based monitoring organisation staffs (2 people)</td>
<td>Reciprocal capital of Quang Tri province</td>
<td>24,000,000</td>
</tr>
<tr>
<td>EMP management cost</td>
<td>Part of management cost for the subproject (WB)</td>
<td>Included in the operational budget of the PPMU</td>
</tr>
</tbody>
</table>
REFERENCES


Trieu Thuong CPC, 2012, Socioeconomic Status Report 2012 and Plans for 2013, number 36/BC-PPC, Quang Tri: Trieu Thuong CPC

APPENDICES

Appendix 1: Environmental Codes of Practice for the Subproject

I. Introduction

1. Objective

This Environmental Code of Practices (ECOP) was prepared to guide the planning and implementation of the mitigation measures to be carried out by Contractor during construction. It sets out standard practices and procedures for managing the potential negative impacts on local environment and local communities of all civil works to be carried out under the Project. The ECOP will be included as a separate annex in all bidding and contract documents and the field engineers and supervisor will be assigned the responsibility to ensure compliance and reporting. The Contractor will be made aware of and commit to this obligation and know that cost for implementation of the measures is part of the construction cost.

2. Scope and application

This ECOP will be applied to all the subprojects to be implemented under Component 4. For the sake of clarity, “construction” in this document includes all site preparation, demolition of structures, spoil disposal, materials and waste removal and all related engineering and construction activities.

II. Relevant World Bank’s Safeguard Policies and Government’s Regulations

3. World Bank’s safeguard policies.

This ECOP is prepared to satisfy the WB safeguard requirements under OP4.01 (EA) which requires planning, implementation, and monitoring of the mitigation measures during construction.

1. GOV’s regulations.

There are a number of GoV regulations, standards, code of practices, etc. related to environmental and safety that are relevant to construction activities and environmental quality. In addition to the main laws and regulation outlined in the Environmental and Social Management Framework, the ones related to environmental quality and safety are listed below (not exhaustive) and have to be closed observed:

Water environment
- QCVN 01:2009/BYT: National technical regulation on drinking water quality
- QCVN 02:2009/BYT: National technical regulation on domestic water quality
- QCVN 08:2008/ BTNMT: National technical regulations on surface water quality
- QCVN 09:2008/ BTNMT: National technical regulations on groundwater quality
- QCVN 10:2008/ BTNMT: National technical regulations on quality of coastal water
- QCVN 14:2008/ BTNMT: National technical regulations on quality of domestic wastewater
- TCVN 5502:2003: Supplied water – Requirements for quality

Soil environment
- QCVN 03:2008/ BTNMT – National technical regulation on the allowable limits of heavy metals in the soils;

Air environment
- QCVN 05:2008: Air quality – Standards for ambient air quality
- QCVN 06:2008: Air quality – Maximum allowable concentration of hazardous substances in the ambient air.
- TCVN 6438:2001: Road vehicles – Maximum permitted emission limits of exhausted gases
- QCVN 07:2009: National technical regulations for classification of hazardous wastes
Vibration and Noise

- QCVN 27:2010 BTNMT – National technical regulation on Vibration (replace TCVN 6962:2001 - Vibration emitted by construction works and factories – Maximum permitted levels in the environment of public and residential areas;
- QCVN 26:2010 BTNMT – National technical regulation on Noise (replace TCVN 5948:1999 Acoustics - Noise caused by transportation means when speeding - Allowable level)
- Decision No.3733/2002/QĐ-BYT issued by Ministry of Healthcare dated on 10/10/2002 about the application of 21 Labour health and safety standards that concerned about microclimate, noise, vibration, Chemicals – Permitted level in the working environment.

Moreover, regarding planning and design of infrastructure, operation and management of the water supply systems, and water source option to serve domestic water supply systems the following standards are used:

- Decision No.628/BXD-CSXD of the Ministry of Construction (MOC) dated 14th December 1996: Vietnamese Construction Regulations and Standards;
- Design standards No. 20TCN-33-85 for water supply projects;
- Instructions for preparation and approval of town construction planning of MOC in 1998;
- Construction standard TCXD No.66:1991 on Operation of water supply and drainage systems - Safety requirements;
- Construction standard TCXD No. 76:1979 on Procedures for technical management in operation of water supply systems; and
- Construction standard TCXD No.233:1999 on criteria used for choosing surface water, groundwater sources to serve domestic water supply system.

III. Responsibilities

5. The subproject owner (PPMUs) and the contractor are the key entities responsible for implementation of this ECOP. Key responsibilities of the subproject owners and the contractors are as follows:

(a) Subproject owner

- General: The subproject owner (PPMUs) on behalf of the Central Project Management Unit (CPMO) is responsible for ensuring that the ECOP is effectively implemented. The subproject owner will assign a group of qualified
staff to be responsible for preparation Environmental and Social Management Framework (ESMF) Viet Nam Natural Hazards Management Project (Vn-Haz/WB5) and management of environmental and social safeguard of the subproject throughout its life, including supervision of contractors. The subproject owner is responsible for preparing the safeguard reports and submitting to the CPMO.

- During construction, the subproject owners will assign the Construction Supervision Consultants (CSCs) and/or field engineer to be responsible for monitoring and supervision of the compliance of the contractors to fulfil the agreed CSEP (see below).

Responsibilities of the CSCs would include the following: (a) monitoring the contractors” compliance with the environmental plan, (b) taking remedial actions in the event of non-compliance and/or adverse impacts occur, (c) investigating complaints, evaluating and identifying corrective measures; (d) advising to the Contractor on environment improvement, awareness, proactive pollution prevention measures; (f) supervising the Contractor”s activities in responding to the complaints; (g) providing guidance and on-the-job training to field engineers on various aspects to avoid/mitigate potential negative impacts to local environment and communities during construction.

(b) Contractors

- Contractors have the responsibility of carrying out contracted works through fulfilling the agreed CSEP (Contract Specific Environmental Plan as defined in General Provisions below). In doing so, the contactors will establish and maintain contact with the subproject owner and local residents, and keep them informed of construction matters likely to affect them. This may include regular and frequent distribution of newsletters and attendance at meetings at the request of the subproject owner with representatives of local residents groups.

- Contractors will provide information and reporting telephone “Hot Line”, staffed at all times during working hours. Contact details should be prominently displayed at the sites. Information on the construction progress, including the projected activities that might require closure of traffic or may cause safety risk should be timely provided.

- Contractors have the duty to secure appropriate permits and licenses before undertaking the works or moving heavy equipment. It is the responsibility of the Contractors to monitor the development and implementation of new environmental legislation and regulation and to use the appropriate standards prevailing at the time of awarding contracts. Contractors must comply with all
prevailing legislation at the time of construction, including any requirements under health and safety.

IV. General Provisions

4.1 Contract Specific Environmental Plan (CSEP)

6. Contractors will be required to prepare a CSEP describing how the Contractor intends to operate construction at works sites as well as other specific measures necessary to avoid and/or reduce the potential negative impacts as required in the ECOP, especially those related to management of the construction site, including borrow pits; transportation of construction materials, especially dredge materials; control of dust, noise, and vibration; solid and liquid Environmental and waste management; and public health. Given different scope and nature of civil works, scope and nature of the CSEP could be differ and all the CSEP will be reviewed and approved by the PEMC to be assigned by the subproject owner.

4.2 Non-compliance Reporting Procedures

7. Contractors must comply with the CSEP, and must ensure that their Sub-Contractors (if any) also comply with it. To ensure that necessary action has been undertaken and that steps to avoid recurrence have been implemented, the CSC/PEMCs and/or Contractors must advise the subproject owner within 24 hours of any serious incidents of non-compliance with the CSEP that may have serious consequence. In the event of working practices being deemed dangerous either by the subproject owners, the local authorities, or the other concerned agencies, immediate remedial action must be taken by the Contractors. The Contractors must keep records of any incidents and any ameliorative action taken. The records on non-compliance that could be practically addressed (not cause serious impacts) should be reported to the subproject owner on a monthly basis.

8. The Contractor will be responsible for dealing with any reports forwarded by the subproject owner, Police or other agencies by (following instruction from the subproject owner representative as appropriate) as soon as practicable, preferably within one hour but always within 24 hours of receipt by either the Contractor. The CSC/PEMC will monitor and ensure that the Contractor has taken appropriate action. Where appropriate, approval remedial actions may require an agreement from the local authorities and/or other GOV agencies. Procedures should be put in place to ensure, as far as is reasonably practical, that necessary actions can be undertaken to avoid recurrence and/or serious damage.

4.3 Liaising with Authorities and the Public
9. Prior to the commencement of subproject activities and throughout the construction duration, the Contractors will work closely with the local authorities and other agencies to ensure full compliance with GOV regulations and will also provide adequate information on the Project to the General Public, especially those that may cause public safety, nuisance, and sensitive areas and the locations of storage and special handling areas.

10. The Contractor will provide information and reporting telephone “Hot Line” staffed at all times during working hours. Information on this facility shall be prominently displayed on site hoardings.

4.4 Community Relations

11. Contractors will assign a community-relation personnel, who will be focused on engaging with the community to provide appropriate information and to be the first line of response to resolve issues of concern. Contractors will take reasonable steps to engage with residents of ethnic minority backgrounds and residents with disabilities (or other priority groups as appropriate), who may be differentially affected by construction impacts.

12. Contractors will ensure that local residents nearby the construction sites will be informed in advance of works taking place, including the estimated duration. In the case of work required in response to an emergency, local residents shall be advised as soon as reasonably practicable that emergency work is taking place. Potentially affected residents will also be notified of the “Hotline” number, which will operate during working hours. The “Hotline” will be maintained to handle enquiries regarding construction activities from the general public as well as to act as a first point of contact and information in the case of any emergency. All calls will be logged, together with the responses given and the callers' concerns action and a response provided promptly. The helpline will be widely advertised and displayed on site signboards.

13. The Contractor respond quickly to emergencies, complaints or other contacts made via the “Hotline” or any other recognized means and liaise closely with the emergency services, local authority officers and other agencies (based on established contacts) who may be involved in incidents or emergency situations.

14. The Contractor will manage the work sites, work camps, and workers in a way that is acceptable to local residents and will not create any social impacts due to workers. Any construction workers, office staff, Contractor’s employees, or any other person related to the Project found violating the “prohibitions” activities listed in Section A2 below may be subject to
disciplinary actions that can range from a simple reprimand to termination of his/her employment depending on the seriousness of the violation.

4.5 Mitigation Objectives and Special Considerations

15. Main objective of this ECOP is to minimize the potential negative impacts during construction on local environment, local community, and human and environmental safety and disturbance. The Contractor is expected to implement the activities in line with the following approach as much as possible in close consultation with the supervision and/or field engineers who will be assigned by PPMU to supervise the contract. Key approaches include, but not limited, to:

- Minimize impacts and restore damages;
- Replanting trees in project areas;
- Control erosion and sedimentation during construction;
- Proper control of suspended solids during dredging;
- Use main roads when possible;
- Heavy traffic restrictions;
- Control (collection, disposal) of wastes (solid and liquid);
- Minimize disturbance to local population; Frequent meetings with local people and provision of timely and adequate information to the project affected peoples (PAPs) so that their living and production conditions could be managed;
- Engage and provide labour opportunity for local population;
- Application of proper safety and warning measures in the construction sites, especially in dredging activities;
- Provision of temporary crossings and bridges during construction of bridges; Application of proper safety and warning measures;
- Conduct public information campaign and outreach program, including training and capacity building.

4.6 Implementation of “Chance Find” Procedures

16. If Contractors discovers archaeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractors will carry out the following steps:

- Stop the construction activities in the area of the chance find;
- Delineate the discovered site or area;
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the National Culture Administration take over;

- Notify the supervisory Project Environmental Officer and Project Engineer who in turn will notify the responsible local authorities and the Culture Department of Province immediately (within 24 hours or less);

- Responsible local authorities and the Culture Department of Province would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of National Culture Administration. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;

- Decisions on how to handle the finding shall be taken by the responsible authorities and Culture Department of Province. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;

- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and

- Construction work could resume only after permission is given from the responsible local authorities or Culture Department of Province concerning safeguard of the heritage.

4.7 Prohibitions

17. The following activities are prohibited on or near the Project sites:

- Cutting of trees for any reason outside the approved construction area; Hunting, fishing, wildlife capture, or plant collection; Buying of wild animals for food; Having caged wild animals (especially birds) in camps; Poaching of any description; Explosive and chemical fishing; Disturbance to anything with architectural or historical value;

- Building of fires; Use of unapproved toxic materials, including lead-based paints, asbestos, etc.; Use of firearms (except authorized security guards); Use of alcohol by workers in office hours; Driving in an unsafe manner in local roads;

- Washing cars or machinery in streams or creeks; Maintenance (change of oils and filters) of cars and equipment outside authorized areas; Creating nuisances and disturbances in or near communities; Disposing garbage in
unauthorized places; Indiscriminate disposal of rubbish or construction wastes; Littering the site; Spillage of potential pollutants, such as petroleum products; Collection of firewood; Urinating or defecating outside the designated facilities; and Burning of wastes and/or cleared vegetation.

V. Management of Construction

5.1 Management of Construction Sites

18. This section outlines the requirements relating to site management practices that should be implemented during site operation. These relate to working hours, site layout and appearance and good housekeeping as well as operations of equipment and vehicles. Monthly inspection/meeting should be conducted to ensure that these procedures are adhered to. The Contractor must follow a “good housekeeping” policy at all times. The site should be cleared by the Contractor on completion of the construction.

19. The Contractor is required to minimize, as far as reasonably practicable, any adverse environmental impact of their construction activities. All appropriate licenses and consents in respect of site operations will be timely secured. Key measures are as follows:

(i) General requirements on construction sites. A construction site must satisfy the following requirements

- Site layout. The overall site layout must be designed and approved under regulations to suit the construction location, the site’s area, natural and climate conditions in the place of construction, facilitate the construction and ensure safety for human, machines and equipments at the construction site and the surrounding areas affected by construction activities.

- Site arrangement. Supplies and materials are placed neatly according to the approved overall plan design. Supplies, materials and obstacles are not placed on roads, emergency exits or fire entrances. Flammable and explosive material warehouses are not arranged near the place of construction and tents. Waste materials are removed and discharged in prescribed places. Water drainage systems are regularly cleared to ensure that the construction ground is always dry.

- Signs. At the construction site there are signs according to Article 74 of the Construction Law. At the main entrance, a plan of the overall ground of the construction site and working regulations is displayed. Safety measures and rules are publicized at the construction site for compliance. At dangerous places at the construction site, such as trenches and foundation pits, there are fences, warning
signs and instructions for accident prevention. At night, signal lights are turned on.

- **Good housekeeping:** The Contractor will follow a „good housekeeping“ policy at all time for the workers and the surrounding environment. This will include, but not necessarily be limited to the following: dust and noise control; waste treatment, keeping the site clean and tidy. To sites located near residential areas, wastes must be covered and collected and properly disposed off. Construction and waste materials during transportation must be properly covered to ensure safety and environmental sanitation.

In case the Contractor does not comply with environmental protection regulations, the project owner and environmental authorized state agencies will have the power to suspend the construction operations. Persons responsible for adverse environmental impacts during the construction will be held responsible and compensate for any damages caused at his fault.

- **Power safety:** Motive and lighting power grids at the construction site are separate and installed with general circuit-breakers and sectioned circuit-breakers for cutting off power in part or the whole of the construction area. Ensure power safety for workers, construction machines and equipment at the construction site. Electric equipment are safely insulated during the construction process. Workers are guided on power safety techniques and ways to give first aid to persons who get electric shock in power accident.

- **Fire and explosion safety:** the Subproject Management Unit needs to set up a commanding board for fire and explosion prevention and fighting at the construction site, which has its own working regulations on its specific duties and powers. Fire and explosion prevention and fighting plans are appraised and approved under regulations.

The contractor organizes a fire and explosion prevention and fighting brigade which has its own working regulations on its specific duties and tasks. At the construction site, local fire fighting equipments are arranged. At fire-prone places, inflammable signboards and fire fighting and alarm equipment are installed to promptly detect fires and take remedies.

(ii) **Requirements during construction.** During construction, the following requirements must be satisfied:

- **Working hours:** Core working hours will be from 0800 to 1800 on weekdays and 0800 to 1300 on Saturday. Individual site requirements which differ from the above will be considered on a site by site basis. Noisy operations shall not take place outside these hours without prior approval from the
subproject owner. All construction related traffic will abide by the agreed hours of working for each site. Any exemption will require an agreement with the Subproject owner, subproject, and/or local authorities.

- Before starting construction, an approved design of construction measures is required, including labour safety solutions for workers and construction machines and equipment for each job, which has explanations about technical and use instructions.

- During construction, the approved design as well as regulations, standards and technical processes are complied with. Jobs dependent on the quality of previous jobs are performed only after the previous jobs have been tested to meet quality requirements under regulations.

- Construction measures and safety solutions are periodically or extraordinarily examined for modification according to practical conditions at the construction site.

- Organizations and individuals are fully capable in the jobs they perform under regulations. Operators of construction machines and equipment and performers of jobs with strict labour safety requirements are trained in labour safety and possess labour safety cards under regulations.

- Construction machines and equipment with strict labour safety requirements are inspected by and registered with competent agencies under regulations for operation at the construction site. During operation, they comply with safety processes and measures. If construction equipment is operated outside the construction site, the investor approves safety measures for construction-affected people, machines, equipment and works inside and outside the construction site. If due to construction conditions, equipment have to be placed outside the construction site and while not in operation, if they operate outside the construction site, such is permitted by authorized agencies under local regulations.

- Workers at the construction site are provided with medical checks-up and safety training and adequate personal safety equipment under the labour law.

- Unexploded Ordnance (UXO): Although the risk is not present in the entire project area, in some subproject areas such as in Quang Nam and Quang Tri, the Contractor will be responsible for ensuring UXO safety of the construction site. The response process needs to be included in emergency procedures. The emergency procedures will be prepared and carried out if UXO risk is identified at the construction site.

(iii) Clearance and rehabilitation of construction site after completion:
- On completion of the works the Contractor will clear away and remove all materials and rubbish and temporary works of every kind. The site will be left clean and in a condition to the satisfaction of the PPMU. Any potentially hazardous defects to the works will be made good, prior to permanent reinstatement

5.2 Management of Environmental Quality

(a) Water quality

20. The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into all rivers and coastal water and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality. Discharge of engine oil and oily waste from dredgers and construction machines to the rivers will be strictly prohibited. Engine oil, used oil, and other toxic substances and hazardous wastes must be properly collected, stored, treated, and/or disposed. Key measures are as follows:

- *Used oil/engine oil:* The oil container at the construction site (especially when the site is located less than 10 meters from the waterways) must be of sufficient strength to ensure to prevent leakage. The container must be situated within a secondary containment system (bunded), which will prevent the release of any leaked oil. The Contractor must make provisions to ensure that all hazardous substances including oil drums or containers on site are properly labeled and properly stored and that no oil or other contaminants are allowed to reach water courses or groundwater.

- *Wastewater from sites:* Whenever possible, the Contractor must minimize the amounts of wastewater that need to be discharged and find alternative means of disposal. The Contractor will ensure that any seepage and wastewater arising from the works and camp sites must be collected and discharged via a settlement tank. The standards for wastewater treatment prior to discharge must be agreed in advance with the ESA. Contaminated water or water of an uncertain quality must be discharged into sewers by tankers or other approved means of disposal.

- *Drainage.* Water drainage must be designed to avoid stagnant conditions that could create bad smell and unsanitary condition. The Contractor must agree with the ESA in advance, details of the methodology to be employed, prior to commencement of the construction. Particular attention must be given to regular pest control treatment (particularly rats and flies); removal of sludge and other debris after drainage; reducing smell nuisance from sludge and algae by measures including deodorizing, hosing down etc. Safety measures must also be
taken to protect both the general public and employees and to prevent fly-tipping and illegal access during the development works.

- **Water quality monitoring**: The Contractor must ensure continuous compliance with all the above conditions under the monitoring of the Subproject Owner and/or field engineer, including undertaking water quality monitoring at specific sites and are in compliance with government regulation related to wastewater management and water quality monitoring.

(b) **Dust, noise, vibration**

21. The Contractor must take all the efforts to control dust, noise, and vibration levels from the site, as far as is reasonably practicable. Excessive noise/vibration generation activities must be in accordance with GOV standards. For critical areas, the Contractor may be required to conduct noise measurement in close consultation with the local residents and establish appropriate measures to control and manage noise level. Measures for reducing dust and other air pollution, noise, and vibration are provided as follows:

- **Inform the residents**: Prior to commencement of work at any site, the Contractor will be required to inform the local authority and residents regarding the construction plan and potential noise and vibration that may occur from the construction activities, including measures to reduce noise and vibration.

- **Dust control**: The Contractor will ensure that no burning of waste materials on site; adequate water supply is available on site; dry sweeping of large areas is not allowed; Cover all trucks carrying loose or potentially dusty materials (soil, mud, etc.) to and from construction site; Water or sprinkle the construction areas periodically, especially at site located near residential area; avoid overloaded of trucks; routinely clean public roads and access routes; Ensure vehicles working on site have exhausts positioned such that the risk of re-suspension of ground dust is minimized (exhausts should preferably point upwards), where reasonably practicable; Control driving speed on un-surfaced haul routes and work areas; Ensure bulk cement and other fine powders materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; Mix large quantities of cement, grouts and other similar materials in designated areas; Store materials with the potential to produce dust away from site boundaries where reasonably practicable; Minimize the amount of excavated material held on site; Sheet, seal or damp down unavoidable stockpiles of excavated material held on site, where required; Seal or re-vegetate completed earthworks as soon as reasonably practicable after completion.
- Care must be undertaken during the transportation of dredge spoil to and from the construction site; the spoil must be covered at all time. Fly-tipping will not be permitted. Loads must only be deposited at designated sites. The Contractor will be responsible for all the trucks delivering to, or exiting from, a worksite and will clean up all damage that may occur to public road and other public facilities. Care should be taken when loading or unloading vehicles or dismantling scaffolding or moving materials to reduce impact noise. Loading or unloading bays may have to be housed in suitable acoustic enclosures.

- The installation of sheet piling with a diesel or air driven impact or drop hammer may not be acceptable on some of the sites. Use of hydraulically operated or vibratory hammers may be necessary in these circumstances to drive and extract sheet piling, provided the soil strata are suitable for such equipment. Where practicable, rotary drills and bursters actuated by hydraulic or electrical power should be used for excavating hard material. Noisy plant or equipment will be sited as far away as is practicable from noise sensitive buildings. The use of barriers, (e.g. soil mounds), site huts, acoustic sheds or partitions to deflect noise away from noise sensitive areas must be employed wherever practicable.

- The Contractor will be obliged to comply with the vibration levels established by agreement with the ESA on a site by site basis given due attention to minimize human exposure (1 Hz to 80 Hz) and protection of damage to nearby structures.

(d) Solid waste control and treatment

1. Solid wastes from subproject construction activities. The subproject construction activities will generate a big amount of escaped soil and stones, cement bags and other surplus materials (oily wastes, miscellaneous woods, etc.). Although solid wastes discharged in this stage are not toxic or dangerous (except for some oily wastes such as oily cloths after cleansing machines and equipments, etc.), proper measures for waste collection and treatment are required to avoid contaminating the environment and affecting local scenery. The Contractor must make a commitment to collect all escaped soil and stones and transport to designated areas or reuse them for dyke/road construction. Bags and other solid wastes will be collected for recycling or burning or taken to temporary dumps in the area (solid wastes disposed at these temporary dumps must be buried or covered in a sanitary way). In addition, during subproject construction, uncontrolled discharging of solid wastes into the environment needs to be minimized to reduce impacts to environmental scenery, transportation and daily activities of local residents, and the environment (water quality, soil quality and natural habitats).
2. Domestic solid wastes. During subproject construction, the Contractor must carry out appropriate measures for waste collection and treatment. The domestic wastes will be collected in plastic or wooden bins with lids placed in convenient places and in worker canteens. Periodically, at appropriate time, transport those bins to the dumping lot (the Contractor will select a proper location for the dumping lot, at least 500 m away from residential areas, 200 m away from work camps and surface water sources, and not in the prevalent wind direction of the area) to dispose of the wastes, from which the local Urban Environmental and Construction Company will be hired to carry out proper removal and treatment. The Contractor must sign a contract with the Urban Environmental and Construction Company to collect and treat solid wastes generated during the subproject construction. In case the wastes cannot be transported to the dumping lot (for example, due to lack of appropriate transport route), wastes must be buried at temporary dumps in the project area in a sanitary way – a waste layer covered by a layer of soil, and when the dump is filled, it is covered by a soil layer about 50 cm thick. Temporary dumps must be located at least 500 m away from residential areas, 200 m away from work camps and surface water sources, and not in the prevalent wind direction of the area. Upon completion of works, cover the entire temporary dumps with soil, ensure land and scenery restoration for the subproject area.

(d) Traffic and Transportation

22. The Contractor will be required to use designated construction traffic routes as directed by the local authorities and the Police. The number of truck movements, hours of operation and any truck holding areas will be agreed in advance with the local authority and the Police. Plans will be required for each site showing the site entrances/exits and the agreed access roads for use to the nearest main road, and the routes to be used by truck to and from the strategic road network.

- The Contractor will maintain an up to date log of all drivers that will include a written undertaking from them to adhere to the local authorities’ approved routes for construction traffic. In the case of non-compliance, the Contractor and/or their subcontractor(s) would be in breach of contract, necessitating disciplinary action against individual drivers.

- The Contractor may be required to provide truck stickers uniquely identifying the group of construction sites included in each contract, details of which shall be submitted to the local authority for approval. For identification purposes the Contractor will fix these in a prominent position on all trucks frequently serving the construction site. The identification will need to be
sufficiently large to be easily read from a distance of 20 metres. Trucks waiting to enter or leave the site must switch off their engines to avoid unnecessary engine noise and emissions. Restrictions on the size and weight of vehicles accessing each site may be imposed depending on agreed access routes.

- For construction that interference with a carriageway or footway, the Contractor will inform the local authorities, responsible agencies, and local residents before commencing the works and proposed measures to minimize the safety risk and inconvenience to the public. All necessary consents and licenses must be obtained in advance. The safety of the public must be ensured. In the case of temporary footways, reasonable access shall be provided for people in accordance with the following requirements: (a) Any temporary footways and carriageways will be constructed to the reasonable requirements of the local authorities and should have uniform surfaces as much as possible; (b) Clear signing must be provided at all times for pedestrian routes with the minimum number of changes to all temporary layouts in order to reduce confusion. Advance warning should, if possible, indicate alternative existing wheelchair-accessible routes; (c) After completion of the works all materials arising from the works will be cleared from the highway leaving the same in a clean and tidy condition to the reasonable requirements of the local authorities; and (d) The Contractor will be responsible for any damage caused by their activities to the roads and public facilities in the vicinity of the worksite. Any defects caused by the Contractors must be rectified immediately if dangerous or otherwise within 24 hours.

- Any street furniture (electrical or non electrical) cannot be removed or relocated by the Contractor or any of its sub-contractors without written agreement from the responsible agencies.

*(e) Excavation Materials and Demolition Materials*

3. Earth excavation must be carefully handled to reduce dust and possible obstruction and causing nuisance and health impacts to local residents. Excavation that affects public roads (such as pipeline and bridges) must be properly planned in consultation with local authority and informed to the residents in advance. All dredged spoils as well as excavation materials will be reused for dike/road construction and/or land filling at or nearby the work site. Demolition materials must be properly disposed off. The Contractor must consult ESA on the final selection of disposal sites and methods.

*(f) Protection of natural habitats*

4. During the construction stage, if mitigation measures of air, noise, water and soil pollution, the project will create negative impacts on the growth
and development of some animal and plant species in the area, especially aquatic species. Proposed mitigation measure is to develop a detailed plan and speed up the construction progress. The Contractor must observe the national and local regulations and policies related to protected areas/species, wildlife sanctuaries. No trees in sensitive areas shall be cut without obtaining prior agreement with the authorities. Strengthen monitoring the contractor’s compliance with environmental protection commitments. In addition, organize training courses to improve environmental protection awareness of the staff and local communities.

5.3 Management of Work Camp

23. The Contractor will consult with local authority regarding the location of the worker camps and will provide appropriate water supply, garbage collection, toilets, mosquito net, and other health protection measures to all workers. Fishing, wildlife hunting, and other social disturbance to local societies are prohibited. Training of workers on safety, good hygiene, and prohibitions activities is required. Detail measures as follow:

(i) During the preconstruction stage:

- Contractor will consult with local authority and subproject management unit regarding the location of the worker camps
- Once work camp location is identified, the Contractor will set up temporary accommodation for all the workers throughout the construction or maintenance period.

In terms of supply and storage of domestic water at the work camp area, the Contractor will comply with the following requirements: (a) Provide adequate drinking water supply for the work camps in appropriate tanks/containers. The Contractor will identify appropriate public water source for drinking in consultation with the local authority; (b) in case no appropriate source of water is identified, the Contractor will take water from other sources which will be tested and treated before supplied to the work camps; (c) All water supply and storage areas must be away from the wastewater storage area, drainage system or other sources of contamination according to the regulations. Water from drains or contaminated water must not be used as domestic water at the site.

- At all construction sites, facilities for washing and necessary and appropriate tools must be provided by the Contractor. Bathrooms must be provided separately for male and female workers. Such facilities must ensure convenience for use and cleaning.
- Waste discharges, wastewater must be properly collected and disposed off.

- First aid/Emergency aid kit. The first/emergency aid kit must be available at the work camp area and managed by a responsible person. This person must be trained on emergency/first aid. Injured or seriously sick people must be taken to the nearest hospital.

- Community relations. The Contractor will ensure that conflicts between the workers and local population are avoided.

(ii) Construction stage:
- Work camps must be kept clean and tidy, unaffected by oil spill and construction wastes. Any oil spilt or leaked must be cleaned immediately to avoid soil and water contamination. Some actions to carry out are as follow: (a) avoid oil leakage into surface water or groundwater; (b) wastewater must not be disposed directly to natural water areas; (c) solid waste materials are removed and discharged in prescribed places at frequent intervals; (d) First/Emergency aid supplies and materials and cleaning tools are regularly provided.

- PPMU will monitor the housekeeping of work camp areas and ensure these areas are kept clean throughout the construction period.

(iii) Construction completion.
- During this stage, all work camps and facilities will be cleared away and removed from the site. The site will be rehabilitated to ensure the operation of the works.

5.4 Management of Stockpiles, Quarries, and Borrow Pits

24. Commercial quarries and borrow pits approved by local environmental agencies should be used as much as possible. If non-commercial quarries and/or borrow pits are used, in consultation with the Construction Management Consultant (CSC) and/or field engineers, the Contractor will comply with the following requirements:

- Large-scale borrow pits or stockpiles will need site-specific measures that go beyond those required in this ECOP.

- All locations to be used must be previously identified in the approved construction specifications. Sensitive sites such as scenic spots, areas of natural habitat, areas near sensitive receptors, or areas near water should be avoided.

- An open ditch shall be built around the stockpile site to intercept wastewater.

- Stockpile topsoil when first opening a borrow pit and use it later to restore the area to near natural conditions.
- If needed, disposal sites shall include a retaining wall.
- If the need for new sites arises during construction, they must be pre-approved by the responsible local authorities.
- If landowners are affected by use of their areas for stockpiles or borrow pits, they must be included in the project resettlement plan.
- For any stockpile, quarry, or borrow pit sites involved in this project, but not to be used afterwards. The contractor will prepare and implement a Contract Specific Environmental Plan (CSEP) in compliance with the ECOP that includes management of borrow pits and their closure plans.
- If access/rescue roads are needed, they must have been considered in the environmental assessment. The alignment for each of these roads must be clearly determined with its impacts and mitigation measures.

5.5. Monitoring of Potential Impacts

27. The Contractor will be required to carry out the following monitoring program and a monitoring plan will be included as part of the CSEP:

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<th>Parameters</th>
<th>Example Locations</th>
<th>Frequency</th>
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<td>Surface water quality deterioration</td>
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<td>Upstream and downstream of dredging and/or construction works, especially when other beneficial uses are located</td>
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Appendix 2: Terms of References (TOR) for EMP Supervision

Overview
In order to avoid affecting local community and reduce impacts on the environment during construction phase, ECOP and EMP prepared for subproject have to be fully complying.

CSC is responsible for providing technical construction “services” with the purpose of ensuring ECOP and EMP of the subproject are implemented sufficiently and efficiently.

Scope of Services
General service provided by CSC is to supervise and monitor construction activities, ensure all mitigations proposed in the EMP is implemented appropriately and negative environmental impacts are mitigated.

In the role of PPMU, CSC will be responsible for these following actions:
- Regularly supervise and monitor construction fields
- Supervise implementation of mitigation in comparison to EMP and contracts
- Evaluate efficiency of environmental mitigations and outcome
- If necessary, consider feasibility of construction methods (for both temporary and permanent items) and related designs. In case of necessary, CSC has to research and propose substitute mitigations to minimise environmental impacts to designer, contractors and PPMU.
- Investigate any violation of mitigation implementation that results in impacts on environmental health and efficiency of substitute mitigation
- Provide information on finance for Head of Engineer if not in compliance with EMP
- Guide contractors to have corrective actions in a specific timeframe and if necessary, implement an additional monitoring in case of non-compliance or presence of complaints
- Guide contractors to stop activities that cause adverse impacts, and stop the operation of contractors when EMP or corrective actions are not implemented.

In case of contracts with Specific Environmental Management Plan, CSC will consider and propose the final plan on site clearance of all projects to protect the environment. All proposals on dredging area, landfill, material sources and worker camps will be considered by CSC and approved by contractors.
In case of projects that do not have EMP, EIA or RAP, CSC will work with PPMU and contractors to propose specific solutions.

**Grievance Redness Mechanism**

Grievance by local people will be received at Contractor’s Office. Grievance should be related to environmental violation, such as noise, dust, traffic safety,… Head of Engineering in cooperation with CSC will instruct contractors to address the issues, as well as supervise effectiveness of solutions for recent solved grievances.

**Commitment of Monthly Fund**

CSC will certify funds for all activities related to environmental issues implemented by contractors.

CSC will prepare reports as following:

- Report every 2 weeks on violations
- Monthly summary report on vital matter, results of supervision and monitoring.

At the end of the project, CSC will prepare a final report, summarise all their main works, number of violations and solutions, as well as recommendation and guidelines for future works.
Appendix 3: Responds by Trieu Thuong Commune Authorities

[Text in Vietnamese]
ỦY BAN MẠT TRẦN TỔ QUỐC
XÃ TRIỆU THUONG

ỦY BAN MẠT TRẦN TỔ QUỐC XÃ TRIỆU THUONG

Vũ y kiến thơm văn và Dự án nâng cấp hệ thống hồ Triệu Thuong 1, 2
xã Triệu Thuong, huyện Triệu Phong, tỉnh Quảng Trị

Kính gửi:
BAN QLDA QUẢN LÝ THIÊN TAI (WB5/VN-Haz) TỈNH QUẢNG TRỊ

Ủy ban Mật tran Tổ quốc xã Triệu Thuong, huyện Triệu Phong nhận được Văn bản số ...
ngày tháng năm 2013 của Ban Quản lý dự án Quản lý thiên tai (WB5/VN-Haz) tỉnh Quảng Trị kèm theo tài liệu tóm tắt về các hạng mục đầu tư, chính, các vấn đề môi trường, các giải pháp bảo vệ môi trường của Dự án Nâng cấp hệ thống hồ Triệu Thuong 1, 2 xã Triệu Thuong, huyện Triệu Phong, tỉnh Quảng Trị. Sau khi xem xét tài liệu này, Ứy ban Mật tràn Tổ quốc xã Triệu Thuong, huyện Triệu Phong có ý kiến như sau:

1. Về những tác động xả của Dự án đến môi trường tự nhiên và kinh tế xã hội:

Ủy ban Mật tran Tổ quốc xã Triệu Thuong hoàn thành công việc với các nội dung về các tác động của Dự án đến môi trường tự nhiên và kinh tế xã hội được trình bày trong báo cáo các tổ chức của Dự án.

2. Về các biện pháp giảm thiểu tác động môi trường của Dự án:

- Bảo cáo tổng thể các tác động của Dự án tới môi trường đã nun được đầy đủ các biện pháp giảm thiểu các tác động tiêu cực tới môi trường tự nhiên và xã hội.

- Ứy ban Mật tran Tổ quốc xã Triệu Thuong đồng ý với các biện pháp giảm thiểu đã nêu

3. Kiến nghị đối với chủ đầu tư:

- Chủ đầu tư cần thực hiện nghiêm túc các biện pháp giảm thiểu ảnh hưởng môi trường như đã đề cập trong báo cáo đánh giá tác động môi trường.

- Nếu dự án có gây ra các tác động tiêu cực tới môi trường, gây ô nhiễm, suy thoái môi trường tự nhiên và ảnh hưởng tới cộng đồng dân cư, chủ đầu tư sẽ chịu trách nhiệm bố thường và khắc phục ô nhiễm.

Trên đây là ý kiến của Ứy ban Mật tran Tổ quốc xã Triệu Thuong, huyện Triệu Phong gửi Ban Quản lý dự án Quản lý thiên tai (WB5/VN-Haz) tỉnh Quảng Trị để xem xét và hoàn chỉnh báo cáo đánh giá tác động môi trường của Dự án.

Chủ tịch

Nơi nhận:

- Như trên;
- Công ty CP Tư vấn và Thẩm định Môi trường Vinascontrol;
- Lưu.
Appendix 4: Public Meeting Minute of Public Consultation Campaign 1
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- Đại diện đơn vị tư vấn:

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</table>

- Người dân trong xã/phường tham gia:
  - Tổng số người tham gia: ....... người
  - Trong đó: Nam: ....... người chiếm ...... %
  - NỮ: ....... người chiếm ...... %

- Đã tiến hành tham vấn công cộng về tiêu dự án: Nâng cấp hệ thống hồ Triệu Thuong 1, 2 (thuộc dự án: “Quản lý thiên tai Việt Nam (WB5)”)

- Chữ ấn cuộc họp: ..........
- Chức vụ: ..........

- Nội công tác: Công ty Cổ phần Tư vấn và Thẩm định Môi trường Vinacontrol

- Nội dung tham vấn:
  - Ông/Bà: .......... nếu nội dung cuộc họp tham vấn
  1. Phân biệt thông tin về dự án
     a. Dự án Quản lý thiên tai Việt Nam
        - Phân biệt thông tin về mục tiêu, mục đích, quỹ mỏ của dự án
        - Kế hoạch triển khai dự án
        - Những mặt thuận lợi và khó khăn của dự án
        - Những tác động tích cực mà dự án mang lại
     b. Tiêu đề dự án: Nâng cấp hệ thống hồ Triệu Thuong 1, 2
  2. Cơ quan tư vấn đưa các thông tin về dự án (bản thông tin kèm theo):
     - Mục tiêu, mục đích, nhiệm vụ khi thực hiện dự án
- Hiện trạng hệ thống hồ Triệu Thuương 1, 2
- Tình hình dân cư bị ảnh hưởng và hưởng lợi
- Hàng mục công việc khi thực hiện dự án
- Thiết kế sơ bộ của dự án

2. Chính sách đền bù, đền dàn tài dinh cư
- Các tác động của thu hồi đất trong dự án
- Quy trình thực hiện thu hồi đất và giải phóng mặt bằng
- Các chính sách đền bù, đền dàn tài dinh cư của Ngân hàng Thế giới, của Chính phủ Việt Nam và của UBND tỉnh Quảng Trị
- Sự tham gia và giám sát của công động trong các giai đoạn của dự án

Tham vấn công động:
Sau khi nghe đại diện tổ vận neu những thông tin về dự án, các văn đề đền bù và đền dàn tài dinh cư, mọi người trong cuộc họp đã thảo luận về các nội dung:
1. Các chính sách giải phóng mặt bằng, đền bù và đền dàn tài dinh cư
2. Tham gia của công động trong các giai đoạn của dự án

Kết quả tham vấn: Tóm tắt ý kiến của công động địa phương:
1. Văn đề liên quan đến đền bù và đền dàn tài dinh cư
Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

Tất cả người dân tham gia cuộc họp đều bày tỏ nguyện vọng tham thiết trong việc tu bổ, nâng cấp và xây dựng công trình để tăng hiệu quả phòng chống lũ lụt, bảo vệ dân cư; tạo điều kiện phát triển cơ sở hạ tầng. Tuy nhiên cần thực hiện nghiêm túc trong việc đến bù cho người dân và trong quá trình nâng cấp hồ.

Cuộc họp kết thúc vào hồi: ............ ngày ...... tháng ...... năm 2013

CÁC BÊN THÔNG NHẬT KÝ TÊN

Đại diện
Công ty CP Tư vấn và Thẩm định
Môi trường Vinacontrol

D/V: UBDT xã Thượng Thượng

D/V: Mặt trận Tổ quốc xã

D/V: Hội PN

D/V: Nguyễn Ngọc

D/V: Hồ Thị Minh
Appendix 5: Public Meeting Minute of Public Consultation Campaign 2

CÔNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Ràô lâp - Tư đở - Hành phôc

BIẾN BẢN THAM VÀN CÔNG ĐÔNG

Tiều dự án

“Năng cấp hệ thống hồ Triệu Thuong 1, 2”

Thưu dự án: “Quản lý thuận taï Việt Nam (WB5)”

Cục hop được tiến hành vào hồi ngày 22 tháng Chô näm 2013 tài xã phẫung. Triệu Thuong, triënn Triệu Thuong, tỉnh Quảng Trị.

Và tiêu dự án: “Năng cấp hệ thống hồ Triệu Thuong 1, 2” (thưu dự án: “Quản lý thuận taï Việt Nam (VN-Haz/WB5).

Nội dung:

- Phô biên nội dung bản dự thảo EMP của Tiểu dự án;
- Thanh văn chính quyền địa phương và các nội dung đã nêu trong bản dự thảo EMP cho Tiểu dự án: Hiền trạng môi trường, các tác động môi trường khi triển khai dự án, các biện pháp giảm thiểu tác động tiêu cực, kế hoạch quản lý, thực hiện các biện pháp giảm thiểu, kế hoạch giám sát môi trường khi triển khai EMP;
- Các vấn đề khác.

Thành phần tham dự:

Đại diện UBND xã/phường:

1. Bác Phan Văn Khoa ……….. Chức vụ: Phó Chủ tịch UBND xã

2. Bác Bùi Thị Phương ……….. Chức vụ: Chủ tịch UBND xã

3. Bác Lê Văn Lương ……….. Chức vụ: Chân thà chưng

Đại diện các tổ chức chính trị xã hội:

1. Bác Trương Văn CÚ ……….. Chức vụ: Chủ tịch Hội nông dân xã

2. Bác Đỗ Thị Thảo ……….. Chức vụ: Chủ tịch Hội phụ nữ xã

3. Bác Đặng Thị Hạnh ……….. Chức vụ: Chủ tịch Hội giáo dục

4. ………………………………. Chức vụ: …

5. ………………………………. Chức vụ: …
Đại diện khóa:

1. .......................................................... Chức vụ..................................................
2. .......................................................... Chức vụ..................................................
3. .......................................................... Chức vụ..................................................
4. .......................................................... Chức vụ..................................................

Đại diện đơn vị tư vấn:

1. Мау Thiết An .................................................. Chức vụ.......................... Quản đốc
2. Đaom Lý Hùng .................................................. Chức vụ.......................... Phó giám đốc
3. Nguyễn Thanh Hiền .................................................. Chức vụ.......................... Nhân viên
4. Dương Minh Thịnh .................................................. Chức vụ.......................... Nhân viên
5. .......................................................... Chức vụ..................................................

Chủ toạ cuộc họp: ...Ông Мау Thiết An......
Chức vụ: ..................................................

Nơi công tác: Công ty Cós phân Tư vấn và Thăm định Môi trường Vinacontrol

Nơi dự tham vấn:
Ông/Bà: Đaom Lý Hùng, nếu nơi dự tham dự cuộc họp tham vấn
1. Phổ biến thông tin về bản dự thảo EMP
   a. Các tác động tiềm tàng và các biện pháp giảm thiểu cần thực hiện
   - Phổ biến thông tin về các tác động tích cực của Tiêu dự án
   - Phổ biến thông tin về các tác động tiêu cực của Tiêu dự án
   - Trình bày các biện pháp giảm thiểu tương ứng cần thực hiện trong quá trình thực hiện Tiêu dự án
   b. Tổ chức thực hiện
   - Quy định vai trò và trách nhiệm của các đơn vị liên quan
   - Trình bày kế hoạch giám sát, các nhân tố cần giám sát và tổ chức giám sát
   - Kế hoạch đào tạo nâng cao năng lực
2. Tham vấn về các nội dung đã nêu trong bản dự thảo EMP
Kết quả tham vấn:
1. Các vấn đề môi trường và biện pháp giảm thiểu
   a. Phân Vấn Kiều
   - Tăng cường giáo dục, nâng cao nhận thức về sự cần thiết của việc bảo vệ môi trường.
   - Thực hiện các biện pháp quản lý, giám sát để phòng ngừa sự ô nhiễm.
   - Thực hiện các bước để cải thiện chất lượng nước và môi trường sống.
   - Thực hiện các biện pháp để giảm thiểu tác động tới môi trường.
   - Thực hiện các biện pháp để giảm thiểu ảnh hưởng đến môi trường.

b. Lê Kim Cận
   - Thường xuyên kiểm tra, kiểm soát, đảm bảoEMP đạt chuẩn theo quy trình.
   - Cansom tự nhiên, làm sạch, bảo vệ nguồn nước.
   - Thực hiện các biện pháp giảm thiểu ảnh hưởng đến môi trường.

2. Đề nghị Văn Anh
   - Thực hiện các biện pháp để giảm thiểu tác động tới môi trường.
   - Thực hiện các biện pháp để giảm thiểu ảnh hưởng đến môi trường.
   - Thực hiện các biện pháp để giảm thiểu ảnh hưởng đến môi trường.

3. Trà Thị:"41
   - Thực hiện các biện pháp để giảm thiểu ảnh hưởng đến môi trường.
   - Thực hiện các biện pháp để giảm thiểu ảnh hưởng đến môi trường.
   - Thực hiện các biện pháp để giảm thiểu ảnh hưởng đến môi trường.
Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”

2. Tổ chức thực hiện

Ms. Le Mai

- Đối phó các vấn đề môi trường
- Phối hợp với các cơ quan chức năng
- Thực hiện các biện pháp phòng ngừa
- Thực hiện các biện pháp khắc phục hậu quả
3. Kiến nghị đổi với ban Quản lý dự án
   - Lý Phan Văn Chấn
   - Đề nghị ban Quản Lý dự án xem xét việc thi công dự án trên diện tích dự kiến
   - Đề nghị ban Quản Lý dự án xem xét việc thi công dự án trên diện tích dự kiến
   - Đề nghị ban Quản Lý dự án xem xét việc thi công dự án trên diện tích dự kiến
   - Đề nghị ban Quản Lý dự án xem xét việc thi công dự án trên diện tích dự kiến
Environmental Management Plan for the Subproject “Upgrading Trieu Thuong 1, 2 Reservoir System”