Initial Environmental Examination

August 2018

Viet Nam: Second Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth Project

Hoa Binh, Nghe An, Quang Binh, Quang Tri, and Thua Thien Hue Provinces

Prepared by the Provincial Peoples Committees of Hoa Binh, Nghe An, Quang Binh, Quang Tri, and Thua Thien Hue for the Asian Development Bank.

CURRENCY EQUIVALENTS

(19 May 2018)

Currency Unit	–	Vietnamese Dong D
D1.00	=	$0.000044
$1.00	=	D22,767

ABBREVIATIONS

ADB	-	Asian Development Bank
PAH	-	Project Affected Household
BOD	-	Biological Oxygen Demand
CEMP	-	Construction Environmental Management Plan
COD	-	Chemical Oxygen Demand
HBPPC	-	Hoa Binh Provincial Peoples Committee
DARD	-	Department of Agriculture and Rural Development
DOC	-	Department of Construction
DOLISA	-	Department of Labor, Invalids, and Social Assistance
DONRE	-	Department of Environment and Natural Resources
DPI	-	Department of Planning and Investment
EA	-	Executing Agency
EIA	-	Environment Impact Assessment
EMP	-	Environment Management Plan
EO	-	Environmental Officer
IA	-	Implementing Agency
IEE	-	Initial Environmental Examination
IES	-	International Environment Specialist
GRM	-	Grievance Redress Mechanism
NAPPC	-	Nghe An Provincial Peoples Committee
NES	-	National Environment Specialist
PMU	-	Project Management Unit
GOV	-	Government of Viet Nam
PMDDS	-	Project Management and Detailed Design Support Consultant
PPC	-	Provincial Peoples Committee
PPTA	-	Project Preparation Technical Assistance
QBPPC	-	Quang Binh Provincial Peoples Committee
QTPPC	-	Quang Tri Provincial Peoples Committee
SO	-	Safeguards Officer
TTHPPC	-	Thua Thien Hue Provincial Peoples Committee
UXO	-	Unexploded Ordnance

WEIGHTS AND MEASURES

km	kilometer
kg	kilogram
ha	hectare
m	meter
mm	millimeter
^{o}C	degree Celsius

NOTE

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

EXECUTIVE SUMMARY

The second Greater Mekong Subregion (GMS) Tourism Infrastructure for Inclusive Growth Project (the project) will develop small scale infrastructure to improve tourist facilities and develop and strengthen management capacity to enhance tourism at selected locations in Viet Nam, Cambodia and Lao People's Democratic Republic (PDR). In Viet Nam, 9 infrastructure subprojects will be implemented in Hoa Binh, Nghe An, Quang Binh, Quang Tri, and Thua Thien Hue, which are the focus of the IEE presented herein. The 9 subprojects are listed below.

Hoa Binh
• Tien Pagoda and Cave Access Improvements
Nghe An
• Cua Lo Beach Access and Environmental Improvements
• Ru Gam Pagoda Access Improvements
Quang Binh
• Nhat Le – Long Dong River and Road Improvements
Quang Tri
• Cua Viet/Cua Tung Beach Access/Environmental Improvements
• Con Co Island Access Improvements
Thua Thien Hue
• Hon Chen Temple Access Improvements
• Huong River Tourist Piers Improvements
• Da Bac Access Improvements

Subproject Benefits

The project supports the government's urbanization efforts and is aligned with the ADB Country Partnership Strategy 2016–2020. It is consistent with ADB's urban operational plan and environment operational directions by promoting inclusive, competitive, and green growth for better living and climate resilience.[1]

The overall tourism and social impacts of the project will be positive and will contribute to improving the quality of life of the people in the five subproject provinces. The project will contribute to inclusive growth by improving access to climate resilient transport and urban environmental services, enable community-level groups to participate in tourism and green action planning, implementation, and monitoring processes. Benefits of the provincial subprojects are summarized below.

Hoa Binh

The upgrades and new sections of roads to the Tien pagoda and caves area will stimulate the tourism economy by improving access and support facilities such as parking and sanitation in the local market facility. Currently the road access to the pagoda and cave areas is unnecessarily

[1] ADB. 2016. *Country Operations Business Plan, 2017–2019, Viet Nam*. Manila; ADB. 2016. *Country Partnership Strategy, 2016–2020: Viet Nam*. Manila; ADB. 2013. *Urban Operational Plan*, 2012–2020. Manila; ADB. 2013. *Environment Operational Directions, 2013–2020*. Manila.

long and in poor condition and the market lacks toilets and sanitation. The subproject will directly benefit about 6,000 people living in Thanh Nong, Phu Lao Commune and nearby settlements.

Nghe An subprojects

The improvements to Cua Lo beachfront in Cua Lo town just north of Vinh will act as a needed catalyst for increasing tourist arrivals and overnight stays. There will be more accessible beach space particularly during important peak use periods. The beachfront upgrades will generate incentive for further hotel and resort investment which in turn will strengthen tourism and local economy. An improved beachfront will allow expansion of different types of beach and water sport activities which will provide significant employment opportunities for local community. The beachfront improvements will upgrade and deliver sustainable environmental infrastructure, including better solid waste and decentralized wastewater treatment systems which are essential for busy tourist areas. The design of the beachfront promenade will be more resistant to increased storm surge and sea level rise. The beachfront development will directly benefit 400 restaurant operators, 300 hotels/guest houses, and 55,925 Cua Lo District residents.

The improved road to Ru Gam Pagoda, northwest of Cua Lo town, will facilitate access to the pagodas in the area in support of the government's large cultural investments in the area. The road will also provide improved access to markets and services for residents. The upgraded access to the pagoda will provide economic opportunities for 20,236 residents of Bac Thanh, Xuan Thanh and Tang Thanh villages.

Quang Binh subproject

The improved tourist piers and support facilities such as small access roads, parking, and amenities along the Nhat Le – Long Dai River starting in Dong Hoi city will greatly improve the tourist experience and access to tourist sites on the river. The river boat tour concept will become a much stronger component of all tourist activities in the area which will benefit the local economy and create employment opportunities. The new and upgraded piers will be resilient to climate induced increases in river and lagoon levels and flow velocities. The subproject will directly benefit 5,553 residents in Hai Thanh ward, 14,174 residents in Quan Hau, Hien Ninh and Truong Xuan communes, and tourist boat operators, boat pier managers, and tourism-service enterprises. It will also increase access to economic and recreation opportunities for 116,903 Dong Hoi City residents.

Quang Tri subprojects

The improvements to the Cua Viet – Cua Tung beachfront will catalyze increased tourist arrivals and overnight stays. There will be more accessible beach space, particularly during peak use periods. The beachfront upgrades will help catalyze more hotel and resort investment, which in turn will strengthen tourism and local economy. The improved beachfront will allow expansion of different types of beach and water sport activities which will provide significant employment opportunities for local community. The beachfront improvements will upgrade and deliver sustainable environmental infrastructure, including better solid waste and decentralized wastewater treatment which are essential for busy tourist areas. The design of the beachfront promenade will be resistant to climate change-induced storm surge and sea levels. The subproject will directly benefit 187 restaurant operators/stall holders, about 60 hotels/guesthouses, and improve economic and recreation opportunities for 75,185 residents of Gio Linh District, specifically Trung Giang (3,406 persons) and Gio Hai (3,363 persons) communes.

The new ferry terminal at the south end of Cua Viet beach will significantly improve access to Con Co island. The new pier will make it easier for tourists to extend coastal excursions and visit the historic island. The port will provide for a greater number of larger and safe ferries, benefitting tourist and residents. The new port will provide economic opportunities for 3,363 residents of Gio Hai commune, directly benefiting about 500 Con Co Island residents, employees, and ferry service operators.

Thua Thien Hue subprojects

The upgraded and widened access road and new parking area at the Hon Chen Temple will provide better and more comfortable access to Hon Chen Temple which will stimulate increased visits by religious pilgrims and tourists. The increased tourist visits to the temple will boost employment opportunities in Huong Ho ward and Huong Tho commune. The road upgrades will facilitate subsequent improvements to environmental services such as solid waste removal. The subproject will benefit 14,543 residents of Huong Tho and Huong Ho villages.

Development and upgrades to the tourist piers on the Huong river and in Tam Giang lagoon will stimulate expansion of water-based recreation in the area and encourage use of the river to move between tourism destinations as opposed to relying solely on automobiles. In addition to tourism, the improved pier network will also benefit residents that use small ferries for transportation and commerce. The upgraded piers will increase employment opportunities for residents and opportunities to expand tour services linked to Hue City. The new piers will be designed to be more resilient to climate induced increases in lagoon and river levels and flow velocities. The subproject will directly benefit at least 11,285 residents of Phu Mau Commune (Phu Vang District), 13,214 Quang Ngan and Quang Loi Commune residents (Quang Dien District) tourist boat operators, and tour operators, as well as 562,000 passengers per year in the first year of operation.

The improved road in Da Bac will provide better and more comfortable access to is Truc Lam Bach Ma Meditation Center for religious pilgrims and tourists. The subproject will also improve access to markets and services for Loc Hoa commune. The associated upgrades to Da Bac stopover point on National Highway 1 will increase local employment and income generating opportunities. The subproject will directly benefit 15,626 residents of Loc Dien and Loc Hoa commune as well as the Truc Lam Bach Ma Meditation Center community and will create economic opportunities for 15,626 residents of Loc Dien and Loc Hoa commune.

Potential Impacts

The nine subprojects are confirmed as Category B for environment pursuant to the SPS (2009).

Pre-construction Phase

The primary impact during the pre-construction phase when the locations and scope of subproject components are finalized is the varying levels of resettlement and/or compensation for asset losses. At the feasibility design stage land acquisition and resettlement (LAR) requirements are foreseen in four provinces summarized as follows.

The LAR impacts for the subproject in Hoa Binh Province include: (i) acquisition of 13,587 m^2 of agricultural and residential lands; and (ii) demolition of eight temporary houses with a total area of 223 m^2, and 21 fences with a total area of 394 m^2. There are eight severely affected households.

The implementation of two subproject in Nghe An province requires the acquisition of land and assets on land from one household, comprising (i) 25 m^2 of land for perennial trees; (ii) 10 m^2 of brick fence. The two subprojects in Quang Tri Province: (i) requires the relocation of four shops and acquisition of 36,937 m^2 residential, agricultural and public lands, two shrimp ponds, and 655 timber trees; (ii) causes business disruption of 22 households; and (iii) impacts severely on agricultural land of four households. In Thua Thien Hue Province, the Hon Chen Temple Access Improvement subproject will: (i) cause impact on lands and assets on land of 24 households and one private business, including seven severely affected households; (ii) require the acquisition of 14,196 m^2 of residential and agricultural lands; and (iii) require the removal of 470 timber trees. The Huong River Tourist Piers Improvement subproject will permanently impact on 2,251 m^2 of agricultural and public lands and 10 fruit trees. One household will have house-cum-shop entirely affected due to land acquisition of the subproject. The Da Bac Access Improvements subproject will: (i) require the acquisition of 22,336 m^2 residential, agricultural and public lands; (ii) require removal of 5,205 trees of acacia and eucalyptus plantation; and (iii) cause severe impact on land of one household. Further details are provided in the separate LAR reports prepared for each province and subproject.

Construction Phase

The potential environmental impacts of the subprojects are temporary disturbances and impacts associated with construction and civil works activities of the different subproject components. The common construction impacts and disturbances for all subprojects are removal of some trees and vegetation, dust, noise, soil erosion and surface water sedimentation, increased traffic and risk of traffic accidents, local air pollution from operating heavy machinery, loss or obstructed access, construction waste, and risk of worker and public safety. Mitigation measures for these impacts are prescribed following standard construction practices, and World Bank EHS Guidelines (2007) for the different sectors. Specific temporary construction impacts, and disturbances of subprojects are summarized below.

<u>Tien Pagoda and Cave Access Improvements</u>

The civil works and operation of heavy equipment required for the construction of the new (6.6 km) and improved (4.2 km) sections of the access road, parking and market, will create dust, noise, and traffic congestion, impede access, and increased the risk of traffic accidents in the village and along the rural roads, and near the pagoda and cave attractions. The access road developments will require minimal tree removal in the predominantly open agricultural area. Excavation and grading activities will cause soil erosion and potential temporary sedimentation in a stream over which a new short bridge will be constructed. Construction waste will be produced which will temporarily cause negative aesthetic impacts. Some aquatic benthic habitat will be lost if bridge support piles are installed in the stream. The construction impact and disturbances can be prevented or minimized with the application of standard national and international construction practices, and IFC EHS guidelines for civil works construction as needed which are detailed in the environmental management plan (EMP) for the subproject. For example, construction waste must be collected and disposed of in DONRE-approved disposal sites. Specific impact mitigations for the subproject are to design the small bridge so that bridge support piles are not placed in the stream bed and build shoreline berms to minimize erosion into the stream. Instream silt curtains will be placed around the bridge site to contain any sedimentation and turbidity at the construction site. Special mitigation measures prescribed in the EMP for the subproject will protect all pagoda property and the cave areas from construction activities. Construction scheduling and road detour measures will be implemented to ensure visitation to the temple and cave areas is not be

disrupted during the construction phase. The subproject is not located near a protected area, and no critical habitat or Viet Nam Red Book species are known in the area.

Cua Lo Beachfront Access and Environmental Improvements

The beachfront developments at Cua Lo involve walkway improvements 50 – 200m from the sea, however the sea environment will not be directly affected by construction activities. Surface waters potentially affected by the subprojects are rivers that drain into the sea at each end of the subproject area. The mouths of the rivers could potentially be affected by minor temporary sedimentation from the beachfront walkway works. Though, the seawalls to be upgraded or constructed will not cross the river mouths.

There are no mangrove forests, or other critical habitat or protected areas in the subproject area. However, tree removal along the beachfront must be minimized because the sparsely distributed trees, while not officially protected, naturally act to stabilize shifting dunes and provide shade. The potential impacts of the subproject concern common construction disturbances that will arise from the beachfront walkway and seawall developments such as noise, dust, traffic congestion, and temporary restricted access. The specific important impact mitigation measure is that all work sites will be well signed warning tourists and pedestrians of beachfront of construction activities. Pedestrian detours around all construction sites, and temporary walkways to all beachfront business establishments must be put in place to prevent disruption to normal tourism and beachfront business activities. Extra effort will be expended to contain and regularly remove construction waste from the beachfront tourist and business areas. Construction disturbances to the community will be prevented or mitigated with standard national and international construction practices as supplemented as necessary by IFC EHS Guidelines, all of which are prescribed in detail in the EMP for the subproject. Due diligence confirms the subproject is not expected to involve land acquisition or resettlement impacts.

Ru Gam Pagoda Access Improvements

Temporary construction impacts and disturbances include dust, noise, and traffic congestion, restricted access, and increased risk of traffic accidents along the rural road to the pagoda. The 3.7 km access road to be upgraded does not cross any watercourse, and the immediate affected area is sparsely populated. Standard construction management practices and mitigation measures will be applied following national and international best practices along with IFC EHS Guidelines for road construction as needed. No critical habitat, or Red Book species are known in the subproject area, and the subproject is not near an ecological protected area.

The important specific construction impact mitigation required is to protect the pagoda from physical damage from construction of the new parking area. Pagoda buildings and property must be separated from construction activities with fences and barriers. Extra care must also be taken to avoid interrupting access to the pagoda by tourists and residents. Construction activities near the pagoda should cease on holy days and festivals because there are large numbers of visitors. The large trees (Xa Cu) along the access road will be protected from construction activities with barriers. Tree removal will be avoided as much as possible. Other important features to be protected are a bridge over an irrigation canal, power distribution lines, and a school. Measures to avoid and mitigate impacts are detailed in the subproject's EMP.

Nhat Le – Long Dai River and Road Improvements

The rehabilitation/construction of the 4 small river piers will temporarily impact the aquatic environment and human uses of the affected pier areas. The benthic habitats under and near the piers will be temporarily disturbed while the pier work is underway; and recover after pier works are completed. The aquatic impacts will arise from maximum turbidity and sedimentation levels and physical alteration to the river bottom. The impacts and required mitigations for construction disturbances (e.g., dust, noise, traffic congestion, reduced access and construction waste) of the associated facilities such as adjacent access roads, parking areas, and tourist buildings will be like the other subprojects. Pier construction can interfere with boat traffic, and other human activity such as fishing and aquaculture. Specific impact mitigation measures include construction of shoreline earthen berms to prevent soil erosion into the river and use of in-river silt curtains around pier work sites to contain suspended sediment. All piers sites must post signs to warn boat traffic of the construction activities. Measures to avoid and mitigate impacts are detailed in the subproject's EMP.

Cua Viet/Cua Tung Beach Access/Environmental Improvements

The construction phase disturbances and impacts of the upgrades to the beachfront walkway, and shops along Cu Viet and Cua Tung beaches will arise from the common construction disturbances of noise, dust, traffic congestion, and temporary restricted access. The primary potential impact will be disturbances and disruptions to local beachfront business activities and tourist and residents use of the beachfront walkways. All construction areas along the beachfront must be well signed and fenced to alert and protect businesses and pedestrians from construction activities. Temporary pedestrian detours must be constructed around all walkway upgrade sites to maintain pedestrian movement, and special walkways to all beachfront businesses and restaurants must be constructed to minimize business disruption. Construction waste must be regularly removed from the beachfront tourist and business areas. Removal of trees must be prevented or minimized along the beachfront because they stabilize sand dunes. There are no known Red Book species in the area, the subproject will not affect any critical habitat, nor is it near a protected area.

Con Co Island Access Improvements

The new 110 m Con Co island ferry pier and terminal will be constructed adjacent to a large commercial shipping port. The potential environment impacts of the construction phase will be negligible because the entire shoreline area has been heavily developed already. Nonetheless the common construction civil works impact mitigations to contain noise, dust, nearshore soil erosion and sedimentation, containment and regular removal of construction waste, and protection of residents from construction activities will occur. Construction activities will be not interfere with the ongoing commercial shipping activities next to the subproject site. The important specific construction impact mitigation is to ensure construction of a short access road to the terminal does not interfere with agricultural activities along the road alignment. No Red Book species and critical wildlife habitat exist in the subproject area, and the subproject is not near an ecological protected area.

Hon Chen Temple Access Improvements

The upgrading of the 1.2 km access road to the Hon Chen temple from AH#1 will create minor temporary construction phase disturbances and impacts (e.g. soil erosion, dust, noise, reduced access, and traffic congestion, construction waste). The existing road and new parking area are

in predominantly agricultural. Mitigation measures must include avoiding encroaching on agricultural land, preventing soil erosion and blocked watercourses, and informing farmers of construction schedules. The subproject area is not located near an ecological protected area and no Red Book species or critical habitat are found in the area. Moreover, the specific alignment upgrades to the access road, and new parking area are well outside the Hon Chen Temple property. A separate access road following the Huong river from Hue city will ensure uninterrupted access during construction. The Hon Chen temple forms part of UNESCO-listed heritage area. Special mitigation measures prescribed in the subproject's EMP will protect all buildings and property of the temple from construction activities. The final detailed design and required impact prevention and mitigation measures for the subproject will be identified in close consultation with the Director and staff of the Hue Monuments Conservation Centre (HMCC) in Hue.

Huong River Tourist Piers Improvements

The rehabilitation and new construction of 5 piers on the Huong river, and the rehabilitation of the 2 piers in the Tam Giang lagoon will directly impact the aquatic environments and human uses of the affected environments. The benthic habitats and water quality at the pier sites will be temporarily severely disturbed while the pier work is underway but will recover after pier works are completed. Local boat traffic to/from the piers will be periodically disrupted or detoured during the construction phase, and boat traffic and fishing activities near the pier areas could be periodically disrupted. The impacts associated the construction of the pier support facilities such as walkways, parking, and toilet ticketing facilities, and seating areas are temporary noise, dust, traffic congestion, disrupted access, and construction waste production. These disturbances and impacts will be managed as detailed in the subproject EMP. A specific important subproject impact and mitigation is to ensure nearby boat traffic, and local fishing and aquaculture activities are not disrupted by the pier works. All pier sites must post signs identifying the construction works. Boat access to/from the affected shorelines must be maintained with the provision of temporary boat landing facilities during the construction phase. The tourist piers in the Tam Giang estuary are not near mangrove areas, and no Red Book species are known at all 7 pier sites.

Da Bac Access Improvements

The major subproject component is upgrading the 6 km access road from AH1 to the Truc Lam Bach Ma Meditation Center parking lot located just south of Bach Ma National Park. The Meditation Centre is located on an island in Truoi Lake next to the park, accessed by boat from a nearby tourist pier. The minor subproject component consists of upgrading the nearby stop-over and rest-stop on AH1. The roadside stopover is famous for the large Banyan tree. A new boat landing will be constructed beside the rest-stop on the southern reach of the Tam Gang-Cau Hai Lagoon to allow boat access to the rest area. The temporary construction impacts and disturbances of the access road upgrade are dust, noise, and traffic congestion, restricted access, and increased the risk of traffic accidents along the road. Important subproject-specific construction impact mitigations are installation of temporary detours around road construction sites to prevent encroachment of construction vehicles on predominantly agricultural land and a few residences. The existing roadside quarry parking area will be used by construction vehicles and for materials storage. In-water silt curtains, and shoreline berms must be placed at the new boat landing at the estuary at the rest-stop to contain soil erosion, and sedimentation and turbidity created by construction works for boat landing. No Red Book species or critical habitat has been identified in the boat landing area. All construction activities will be well outside of Bach Ma National Park.

Operational Phase

The potential impacts of the operation of the completed subprojects will arise from (i) increased vehicle traffic along the upgraded access roads, (ii) increase solid waste and wastewater, and (iii) increase boat traffic and aquatic pollution. The increased vehicle traffic that will follow the access improvements to subproject sites could increase risk of vehicle accidents, and potentially increase noise and dust. Speed limits must be clearly posted and enforced along the affected roadways and be clearly lit as per the feasibility design. At all subproject sites, solid waste and wastewater disposal could become a problem if required operations and maintenance (O&M) budgeting is not provided to support waste management systems. However, waste management is prescribed in the EMP, and is also considered in the subproject designs and capacity development programs.

Climate Change

The sensitivity of the subprojects to climate change is assessed as Medium - High by the AWARE^{TM} software tool. A separate Climate Vulnerability and Risk Assessment (CVRA) guided infrastructure preliminary design. The CRVA adopted climate change projections for rainfall, sea level and air temperature in subproject areas. Examples of sensitive subproject features that will receive climate proofing are: (i) pier and beachfront walkway height and structures; (ii) seawall height and slope structures; and (iii) roadside drains. The initial cost (USD) estimates of the climate change resilience measures are about $4.8 million.

Recent downscaled assessments of climate change prepared by MONRE[2] for the medium and high (RCP 4.5 and 8.5) greenhouse gas (GHG) emission scenarios project increases in average annual air temperature in the subproject provinces ranging from 1.4 – 3.7°C during 2050–2100. Average summer temperatures are projected to rise between 1.8 – 4.0 °C. Projected changes to rainfall are more variable. By 2100, average annual rainfall in the subproject provinces is projected to increase from 10.9%–26.4% under medium and high GHG emission scenarios. Average maximum 5-day rainfall under both emission scenarios is more variable with projected increases ranging from 10%–60%. Median projected sea level rise in north central Viet Nam over this period ranges from 23– 77cm for the medium and high GHG emission scenarios.

The project will generate greenhouse gas (GHG) from anticipated increased boat and vehicle traffic on subproject access roads, however, the increase is not expected to exceed the 100,000CO_2e/a [3]. Promoting ASEAN Tourism Standards (e.g., Green Hotel) will help reduce the carbon footprint in subproject areas through increased energy efficiency (e.g., use of LED lighting).

Institutional arrangements

The Provincial People's Committee (PPC) of each of the five provinces will be the executing agency (EA) and provincial project owner. The PPCs will form a provincial project steering committee, and create, or assign an existing project management unit (PMU) to be responsible for most aspects of project implementation. A project coordination unit (PCU) will be established within the Ministry of Culture, Sports and Tourism (MCST) to coordinate and ensure consistency in project implementation in the five provinces and coordinate regional activities with other GMS countries. Project management, including consultant recruitment and management and

[2] Ministry of Natural Resources and Environment. 2016. *Climate Change and Sea level Rise Scenarios for Viet Nam.*
[3] ADB (2016) Guidelines for GHG Emissions Transport Projects

procurement of goods, works and services will be decentralized to the provincial PMUs as per the directives of Decree 16.[4]

Conclusions

The EMPs developed for each province provide impact mitigation plans, environmental monitoring plans, and specify the institutional responsibilities and capacity needs for sound environmental management of the nine subprojects. The EMPs need to be reviewed and updated at the detailed design phase to ensure that they fully address the potential impacts of the final designs.

The IEE concludes that the subproject's feasibility design descriptions combined with available information on the affected environments is sufficient to identify the scope of the project's potential environmental impacts. Given significant changes do not occur to the design of any subproject components, and that new sensitive environmental or social receptor data are not discovered, the subprojects will remain Category B for environment and will not require further detailed environmental impact assessment (EIA).

[4] Government of Viet Nam. 2016. *Decree No.16/2016/ND-CP dated 16 March 2016 on Management and Utilization of Official Development Assistance and Concessional Loans of international donors.* Hanoi.

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I. INTRODUCTION

1. The Second Greater Mekong Subregion (GMS) Tourism Infrastructure for Inclusive Growth Project (the project) will develop small infrastructure to improve tourist facilities and develop and strengthen management capacity to enhance tourism at selected locations in Viet Nam, Cambodia and Lao People's Democratic Republic (PDR). In Viet Nam, 9 infrastructure subprojects will be implemented in Hoa Binh, Nghe An, Quang Binh, Quang Tri, and Thua Thien Hue, which are the focus of the IEE presented herein.

2. The project will improve urban-rural transport infrastructure, improve urban environmental services, strengthen capacity to implement regional tourism standards, and strengthen tourism destination management. It will contribute to the transformation of secondary towns in the GMS into green cities, supporting the Sustainable Green Cities Initiative for southeast Asia[5], which has been articulated into the specific Green City Action Plan (GCAP) for Hue.[6] The green cities approach will further promote inclusive and competitive international tourism destination development to boost trade in services and deepen market linkages between members of the GMS and Association of Southeast Asian Nations (ASEAN).

3. The expected impact of the project is sustainable, inclusive, and more balanced tourism development achieved, as envisaged in the *ASEAN Tourism Strategic Plan 2016–2025.* The expected outcome is increased tourism competitiveness in project areas. Project outputs include: (i) urban-rural access infrastructure and urban environmental services improved, (ii) capacity to

[5] ADB. 2012. *Technical Assistance Report: Green Cities–A Sustainable Urban Future in Southeast Asia*. Manila. The TA promoted the "GrEEEn city" approach that enables cities to "economically competitive", "environmentally sustainable", "(socially) equitable" and increased risk of climate change and natural disasters

[6] ADB. 2014. *Hue GrEEEn City Action Plan*. Manila; ADB. 2014.

implement ASEAN tourism standards strengthened, and (iii) institutional arrangements for tourism destination management and infrastructure operations and maintenance (O&M) strengthened.

A. Assessment Context

4. The project is classified as category B for environment pursuant to ADB's 2009 *Safeguard Policy Statement*[7] and recent Good Practice Sourcebook.[8] A Category B project will have potential adverse impacts that are less adverse than those of a Category A project, are site-specific, largely reversible, and can be mitigated with an environmental management plan (EMP) as described in the Good Practice Sourcebook.[9]

5. The IEE was prepared for the subprojects at feasibility design stage, using available data and information on sensitive ecological and cultural receptors that exist at the different subproject sites. Detailed subproject designs will follow project approval. The IEE and EMPs prepared for the subprojects will be updated where necessary to meet the final detailed designs of the subprojects.

Impact Footprints

6. Most of the subproject components are improvements to existing infrastructure at established tourist sites, thus, the potential adverse environmental impacts will be marginal and are intended to improve the environment condition of the sites. The new impact footprints will arise only from the new sections of subproject access roads, the new short piers on the Huong and Nhat Le rivers in Hue and Dong Hoi, and the new small tourist port in Dong Ha.

B. Structure of the report

7. The IEE and the separate subproject EMPs follow the formats as set out in Appendix 1 of the SPS (2009). The IEE was conducted and the results presented by individual subproject by province to minimize redundancy of background information. The structure of the EMPs follows this format and is consistent with the parent IEE.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

8. The project will be implemented according to the directives set out for use of Official Development Assistance (ODA) in Decree No.16/2016/ND-CP (16 March 2016) on Management and Utilization of Official Development Assistance and Concessional Loans of international donors.[10]

A. Viet Nam Regulatory Framework for Environmental Assessment

9. The revised Viet Nam Law on Environmental Protection No. 55/2014/QH13 (LEP 2014) prescribes the requirements for environmental assessment (EA) for development projects that affect the natural and social environments. Government Decree 18/2015/ND-CP (2015) and Circular 27/2015/BTNMT (2015) on environmental protection planning, strategic environmental assessment (SEA), and environmental impact assessment (EIA) support the implementation of

[7] ADB. 2009. Safeguard Policy Statement. Manila.

[8] ADB. 2012. Environmental Safeguards, A Good Practice Sourcebook, Draft. Manila.

[9] Footnote 3, pg. 18, para 82.

[10] Footnote #6

the LEP (2014). Under GoV regulations the future national environmental impact assessments (EIA) to be prepared for all subprojects will be approved by the Provincial People Committee with assistance from respective provincial Departments of Natural Resources and Environment (DONRE). The EIA for projects listed in Appendix 3 of the Decree 18/2015/ND-CP (2015) will be approved by MONRE.

B. Environmental Laws, Policy, Environmental Standards, and Guidelines

10. The following are the legal directives for environmental assessment and protection in Viet Nam relevant to the subprojects:

On Environment Protection

- Law on environmental protection No. 55/2014/QH13, passed by the National Assembly on 23th June 2014, in effect on January 01, 2015;
- Law on Water Resources No 17/2012/QH13;
- Law No 29/2004/QH11 on forest protection and development, passed by the National Assembly on December 03, 2004, in effect on April 01, 2005;
- Biodiversity Law 20/2008/QH12 dated 13th November 2008;
- Decree No.18/2015/ND-CP, dated February 14, 2015, on environmental protection planning, Regulating Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment;
- Decree No. *179/2013/ND-CP* dated November 14, *2013 of the Government*, on the sanction of administrative violations in the domain of environmental protection;
- Decree No. *32/2006/ND-CP of the Government*, on management of endangered, precious and rare forest plants and animals;
- Decree No. *23/2006/ND-CP* dated March 03, *2006* of the Government on the implementation of the law on forest protection and development.
- Decree No. *59/2007/ND-CP* dated April 09, *2007* of the Government on solid waste management.
- Circular 27/2015/BTNMT, On Strategic Environmental Assessment, Environmental Impact Assessment, and Environmental Protection Plans, date May 29, 2015.

On Land Management

- Land Law No. 45/2013/QH13, passed by the National Assembly dated November 29, 2013, in effect on July 01, 2014;
- Decree No. 43/2014/NĐ-CP dated May 15, 2014 of the Government, detailing implementing some articles of Land Law, in effect on July 01, 2014;
- Decree No. 47/2014/NĐ-CP dated May 15, 2014 of the Government, providing on compensation, support, resettlement when the State acquires land, in effect on July 01, 2014;
- Circular No. 37/2014/TT-BTNMT dated June 30, 2014 of the MONRE, providing details on compensation, support and resettlement when the State acquires land.

Environmental Standards and Regulations

- Labor hygiene standards issued via Decision No. 3833//2002/QĐ-BYT dated October 10, 2002 of the Ministry of Health.
- QCVN 05:2013/BTNMT – National technical regulation on quality of ambient air.

- QCVN 26:2010/BTNMT – National technical regulation on noise.
- QCVN 27:2010/BTNMT – National technical regulation on vibration.
- QCVN 03:2008/BTNMT - National regulation on heavy metals concentrations in soil.
- QCVN 08:2008/BTNMT - National technical regulation on quality of surface water.
- QCVN 09:2008/BTNMT - National technical regulation on quality of groundwater.
- QCVN 14:2008/BTNMT - National technical regulation on quality of domestic wastewater.
- QCVN 40:2011/BTNMT- National technical regulation on industrial wastewater.
- TCVN 5948:1999. Acoustics. Noise generated by road traffic vehicles when increasing speed. Maximum allowable noise;
- TCVN 6438:2001: Maximum permitted emission limits of exhausted gases from vehicles.

International Environmental Management Conventions

11. Viet Nam is signatory to the following relevant international conventions:

- 1971, Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar).
- 1982, Protocol to Amend the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Paris.
- 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage October 1987].
- 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.
- 1992, Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Copenhagen.
- 1992, United Nations Framework Convention on Climate Change.
- 1992, Convention on Biological Diversity

International Guidelines

- IFC/World Bank Group, (updated 2012). Environmental Health and Safety Guidelines *for* Ports Harbors, and Terminals, Urban Development, Toll Roads, Occupational Health and Safety, Tourism and Hospitality Development, Waste Management Facilities, and General EHS Guidelines, Wash. DC.

Specific Environmental Protection and Climate Change Directives

- Nghe An
  - Framework on Climate Change
  - Management Guidelines for Pu Mat National Park
  - UNESCO Guidelines for Nghe An Biosphere Reserve
  - GoV Decision on Grievance Redress Mechanism (GRM)
- Quang Binh:
  - Framework on Climate Change
  - GoV Decision on GRM
- Quang Tri:
  - Management Guidelines for Con Co Island Marine Protected Area
  - Framework on Climate Change
  - GoV Decision on GRM
- Thua Thien Hue:

- Hue City Master Plan for Waste Disposal Sites
- Hue Monuments Conservation Centre Management Guidelines
- GoV Decision on GRM Decree
- Framework on Climate Change

C. Responsibility for Environmental Management and Protection

12. The primary agency responsible for national environmental assessment and protection in Viet Nam is the Ministry of Natural Resources and Environment (MONRE). At the provincial level the DONRE represents the MONRE. The DONRE, *inter alia,* is responsible to ensure provincial government agencies, the private sector, and civil society comply with laws and regulations for environmental protection. The M/DONREs review and approve environmental impact assessments and enforce environmental laws and regulations through inspection and compliance monitoring of government agencies, private sector, and civil society.

D. ADB Safeguards Policy

13. The ADB Safeguard Policy Statement and Sourcebook (ADB 2009, 2012) clarifies the rationale, scope and content of an EA and is supported by technical guidelines (e.g., Environmental Assessment Guidelines 2003). Projects are initially screened using a Rapid Environmental Assessment (REA) Checklist to determine the level of assessment that is required. Projects that cause significant or major environmental impacts that are irreversible, diverse or unprecedented and/or affect an area larger than the sites or facilities subject to physical works are classified as Category A, an Environmental Impact Assessment (EIA) is required; Projects which have potential adverse impacts that are less adverse than those of category A, which are site-specific, largely reversible, and for which mitigation measures can be designed more readily than for category A projects are classified as Category B (an Initial Environmental Examination (IEE) is required); and Projects that are likely to have minimal or no negative environmental impacts are classified as Category C, environmental implications need to be reviewed.

III. SUBPROJECT DESCRIPTIONS

14. The subproject descriptions are presented below.

A. Hoa Binh Province

1. Tien Pagoda and Cave Access Improvements

15. Tien Pagoda and Caves are in Hoa Binh province approximately 8 km from Lac Thuy District center. This is a growing tourist destination and in 2016 about 600,000 tourists visited Tien Pagoda, the main attraction; however, tourism activity beyond the main pagoda area is constrained by inadequate road access, lack of retail facilities and amenities, and lack of parking. The subproject will directly benefit about 6,000 people living in Thanh Nong, Phu Lao Commune and nearby settlements.

16. The initial section of Road 1 starts at an intersection with Ho Chi Minh Highway in Thanh Nong commune and passes through an 800m residential area before entering an area of rice field at which point a completely new section of road will extend the existing 800m of road. The new section will also require a small bridge. After the new section, Road 1 links to an existing section through Phu Lao district which has a foundation already prepared. Tien Pagoda is in Phu Lao district (Figure 1).

17. The new section of Road 1 is 3.5 km with a carriageway 6.5m wide. The linked, existing 4.2 km of Road 1 requires rehabilitation of existing base and sealing. Footpaths are proposed for the two end sections only, through the village at the northern end, and between carpark and the beginning of the Road 2 at the southern end.

18. Road 2 runs west of the main road and connects several caves and Tien Pagoda. The 3.1km western part of the loop road marked “Tuyen 2” in Figure 1 will be 5m wide with 1m footpaths on either side (1-5-1m). The 4.5km eastern part (“Tuyen 3” in Figure 1) will be developed by a private company and is not included in this scope. A new market will be developed on a 0.5ha site in Lão Ngoại village. The major subproject components are summarized in Table 1.

Table 1. Components of Tien pagoda subproject

Tien Pagoda Access and Environmental Improvements	• New 3.5 km X 6.5m road section to Tien pagoda including short bridge over a creek • Upgrade 4.2 km X 6.5m of existing road to Tien pagoda with dual 1m side footpaths • New 3.1km X 5m loop road to pagoda with dual 1m side footpaths • All roads surfaced developed to double bituminous surface treatment (DBST) standard • New car park (2ha) • New tourist market (0.5ha)

Figure 1. Road access to Tien pagoda and caves

Figure 1a: View of all roads

Figure 1B: Close-up of southern roads

B. Nghe An Province

1. Cua Lo Beach Access and Environmental Improvements

a. Current situation

19. Cua Lo beach is approximately 8 km long and over 200 meters wide at most locations with gentle slopes of fine sand. Prior to the "Formosa" environmental disaster in 2016 tourism was growing rapidly. Visitor numbers consequently fell from almost 4 million in 2015 to 2.5 million in 2016. Cua Lo is recovering and forecasts suggest that the number of tourists will reach 3.98 million in 2026. The 5km stretch of beach from the northern end of the subproject site at Lan Chau south to Binh Minh Square consists of an embankment and promenade with trees. From the Square south 5.4km to the Border Guard Station there is no embankment or promenade

20. The developed part of the beach is in poor condition. Some sections are sensitive to inundation from the sea and have failed walkways and unstable embankment protection. The promenade including small shops and restaurants is generally unattractive due in part because the facilities are poorly maintained with inadequate drainage, and frequently damaged by storms. The undeveloped part of the beach has fewer problems and to some extent is protected by sand dunes and a natural headland.

b. Subproject components

21. The subproject area will upgrade three sections of Cua Lo beach (Figure 2). The beachfront development will directly benefit 400 restaurant operators, 300 hotels/guest houses, and 55,925 Cua Lo District residents. Table 2 summarizes the beach upgrades.

Table 2. Main components of Cua Lo beach access and environmental improvements

Cua Lo Beach Access Improvements	• upgrade the existing beachfront walkway (2.5 km) and central square; • rehabilitate the seawall and upgrade/build new beachfront walkways (3.0 km); • construct new sections of beachfront walkway in the southern beach sections (1.1km); and • upgrade service roads to paved condition (3.9 km x 4m wide). All walkway sections will include sidewalks, lighting, drainage and green landscaping.

Figure 2. Sections of Cua Lo Beach to be upgraded

2. Ru Gam Pagoda Access Improvements

a. Current situation

22. Ru Gam Pagoda is 1.8km from Yen Thanh District center. In 2016 tourist arrivals reached 50,920. The pagoda complex is being expanded and visitor arrivals could reach 80,000 in 2026. The original Gám temple and pagoda were built in 1004. Despite significant private investment in the hilltop pagoda site, existing road access is very difficult.

b. Subproject components

23. A 3.7km road upgrade is proposed from National Road 7b to the entranceway of the new Ru Gam pagoda complex (Figure 3). The upgraded access to the pagoda will provide economic opportunities for 20,236 residents of Bac Thanh, Xuan Thanh and Tang Thanh villages. Table 3 summarizes the proposed works.

Table 3. Components of Ru Gam pagoda access improvement subproject

Ru Gam Pagoda Access Improvement	• 3.7km X 7.5m road upgrade to connect National Road 7b to entranceway of new Ru Gam pagoda complex. • Road will be upgraded with DBST or asphalt surface

	• Road will have 1-2m footpaths on both sides.

Figure 3. Road to Ru Gam pagoda

C. Quang Binh Province

1. Nhat Le-Long Dai River and Road Access Improvements

a. Current situation

24. The subproject includes 4 riverside sites in Nhat Le and Long Dai river valley. Nhat Le River is in Dong Hoi City and flows through Quan Hau, Long Dai and Than Dinh in Quang Ninh District. The Nhat Le River and Long Dai Rivers provide a wide range of tourist activities including historical and religious sites along with river tour experiences. The starting point is the mouth of the Nhat Le river and end is Than Dinh mountain / Tam Lu waterfall. There is an opportunity to develop a tourist route from Dong Hoi town to access points of interest as part of a

river cruise. This would also require constructing toilets, short access roads, car parking, and a small new bridge. Currently many tour operators want to develop river tours further but the route lacks piers.

b. Subproject components

25. The main subproject components are four river piers and associated access road and bridge at Than Dinh pier which are described below. The subproject will directly benefit 5,553 residents in Hai Thanh ward, 14,174 residents in Quan Hau, Hien Ninh and Truong Xuan communes, and tourist boat operators, boat pier managers, and tourism-service enterprises. It will also increase access to economic and recreation opportunities for 116,903 Dong Hoi City residents. Figure 4 shows the locations of the piers along the Nhat Le river. The aerial views of Piers 2-4 are shown in Figure 5.

26. **Nhat Le Pier** is in Dong Hoi town close to the river mouth. The subproject will: a) improve the 780 m of riverside road to DBST condition, with dual 7.5 m carriageways with 2.0m median, and 3.5m footpaths; (b) 1.55 ha riverside park to incorporate flood protection and recreation/parkland, footpaths, public toilets, lighting, vehicle parking, and ferry access; (c) 0.68 km riverbank protection; and (d) 80 m concrete boat pier with capacity for 25 boats, ticketing/waiting areas, retail kiosks, and sanitation. No infilling or dredging will occur for the pier development. The plan view of the Nhat Le pier is shown in Figure 6.

27. **Quan Hau Pier** is located 9km upstream of Nhat Le pier. The subproject will: (a) construct a new 1.05 ha riverside recreation area, incorporating the existing war memorial and facilities to support river boat racing festivals, landscaped green space, service buildings, public toilets and vehicle parking; and (b) new 110 m concrete boat pier with capacity for 20 boats, ticketing/waiting areas, retail kiosks, and sanitation. An estimated 80m x 30m x 2m = 4800m^3 of clean fill is required for the old borrow pit of the adjacent bridge. The plan view of the Nhat Le pier is shown in Figure 7.

28. **Long Dai Pier** is located upstream of the Quan Hau Pier. A new 40 m concrete boat landing will be constructed with a 250 m footpath to Long Dai Memorial Temple.

29. **Than Dinh Pier** is located farthest upstream on the Nhat Le river. The subproject will: (a) provide ticketing/waiting area, public toilets and vehicular parking; (b) rehabilitate Thanh Dinh mountain steps (approx. 800 steps); (c) resurface the 3.35 km x 5.5m Truong Xuan commune access road with 1m side drains to concrete condition; (d) construct a new 63m x 7.5m river bridge at Truong Xuan Commune with adequate headroom for tourist boats; and (d) provide 2 prototype environmentally friendly tour boats

Figure 4. Tourist piers on Nhat Le river

Figure 5. Aerial views of developments at Piers 2 - 4

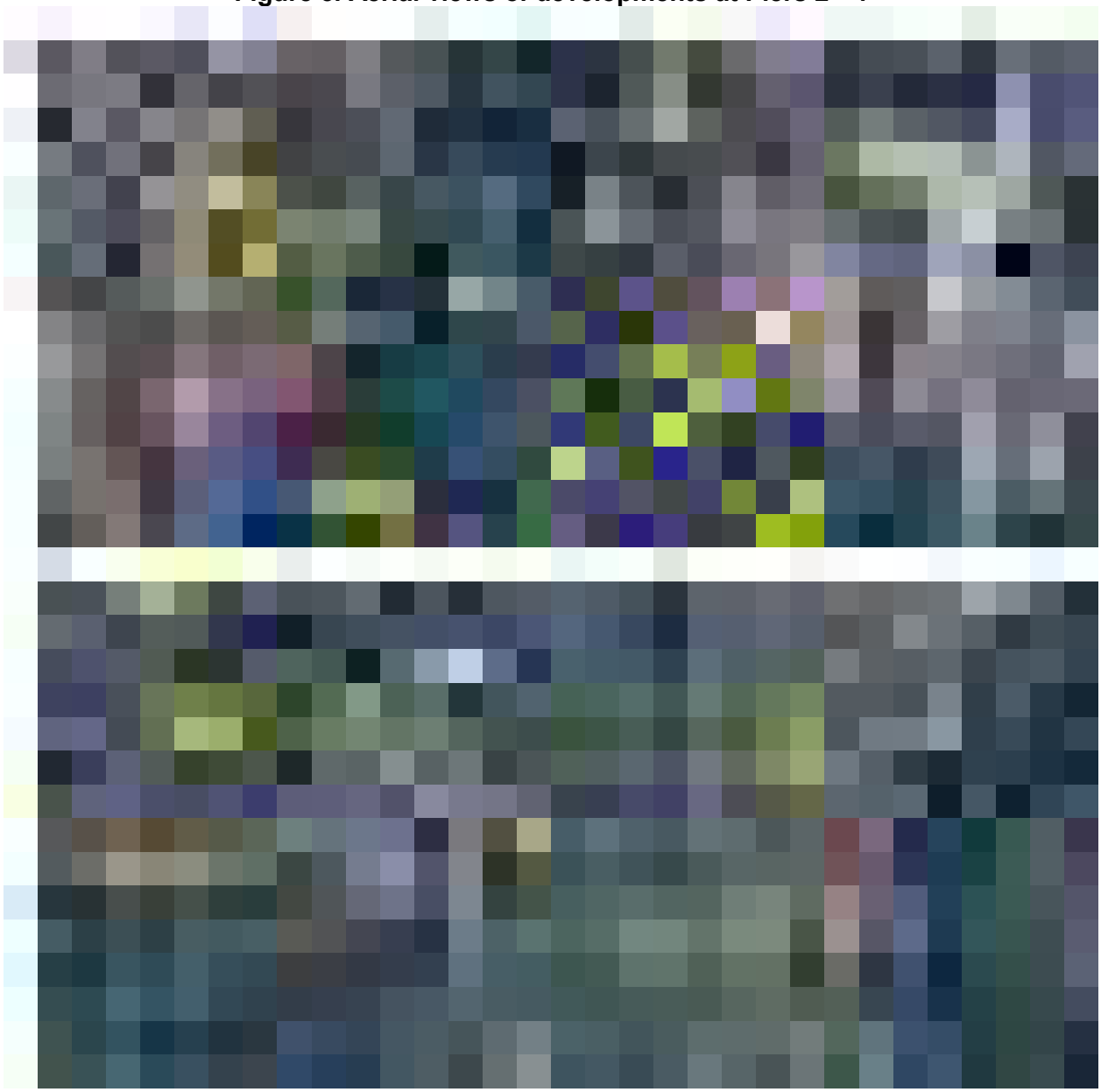
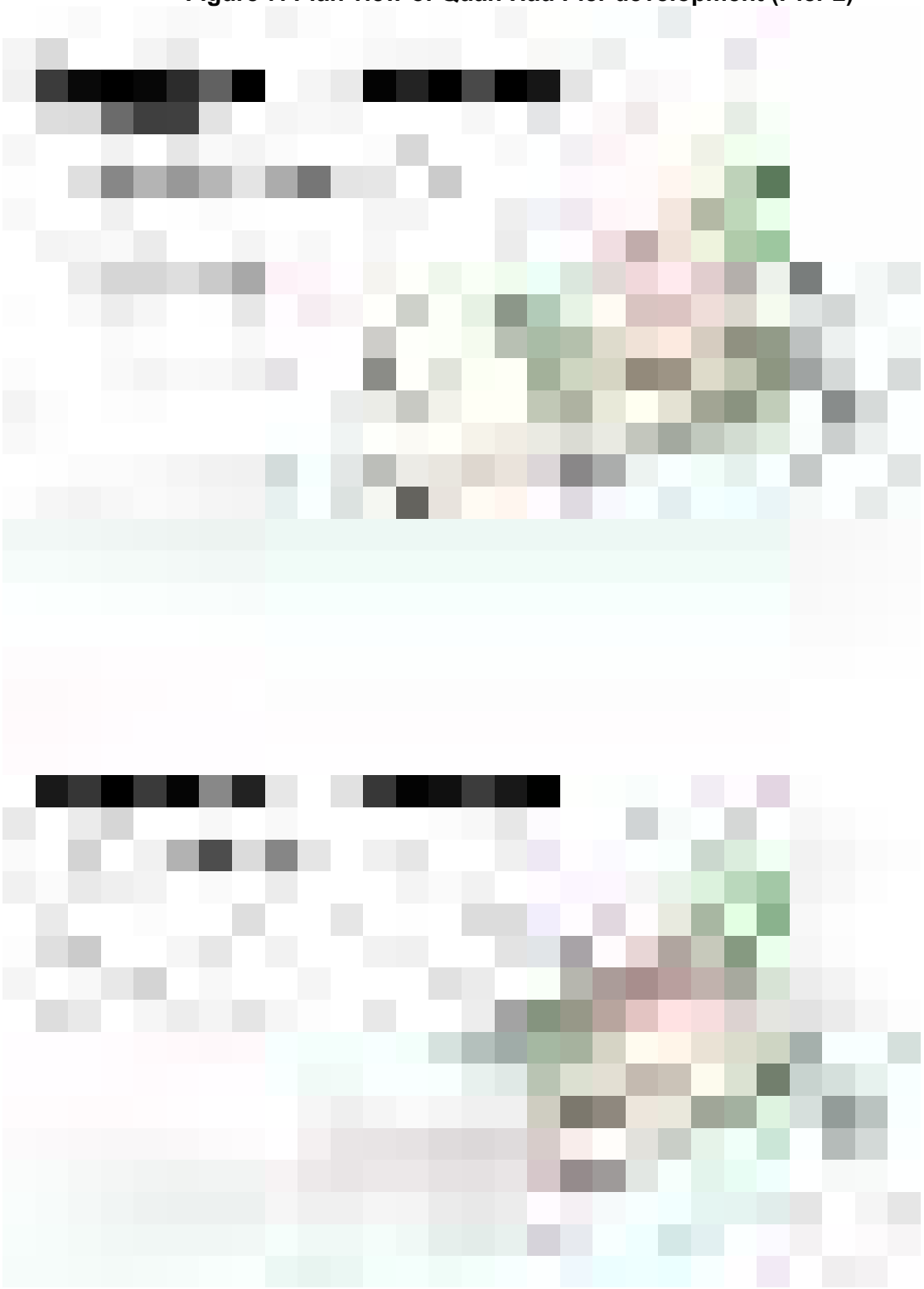


Figure 6. Plan view of Nhat Le Pier development (Pier 1)

Figure 7. Plan view of Quan Hau Pier development (Pier 2)



D. Quang Tri Province

1. Cua Viet/Cua Tung Beach Access and Environmental Improvements

a. Current situation

30. Cua Viet/Cua Tung are seaside destinations 15 km - 25 km east of Dong Ha City. The area received 448,000 tourists in 2016 and forecasts suggest arrivals could reach 672,000 in 2026. The area is characterized by a beachfront with deteriorating environmental quality and lack of public and private infrastructure investment. Trung Giang and Gio Hai beaches are the most popular, however the underdeveloped facilities are unable to handle the seasonal surge in visitors during May-September. Existing basic infrastructure at both beaches is also deteriorating from storm damage and inadequate maintenance.

b. Subproject components

31. The main subproject components are summarized in Table 4. The subproject will directly benefit 187 restaurant operators/stall holders, about 60 hotels/guesthouses, and improve economic and recreation opportunities for 75,185 residents of Gio Linh District, specifically Trung Giang (3,406 persons) and Gio Hai (3,363 persons) communes. Figures 8-11 provide the aerial and plan views of the subproject areas.

Table 4. Components of Cua Viet – Cua Tung subprojects

Subproject	Description
Cua Viet-Cua Tung Beach Access and Environmental Improvements	(i) upgrade existing 450 m Cua Viet beachfront walkway/promenade with hard and soft landscaping, public toilets and septic tanks; and (ii) improve hard and soft landscaping and walkways, vehicular access and parking (4,300 m^2), and utilities/sanitation at Gio Hai and Trung Giang; (iii) develop 44 shops (20m^2 each), restaurants, and retail units, in compliance with DCST-approved tourist design standards which align with ASEAN Tourism standards.

Figure 8. North end of subproject area, Cua Tung beach

Figure 9. Trung Giang beach

Figure 10. Gio Hai beach

Figure 11. Southern Cua Viet beach

2. Con Co Island Access Improvements

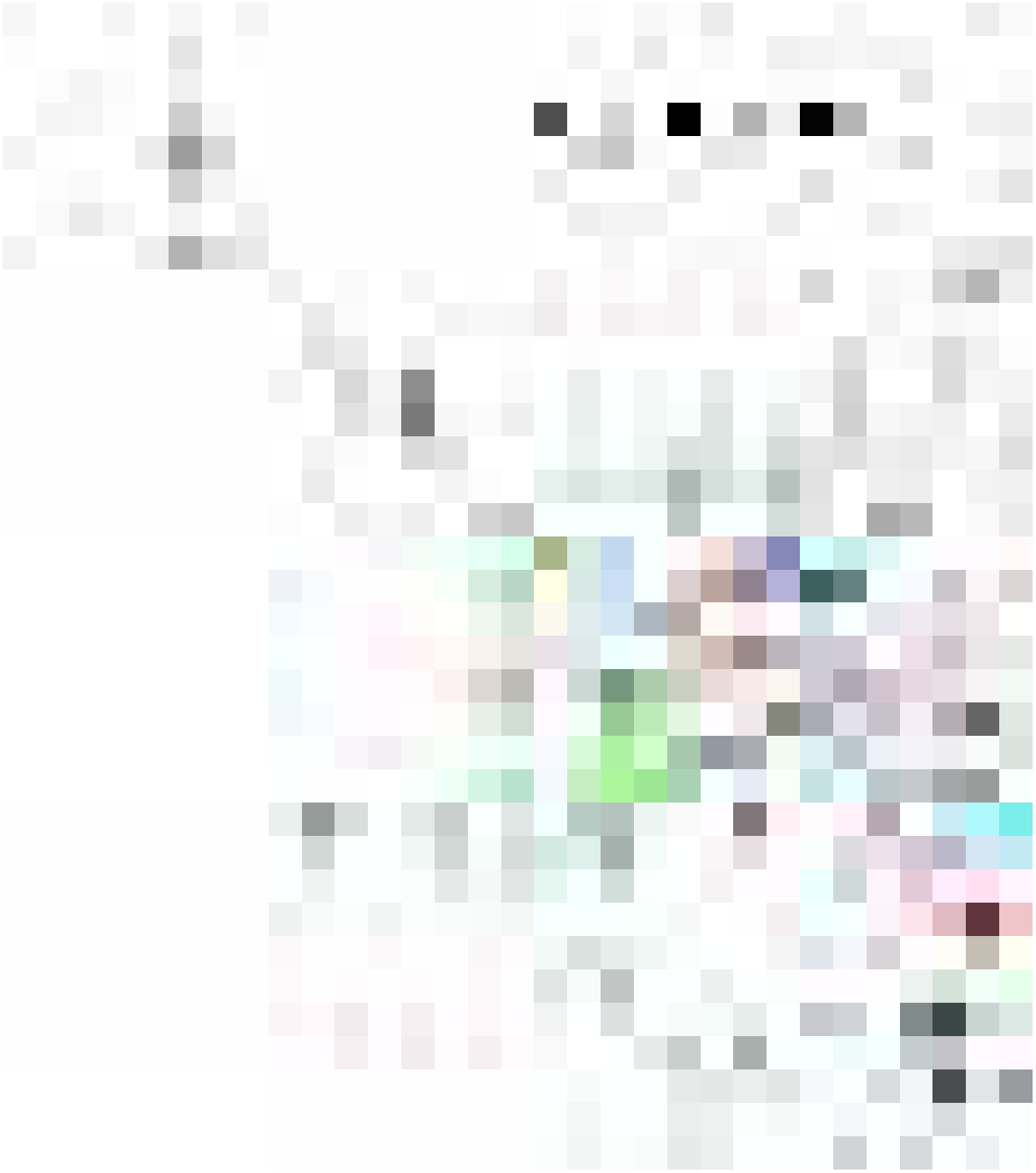
32. The subproject is located at Cua Viet port, 15 km east of Dong Ha city in Quang Tri Province. The National Tourism Development Strategy recognizes Con Co Island as an important ecotourism resource and historic center. The island was opened for tourism in 2016. It recently achieved district status and is trying to overcome two key interrelated development constraints, i.e. the need for a better and safer ferry port and ferry services and lack of quality accommodation investment. Presently there are few tourists, but forecasts suggest visitor arrivals could increase to about 25,000 in 2026 if the port and ferry services are improved. At present passengers embarking/disembarking at Cua Viet must use the freight port, which is unsafe and unattractive for tourists. The new ferry port (pier and terminal) will provide economic opportunities for 3,363 residents of Gio Hai commune, directly benefiting about 500 Con Co Island residents, employees, and ferry service operators.

33. The subproject components are summarized in Table 5. An estimated 19,960 m^3 of infill is required for the port site. The plan view of port is shown in Figure 12.

Table 5. Components of Con Co Island Access Improvement Subproject

Con Co Island Access Improvements	A new 110m pier and ferry terminal for Con Co Island will be constructed adjacent to commercial freight port which will include; (i) a seawall and pier with space for at least two 15 m ferries, (ii) 715 m^2 terminal with waiting rooms, commercial space, ticketing, and toilets; (iii) 1,500 m^2 vehicle parking; and (iv) a new 0.5 km concrete access road to be shared with the adjacent freight port.

Figure 12. Plan view of Cua Viet tourist port



E. Thua Thien Hue Province

1. H1: Hon Chen Temple Access Improvements

a. Current situation

34. Hon Chen Temple is in Huong Tra District about 5 km from Hue City. Despite the narrow access road, it receives a steady stream of visitors throughout year, but numbers can reach 15,000-20,000 per month during the three-month festival period. The narrow road and inadequate parking results in congestion, traffic accidents, and delays solid waste removal. River access is constrained by inadequate pier facilities.

b. Subproject components

35. The subproject components are summarized in Table 6. Figure 13 provides an aerial view of the southern access road to be upgraded by the subproject. The subproject will benefit 14,543 residents of Huong Tho and Huong Ho villages.

Table 6. Main components of Hon Chen temple subproject

Hon Chen Temple Access Improvements	Upgrade 1.2 km southern access road from national highway #1 to DBST condition with 7m carriageway, footpaths, and 5,000 m^2 parking area.

Figure 13. Hon Chen temple access road

2. Huong River Tourist Piers Improvements

a. Current situation

36. Hue city is a hub of culture and tourism in Viet Nam and the Huong river is an important resource in Hue for socio-economic development. The Tam Giang lagoon east of Hue is also a popular tourist destination. The subproject includes five riverside tourist pier sites alongside the Huong River in Hue City and Phu Vang District, and two Tam Giang lagoon piers in Quang Dien District. River tours are popular and in 2016 the total number of tour passengers was around

155,000. This is forecast to reach over 240,000 by 2026. The total number of tourist boats is around 130 and the numbers are increasing to match demand. However, some river piers are inadequate and many riverside tourist destinations lack piers.

b. Subproject components

37. The five Huong river piers and two Tam Giang Lagoon piers to be constructed or upgraded are described below and summarized in Table 7. No dredging or infilling will be required for the 7 piers. Figures 14 and 15 provide aerial views of the 7 piers. The subproject will directly benefit at least 11,285 residents of Phu Mau Commune (Phu Vang District), 13,214 Quang Ngan and Quang Loi Commune residents (Quang Dien District) tourist boat operators, and tour operators, as well as 562,000 passengers per year in the first year of operation.

Table 7. Components of Huong river and Tam Giang lagoon piers

Huong river piers	• Bao Vinh Heritage Village Pier: (i) construct a new 30 m concrete pier; (ii) 20m^2 parking area for bicycles; (iii) 100m^2 service building with waiting space, ticketing, and toilets; and (iv) 188m^2 yard and green area. • Than Pier: (i) construct new 60 m concrete pier; (ii) 830 m^2 parking area; (iii) 200m^2 service building with waiting rooms, commercial space, ticketing, and toilets; and (iv) 1,120m^2 landscaped yard. • Le Loi Pier: (i) construct 120 m concrete pier; (i) 250m^2 service building with waiting rooms, commercial space, ticketing, and toilets; (iii) 3,000 m^2 landscaped yard; (iv) upgrade the 0.18 km access road (9 m carriageway) with road side access to the pier. • Voi Re/Ho Quyen Pier: (i) construct a new pier 60 m concrete pier; (ii) 520 m^2 parking; (iii) 175m^2 service building with waiting rooms, commercial space, ticketing, and toilets; (iii) 950 m^2 landscaped yard; (iv) upgrade 0.11 km concrete road (5m with) and construct 110m new road (3m wide). • Thanh Tien Pier: (i) construct new 40 m concrete pier; (ii) 270 m^2 parking area; (iii) 245m^2 service building with waiting rooms, commercial space, ticketing, and toilets; (iii) 730 m^2 landscaped yard; (iv) upgrade 0.2 km concrete access road (3.5m wide) and new 35m pier access road (5.5 m wide).
Tam Giang lagoon piers	• Can Toc Pier: (i) construct new 80 m concrete pier; (ii) 1,340 m^2 parking; (iii) 270m^2 service building with waiting rooms, commercial space, ticketing, and toilets; (iv) upgrade 0.2 km foot path and construct 270m new road (13.5 m wide). • Vinh Tu Pier: (i) construct new 70 m concrete pier; (ii) 350 m^2 parking; (iii) 230 m^2 service building with waiting rooms, commercial space, ticketing, and toilets; and (iii) 400 m^2 landscaped yard.

Figure 14. Huong River piers, Hue

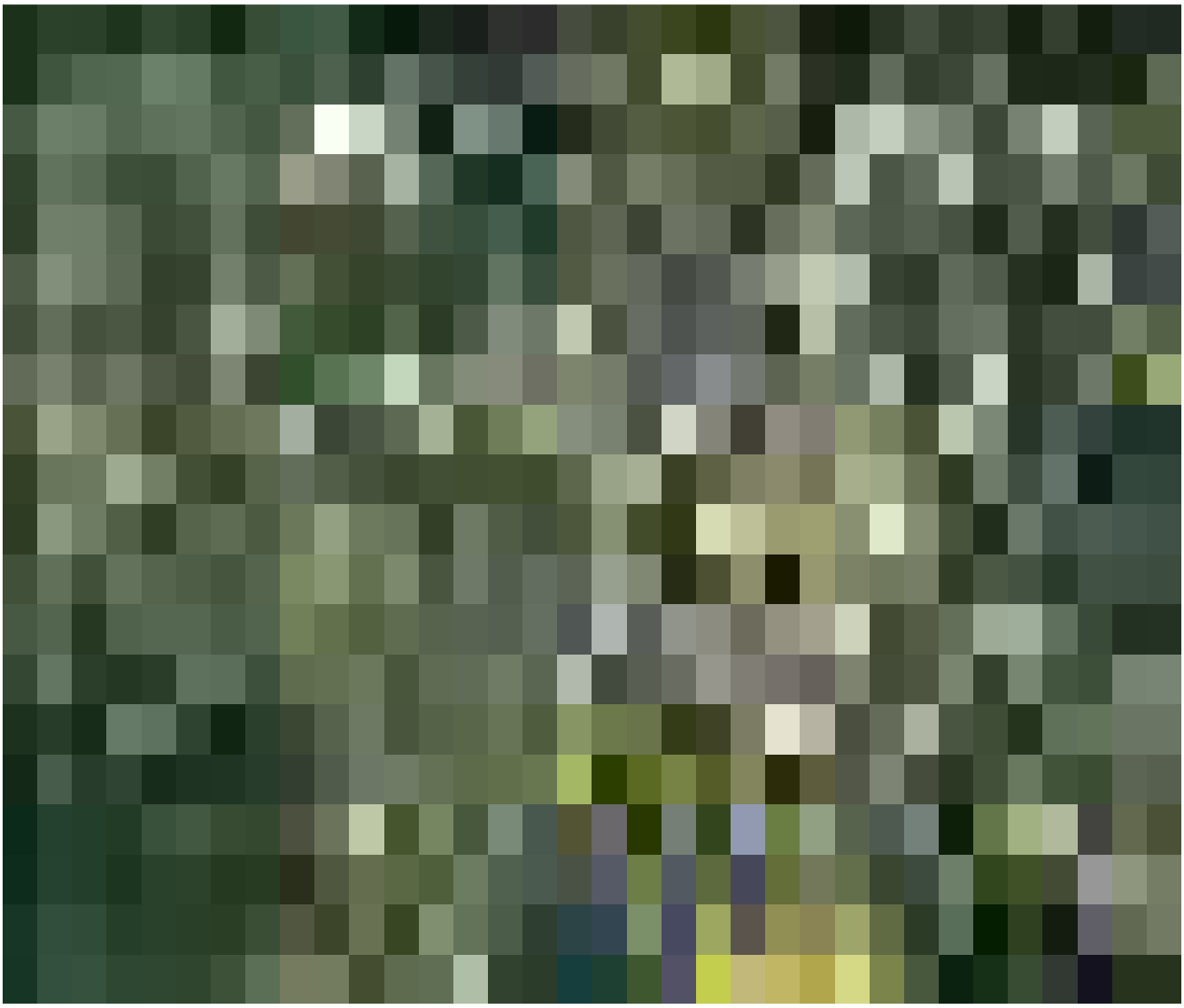
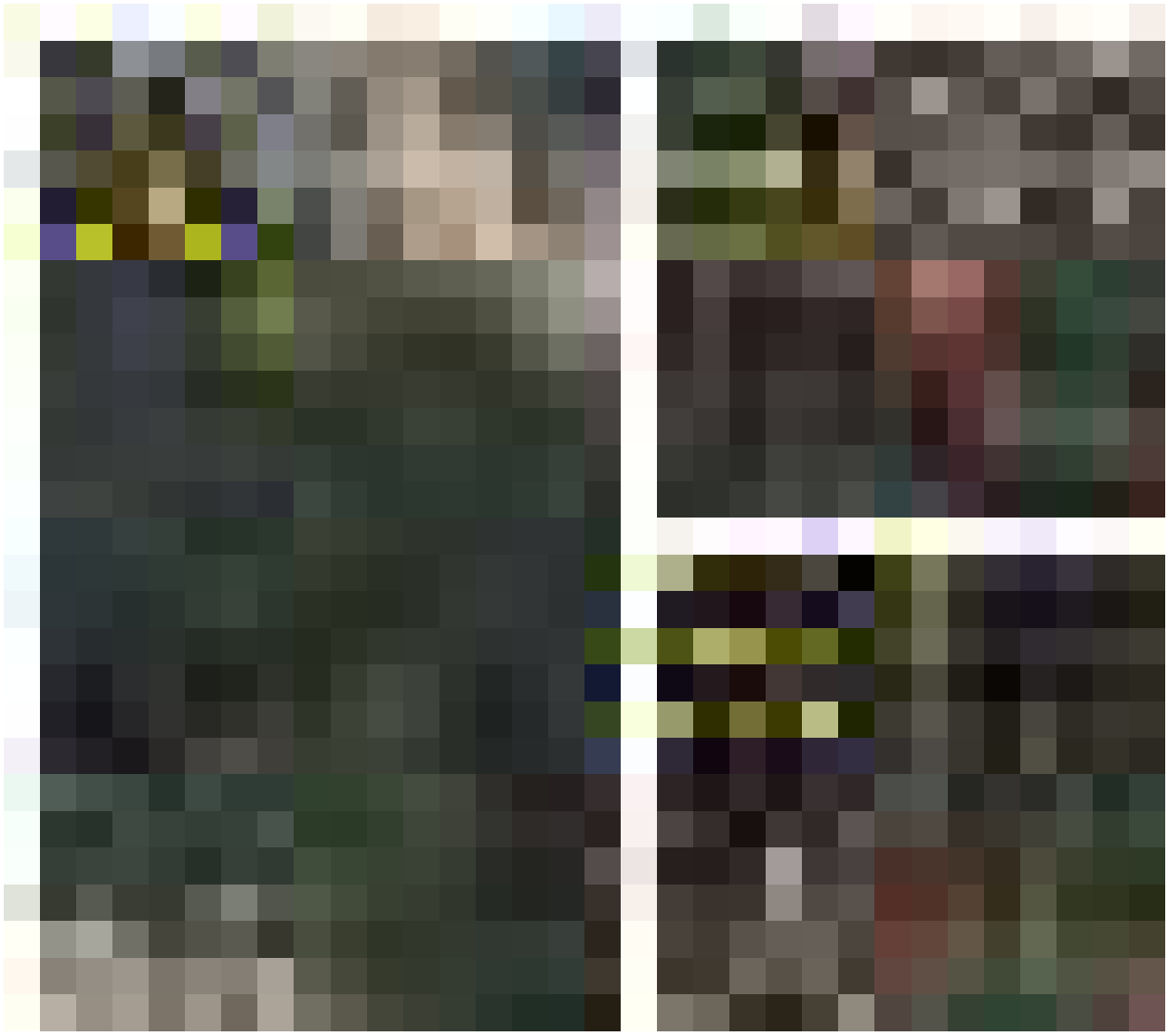


Figure 15. Tam Giang Lagoon Piers



3. Da Bac Access Improvements

38. There are two sites under this subproject, the Da Bac rest stop and the Bach Ma meditation center. The complex of Ràng Bò junction and Đá Bạc Banyan tree relics were recognized as National Revolution Relics in 1991, and the tree was certified as a Heritage tree of Viet Nam in 2016. The Đá Bạc tree is an ideal stopover for travelers on NR1.

39. Trúc Lâm Bạch Mã Mediation Center belongs to Trúc Lâm Yên Tử Meditation clan and has a beautiful landscape. It is located at the foot of Bach Ma mountain on the edge of the Truồi lake in Lộc Hòa commune, Phú Lộc district. Its construction started in March 2006, with three components completed with over 20 structures. There were 47,000 visitors to the centre in 2016, with about 2% being foreign visitors. Growth rate is approximately 15% per annum. The access road is the original road built for hydropower access before the meditation centre existed, is only 3m wide in places and is deteriorated. The entrance to Bạch Mã is at a junction with NR 1 at Km858+200 (Ràng Bò intersection) in Lộc Điền commune, Phú Lộc district and final point at

connection to the dam of Truồi lake in Lộc Hòa commune, Phú Lộc district. The total length is approximately 6,000m on the existing road, with original base width 6.5m, and original road seal width 3.5m. The first 350m segment is asphalted, the remainder is concrete surface. The road passes private gardens, fields and forest land. There are about 50 families along the route. At the route terminus, a car park has been recently completed of area 75x140m^2.

a. Subproject components

40. Subproject components are summarized in Table 8. Figure 16 provides an aerial view of the subproject components. The subproject will directly benefit 15,626 residents of Loc Dien and Loc Hoa commune as well as the Truc Lam Bach Ma Meditation Center community and will create economic opportunities for 15,626 residents of Loc Dien and Loc Hoa commune.

Table 8. Components of Da Bac Access Subproject

Da Bac Access Improvements	• Upgrade 6km X 5.5m wide carriageway with 1m shoulders to DBST condition from NR#1 to existing car park near boat pier • Provide electric shuttle cars to transport passengers from car park to boat pier • Improve existing Da Bac rest stop with sealed 260 m^2 parking area, construct 300 m^2 of kiosks for local vendors, toilets, and a 70 m long, 3,970 m^2 concrete and floating pier, with hard and soft landscaping and lighting.

Figure 16. Components of the Da Bac Access Improvements

IV. DESCRIPTION OF AFFECTED ENVIRONMENTS

A. Hoa Binh Province

Lac Thuy district

41. The Tien Pagoda and Cave Access Improvements subproject is in rural Lac Thuy district of Hoa Binh province. Lac Thuy district is located at the southeast corner of the Hoa Binh province. The administrative units of the district include two towns Chi Ne and Thanh Ha with 13 communes: An Binh, An Lac, Co Nghia, Dong Mon, Dong Tam, Hung Thi, Khoan Du, Lac Long, Lien Hoa and Phu Lao. Phu Thanh, Thanh Nong, Yen Bong. The estimated population, and population density in Lac Thuy district (2013) was 57,631, and 183 /km^2.

42. In the east Lac Thuy is bordered by the two districts of Kim Bang and Thanh Liem of Ha Nam province. West of Lac Thuy district is Yen Thuy district. province. To the south Lac Thuy borders Gia Vien Nho Quan district of Ninh Binh province. Northern Lac Thuy borders Kim Boi district of Hoa Binh province and My Duc district of Hanoi.

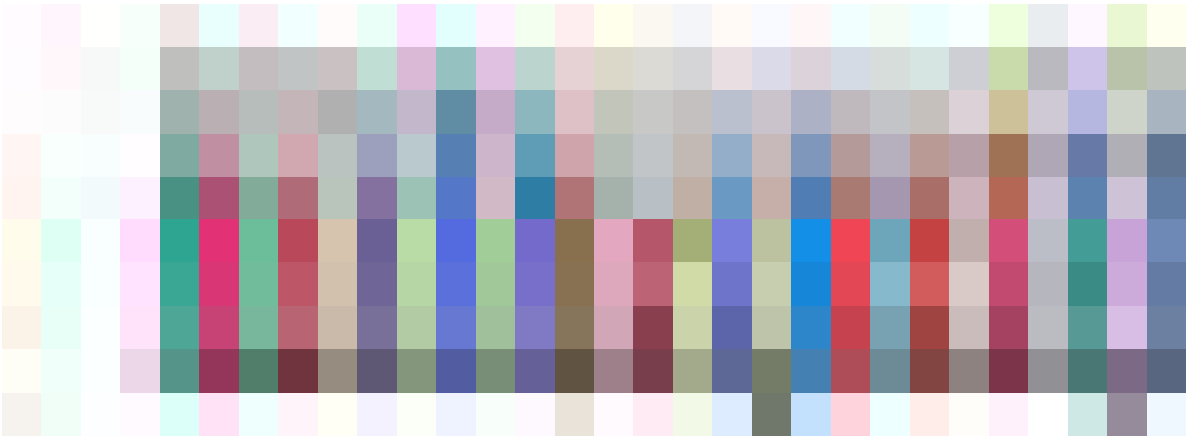
1. Climate

43. Lac Thuy district, like the entire province of Hoa Binh, experiences a tropical monsoon climate with two distinct rainy and dry seasons. Average annual temperature is 23°C with summer maximums exceeding 32°C. Average annual humidity is at 60% with maximum levels exceeding 84%, and average annual total rainfall is 1,800 mm (Figure 17). The wet and hottest season occurs from April to September with the dry, cooler period extending from October to March.

44. The heavy rains of wet season in combination with the northern steep terrain and patchy ground cover causes irregular flashy surface water flow and widespread soil erosion. Humidity is quite high: the average relative humidity over the year is 84% and it seldom drops below 60%.

45. North-eastern winds blow during the dry and cold season with south-eastern winds dominating the rainy season. Dry and hot winds from the west often stress agriculture ahead of the rainy season which can produce very strong and crop-damaging rainfall events. The rainfall gauge data are used to indicate general high- and the low-risk natural hazard areas for landslides.

Figure 17. Average rainfall at national gauges in Hoa Binh



46. In general, the air quality of the sub-project location of Lac Thuy district is good (Table 9).

Table 9. Air quality in Lac Thuy district

Unit : mg/m^3

Location	Dust	CO	NO2	SO2
Lac Thuy district	0.394	2.25	0.041	0.053
QCVN 05:2013/BTNMT- National technical regulation on ambient air quality	0.3	30	0.2	0.35

(Source: Environmental Monitoring Center DONRE. Report on the results of environmental monitoring of Hoa Binh province. 2016)

2. Topography

47. The district covers an area of 320 km² of rolling hills and many limestone karst outcrops. The district transitions between southeastern midland and northwest mountainous topography. Overall, the terrain of hills and karst outcrops tends to slope from the northwest to southeast. The subproject area is located on flat agricultural lands between distant karst outcrops.

3. Water Quality

48. The available surface water quality in Lac Thuy district is summarized in Table 10. Coliform bacteria exist at unacceptable high levels. This is due to the absence of wastewater treatment in the district. The subproject is not near a major river or lake, rather only a small stream that drains rice paddy area that will be crossed by the new section of access road of subproject.

Table 10. Surface water quality in Lac Thuy district

Location	pH	DO	TSS	NH_4^+	PO_4^{3-}	COD	BOD_5	Coliform
Dong Tam lake, Dong Tam commune, Lac Thuy district (a)	7.02	5.6	8.2	<0.02	<0.03	6.8	4.2	593
Boi river (Lac Thuy district) (b)	7.11	5.0	9.5	0.058	-	56	37	3500
QCVN 08:2015/BTNMT – A2	6 – 8.5	≥5	30	0.2	0.2	15	6	5000
QCVN 08:2015/BTNMT - B1	5.5 - 9	≥ 4	≤ 100	0.9	0.3	30	15	7.500

Source:
(a) Environmental Monitoring Center DONRE. Report on the results of environmental monitoring of Hoa Binh province. 2016)
(b) Source: DONRE, Report on the state of the Hoa Binh environment for 2010 - 2014)
QCVN 08:2015/BTNMT – A2 - For domestic water supply
QCVN 08:2015/BTNMT - B1 - For irrigation

4. Groundwater

49. The groundwater quality of aquifers in the district of Lac Thuy is summarized in Table 11. The monitoring data indicate that most groundwater quality parameters in Lac Thuy

Table 11. Groundwater quality in Lac Thuy district

Parameters	pH	Hardness	TSS	NO_2^-	NH_4^+	Fe	As	Coliform
Unit	-	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100ml
Lac Thuy district	6.54	116	<5	KPHĐ	<0.02	0.95	<0.0005	7
QCVN 09-MT:2015/ BTNMT	5.5 - 8.5	500	1500	1.0	1	5	0.05	3

Source: Environmental Monitoring Center DONRE. Report on the results of environmental monitoring of Hoa Binh province. 2016)

district meet the Vietnamese Standard QCVN 09: 2015/ BTNMT - National Technical Regulation on Groundwater Quality).

5. Mineral deposits

50. The mineral resources of Lac Thuy district consist of different types of rock, sands and gravel. Yellow sand is mined mostly in riparian Boi. Gravels are concentrated in Phu Lao, Dong Tam and An Lac communes; Rock is concentrated in the communes of Phu Lao, Dong Tam, Khoan Du. The district has other mineral deposits, such as small deposits of coal in Lac Long, Chi Ne and Dong Mon towns which produce about 2,000 tons annually. Small reserves of Antimony also mined in in An Binh commune.

6. Agro-forestry resources

51. Lac Thuy district has 5,455 ha of agriculture, and 12,766 ha of forested lands. Common tree species include bamboo, and rattan, as well as an array of important medicinal plants in the forest. The undeveloped forests away from the subproject area support an array of small mammals and reptiles.

52. The district has approximately 1,200 ha of fruit trees including 600 ha of orange trees in Hung Thi, Phu Thanh, Phu Lao, Lac Long, and Lien Hoa communes, 250 ha of pomelo (Phu Thanh Lien Hoa, Dong Tam, An Lac, Binh communes), and 150 ha of the apple (Dong Tam, Phu Thanh, Thanh Agriculture, An Lac, Binh, Hoa Lien communes).

53. Lac Thuy district is the leader in the production of chicken and goats in the province with 180 farms, breeding farms. In 2014 there were nearly 48,000 pigs, 485,000 poultry, and about 7,000 goats.

7. Protected Areas

54. The access roads to the Tien pagoda are not near any protected areas.

8. Dam Da tourist area

55. The subproject will upgrade access roads to the complex of caves and temples in the area that are collectively known as the Dam Da. Dam Da is a vast array of temples, pagodas and caves in the district, including Trinh temple (also known as Quan Trinh), Mau temple, and Tien pagoda. The temples and pagodas here are closely related to legendary figures in Viet Nam's history such as Au Co mother, Lac Long Quan Father, Hoang Bay Mandarin and Tam Toa Thanh Mau. In Tien cave and Ho cave (other name: Nguoi Xua cave), archaeologists have found traces of ancient people, contributing a great deal to the historical study. Now Tien pagoda has received national recognition as a historical cultural site and it is attracting many visitors to come here for sightseeing or worship.

9. Features of subproject sites of Tien Pagoda access improvements

56. The features of the affected subproject sites are shown in Figure 18.

Figure 18. Features of Tien Pagoda subproject site

Fig 18a: Agriculture area for alignment of new northern road section.

	Fig 18b: Example short northern section of road to be upgraded.
	Fig 18c: Example southern section of road to be upgraded.

Figure 18d: Existing market area to be upgraded.

B. Nghe An Province

1. Overview of topography

57. Nghe An province is in south central Viet Nam and is bounded to the north by Thanh Hoa province, Ha Thinh province to the south, Lao PDR to the west and Viet Nam sea to the east. The coastline of the province which includes Cua Lo town is 82 km long. The Ru Gam pagoda area is located Yen Thanh District northwest of Cua Lo town.

58. Nghe An has a complexity of terrain, sharply split by western mountain ranges and river systems. Nghe An slopes down from the northwest to sea level and is divided into three eco-zones defined by western mountainous area, lowlands, and coastal plains. The mountainous areas accounts for about 83% total land area. The Ru Gam subproject is located on the forested lowlands between the western mountains and the flat coastal sand dune area of the Cu Lo subproject.

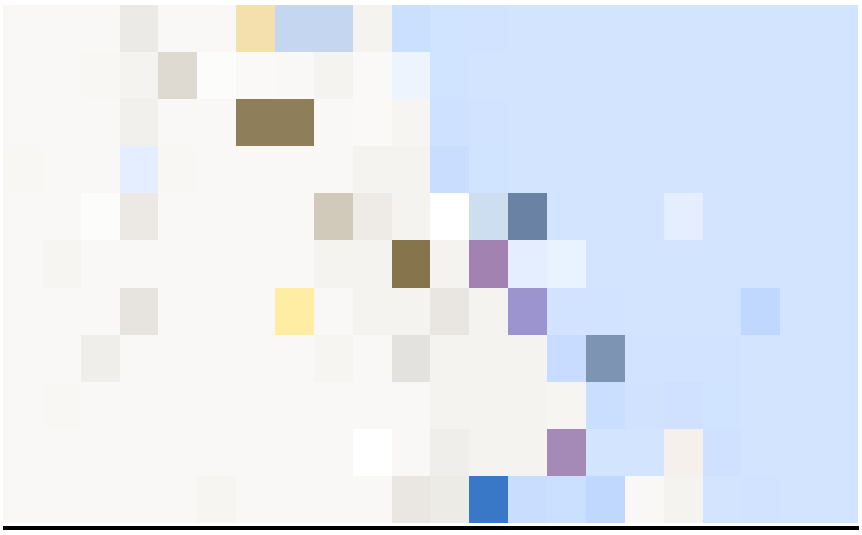
59. The topography the province is comprised of a wide range of soil types defined by extensive coastal sands, and alluvial plains the latter of which are used extensively for agriculture. The extensive sand deposits in dunes are largely infertile and not good for agricultural production. The mountainous areas to the west are dominated by clays, sandstones, and organically enriched soils of high humus content, which also support agriculture slope agriculture. Acid-bearing rock deposits also are found in the western region of the province.

2. Subproject Areas

60. Cua Lo town is located approximately 16 km north of Vinh city (Figure 19) on flat coastal land. Cua Lo town is bounded by 2 rivers defined Phuong Tich River to the south and Cam River to the north. Ru Gam Pagoda subproject is in a scattered forested area. There are no major rivers near the subproject area

61. Ru Gam pagoda area and Cua Lo town experience a tropical monsoon climate divided into two main seasons defined by the rainy season from April to October and the dry season from November to March. Average annual rainfall in last 5 years has been about 3,400mm with July and August normally producing over 50% of annual rainfall. The coastal location the subproject area is often affected by tropical storms which occur between April and October.

Figure 19. Cua Lo town north of Vinh



3. Environmental quality

a. Air Quality

62. Air quality inland at the Ru Gam Pagoda area and at coastal Cua Lo town is considered good due to the absence of significant industry in both areas. Available air quality data for Cua Lo indicate local dust and SOx and NOx levels are concentrated in industrial areas to the south at Vinh (e.g., Hoang Mai Cement Plant, Dien Hong Industrial Zone, Vinh Market Area, Quan Banh Crossroad, Nam Cam Industrial Zone). However, local dust levels can be intermittently high along the roadways of Cua Lo town and along the existing access road to Ru Gam pagoda caused by large vehicle traffic.

b. Surface water quality

63. The water quality of local rivers and lakes in/near Cua Lo town is summarized in Table 12. The data show that most parameters are within the permissible limits specified in QCVN standard for domestic use (A2) but requires treatment to meet drinking water quality standard. While significant surface waters are not located near the Ru Gam Pagoda area, regional surface water quality in the area is expected to be good given the lack of development and low population consistent with the absence of significant industry in the areas.

Table 12. Surface water quality of Cua Lo

	Parameters	Unit	Analysis results				QCVN 08:2015/BTNMT Column A2
			M1	M2	M3	M4	
1	Temperature	°C	27,6	27,5	28,9	28,8	-
2	pH	-	6,9	7,05	7,0	7,06	6-8,5
2	Salinity	%o	0,1	0,15	0,12	0,14	-
3	TSS	mg/l	28,5	24,5	26,0	24,6	30
4	Turbidity	NTU	31,2	21,6	22,5	22,6	-
5	COD	mg/l	12,6	11,4	11,6	12,4	15
6	BOD5	mg/l	5	6	5	6	6
7	Mn	mg/l	0,16	0,12	0,11	0,12	-
8	Total Fe	mg/l	0,29	0,21	0,22	0,22	1
9	DO	mg/l	6,0	6,5	6,5	6,4	≥5
10	NH4+	mg/l	0,16	0,11	0,11	0,12	0,2
11	NO3-	mg/l	2,9	1,1	1,2	1,1	5
12	NO2-	mg/l	0,01	0,01	0,01	0,01	0,02
13	F-	mg/l	ND	ND	ND	ND	1,5
14	CN-	mg/l	ND	ND	ND	ND	0,02
15	As	mg/l	ND	ND	ND	ND	0,02
16	Pb	mg/l	0,001	0,002	0,001	0,002	0,02
17	Cd	mg/l	0,001	0,001	0,001	0,001	0,005
18	Hg	mg/l	ND	0,0001	ND	0,0001	0,001
19	Cu	mg/l	0,04	0,05	0,04	0,05	0,2
20	Cr (VI)	mg/l	0,001	0,002	0,001	0,002	0,02
21	Coliform	MPN/ 100ml	3600	2900	2900	3000	5.000

Source: DONRE, 2014

M1: surface water in the lake, Nghi Loc district;
M2: surface water of the Phuong Tich river (at the Phuong Tich Bridge pier in Nghi Hoa commune);
M3: surface water of the Phuong Tich river (500 m upstream the Cam Bridge)
M4: surface water of the Phuong Tich river (the Cam Bridge)

c. Groundwater quality

64. The quality of groundwater in Cua Lo town is shown in Table 13. The data indicate that pH, TSS parameters at 13 monitoring points are within the QCVN 09: 2008 / BTNMT (domestic water supply). However, 1/13 and 2/13 monitoring points exceed alkalinity and iron (Fe) standards. The data in Table 13 suggest that groundwater quality in the Cua Lo area is good with little or no pollution. No groundwater data is available for the Ru Gam pagoda area.

Table 13. Groundwater quality in Cua Lo town

N	Parameters	Unit	Results				QCVN 09:2008/ BTNMT
			N1	N2	N3	N4	
1	pH	-	7,01	7,02	6,96	7,08	5,5 - 8,5
2	Hardness	mg/l	131,5	153,0	153,6	146,3	500
3	TSS	mg/l	12,5	12,8	14,1	14,4	1500

N	Parameters	Unit	Results				QCVN 09:2008/ BTNMT
			N1	N2	N3	N4	
4	NO3-	mg/l	2,21	2,16	2,06	2,16	15
5	NO2-	mg/l	0,06	0,08	0,08	0,07	1,0
6	NH4+	mg/l	0,02	0,02	0,03	0,02	0,1
7	Fe	mg/l	0,92	0,75	0,47	1,66	5
8	Cu	mg/l	0,002	0,001	0,002	0,002	1,0
9	Zn	mg/l	0,001	0,001	0,001	ND	3,0
10	Pb	mg/l	ND	ND	ND	ND	0,01
11	As	mg/l	ND	ND	ND	ND	0,05
12	SO42-	mg/l	69,0	76,0	71,5	68,5	400
13	Cl-	mg/l	6,5	7,8	7,8	9,5	250
14	Coliforms	mg/l	0	1	0	0	3

Source: DONRE, 2014

d. Coastal water quality

65. The coastal water quality along of Cua Lo town is summarized in Figures 20 and 21.

Figure 20. Ammonia (NH_3) at Nghe An beaches (2010-2013)

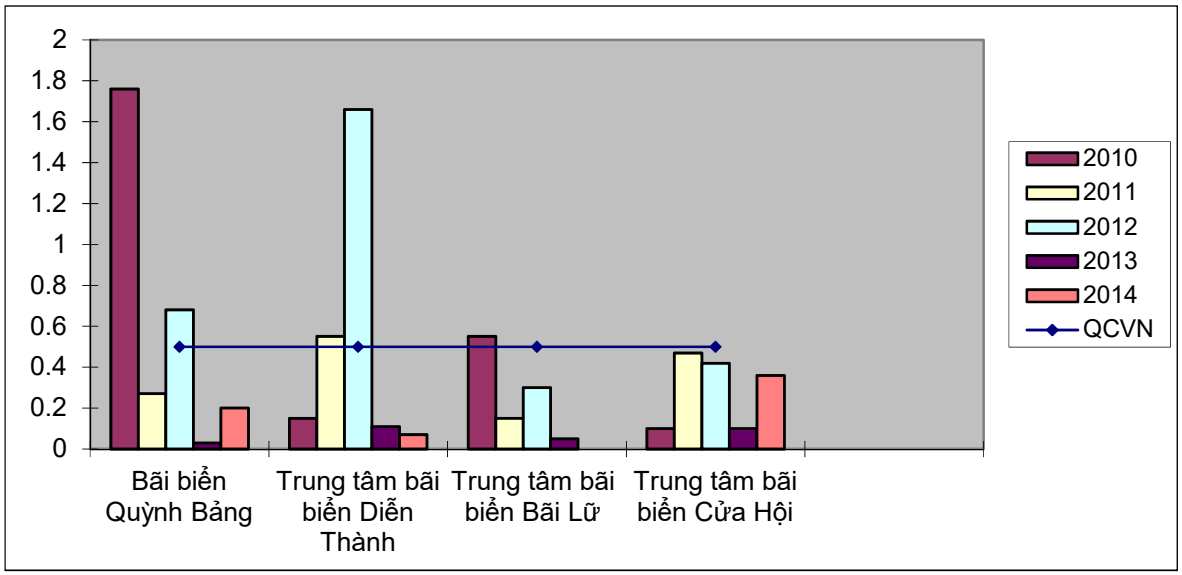
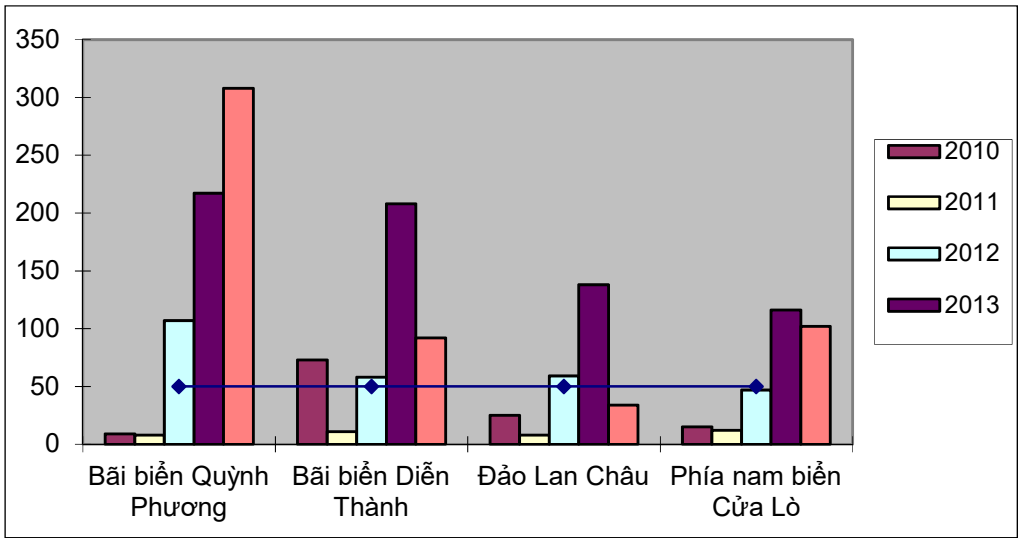


Figure 21. Suspended sediment at beach locations in Nghe An (2010-2013).



(Source: DONRE, Report on the state of the Nghe An environment for 2010 - 2014)

66. The Nghe An DONRE monitoring report for 2010-2014 indicates that the beaches exceed suspended sediment standards which is TSS > 100 mg/l) (QCVN 10: BTNMT - National Technical Regulation on coastal water quality is 50 mg / l).

4. Biological resources

67. The scattered forest near Ru Gam Pagoda and west of Cua Lo support different species of trees, herbs, and vines. Contrastingly, the sand dune ecosystem of the Cua Lo subproject area is thinly forested which is dominated by coniferous trees and sparse ground shrubs. The dune ecosystem is dominated by a few small mammals (e.g., rodents), and shorebirds. There are no known Red Book species in the Cua Lo and Ru Gam Pagoda areas.

5. Protected Areas

68. Nghe An province has 1 national park (Pu Mat), 2 nature reserves (Pu Hoat and Pu Huong), a Western Nghe An is the country's largest Biosphere Reserve, covering nearly 1.3 million hectares, including Pu Mat National Park, Pu Hoat and Pu Huong Nature Reserves). It is home to 70 species of flora and 80 species of fauna listed in Vietnam's Red Book of endangered species, 295 species of birds, 54 species of reptiles and amphibians, 83 species of fish and 39 species of bats.; and 2 landscape Protection Areas (Mother Abyss, and Chung Mountain). However, none of the protected areas are near Ru Gam Pagoda or Cua Lo subproject areas.

6. Marine resources

69. According to the research of Institute of Sea Products, the offshore annual productivity of sea products reaches 35-37 thousand tons/year. Surface water fisheries (<30m) and deep-water fisheries account for 30% and 70% of annual production, respectively. Inshore fisheries are least productive due to the bottom sand habitat extending from the terrestrial dune ecosystem. There are 267 species of fish in 91 families comprised of herring 30-39%, scads 15-20%, and anchovy 10-15%. Additionally, 8 species of shrimps are fished, with prawns accounting for 30% of the

annual catch. Along the coastal line south and north of Cua Lo 3,500 ha of brackish water aquaculture and salt farming exists.

70. Nghe An has many beautiful beaches such as Cua Lo, Nghi Thiet, Cua Hien, Quynh Bang, Quynh Phuong, etc., with clear water, medium waves, gentle slopes, medium salt and in convenient point for transportation. However, some beaches have not been invested for better service provision, including Cua Hien, Quynh Phuong, Ngu island and Lan Chau island, etc.

7. General Socio-Economic Profile of Province

a. Population (1000s)

Total	Male	Female	(people/km^2)
3,063.9	1,526.6	1,537.3	186

b. Labor in agriculture, forestry and fishery (1,000 persons)

2013	2014	2015	2013	2014	2015
1,920.4	1953.1	1892	63.8	64.3	61.8

71. The poverty level of the province decreased between 2012 and 2015. The poverty reduction programs contain specific actions such as access to low credit schemes, free medical care and education as well as vocational training and extension services for agriculture, forestry and fishery sectors to enhance productivity. Many poor rural households in the project provinces have benefited from these programs. Poverty rate according to the Government's new poverty line from 2012 to 2015 was 19.8% – 12.3%.

c. Income per capita per month by year (1,000 D)

2008	2010	2012	2014	2015
640	919.6	1,572.0	1,732	1,883.2

(Source: Statistical Yearbooks of the project provinces, 2015)

d. Land use situation

72. Current land use in the project provinces could be classified into four main categories: agricultural land, forest land, specialized land and residential land. Vacant land in the coastal areas is mainly coastal sand dune land, which is planned for forestry purposes, by the project.

Total area (ha)	Agricultural	Forestry	Specialized	Residential
1,649.0	276.1	963.7	72.0	20.6

(Source: National Statistical Yearbook, 2015)

e. Education

73. The number of primary and junior secondary schools in the school year of 2014-2015 in the province are summarized below

School type	(a)	(b)	(c)	(d)
	544	9,733	393	5,487

Source: Statistical Yearbooks of the project provinces, 2015, Note:

(a) Primary School
(b) Class of primary school
(c) Junior secondary schools
(d) Class of junior secondary schools

f. Health facilities

74. The number of existing health facilities in the communes in 2015 is summarized as follows.

(a)	*(b)*	*(c)*	*(d)*	*(e)*
531	28	22	1	480

Source: Statistical Yearbooks of the project provinces, 2015, Note:

(a) Total
(b) Hospital
(c) Clinic
(d) Hospital nursing and rehabilitation
(e) Clinic oi commune, ward, office and factory

g. Other socio-economic indicators

75. Economic indicators related to the GDP and GDP growth rate are summarized in Table 14.

Table 14. Social economic development targets in 2013

No	Target	Unit	Planned 2013 target
I	**Economic Targets**		
1	GDP growth rate	%	7,0-8,0
2	Production value growth rate of Agriculture, Forestry and Fishery	%	4,0-4,5
3	Production value growth rate of Industry – Construction	%	10-11
	Of which, Production value growth rate of Industry	*%*	*11,0-12,0*
4	Production value growth rate of Services	%	10,0-11,0
5	Economic Structure	%	100
-	Agriculture, forestry and fishery	%	25-26%
-	Industry – Construction	%	32-33%
-	Services	%	41-42%
6	Budget Revenue	Bill. D	5.514
7	Export Turnover	Mil. USD	460-480
8	Average Income per capita	Mil.D	23
9	The whole society's investment capital	1000 bil.D	31-32

No	Target	Unit	Planned 2013 target
II	**Social Targets**		
11	Rate of poor households	%	12,5
12	The rate of malnourished under-five children	%	18,5
13	School get national standard	School	835
14	Job creation	1000 peoples	36-37
15	Rate of trained labor	%	48
	Of which: Rate of vocationally trained labor	*%*	*44*
17	Number of doctors per 10,000 peoples	Doctors/10,000 peoples	6,5
19	Bed number for patients per 10,000 peoples	Beds/ 10,000 peoples	22,5
20	Rate of families get cultural standard certificate	%	76
III	**Environmental Targets**		
22	The rate of population having access to fresh water in rural areas	%	92
23	The rate of population having access to fresh water in urban	%	93
24	The rate of forest coverage	%	54
25	The rate of solid wastes shall be gathered and treated to environmental standards.	%	87

(Source: Statistical Yearbooks of the province, 2015)

8. Infrastructure

a. Roads

76. The existing access road to the Ru Gam Pagoda which will be upgraded by the subproject exemplifies the substandard condition of many rural provincial roads that are unable to satisfactorily accommodate the steadily increasing local and regional population, and tourist traffic. While the coastal road system is better the quality of the roads generally also requires rehabilitation to meet increasing demand.

b. Sea protection embankments

77. The seawalls and embankments consist mainly of reinforced concrete slabs while the embankments of estuaries are paved with stone and covered with grass. Key protection areas are from direct wave action, wind, and tides. In addition to seawalls and embankments, there are groin systems usually positioned perpendicular to the shoreline. These systems are used to prevent or limit wave erosion of beaches and movement of sand dunes. The once natural coastal protection from mangroves along Cua Lo has long been replaced by coastal development.

c. Water supply and wastewater

78. Vinh water treatment plant with a capacity of about 80,600 m^3/day supplies the fresh water for Vinh City and suburbs including Cua Lo town. The capacity is expected to increase 150,000 m^3 in 2020. Approximately 75% of the population is connected to the existing wastewater drainage system, which includes three pumping stations with a total capacity of 60,000 m^3/day, and several regulation lakes. Germany's KfW and ADB's water sector investment program assist the broader coastal area with construction of a new wastewater treatment plants in Vinh and to serve Cua Lo.

9. Features of subproject sites along Cua Lo beach

79. Features of the coastal Cua Lo beach area affected by the subproject are shown in Figure 22.

Figure 22. Features of Cua Lo beach affected by subproject

Figure 22a: Example northern section of Cua Lo beachfront to be upgraded

	Figure 22b: Central square area of beachfront to be upgraded.
	Figure 22c: Example section of Cua Lo beachfront to receive new seawall

Figure 22d: Example southern section of beachfront walkway to be upgraded.

C. Quang Binh Province

1. Overview

80. Quang Binh borders Hà Tĩnh province to the north, Quang Tri province to the south, Lao PDR to the west, and the Viet Nam East Sea to the east. Dong Hoi, which is the capital city and location of subproject, is located on the coastal plain.

81. The provincial topography is characterized by a general slope from the hills and mountains of the west down to the eastern coastline. The Truong Son mountain range is the natural border between Quảng Bình province and Lao PDR, with peaks ranging from 1,000 to 1,500m, the summit of which is peak Phi Co Pi with the height of 2,017m. In the east of the province are lower hills and then several narrow plains and river deltas. The coastal sand dunes act as natural barrier that protects the land from the sea.

2. Geology and soils

82. The province is divided into specific geological zones defined by: mountainous, hilly and midland, lowland and coastal sandy area in which the subproject is located. Two main soil types are defined by the alluvial soils in lowland coastal area and ferralite soil in mountainous areas. The barren soil lying mainly in the mountainous districts in the West accounts for over 80% of natural area of the province. The coastal sandy dunes account for over 5.9% and alluvial soil accounts for 2.8%. The western highlands, characterized by steep slopes, sharp crests, and narrow valleys, are covered mainly by a dense broadleaf evergreen forest. Most of the peaks are from 4,000 feet (1,200 m) to 7,000 feet (2,100 m) feet high, but some rise above 8,000 feet (2,400 m). Whereas, the coastal plains flanking the highlands on the east have rocky headlands and consist of extensive belts of sand dunes and, in areas where the soil is suitable, rice fields.

3. Climate

83. The coastal area where the subproject is located experiences a tropical monsoon climate which is divided into two seasons. The dry season begins in September and extends to March with the rainy season lasting from April through to August. Average rainfall during the rainy season ranges 2,000-2,300mm. Dong Hoi shows high temperatures year-round. Average monthly climate parameters are summarized in Table 15.

Table 15. Summary of climate in Don Hoi, Quang Binh

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Ave/ Total
Temp. Average °C	25.1	17.8	18.5	21.4	26.3	29.2	30.1	29.7	29.2	26.8	25.6	24.8	25.4
Rainfall Avg mm	38.3	11.0	17.5	82.2	154.7	82.6	123.2	145.2	547	281.9	156.8	103.7	1744
Humidity %	88	90	89	87	80	72	69	75	84	86	85	85	83
ETP mm (*)	58	43	58	72	123	165	191	154	85	80	76	74	1178

(Source: DONRNE, Report on the state of the Quang Binh environment (2010 - 2014)

84. Average humidity ranges 83 - 85% with maximum of 87% and minimum in summer as low as 50%. Dong Hoi experiences two main wind seasons during the year defined by winter wind primarily from the northwest and summer wind from the northeast. Average evaporation is 85 to 90 mm/month.

4. Dong Hoi Coastal Zone

a. Air quality

85. The air quality in Dong Hoi is summarized in Table 16 and Figure 23.

Table 16. Air quality in Dong Hoi

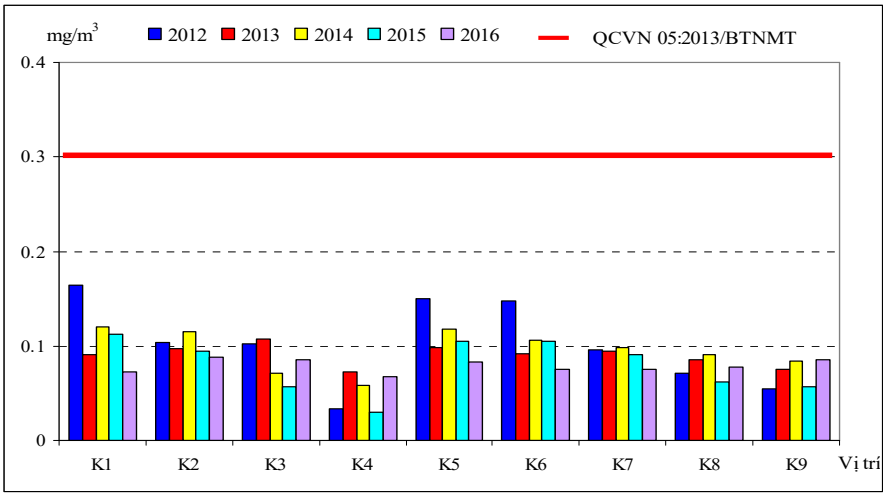
Sampling Sites	Dust (mg/m^3)	SO_2 (mg/m^3)	NO_x (mg/m^3)	CO (mg/m^3)	Noise (dBA)
The crossing of the provincial post office					
2010	0.016	No detected	0.19	7.56	72.3
2011	0.122	0.072	0.089	7.4	72.4
2012	0.097	0.064	0.074	6.47	75.7
2013	0.108	0.058	0.055	5.05	82.2
2014	0.072	0.116	0.074	4.75	85.1
Crossroads of Thuan Ly bridge					
2010	0.073	No detected	No detected	6.04	72.6
2011	0.065	0.052	0.075	6.25	72.6
2012	0.12	0.07	0.06	5.31	76.9

Sampling Sites	Dust (mg/m^3)	SO_2 (mg/m^3)	NO_x (mg/m^3)	CO (mg/m^3)	Noise (dBA)
2013	0.161	0.051	0.046	4.44	82.7
2014	0.079	0.114	0.077	4.15	84.3
Quan Hau town Center					
2010	0.042	No detected	No detected	3.75	73.2
2011	0.048	0.026	0.038	2.55	70.9
2012	0.105	0.039	0.039	3.99	76.1
2013	0.098	0.039	0.037	3.96	83.3
2014	0.115	0.073	0.042	3.15	79.7
Center of the reception Phong Nha					
2010	0.033	No detected	No detected	1.13	70.9
2011	0.029	No detected	No detected	No detected	67.5
2012	0.034	0.013	0.013	0.056	62.8
2013	0.073	0.019	0.018	1.12	74.5
2014	0.059	0.027	0.028	1.12	71.9
QCVN 05-2009 (g/m^3)	**0.3**	**0.35**	**0.2**	**30**	
QCVN26-2010 (dBA)	**70**				

(Source: DONRE, Report on the state of the Quang Binh environment for 2010 - 2014)

86. Air quality at some points in the Dong Hoi is generally good with all parameters level in the permitted limits QVCN 05-2009 BTNMT - National Technical Regulation on Quality air ambient environment. Meanwhile, the noise level of the observation points in the optical city exceeds the permitted standard QCVN26-2010 BTNMT - National Technical Regulation on noise.

Figure 23. Dust levels in Dong Hoi (2012-2016)



Note: K1- Cam Lien 3 junction (Le Thuy district), K2 - Kien Giang Townlet Center, K3 - Quan Hau Town Center (at the Quan Hau Bridge), K4 - Provincial Post Office, K5 - Ha Huy Tap and Dong Hoi streets, K6- Center of the Phong Nha, K7- Hoan Lao Town Center (Market Area), K8 - Ba Don town junction, K9 - Ba Don market

b. Water Resources

87. Quang Binh has a large system of rivers which originate in the mountains in the west. As a result, the rivers initially are steep with steep slopes to then become slow moving and sluggish on the coastal plain. Four main rivers constitute the river system near Dong Hoi city which are defined by the Nhat Le, My Cuong, Cau Rao and Le Ky rivers.

- Nhat Le River, which is the main river of the subproject, is formed by the confluence of the Kien Giang River in Le Thuy and the Dai Giang River in Quang Ninh District. It is 152 km long including Kien Giang River (58 km) and Dại Giang River (77 km long). Nhat Le estuary opens on the sea at Dong Hoi.

- My Cuong River drains areas of Dong Son, Thuan Duc, Bac Nghia wards and Nghia Ninh and Duc Ninh communes. It starts from Phu Vinh Dam in Thuan Duc and runs Northwest to Southeast direction before its confluence with the Nhat Le River at Quang Ninh commune. My Cuong river is 16 km long, with an average width of 80m. The maximum flow Qmax is 350 m^3/s, and the minimum flow Qmin is only 0.25 m^3/s. The river is narrow and turbid with saline water reaching over till My Cuong bridge.

- Cau Rao River (also named Luy river) flows from the junction (triple-crossing) between Phong Thuy canal and the canal of Loc Ninh commune's rice field, with a total length of 4.5 km, and crossing the city from North to South before running in Le Ky river. The dredging of the last 300 m reach of the Cau Rao before it joins the Nhat Le is proposed as a sub-component of the present project.

- Le Ky River originates from high mountains in Quang Ninh district and runs around the Dong Hoi city before it joins the Nhat Le. It is 20km long with an average width of 200m. The catchment area is 90km², with a Qmax of 630 m3/s and a Qmin of 3.1 m3/s. The Le Ky will be the receiving river for the treated effluents from the new Duc Ninh wastewater treatment plant already under construction.

c. Surface water quality

88. Surface water quality at subproject sites (M1 and M2) on the Nhat Le river are shown in Table 17. The data indicate the water quality in Nhat Le river is good (QCVN 08/2015 – B1 BTNMT- Regulation for irrigation water).

Table 17. Monitoring results of Nhat Le water river

N	Parameters	Unit	2014		QCVN 08:2015/BTNMT - B1
			M1	M2	
1	pH	-	7.07	6.97	5.5 - 9
2	Temperature	^{0}C	27.53	26.95	-
3	TSS	mg/l	20.25	26.75	≤ 100
4	DO	mg/l	6.71	6.99	≥ 4
5	BOD	mg/l	14.9	11.5	15
6	COD	mg/l	23	17.25	30
7	Fe	mg/l	0.24	0.17	1.5
8	PO_4^{3-}	mg/l	0.02	0.05	0.3
9	Nitrate (N)	mg/l	0.004	0.004	10
10	Ammonia (N)	mg/l	0.11	0.07	0,9
11	Arsenic	mg/l	0.002	0.002	0.05
12	Cadmium	mg/l	0.0019	0.0019	0.01
13	Pb	mg/l	0.0027	0.0028	0.05
14	Hg	mg/l	0.0004	0.0006	0.001
15	Coliform	VK/100ml	3.000	955	7,500

Source: Center for Environmental Monitoring and Techniques DONRE, 2015
M1: The area near the sea (20 m to the coast); M2: Quan Hau

d. Groundwater quality

89. Groundwater quality at the subproject sites is summarized in Table 18.

Table 18. Groundwater quality in Dong Hoi town.

N	Parameter	Unit	Results					QCVN 09:2015/BTNMT
			2010	2011	2012	2013	2014	
Đong Hoi								
1	pH	-	7.91	6.78	7	7.03	6.49	5.5 - 8.5
2	Hardness	mg/l	97	104	102	94	83	≤ 500
3	TSS	mg/l	131	209.5	189	197.5	112.5	≤ 1500
4	Sulphat	mg/l	4	5	7	9	12	≤ 400
5	Iron	mg/l	2.68	0.06	0.03	0.12	0.99	≤ 5
6	Clorua	mg/l	18.6	11.75	9.95	6.55	9.7	≤ 250

N	Parameter	Unit	Results					QCVN 09:2015/BTNMT
			2010	2011	2012	2013	2014	
7	Asen	mg/l	0.001	0.002	0.003	0.002	$1.84x10^{-3}$	≤ 0.05
8	Amoni (- N)	mg/l		0.06	0.04	0.47	0.023	≤ 0.1
9	Nitrit (- N)	mg/l		0.004	0.003	0.005	0.018	≤ 1.0
10	Cadimi	mg/l	0.002	0.002	0.0011	0.0006	$0.31x10^{-3}$	≤ 0.005
11	Pbì	mg/l			$0.029x10^{-3}$	$1.447x10^{-3}$	$0.758x10^{-3}$	≤ 0.01
12	Hg	mg/l			$0.098x10^{-3}$	$0.283x10^{-3}$	$1.217x10^{-3}$	≤ 0.001
13	Coliform	VK/100ml	5	12	15	11	9	≤ 3
Quang Ninh district								
1	pH	-	6.49	6.76	6.90	7.88	7.23	5.5 - 8.5
2	Hardness	mg/l	165	145	127	156	161	≤ 500
3	TSS	mg/l	219	225	220.5	207.5	171.3	≤ 1500
4	Sulphat	mg/l	10	15.5	25.5	55.5	30.5	≤ 400
5	Iron	mg/l	0.14	0.43	0.13	0.21	0.17	≤ 5
6	Clorua	mg/l	7.4	12.6	16.5	28.1	28	≤ 250
7	Asen	mg/l	0.001	0.001	0.001	0.002	$1.84x10^{-3}$	≤ 0.05
8	Amoni (- N)	mg/l		0.07	0.13	0.07	0.11	≤ 0.1
9	Nitrit (- N)	mg/l		0.011	0.009	0.013	0.017	≤ 1.0
10	Cadimi	mg/l	0.001	0.001	0.0007	0.008	$0.31x10^{-3}$	≤ 0.005
11	Pbì	mg/l			$0.011x10^{-3}$	$1.738x10^{-3}$	$0.801x10^{-3}$	≤ 0.01
12	Hg	mg/l			$0.365x10^{-3}$	$0.442x10^{-3}$	$0.43x10^{-3}$	≤ 0.001
13	Coliform	VK/100ml	9	16	3	7	25	≤ 3
Bo Trach district								
1	pH	-	7.09	7.08	7.16	7.07	6.97	5.5 - 8.5
2	Hardness	mg/l	108.5	104.5	102.5	11	53.5	≤ 500
3	TSS	mg/l	260.5	144	158.5	160.5	142.9	≤ 1500
4	Sulphat	mg/l	18	10.5	7	19	1	≤ 400
5	Iron	mg/l	0.03	0.34	0.23	0.26	0.05	≤ 5
6	Clorua	mg/l	20.5	7.5	10.2	23.45	14.7	≤ 250
7	Asen	mg/l	0.001	<0.001	0.001	0.002	$<1.84x10^{-3}$	≤ 0.05
8	Amoni (- N)	mg/l		0.06	0.035	0.035	0.115	≤ 0.1
9	Nitrit (- N)	mg/l		0.006	0.004	0.117	0.023	≤ 1.0
10	Cadimi	mg/l	0.001	0.001	0.0006	0.003	0.31x10-3	≤ 0.005
11	Pbì	mg/l			$5.267x10^{-3}$	$2.476x10^{-3}$	$0.744x10^{-3}$	≤ 0.01
12	Hg	mg/l			$0.481x10^{-3}$	$0.295x10^{-3}$	$0.49x10^{-3}$	≤ 0.001
13	Coliform	VK/100ml	2	12	10	8	3	≤ 3

Source: Center for Environmental Monitoring and Techniques of DONRE

90. The monitoring results show that almost underground water quality parameters in Dong Hoi city and Quang Ninh, Bo Trach districts (Projects location) are meet the Vietnamese Standard QCVN 09: 2015/ BTNMT - National Technical Regulation on Groundwater Quality).

e. Marine and coastal resources:

91. Quang Binh has 116 km of coastline and 5 estuaries. There are seaports namely Nhat Le, Gianh, Hon La. Hon La gulf, which is of 4km^2 water surface, over 15m depth and surrounded by the islands of Hon La, Hon Co, Hon Chua, allows 30,000 – 50,000 tons ships to shelter without dredging. The coastal zone provides a large fishing area which generates about 100,000 tons of sea products annually. There are 1650 kinds of sea products, including valuable lobster, tiger shrimp, cuttlefish, holothurians, coral. These resources including coral reefs located in the north of the province enable a comprehensive coastal economy[11]

f. Coastal water quality

92. Coastal water quality at the mouth of the Nhat Le river is shown in Table 19. The water quality report (2010-2015) prepared by the Quang Binh DONRE indicates that the coastal waters quality of Nhat Le, Quang Binh province is generally good, with only coliform and COD exceeding QCVN 10: BTNMT - National Technical Regulation on Coastal Water Quality. Monitoring results show that coastal water quality at Dong Hoi from 2012 - 2016 is good with exception of levels of Fe and coliform in some areas (Figure 24).

Table 19. Coastal water quality at Nhat Le river (2010 – 2014)

Parameters (mg/l)	Year					QCVN 10-2008
	2010	2011	2012	2013	2014	
pH	7.79	7.8	7.45	7.26	7.57	6.5 – 8.5
TSS	32.66	36.25	33.75	23	21.75	50
BOD	-	7.25	7.07	8.87	10.35	-
COD	4.66	11.75	12.25	13.5	15.25	4
NH_4^+	0.047	0.057	0.015	0.043	0.026	0.5
As	<0.001	-	-	-	<0.001	0.04
Cd	0.001	-	<0.001	<0.001	<0.001	0.005
Hg	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
Coliform (MPN/100ml)	85	177	947	1,138	1,447	1,000

(Source: D0NRE, Report on the state of the Quang Binh environment for 2010 - 2015)

[11] *Source: DONRE, Report on the state of the Quang Binh environment 2010 - 2014*

Figure 24. Water quality along coast of Dong Hoi

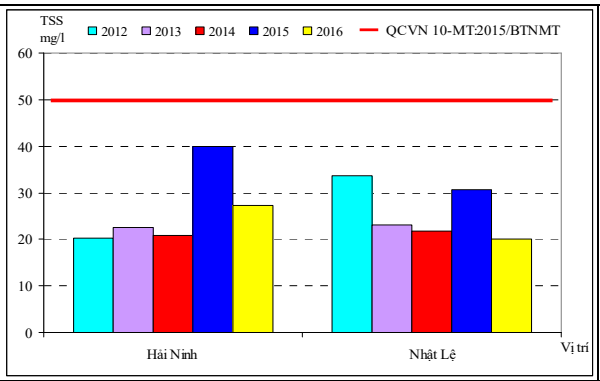


Figure -The TSS level in Nhat Le and Hai Ninh Coastal at 2012 – 2016

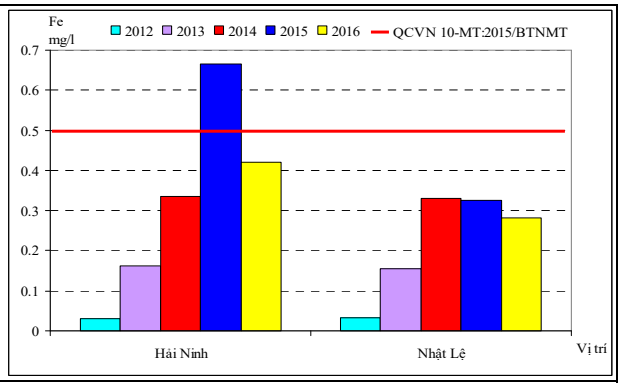


Figure -The Fe level in Nhat Le and Hai Ninh Coastal at 2012 – 2016

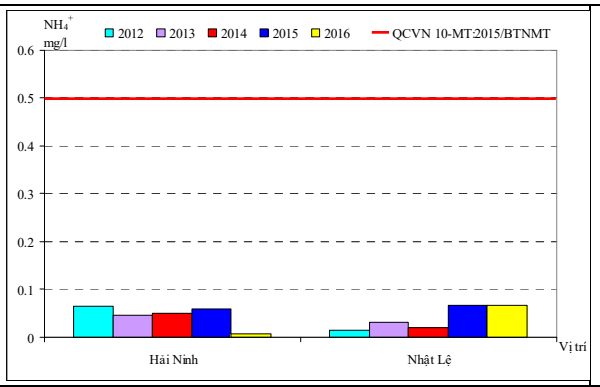


Figure -The NH4+-N level in Nhat Le and Hai Ninh Coastal at 2012 – 2016

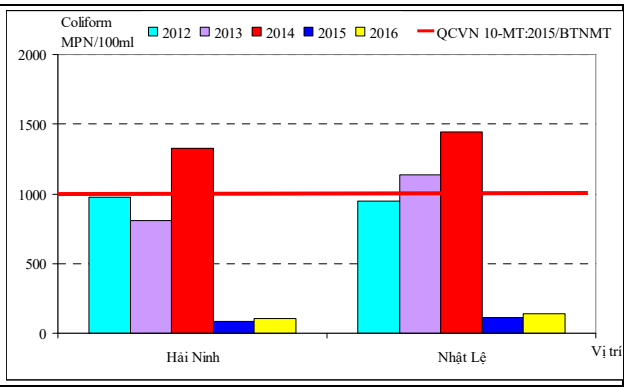


Figure -The Coliform level in Nhat Le and Hai Ninh Coastal at 2012 – 2016

(Source: D0NRE, Report on the environmental quality monitoring for 2012 - 2016)

5. Biological resources

93. The aquatic fauna and flora the lower Nhat Le river basin in which the subproject is located are not well described, and expectedly, low in diversity due to the natural low biodiversity of coastal dune ecosystems.

a. Protected Area

Phong Nha Ke Bang National Park to the west contains a rich fauna diversity comprised of 493 species, 67 kinds of animals, 48 kinds of reptile, 297 kinds of bird and 61 kinds of fish. Many rare and precious animals can be found in this area such as Ha Tinh langur, bear, tiger, Saola, Giant muntjac, White Tail Lophura with, Black Crested Liophura, pheasant and others.

94. In terms of floral diversity, Quang Binh has 486,688 ha of forest including 447,837ha of natural forest and 38,851ha of planted forest. Pine forests cover 17,397 ha. The barren land occupies 146,386ha. Flora is diversified and divided into 138 families, 401 branches and 640 species, and greatest in Phong Nha Ke Bang National Park. There are various kinds of precious wood such as ironwood, *sindora vietnamiensis*, ebony, fragrant wood, pine, rattan, etc. Quang

Binh is one of the provinces which still contain a large reserve of unharvested forest. At present, the total wood reserve here is 31 million m^3.

b. Fish species

95. Among 259 fish species identified in Quang Binh, 4 species are endangered (VU) and 1 species highly endangered (CR) (Table 20). However, no known rare or endangered species are known in the Nhat Le river.

Table 20. The rare fish species in the province of Quang Binh

N	Vietnamese name	Scientific name	Red Vietnam book (2007)
1	Cá Chình Mun, cá Chình	*Anguilla bicolor* Mc Clelland, 1844 = *Anguilla bicolor pacifica* (Schmidt, 1928)	VU
2	Cá Chình Hoa	*Anguilla marmorata* Quoy and Gaimard, 1824.	VU
3	Cá Mòi Cờ Mõm Tròn	*Nematolosa nasus* (Bloch, 1795)	VU
4	Cá Cháo Biển Lớn	*Megalops cyprinoides* (Broussonet, 1782)	VU
5	Cá Bống Bớp	*Bostrichthys sinensis* (Lacépède, 1802)[V]	CR

Source: Institute of Ecology and Biological Resources, 2015
Note: CR (Critically Endangered), EN (Endangered), VU (Vulnerable), LR (Lower risk)

6. Socio-economic profile

a. Marine economy

96. Quang Binh province has more than 100 km coastline along districts of Quang Trach, Bo Trach, Dong Hoi City, Quang Ninh and Le Thuy, and five estuaries of which the two largest are Gianh and Nhat Le. Quang Binh has 15,000 ha available for aquaculture. The semi-diurnal tidal regime provides regular inshore flushing which benefits shrimp, crab and other seafood farming. For marine economic development Quang Binh's focus is construction of Hon La economic zone as a general economic zone with key sectors of auxiliary industries, power generation, shipbuilding, fishing boat building, cement, glass manufacturing.

b. Population

97. The population and population density of Quang Binh is summarized below.

Population (1000s)			Population density (people/km^2)
Total	**Male**	**Female**	
872.9	436.9	436.0	108

Source: Statistical Yearbooks of the project provinces, 2015

c. Labour

98. Labor population in agriculture, forestry and fishery (1,000 persons) is summarized below.

Total employed population and % working in agriculture and fishery

2013	2014	2015	2013	2014	2015
516.5	528.9	520.3	59.8	60.9	59.6

d. Poverty level

99. Poverty decreased significantly between 2012 and 2015 due to access to low credit schemes, free medical care and education, as well as vocational training and extension services for agriculture, forestry and fishery sectors to enhance productivity. Many poor rural households in the province have benefited from these programs. Poverty rate according to the Government's new poverty line from 2012 to 2015 in Quảng Bình was 19.8%

e. Income

Income per capita per month by year (1,000 D) for Quang Binh is summarized below.

2008	2010	2012	2014	2015
645	950	1,437	1,839	-

(Source: Statistical Yearbooks of the project provinces, 2015)

f. Land use

100. Current land use in Quang Binh can be classified into four main categories: agricultural land, forest land, specialized land and residential land. Vacant land in the coastal areas is mainly coastal sand dune land, which is planned for forestry purposes, by the project.

Total area	Agricultural	Forestry	Specialized	Residential
806.5	82.8	630.9	28.6	5.5

(Source: National Statistical Yearbook, 2015)

g. Education

101. The number of primary and junior secondary schools in Quang Binh in 2014-2015 are summarized below.

(a)	(b)	(c)	(d)
211	3,040	148	1,770

Source: Statistical Yearbooks of the project provinces, 2015
Note: (a) primary school
(b) class of primary school
(c) junior secondary
(d) class of secondary

h. Health facilities

102. The number of different types of health facilities in the communes in Quang Binh in 2015 are summarized below.

(a)	*(b)*	*(c)*	*(d)*	*(e)*
174	8	7	-	159

Source: Statistical Yearbooks of the project provinces, 2015

Note:
(a) total
(b) hospital
(c) clinic
(d) hospital nursing and rehabilitation
(e) clinic of commune, ward, office, and factory

i. GDP growth rate

103. The GDP growth rate in Quang Binh has been 11% per year in the period of 2006-2010.

Year	**2006**	**2007**	**2008**	**2009**	**2010**
GDP (%)	12.8	11.63	11.42	10.2	8.9

104. In 2013, the GDP growth rate reached 7.1%, higher than the same period of previous year. The value of industrial production increased by 9.5%; production value of services rose 8.5%, the value of agriculture, forestry and fisheries production increased 3.2%. GDP per capita reached D22.5 million. The economy has slowly shifted toward industry and services, and away from agriculture, forestry and aquaculture.

Year	**2006**	**2007**	**2008**	**2009**	**2010**
Agriculture-Forestry-Aquaculture (%)	27.9	25.8	24.2	23.0	21.7
Industry – Construction	33.6	35.3	36.59	37.5	37.7
Services	38.5	38.9	39.21	39.5	40.6

(Source: Statistical Yearbooks of the province, 2015)

Water supply

105. Treated water is supplied from Phu Vinh and Bau Tro water treatment plants at capacity of 27,000 m^3/day and night for the city and surrounding areas. The water supply systems in Ba Don, Quy Dat, Dong Le, Quan Hau, Kien Giang communes and Viet Trung town now have capacity of 1,000-2,000m^3 per district**.**

7. Physical Cultural Resources

106. Apart from the Than Dinh pagoda and Quan Hau war memorial located at pier sites 3 and 4, there are no historic relics in the immediate subproject area.

8. Features of subproject pier areas

107. The four subproject areas are shown in Figure 25.

Figure 25. Features of the four subproject pier areas

Fig 25a: Site of new Nhat Le pier in foreground with parkland behind.

Figure 25b: Existing boat landing at Quan Hau pier site.

	Figure 25c: Site of new Than Dinh pier with Nhat Le river behind treed shoreline.
	Figure 25d: Footpath and stairs to Than Dinh Pagoda to be upgraded.

Figure 25e: Section of 3.35 km access road to Than Dinh Pagoda to be upgraded.

D. Quang Tri Province

1. Overview

108. Quang Tri is a coastal province that borders Quang Binh province to the south and Lao PDR to the west. The province of approximately 4,760 km^2 is divided into four main terrain types defined by: (i) Annamite highlands and mountains in the west with sloped elevations ranging from 250 - 2,000m; (ii) Inland hills ranging 50-250m; (iii) Alluvial plains of the major rivers that flow east to the Viet Nam sea; and (iv) the 75 km flat sand dune coastal zone where the two subprojects in Quang Tri are located.

2. Climate

109. Dong Ha in which the subproject is located experiences a tropical monsoon climate with strong rainy and dry seasons. Hot dry winds prevail from the northeast from March to September to bring the dry season. From October to February the northeast monsoon brings heavy rains and local flooding. Annual average temperature is 24°C but temperatures can drop as low as 7°C during the rainy season and normally exceed 32^{o}C during the rainy hot season (Table 21).

Table 21. Average monthly temperature at Dong Ha subproject area (1993-2013)

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Average temperature
Cồn Cỏ	20.6	21.1	22.1	24.8	27.7	29.7	29.5	29.4	28.1	26.5	24.8	22.1	25.5
Đông Hà	19.6	20.8	22.7	26.0	28.3	29.9	29.5	28.8	27.0	25.3	23.1	20.4	25.1

(Source: D0NRE, Report on the environmental quality monitoring for 2012 - 2016)

110. Total annual rainfall in the Dong Ha subproject area is in the range of 2,000 - 2,800 mm (Table 22).

Table 22. Average monthly rainfall (mm)

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual
Vĩnh Linh	129.9	83.3	48.6	51.9	100.5	97.8	94.3	125.3	420.2	766.0	462.3	227.0	2614.1
Đông Hà	48.2	34.1	30.8	60.7	119.3	83.0	65.7	163.2	388.9	683.9	429.0	175.2	2291.8
Thạch Hãn	84.3	60.7	48.9	63.0	135.0	105.7	82.9	135.3	476.4	710.6	438.6	240.7	2627.3
Cửa Việt	57.6	48.6	33.1	50.8	102.6	63.4	68.1	150.3	398.6	574.3	415.7	219.6	2187.8

(Source: D0NRE, Report on the environmental quality monitoring for 2012 - 2016)

3. Surface water resources

111. Quang Tri has a dense river system. Because of the relatively short distance between the Viet Nam sea and the western Truong Son border mountains the rivers of Quang Tri are short and steep. Stream valleys mostly are narrow with steep slopes creating waterfalls of hundreds of meters high. The province supports three large rivers and many smaller tributaries. Ben Hai River originates from Truong Son range at an altitude of 1,257m and a total length of 100 km. Ben Hai river enters the sea through the Tung estuary. The Thach Han river, which also originates in the Truong Son range, has a drainage basin of 2,660 km^2, travels is 155 km before draining into the Viet Nam sea Cua Viet estuary and subproject area. The O Lau River, which is 65km and with a basin of 900 km^2, discharges to the Tam Giang lagoon in Thua Thien Hue province to the south.

4. Environmental quality

a. Surface water quality

112. Monitoring conducted by the DONRE of Thach Han and Ben Hai rivers in Quang Tri showed that the river water quality is good and in the standard limits (QCVN 08/2015 – B1 /BTNMT- Regulation for irrigation water) (Table 23).

Table 23. Water quality in Thach Han and Ben Hai rivers

		2010	2011	2012	2013	2014	QCVN 08/2008 /B1-TNMT
Thach Han river	DO	7.2	7.2	6.9	6.2	7	≥ 4
	BOD	1.8	3.9	3.2	2.2	2	15
	COD	4	7	6.5	3.9	5	30
	NH_4^+	0.05	0.24	0.15	0.15	0.05	0.5
	NO_2^-	0.015	-	0.035	0.035	0.035	0.04
	NO_3^-	0.6	0.5	1.2	0.3	0.32	10
Ben Hai river	DO	7.2	7.2	5.8	6	7	≥ 4
	BOD	2.2	4	3.8	1.8	2	15
	COD	5	7.8	6.5	4	5.5	30
	NH_4^+	0.03	0.32	0.35	0.08	0.06	0.5
	NO_2^-	0.01	0.015	0.02	0.02	0.04	0.04
	NO_3^-	0.6	2	1.8	0.1	0.15	10

Source: DONRE, 2015

b. Groundwater quality

113. The Quang Trị provincial environment report (2010-2015) indicates that some groundwater parameters such as COD, $NH_4^{+,}$ Fe and coliform are higher than the national standard (QCVN 9/ 2008: BTNMT - National Technical Regulation on Groundwater) in some places of Gio Linh and Vinh Linh districts (area of Cua Viet-Cua Tung Beach).

c. Air quality

114. Air quality monitoring conducted in 2010 - 2014 by the provincial Department of Natural Resources and Environment (DONRE) indicates that air quality in the subproject area (Vinh Linh and Gio Linh districts is generally good. Dust levels in these provinces within the permitted limits (QCVN26-2010 BTNMT - National Technical Regulation on noise) (Table 24).

Table 24. Air quality in Vinh Linh and Gio Linh districts of subproject

Sampling Sites	Dust (mg/m^3)	SO_2 (mg/m^3)	NO_x (mg/m^3)	CO (mg/m^3)	Noise (dBA)
Vinh Linh district					
2010	0.15	0.048	0.19	2.5	< 70
2011	0.18	0.04	0.089	2	
2012	0.152	0.048	0.074	2.5	
2013	0.15	0.035	0.055	2.0	
2014	0.19	0.02	0.074	2.2	
Gio Linh district					
2010	0.152	0.05	0.035	1.8	<70
2011	0.16	0.04	0.03	1.8	
2012	0.22	0.035	0.037	2	
2013	0.16	0.035	0.03	2	
2014	0.22	0.02	0.04	2	
QCVN 05-2009 (g/m^3)	**0.3**	**0.35**	**0.2**	**30**	
QCVN26-2010 (dBA)	**70**				

(Source: DONRE, Report on the state of the Quang Tri environment for 2010 - 2014)

d. Coastal water quality

115. The water quality data (2010-2015) prepared by the Quang Tri DONRE indicates that the coastal waters quality of the project's provinces (Vinh Linh and Gio Linh districts) is generally good (QCVN 10: BTNMT - National Technical Regulation on coastal water) (Table 25).

Table 25. Coastal water quality in Quang Tri (2010 – 2014)

Parameters (mg/l)	Year					QCVN 10-2008 BTNMT
	2010	2011	2012	2013	2014	
Vinh Linh district						
DO	7.5	7.7	7.5	6.9	6.8	4
NH_4^+	0.05	0.012	0.25	0.1	0.08	0.5
Heavy metals (Except Mn)	< 0.01 - 0.22					
Mn	0.025	0.025	0.12	0.12	-	
Grease	-	0.025	0.025	0.12	0.12	0.5
Gio Linh district						
DO	7.5	7.2	7.3	6.8	6.5	4
NH_4^+	0.08	0.12	0.25	0.1	0.08	0.5
Heavy metals (Except Mn)	< 0.01 - 0.22					
Mn	-	0.17	0.11	0.12	-	0.5
Grease	-	0.17	0.11	0.12	-	0.5

(Source: D0NRE, Report on the state of the Quang Tri environment for 2010 - 2015)

5. Biological resources

116. The province provides a range of terrestrial and aquatic resources and sources of income. The Annamite highlands in the west support cattle and other livestock raising and forest harvesting and plantations. Rubber, pepper, fruit tree production occurs in the more open inland hill areas. The alluvial plains of the major river systems provide the rich soils for the extensive rice production and other crops. The coastal zone in which the two subprojects are located provide a productive fishery of about 8,400 km^2 comprised of for example high valued lobster, cuttlefish, crab, and holothurian, seaweed, and numerous finfish. Annual output of sea products is about 17,000 tons. Shrimp and some finfish culture also occurs along the coast. The area of the two coastal supports sparse forests with minimal agriculture.

6. Protected Areas

117. The two subprojects on the coast of Quang Tri at Cua Viet are not near any provincial or national protected areas. The Dakrong and Bac Huong Hoa Nature Reserves are located south and west of the sites, and the Linh Mountain and Ho Chi Minh Road Landscape Protection Areas are located north and west of the sites. There are no known aquatic or terrestrial Red Book species at the subproject sites.

7. Socioeconomic profile

118. Quang Tri's socio- economic development has gained significant achievements (Table 26). The annual average GDP grew at 10.7% in the 2006-2010 period, the average income per capita was million D 21.7 in 2011 (equivalent to 1,000 USD/capita); the trained labor proportion

reached above 35%. The economic structure has shifted positively, in which the shares of the industry - construction sectors are increased while those of the agro-fishery and forestry sectors are reduced.

Table 26. Economic indicators of Quang Tri

Indicators	Year 2000	Year 2005	Year 2010	Year 2011
Economic indicators				
GDP- billion dong (price 1994)	1195	1813	3008	3304
GDP - billion dong (current price)	1679	3407	9821	12998
GDP growth rate - %	9	10,6	10,6	9,6
GDP shares	100	100	100	100
Industry - Construction	15,1	25,6	35,5	37
Agriculture	44,9	35,9	29	27,9
Service	40	38,5	35,3	35,1
Export turnover (thousand USD)	21.851	12.343	43.954	80.200
Social indicators				
Trained workforce rate (%)	19	24	33,5	35,2
GDP per capita - Million dong (current price)	2,9	5,5	16,5	21,6

119. The GDP growth rate in the period of 2006-2010 was 10.7%

Year	**2006**	**2007**	**2008**	**2009**	**2010**
GDP (%)	11.53	11.2	10.3	9,0	10.6

120. The economy has been shifting in the way of increasing the proportion of industry and services while decreasing that of agriculture.

Year	**2006**	**2007**	**2008**	**2009**	**2010**
Agriculture-Forestry-Aquaculture (%)	35.9	31.48	-	29.9	28.5
Industry – Construction (%)	29.0	33.01	-	34.7	35.2
Services (%)	35.1	35.51	-	35.4	36.3

121. In 2010, the population of the province was 633,075 people. The number of people of working age was 336,327 including 159,736 females (the province's population was 627,077). Agricultural laborers accounted for 79.65%. Trained laborers accounted for 23.3%

8. Water supply

122. All communes, townlets, economic and industrial zones of the coastal subproject areas are supplied with water by plants. Provincially,85% of the population has access to clean water.

9. Features of subproject pier areas

123. The three subproject areas are shown in Figure 26.

Figure 26. Features of beachfront subproject areas.

Figure 26a: Example light wooden kiosk structures on Cua Viet beach to be replaced.

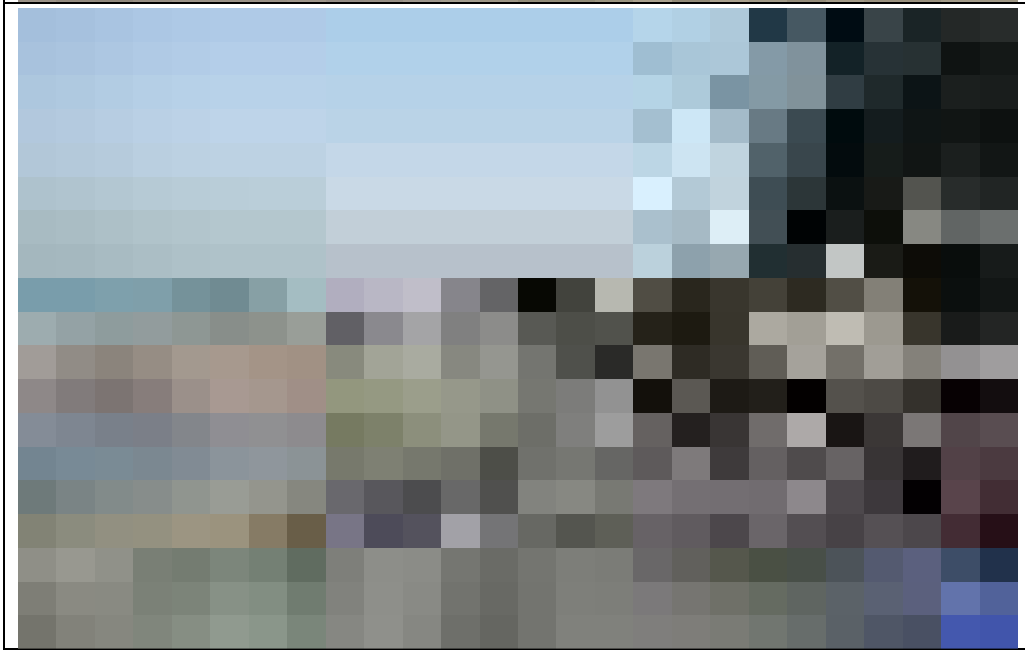


Figure 26b: Section of Gio Hai beach promenade to be upgraded.

Figure 26c: Section of beach promenade and service road to be upgraded.

Figure 26d: Section of northern Viet Trung beachfront behind which promenade, and footpaths will be upgraded.

E. Thua Thien Hue Province

1. Overview

124. The three subprojects are in and slightly south of Hue which is the capital city of the coastal province of Thua Thien Hue which borders the south of Quang Tri province. Hue is located on the banks of the Huong River (Perfume River) just a few miles inland from the Viet Nam East sea at 16°30'45" north and 107°31'45" east. The city is located on important transportation routes defined by national highway 1A, the north-south railway, and the marine shipping routes that

connect the north and south of Viet Nam. With a total land area of about 71.7 km^2 Hue City is administratively subdivided into 27 urban wards.

2. Physical Resources

a. Topography

125. Hue city is characterized by the marine coastal area and lagoons in the east, and high mountainous terrain in the west. A portion of the eastern area of the city is very low-lying at a height less than 1.0 msl. The areas around Highway 1A range from 1 to 50 msl. Most of the eastern plain area experiences a west-east slope of less than 5%. Conversely, the western area is mountainous with steep eastward slopes above 20%.

b. Climate

126. Hue is influenced by the tropical monsoon which affects southeast Asia throughout with high temperatures and slight volatility. The subproject areas experience two separate seasons with the rainy season from October to March, and dry season between April and September. Prevailing winds are strong and dry from the southwest. Normally, September and October bring heavy rain and occasional typhoons with flooding. Cold winters occasionally occur but are short.

127. Average annual temperature in Hue is about 25.3ºC with the average highest temperature of 30.4°C in June, and lowest temperature of 18.7°C in January. Average total annual rainfall is 2,104 mm, which is greatest between November and December ranging from 550 to 775 mm/month, and the lowest in April to June ranging from 5.3 to 20 mm/month. Humidity averages 84% annually with the highest levels from October to April ranging from 86 to 96%, and the lowest levels between June and July from 72 to 84%.

128. The prevailing wind directions in Hue are north, east and northeast from October to March, and west and southwest from April to September. In the city center, the frequency of calm wind is quite high (30-50%). The average wind speed varies from 2.3 to 2.7m/sec. Storms frequently occur from August to October.

c. Air quality, noise

129. Air quality recently measured in the subproject areas met all national ambient air quality standards (QCVN 05-2013) including noise (QCVN 26-2010) as well as WHO ambient air and noise quality guidelines. Concentrations of air pollutants associated with combustion of fossil fuels such NO_2, CO and SO_2 are very low and several times less than the standards. The moderate noise levels did not exceed permissible limits.

d. Main Hydrology

130. Hue City is directly affected by the hydrological regime of the Huong River system which is the largest river system in Thua Thien Hue province. The Huong River has three main tributaries; the Bo, Ta Trach and Huu Trach, which originate from the slopes of the Truong Son range (Figure 62), and which flow through the center of Hue City. The Huong River basin is 2,830 km^2 which is 56 percent of the area of the province. The main channel of the Huong River is 104 km long at an average elevation and gradient of 330m and 2.85 percent, respectively.

131. The central area of the Hue was built on a narrow strip of downstream floodplain of the Huong River. The famous Citadel area has an elevation of +1.8 msl to +3.5 msl. Phu Hiep and Phu Cat Wards have an elevation of 2.7m to 3.5m. Areas with elevation of less than + 2.0m are frequently flooded. The southern area of the city is on a relatively broad elevation range of +2.5m to +7.5m. There are flat hills in the area between +12.0m and +18.0m, in contrast to local rice fields and lakes/ponds with elevations <+1.5m.

132. Periodic flooding is caused by combinations of high river levels, sea level rise – storm surge, and local accumulation of rainwater. The key determining factors are: (i) the basin configuration in which three main rivers with mountainous headwaters converge to a flat plain; (ii) a complex drainage network (rivers, streams, canals); and (iii) very heavy rainfall events such the monsoon or and typhoons that produce high intensity rain. The Tam Giang Lagoon east of Hue at the sea can act aggravate river flooding by acting as a reservoir that impedes discharge of river flood water to the sea.

133. In the last 40 years, at least five recorded rainfall events have generated a water level in the Huong River of 4.50 m as recorded at the at Kim Long gauge station 2 km upstream of the city. The most severe recorded flood event occurred November 1-6, 1999 producing river level of 5.81 m at Kim Long station. Most parts of the city are flood sensitive due to the low elevation of the city.

134. Groundwater aquifers are distributed throughout the city with depths varying from 12m to 22m. The amount of water in each aquifer ranges from poor to average depending on its source. The water is fresh with static levels is shallow ranging varying from 0.1m to 5.5m.

3. Biological resources

135. The Huong river pier subproject and the Hon Chen Temple subproject areas in Hue support urban shade trees (e.g., *Lagerstroemia speciosa*, *Delonix regia, Khaya senegalensis*); fruit trees (e.g., grape fruit, banana, logan, guava); production trees (e.g., *Eucalyptus, Acacia)*; shrub and grass. A few types of birds inhabit Hue city such as bulbul, sparrow, dove, and kingfisher. Terrestrial animal life in the city is restricted to primarily small rodents. Whereas the Huong River support subsistence fish species. The Da Bac access road alignment to be upgraded is primarily agricultural and forest plantation lands. Agriculture and some plantation forest is also located along the southern access road to the Hon Chen temple that will be upgraded. No known Viet Nam Red Book species are found in these affected terrestrial areas and in the Huong river where the piers will be developed.

a. Protected areas

136. Thua Thien Hue has three Protected Areas which will not be affected by three subproject sites. The only protected area near a subproject (Da Bac Access Improvements) is Bach Ma National Park (see below) which is situated north of the parking lot of the Bach Ma Meditation Centre where the upgraded access road will end. The Department of Agriculture and Rural Development (DARD) as well as the DONRE was consulted and confirmed that the Da Bac subproject will not encroach the park.

b. Bạch Mã National Park

137. Bạch Mã National Park is a protected area south of Hue town. The park is located close to the western end of the Da Bac Access Improvements subproject. It covers 220 km^2 and comprises three zones: a strictly protected core area, an administrative area and a buffer zone. Bạch Mã National Park is situated in the Annamite Mountains and is one of the wettest places in Viet Nam. Its mountains are composed mainly of granite, and the topography of the park is generally very steep. The position of Bạch Ma at the biogeographical border between northern and southern Viet Nam, combined with a variety of habitats from the coast to high mountains, results in a high biodiversity. It is in an area that is considered a centre of plant diversity in Viet Nam. The mammals of the park are not well described, though historically important species such as the Asian elephant, white-cheeked gibbon and red-shanked douc langur were believed to exist. It also protects important bird species, especially endemics such as the crested argus, Annam partridge and Edwards's pheasant, which had been thought extinct.

c. Tam Giang - Lagoon

138. The Tam Giang is located at the coast of east of Hue. The 21,600-ha lagoon is 70km long and separated from the Viet Nam East sea by the giant sand dune system while connected to the sea by the Thuan An (north) Tu Hien (south) inlets. The lagoon is the largest in Southeast Asia. It has taken an important part in maintaining the stability of hydrological, biological and ecological features in relation to the survival of about one million people in surrounding. It serves as a climate regulation lake able to restrict storm surge, flood-inundation, salt-intrusion and to stabilize ground water level, and to conserve biodiversity with numerous noteworthy and endemic species. It is where diverse waterfowls, including migrants, concentrate with a high density, and where numerous neritic fishes in-migrate for its rich food supply and favorable nursing conditions. It is also a large fishing ground, good refuge for marine fishing boats in typhoons, a resort for recreation and tourism, and a coastal waterbody for boating passengers and goods to localities. Thus, the lagoon plays a large role in the socioeconomic development in the region.

Biodiversity of Tam Giang lagoon

139. The lagoon is an area of coastal flood land, brackish water, tropical monsoon area, having high values in natural resources and particularly biodiversity. In Tam Giang–Cau Hai Lagoon, there are 947 species, including 250 phytoplankton, 66 zooplankton, 54 bottom plants, 179 bottom animals, 46 sea weeds, 31 high class plants, 18 water weeds, 177 fish species and 73 bird species. This is the habitat of many migrating birds, including about 30 species under protection: purple heron, kite-fisher, brown back yellowlegs. The system of Tam Giang–Cau Hai Lagoon is also a flood land with the biggest area and an area with the richest ecosystem and under most complete evaluation in Viet Nam.

Fish diversity in Tam Giang lagoon

140. Tam Giang Lagoon has 177 species, belonging to 129 varieties of 73 families, 18 sets. Perciformes (Perciformes) dominated most: with their 37 (50.68%), 67 varieties (51.94%), 100 species (56.50%); Anguilliformes have 5 families (6.84%), 7 varieties (5.43%), 12 species (6.78%); Cypriniformes have 2 families (2.74%), 12 species (9.30%), 15 species (8.47%).

141. Of the 177 fish species in Tam Giang has 8 species listed in the Vietnam Red Book (2007); among them, there are 7 species of VU and EN 1 Career species, 21 species of fish in the local

economy (accounting for 11.86% of the total number of species recorded), mainly in perciformes (perciformes) (Table 27).

Table 27. Fish species in Tam Giang lagoon listed in Vietnam Red Book (2007)

	Scientific name	Vietnamese name	Level of threat
1	Megalops cyprinoides (Broussonet, 1782)	Cá cháo lớn	VU
2	Elops saurus Linnaeus, 1766	Cá cháo biển	VU
3	Albula vulpes (Linnaeus, 1758)	Cá mòi đường	VU
4	Anguilla marmorata Q. and Gaimard, 1824	Chình hoa	VU
5	Anguilla bicolor (Mc. Clelland,1844)	Chình mun	VU
6	Clupanodon thrissa (Linnaeus, 1758)	Cá mòi cờ hoa	EN
7	Konosirus punctatus (Temm. and Sch., 1846)	Cá mòi cờ chấm	VU
8	Chanos chanos (Forskal, 1775)	Cá măng sữa	VU

Note: VU: Vulnerable (sẽ nguy cấp); EN: Endangered (nguy cấp). (Source: Biological Journal 2012. 34(1) 20 – 30.

4. Cultural Resources

142. The Citadel complex in the centre of Hue is the largest cultural resource of the city. In addition to the Citadel there are the Tombs of Kings, pagodas, and other cultural relics located southwest of the city alongside the Huong River including the Hon Chen Temple. The Citadel complex has been designated as a World Heritage Site by UNESCO which is managed by the Hue Cultural Monuments Centre (HMCC). The pier developments on the Huong river and the access road upgrade at the Hon Chen temple will be designed and implemented in close collaboration with the HMCC.

5. Land Use

143. The 2012 land inventory report indicates the area of Hue City comprises 1,909 ha of agricultural land (26.6 percent of city area); 5,136 ha of non- agricultural land (71.6 percent); and 24 ha of unused land (1.73 percent). The only land types that could be affected by the subprojects are residential, agricultural, and plantation forestry lands.

6. Socioeconomic Profile

a. Population and demographic

144. The population of Hue City in 2011 was 342,550 accounting for 31 percent of the provincial population. Population density in the city is approximately 4,779 people/km^2, which is 22 times greater than the average density province wide. Phuoc Vinh ward in the city has the highest density at 20,705 people/km^2 with lowest city density occurring in Huong Long Ward at 1,411 people/km^2. An Cuu was the most populous Ward with 22,620 people, while Phu Hoa Ward had only 5,792 people. The urban population increased by about 100,000 people in the ten-year period from 2001 to 2011, while the rural population decreased from about 60,000 people in 2001 to about 32,000 people in 2008.

b. Economy, employment, and income

145. Hue City has an abundant labor force. In 2011 the number of employees in the economic sectors was about 198,480 people, representing 58 percent of the population (Table 28). Over the past several years, the economic and labor structures have been changing rapidly with an increase in tourism and services and a decrease in industry, handicrafts and agriculture. Employment in the service sector increased from 55 percent in 2005 to 72 percent in 2011, while the agriculture sector decreased rapidly from 17 percent in 2005 to 12 percent in 2011.

Table 28. Employment and changes in labor in Hue

Sector	2005		2011	
	Total (people)	Proportion (%)	Total (people)	Proportion (%)
Total	112,413	100	125,714	100
Agriculture, forestry and fishery	16,464	17,31	15,635	12,43
Industry and construction	31,070	27,64	19,188	15,34
Services	61,879	55,05	90,891	72,23

146. The average monthly income per capita in Hue is D 1.7 million (USD 83). The poverty rate in the north central coast region of Viet Nam, where Hue is situated is 21% which is slightly higher than the country's overall poverty rate.

7. Features of subproject areas

147. The three subproject areas are shown in Figure 27.

Figure 27. Features of three subproject sites

Hon Chen Temple Access Subproject

Figure 27a: Area for parking next to existing south access road.

Huong River Pier Upgrades

Can Toc Pier, Tam Giang Lagoon

	Vinh Tu Pier, Tam Giang Lagoon
	Huong river pier sites 1-5

V. PUBLIC CONSULTATION

148. Stakeholder consultations embodied the principles of meaningful engagement, transparency, participation, and inclusiveness to ensure that affected and marginalized groups such as women and the poor were given equal opportunities to participate in the design of the project, in accordance with the requirements ADB's *Safeguard Policy Statement* (2009).

149. Stakeholder consultations for environment safeguards were conducted in affected Wards and Communes in the 9 subprojects the 5 project provinces of Hoa Binh, Nghe An, Quang Binh, Quang Tri, and Thua Thien Hue. The approach to stakeholder consultations for environmental concerns or issues with three subproject cities projects consisted of the following avenues of inquiry and data collection:

1) Through informal discussions with affected households of affected community conducted as part of the subproject site investigations;
2) Through formal public meetings with affected household and Ward/Commune leader consultations, conducted in conjunction with the resettlement team; and
3) From interviews conducted by the environment safeguard team of the environment and natural resource agencies in each province and provincial district.

A. Identification of Stakeholders

150. Stakeholders were identified and engaged in a participatory manner. Key groups are summarized below:

- Directly and indirectly affected community (e.g., households, businesses, restaurants, fishermen) living in the subproject areas; and
- Government and community groups including, DSCT, DPI, CPC DONRE, DARD, Farmers Union, and Women's Union.

B. Discussion Guide

151. Five open-ended questions, and information requests (Table 29) were posed to consultation participants to guide discussions of participants on environmental issues or concerns during the formal joint environment-resettlement consultation meetings. The consultation meetings in each subproject city were opened with a brief ppt presentation to introduce the project, and individual subproject components.

Table 29. Guiding questions and information for stakeholder consultations

1. What will be the benefits of the subproject components of your area?

   Please list benefits of individual subproject components.

2. Do you have any environmental concerns with any of the subproject components in your area?

   Please identify environmental concerns of individual subproject components.

3. Do you any have environmental concerns with the **construction activities** of any subproject component?

Please identify any environmental concerns of construction activities of the subproject.

4. Do you have environmental concerns with the **completed operation phase** of the subproject components?

   Please identify any environmental concerns of the operation of completed subproject.

5. Do you think the subproject design or operation should be changed to prevent negative environmental, or community impacts?

   Please identify changes to the subproject that you think will prevent or reduce negative environmental, or community impacts?

152. To help orient the discussions on environmental issues and concerns of the subproject a list of example environmental components (Table 30) were introduced to the stakeholders ahead of the question and answer period. The stakeholders were encouraged to add their own components of environment to the discussions.

Table 30. Environmental components used to guide stakeholder discussions.

• drinking water quality and availability • surface water quality and quantity • groundwater quality and quantity • air quality • climate • land and soil quality • rivers, canals, lakes, reservoirs, • trees, other vegetation, • terrestrial and aquatic animals, e.g., fish, birds, small mammals	• ecological protected areas (e.g., national parks, wildlife sanctuaries), • land and surface water use (e.g., agriculture, fisheries, forestry, navigation, aquaculture, commercial, other), • public safety • public movement and access • physical cultural values (e.g., Citadel, pagodas, cemeteries, monuments)

C. Subproject Consultations

153. The consultation meetings were held in May and July, 2017. Table 31 summarizes the location of individual public consultations. The list of participants of the public consultation meetings are presented in Appendix A.

Table 31. Location of Public Consultations

Province / subproject	Subprojects	Location	# of participants	Date
Hoa Binh				
HB 1	Tien Pagoda Access and Environmental Improvements	Lac Thuy district	29	22/6
Nghe an				

NA1	Cua Lo Beachfront Access and Environmental Improvements	Cua Lo town	20	19/4
NA2:	Ru Gam Pagoda Access Improvements			
Quang Binh				
QB1	Nhat Le-Long Dai River and Road Access Improvements	Hien Noi Commune (Long Dai) Quan Hau Town Truong Xuan Commune (than dinh mountain). Cu Nam, Ha Trach, Bac Trach, Vạn Trach, Hung Trach Communes, Nhat Le, Quảng Ninh, Bố Trạch districts	8 4	21/4
QB2	Dong Hoi Riverside Upgrading	Dong Hoi city	8	
Quang Tri				
QT1	Cua Viet, Cua Tung –Beachfront Access and environmental Improvements	Tan Loi village, Gio Viet commune, Gio Linh district An Duc Village, Vinh Quang Commune, Vinh Linh District	12 18 25 7	24/4 25/4
QT2	Con Co Island Access Improvements, Cua Viet		15	26/4
Thua Thien Hue				
H1	Hon Chen Temple – Road upgrading	Ngoc Ho village, Huong Ho ward, Huong Tra town	11	19/6
H2	Huong River Tourist Piers Improvement	Ngoc Ho village, Huong Ho ward, Huong Tra town Huong Vinh commune, Huong Tra town Huong Vinh commune, Huong Tra district,	22	21/6
H3	Da Bac Access Improvements	Loc Hoa Hamlet	10	

D. Summary of Stakeholder Responses

154. The general feedback indicated that residents recognize the subprojects will improve livelihoods, reduce poverty, and improve the environment for local people in subproject areas. Thus, the subprojects will contribute to promote socio-economic development area. The main positive economic impacts of sustainable tourism are contributions to local people revenues, generation of employment and business opportunities, and development of social involvement and pride of the local people.

155. In some situations, the improved tourism will also help to raise local awareness of the financial value of natural and cultural sites. It can stimulate pride in local and national heritage and interest in conservation.

156. The jobs created by tourism can act as a very important motivation to reducing emigration from rural areas. The subprojects would improve sanitation conditions in the area, contributing to

the better local people's living environment. Women from subproject areas have opportunity to participate in project, thereby improving livelihoods and socio-economic status of women.

157. The people consulted request that the project be conducted soon because it would be very practically helpful to the people's life. All households in the subproject areas will cooperate with the project. The local people support the project and agree with mitigation methods proposed by the project owners, engineers, and community leaders and commit to cooperate during construction phases.

158. Negative environment impacts caused by the subproject were considered mainly to be from the construction stage. The primary issues associated with infrastructure construction and civil works activities that were identified as follows:

- Traffic congestion during construction;
- The potential hazards caused by fast moving trucks;
- Pits without fences;
- Danger to children and the elderly;
- Dust, smoke, and noise;
- Soil from excavations; and
- Waste and garbage from the construction
- Ensure drainage and waste collection system protected are temporary drains put in place.

159. The project owner was requested:

- To implement properly all mitigation measures to limit negative impacts of the project on the natural environment, and the local social – economic environment;
- To implement strictly the environmental monitoring program approved for the project;
- To implement construction methods must be adequate and appropriate;
- Ensure no disturbance to traffic, air quality, and occupational safety and social security during construction period;
- Affected facilities must be reinstated to their original status;
- Assets of local households must not be affected during the construction phase;
- Construction should be optimized to complete construction quickly;
- There should be no obstruction to operation of business or HHs within the project sites;
- Upon construction completion, the sites will be reinstated to their original conditions; infrastructure used temporarily for construction purpose should be recovered; and
- To use local workforce for project implementation to create jobs for the people; and
- Comply with general Viet Nam national standards on environmental protection.

160. Table 32 summarizes concerns and issues by subproject.

Table 32. Results of Public Consultations for Environment

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
Tien Pagoda and Cave Access Improvements	- The major negative impacts occur during the subproject construction phase: - Prevention of impact of noise, dust, rubbish, and food and traffic accident should be implemented strictly. The contractor is required to have appropriate solutions to ensure environment and sanitation. - Dust generated from transportation, loading and unloading, temporary gathering of construction materials such as soil, sand, stones, cement and wastes, or generated during construction, especially earthworks; - To apply measures to protect the environment, which need special attention to items sensitive environment near the project location, e.g., market Phu Lao, 2 3 ha ponds, and caves along the roadside. At present many environmental problems in the local area have not been resolved such as: 1. No general drainage system 2. Solid waste in the commune also spilled haphazard (especially near the market area).	Local community will be informed about site clearance plan, and noise/dust/traffic/safety management plan. The project will place signs near dust generating areas to warn residents, residual building materials scattering on the construction site will be collected. Owners commit to prevent any harm to sensitive community assets and avoid negative impacts of project on community. Existing environmental issues and waste management will not be made worse by project.	The mitigation plan of EMP incorporates subplans for noise, dust, solid and liquid construction waste, and community protection from increased traffic construction traffic. Subplans for managing required excavations, and transport of materials is included in EMP. Sensitive natural features such as local caves and socioeconomic features and structures of the area such as adjacent Phu Lao markets will be protected with measures identified in EMP. As part of the update of the EMP during detailed design, all existing issues such as poor drainage, and pollution will be factored into final subproject road designs to ensure issues are not increased in severity.

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
	3. In some places, there are signs of groundwater contamination		
Cua Lo Beach Access and Environmental Improvements	- The local people support project and hope project will be implemented soon. - People mentioned major negative impacts occur during the subproject construction phase as noise, vibration and dust from earthworks. - Changes to road safety/traveling (risks to health and safety of local people and construction workers) - Trading activities and access to infrastructure system (e.g., electricity) disrupted. - Direct impacts on landscape at construction sites and on tourist activities along Cua Lo coastline - Construction will disrupt daily life and business activities of households and tourist activities around the construction areas. Impacts on coastal restaurants/shops. Social disease from workers.	Project will inform the street household businesses of the construction activities and their potential impacts such, waste, dust, and noise, traffic, and construction schedule at least 2 weeks before start of the construction. Damages environment such as trees and coastline, etc. will be limited with use of protection barriers. Disruption to daily life and business activities along Cua Lo will be minimized with scheduling and notices of construction activities	The EMP provides directive for preventing disruption to utility services such as electricity supply to affected community of Cua Lo, and prescribes subplans to prevent or minimize disturbances of dust, noise, and possible vibration from construction activities; The EMP identifies measures to prevent disruption or interference to operation of existing restaurants and shops along Cua Lo boardwalk. The contractors with the CEMPs which are developed from the EMP will develop and disseminate work schedules and coordinate with households and businesses to prevent or minimize disturbance to daily life and business activities. Safety of workers and public from construction activities and heavy construction traffic is prescribed in EMP as per requirements of M/DOLISA.
Ru Gam Pagoda Access Improvements	Local people support project and agree with mitigation methods proposed by the project owner	The project will provide temporary walkways for the pupils of the Yen	

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
	and engineer and commit to create favorable conditions for contractors during construction phases. Negative impacts during the subproject construction: - People mention risks of accidents for pedestrians as the residual building materials are not collected and the manholes are not covered. - Concerns of risk to children safety walking to and accessing Yen Thanh secondary school near road, and for residents of the Bac Thanh and Xuan Thanh communes . - Concerns of the impacts from noise and dust during the construction - Materials collection and temporal disposal sites will affect local landscapes, and material transport and waste disposal will affect the landscapes along the transport routes.	Thanh Secondary School, Xuan Thanh Primary School during construction People will be informed by notice ahead of construction Project will put on signal signs, will collect and store residual building materials scattering on the construction site. Owners commit to seriously reduce effects of negative impacts that are brought in by the project as well as manage environment and monitor environment quality.	Domestic and solid construction waste management is prescribed by EMP. The EMP for subproject prescribes mitigation sub-plans for managing the key construction disturbances of noise, dust, traffic congestion, public safety, utility disruption, and public access. Specific safety measures will be prescribed for nearby schools such as Yen Thanh Secondary. Safe walkways will be prescribed for children and general pedestrian traffic of Bac Thanh and Xuan Thanh communes.
Nhat Le – Long Dai River and Road Improvements	Support for project indicated by community. Negative impacts of project identified. - Prevention of impact of noise, dust, rubbish, and food and traffic accident should be implemented strictly.	Construction vehicles will be maintained, and not operated at night to not disturb residents.	The EMP and overall capacity development program of project prescribes training for PMU and DPWT for implementing the EMP. Prevention and minimization of soil erosion and water course (Nhat Le river) sedimentation is prescribed by the EMP.

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
	- Local households in Dong Hoi City, Hien Noi Commune (Long Dai) Quan Hau Town, Truong Xuan Commune (than dinh mountain), and Cu Nam, Ha Trach, Bac Trach, Vạn Trach, Hung Trach Communes, Nhat Le, Quang Ninh, Bo Trach districts living along the roadsides might suffer from dust and vibration when the road is expanded. - Contractor is required to have appropriate solutions to ensure sanitation and protection of environment Surface runoff from the construction sites to cause sedimentation of Nhat le river	Restaurants, hotels and people working along river will be notified about the construction within 2 weeks prior to the commencing date. (from Commune People's Committee) Project will cooperate with agencies and local people to help direct the flow of boat transportation. Impact and disturbance mitigation measures in EIA will be followed closely including barriers for Nhat Le river, and people's property	The EMP for subproject prescribes mitigation sub-plans for managing the key construction disturbances of noise, dust, traffic congestion, public safety, utility disruption, and public access. The mitigation measures are targeted specifically for Dong Hoi town, and the communes of Hien Noi (Long Dai), Truong Xuan (Than dinh mountain), and Cu Nam, Ha Trach, Bac Trach, Vạn Trach, Hung Trach communes, (Nhat Le, Quang Ninh, Bo Trach districts).
Cua Viet/Cua Tung Beach Access/Environmental Improvements and Con Co Island Access Improvements	Perceived subproject impacts are below. - Income from coastal tourism activities in the Cua Viet beach area will be reduced due to the decrease in tourist arrivals - The construction will cause difficulties for the local movement and access of the population, and tourists - Construction will negatively affect the business of some	Local and business community will be informed by notice Commune People's Committees of construction activities scheduled ahead of construction. Construction scheduled during low tourist season.	Any temporary business income loss due to construction activities and disturbances will be compensated by the separate LARP. Ultimately the project will lead to increased tourism-based income. The EMP prescribes subplan to organize and schedule construction activities along Cua Viet and Cua Tung that will minimize reduced access and movement of local peoples and tourists in affected areas. The EMP prescribes subplans to contain and isolate construction works and activities thereby minimizing disturbances to normal activities along Cua Viet and Cua Tung,

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
	restaurants and hotels along affected coastline - Earthworks, and construction of drains, and manholes will impose direct impacts on the port area and nearby urban Cua Viet landscape at construction sites and on tourist activities Cua Viet, Cua Tung. - Dust and noise from truck transportation, excavating, and construction materials piling. - Construction waste	Sidewalks and roads will not be blocked during construction. Project will install special signal signs and lights at night to show construction areas. Project will avoid damages caused to the trees and reinstate vegetation cover. Environmental training for the workers includes codes of conducts when working in public areas and sensitive receptors Project commits to prevent or reduce negative impacts, as well as manage environment and monitor environment quality.	and the existing port activities adjacent to the new tourist pier to be built at south end of Cua Viet. The EMP for subproject prescribes mitigation sub-plans for managing the key construction disturbances of noise, dust, traffic congestion, public safety, utility disruption, and public access.
Hon Chen Temple Access Improvements	Project is supported by local people. Impacts concerned about are: - Gas emissions and smoke from construction trucks and equipment	Owner agrees to intensify contractor's compliance with environmental regulations on material storage, construction equipment, waste	The EMP prescribes regular maintenance schedules and speed limits for all construction vehicles to minimize air pollution form operation of heavy equipment. Specific construction scheduling is identified in EMP to manage disruption and delays to normal visitation to the temple.

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
	- Vibration and noise along roads from construction truck, and excavation activities - Construction phase will block access to temple, and person walkways around temple - Local landscape will be damaged from civil works and excavations. - Construction may disrupt local tourist activity and business at temple - Concentration of worker force in areas may cause social disorder and social diseases.	disposal, air quality, dust, noise and vibration to ensure safety for the community during construction stage and operation stage; Owner will inform the residents along north road at least one week in advance about road construction schedule of activities. Construction activities will be halted if complaints come from the local people Inform temple of the construction schedule, and the potential impacts on the temple such as waste, dust, and noise, traffic disturbance, at least 1-month before start of the construction.	The EMP prescribes subplan to prevent damage to vegetation, unnecessary tree removal, and the complete restoration of the Rows of the upgraded roads to the temple. The use of local workers is prescribed by EMP to prevent or minimize social issues between local community and construction phase of project.
Huong River Tourist Piers Improvements	Participants indicated support for project as they recognize project significance for improving their livelihoods from increased tourism on river. Negative impacts occur during the subproject construction phase:	Local community will be informed about construction plan including river works location plan.	

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
	- Vibration generated by pier piling activities during construction. - lack of information and understanding on construction activities and locations - Disruption of boat traffic in river, and access to tourist areas and pagodas near Ngoc Ho village, Huong Ho ward, Huong Tra town Huong Vinh commune, Huong Tra town - The project shall ensure the cleanliness of environment and work quality control should occur. - Surface runoff erosion from the construction sites to Huong river and Tam Giang lagoon. - Health of the workers and local people around the construction areas	Heavy river and shoreline works will be conducted during the day. Contractor compliance with government environmental regulations will be strictly enforced on material storage, construction equipment, waste disposal, air quality, dust, noise and vibration to ensure safety for the community during construction stage and operation stage. Pier construction areas in Huong river and in lagoon will be well marked to inform boat traffic. Shoreline civil works will be separated from Huong river and lagoon with berms and sheeting to minimize erosion. Contractors will follow requirements for worker and public safety of M/DOLISA	The EMP for subproject prescribes mitigation sub-plans for managing the key construction disturbances of noise, dust, traffic congestion, public safety, utility disruption, and public access. Included is scheduling for any pier pile driving. Construction activities, locations, and scheduling will be provided to affected community as prescribed by the EMP for the subproject. The EMP prescribes mitigation subplan for preventing or minimizing soil erosion and sedimentation of the Huong river and Tam Giang lagoon during pier development and upgrade works. Safety of workers and public from construction activities and heavy construction traffic is prescribed in EMP as per requirements of M/DOLISA

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
Da Bac Access Improvements	The community fully supports the project after hearing its objectives as they recognize its significance for improving their livelihood. - Construction of road will make it difficult for the movement of people, including pupils and parents of preschool Hoa Mai Loc . - People mentioned potential traffic accidents since the materials are transported and gathered near the road (the highway 1A) under construction and the transportation flow of vehicles passing some parts nearby the residential areas. (Phu Loc town, Phu Loc district). Or, accidents from construction activities practice such as dangerous uncovered manholes. - Dust generated from transportation, loading and unloading construction materials such as soil, sand, stones, cement and wastes, or generated during construction, especially earthworks; - Traffic disruption - Road widening will destruct some crops (fruit: Jackfruit, acacia) and land of some farmers.	- Inform local community about site clearance plan so as they can plan for using the trees for beneficial use -PMU enforce contractor's compliance with environmental regulations on material storage, construction equipment, waste disposal, air quality, dust, noise and vibration to ensure safety for the community during construction stage and operation stage; - PMU coordinate with local authorities to formulate and implement EMP. -PMU will inform the local managers at least one week in advance about construction schedule - Consider efficiency of environmental mitigation measures and environmental implementation of the Project; - Appraise the survey results about any nonconformity to the environmental quality	The EMP prescribes mitigation subplan for managing and isolating construction traffic to minimize disturbance to and risk of local community harm. Special consideration will be given to local schools such as Hoa Mai Loc school. Attention will be given to not making worse existing truck traffic from nearby Hung Viet and Loc Dien quarries. All storage of construction materials anywhere along road will be isolated a covered to prevent dust. Transport of construction materials to and from road to be widened will be carefully scheduled and controlled to minimize impacts on residents and businesses. The EMP for subproject prescribes mitigation sub-plans for managing the key construction disturbances of noise, dust, traffic congestion, public safety, utility disruption, and public access. Loss of agricultural land and production such as fruit production will be compensated by LARP.

Location	Issue or Concern Identified	Project Management Unit Actions	Response of EMP
	The road is also the transportation of stones from two quarries located nearby (Hung Viet stone mine and Loc Dien stone mine), so there is a risk of traffic accident.	and efficiency of remedial measures;	

VI. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATIONS

A. Benefits of Subprojects

161. The overall project impacts will be positive and contribute to improving the quality of life of the people in Hoa Binh, Nghe An, Quang Binh, Quang Tri, and Thua Thien Hue. The project will improve the resilience of vulnerable groups and alleviate poverty through improvements in climate resilient tourism development; enable community-level groups to participate in the benefits of local tourism.

1. Hoa Binh Province

a. Tien Pagoda and Cave Access Improvements

162. The new and upgraded roads to the Tien Pagoda in Luc Thuy district will:

- Increase tourist access and development of this cultural area;
- Improve vehicular access (comfort and travel time improvements) for visitors to the pagoda and cave areas; and
- Increase local revenue and strengthen local economy from tourism.

2. Nghe An Province

a. Cua Lo Beachfront Access and Environmental Improvements

163. The subproject in Cua Lo town will:

- Creating a better beachfront environment as a catalyst, for increasing tourist numbers, including increased overnight stays and international tourists.
- Creating more beach space for tourists, particularly during crowded peak use periods.
- Creating potential for higher level investment in tourism hospitality sector, through hotel/resort and residential development.
- Creation of a wider base for active recreation, including water sports.
- Increased employment opportunity for residents, and for tourism related professionals and other employees regionally.
- Sustainable environmental infrastructure, including better solid waste and wastewater management.
- Improved resilience to climate change-induced increases in storm severity and surge in a coastal environment.

b. Ru Gam Pagoda Access Improvements

164. The new road to the Ru Gam Pagoda complex will:

- Improve vehicular access (comfort and travel time improvements) for visitors to the Ru Gam Pagoda area complex;
- Increase tourist access and development of this coveted cultural area; and
- Increase local revenue and strengthen local economy from tourism.

3. Quang Binh Province

a. Nhat Le-Long Dai River and Road Improvements

165. The pier developments along the Nhat Le-Long Dai river will:

- Add significant green space and promenade in Dong Hoi town
- Enable tourists to begin their boat journeys up Nhat Le river in Dong Hoi town;
- Beachfront tourist area will be joined to Nhat Le-Long Dai river tourist areas.
- Upgrade tourism related transport infrastructure in the Nhat Le and Long Dai River catchment areas and helping to generate additional tourism interest in the river-based tourism concept; and
- Provide better visitor/tourism facilities at tourism nodes in the Nhat Le and Long Dai River catchment areas, to include better walking trails and interpretation facilities;
- Provide better, more convenient, and safer access to tourism destinations;
- Provide opportunities for further community based and private sector investment in the tourism sector;
- Provide additional local employment opportunities;
- Upgrade 3.35 km of rural roads and place new bridge to help protect sensitive religious and village environments from environmental disruption and poor road safety conditions;
- Increase vehicular parking capacity and facilities to meet user needs during peak visitor periods (i.e., public holidays and weekends); and
- Greater resilience to climate-change induced storm flow and levels in the Nhat Le-Long Dai rivers.

4. Quang Tri Province

a. Cua Viet/Cua Tung Beach Access/Environmental Improvements

166. The improvements to the beachfront along Dong Ha town will:

- Create a better quality beachfront environment as a catalyst, for increasing tourist numbers, including a higher income profile and increased overnight stays;
- Provide more beach space for tourists, particularly during crowded peak use periods.
- Increase potential for higher level investment in tourism hospitality sector, through hotel/resort and residential development.
- Provide a wider base for active recreation, including water sports.
- Increase employment opportunity for residents, and for tourism related professionals and other employees regionally.
- Provide sustainable environmental infrastructure, including better solid waste and wastewater management; and
- Improve resilience to climate change-induced increases in storm severity and surge in a coastal environment.

b. Con Co Island Access Improvements

167. The new passenger pier at Cua Viet will:

- Greatly assist tourist access to Con Co island, and overall island tourism by providing a proper mainland disembarkation point and tourist support facilities;
- Allow greater numbers of tourists to go to the island more easily and safely;

- Allow delivery of supplies and services in support of tourist including food and water to the island; and
- Provide important facilities such as toilets and information centre to enhance the tourist experience.

5. Thua Thien- Hue Province

a. Hon Chen Temple Access Improvements

168. The upgrades to the roads to Hon Chen Temple will:

- Provide better and more comfortable access to Hon Chen Temple leading to increased number of religious visitors and tourists;
- Improve access to the Hue religious and heritage tourism circuit in Hue further adding to the tourism potential of Hon Chen Temple;
- Increase employment opportunity for residents, including Huong Ho ward and Huong Tho commune;
- Spin off potential for hospitality sector investment alongside the road between Huong Ho ward and the temple which has direct riverside views; and
- Increase potential to extend sustainable environmental infrastructure (i.e. solid waste and wastewater management) alongside the road between Huong Ho ward and the temple which has direct riverside views.

b. Huong River Tourist Piers Improvements

169. The development of the tourist piers along the Huong river, and in Tam Giang Lagoon will:

- Create a better experience for tourists in Hue and encourage full use of the river downstream to and including the Tam Giang -Cau Hai Lagoon;
- Form integral part of the tourism marketing packages leading to increased tourism numbers and economic development in Hue;
- Help to attract more use of the boat piers by the local population, accessing schools for instance;
- Increase employment opportunity for residents, and other employees mainly from Thua Thien- Hue province;
- Create new green recreation and leisure resources for Hue alongside better ferry/boat operations; and
- Will make the tourist boat industry more resilient to climate change-induced increases in water levels and flows in the river and estuary.

c. Da Bac Access Improvements

170. The upgrades to the road to the disembarkation pier to the Bach Ma Temple will:

- Provide better and more comfortable access to the Bach Ma Meditation Temple with the potential for increased number of religious visitors and tourists;
- Improve access for the Loc Hoa commune which feeds onto the Meditation Center access road. The Loc Hoa commune has a population in the order of 3,300 persons; and
- Lead to increased use of the area as a stopover point on National Highway 1A will act to

bring local employment potential and increasing revenue opportunities to the local village community.

B. Impacts Screening

171. The potential impact of the Category B subprojects were screened with a qualitative impact scale from *High – No Impact* (Table 33). The potential impact scale was subsequently applied to a simple impact matrix (Table 34) of the subprojects against likely environmental and social components to be affected during the three phases of project implementation defined by *Pre-construction, Construction, and Operation.* The impacts allocated in Table 34 are subsequently discussed at the individual subproject level for further clarity. The positive impacts of the subprojects summarized above are excluded from impact matrix.

Table 33. Impact levels of subproject component types (Category B)

Impact level		Symbol	Description
High		H	Maximum change or disturbance to environmental receptor throughout duration of component activity
Moderate		M	Noticeable change or disturbance of environmental receptor periodically during component activity
Low		L	Minor change or disturbance of environmental receptor in response to normal non-project human activity
None		N	n/a

Table 34. Impact matrix of subprojects and environmental receptors

Province/ Subproject	Environmental Receptor																	
	Biological			Physical							Social							
	Trees, vegetation and wildlife habitat	Aquatic vegetation and wildlife habitat	Animal and plant specie	Noise or vibration	Dust, NOx, SO_X, odor	Water quality, TSS, oil, grease, BOD, TN, TP, coliform	Soil erosion	Soil quality, oil, gas grease, worker waste	Drainage, local floods	Solid and domestic waste	Fishing and aquaculture	Access	Road traffic, and traffic safety	Boat transportation	Tourism	Cultural heritage	Economy	Resettlement and asset loss compensation
Pre-construction Phase																		
Hoa Binh																		
Tien Pagoda Access and Environmental Improvements																		M
Nghe An																		
Cua Lo Beachfront Access Improvements																		L
Ru Gam Pagoda Access Improvements																		L
Quang Binh																		
Nhat Le-Long Dai River and Road Access Improvements																		M
Quang Tri																		
Cua Viet-Cua Tung Beach Access and Environmental Improvements																		L
Con Co Island Access Improvements																		L
Thua Thien Hue																		

Province/ Subproject	Environmental Receptor																	
	Biological			Physical							Social							
	Trees, vegetation and wildlife habitat	Aquatic vegetation and wildlife habitat	Animal and plant specie	Noise or vibration	Dust, NOx, SO_X, odor	Water quality, TSS, oil, grease, BOD, TN, TP, coliform	Soil erosion	Soil quality, oil, gas grease, worker waste	Drainage, local floods	Solid and domestic waste	Fishing and aquaculture	Access	Road traffic, and traffic safety	Boat transportation	Tourism	Cultural heritage	Economy	Resettlement and asset loss compensation
Hon Chen Temple Access Improvements																		H
Hue Tourist Piers Improvements																		L
Da Bac Access Improvements																		M
Construction Phase																		
Hoa Binh																		
Tien Pagoda Access and Environmental Improvements	M	L	N	H	H	L	M	L	M	M	N	M	M	N	L	L	L	N
Nghe An																		
Cua Lo Beachfront Access Improvements	L	N	N	M	M	L	L	L	M	M	N	M	M	N	L	N	L	N
Ru Gam Pagoda Access Improvements	M	N	L	H	H	M	M	M	M	H	N	M	M	N	L	L	L	N
Quang Binh																		
Nhat Le-Long Dai River and Road Access Improvements	L	M	L	M	M	H	M	M	M	H	H	M	M	H	L	L	L	N
Quang Tri																		
Cua Viet-Cua Tung Beach Access and	L	N	N	M	M	L	L	L	M	M	N	M	M	N	L	N	L	N

Province/ Subproject	Environmental Receptor																	
	Biological			Physical							Social							
	Trees, vegetation and wildlife habitat	Aquatic vegetation and wildlife habitat	Animal and plant specie	Noise or vibration	Dust, NOx, SO_X, odor	Water quality, TSS, oil, grease, BOD, TN, TP, coliform	Soil erosion	Soil quality, oil, gas grease, worker waste	Drainage, local floods	Solid and domestic waste	Fishing and aquaculture	Access	Road traffic, and traffic safety	Boat transportation	Tourism	Cultural heritage	Economy	Resettlement and asset loss compensation
Environmental Improvements																		
Con Co Island Access Improvements	L	M	L	M	M	H	M	M	M	H	H	M	M	H	L	L	L	N
Thua Thien Hue																		
Hon Chen Temple Access Improvements	L	N	L	H	H	L	M	M	M	H	N	M	M	N	L	L	L	N
Hue Tourist Piers Improvements	L	M	L	M	M	H	M	M	M	H	H	M	M	H	L	L	L	N
Da Bac Access Improvements	L	N	L	H	H	L	M	M	M	H	N	M	M	N	L	L	L	N
Operation Phase																		
Hoa Binh																		
Tien Pagoda Access and Environmental Improvements				L	L								M					
Nghe An																		
Cua Lo Beachfront Access Improvements										L								
Ru Gam Pagoda Access Improvements				L	L								M					
Quang Binh																		
Nhat Le-Long Dai River and				L	L	M								L				

Province/ Subproject	Environmental Receptor																	
	Biological			Physical							Social							
	Trees, vegetation and wildlife habitat	Aquatic vegetation and wildlife habitat	Animal and plant specie	Noise or vibration	Dust, NOx, SO_X, odor	Water quality, TSS, oil, grease, BOD, TN, TP, coliform	Soil erosion	Soil quality, oil, gas grease, worker waste	Drainage, local floods	Solid and domestic waste	Fishing and aquaculture	Access	Road traffic, and traffic safety	Boat transportation	Tourism	Cultural heritage	Economy	Resettlement and asset loss compensation
Road Access Improvements																		
Quang Tri																		
Cua Viet-Cua Tung Beach Access and Environmental Improvements										L								
Con Co Island Access Improvements						L								L				
Thua Thien Hue																		
Hon Chen Temple Access Improvements				L	L								M					
Hue Tourist Piers Improvements						L					L			L				
Da Bac Access Improvements				L	L								M					

1. Subproject types

172. The 9 provincial subprojects can be grouped by primary subproject types according to common activities and affected environments which are summarized in Table 35.

Table 35. Common subproject types

Subproject Type	Subprojects by province				
	Hoa Binh	Nghe An	Quang Binh	Quang Tri	Thua Thien Hue
New or upgraded roads, footpaths, and parking	✓	✓	✓	✓	✓
New or upgraded river or estuary piers and facilities			✓	✓	✓
Coastal beach walkway upgrades and development		✓		✓	

C. Pre-construction Phase (Siting)

173. Summarized below are key activities of the pre-construction phase that initiate the process of mitigating the impacts identified by the IEE. They represent the first stage of the Mitigation Plan that is detailed in the subproject EMPs.

1. Resettlement and compensation

174. The primary impact during the pre-construction phase when the scope of subproject components, subproject sites, in particularly the road alignments are finalized are the varying levels of resettlement of households, asset losses, or lost income from disrupted employment or commerce that will occur. Land acquisition and resettlement (LAR) impacts for the subproject in Hoa Binh Province include: (i) acquisition of 13,587 m^2 of agricultural and residential lands; and (ii) demolition of eight temporary houses with a total area of 223 m^2, and 21 fences with a total area of 394 m^2. There are eight severely affected households. The implementation of two subproject in Nghe An province requires the acquisition of land and assets on land from one household, comprising (i) 25 m^2 of land for perennial trees; (ii) 10 m^2 of brick fence. The two subprojects in Quang Tri Province: (i) requires the relocation of four shops and acquisition of 36,937 m^2 residential, agricultural and public lands, two shrimp ponds, and 655 timber trees; (ii) causes business disruption of 22 households; and (iii) impacts severely on agricultural land of four households. In Thua Thien Hue Province, the Hon Chen Temple Access Improvement subproject will: (i) cause impact on lands and assets on land of 24 households and one private business, including seven severely affected households; (ii) require the acquisition of 14,196 m^2 of residential and agricultural lands; and (iii) require the removal of 470 timber trees. The Huong River Tourist Piers Improvement subproject will permanently impact on 2,251 m^2 of agricultural and public lands and 10 fruit trees. One household will have house-cum-shop entirely affected due to land acquisition of the subproject. The Da Bac Access Improvements subproject will: (i) require the acquisition of 22,336 m^2 residential, agricultural and public lands; (ii) require removal of 5,205 trees; and (iii) cause severe impact on land of one household. The details of required resettlement and land acquisition are reported in separate LAR reports for the subprojects.

2. Unexploded ordnance (UXO)

175. A critical activity that must occur before any civil works or excavation activity begins is the ten subproject areas - specifically all excavation sites, must be reviewed by the military to ensure all potential sites are clear of UXO. The EA/PMU will coordinate required UXO identification and clearing with the military.

3. Information disclosure and GRM

176. A key activity during the pre-construction phase is to continue stakeholder consultations. The IEE and the 5 provincial-level EMPs will be available for review by stakeholders, and a Grievance Redress Mechanism (GRM) for affected persons will be established (see chapter VIII).

4. Update EMPs, and tender documents

177. The EMPs need to be updated during the pre-construction detailed design stage to ensure they address the potential impacts of the final detailed designs. The PMUs with support of consultant environmental specialists will update the EMPs. Updated EMPs will be submitted to ADB for review and clearance and will be attached to the final tender documents for civil works packages.

178. Thus, the key processes that initiate the mitigation plans of the subproject EMPs of the pre-construction phase are:

1) Finalization and initiation of compensation and resettlement plans for affected households and businesses;
2) Completion of detailed designs of the subproject components;
3) Updating and initiation the subproject EMPs; and
4) Preparation of bidding documents ensuring incorporation of updated EMPs.

D. Construction Phase

179. The construction phase of the 9 subprojects will cause primarily temporary disturbances and impacts that can be prevented or mitigated with standard civil works actions. To avoid or minimize redundancy with the assessment the potential environmental impacts of the construction phase of the Category B subprojects in the five provinces, the potential impacts associated with the three common subproject types from Table 35 are assessed. Impact mitigation measures are identified for each subproject type. The focus of the impact assessment are the potential impacts classed as **H**igh and **M**oderate in Table 34. However, subproject-specific potential impacts are subsequently elaborated and evaluated where necessary along with prescription of specific impact mitigations. The mitigation measures for the potential impacts of the subprojects are detailed in the Mitigation Plans of the separate provincial Environmental Management Plans (EMP) for the individual subprojects.

1. New or Upgraded Road, Footpaths, and Parking

180. The impacts of road construction are primarily on the terrestrial environment but can directly affect aquatic environments from crossings and from road alignments placed adjacent to surface waters.

a. Terrestrial wildlife habitat

181. The construction of new roads and the upgrades of new roads will require some forest and tree cutting in all three subproject cities. The initial estimates of tree loss and affected area are summarized above as part of anticipated land compensation requirements. The loss of forest and trees will translate to a loss of terrestrial habitat. However, as indicated in Chapter 3 only road side plantation or scrub forests will be cut which do not provide critical habitat for rare or endangered species. This was confirmed by all DARDs and DONREs consulted during the site visits. The loss of vegetation along the new or expanded RoWs will in the temporary cause erosion issues until the area is either actively or naturally re-vegetated. The natural effect of vegetated ground of moderating runoff will be lost temporarily.

Mitigation

182. Removal of natural vegetation should be minimized as much as possible. If vegetation is removed for the new or upgrades roads, it should be replaced local like-for-like, or with more robust vegetation varieties. The NRE and Division of Forest Protection must be consulted for guidance with avoiding or minimizing tree removal or damage. The large trees (Xa Cu) along the access roads will be protected from civil works activities and construction vehicle movement with barriers. Tree removal will only occur if absolutely necessary. Similarly, the trees along the steps from Long Dai river up to the Than Dinh pagoda and surrounding forest need protection.

i. Aquatic wildlife habitat

183. The sections of new and upgraded road alignments to the Tien Pagoda in Hoa Binh and the Rum Gam Pagoda in Nghe An, the new short bridge and road for Pier 4 on the Nhat Le river in Quang Binh, the new short road to be constructed to the new Con Co destination port in Quang Tri, and the road upgrades to Da Bac and the Hon Chen Temple in Thua Thien Hue that occur beside, or cross rivers or creeks will negatively affect aquatic habitat from soil erosion and in-stream sedimentation. The bridge works will temporarily affect aquatic habitat from placement of bridge piles, columns, and shoreline concrete anchors. However, these construction impacts will not be significant because they will be temporary and end after construction phase and will not impact rare or endangered wildlife or critical habitat.

Mitigation

184. At detailed design the primary mitigation is to finalize alignments away as much as possible from surface waters. The final designs of all new bridges such as at Pier 4 on Nhat Le river in Quang Binh should span the watercourses without the need to install in-river support columns. At shoreline, the works should be minimized to minimize soil erosion. Temporary berms should be constructed along the stream bank to catch and prevent soil from entering the river courses. If possible, shoreline works should be scheduled to avoid the periods when fishermen are in area which are good indications of when fish are in the areas.

ii. Noise and vibration

185. Road construction creates noise from the operation of heavy equipment on site and along the roadways, and from the use of jack hammers, and pile drivers. Vibration is not expected to be a significant issue because blasting has not been identified for any of the road components. However, small vibrations from truckloads of aggregate, or heavy equipment could be an issue in the denser urban areas such as in Hoa Binh city, and near the target pagodas of

the subprojects such as Ru Gam in Nghe An. Estimated noise levels from construction equipment and machinery are presented in Table 36. Estimated noise levels from more than one machine or equipment in operation are summarized in Table 37.

Table 36. Construction equipment noise emission levels

TT	Equipment/Machine	Noise levels and impact ranges (dBA)							
		15m (*)	25m	30m	45m	60m	90m	120m	150m
1	Truck	**88**	**84**	**82**	**78**	**76**	**72**	70	68
2	Dozer	**85**	**81**	**79**	**75**	**73**	69	67	65
3	Compactor	**82**	**78**	**76**	**72**	70	66	64	62
4	Backhoe	**80**	**76**	**74**	70	68	64	62	60
5	Concrete Mixer	**85**	**81**	**79**	**75**	**73**	69	67	65
6	Concrete Vibration	**76**	**72**	70	66	64	60	58	56
7	Grader	**85**	**81**	**79**	**75**	**73**	69	67	65
8	Paver	**89**	**85**	**83**	**79**	**77**	**73**	**71**	69
9	Loader	**85**	**81**	**79**	**75**	**73**	69	67	65
10	Generator	**81**	**77**	**75**	**71**	69	65	63	61
11	Pump	**76**	**72**	70	66	64	60	58	56
QCVN 26:2010/BTNMT		70 dB(A)							
WHO Noise Guideline		Commercial and Industrial: 70 dB(A) (daytime) Residential, institutional, and educational: 55 dB(A)							

US Environment Protection Agency "Noise from Construction equipment and Operation, Building Equipment and Home Appliances" NTID 300.1, December 31, 1971.

Table 37. Combined noise from construction equipment

No	Equipment/Machine	Noise levels (dBA)							
		15m	25m	30m	45m	60m	90m	120m	150m
1	Combination of noise during filling and excavation (truck, dozer, compactor, grader...)	99.5	95	93	90	87	84	81	80
2	Combination of noise during pavement and construction drainage (truck, paver, pump, generator, concrete mixer...)	89	84	82	78	76	72	70	68

186. Given estimated noise levels in the table, residential areas within 150 m surrounding the construction sites of road construction works could be affected by noise generated from road construction activities. The potentially affected areas include the Tien pagoda nearby village, and roadside homesteads in Hoa Binh, the Ru Gam pagoda, roadside homesteads, and beachfront businesses and homesteads in Nghe An, homesteads and temples near the 4 piers on Nhat Le river in Quang Binh, the businesses and tourist area along Cua

Viet/Cua Tung beachfronts, and any homesteads near access road to Con Co port in Quant Tri, and all homesteads, businesses, and temples near the 5 Huong river piers in Hue, and homesteads along the access road to the Bach Ma Meditation Centre.

Mitigation

187. The operation of heavy vehicles, and pile driving activities should be scheduled during the hours of 07:00 and 18:00. All heavy equipment will be kept in good working order equal to, or as close as possible to vehicle operating condition when new. Construction truck traffic along roadways should not occur after 19:00 and before 06:00. Noise monitoring will be conducted regularly at sensitive sites such as homesteads, schools and hospitals to ensure that noise levels are contained within the WHO or IFC standard of 55-70 dB(A) during daytime. Temporary vertical noise barriers must be erected around construction sites in case noise levels exceed the standard value.

iii. Dust and air pollution

188. The operation of heavy equipment, and trucks emit SOx, NOx, and CO_2. The local levels of these gases can be high depending on how well the equipment is maintained in proper working condition, and if uncontrolled vehicle idling is allowed. In addition to air pollution, exhaust from heavy equipment can become a significant nuisance to residents.

189. The operation of heavy trucks along dedicated new construction roads, or along existing roads to the embankment sites will create dust. The dust levels can be significant depending on the amount of sand and small aggregate that is transported along the roads, and how much mud and sand accumulates on the roads that is spread from the tires of the construction vehicles. Dust will pose the biggest problem for residents alongside the roadways to be upgraded or near the new road alignments. Dust generated from the construction sites will be restricted to dust blown from aggregate piles on site.

190. Air pollutant loads (Table 38) generated by construction and transportation are calculated based on the coefficients of pollution established by US EPA and WHO for operation of trucks more than 16 ton which is indicated that a truck 16 ton emits SO_2 =7,43xS kg/km (S=0.5%), NO_2=24,1 kg/km; CO=3,7 kg/km.

Table 38. Load of air pollutant from construction equipment[12]

Estimated volume of air pollutant generated by subproject			**Construction time (month)**	**Load of air pollutant (mg/m^3**		
CO_2	SO_2	NO_2	24	CO_2	SO_2	NO_2
18,512	26,446	36,363		0.2448	0.3498	0.4809

Mitigation

191. Regularly water spraying to all construction roads, and aggregate piles will be applied. Trucks carrying aggregate should always be covered. All construction vehicles should be kept in good working order.

[12] From 2017 IEE of Secondary Cities Development Project: Hue

iv. Surface water quality

192. The effects of road works on erosion and sedimentation identified for aquatic habitat apply to water quality. The other common source of surface water pollution is from oil, gas, and grease from the operation [and maintenance] of heavy equipment in, and near surface waters. Fuel tanks can leak and spent oil and grease can also be discharged in or near the lakes or streams. Waterbodies affected by the new and upgraded roads of the subprojects in the 5 provinces are exemplified below. Because there are no rare or endangered species, critical habitat, or protected areas affected these temporary water impacts are not significant.

1. Small stream that will be bridged for new road section to Tien Pagoda area in Luc Thuy, Hoa Binh.
2. Small stream crossings that may be required for new road to Ru Gam Pagoda in Nghe An.
3. Streams emptying into Cua Lo beach in Cua Lo, Nghe An.
4. Upgraded bridge across the Nhat Le river at Pier 4 south of Dong Hoi, in Quang Binh.
5. Streams emptying into Cua Viet / Cua Tung beaches in Dong Ha, Quang Tri.
6. Sections of the Huong river close to the road upgrades to the Hon Chen temple in Hue.

Mitigation

193. As stated for aquatic habitat, earth berms sufficiently high (e.g., 1m) must be constructed along shorelines to separate shoreline works from affected rivers and lakes. Heavy equipment should not be maintained near water courses. Waste oils and grease must be contained and disposed in DONRE-approved sites.

v. Solid and domestic waste

194. Road construction will generate construction material waste, and domestic waste from workers. Work camps whether temporary or long term provide places to eat and sleep for workers. Camps provide pit latrines and supplies of potable water for cooking and bathing. Domestic liquid and solid waste can become a local problem depending on the size of the camp, and compliance with formal waste management procedures.

Mitigation

195. An organized, formal construction waste collection and disposal plan for all construction sites must be identified. The plan will dictate a schedule for construction waste collection, where and how waste must be stored on site, and the collection frequency for offsite disposal at DONRE approved sites. Contractors must identify responsible workers and provide necessary equipment and vehicles to implement the plan. Worker living areas must be provided with adequate garbage bins, and garbage collected and transported to local landfill regularly. Pit latrine areas must be kept clean and buried when camp closed.

vi. Reduced road access, increased traffic, and risk of traffic accidents, worker and community safety, and utility service

196. Road construction will create traffic and access problems at, and near the roads that are under construction, and along roadways used by construction vehicles. This will be

particularly prevalent in the urban core areas such as Hoa Binh city where traffic density is highest or is high periodically such as around the Hon Chen Temple in Hue, or the cultural sites and monuments along the Nhat Le river south of Dong Hoi, Quang Binh. Utility services must not be disrupted, and local irrigation supplies from construction works.

Mitigation

197. A traffic management plan must be put in place by the PMU and contractors for local and construction traffic at all subproject construction sites. The plan will identify dedicated truck routes if possible, and speed limits, and will identify the required road signage to identify construction areas for the public. Enforced speed limits must be well posted, and sufficient traffic direction signs to assist both construction and local traffic should be posted outside and inside construction zones and along construction truck routes. The implementation of the traffic management plan is particularly important near schools, and hospitals, and community areas such as pagodas, and tourist sites. An example school that requires protection from traffic is the school along the road to Ru Gam pagoda.

2. New or Upgraded River or Estuary Piers and Facilities

i. Aquatic wildlife habitat

198. Construction of new piers or major pier upgrades in rivers or estuarine lagoons temporarily destroys or disrupts the benthic community of plants and animals because the construction of foundations and pile driving damage or destroy benthic habitats on which fish communities depend for food and reproduction. Pier construction also tends to re-surface anoxic sediments which degrades water quality.

199. The Huong river in Hue, the Tam Giang Lagoon east of Hue, and the Nhat Le river in Dong Hoi will experience the greatest temporary impacts of pier construction and rehabilitation. While no data exist for the benthic communities, and limited information exists for fish communities in the affected rivers the impacts likely will be greatest in the Huong and Nhat Le rivers.

Mitigation

200. For all pier works construction vehicles should be kept out of the rivers or lagoons, unless absolutely required for construction purposes. Vehicle maintenance should be conducted greater that 300 m from any watercourse. Infilling along shorelines should be avoided or minimized. Silt curtains should be placed around entire pier construction area to contain sediment and minimizing exposure of aquatic biota and habitat to transported and sedimented silt. Silt curtains must be placed in the Nhat Le river at Quan Hau memorial pier around infilling of old borrow pit to contain sediment and protect water quality of main river. Regular water quality monitoring (i.e., turbidity, TSS) will be conducted during pier works to ensure that temporary disruption of the water quality through sediment stir-up is contained within the direct area of work.

ii. Terrestrial habitat

201. The impact to terrestrial environments from pier developments arise from the land-based associated support facilities. Specifically, the cleared footprints of the walkways and promenades to the piers, service buildings such as tourist information centers and shelters, and bathrooms,

parking lots, and access roads. The extent of the associated facilities varies among the subprojects with piers on the Nhat Le river in Quang Binh having the greatest shore-based development footprints

202. However, the shoreline terrestrial environments of the 7 pier developments along the Huong river and Tam Giang lagoon in Hue and the 4 pier developments along the Nhat Le river in Quang Binh support no natural (pristine) or critical wildlife habitat. There are no rare and endangered terrestrial wildlife that will be affected by the pier developments.

203. Removal of the existing vegetated shorelines for pier and pier support facilities will remove the natural erosion control function of the shorelines. By design the new or upgraded pier developments must duplicate or improve existing erosion control features.

Mitigation

204. The removal of vegetation from shorelines should be avoided, or at least minimized. If vegetation must be removed for construction of the pier and associated facilities, after the piers and facilities are completed the same or similar vegetation will be replanted to restore the area to original condition.

iii. Water quality

205. A major temporary impact of civil construction works in rivers and estuaries on surface water quality is caused from soil erosion and sedimentation. Local suspended sediment levels (TSS) in the Huong and Nhat Le rivers, and in the Tam Giang lagoon will reach maximum possible concentrations which can last over long periods of time depending on the extent of pier and shoreline facilities development. Suspended sediment will arise from the installation of new or upgraded pier piles. Moreover, sedimentation continues when shoreline equipment is not operated because the loose soil at these sites continues to erode into affected water courses. As indicated above excavation/disruption of the river bottom and nearshore area also re-surfaces anoxic and any toxic material lying in the sediments.

206. The other common source of surface water pollution during construction phase is from oil, gas, and grease from the operation [and maintenance] of heavy equipment in, and near surface waters. Fuel tanks can leak and spent oil and grease can also be discharged in or near the lakes or streams.

Mitigation

207. Silt curtains should be installed to isolate the pier and shoreline works. At a minimum silt curtains should be placed on downstream side of work area to contain suspended sediment. Regular water quality monitoring will be conducted during dredging and embankment rehabilitation works to ensure that temporary disruption of the water quality through sediment stir-up is contained within the direct area of work. Any dredging or excavation at the shoreline should be minimized. All equipment and vehicle fuels, oil, and grease, as well as all other hazardous substances and hazardous waste must be stored in a designated depot area on a concrete floor on construction sites. Materials for disposal must be transported in covered containers and disposed of at DONRE-approved disposal sites.

iv. Noise and vibration

208. Operation of heavy excavation equipment, pile driving for footings, and movement of large construction vehicles creates noise. The noise will not be an issue in the more remote areas such the upper Nhat Le river or Tam Giang lagoon. However, noise from pier and facility works will be a potential issue in the towns of Dong Hoi, Dong Ha, and Hue, and near the Hon Chen Temple. Estimated noise from heavy equipment commonly used for shoreline and river construction works is provided in Table 39.

Table 39. Generic construction equipment noise emission levels

Equipment/Machine	Noise levels and impact ranges (dBA)							
	15m (*)	25m	30m	45m	60m	90m	120m	150m
Truck	88	84	82	78	76	72	70	68
Concrete Mixer	85	81	79	75	73	69	67	65
Concrete Pump	82	78	76	72	70	66	64	62
Backhoe	80	76	74	70	68	64	62	60
Pile driver	101	97	95	91	89	85	83	81
70 dBA (day time)								
Commercial and Industrial: 70 dB(A) (daytime) Residential, institutional, and educational: 55 dB(A)								

US Environment Protection Agency "Noise from Construction equipment and Operation, Building Equipment and Home Appliances" NTID 300.1, December 31, 1971.

209. Table 48 suggests residents within 60-90 m surrounding the pier and facilities construction sites could become annoyed by noise generated from construction activities. Pile driving could create noise exceeding the current government QCVN standard up to 150m from the construction site.

210. Vibration should not be an impact of the pier subprojects because no blasting has been identified as an activity needed for pier development. Vibration for heavy equipment or truck operation will not be significant.

Mitigation

211. The operation of heavy vehicles for the pier works and associated facilities on the Huong and Nhat Le rivers and in Tam Giang Lagoon should be scheduled during the hours of 07:00 and 18:00. All heavy equipment should be kept in good working order. Noise monitoring will be conducted regularly at sensitive sites to ensure that noise levels are contained within the WHO or IFC standard of 55-70 dB(A) during daytime. Temporary noise barriers shall be used in case noise levels exceed the standard value.

v. Dust and air pollution

212. The operation of heavy equipment, and trucks will emit SOx, NOx, and CO_2. The local levels of these gases can be high depending on how well the equipment is maintained in proper working condition, and if uncontrolled vehicle idling is allowed. In addition to air pollution, exhaust from heavy equipment can become a significant nuisance to residents.

213. The operation of heavy trucks along dedicated new construction roads, or along existing roads to the pier sites will create dust. The dust levels can be significant depending on the amount of sand and small aggregate is transported along the roads, and how much mud and sand accumulates on the roads that is spread from the tires of the construction vehicles.

214. Dust may pose a problem for residents living adjacent to the pier sites, or along the construction truck routes to the sites because all surfaces outside and inside the homestead tend to become dust covered from truck traffic. Dust generated from the shoreline will be restricted to dust from excavations, fugitive dust from truck transport, and wind erosion from aggregate piles and storage. Any nearshore excavation required for pier development will create dust if the excavate becomes completely dry on land before transport to the disposal sites.

Mitigation

215. Embankments that need vegetation clearance should be wetted or covered during construction works, and re-vegetated as soon as possible. Excavated sediment storage and disposal sites should be covered. Wetting agents should be applied regularly to all construction roads. Trucks carrying aggregate should always be covered. All construction vehicles should be kept in good working order. Air quality monitoring, especially dust levels, will be conducted regularly to confirm compliance with the QCVN 05: 2013 / BTNMT.

vi. Solid and domestic waste

216. The pier and shoreline facilities construction will generate solid waste and domestic waste from workers, and from discarded construction materials. Work camps, whether temporary or long term, provide places to eat and sleep for workers. Camps provide pit latrines and supplies of potable water for cooking and bathing. Domestic liquid and solid waste can become a local problem depending on the size of the camp, and compliance with formal waste management procedures.

217. The pier works along the different rivers and in Tam Giang Lagoon will produce construction material waste in the form of unused and discarded aggregate, concrete, asphalt, wood forming material, reinforcing bar, and sheet steel for piling. Waste from any dredging operations should be less.

Mitigation

218. A formal waste collection and disposal plan like the plan for solid waste management for roads developments identified above will be developed and implemented at all embankment sites and for all dredging operations. All waste construction material must be stored and removed from site daily or weekly. Worker living areas must be provided with adequate garbage bins, and garbage collected and transported to local landfill regularly. Pit latrine areas must be kept clean and buried when camp closed.

vii. Reduced road access, increased traffic, and risk of traffic accidents

219. Construction activities on or adjacent existing roadways, or roadways that are used by construction vehicles to access the embankment sites will act to block normal local traffic thereby reducing access. This will be particularly prevalent in the urban core areas where traffic density is highest. Thus, access and movement of residents in and around Dong Hoi, Dong

Ha, or Hue will be affected the most by the pier development works.

220. The increased construction vehicle traffic that will occur with the pier works, and along routes to sediment disposal sites will affect normal traffic patterns and volumes. Along with the increase in large truck traffic will be an increase in the risk of traffic accidents.

Mitigation

221. A traffic management plan like the plan identified above for road developments must be put in place for local and construction traffic near the pier development sites. Enforced speed limits must be well posted, and additional traffic direction signs to assist both construction and local traffic should be posted outside and inside construction zones and along construction truck routes. The traffic management plan shall be developed by the works contractors as part of their construction environmental management plan (CEMP), and be submitted to local (provincial and city) traffic control authorities for approval.

viii. River/lagoon transportation and fishing/aquaculture

222. Pier construction primarily, and shoreline works secondarily, will interfere with local boat traffic in the Huong and Nhat Le rivers and in Tam Giang Lagoon. Similar, to road traffic the greatest impact will occur in the busy river sections in Hue, Dong Hoi, and Dong Ha due to the higher urban density and associated greater commercial and private boat traffic.

223. Pier works will also potentially affect fishing and aquaculture activities. However, the greatest concentration of fishing and aquaculture is in Tam Giang Lagoon.

Mitigation

224. Shoreline signage should be placed above and below pier and shoreline work areas, areas, and community information leaflets should be distributed to warn and educate users of the water bodies of the subproject activities. The user community should be consulted so that the pier development activities can be scheduled to avoid user activities on the project rivers and in Tam Giang Lagoon. The PMUs, with support from the EAs, will be responsible to inform all users of the affected waterbodies of the types and schedules of activities that could disrupt uses of the surfaces waters. As part of the detailed Inventory of Losses and LARP, fishers will be compensated for any permanent or temporary loss of fishing income caused by the subprojects.

3. Coastal Beach Walkway Upgrades and Development

225. The Cua Lo beachfront rehabilitation subproject in Cua Lo town, Nghe An, and the Cua Viet/Cua Tung beach front rehabilitation subproject in Dong Ha, Quang Tri are unique in that they are *soft* linear developments along marine coastal environments, but unlike the pier development and some road subprojects, are largely physically away from surface water due to the extensive natural beaches separating the beachfronts from the sea.

226. The coastal subprojects share some of the potential impacts of linear developments such as roads but are much less invasive. And while decidedly taking advantage of the view and access to the sea the subprojects do not directly impact the sea environment. The potential impacts of the relatively small-scale infrastructure developments of the two subprojects focus mostly on

existing community and businesses because the affected coastal environments are comprised of dune ecosystems which characteristically are relatively deserted and lack natural wildlife.

i. Aquatic wildlife habitat

227. Construction of new and upgrades of existing sections of beachfront walkways in Dong Hoi and Dong Ha will not affect the sea wildlife community because the walkways are separated from the sea by upwards of 100-200m of beach. The only places where the beachfront works could affect aquatic wildlife is where the walkways cross the mouths of streams and rivers that discharge into the sea. Like the impacts of river piers identified above, the impact would stem from temporary losses of habitat from the placement foot bridge piles, and the effect of suspended sediment from local excavations. However, the impacts would be minor and short-lived because these watercourses are strongly influenced by sea tides.

228. The Huong river in Hue, the Tam Giang Lagoon east of Hue, and the Nhat Le river in Dong Hoi will experience the greatest temporary impacts of pier construction and rehabilitation While no data exist for the benthic communities, and limited information exists for fish communities in the affected rivers the impacts likely will be greatest in the Huong and Nhat Le rivers.

Mitigation

229. Vehicles should be kept out of the sea and the rivers emptying into the sea. That is no vehicles can stand in watercourses unless absolutely needed for construction. Maintenance of vehicles must not occur within 300m of any watercourse. Infilling waterways must be avoided or minimized. Silt curtains should be placed around all construction work adjacent to rivers. Regular water quality sampling will be conducted at affected river mouths during beachfront works to ensure that temporary degradation the water quality through sediment stir-up is contained within the areas of work.

ii. Terrestrial habitat

230. The potential impact of the beachfront developments on the terrestrial environment will be minor because the dune environments on which the beach fronts have been established are natural sparsely forested and provide little wildlife habitat. The footprints of the new promenade sections and support building will not cause significant impact to the terrestrial environment. The only disturbance to terrestrial habitat and wildlife will be to local birds that use the coastal trees. However, the removal of the sparsely distributed trees along the walkways and promenades must be minimal because the trees act as a natural stabilizer of the dynamic coastal dune environment.

Mitigation

231. The removal of trees and vegetation from the affected beachfront areas should be avoided/minimized. If vegetation is removed for a section of promenade or support building it should be replaced local like-for-like, or with more robust local vegetation varieties.

iii. Water quality

232. Like the other subproject types the primary impact of civil construction works in or

adjacent rivers on surface water quality is caused from soil erosion and sedimentation. Local suspended sediment levels (TSS) in directly affected rivers discharging into the sea will reach maximum possible concentrations which can last over long periods of time depending on the extent of beachfront development works. Suspended sediment will arise from the installation of piers or concrete footings. Moreover, sedimentation can continue when shoreline equipment is not operated because the loose soil at these sites continues to erode into affected water courses. And, as indicated above excavation/disruption of the river bottom and nearshore area also re-surfaces anoxic and any toxic material lying in the sediments.

233. The other common source of surface water pollution during construction phase is from oil, gas, and grease from the operation [and maintenance] of heavy equipment in, and near surface waters. Fuel tanks can leak and spent oil and grease can also be discharged in or near the lakes or streams.

Mitigation

234. Silt curtains should be installed to isolate the beachfront and any shoreline works. At a minimum silt curtains should be placed on downstream side of work area to contain suspended sediment. Regular water quality sampling will be conducted during all shoreline works to ensure that temporary disruption of the water quality through sediment stir-up is contained within the direct area of work. Any dredging or excavation at the shoreline should be minimized.

iv. Noise and vibration

235. Operation of heavy excavation equipment and movement of large construction vehicles creates noise. The noise will be an issue because the beachfronts are already established with small businesses and houses. Estimated noise from heavy equipment commonly used for shoreline and river construction works is provided in Table 39 which suggests residents and businesses within 60-90 m of the beachfront works become annoyed by noise generated from construction activities. Pile driving could create noise exceeding the government QCVN standard up to 150 m from the construction site. As above, the WHO standard or IFC standard for noise at sensitive sites as applied.

236. Vibration should not be an impact of the subprojects because no blasting has been identified as an activity needed for beachfront development. Vibration for heavy equipment or truck operation will not be significant.

Mitigation

237. The operation of heavy vehicles for the pier works and associated facilities should be scheduled during the hours of 07:00 and 18:00. All heavy equipment should be kept in good working order. Noise monitoring will be conducted regularly at sensitive sites to ensure that noise levels are contained within the WHO or IFC noise standard of 55-70 dB(A) during daytime. Temporary noise barriers shall be used in case noise levels exceed the standard value.

v. Dust and air pollution

238. Like the other two subproject types, the operation of heavy equipment, and trucks will emit SOx, NOx, and CO_2. The local levels of these gases can be high depending on how well the equipment is maintained in proper working condition, and if uncontrolled vehicle idling is allowed. In addition to air pollution, exhaust from heavy equipment can become a significant

nuisance to residents.

239. The operation of heavy trucks along dedicated construction routes, or along existing roads to the beachfront sites will create dust. The dust levels can be significant depending on the amount of sand and small aggregate is transported along the roads, and how much mud and sand accumulates on the roads that is spread from the tires of the construction vehicles.

Mitigation

240. Wetting agents and regularly water spraying must be applied on all roads during construction. And all disturbed or excavated soil should be re-vegetated as soon as possible. Excavate storage and disposal sites should be covered. Trucks carrying aggregate should always be covered. All construction vehicles should be kept in good working order. Air quality monitoring, especially dust levels, will be conducted regularly to confirm compliance with the QCVN 05: 2013 / BTNMT.

vi. Solid and domestic waste

241. The beachfront development construction will generate solid waste and domestic waste from workers, and from discarded construction materials. Work camps, whether temporary or long term, provide places to eat and sleep for workers. Camps provide pit latrines and supplies of potable water for cooking and bathing. Domestic liquid and solid waste can become a problem depending on the size of the camp and non-compliance with formal waste management procedures.

Mitigation

242. A formal waste collection and disposal plan as described above for the other types of subproject components must be designed and implemented along entire beachfront developments in Nghe An and Quang Tri. All waste construction material must be stored and removed from site daily or weekly. Worker living areas must be provided with adequate garbage bins, and garbage collected and transported to local landfill regularly. Pit latrine areas must be kept clean and buried when camp closed.

vii. Reduced road access, increased traffic, and risk of traffic accidents

243. Construction activities on or adjacent existing roadways, or roadways that are used by construction vehicles to access the Cua Lo and Cua Viet / Cua Tung beachfronts will act to block normal local traffic thereby reducing access. This will be particularly prevalent in the denser beachfront areas where traffic density is highest. Along with the increase in large truck traffic will be an increase in the risk of traffic accidents.

Mitigation

244. As above for the other subproject component types, a traffic management plan must be put in place for local and construction traffic near the beachfront sites. Enforced speed limits must be well posted, and additional traffic direction signs to assist both construction and local traffic should be posted outside and inside construction zones and along construction truck routes. The traffic management plan shall be developed by the works contractors as part of their construction environmental management plan (CEMP), and be submitted to local

(provincial and city) traffic control authorities for approval.

b. Additional Common Construction Impact Mitigation Measures

245. The detailed designs of the 9 subprojects will be done after the government approves the feasibility designs on which this IEE is based. To address expected changes to the scope of the detailed designs additional potential impact mitigations have been identified to supplement the more subproject-specific impact mitigations prescribed above.

246. The following mitigation measures for construction phase impacts and disturbances are commonly applied to projects in Viet Nam. Along with the mitigations identified for the different component types, the common mitigations below will be included where appropriate in the five provincial EMPs for the 10 subprojects. The contractors will be required to reflect these measures in their site-specific construction EMPs (CEMP) that they will submit with their proposals to the PMUs and project management and construction supervision consultants of the five provinces for review and approval prior to construction. Monitoring prescribed by the CEMPs will be conducted by the contractors with supervision as needed provided by the project management and detailed design supervision consultants during the construction period. The entire monitoring plan for the subproject is detailed in the subproject EMPs.

247. **Air pollution**. The Contractor shall include all necessary measures to reduce air pollution and dust development that would impact public health, by implementing the following air quality control measures. Most of these measures are generic measures that are applicable to all construction sites and construction activities as good practice. Yet these are effective measures and are also described in the World Bank Group's EHS guidelines.

(i) Build access and hauling roads at sufficient distances from residential areas and from local schools and hospitals.
(ii) Assign haulage routes and schedules to avoid transport occurring in the central areas, traffic intensive areas or residential areas. For the areas with high-demand on environmental quality, transport should be arranged at night.
(iii) Spray water regularly on unpaved haul roads and access roads (at least once a day) to suppress dust; and erect hoarding around dusty activities.
(iv) Cover material stockpiles with dust shrouds or tarpaulin. For the earthwork management for backfill, measures will include surface press and periodical spraying and covering. The extra earth or dreg should be cleared from the project site in time to avoid long term stockpiling.
(v) Minimize the storage time of construction and demolition wastes on site by regularly removing them off site.
(vi) Site asphalt mixing and concrete batching stations at least 300 m downwind of the nearest air quality protection target.
(vii) Equip asphalt, hot mix and batching plants with fabric filters and/or wet scrubbers to reduce the level of dust emissions.
(viii) Install wheel washing equipment or conduct wheel washing manually at each exit of the works area to prevent trucks from carrying muddy or dusty substance onto public roads.
(ix) Keep construction vehicles and machinery in good working order, regularly service and turn off engines when not in use.
(x) Vehicles with an open load-carrying case, which transport potentially dust-producing materials, shall have proper fitting sides and tail boards. Dust-prone materials shall not be loaded to a level higher than the side and tail boards and shall always be

covered with a strong tarpaulin.

(xi) In periods of high wind, dust-generating operations shall not be permitted within 200 m of residential areas. Special precautions need to be applied near sensitive receptors such as schools, kindergartens and hospitals.

(xii) Site all dredged sediment storage or disposal facilities at least 50 m from the nearest air quality protection target.

(xiii) To avoid odor impacts caused by sediment dredging, transport dredged sediment in closed tank wagons to contain odor and prevent scattering along the way.

(xiv) Unauthorized burning of construction and demolition waste material and refuse shall be subject to penalties for the Contractor and withhold payment.

248. **Construction noise**. Contractors will be required to implement the following mitigation measures for construction activities to meet VIE construction site and IFC/WHO recommended environmental noise standards (i.e., 45-70 db daytime) and to protect sensitive receptors. Some measures are generic and are applicable to all construction sites and activities. Yet they represent good practice and are effective measures and are also in line with IFC's EHS guidelines.

(i) During daytime construction, the contractor will ensure that: (1) noise levels from equipment and machinery conform to the IFC EHS Standards, and properly maintain machinery to minimize noise; (2) equipment with high noise and high vibration are not used near village or township areas and only low noise machinery or the equipment with sound insulation is employed; (3) sites for concrete-mixing plants and similar activities will be located at least 300 m away from the nearest noise protection target; and (4) temporary noise barriers or hoardings will be installed around the equipment to shield residences when there are residences within 20 m of the noise source.

(ii) No construction is allowed between the night time hours of 22:00 to 06:00.

(iii) Regularly monitor noise levels at construction site boundaries. If noise standards are exceeded by more than 3 dB, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation.

(iv) Provide the construction workers with suitable hearing protection (ear muffs) according to the worker health and safety law of Viet Nam.

(v) Control the speed of bulldozer, excavator, crusher and other transport vehicles travelling on site, adopt noise reduction measures on equipment, step up equipment repair and maintenance to keep them in good working condition.

(vi) Limit the speed of vehicles travelling on site (less than 8 km/h), forbid the use of horns unless necessary, minimize the use of whistles.

(vii) Maintain continual communication with the villages and communities near the construction sites and avoid noisy construction activities during school examination periods.

249. **River pier construction and dredging**. When construction is completed at a location, the activities move on and away. Construction noise impact is therefore short term. The above measures are defined in the EMPs. These will be supervised by the project management and construction supervision consultants. Contractors will be required to ensure compliance with relevant VIE noise standards. Noise monitoring will be carried out by the above consultants during the construction period. With these measures in place and implemented, noise impacts during construction would comply with applicable standards.

250. **Water pollution**. The contractors will implement the following measures to prevent

water pollution:

(i) Portable toilets and small package wastewater treatment plants will be provided on construction sites and construction camps for the workers and canteens. If there are nearby public sewers, interim storage tanks and pipelines will be installed to convey wastewater to those sewers.
(ii) Sedimentation tanks will be installed on construction sites to treat process water (e.g. concrete batching for bridge construction) and muddy runoff with high concentrations of suspended solids. If necessary, flocculants such as polyacryl amide (PAM) will be used to facilitate sedimentation.
(iii) Construction machinery will be repaired and washed at special repairing shops. No onsite machine repair and washing shall be allowed.
(iv) Material stockpiles will be protected against wind and runoff waters which might transport them to surface waters.
(v) Dedicated fuel storage areas must be established away from public areas and marked clearly.
(vi) Storage of bulk fuel should be on covered concrete pads away from the public and worker camp. Fuel storage areas and tanks must be clearly marked, protected, and lighted. Contractors should be required to have an emergency plan to handle fuel and oil spillage.
(vii) Mitigation of water quality impact during bridge construction, dredging, cofferdam construction and water pumping out of the cofferdam will be based on water quality monitoring results.
(viii) Berms and/or silt curtains should be constructed around all excavation/trench sites and along all surface waters to prevent soil erosion and surface water sedimentation.

251. **Earthworks soil erosion**. The contractors will implement the following measures related to earthwork management:

(i) Present and past land use should be reviewed to assess whether excavated soils are contaminated. Contaminated spoil should be disposed at a nearby landfill or a location approved by DONRE.
(ii) Confirm location of the borrow pit and temporary spoil storage and final disposal sites, securing permits from relevant DONREs.
(iii) Develop borrow pit and spoil disposal site management and restoration plan, to be approved by responsible authority; obtain permit for the clearance of excavated earthworks.
(iv) Construct intercepting ditches and drains to prevent runoff entering construction sites and diverting runoff from sites to existing drainage.
(v) Construct hoardings and sedimentation ponds to contain soil loss and runoff from the construction sites.
(vi) Limit construction and material handling during periods of rains and high winds.
(vii) Stabilize all cut slopes, embankments, and other erosion-prone working areas while works are going on.
(viii) Stockpiles shall be temporary, placed in sheltered and guarded areas near the actual construction sites, covered with clean tarpaulins, and sprayed with water during dry and windy weather conditions.
(ix) All earthwork disturbance areas shall be stabilized with thatch cover within 30 days after earthworks have ceased at the sites.

(x) Immediately restore, level and plant landscape on temporary occupied land upon completion of construction works.

(xi) Implement all soil erosion protection measures as defined in the soil and water conservation reports.

252. **Ecological impacts**. The contractors will implement the following measures to prevent ecological impact during construction:

(i) Preserve existing vegetation where no construction activity is planned.

(ii) Protect existing trees and grassland during construction; where a tree must be removed, or an area of grassland disturbed, replant trees and re-vegetate the area after construction.

(iii) Remove trees or shrubs only as a last resort if they impinge directly on the permanent works or necessary temporary works.

(iv) Prior to commencement of construction, tag and conspicuously mark all the trees to be preserved to prevent damage to these trees by construction workers.

(v) Construction workers are prohibited from capturing any wildlife in the project areas.

253. **Occupational health and safety**. The construction industry is considered one of the most hazardous industries where several potentially hazardous operations are carried out. The civil works contractors will implement adequate precautions to protect the health and safety of construction workers. Contractors will manage occupational health and safety risks by applying the following measures:

(i) To minimize the impact of construction on the public and workers, the specific guidelines for safety of the worker and public set down by the Ministry of Labor, Invalids and Social Assistance (MOLISA) must be followed. The IFC/World Bank Environment, Health, and Safety Guidelines (2007) that govern the safe and orderly operation of civil works should be added as supplementary guidance if needed.

(ii) Care must be taken to ensure that sites for all earthworks (e.g., excavations, trenches) and dredging that are suspected to have unexploded ordnance (UXO) are surveyed by the military prior to construction. If such ordnance is detected clearing work will need to be commissioned prior to undertaking civil works.

(iii) Construction site sanitation: (1) Each contractor shall provide adequate and functional systems for sanitary conditions, toilet facilities, waste management, labor dormitories and cooking facilities. Effectively clean and disinfect the site. During site formation, spray with phenolated water for disinfection. Disinfect toilets and refuse piles and timely remove solid waste; (2) Exterminate rodents on site at least once every 3 months, and exterminate mosquitoes and flies at least twice each year; (3) Provide public toilets in accordance with the requirements of labor management and sanitation departments in the living areas on construction site, and appoint designated staff responsible for cleaning and disinfection; (4) Work camp wastewater shall be discharged into the municipal sewer system or treated on-site with portable system.

(iv) Occupational safety: (1) Provide safety hats and safety shoes to all construction workers; (2) Provide safety goggles and respiratory masks to workers doing asphalt road paving and tunnel blasting; (3) Provide ear plugs to workers working near loud noise sources.

(v) Food safety: Inspect and supervise food hygiene in canteen on site regularly. Canteen workers must have valid health permits. Once food poisoning is discovered, implement effective control measures immediately to prevent it from spreading.

(vi) Disease prevention, health services: (1) All contracted labor shall undergo a medical examination which should form the basis of an (obligatory) health/accident insurance and welfare provisions to be included in the work contracts. The contractors shall maintain records of health and welfare conditions for each person contractually engaged; (2) Establish health clinic at location where workers are concentrated, which should be equipped with common medical supplies and medication for simple treatment and emergency treatment for accidents; (3) Specify (by the PMUs and contractors) the person(s) responsible for health and epidemic prevention responsible for the education and propaganda on food hygiene and disease prevention to raise the awareness of workers.

(vii) Social conflict prevention: No major social risks and/or vulnerabilities are anticipated because of the project. The project construction workers will be engaged locally. Civil works contracts will stipulate priorities to (1) employ local people for works, (2) ensure equal opportunities for women and men, (3) pay equal wages for work of equal value, and to pay women's wages directly to them; and (4) not employ child or forced labor.

254. **Community health and safety**. Temporary traffic diversions, continual generation of noise and dust on hauling routes, and general hindrance to local accesses and services are common impacts associated with construction works within or nearby local settlements. The project may also contribute to road accidents through use of heavy machinery on existing roads, temporarily blocking pavements for pedestrians etc. The potential impacts on community health and safety will be mitigated through many activities defined in the EMPs. The contractors will implement the following measures:

(i) Temporary Traffic management: A traffic control and operation plan will be prepared together with the local traffic police prior to any construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road crossings with an emphasis on ensuring public safety through clear signs, controls and planning in advance.

(ii) Information disclosure: Residents and businesses will be informed in advance through media of the construction activities, given the dates and duration of expected traffic disruption.

(iii) Construction sites: Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc. and raising awareness on safety issues. Heavy machinery will not be used after day light and all such equipment will be returned to its overnight storage area/position before night. All sites will be made secure, discouraging access by members of the public through appropriate fencing whenever appropriate. Open excavations should be fenced, and trenches covered where public walkways or vehicles must cross.

c. Subproject-specific issues

255. The following potential subproject aspects are identified for more careful impact management and mitigation. The mitigations are elaborated in the subproject EMPs.

i. Tien Pagoda Access and Environmental Improvements

256. Extra care must be taken to not physically damage or disrupt normal visitation to the Tien pagoda and all nearby tourist caves.

ii. Cua Lo Beachfront Access Improvements

257. No, or minimal disruption to the active businesses, shops and restaurants must occur. Construction disturbances from dust, noise, and truck traffic should be managed to minimum possible levels, and no bridge piling should be installed in intersection rivers mouths. Tree removal should be minimal.

iii. Ru Gam Pagoda Access Improvements

258. Like Tien pagoda in Hoa Binh, extra care must be taken to not physically damage, or disrupt normal visitation to the Ru Gam pagoda complex under development.

iv. Nhat Le-Long Dai River and Road Access Improvements

259. Damage to the benthic environment under the pier footprints should be minimized with minimal civil works intervention into the river, silt curtains should be installed, and well-marked warning signs of the pier construction works installed at all piers for boaters and fisherman. The Quan Hau War Memorial, and Long Dai Temple, and Than Dinh Pagoda at Piers 2-4 must be protected from physical damage, and tourist visitation should not be disrupted.

v. Cua Viet-Cua Tung Beach Access and Environmental Improvements

260. Like Cua Lo Beachfront, disruption to the active businesses, shops and restaurants must not occur or be minimized. Construction disturbances from dust, noise, and truck traffic should be managed to minimum possible levels, and no bridge piling should be installed in intersection rivers mouths. Tree removal should be minimal.

vi. Con Co Island Access Improvements

261. Construction activities for the new tourist port must not disturb or delay construction of the adjacent commercial port.

vii. Hon Chen Temple Access Improvements

262. Like the Tien pagoda and Ru Gam pagodas extra care must be taken to not physically damage, or disrupt normal visitation to the Hon Chen Temple

viii. Hue Tourist Piers Improvement

263. Potential damage to the benthic environment under the pier footprints on the Huong river must be minimized with minimal civil works intervention into the river, silt curtains should be installed, and well-marked warning signs of the pier construction works installed at all piers for boaters and fisherman. Extra care to prevent of minimize disturbance of the Tam Giang Lagoon will be implemented, such as construction activities scheduling to avoid fishing periods, protective shoreline berms to prevent soil erosion, and placement pier piing with minimal footprint area to minimize impact on bottom habitat.

ix. Da Bac Access Improvements

264. The civil works to upgrade the access road to the existing parking lot must be scheduled and implemented to not disturb ongoing tourist travel along the road to get to the Bach Ma Meditation Centre. The upgrades to the stopover on National Highway #1 must not prevent use of the stopover and rest area by tourists on route to the Meditation Centre. Extra care must be taken to not encroach the adjacent buffer zone of the park with parked equipment or stockpiled road construction aggregate. All civil works must be contained in the final alignment of the road upgrade.

E. Operational Phase

265. The potential impacts during the operation of the completed subprojects focus on the operation and maintenance of the new and upgraded roads of the various subprojects. Potential environmental issues of the operation of the piers and beachfront developments only concern adequate solid and domestic waste management, which are addressed in the subproject EMPs.

1. New and Upgraded Roads

266. Traffic and risk of roads accidents will arise with the new and upgraded roads of the various subprojects. Noise will increase from the increase in traffic. Motor vehicles travelling on the roads will emit air pollutants via exhaust. The most important pollutants include NO_2, CO, SO_2 and TSP (including dust). Of these, the important air pollutant is NO_2, meaning that if NO_2 complies with the applicable standard, other pollutants such as CO_2, and PM_{10} or $PM_{2.5}$ should also comply with their respective standards.

a. Gas emissions

267. An increase in traffic due to improved road networks leads to increased gas emissions. Because there is currently no standard data on emission sources of pollutants from vehicles in Viet Nam, air pollution coefficients for various traffic means are established based on the reference document of the World Health Organization (WHO), *Environmental Technique Manuals, Volume 1: Assessment on air, water and land pollution sources.* Geneva, 1993. Given significant improvements in vehicle technology and pollution control, this is considered a conservative approach. Table 40 provides example estimates of emission from automobiles which can be applied to projected increases in automobile traffic to estimate increases in GHG emissions.

Table 40. Air pollution coefficient of cars[13]

Types of vehicle	Unit (U)	TSP kg/U	SO_2 kg/U	NO_x kg/U	CO kg/U	VOC kg/U
Car	1000 km	0.07	2.05S	1.19	7.72	0.83

Note: U is the consumed fuel quantity for 1000-km (100 Liters); S is Sulphur content in gasoline and oil. Following Vietnamese regulation QCVN 1: 2007/BKHCN National Technical Regulation on gasoline and diesel fuel: For cars and buses using diesel oil with content not exceeding 500mg/kg or S=0.05 (%).

Mitigations

[13] Adopted from 2017 IEE of Secondary Cities Development Project: Hue

268. Automobiles and trucks that use the road networks should be maintained in proper working condition equal to, or as close as possible to the condition when the vehicle was new. Trucks should be loaded appropriately, and speed and load limits should be enforced. Regular vehicle inspections and certifications should be applied to enforce regulations.

b. Dust

269. Dust is also an associated impact of new road or road expansion. Prediction of dust emissions during road operation is conducted based on the forecast of emission volume on the route. Apart from particulate matter (PM) generated from engines, there is also dust generated from friction of vehicle wheels and road surface.

270. At present, there is no guidance document or regulation on this coefficient in Viet Nam. In this case, coefficients of advanced countries are applied. Following guidance of the United States Environmental Protection Agency (http://www.epa.gov) and California Environmental Protection Agency (http://www.arb.ca.gov) (Table 41).

Table 41. Example emission coefficients

No.	Type of road	Emission coefficient of road surface sL (g/m^2)	k lb/VMT	W (ton)	E (lbPM10/turn/mil)	E (mgPM10/ turn/m)
1	Freeway	0.02	0.016	2.4	0.00051681	0.1092
2	Arterial; Collector	0.035	0.016	2.4	0.00074354	0.1572
3	Local road	0.32	0.016	2.4	0.00313333	0.6623
4	Rural road	1.6	0.016	2.4	0.00891941	1.8854

Mitigations

271. As much as O&M budgets will allow, roads should be cleaned with proper road sweeping trucks to prevent sand build-up on roads. The operators of all vehicles that spill gravel and sand on roads should be responsible for clearing and clean up spills immediately. Temporary measures should be the use of wetting agents to prevent or minimize dust.

c. Noise

272. Increases in vehicle traffic on new and upgraded roads increases road noise. To determine the effect of traffic noise on the surrounding environment and on public health, it is necessary to define noise transmission level to the surrounding environment. Forecasts of noise levels along the main traffic routes is normally made with the following types of noise transmission models: a) Point source; b) Line source; and c) Combined source models.

Mitigations

273. The mitigations for air pollution as above apply.

d. Traffic accidents

274. The risk of traffic accidents and pedestrian injury increases with traffic on roads, size and diversity of vehicle traffic, and allowable driving speeds (speed limits). The expanded and improved roads of the different subprojects will increase the risk of traffic accidents and injury.

Mitigations

275. Speed limits for different vehicle types must be strictly enforced. Adequate lighting and pedestrian and motorist indicator and warning signage should be included with the detailed subproject designs.

F. Cumulative Impacts

276. Potential cumulative impacts are: 1) multiple subprojects negatively affecting the same environmental receptor; and 2) joint positive impacts of project components and external projects; and 3) more intensive natural resource use in Bach Ma National Park because of better road access. Potential increased cumulative impacts in Bach Ma national park will be addressed by the park management board through review and updating the park management plan considering the expected increase in tourist numbers, as necessary, and increased patrolling and vigilance at the existing control points along the project road.

277. In Hue the new pier at the Hon Chen Temple and the road upgrades to the Hon Chen temple will create a combined disturbance to the Temple and visitation of the Temple during the construction phase. Similarly, the combined work and development of the piers in the Huong river, and Nhat Le river will affect boat traffic and other human uses along those rivers.

278. Conversely, like the ongoing ADB Secondary Cities Developments in Hue, the two subprojects in Hue together will combine to create a major positive impact to the urban development of Hue and Hue tourism.

G. Climate Change

279. A Climate Vulnerability and Risk Assessment (CVRA) was prepared separately. Provided below are excerpts from the assessment.

1. Climate change projections

280. The recent downscaled assessments of climate change prepared by MONRE[14] for the medium and high (RCP 4.5 and 8.5) greenhouse gas (GHG) emission scenarios project increases in average annual air temperature in the subproject provinces ranging from 1.4 – 3.7°C during 2050–2100. Average summer temperatures are projected to rise between 1.8 – 4.0 °C. Projected changes to rainfall are more variable. By 2100, average annual rainfall in the subproject provinces is projected to increase from 10.9% – 26.4% under medium and high GHG emission scenarios. Average maximum 5-day rainfall under both emission scenarios is more variable with projected increases ranging from 10%–60%. Median projected sea level rise in north central Viet Nam over this period ranges from 23– 77cm for the medium and high GHG emission scenarios.

[14] Ministry of Natural Resources and Environment. 2016. *Climate Change and Sea level Rise Scenarios for Viet Nam*.

2. Greenhouse gas emissions

281. The project will result in very low/insignificant increases in greenhouse gas (GHG) emissions from vehicles on subproject roads, and emissions from boats using the improved piers. The project construction phase is unlikely to produce large GHG emissions because existing construction equipment will be used and diverted to the current project. Operational phase increases in GHG emissions are also expected to be insignificant. Moreover, reductions in GHG emissions are expected at all subproject sites after the subproject are completed because of ASEAN Tourism Standards adoption (e.g., Green Hotel, and Public Restroom) at all sites, supported by output 2 of the project

282. The GHG emissions from project roads was established based on the guidance provided in the ADB Environment Safeguards - a Good Practice Sourcebook (2012). If the traffic expressed as passenger car units per day (PCU/day) is below the numbers indicated in Table 42 in a representative year, the emissions in that year are unlikely to exceed the 100,000 tons CO_2e threshold.

Table 42. Maximum Number of PCU per Km to Trigger 100,000CO2e/a

Length of Road. (km)	PCU/day	Length of Road. (km)	PCU/day
10	76,000	50	23,000
20	57,000	60	19,000
30	38,000	70	16,000
35	33,000	90	13,000
40	28,000	100	11,000

Source: ADB Environment Safeguards - a Good Practice Sourcebook (2012)

283. The total length of the proposed new roads in this project is estimated at about 15 km. However, the projected traffic flows in a representative year of say 2030 is expected to below 57,000 PCU/day traffic to reach 100,000 tons/a of GHGs.

3. Climate Risk and Vulnerability

284. The indicative sensitivity of the 9 subprojects to climate change was classified mostly as "HIGH" by the AWARE™ software tool which is used to assess climate change sensitivity of proposed infrastructure projects. The software combines geographic information on current site-specific climate, climate hazards from topography, elevation, and distance to sea, and the latest climate change projections for each area. The HIGH sensitivity of the subprojects is due primarily to proximity to the sea and sensitivity to sea level rise, and to sensitivity to flooding from rainfall.

4. Climate Proofing Project Infrastructure

285. The subprojects are being designed at the outset to be resilient to the impacts of present-day climate extremes defined primarily by sea level rise, and increased rainfall.

286. The most sensitive attributes of subproject components consist of; (1) pier and beachfront walkway height and structure, (2) coastal seawall height and slope structure; and river flood discharge and stage. These design factors must be resilient to climate change for the individual components to be sustainable without premature, major retrofits. Provided below is an indicative estimate of the scope of design criteria for climate proofing.

a. Pier developments

287. The heights of the new and rehabilitated piers in the Huong and Nhat Le rivers and in Tam Giang Lagoon will be set to accommodate anticipated future increase in river flood levels. The Tam Giang piers will need to be raised to accommodate present regular river and high tide and be resilient to projected sea level rise. The structure of the piers will be fortified accordingly.

b. Beachfront walkways and seawalls

288. The height of the beachfront walkways and seawalls, and the new and upgraded support facilities such as tourist information buildings and parking lots will be set at heights to be resilient to sea level rise, and structurally stable and strong to withstand increased storm surge caused increased sea level and storm intensity.

289. The initial cost estimates of the climate change resilience measures for the feasibility designs of the coastal and most sensitive provincial subprojects are as follows: Nghe An; $2,648,238.; Quang Binh; $542,696.; Quang Tri; $564,290; and Thua Thien Hue; $141,958. For subprojects in Hoa Binh, Nghe An, and Thua Thien Hue, the initial cost estimates for resilience measures for the road components are $443,718, $344,141, and $139,560, respectively.

VII. INFORMATION DISCLOSURE AND GRIEVANCE REDRESS MECHANISM

290. The subprojects were introduced to affected stakeholders and the public of the five project provinces during the public consultation meetings with verbal and visual presentations of the subproject components. The subproject PMUs, with support from safeguard staff of the detailed design support consultants will manage environmental and social impacts during project implementation. This will include (i) monitoring impacts and mitigation measures during the construction and operation stages; (ii) evaluating environmental and economic benefits and social impacts; and (iii) receiving comments and if required interviewing the public during project implementation. Public involvement with project will include site visits, investigation of specific issues, interviews, and public hearings. The cost for public consultation and participation during project implementation will be borne by the project. Public consultation plans are defined in the provincial EMPs prepared for the subprojects.

291. The formal disclosure of subproject information in local language to affected persons and stakeholders of the five provinces that occurred during the development of the IEE is meant to form the beginning of continued information disclosure and stakeholder involvement as the project is implemented. The executive summary of the IEE will be translated into the Vietnamese language and distributed to all affected persons. As part of the stakeholder communication strategy developed for the IEE, regular information exchange meetings with stakeholders are required throughout implementation of the subprojects.

292. The IEE will be available on the websites of the five provincial DCSTs, Provincial Peoples Committees (PPC) at PPC offices, on the websites of the eleven subproject PMUs, and at subproject office sites. Similarly, all environmental reporting on the eleven subprojects with specific reference to stakeholder consultation minutes, environmental monitoring, and reports on EMP implementation released by the EA/PMUs will be available at the same offices and from same websites. After implementation of the 9 subprojects begins, all environmental and EMP reporting submitted by the EA/PMUs will also be available on the ADB website.

293. The PPCs have agreed to the following reporting commitments: (i) submission of periodic

progress reports during project implementation; (ii) submission of semiannual integrated safeguards monitoring reports, covering resettlement activities, EMP implementation, (iii) submission of GAP implementation progress reports; (iii) submission of project completion report three months after completion of the project. Table 43 summarizes the key reporting requirements during project implementation. All reports will be disclosed.

Table 43. Key Reporting Requirements for Environment

Report	Reference	Timing of Reporting	Responsible Agency
Project Progress Report			
- Reporting of baseline and progress data including environmental management plan	Project Agreement	- in consolidated project quarterly progress reports.	- The EAs supported by PMCS
Environmental Report			
- Periodic safeguards report including environment monitoring and EMP during the construction phase - Environment monitoring during the operation phase	Project Agreement	- Semiannual (January–June and July–December) in July and January - Annual during first year of operation (in January)	- The EA/PMUs supported by PMCS
Project Completion Report			
- Reporting on overall implementation after the subproject completion, including on EMP implementation	Project Agreement	- Not later than three months after the physical completion of the sub project	- The EAs supported by PMCS

A. Grievance Redress Mechanism

294. A clear and easily accessible grievance redress and resolution mechanism has been prepared to assist affected persons (AP) with issues or complaints regarding all subprojects in the five project provinces. The GRM have been developed in coordination with the project PMUs as well as the provincial DONREs. All APs will be made fully aware of their rights, and the detailed procedures for filing grievances, and the appeal process. The GRM shall be published and disseminated through an effective public information campaign during the detailed design-preconstruction phase. The grievance redress mechanism and appeal procedures will be distributed to all APs in a project information booklet (PIB).

295. The APs are entitled to directly lodge complaints regarding any aspect of affected environments, land acquisition and resettlement requirements such as, noise, pollution, entitlements, rates, and payment and procedures for resettlement and income restoration programs. The AP complaints can be made verbally to construction contractors for environmental annoyances or in written form.

1. Overview of GRM

296. The PMUs will take the leading roles in the application of the GRM process that is described below. The PMU offices will receive, log, and initiate required actions to resolve grievances. In this way the concerns of affected persons are closely linked to the implementation

of the subprojects at no cost or retribution to the affected persons. The GRM shall make use of the existing legal procedures.

297. As introduced above the subproject PMUs shall make public the existence of the GRM through public awareness campaigns. The PMUs shall establish a 24-hour hotline for complaints and the hotline shall be publicized through the media. Names and contact numbers for the PMUs, and contractors tasked to receive complaints shall be placed on the notice boards outside every construction site. Locally affected people may express grievances through the ward/commune or district committees, however by design these are immediately forwarded to the PMUs.

298. The legal basis and formal procedure for the GRM for environment is established in the following legislation:

- Law No 02/2011/QH13 on Complaints and Decree No. 75/2012/ND-CP detailing several articles of the law on complaints
- Law No 03/2011/QH13 on Denunciations
- Law No 55/2014/QH13 on Environmental Protection

299. Based on Article 143 of Law No 55/2014/QH13, the District People's Committee (DPC), Provincial People's Committee (PPC), and Ministry of Natural Resources and Environment (MONRE) have functions and responsibilities to receive and resolve complaints.

300. Based on Law 02/2011/QH13, the first step in GRM is to contact the ward/commune PC, the second step the City PC, and third step the Province PC. MONRE has also responsibility to receive and resolve complaints as the first step for its official decisions or administration actions of officers and staff under MONRE's direct management. The scope of this law is for official decisions and administration actions of government agencies and officers.

2. Current government GRM in the five provinces

301. APs can send any question to implementation agencies about their rights in relation with land acquisition, environmental problems, compensation. APs will not be ordered to pay any fee for resolving their grievance and complaints at local levels and court. The following steps for grievance redress are established based on the Complaint Law No. 02/2011/QH13, dated 11/11/2011 and Degree No 75/2012/NĐ-CP on November 20, 2012. A complaint is handled through three stages, if not solved, it can be sent to court as a final level.

First Stage: Ward/Commune Peoples' Committee (W/CPC)

302. An AP may lodge his/her complaint before any member of the W/CPC through the residential group leader or directly to the W/CPC, in written or verbal form. It is incumbent upon the village chief to notify the CPC about the complaint. The W/CPC will meet personally with the aggrieved AP and will have 15 days to respond to the complaint. The W/CPC secretariat is responsible for documenting and keeping file of all complaints that it handles.

Second Stage: City People's Committee (City PC)

303. If after 15 days the aggrieved AP does not hear from the W/CPC, or if the AP is not satisfied with the decision taken on his/her complaint, the AP may bring the case, either written or verbal, to any member of the City PC. The City PC has 10 days to respond to the complaint. The City PC is responsible for documenting and keeping files of all complaints that it handles.

Third Stage: Province People's Committee (PPC)

304. If after 10 days the aggrieved AP does not hear from the City PC, or if the AP is not satisfied with the decision taken on his/her complaint, the AP may bring the case, either in writing or verbal, to any member of the PPC. The PPC has 10 days within which to respond to the complaint to the satisfaction of all concerned.

Final Stage: People's Court

305. If after 10 days following the lodging of the complaint with the PPC, the aggrieved AP does not hear from the PPC, or if he/she is not satisfied with the decision taken on his/her complaint, the case may be brought to the people's court.

3. Proposed Project GRM

306. The subproject PMUs will play the central role in the coordination of the city-level GRMs. Each PMU will establish a central GRM unit composed of relevant PMU project staff, subject to approval by the PPCs. Decision making is done by PPC involving relevant stakeholders. With decisions taken at the highest level, there is no need for appeals except if complainants choose to use the court systems should they not agree with the proposed resolutions. The proposed GRM is shown in Figure 28.

307. The GRU will be composed of a GRU head, an environment specialist, a resettlement specialist, and possibly representative of the EAs.

308. The W/CPC and/or complainants will: (i) draft a written complaint to be signed by the complainant indicating name of complainant, date and address of the complainant, description of complaint and supporting documents, if any; and (ii) send the complaint to the GRU. They also may participate in GRM meetings, and provide relevant information related to the submitted complaints as required.

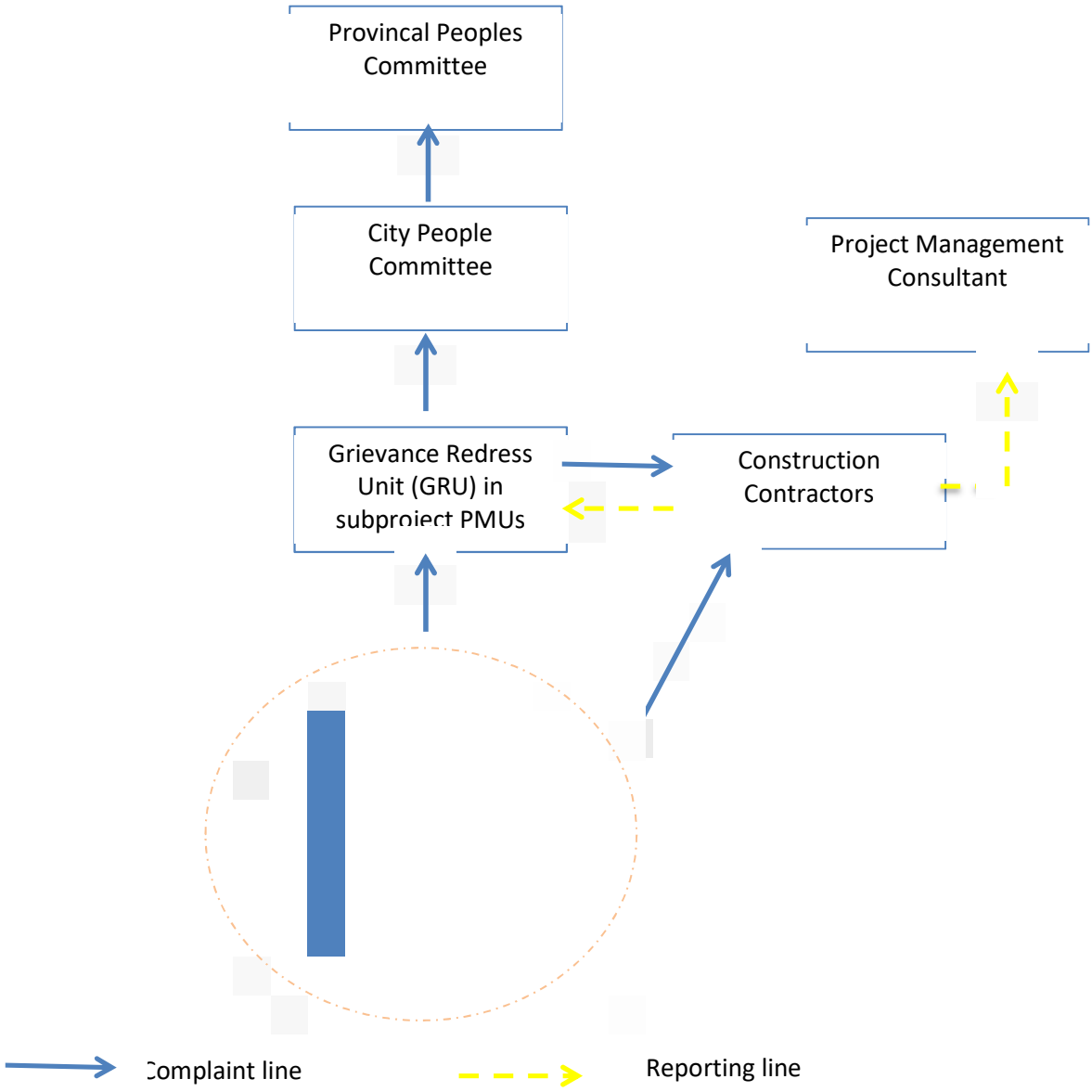
309. The GRU will: (i) receive all complaints from people seeking access to the GRM and promptly acknowledge them (within 5 working days); (ii) register the complaints; (iii) determine eligibility of a complaint; (iv) screen and forward the complaint to contractors if required; (v) coordinate and monitor activities by contractors; (vi) track and record all actions taken by the GRC, (vi) provide information and feedback to W/CPC and complainants, (vii) maintain a complaint registration and tracking system.

4. GRM Procedures

Stage 1: Access to the GRM.

310. If a concern arises, the complainant will make his/her complaint known to the Ward/Commune People's Committee (W/CPC) or to the grievance redress unit (GRU). Complaints can also be sent directly to the contractor through the hotline number provided for construction related matters such as noise, dust and other emergency matters which require immediate action. Contractors are required to report back to the GRU as well as the Construction Supervision Consultant on complaints received and resolved. For more complex construction matters, the GRU will forward the complaint to the contractors with recommendations for action.

Figure 28. Proposed GRM for the Project.



Stage 2: Submission and Registration.

311. The W/CPC or complainant will submit a written or verbal complaint to the GRU. The GRU will register the complaint. The GRU will register the complaint in the grievance registry and issue an acknowledgement of receipt within 5 working days of the complaint with information on when a decision will be made regarding the complaint. The GRU will handle all questions and queries of project related activities.

Stage 3: Determine Eligibility.

312. The GRU will determine whether the complaint is eligible for the grievance mechanism. A screening procedure based on simple eligibility criteria will be established for the GRU. Criteria include: (i) the complainant is directly affected by the project; (ii) in case of representation, the complainant has a valid representation authorization; (iii) the complaint relates to environmental or social safeguards aspects of the project. If the complaint is deemed ineligible, the complainant is informed of the decision and the reasons for ineligibility. A response on the eligibility shall be given to the complainant within 10 working days after receipt of the complaint.

Stage 4: Assessment and Decision on Action.

313. If the complaint is eligible, the GRU will inform the complainant within 10 working days after receipt of the complaint that his/her complaint is eligible, including indication of the grievance assessment process and timeframe. The GRU, with support of relevant authorities, will conduct an assessment and gather information about the complaint and key issues and concerns to determine how the complaint might be resolved. The W/CPC and community members will participate in the assessment as necessary. If outside experts or technical information is needed, the GRU may seek such guidance and may request all parties concerned to participate in the GRM process. The decision on the solution will be by the PPC. The GRU will develop an action plan and identify responsibilities for the plan. This action plan will be reported directly to the complainant and/or W/CPC through the GRU. The response shall not be submitted later than 30 days after receipt of the complaint. If this timeframe cannot be ensured, the complainant shall be informed accordingly prior to the deadline of 30 days.

Stage 5: Implementation of Actions.

314. Implementation of the action plan commences with close collaboration of relevant project stakeholders depending on the type of complaint.

Stage 6: Monitoring and Reporting on Implementation.

315. The GRU will monitor the implementation of actions and record. As part of the monitoring process, the GRU will consult the relevant project stakeholders, as needed. The monitoring time frame will be complaint-specific depending on the implementation of the actions.

Stage 7: Closure of the Complaint.

316. When complaint redress and monitoring is completed, the GRU will prepare a final report which is shared with the complainant and W/CPC and filed. The complainant will confirm completion of the actions and agree to the closure of the complaint. The grievance dossier is closed and filed in the project archive.

5. Complaint Monitoring and Evaluation

317. All grievances, concerns and complaints received will be entered into a complaint tracking system that will allow complaints to be tracked and monitored with sufficient details. Monitoring information will include the following data organized by type and location:

- number and type of complaints received
- number and % of complaints that have reached agreement
- number and % of complaints that have been resolved
- number and % of complaints that are unresolved

318. The GRU will review the data on a quarterly basis to evaluate the functionality of the system, as well as to note the following:

- Failures to follow GRM procedures
- Delays in complaint resolution, particularly those that can affect project construction
- Most frequent types of grievances and complaints
- Location(s) producing the most grievances and complaints