Initial Environmental Examination

September 2018

VIE: Second Health Human Resource Development Project (SHHRDP)

Initial Environmental Examination (IEE)

Hanoi Medical University Phase 1

Prepared by Ministry of Health for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 1 September 2018)

Currency unit	–	Dong (VND)
VND1.00	=	$0.00004
$1.00	=	VND23,290

ABBREVIATIONS

ADB	Asian Development Bank
ADB SPS 2009	ADB Safeguard Policy Statement (2009)
BOMICEN	Technology Center for Bomb and Mine Disposal
CEMP	Contractor Environmental Management Plan
CHPMU	Central Health Project Management Unit (Project Owner)
CiPC	City People's Committee
CoPC	Commune People's Committee
C-PMU	Central Project Management Unit
CSC	Construction Supervision Consultant
DoNRE	Department of Natural Resources and Environment
EA	Executing Agency
EHS	Environment, Health and Safety
EMP	Environmental Management Plan
ESO	Environmental Safeguard Officer
ERP	Emergency Response Plan
ERT	Emergency Response Team
EERT	External Emergency Response Team
GOV	Government of Vietnam
GRM	Grievance Redress Mechanism
HCMC	Ho Chi Minh City
HCMCUMP	Ho Chi Minh City University of Medicine and Pharmacy
HMU	Hanoi Medical University
IA	Implementing Agency
IEE	Initial Environmental Examination
IFC EHS General Guidelines	International Finance Corporation Environmental, Health, and Safety General Guidelines
IFC EHS Guidelines for HCF	International Finance Corporation Environmental, Health and Safety Guidelines for Health Care Facilities
IFC EHS Guidelines for THD	International Finance Corporation Environmental, Health and Safety Guidelines for Tourism and Hospitality Development
MOH	Ministry of Health
MoNRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
ODA	Official Development Assistance
PAI	Project Area of Influence
PIB	Project Information Booklet
PMU	Project Management Unit
PPC	Provincial People's Committee
PPE	personal protective equipment
PPTA	Project Preparatory Technical Assistance
SHHRDP	Second Health Human Resource Development Project
TOR	Terms of Reference

USD	United States Dollar
VND	Vietnamese Dong

NOTES

(i) The fiscal year of the Government of Viet Nam ends on 31 December.

(ii) In this report, "$" refers to US dollars.

TABLE OF CONTENTS

ANNEXES

FIGURES

TABLES

EXECUTIVE SUMMARY

1. The proposed Second Health Human Resources Development Project (SHHRDP), funded by the Asian Development Bank (ADB), which approved a Project preparatory technical assistance (PPTA) in December 2015, will assist the Government of the Socialist Republic of Vietnam (GOV) to achieve universal health coverage and progress towards meeting the health-related sustainable development goals to: (i) increase the number of graduates from medical, nursing, and other health sciences to meet the country's health workforce needs and address supply constraints to achieve universal health coverage, (ii) diversification into the size of the medical training programs in general and intensive training to meet the country's epidemiological and demographic changes, (iii) ensure the quality of future medical services through training of staff and graduates under internationally recognized programs, (iv) strengthening research and development capacity in the field of technical and medical technology, and technology transfer.

2. The Ministry of Health (MOH) has issued a plan for developing human resources for health, which highlights the significant shortfall in the number of physicians, nurses, pharmacists, technical specialists and other specialized health specialists and goals and requirements for human development by 2020. Consequently, in January 2016 it has requested the incorporation of a new campus (or "second campus") for Hanoi Medical University (HMU) and Ho Chi Minh City University of Medicine and Pharmacy (HCMCUMP) in Ha Nam and Dong Nai provinces, respectively. Currently operating at capacity, existing HMU and UMP's classrooms, laboratories, and skill labs are unable to accommodate increased student numbers while maintaining teaching quality. A lack of adjacent land and restrictions on the development of educational campuses in central city locations prevent HMU and UMP from expanding in their current locations.

3. The investment for these campuses will be realized in phases, and SHHRDP will provide a financing of $80 million for **Phase 1 development of HMU and HCMCUMP, which is the only works supported by SHHRDP**[1]. Phase 1 development of HMU ("HMU Phase 1" or "the Project") encompasses the facilities required for teaching the undergraduates and graduates students to be developed according to social and environmental safeguards for construction development on 16 ha of land. This development will occur inside 80-100 ha for the future development of a complete campus which will include a hospital, teaching laboratory and other facilities, designated along the text as **Main Project** of HMU University. This Main Project will consist of HMU Phase 1 development, Phase 2 (the main features; the university hospital, a conference center and extension of existing facilities) and Phase 3 (the main features; start-up companies, bio incubators and the extension of the university hospital up to its full capacity) that will be developed inside the approved zoning plan that the Nam Cao University is currently proposing for a 900 to 1,300ha development which includes five other universities and will accommodate approximately 80,000 students, hereby referred as **Nam Cao University Development**. HMU Phase 1 is

[1] This report is for HMU Phase 1 only, while separate Initial Environmental Examination (IEE) report is prepared for HCMCUMP Phase 1.

for about 5,540 students, going up to 12,140 students in Phase 2 and up to a total of 23,000 students for the extension (Phase 3).

4. The Ministry of Health (MOH) is the executing agency and will have overall responsibility in Project coordination and implementation. The Project will be implemented through MOH's Central Heath Project Management Unit (CHPMU). The expected Project duration for HMU Phase 1 is 6 years from 2019 to 2024 including 3 years and 4 months of construction period which starts in July 2021, while in the Master Plan of HMU, the Main Project campus (Phase 1 to 3) is expected to occupy an area of 40 to 50ha by 2030.

5. Based on this assessment, SHHRDP is classified as Category B for environment under the ADB Safeguard Policy Statement (2009) (ADB SPS 2009), therefore requiring an Initial Environmental Examination (IEE).

6. Literature review and field assessment for collection of secondary data for this IEE show that the potential environmental impacts of HMU Phase 1 will mainly occur during the pre-construction and construction phases. Negative impacts during pre-construction phase will be basically related to land clearance and consequent compensation, changes in livelihoods of people, and changes in landscape; during construction there may be increased traffic, emission of gases, construction noise, dust, vibration, solid waste and sewage, pressure on neighboring villages for housing, and increased risks of injuries and casualties of workers and residents.

7. Although many of these impacts are temporary, land acquisition and changes in landscape will be permanent. In general, impacts are considered to be moderate, and turn into negligible after application of mitigation measures.

8. No rare or endangered wildlife or natural or critical habitats were found inside HMU Phase 1 or surrounding areas.

9. HMU Phase 1 will result on the acquisition of mainly agricultural land and also some water canals.

10. The impacts from the implementation of HMU Phase 1 will be considered as moderate during construction works and as minor during operation stage, considering many of the impacts will be temporary and the high receptiveness of local people towards this development and the benefits of the Project in general.

11. The Environmental Management Plan (EMP) provides a comprehensive overview on the identified mitigation and management measures to avoid, minimize, mitigate and compensate for anticipated adverse environmental impacts, implementation of monitoring and reporting, responsibilities and regulations applicable to the Project.

I.INTRODUCTION

1. The purpose of this report is to incorporate any environmental concerns regarding the Second Health Human Resources Sector Development Project (SHHRDP), with focus on Hanoi Medical University (HMU) Phase 1, including the construction of one new campus for the enlargement of the capacity of existing HMU, to assure its environmental feasibility.

2. Literature review of existing studies and field environmental assessments were performed on site in order to predict and evaluate possible impacts and prescribe mitigation measures for the planning actions, construction works and operation of the new medical center.

3. SHHRDP will provide a financing of $80 million for **Phase 1 development of HMU and HCMCUMP**. Phase 1 development of HMU ("HMU Phase 1" or "the Project") encompasses the facilities required for teaching the undergraduates and graduates students to be developed according to social and environmental safeguards for construction development on 16 ha of land – expected to receive the first students by August 2024. This development will occur inside 80-100 ha for the future development of a complete campus which will include a hospital, teaching laboratory and other facilities, designated along the text as "**Main Project"**. In the Master Plan of HMU, the Main Project campus is expected to occupy an area of 40 to 50 ha by 2030. This Main Project will consist of not only HMU Phase 1 development, but also a Phase 2 and extensions that will be developed inside the approved zoning plan that the Nam Cao University is currently proposing for a 900 to 1,300 ha development which includes five other universities and will accommodate approximately 80,000 students, hereby referred as "Nam Cao University Development", as indicated below in Figure 1. HMU Phase 1 is for about 5,540 students, up to 12,140 students in Phase 2 and up to a total of 23,000 students after the extension phase. The planning for the remaining Phases 2 and 3 is not yet defined.

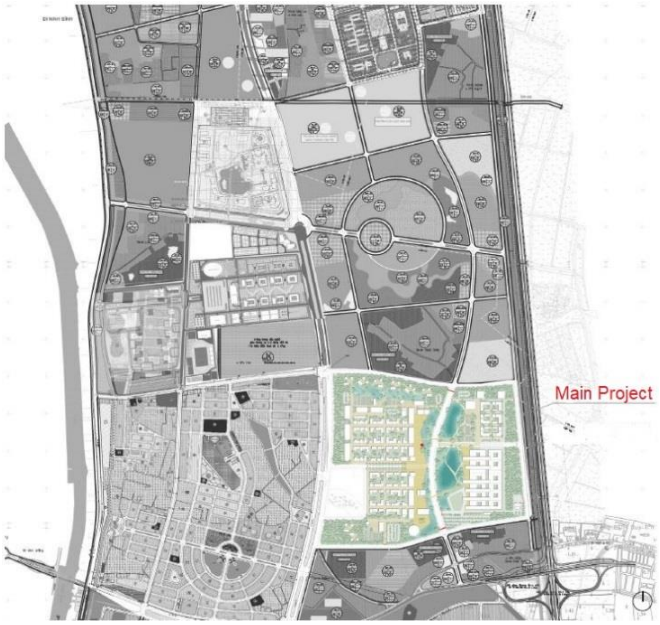


Figure 1: Nam Cao University Development (black and white area) and Main Project Master Plan (colors). ***POLO Architects***

4. Investment in infrastructure development at the university is fundamental since it cannot accommodate the increasing number of students. The investment in this Project is in line with policies of the Political Bureau of the Central Committee Communist Party of Vietnam (Politburo)and the Government, on fundamental and comprehensive reform of education following Resolution No. 22/NQ-TW dated 10 April 2013 on international integration and Directive No. 15/CT-TTg dated 7 July 2015 on continuing the implementation of the Politburo's Resolution No. 22/NQ-TW on international integration. The Project is in accordance with the Prime Minister's Decision No. 37/2013/QD-TTg dated 26 June 2013 on adjusting the planning of the network of universities and colleges in the period 2006-2020 with priority given to the construction of internationally recognized universities/colleges. The Project will help HMU to meet criteria for a research-oriented university in accordance with Decision 73/2015/ND-CP dated 8 September 2015. On 3 May 2018 an official letter was issued for the acceptance of SHHRDP, according to which Mr. Pham Binh Minh agrees to propose the Project as per the Ministry of Planning and Investment (MPI) letter No. 2808/BKHDT-KTDN, with full collaboration of MOH, the two Universities involved and other relevant entities.

5. Being the **overall objective** of SHHRDP to assist the Government of Vietnam to reach the target of universal health coverage and progress towards meeting sustainable development goals through an increase in the supply of qualified workforce in health sectors to appropriately respond to changes in Vietnam's epidemiological and demographic profile, this Project makes a significant contribution to the general health state of the country by:

a) Increasing the number of medical graduates to meet the demand in health workforce in the country and address existing constraints to reach the target of universal health coverage;
b) Diversifying the scope of the training programs and majors to accommodate the demographic and epidemiological changes that the country is experiencing;
c) Ensuring the future quality of health services by training students in accordance with international standards;
d) Strengthening Research and Development (R&D) capacity in medical engineering and technology, and technology transfer.

6. The **specific objective** of SHHRDP will be to help develop HMU and HCMCUMP to become an university of health sciences to meet international standards, by assisting the construction of the universities' second campus. These campuses will improve the quality of health education and training in these Universities and strengthen the accreditation for medical training in these two cities.

7. For HMU, the number of students is specified according to the Master plan for the development of HMU to 2020 with a vision towards 2030, approved in Decision No.3680/QĐ-BYT and calculation of the student population size. Accordingly, and considering the scope of implementation of this Program, the construction of training facilities will be for about 5,540 students on Phase 1.

8. The Beneficiaries of the Project will be the health students, since the new facilities have new and modern spaces to study and practice, adapted to international standard training programs.

9. Lecturers will also be able to develop competencies from the adaptation to the new training programs, developed according to international standards. New staff will be recruited to work at the new campuses, which will also be identified as direct beneficiaries from the Project (higher employment rates in the areas) and most importantly, the medical services in both cities (and therefore the country in general) will be served with hospitals with medical services of world-standard quality.

10. Indirect beneficiaries will be the students in other institutions related to health who will also have the chance to enjoy new training programs and new training facilities with the required accreditation for medical training and other medical related service providers who will have more demand for quality products.

II.POLICY AND LEGAL REQUIREMENTS

11. This Project is implemented in accordance with the provisions of the Government's Decree No. 16/2016/NĐ-CP dated 16 March 2016 for the use of official development assistance (ODA) resources of the Government.

A. Legal Framework for Environmental Assessment in Vietnam

12. Vietnam is part of several relevant International Conventions on Environmental Management that may be relevant to mention for the Project which are the 1987 Convention on the Protection of the World's Natural and Cultural Heritages, the Montreal Protocol on Substances that Deplete the Ozone Layer, the 1992 United Nations Statement on Environment and Development, the 1994 Vienna Convention for the Protection of the Ozone Layer, the 1994 Convention on Biological Diversity (CBD), the 1994 Cartagena Protocol on Biosafety, 1994 United Nations Framework Convention on Climate Change (UNFCCC), the 1995 Basel Convention on the Control of Transboundary Movements of Harmful Substances and the 2009 Stockholm Convention on Persistent Organic Pollutants (POPs).

13. On a legal basis, the environmental assessment of a Project in Vietnam is carried out accounting for the environmental protection 55/2014 / QH13; Decree No. 18/2015 / ND-CP dated 14/02/2015 of the Government providing for environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection planning; Circular No. 27/2015 / TT-BTNMT dated 29/05/2015, detailing a number of articles of the Government's Decree No. 18/2015 / ND-CP dated 14/02/2015 regulations on environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plan.

14. The implementation of an EIA Project in Vietnam follows, in general, certain steps until approval. This process starts with (i) a study on the contents of reports on Project descriptions and basic designs as well as relevant technical documents and documents; (ii) a collection of data on socio-economic, climate, hydrology and environment (and possibly others) related to the Project area; (iii) an investigation, sampling and analysis of environmental components of the Project area; (iv) the identification of the sources of impact, objects, scales affected, analyze, evaluate and forecast Project impacts on the environment; (v) work out measures to minimize the adverse impacts, prevent and respond

to environmental incidents of the Project; (vi) construction of environmental treatment facilities, Project management and monitoring program; (vii) data analysis, report writing in professional fields of experts; (viii) collect data, develop topics; (ix) synthesizing EIA reports; (x) conduct consultation with local authorities; (xi) direct community consultation through community meetings; (xii) supplement and finalization of EIA reports; (xiii) submit to the State management agency for environmental protection for appraisal and approval (MoNRE); (xiv) inspection Team of the Ministry of Natural Resources and Environment inspects the field in the Project area; (xv) meeting of Appraisal Council of EIA Report of the Project; (xvi) amend and / or supplement the opinions of the Examination Council; (xvi) submission to the Council Standing Committee for consideration and approval of the EIA Report of the Project.

15. Pursuant to the Decree No. 18/2015 / ND-CP dated 14/02/2015, the criteria for screening and evaluating environmental impact assessment Projects should also be considered. The following documents are pointed as the major documents on environmental assessment and protection in Vietnam. Under the Environmental Law:

- ¬ Law on Environmental Protection No. 55/2014 / QH13 adopted by the National Assembly of Socialist Republic of Vietnam on 23/06/2014;
- ¬ Law on Water Resources No. 17/2012 / QH13 adopted by the National Assembly of Socialist Republic of Vietnam on 21/06/2012;
- ¬ Decree No. 155/2016 / ND-CP dated 18/11/2016 of the Government stipulating the sanctioning of administrative violations in the field of environmental protection;
- ¬ Decree No. 18/2015 / ND-CP dated 14/02/2015 of the Government providing for environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plan;
- ¬ The Government's Decree No. 19/2015 / ND-CP dated 14/02/2015 detailing the implementation of a number of articles of the Law on Environmental Protection;
- ¬ Circular No. 16/2009 / TT-BTNMT dated 07/10/2009 of the Ministry of Natural Resources and Environment on regulations on national technical standards on environment;
- ¬ Circular No. 25/2009 / TT-BTNMT dated 16/11/2009 providing for national environmental standards;
- ¬ Ministry of Natural Resources and Environment's Circular No. 39/2010 / TT-BTNMT dated 16/12/2010 regulating national technical standards on environment;
- ¬ Circular No. 28/2011 / TT-BTNMT dated 01/08/2011 of the Ministry of Natural Resources and Environment regulating technical procedures for observation of ambient air environment and noise; 10. Circular 47/2011 / BTNMT: Circular regulating national technical regulations on environment on 28/12/2011;
- ¬ Circular No. 27/2015 / TT-BTNMT dated 29/05/2015 of the Ministry of Natural Resources and Environment detailing a number of articles of Decree No. 18/2015 / ND-CP dated 14/02/2015 The Government shall stipulate environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plan;
- ¬ Circular No. 36/2015-TT-BTNMT dated 30/06/2015 of the Ministry of Natural Resources and Environment regulating the management of hazardous waste;
- ¬ Prime Minister's Decision No. 256/2003 / QD-TTg dated 02/12/2003 approving the

national environmental protection strategy till 2010 and orientations towards 2020;

- ¬ Decision No. 16/2008 / QD-BTNMT dated 31/12/2008 of the Ministry of Natural Resources and Environment promulgating the National Technical Regulation on Environment;
- ¬ Decision No. 33/2015 / QĐ-UBND dated 15/12/2015 of Ha Nam Provincial People's Committee (PPC) promulgating regulations on environmental protection in Ha Nam province;
- ¬ Decision No. 26/2013 / QD-UBND dated 27/05/2013 by Ha Nam PPC promulgating the Regulation on management, collection, transportation and treatment of domestic waste in the province.

Under the Land Law:

- ¬ Land Law No. 45/2013 / QH13 dated 29/11/2013 of the National Assembly of the Socialist Republic of Vietnam, Session 13, 6th Session, effective on 01/07/2014;
- ¬ Decree No. 43/2014 / ND-CP dated 15/05/2014 of the Government on the implementation of the Land Law;
- ¬ Decree No. 01/2017 / ND-CP dated 06/1/2017 of the Government providing for amendments and supplements to a number of decrees detailing the implementation of the Land Law;
- ¬ Circular No. 33/2017 / TT-BTNMT dated 29/9/2017 detailing the Government's Decree No. 01/2017 / ND-CP dated 06/01/2017 amending and supplementing a number of decrees detailing the implementation of the Land Law and amending and supplementing a number of articles of the circulars guiding the implementation of the Land Law.
- ¬ Circular No. 01/2017 / TT-BTNMT dated 09/02/2017 regulating the land use for the construction of cultural and medical facilities and land for the construction of educational and training establishments, physical training and sports facilities and cultural works belonging to the community.

Other legal documents related to the Project:

- ¬ Decision 2992 / QD-BYT dated 17/07/2015 approving the Health Human Resources Development Plan in the national health care system for the period 2015-2020;
- ¬ Decision No. 3680 / QD-BYT dated 02/10/2009 approving the master plan for development of Hanoi Medical University to 2020 with a vision to 2030;
- ¬ Decision No. 1748 / QD-TTg dated 27/09/2013 approving the Project of building the Nam Cao University Development in Ha Nam province;
- ¬ Resolution No. 22 / NQ-TW dated 10/4/2013 on international integration and Directive No. 15 / CT-TTg dated 07/07/2015 on further implementation of the Resolution No. 22 / NQ-TW of the Ministry. Politics of international integration;
- ¬ Decision No. 37/2013 / QD-TTg dated 26/06/2013 of the Prime Minister on the adjustment of the network of universities and colleges in the 2006-2020 period;
- ¬ Directive No. 15 / CT-TTg dated 07/07/2015 of the Politburo on the implementation of the Politburo's Resolution No. 22 / NQ-TW on international integration;
- ¬ The Project "Relocation of some universities and colleges from the inner city of Hanoi and Ho Chi Minh City to the planned areas";
- ¬ The Memorandum of Understanding on September 12, 2011 between Hanoi Medical

University and Ha Nam PPC on the construction of the second campus of Hanoi Medical University in Ha Nam;
- TCVN 9386:2012 – Design of earthquake resistant buildings;
- Law No.84/2015/QH13 dated 25/07/2015 on occupational safety and hygiene;
- Decree No. 39/2016 / ND-CP of the Government detailing the implementation of a number of articles of the Law on Occupational Safety and Hygiene;
- Joint Circular No. 01/2011 / TTLT-BLDTBXH-BYT: Guiding the organization of implementation of labor safety and hygiene in labor establishments;
- Circular 19/2011 / TT - BYT: Guideline on management of occupational health, occupational health and occupational diseases

Other legal standards[2]:

- QCVN 05: 2013 / BTNMT - Air quality - National technical standards on ambient air quality;
- QCVN 08-MT: 2015 / BTNMT - National technical regulation on surface water;
- QCVN 07: 2009 / BTNMT - National technical standards on hazardous waste thresholds;
- QCVN 14: 2008 / BTNMT - National technical regulation on domestic wastewater;
- QCVN 26: 2010 / BTNMT: National technical regulation on noise;
- QCVN 27: 2010 / BTNMT: National technical regulation on vibration;
- QCVN 24: 2016 / BYT - national technical noise regulations - noise exposure allowed in the workplace;
- QCVN 26: 2016 / BYT - national microclimate technical regulation - microclimate permit in the workplace;
- Decision No. 3733/2002 / QD-BYT - Decision on promulgation of 21 occupational hygiene standards, 5 principles and 7 indicators on occupational hygiene.

B. ADB Safeguard Policy

16. ADB requires the consideration of environmental issues in all aspects of its operations, and the requirements for environmental assessment are described in the ADB SPS 2009. It emphasizes environmental and social sustainability in progress of economic growth and poverty reduction in Asia and the Pacific, with the following aims:

- Avoid adverse impacts of Projects on the environment and affected people, where possible;
- Minimize/mitigate and/or compensate for adverse impacts on environment and affected people when avoidance is not possible;
- Help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks through compliance with performance levels and measures by application of existing technology at reasonable

[2] Specific environmental standards applied for the Project are in Table 18 to Table 22.

costs.

17. The ADB SPS 2009 also requires, during the design, construction and operation of a project that the borrower follows environmental standards consistent with good international practices as reflected in internationally recognized standards such as the International Finance Corporation Environmental, Health and Safety Guidelines (IFC EHS Guidelines). The IFC EHS Guidelines contain discharge effluent, air emissions, and other numerical guidelines and performance indicators as well as prevention and control approaches that are normally acceptable to ADB and are generally considered to be achievable at reasonable costs by existing technology. When host country regulations differ from these levels and measures, the borrower/client is to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client is required to provide justification for any proposed alternatives.

18. The IFC EHS Guidelines include the International Finance Corporation Environmental, Health and Safety General Guidelines (IFC EHS General Guidelines)[3] covering environment, occupational health and safety, and community and health and safety) and Sector Guidelines. Applicable sector Guidelines utilized in the IEE include the International Finance Corporation Environmental, Health and Safety Guidelines for Health Care Facilities (IFC EHS Guidelines for HCF)[4] and the International Finance Corporation Environmental, Health and Safety Guidelines for Tourism and Hospitality Development (IFC EHS Guidelines for THD)[5].

19. The nature of the environmental assessment required for a Project depends on the significance of its environmental impacts, which are related to the type and location of the Project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their anticipated environmental impacts and allocated to one of the following four categories (A, B, C, FI) from which this present Project was classified as a Category B Project.

20. An EMP, which addresses the potential impacts and risks identified by the environmental assessment, is prepared and the level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks. For this Project the EMP can be found inside Section IX.

21. ADB will post different safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the Project design and implementation, which in this case should be the IEE final document and the environmental monitoring reports submitted by CHPMU during implementation.

[3] https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES
[4] https://www.ifc.org/wps/wcm/connect/bc554d80488658b6b6e6f66a6515bb18/Final%2B-%2BHealth%2BCare%2BFacilities.pdf?MOD=AJPERES&id=1323161961169
[5] https://www.ifc.org/wps/wcm/connect/e9f48800488559c0840cd66a6515bb18/Final%2B-%2BTourism%2Band%2BHospitality%2BDevelopment.pdf?MOD=AJPERES&id=1323162543953

C. Environmental Legal Procedures

22. The following law and decree require EIA (Vietnamese EIA) for the Main Project (or HMU Phase 1) to be approved by MoNRE before the civil works of the Project starts:

- Environmental Law 55/2014/QH13: Article 23. Authority to verify the report on environmental impact assessment: MoNRE shall arrange to verify the report on environmental impact assessment in respect of the following Projects: a) Projects subject to the decision on investment intentions made by the National Assembly, Government and the Prime Minister;
- Decree 18/2015/ND-CP: Article 14. Assessment and approval for EIA reports: 1. The competence of the EIA report assessment authorities: a) The Ministry of Natural Resources and Environment shall assess and approve the EIA reports on Projects prescribed in Appendix III of this Decree: Appendix III: 1. Projects under competence to decide of the National Assembly, the Government and the Prime Minister.

23. The province of Ha Nam has approved the 1/2000 master plan for Nam Cao University Development in 2012 and, due to some changes on this master plan, Ha Nam province recently approved a new master plan and submitted to the Ministry of Construction and project Minister in 2017[6]. After approval of this new plan, a strategic environmental assessment of Nam Cao University Development will be done by the developer of Nam Cao University Development in accordance with Environmental Law 55/2014/QH13 and Decree 18/2015/ND-CP.

24. The budget for the preparation of Vietnamese EIA will be allocated by the government only after the Project's Pre-Feasibility Study[7] is approved. CHPMU will, as soon as the pre-Feasibility Study is approved (within 2018), engage a licensed national consulting firm for the site specific environmental assessment and sampling, preparation and approval of the Vietnamese EIA which should be submitted to MONRE, and expected to be approved 2-3 months after the submission. Subsequently, this IEE will be updated as necessary to reflect any undated national requirements to be met.

25. The Main Project is subject to Circular No. 01/2017/TT-BTNMT[8] which Article 6 restricts land use for universities between 5 and 24ha, but due to the specific nature of the Project (entailing latter on the construction of health care facilities, and with the agreement of the MOH on the land use plan[9], although the Main Project area is more than 24ha, it is approved and the CHPMU is required to coordinate closely with MoNRE as well as Ha Nam PPC, in preparation of the Project. Threshold values are presented from Table 18 to Table 22.

[6] The revised master plan has not been approved as of September 2018.

[7] The pre-Feasibility Study which covers the Main Projects of both HMU and HCMCUMP was submitted to the Prime Minister for approval in September 2018. The Feasibility Study of HMU and HCMCUMP Phase 1 is under preparation accordingly and planned to be approved by MOH within 2018.

[8] https://thuvienphapluat.vn/van-ban/Bat-dong-san/Thong-tu-01-2017-TT-BTNMT-Dinh-muc-su-dung-dat-xay-dung-co-so-van-hoa-y-te-giao-duc-340568.aspx

[9] CHPMU met senior staff of MoNRE in April 2017 and confirmed that the Circular No. 1/2017/TT-BTNMT will not impact on (pre-) feasibility study approval.

III.PROJECT DESCRIPTION

26. SHHRDP is classified as a Category B Project according to ADB SPS 2009 environmental categories. This means the Project will have site-specific, few and some reversible potential adverse impact than a Category A Project, and mitigation measures can be designed more readily. This IEE was prepared for the Project accounting for pre-construction, construction and operational phases, using the information available from previous studies, further collection of information (especially considering the history of the development on-site, natural conditions and biological data) and site visits.

A. Project Location

27. The Main Project is located in plots TH08, TH09, TH10, TH11 and NT10 under the master plan of Nam Cao University Development, Ha Nam province. The site is located in a rice cultivation area and belongs to two communes (Tien Tan and Tien Hiep) of Phu Ly city, Ha Nam province. The Project location is considered as suitable according to environmental safeguards and is shown as a reference on Figure 2 to Figure 9 below, and it has the following borders:

- North boundary: residential area of Truc Son village, Tien Tan commune;
- South boundary: rice fields of Tien Hiep commune and 300 km of provincial road 9711 turn to Q1 road;
- East boundary: boundary road of Nam Cao University Development Area along Cau Gie-Ninh Binh highway.
- West boundary: 68m main road of in Nam Cao University Development Area

Figure 2: Location of the Project on a national scale

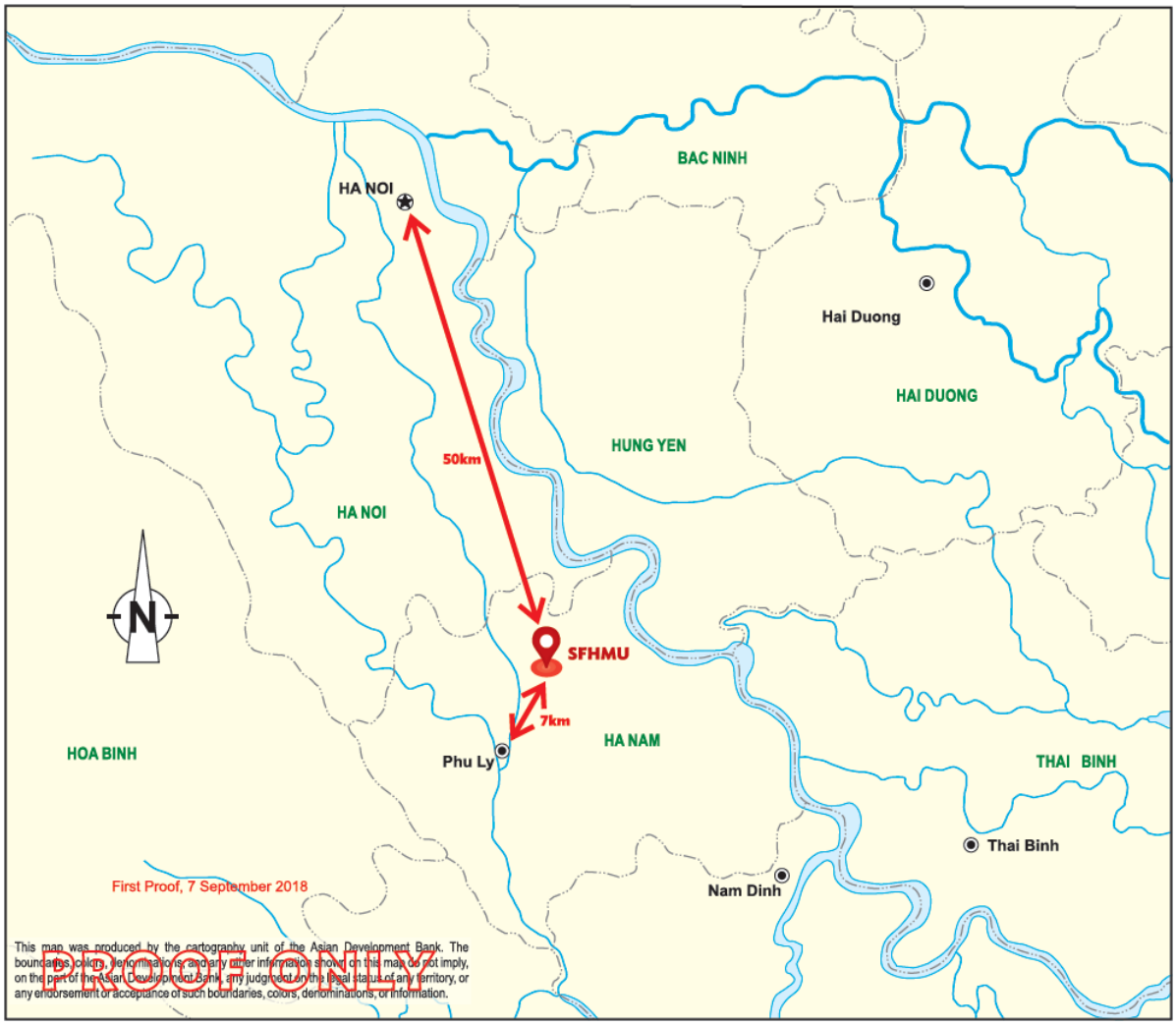
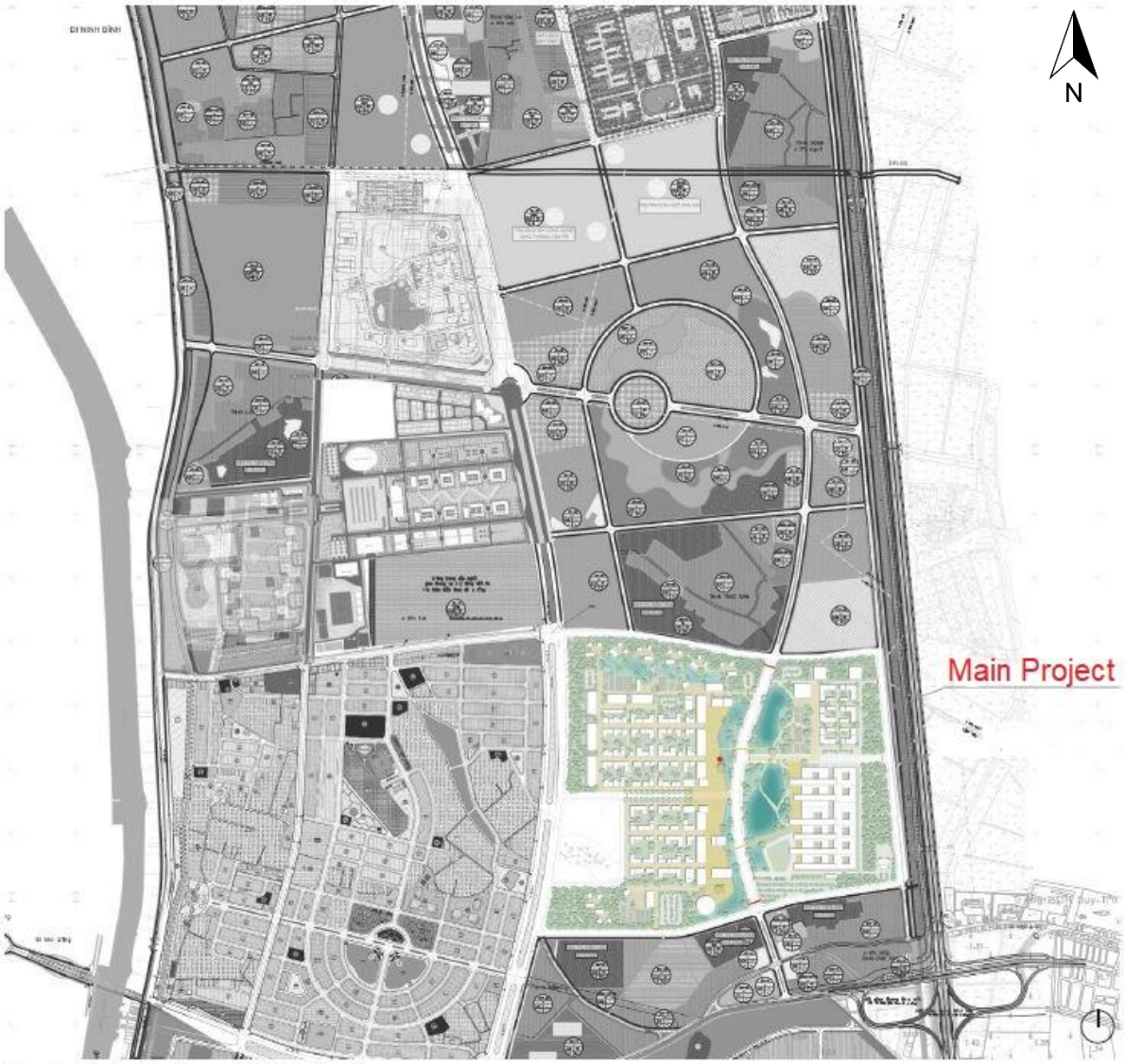


Figure 3: Location of the Project on a regional scale



Nam Cao Zoning Plan (image: POLO Architects)

Figure 4: Nam Cao Zoning Plan (image: POLO Architects)

Figure 5: Master Plan for Main Project Area

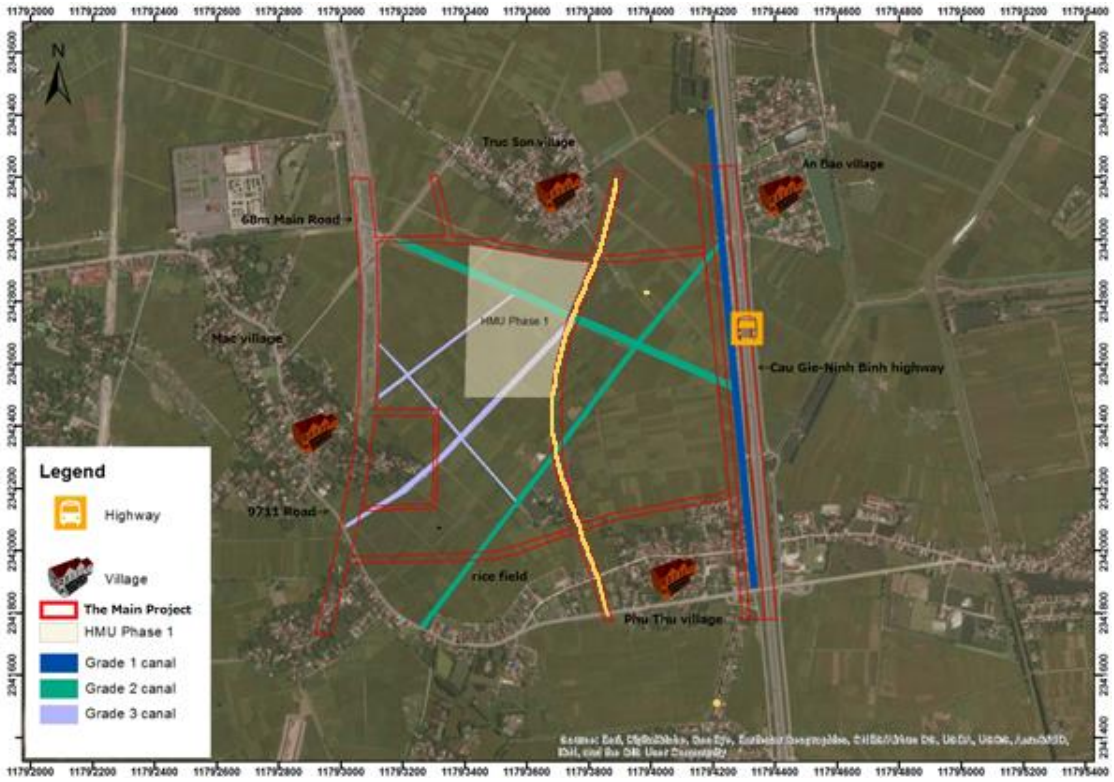


Figure 6: Location of HMU Phase 1 development (approx., in white) inside the Main Project Area (in red lines).

28. As shown in the figure below, HMU Phase 1 is located on the northwest quadrant of the Main Project area, to be developed according to Option B for development (further explained under Section VI) and will have several green open spaces, and will be developed considering accessibility in the area (considering the north-south public road (currently under construction), the avoidance of relocation of graves (para.77) and avoidance (as much as possible) of disturbances to the water bodies.

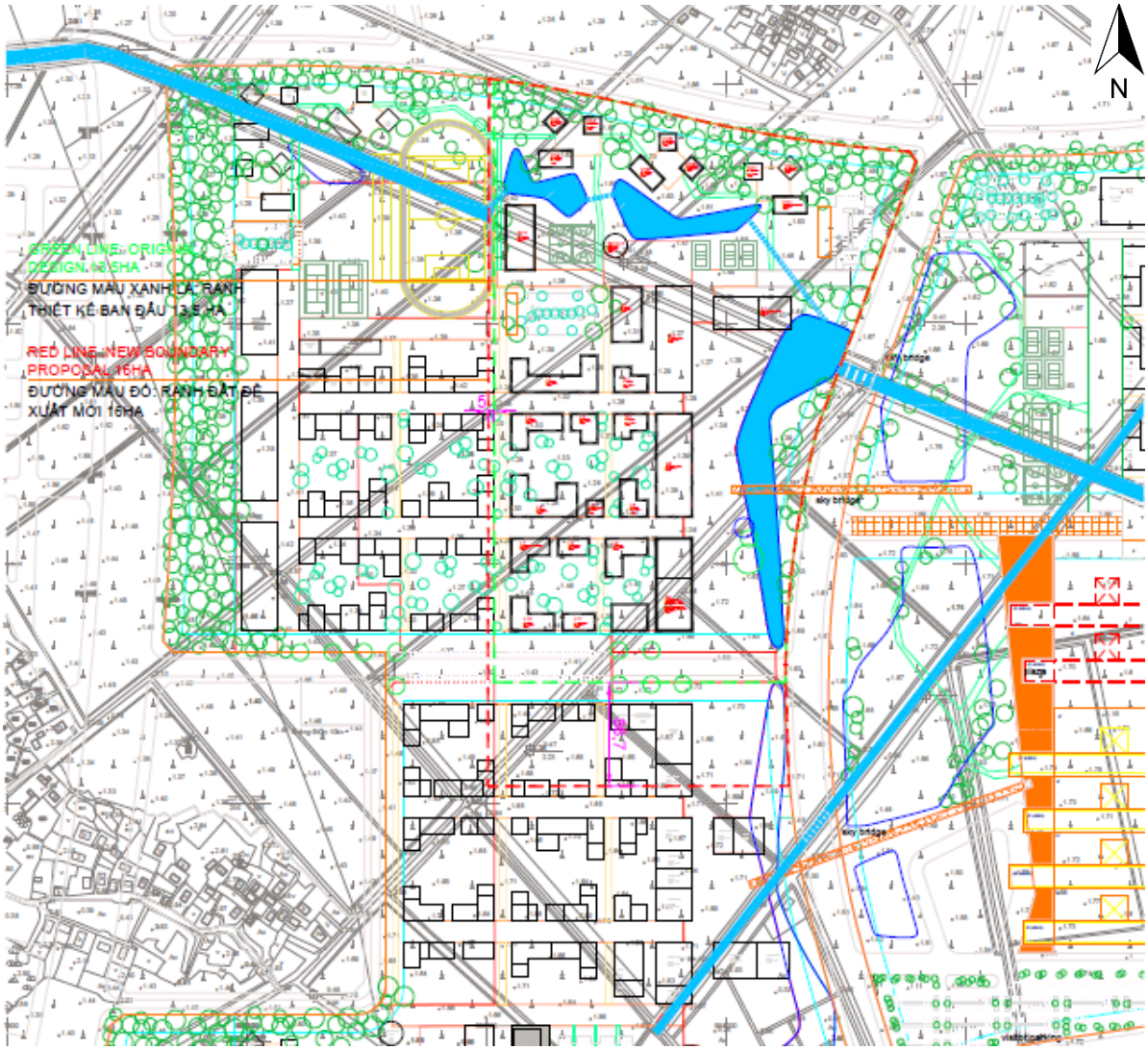


Figure 7: Specific location of HMU Phase 1 development (red line) inside the Main Project area

B. Project Area of Influence

29. The area of influence of HMU Phase 1 development (Figure 8) will consider the Project area, cumulative and induced impacts and a buffer zone (complete 80-100 ha for the total development of consequent Phases 2 and extensions). According to ADB SPS 2009, there are no associated facilities to HMU Phase 1; no facilities' viability and existence depend exclusively on the Project and whose goods or services are essential for successful operation of the Project. Nevertheless, this buffer zone is not centered in the Project

footprint, due to the foreseeable social impacts from the influx of workers during the construction phase and of students and teachers during implementation stage, therefore it is slightly displaced to the north and to the east, including Truc Son village, Tien Tan commune. Some impacts may be considered further away from this area of influence if relevant (e.g., the impact of traffic on the local roads or the pressure of incoming workers on surrounding physical cultural resources[10] and settlements).

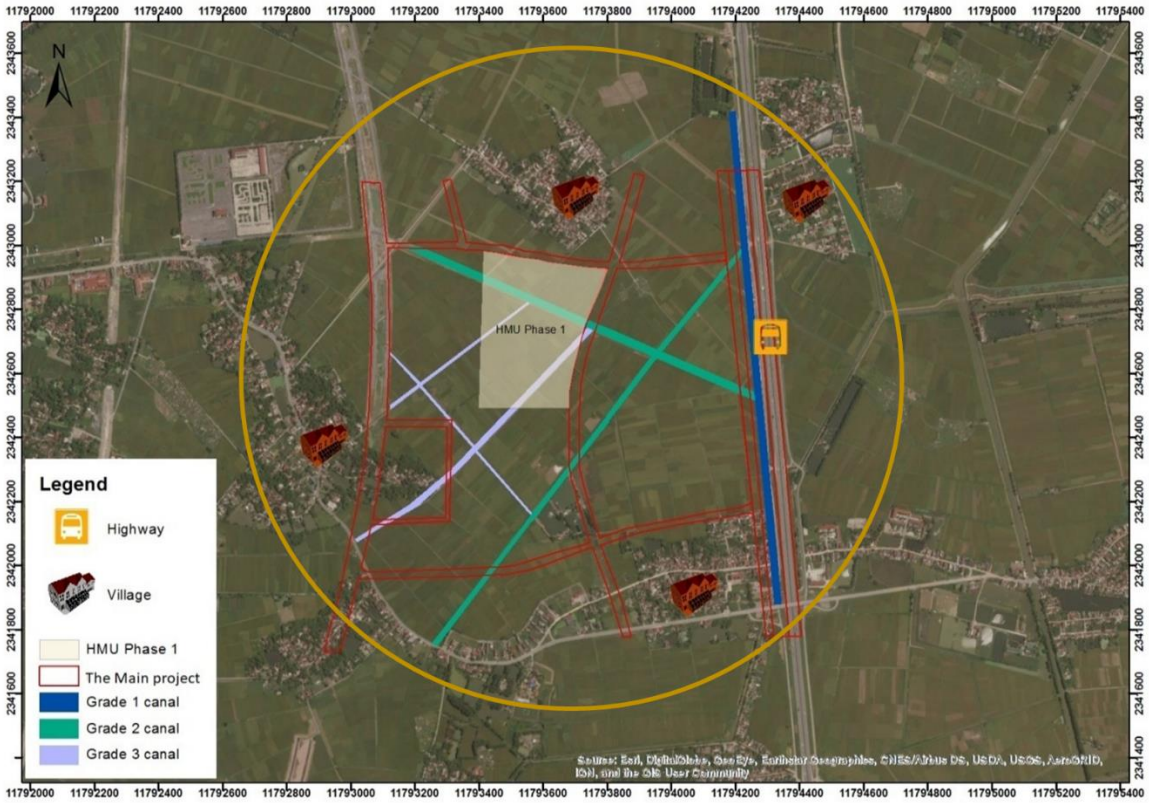


Figure 8: Project Area of Influence

C. Content of the Project

30. HMU Phase 1 will consist of facilities foreseen for teaching Nursing, some laboratory skills, Physics, Chemistry, Pharmacy, Traditional Medicine, Examination Center, Microbiology and Microscopy, Physiology, Biochemistry, Pharmacology, Public Health and Dentistry, which are an auditorium, one main administration and one library building, dorms, teaching laboratory facilities, one teaching medical center, one sport hall, dorms,

[10] Physical Cultural Resources are movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings and may be above or below ground or under water. Their cultural interest may be at the local, provincial, national, or international level. (ADB SPS 2009).

parking, a socio-cultural space, a canteen and a technical cluster, while the preliminary design for the Main Project is expected to consist of one head office, one lecture hall, member universities, university hospital, institute of sciences, companies, general medical libraries, dormitories and hall houses, sports areas, housing for staffs, pedestrian areas and other open areas. Approximately 20% of the students and 11 teaching staff will be housed inside of HMU Phase 1 and the remaining people are expected to get accommodation in the surrounding areas and communities.

31. In the Master Plan of HMU, the Main Project is expected to occupy an area of 40 to 50ha by 2030, which includes the construction of schools, centers, research institutions, administrative units, health service providers and practical training facilities in the university's development plan and in the decisions of relevant agencies. In 2011, the University signed a Memorandum of Understanding with Ha Nam PPC on the handover of 80-100ha of land in Duy Tien Rural District, Ha Nam Province for HMU to build a second campus. This land area is located within the 900 to 1300 ha of the Nam Cao University Development area, an area chosen in accordance with Decree No. 16/2016/NĐ-CP on the relocation of universities and colleges within the inner city of Hanoi. As such, the land use requirement for the construction of HMU's second campus has been met.

MẶT BẰNG TỔNG THỂ- GIAI ĐOẠN 1/ *MASTER PLAN PHASE 1*

SECOND FACILITY OF HA NOI MEDICAL UNIVERSITY

Figure 9: Design of HMU Phase 1 inside Main Project and corresponding legend

Table 1: Components to be considered for the development of HMU Phase 1 (SHHRDP)-VK sources

				SECOND FACILITY HMU - PHASE 1 - OPTION B									
				Planning									Costs
NO. / STT	Function/ Chức năng	Code/ Mã	Storey/ Số tầng	Footprint / Diện tích sàn T1 (m2)	Floor area F2/ Diện tích sàn T2 (m2)	Floor area F3/ Diện tích sàn T3 (m2)	Floor area F4/ Diện tích sàn T4 (m2)	Floor area F5/ Diện tích sàn T5 (m2)	Floor area F6/ Diện tích sàn	Floor area F7/ Diện tích sàn T7 (m2)	Floor area F8/ Diện tích sàn T8 (m2)	GFA/ Tổng diện tích sàn (m2)	Cost Type
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(1)+(2)+(3)+(4)+(5)+(6)+(7)+(8)	
I	**ADMINISTRATION BUILDING, AUDITORIA, LIBRARY/ KHỐI NHÀ HÀNH CHÍNH, HỘI TRƯỜNG, THƯ VIỆN**			**4,796**	**3,072**	**517**	**495**	**460**	**495**	**460**	**495**	**10,790**	
	Auditoria \ / Khối nhà Hội trường	A1											
	Auditoria \ / Khối nhà Hội trường	A2											
	Auditoria \ / Khối nhà Hội trường	A3	2	2,580	1443	-	-	-	-	-		**4023**	2.1b
	Main administrative building, library, auditorium and medical centre/ Khối nhà Hiệu bộ, Thư viện, hội trường và trung tâm y tế	A4	8	2,216	1,629	517	495	460	495	460	495	**6,767**	
II	**EDUCATION/ KHU HỌC ĐƯỜNG**	L		**5,437**	**4,710**	**2,840**	**993**	-	-	-		**13,980**	
	Nursing / Skill labs/ Seminar rooms / Điều dưỡng / Phòng huấn luyện kỹ năng / Phòng hội thảo	L1	4	1,503	1,503	787	399	-	-	-		**4,192**	2.1a
	Physics/ Chemistry/ Pharmacy/ Traditionalmed/ Vật lý/ Hóa học/ Dược/ Y học cổ truyền	L2	3	980	787	592	-	-	-	-		**2,359**	2.1a
	Examination center/ Trung tâm Khảo thí	L4	4	1,414	982	594	594	-	-	-		**3,584**	2.1a
	Microbiology & Microscopy/ Khoa Vi sinh & Hiển vi	L7	2	483	483	-	-	-	-	-		**966**	2.1a
	Physioligy/ Biochemistry/ Pharmacology/ Sinh lý học/ Hóa sinh/ Dược lý	L8	3	364	364	276	-	-	-	-		**1,004**	2.1a
	Public Health/ Khoa Sức khỏe cộng đồng	L9	3	693	591	591		-	-	-		**1,875**	2.1a

III	**DORMITORY/ KÝ TÚC XÁ**			**2.208**	**2.266**	**2.266**	**1.039**	**534**	**58**	**-**		**10.315**	**2.3a**
	Student Dormitories/ Ký túc xá sinh viên	D1a	3	434	442	442	29	-	-	-		**1.347**	2.3a
	Student Dormitories/ Ký túc xá sinh viên	D1b	3	434	442	442	29	-	-	-		**1.347**	2.3a
	Teacher Residence/ Nhà ở cho giảng viên	D1c	3	424	430	430	29	-	-	-		**1.313**	2,5
	Student Dormitories/ Ký túc xá sinh viên	D2a	5	229	238	238	238	238	29	-		**1.210**	2.3a
	Student Dormitories/ Ký túc xá sinh viên	D2b	5	229	238	238	238	238	29	-		**1.210**	2.3a
	Student Dormitories/ Ký túc xá sinh viên	D2c	5									-	2.3a
	Student Dormitories/ Ký túc xá sinh viên	D3a	4	229	238	238	238	29	-	-		**972**	2.3a
	Student Dormitories/ Ký túc xá sinh viên	D3b	4	229	238	238	238	29	-	-		**972**	2.3a
	Student Dormitories/ Ký túc xá sinh viên	D3c	4	229	238	238	238	29	-	-		**972**	2.3a
		D3d	4	229	238	238	238	29	-	-		**972**	2.3a
IV	**SEMINAR/ NHÀ HỘI THẢO**			**1.891**	**1.584**	**980**	**335**	**-**	**-**	**-**		**4.790**	**2.1a**
	Seminar/ Nhà Hội thảo	S1		-	-	-	-	-	-	-		-	
	Seminar/ Nhà Hội thảo	S2	3	534	534	323	-	-	-	-		**1.391**	2.1a
	Seminar/ Nhà Hội thảo	L3	3	454	322	322	-	-	-	-		**1.098**	2.1a
	Seminar/ Nhà Hội thảo	L5	2	234	234	-	-	-	-	-		**468**	2.1a
	Seminar/ Nhà Hội thảo	L6	4	669	494	335	335	-	-	-		**1.833**	2.1a
	Seminar/ Nhà Hội thảo	L10		-	-	-	-	-	-	-		-	
	Seminar/ Nhà Hội thảo	L11		-	-	-	-	-	-	-		-	
V	**SPORT/ NHÀ THỂ THAO**			**1.450**	**236**	**-**	**-**	**-**	**-**	**-**		**1.686**	**2.2d**
	Sports Hall/ Nhà Thể thao	SH1	2	1.450	236	-	-	-	-	-		**1.686**	2.2d
												-	
VI	**SOCIO CULTURAL SPACE/ TT VĂN**			**335**	**-**	**-**	**-**	**-**	**-**	**-**		**335**	2.2c
	Socio Cultural Space/ TT Văn hóa cộng đồng	SOCU1	1	335	-	-	-	-	-	-		**335**	2.2c
												-	
VII	**CANTEEN/ NHÀ ĂN CÔNG CỘNG**			**2.727**	**1.155**	**-**	**-**	**-**	**-**	**-**		**3.882**	2.1b
	Public Canteen / Nhà ăn công cộng	C1	2	1155	1155	-	-	-	-	-		**2.310**	2.1b
	Technical cluster (splitted in MP) / Cụm Kỹ thuật (được tách ra trong quy hoạch tổng thể)	T	1	1.572								**1.572**	
TOTAL GFA/ DIỆN TÍCH SÀN				**18.844**	**13.023**	**6.603**	**2.862**	**994**	**553**	**460**	**495**	**45.778**	

32. The final pre-feasibility study indicates that power will be supplied from the regional system network through transformer substations to be incorporated inside HMU Phase 1, and there will be electricity supply from backup generators in case this provision fails. Three phase transformers need to be upgraded to fit the future requirements of the Main Project and all electrical appliances must be advanced, synchronous and safe. Energy-saving solutions are applied in combination with the smart use of natural lighting. Natural lighting will be privileged in the design of the buildings. Detailed power equipment will be described during the Technical Design Stage, after the Feasibility Study.

33. While Tien Tan commune has used fresh water from a connection with the commune's water supply (para.80), municipal water sources provide water for domestic use and other activities and construction materials used will comply with latest standards (e.g. HDPE pipes) and should come from a piped system that will be installed as part of the road construction. This was confirmed from the municipality, under the Ha Nam Water Joint Stock Company, written on an Official Dispatch No. 1999/UBND-GTXD dated September 28, 2015 of the People's Committee of the Ha Nam Province. Appropriate capacity of wastewater treatment system will be installed under HMU Phase 1. The quality of wastewater after processing will meet class A as per QCVN 14:2008/BTNMT and will be drained into a closed ditch system (H10 centrifugal concrete pipes), then released into external drainage channels, which fulfils the requirements of environmental protection. Wastewater treatment is detailed during the Technical Design Stage, after the Feasibility Study. There is not yet a clear location for the wastewater treatment plant, but it can be indicated it will probably be at the north side of HMU Phase 1 site, with the discharge entering the pubic drainage system along the new west-east road.

34. Fire alarms and automatic firefighting systems will be designed according to the applicable Vietnamese and International Standards. Equipment furbished for the scheme performs seamlessly to ward off any negative consequences on the safety of facility users and properties. Air-conditioning and telecommunication cable networks are planned in a synchronous way.

35. All equipment for construction works must be provided including elevators, air conditioners, telecommunications, generators, water pumps, fire protection, outdoors power and water supply and waste water treatment. Teaching equipment should meet high technical requirements in line with the function and scope of investment. On latter states, there should be a clear definition on the access road, location of construction camp and origin of construction materials (some will likely come from nearby quarries, indicated in map below).

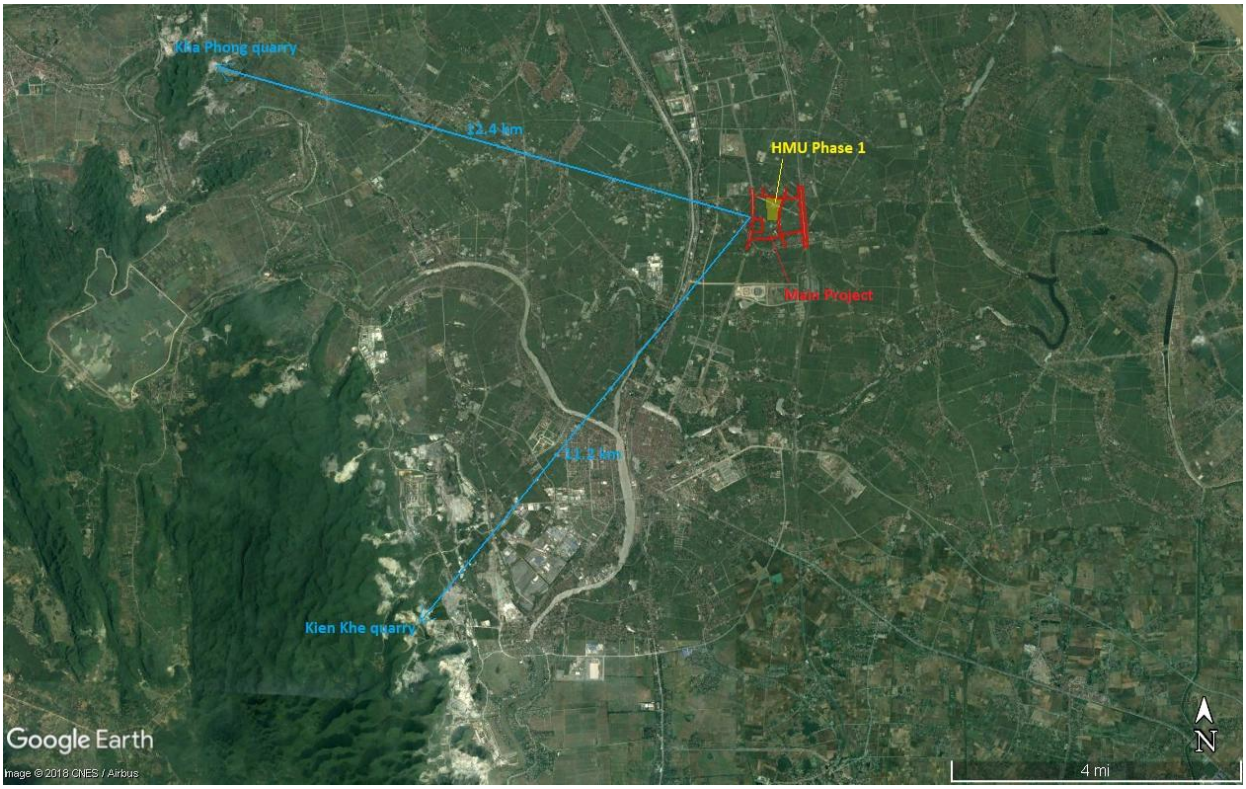


Figure 10: Quarries close to HMU Phase 1 development.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Existing Natural Elements and Infrastructures

36. Inside the Main Project area there is a dense network of internal **water canals** and ditches to irrigate and drain the water in the fields, used for cultivation of rice. There are no other rivers or water canals inside the area. The rice cultivation occurs on a typical flat terrain area, with an average height of 1-2m as compared to the water canals.

37. On the east boundary of the Main Project area, there is the A46 grade-I canal, about 7 km long, with an average width of 10m, made of bricks, serving as the main drainage canal of the commune. This canal is managed by Phu Ly city. There are also two grade-II canals, which are connected from Tien Tho hamlet to the canal between Tien Tan commune and Tien Hiep commune. These two canals are made of soil, and they serve as supply to the local rice fields. They are managed by the commune. Finally, there are other small canals and ditches that are responsible for supplying and draining water to the fields (Figure 11), as presented in Figure 6. There are no Biosphere Reserves, National Parks, Nature Reserves, or World Nature Reserves inside or nearby the Project area.

Figure 11: Visual overview over the rice paddies in the Project area

38. There is only one road inside of the Main Project area. Nam Cao University Development Project Management Unit has constructed a road with 4 km long and 36m wide from north to south (dirt road, unpaved but functional, identified in yellow on Figure 6) in 2017. In the northwest corner there is road 68m (built in 2017 with approval from Ha Nam province) and along the west boundary there is the 300m provincial road 9711 (recently asphalted). On the east boundary is the A46 grade-I canal, parallel to the 23m route to Nam Cao University Development Area. Figure 6 shows the spatial location of these elements. About 50-60m east of the Main Project area is the Cau Gie–Ninh Binh Highway.

39. The rice cultivation occurs on a typical flat terrain area, with an average height of 1-2m as compared to the canals needed to assure the necessary irrigation. There are 600m of pipe lines inside of the area.

40. There is a pumping station system to foresee the irrigation of the agricultural land but it is degraded and it should be renovated and upgraded in case some water canals will be kept for future cultivation inside HMU Phase 1 and its area of influence. The general elevation is of 2.5-3.0m.

41. The area is crossed over by 300m of power lines (without EMF risks to HMU Phase 1 beneficiaries. The provincial electricity management unit will arrange for the relocation of this power line) and is supplied with power from 35kv and 10kv lines. The 35kv line passes through the AC-70 conductor in the Main Project area. There are 35 / 0.4 kV grid substations installed in the nearby communes. At least 85% of the district roads (outside of the Main Project area) have power poles, and the village roads are illuminated up to 70%; the inner road inside the Main Project area is not lightened. Surrounding public facilities have electrical supply except for the cemetery inside of the Main Project area. In the nearby communes all houses have connection to the electricity grid.

42. Currently there are no water supply systems in the Project area. Domestic consumption is guaranteed from drilling wells and for livestock raising rainwater is used. Water wells are of about 30 - 40m depth and are equipped with rainwater tanks. It is known that most wells have high iron content, therefore, all households have preliminary filter tanks. Some 80% of the people in two communes of Tien Tan and Tien Hiep use more rainwater for hygiene and food consumption (volume of rainwater tanks is from over $3m^3$). The Ha Nam water company will guarantee the supply of water for the development of HMU Phase 1, the Main Project and Nam Cao University Development as planned and approved by the Ha Nam Province.

43. Each of the neighboring communes has a waste management organization for collection (on collection points, biweekly) and deposition of the waste (in the local dumpsite, managed by Ha Nam Environment and Urban JSC). The main environmental pollution is from cultivation on the paddies considering the use of chemical fertilizers, and others.

44. Wastewater and rainwater drainage is by ditches built along both sides of the roads, which lead into bigger ditches (along A-46 and A-48) and consequently into Chau Giang river. Most of the wastewater is not adequately treated. Currently, only about 20% of the wastewater is treated using septic tanks before being released into the environment.

45. In HMU Phase 1, the area is mostly agricultural rice fields. The chosen area is besides the main road for accessibility and there is one grade-II canal and 2 grade-III canals. No graves were identified inside this area, nevertheless it is possible that some remains can be found during clearance and construction works (para.77).

B. Abiotic Site Description

1. Topography

46. Ha Nam is a mountainous delta province composed both of plains and hills. The slope of the terrain in the region is northwest-southeast along the valley of the Red river, the Day river and the limestone mountains of Hoa Binh–Ninh Binh, reflecting the simple nature of the geological structure. HMU phase 1 is located in the eastern part of Ha Nam province. The main character of this location is plain field with alluvial soil which is suitable for fertilizing of rice and vegetable cultivations and short-term industrial crops such as sugarcane, strawberry, soybean, peanut and some fruit trees. Most of the land area is divided by a relatively dense canal system making it suitable for ponds, lakes, lagoons and rivers that are suitable for aquaculture, capture fisheries and poultry farming (but which do not occur inside HMU Phase 1). The average elevation in the existing villages is between +3.0 to +5.2m and the average elevation for the

cultivated fields inside the Main Project area is ranging between+1.2 to +2.8m. The water resources are abundant and relatively easy to exploit.

2. Geology

47. The first geological assessment by the Vietnam Department of Survey and Mapping shows the geology in the Ha Nam area is mainly composed by clays with high content of organic matter (in marshes or pond areas), followed by plastic and flexible clays of Jurassic and Cenozoic age.

48. Ha Nam Province is located in an area identified for earthquakes of level 8 (out of 12. Vietnamese structural codes are tougher than western codes and include additional safety for earthquakes, which were accounted for on the design of HMU Phase 1 facilities), according to the forecast of Institute of Earth Physics. This should be taken into consideration when designing the buildings and executing the construction works.

3. Climate

49. The province is located in a tropical monsoon climate area, with 4 seasons and 4 types of weather: warm spring, hot summer, cool autumn and winter. Average rainfall in the last 8 years is about 1,806mm/year, divided into two distinct seasons: the rainy season and the dry season. The rainy season (May to October) accounts for about 80% of the annual rainfall. The average rainfall measured at Ha Nam meteorological station is shown in Table 2.

Table 2: Precipitation in Ha Nam (mm)

TT	Month	Year							
		2008	2009	2010	2011	2012	2013	2014	2015
1	January	37	10,3	106,4	13,3	39,9	30,1	5,8	58
2	February	14	9,9	8,7	27,9	29,5	34,8	37,5	79
3	March	23	55,5	17,4	95,8	24,3	37,6	74	93
4	April	34	88,0	59,9	52,4	60,9	42,2	268,8	27
5	May	260	347,4	176,9	192,8	200,5	296,4	144,7	98
6	June	372	86,5	213,7	325,2	126,3	135,5	228,9	140
7	July	231	509,5	334,2	223,6	253,7	274,0	414,1	61
8	August	271	115,1	429,5	291,7	251	397,4	291,4	146
9	September	352	285,5	209,7	405,9	382,9	377,5	173,5	274
10	October	323	91,1	136,8	135,4	145,6	136,3	141,4	43
11	November	199	6,7	9,9	70,0	182,9	59,7	63	193
12	December	22	32,1	59,0	12,7	71,5	16,9	36,5	48
Total		**2.138**	**1637,6**	**1762,1**	**1.846,7**	**1.768,8**	**1838,4**	**1.879,6**	**1.260**

(Source: Ha Nam Statistical Yearbook 2007-2015)

50. As shown in Table 3, the annual average temperature in the area ranges from 23 to 24.5°C. The hottest months of the year are June, July, August and September. The lowest average annual temperature is recorded in January, February and December. The highest annual average temperature was 25.5°C (2015), the lowest annual temperature was 23°C (2011). The lowest monthly average temperature was 12.7°C (January 2011), the highest monthly average temperature was up to 30.6°C (June 2010).

Table 3: Temperature in Ha Nam (°C)

TT	Month	Year							
		2008	2009	2010	2011	2012	2013	2014	2015
1	January	14,9	15,5	17,7	12,7	14,4	15,3	17,1	17.6
2	February	13,2	22,0	21,5	17,4	16,0	19,8	16,9	18.9
3	March	20,6	20,6	21,6	16,9	19,8	23,3	19,6	21.6
4	April	24,2	24,0	23,0	23,2	25,6	24,5	25,0	24.6
5	May	26,8	26,4	28,1	26,6	28,5	28,5	28,7	30.0
6	June	28	30,2	30,6	29,2	30,2	29,6	29,9	30.9
7	July	29,2	29,4	30,3	29,6	29,7	28,5	29,3	29.6
8	August	28,5	29,3	27,8	28,8	28,9	28,4	28,5	29.6
9	September	27,5	28,3	28,0	27,2	27,2	26,5	28,6	28.1
10	October	26	26,0	24,9	24,2	26,1	25,1	26,5	26.4
11	November	21,3	21,3	21,8	23,5	23,2	22,2	22,7	24.4
12	December	17,9	19,2	19,3	17,2	18,9	15,4	17,1	18.5
Total		**23,2**	**24,35**	**24,55**	**23,04**	**24,04**	**24,0**	**24,1**	**25,5**

(Source: Ha Nam Statistical Year Book 2008 - 2015)

51. The total number of sunshine hours per year in Ha Nam province was the lowest in 2013 (1004.8 hours) and is the highest in 2015 with 1,482 hours. The summer accounts for about 82% of the total sunshine hours in the year. The sunny months are May, June, July, August, September, and October. Solar radiation is an important factor that directly affects the heat regime in the area, affecting emissions, as well as changing pollutants. The average daily radiation in the Province is 100-120 kcal/cm^2. The months with the highest radiation are the summer months (June, August and September) as indicated in Table 4.

Table 4: Hours of sunshine in Ha Nam (hours)

TT	Month	Year							
		2008	2009	2010	2011	2012	2013	2014	2015
1	January	64	96,4	33	11,1	1,9	12,0	136,7	108
2	February	27	79,0	90,6	37,3	17,9	35,3	33	29
3	March	58	44,1	59	16,8	20,5	62,3	10,5	28
4	April	71	77,2	58,6	61,2	105	76,4	15,1	130
5	May	155	117,6	139,1	159,7	167,2	163,3	196,8	228
6	June	101	183,9	170,8	151,2	110,8	177,4	140,8	214
7	July	128	153,7	211,0	170,4	168,2	120,1	143,6	132
8	August	126	204,2	123,9	177,9	168,5	155,8	107,6	192
9	September	110	138,6	142,5	109,4	129,4	90,8	159,8	123
10	October	75	115,4	116,1	65,4	113,1	134,8	150,3	147
11	November	128	138,7	91,7	98,3	105,6	52,2	84,8	97
12	December	103	77,8	93,1	73,6	45,7	161,4	89,7	54
Total		**1.146**	**1.426**	**1329,4**	**1132,3**	**1153,8**	**1004,8**	**1262,7**	**1482**

(Source: Ha Nam Statistical Yearbook, 2008-2015)

52. In Ha Nam there are two major wind directions in the year: winter winds from the north and northeast from November to April and summer winds from south and southeast from April to August. The area of Ha Nam is affected by storms similar to the other places in the Northern Delta. In recent years the number of storms affecting the province is low, but it seems increasing due to the impact of climate change. The average wind speed in the year is ca. 2.5 m/s.

53. In the Northern Delta there are areas where hail, tornadoes, winds, earthquakes, landslides occur, however, in Ha Nam, this phenomenon is low risk.

4. Hydrological conditions

54. Ha Nam province has an average rainfall of 1,806mm / year (average of 8 years). Surface water flows from Red River, Day River, Nhue River sum up to about 87.6 billion m^3 of water annually. The groundwater also helps Ha Nam to be supplemented with water from other areas. The Day River basin measures 5,800 km^2. According to the Ha Nam Hydro-Meteorological Station, the Day River water level at Phu Ly station was the lowest at the level of - 0,14m. Historical flooding corresponds to a maximum level of +4,72m (1985). Water level alarms include BD1 (+2.9m), BD2 (+3.5m) and BD3 (+4,1m) (Decision No.632 / QDTTg dated 10 May 2010 of the Prime Minister at the Hydro Hydrological Station).The Day river flow is about 105m^3/s in the dry season and about 400 m^3/s in rainy season.

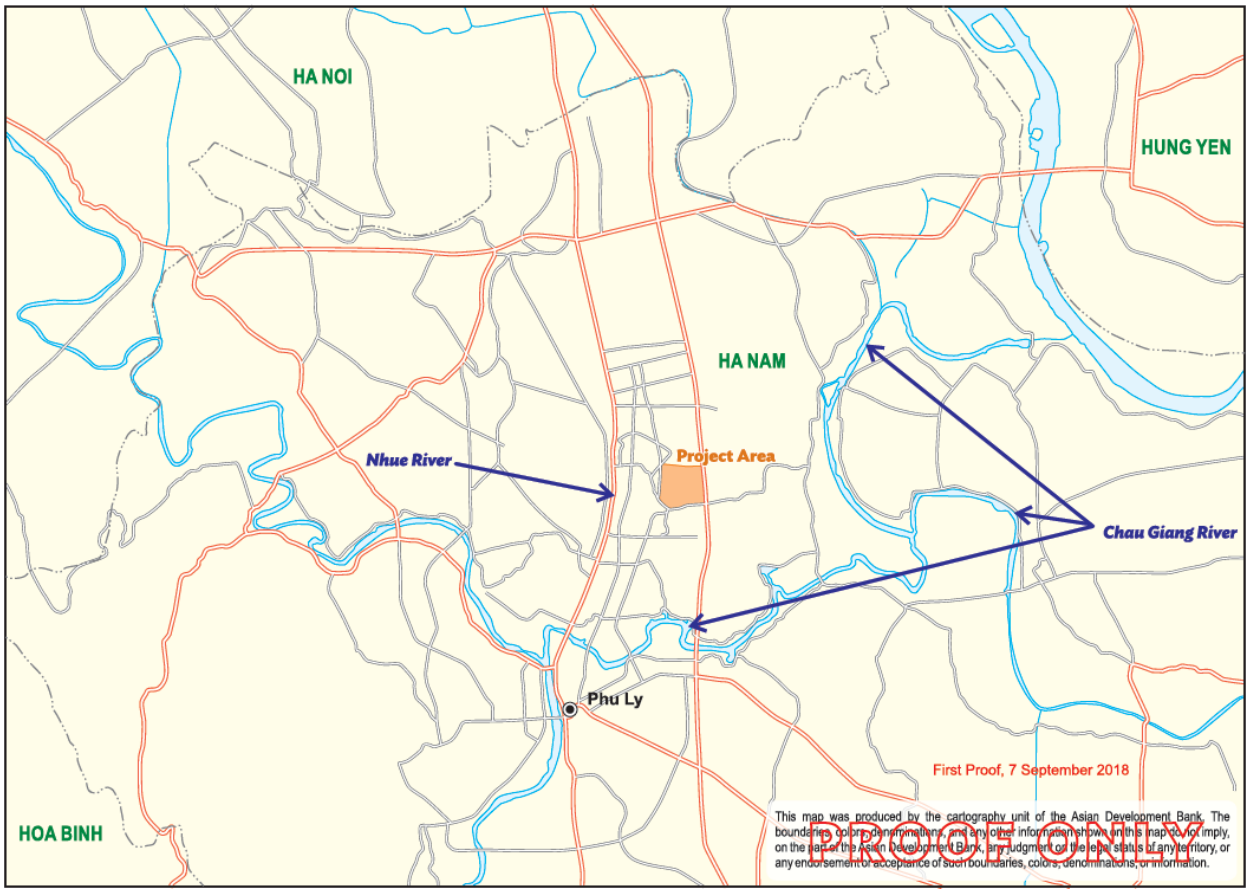


Figure 12: Location of river branches nearby the Main Project area.

55. Parallel to QL1A road at some 3.5 km away from HMU Phase 1 runs the Nhue River. It is in the vicinity of the Main Project area to the north. South and east is the Chau Giang River (Figure 12), a tributary of the Red River. From the analysis of hydrographic data in the field and the existing data at Phu Xuyen and Phu Ly stations, it can be concluded that the regional hydrological regime mainly relies on rain local rivers. There are some flood events recorded in 1978, 1985 and 1996, which may happen again in the future.

C. Environmental Quality Sampling

56. According to the Environment Protection Law (2015), the Vietnamese EIA preparation shall be conducted in parallel with the development of the Feasibility Study. Given that the Pre-Feasibility Study has not been approved (footnote 7), the Vietnamese EIA of this Project including environmental quality sampling of air, water and soil has not been conducted yet. Under this situation, this IEE can only refer to other Vietnamese EIAs which were implemented in the vicinity of the Project site.

57. To prepare an approved local EIA conducted in 2017 for a sub-project which will construct general services and residential zone for teachers and students in 1 ha area of the Nam Cao University Development area, and in order to assess the environmental quality of the air and water, the Green Industrial Environment Joint Stock Company collaborated with the Center for Environmental Treatment Technology and the sub-project's owner, conducted surveys and observations, which took place on 10 March 2017, about 1.5km away from the nearest Project boundary (Figure 13).

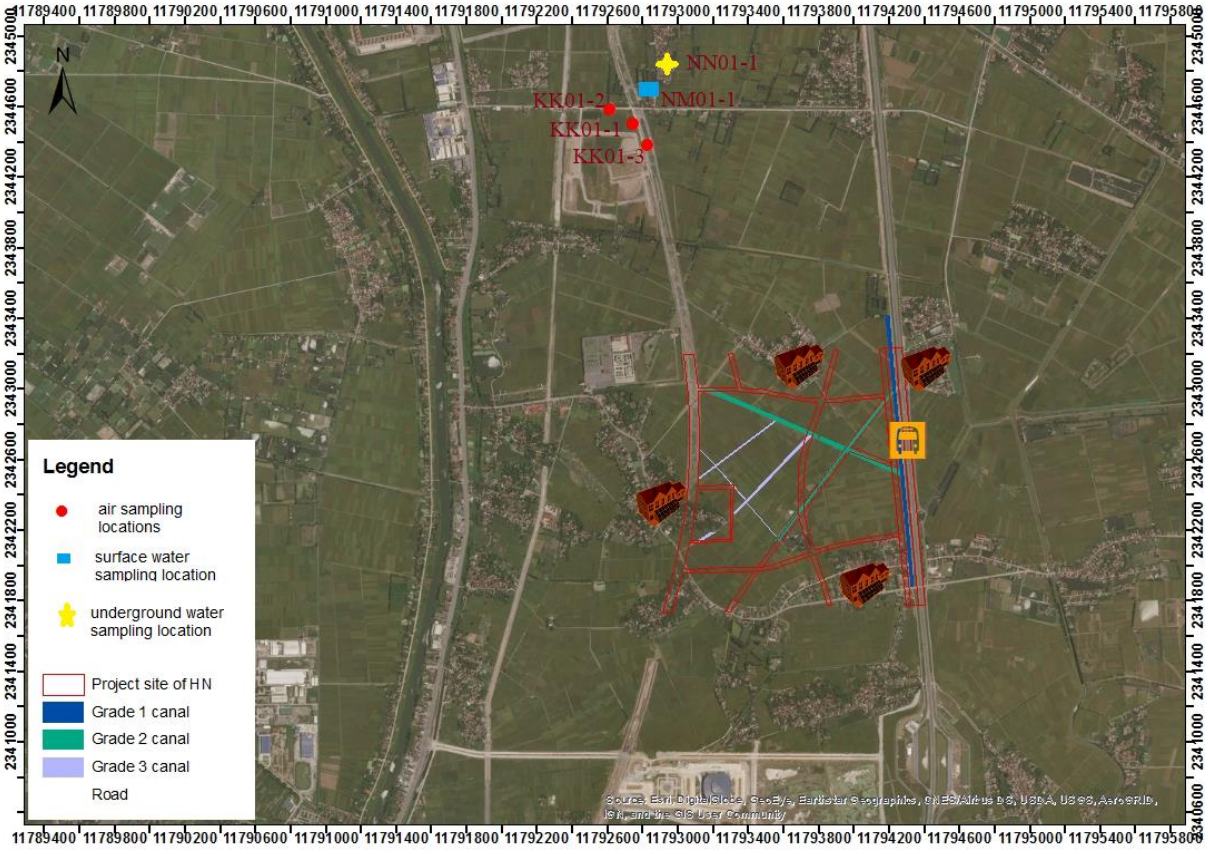


Figure 13: Location of air, superficial and underground water quality sampling points collected for EIA conducted in 2017 for a sub-Project of the Nam Cao University Development area for construction of general services and housing for teachers and students

1. Air Quality and Noise Level

58. Field sampling was done according to Vietnamese Standards regarding sampling methods, sample processing and sample preservation. At the time of sampling, it was sunshine, the average wind speed was of 1.4m/s, northeast wind direction. The coordinates and the results are shown in Table 5.

59. The sample results were compared to QCVN 05: 2013 / BTNMT, the National Technical Regulation on Ambient Air Quality (average measurement value of 1h), to QCVN 26: 2016 / BTNMT, the National Technical Regulation on Microclimate - Permissible Value of Microclimate in the Workplace, to QCVN 24: 2016 / BYT, the National Technical Noise Regulation on exposure to permissible noise levels at workplace, and with Decision 3733-2002 / BYT-QĐ dated 10 October 2002 of the Ministry of Health - Standards of Pollutants in the air at the place of production.

Table 5: Air Quality Field Results

Item	Unit	Analysis results			QCVN 05: 2013 / BTNMT (1h)	QCVN 26: 2016 / BYT	IFC EHS General Guidelines
		KK-01-1	KK-01-2	KK-01-3			
Coordinate X		2279192	2279267	2279083	-	-	
Coordinate Y		597373	597251	597450	-	-	
Temperature	°C	21.5	21.6	21.5	-	18 - 32	
Humidity	%	78.4	78.6	78.3	-	40 - 80	
Noise (1h)	dBA	35	40	42	55*	-	55
Wind speed	(m^3/s)	1.6	1.5	1.6	-	0.2 - 1.5	
Wind direction	-	NE	NE	NE	-	-	
Dust (TSP)	µg/m^3	105	120	100	300	-	20 (1yr) 50 (24hr)
CO	µg/m^3	3,900	3,130	3,005	30,000	-	
SO_2	µg/m^3	13	11	12	350	-	125 (24hr) 500 (1hr)
NO_2	µg/m^3	27	28	26	200	-	40 (1yr) 200 (1hr)

Note: QCVN 05: 2013 / BTNMT - Air quality - National technical standards on ambient air quality (1h)
*QCVN 26: 2010 / BTNMT: National technical regulation on noise One Hour LAeq (dBA) – special areas, daytime
QCVN 26: 2016 / BYT - National Technical Regulation on Microclimate
IFC EHS General Guidelines – Noise level (1hr) at residential; institutional; educational receptor (Table 1.7.1), WHO Ambient Air Quality Guidelines (Table 1.1.1)

60. The concentration of dust and pollutants in the air such as SO_2, NO_2, CO, etc. at the survey sites is lower than the permitted Vietnamese limits, although for dust (TSP) or PM_{10} the WHO Air Quality is much more stringent and therefore the results surpass the guideline of 50 µg/m^3. According to the applicable standards, and the noise measured at the time of the survey is within the allowable limit QCVN 26: 2010 / BTNMT and the WHO standard for residential areas as well.

61. Although sampling points are about 200m away from HMU Phase 1 site, in view of close distance between the Project site and the sampling area (200 m way) and the similarity of environmental and social-economic aspects, the PPTA team (VK Architects and Engineering, in

association with Polo Architects and Ecorem) considers that the air sampling results can be presented as an indication of the overall air quality in the Project area.

62. Although 68m road was constructed after the sampling on 10 March 2017, the PPTA team considers that the environmental quality in HMU Phase 1 site has not changed significantly since then, because the 68m road is 150m away from the Phase 1 Project area and its traffic volume is low, based on the site observation, like the Nam Cao University Development area internal road, constructed in 2016, with no great use up to date.

2. Water Quality

63. HMU Phase 1 locates within the Nam Cao University Development area of agricultural land without natural water ways. There are some canals used for irrigation and drainage crossing through the Project site. These canals take water from Nhue River about 1 km away. Based on the information from the previous sampling and the site observation, the PPTA team considers that the water quality of these canals are not polluted because (i) fish (perch), crab, snail, eel were observed in the canals; and (ii) no bad odors were observed around the canals. However, the underground water results indicate a contamination of Arsenic (As) and Manganese (Mn) which may come from natural (geological) contributions and/or industrial water discharges. Nevertheless, a sampling campaign targeted to the area should be included in the Vietnamese EIA of this Project.

3. Surface Water

64. As reflected in Table 6 below, the analytical results show the sample collected in the water channel (7m to the North of the sub-Project of the Nam Cao University Development area for construction of general services and housing for teachers and students) is within permitted standard QCVN 08-MT: 2015 / BTNMT and therefore it can be concluded that the surface water of the regional water channel is of good quality.

Table 6: Results of surface water quality survey in the area

No.	Parameters	Unit	Analysis Result	Allowable limit (QCVN 08-MT: 2015 / BTNMT)	Analysis Method
			NM-01-1	B1 column	
	Coordinate X		2279257		
	Coordinate Y		597311		
1	pH	-	6,9	5.5-9	TCVN 6492:2011
2	DO	mg/l	6,4	≥ 4	TCVN 7325:2004
3	TSS	mg/l	38,5	50	TCVN 6625:2000
4	COD	mg/l	20	30	SMEWW 5220C:2012
5	BOD_5	mg/l	14	15	TCVN 6001-1:2008
6	NH_4^+	mg/l	0,5	0.9	TCVN 6179-1:1996
7	NO_2^-	mg/l	0,04	0.05	SMEWW 4500 NO_2^-.B:2012
8	PO_4^{3-}	mg/l	0,20	0.3	TCVN 6202:2008
9	NO_3^-	mg/l	1,01	10	SMEWW 4500 NO_2^-.F:2012
10	General grease	mg/l	<0,02	1	SMEWW 5220B
11	Coliform	MPN/100ml	3.800	7.500	TCVN 6187-2:1996

Note: The results are only valid for the sample.

4. Underground Water

65. As shown in Table 7 below, the analytical results indicate that the groundwater in the sampling location (underground water tank of Hoang Trung household, Kim Lu village, Tien Noi commune, 120m to the northeast of the project) has been contaminated.

66. The QCVN 09-MT: 2015 / BTNMT: National technical standard on groundwater quality is exceeded in this sample for Arsenic (As) (2.4 times) and Manganese (Mn) (over 1.34 times). According to the documents "Widely-distributed arsenic pollution in groundwater in the Red River Delta, Vietnam" by Tetsuro Agusa, Suguru Inoue, Takashi Kunito, Reiji Kubota, Tu Binh Minh, Pham Thi Kim Trang, Annamalai Subramanian, Hisato Iwata, Pham Hung Viet, Shinsuke Tanabe (2005), "Arsenic contamination in groundwater and its possible sources in Ha Nam, Vietnam" by Phuong NM, Kang Y, Sakurai K, Sugihara M, Kien CN, Bang ND, Ngoc HM (2012) and "Arsenic and other trace elements in groundwater and human urine in Ha Nam province, the Northern Vietnam: contamination characteristics and risk assessment" by Long Hai Pham, Hue Thi Nguyen, Cuong Van Tran, Ha Manh Nguyen, Tung Hoang Nguyen, and Minh Binh Tu (2016), this may be due to the fact that the geology in the area of Ha Nam contributes with Arsenic and Manganese to the underground waters. Furthermore, the people in the area mainly use groundwater from water wells, which may cause a decrease in the local aquifer, therefore facilitating the natural movement of these contaminants. Other environmental agencies recently sampled the water quality in the vicinity and got similar results. These results are not definite for HMU Phase 1 area and should be verified with a local sampling campaign.

Table 7: Results of underground water quality survey in the area

No	*Parameters*	*Unit*	*Analysis Result*	*Allowable limit (QCVN 09-MT: 2015 / BTNMT)*	*Analysis Method*
			NN-01-1		
	Coordinate X		2279275		
	Coordinate Y		597471		
1	pH	-	6,9	5.5 – 8.5	TCVN 6492:2011
2	NH_4^+	*mg/l*	0,52	1	SMEWW 4500 NH_3.F:2012
3	NO_3^-	*mg/l*	3,52	15	SMEWW 4500 NO_3^-.E:2012
4	NO_2^-	*mg/l*	0,74	1	SMEWW 4500 NO_2^-.B:2012
5	Total Fe	*mg/l*	6,5	5	EPA Method 200.8
6	Mn	*mg/l*	0,68	0.5	EPA Method 200.8
7	As	*mg/l*	0,12	0.05	TCVN 6626:2000
8	Hardness	*mg/l*	450	500	SMEWW 2340C
9	Coliform	*MPN/ 100ml*	KPH	3	TCVN 6187-2:1996

Note: The results are only valid for the sample. KPH not detected.

5. Soil Quality

67. There is no information of soil quality in the Project area.

6. Collection of Specific Environmental Data

68. For specific collection of environmental quality data such as noise level and quality of air, underground water, surface water and soil, further tailor-made sampling for HMU Phase 1 will be conducted during the preparation of Vietnamese EIA (para. 23).

69. The sampling of noise and air quality will be conducted not only at Project site but also at sensitive receptors (residential area) in the vicinity of the Project site. Noise level will be measured continuously for 48 hours including day and night and weekdays and weekends. The sampling of soil quality will confirm if the soil is contaminated by fertilizers/pesticides.

D. Biological Environment

70. HMU Phase 1 and the Main Project are enclosed in the planning area of Nam Cao University Development area, which is rice land in Tien Tan and Tien Hiep Communes, Phu Ly city, Ha Nam Province. A recent quick and overall site survey shows that most of the area of HMU Phase 1 and area of influence are paddy rice land with 2 crops per year. The flora is mainly rice, with some shrubs on the edge of the field according to consultation from Department of Agriculture and Rural Development of Ha Nam.

71. According to the consultation with DONRE of Ha Nam, there is no rare or endangered species in the Project area. The identified wildlife is composed of mice, toads, frogs, snakes, lizards, and birds such as sparrows, storks, cauldrons, worms, crests and others. Livestock and poultry species include buffalo, cow, pig, dog, cat, chicken, duck, goose and others.

72. In the ditches, ponds, rice paddies mainly crustaceans, rodents, larvae, fish were identified. The benthic fauna encompasses snails, mussels, clams, crabs, snakes, and eels. According to DONRE of Ha Nam in consultation from March 2018, there are no protected areas inside the Project area or its vicinities.

73. The information above is consistent with the approved local EIA conducted in 2017 for a sub-Project of the Nam Cao University Development area for construction of general services and housing for teachers and students.

74. The ADB Project team also confirmed using IBAT (Integrated Biodiversity Assessment Tool) that there are no protected areas, the location and importance of priority sites for conservation (key biodiversity areas) and threatened species in and around the Project site.

E. Social Environment

75. Two communes will be affected directly by HMU Phase 1: Tien Hiep and Tien Tan, both belonging to Phu Ly City, Ha Nam province. For Tien Hiep commune, there is only one out of five villages affected by this Project (Phu Thu village). For Tien Tan commune, there are two villages affected by HMU Phase 1 (Mac Village and Truc Son village). A total of 80ha of agriculture land will be occupied by the Main Project, of which 16ha are subject of study for HMU Phase 1. The following table shows the distance of several elements to the nearest boundary of the Project:

Table 8: Distance of elements to nearest boundary of Project

No	Element	Distance from nearest Project boundary (m)	Distance from center of Project area (m)
1	Cemetery Phu Thu Village	110	366
2	Primary and Secondary School	1,070	1,345
3	Mac Pagoda	465	740
4	Medical Center of Commune	870	1,145

1. Existing Socio-Economic Features

76. As mentioned previously, and as indicated in Figure 11, the Main Project area is used for rice fields by farmers from neighboring communes. On the east boundary of the Project area lies Truc Son village, belonging to Tien Tan Commune. Towards the south there is the residential area of Phu Thu Hamlet, Tien Hiep Commune. In the southwest is Ngoi Village, Tien Tan Commune and to the west Mac Xa Village, Tien Tan Commune. On the opposite side of road 68m there is the newly built Tan Ha Urban area.

77. Approximately 500m south of the HMU Phase 1 site there is a sports complex of Ha Nam province. Some 4.5 km to the north is Dong Van Industrial Park. About 220m to the north there is the Truc Son Pagoda in Truc Son village (Tien Tan Commune). Approximately 120m to the southwest of HMU Phase 1 is Mac village pagoda (Tien Tan commune) and the Mac Xa Hamlet (Tien Tan Commune). There are no other pagodas, temples, shrines or other physical cultural resources inside the Project area.

78. There is a number of graves inside of the Main Project area, scattered on the land, but also gathered inside a graveyard, with Tien Tan and Tien Hiep Communes relatives (Figure 14). When the Main Project will be implemented, the scattered graves should be moved, and the graveyard either kept as part of the planned development or relocated into another location close by. Based on the survey of HMU Phase 1 and comparing to the map as well as the results of the interviews with people, the PPTA team concludes that there are no known scattered graves, only 11.33 ha of agricultural rice land, 4.85 ha of public land (roads and water canals) inside HMU Phase 1 site. This was also confirmed by the village head and the cadastral official at a meeting with commune's representatives.

Figure 14: Graveyard inside Main Project area

79. The baseline health profile for the province of Ha Nam and Viet Nam are presented in Annex 1. It provides the various determinants of health: socio - demographic profile, employment and education and the health outcomes with health indicators, health services, curative care and health insurance.

2. Socioeconomic Profile of the Affected Households

DEMOGRAPHICS

80. The PPTA team including one expert with three assistants and support by a local Project coordinator has surveyed 125 households directly affected by HMU Phase 1 and at least 44.8% of the key informants are women.

Table 9: Surveyed AHs and head of household gender

No.	District/ Commune	No. of AHs	No. of APs	Members of the surveyed AHs	
				Male	Female
1.	Mac village, Tien Tan commune	50	166	99	67
2.	Truc Son village, Tien Tan commune	75	264	158	106
	Total	125	430	257	173

Source: Questionnaire interviews

AH = affected household, AP = affected person

Table 10: Population Structure by Age Group

No.	Communes/Village	Age group			
		Below 17	18-60	Above 60	Total
1	Mac village, Tien Tan commune	31	69	66	166
2	Truc Son village, Tien Tan commune	42	148	74	264
	Total	**73**	**217**	**140**	**430**

Source: Questionnaire interview

81. Most of interviewed households have a large number of people of working age. In 2016-2017, the school attendance rate was 100% and about 4% of the students won provincial and city awards, with 65% of graduates. In HMU Phase 1 development area there are 430 affected people, of which 173 are women (40.23%). There are 217 people at working age (18-60).

82. According to the information from commune officials, presently Tien Tan commune has used fresh water from a connection with the commune's water supply. In addition, toilets of households in the commune are mostly septic toilets and sanitation is therefore ensured.

83. The existing health care related facilities are a commune health office and some private pharmacies. The general hospital of Phu Ly city is located not far from the commune center and people can easily reach the central hospital or other health centers. The transportation system in the commune and to surrounding communities is convenient.

LIVELIHOOD OF AFFECTED HOUSEHOLDS

84. The main livelihoods of AHs in both Communes are rice cultivation, livestock (poultry, pigs, others), workers (in IZs in Phu Ly city), small business services (such as grocery stores and others) and seasonal independent workers. Most of the AHs that still grow rice don't want to continue with this activity (90%) because of its low productivity and revenue, and the possible natural disasters risks. Although it is the most common livelihood in the local community, many households in the community have not used their farmland for the past five years and instead they rent it to other people to grow rice so that the land is in use.

85. Within the 125 interviewed heads of Affected Households (AH), there are people who are at working age, 53 of them (equal to 43%) has main job as farming. The remaining number of 41 people in Tien Tan (equal to 24%) and 39 people (equal to 23%) are working in factories in the industrial zones nearby. There are only a few people with other options, such as livestock husbandry or small businesses.

Table 11: Occupational Structure of Affected People

Occupation	AH Head		AH member	
	Quantity	%	Quantity	%
Cultivation, livestock and husbandry	53	42%	68	22%
Contract workers (IZs, others)	8	6%	55	18%
Small businesses (grocery stores, others)	9	7%	24	8%
Independent workers / free labor	23	18%	56	18%
Others (housewives, retired, others)	32	26%	102	33%
Total	**125**	**100%**	**305**	**100%**

Source: Questionnaire interview

AP = affected person

HOUSEHOLD MONTHLY INCOMES

86. According to the statistics of Tien Tan commune, the average income of households is approximately 2,910,000 VND per person per month.

3. Gender Issues – Disparity between Women and Men on Foreseeable Impacts

87. The survey showed some gender issues related to resettlement. Men often take the final decision for all important issues in the family. The AHs of HMU Phase 1 reported in the in-depth interviews that at least 71% of the men take the important decisions in the family, such as selling and buying high value goods; investments for production; business operation, etc. As such, there is only a low percentage of women (19%) that have the opportunity to make the important decisions in the family.

88. In addition, men are the owners of the high value assets in the family. Women have access to these facilities, but they do not make decision on those. The survey also revealed that 55.2% of the men are the owners of the household's land. Women may have the opportunity to provide their opinion, but eventually the men make final decisions on these matters.

V.ANTICIPATED IMPACTS AND CORRESPONDING MITIGATION MEASURES

89. The anticipated impacts described below are valid for HMU Phase 1 development, corresponding to the teaching and accessory facilities described under Section 4.

90. In this chapter, impacts are classified as Negligible, Minor, Moderate or Major according to their magnitude and the sensitivity of the receptor, depending on the type, extent, duration, scale and frequency of each impact, as indicated in Table 12. The result is an impact significance table (Table 13) applied to all impacts on the Project site and area of influence, with further description of mitigation measures and foreseeable residual impacts.

Table 12: Impact classification system used for this assignment

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

91. This will allow for the Project to determine the scope and level of efforts devoted to the risks and impacts identification and mitigation process. The impacts will be described for each of the phases of the Project (pre-construction, construction and operation).

A. Screening of Potential Anticipated Benefits

92. The establishment of the second campus of the University is necessary to build one of the country's leading health universities in the Capital Region and reduce the load on the existing facilities of Hanoi. Urban facilities are mainly used for in-depth, post-graduate and in-depth training; these facilities shall serve basic medical training and specialties attached to medical establishments. Schools have the prescribed infrastructure to improve the quality of training to meet the human resources needs of the health sector in order to implement Resolution No. 20 / NQ-TW dated 25/10/2017 of the Central Conference.

93. Thus, the benefits from this Project will be mainly the contribution to the renewal of medical human resources training, trainings that meet ethical and professional international requirements, schools with spacious and modern facilities creating great conditions for learning, strengthening of the country' health system in the long run, healthcare in areas outside of big city centers, creation of jobs, renovation of spaces into facilities that promote health (open spaces, seminar rooms, etc.). More specifically, these include:

a. Increase of the number of graduates with strong expertise in health, nursing, pharmacy and others;

b. Diversify the scope of training by introducing new programs and disciplines;

c. Ensure the quality of health human resources by generating a class of graduates from regionally accredited training programs;

d. Strengthen continuing medical education and the licensing of practitioners, which promotes the quality and management of healthcare resources in the country;

e. Strengthen the deployment of health graduates, which resolves the understaffing issue in poor and vulnerable areas;

f. Compliance with the socio-economic development plan for 2016-2020 (Resolution No. 142/2016/QH13 dated April 12, 2016)on increasing the number of doctors per 1,000 people;

g. The health sector development plan for the 2016-2020 period (MOH. The Plan for people's health protection, care and promotion in the 2016-2020 period. Hanoi) with the aim for universal healthcare coverage by removing the barriers of the quantity, quality, and allocation of health human resources;

h. Health human resources development Master plan, in order to build up capacity for education and training institutions and meet the requirements for human health resources nationwide.

B. Project Impacts during Pre-Construction Phase

94. The Project preparation stage will mainly consist of land acquisition, compensation and site clearance. As mentioned before, the area to be recovered is 100% agricultural land for rice cultivation, belonging to people of Tien Tan commune. Since Ha Nam PPC agreed to deliver cleared land to the CHPMU (Project Owner) when the Project would be ready for implementation, a Memorandum of Understanding was signed on 12 September 2011 between Ha Noi Medical University and Ha Nam PPC. Therefore, in the Project preparation stage, the land acquisition will entail costs for compensation of rice and other crops, loss of land and relocation of assets (if any). The total cost of compensation for crops is included in the Project investment. The main environmental impacts during this phase will therefore be the clearing, cutting, and levelling of the area (if any). Potential impacts are depending on the machinery used, and may include dust, noise, emissions, domestic waste and wastewater from workers on site, construction waste and hazardous waste from the maintenance of machinery and UXO clearance.

95. UXO clearance will include surveys and explosive detection, removal, transport and destruction in accordance with the local Vietnamese regulation and in coordination with the Technology Center for Bomb and Mine Disposal (BOMICEN), part of the Ministry of Defense and Provincial Authorities.

96. Other impacts may be the changes in landscape, increased traffic, environmental and social impacts associated with the influx of workers that may move to the site for the works (stemming from solid and liquid waste generated in worker accommodations; and an increase in social evils such as drug use, alcoholism, prostitution and gambling) and occupational health and safety risks.

97. The general facility design and operations should, according to IFC EHS Guidelines, foresee the application of prevention and control measures to occupational hazards based on comprehensive job safety analysis, which regard to (i) integrity of workplace structures, (ii) severe weather and facility shutdown, (ii) workspace and exit, (iii) fire precautions, (iv) lavatories

and showers, (v) potable water supply, (vi) clean eating area, (vii) lighting, (viii) safe access, (ix) first aid, (x) air supply, and (xi) work environment temperature.

98. Social impacts associated with resettlement and loss of livelihoods can be considered major depending on the adequacy of resettlement action planning, livelihood restoration planning and if appropriate mitigations are not implemented. Potential impacts can include:

a. Food insecurity (if economic resettlement is done in money and affected persons currently harvesting do not have opportunity for at minimum, small-scale harvesting);

b. Increase in drug and alcohol consumption if cash compensation is not dovetailed with engaged resettlement planning with affected people prior to relocation;

c. Loss of informal trade networks, depending on the informal socio-economic location of the village;

d. Stress-mediated mental well-being disorders such as anxiety and depression associated with resettlement.

99. It is considered these impacts are, in general, major, since they are large in magnitude and the sensitivity of the receptors is considered as moderate.

100. It is anticipated that mitigation measures will be included in the detailed design of the Project implementation. Common techniques for energy and water conservation should be included in the Project design since some impacts to these resources are expected during the construction and operation stages. The IFC EHS General Guidelines indicate conservation opportunities, which are applicable to HMU Phase 1, for energy efficiency, heat distribution systems, energy conversion system efficiency improvements for process cooling, and energy conversion and also indicate water conservation measures like water monitoring/management techniques, process and cooling/heating water recycling, reuse, and other techniques and sanitary water conservation techniques (for example: storm/rainwater harvesting and use, zero discharge design, adequate water collection measures for adequate water collection, spill control and leakage control system.

101. More in detail, the IFC EHS HCF (applicable to the medical laboratories and research facilities of HMU Phase 1) indicates HCF design considerations to ensure the separation of materials and people flows, development of adequate disinfection facilities, adequate space for storage of materials, selection of heating and ventilation systems that prevent airborne infections, design of water systems, provision of hazardous materials and waste storage and handling areas, treatment and exhaust systems for infectious agents and selection of easily cleaned building materials. The IFC EHS THD (applicable to the accommodation and catering facilities of HMU Phase 1) indicates potential EHS on issues like increased demand on limited local infrastructure including roads, water supply, and liquid effluent and solid waste disposal capacity, and increased stress on ecologically sensitive areas.

102. Furthermore, all workers will undergo a site induction/orientation that will highlight expectations on minimizing impacts to the physical and social environment. There will be an on-site and off-site code of conduct established that will outline roles, responsibilities and consequences for non-compliance. Prior to construction, the Contractor Environmental Management Plan (CEMP) will have its Impact Mitigation Plan updated based on the EMP of

this IEE, to include more detailed information regarding (a) Traffic and noise/dust/vibration/emissions management plan; (b) Waste management plan; (c) Wastewater management plan; (d) Worker accommodation management plan; (e) Occupational and community health and safety management plan; and (f) Grievance redress mechanism.

103. As examples of mitigation measures to be implemented, solid waste and domestic wastewater deposition and collection equipment will be available on site and for worker accommodations. The design of the Project should include best practices mentioned in the IFC EHS Guidelines like (i) establishing waste management priorities at the outset of activities based on an understanding of potential EHS risks and impacts and considering waste generation and its consequences, (ii) establishing a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes, (iii) avoiding or minimizing the generation waste materials as far as practicable, (iv) recovering and reusing waste, and (v) where waste cannot be recovered or reused, treating, destroying, and disposing of it in an environmentally sound manner.

104. If any hazardous waste is foreseen to be produced, it will always be segregated from non-hazardous wastes and if its generation cannot be prevented, its management should focus on the prevention of harm to health, safety and the environment following the principles of (i) understanding potential impacts and risks associated with the management of any generated hazardous waste during its complete life cycle, (ii) ensuring that contractors handling, treating and disposing of hazardous waste are reputable and legitimate enterprises, licensed by the relevant regulatory agencies and following good international industry practice for the waste being handled, and (iii) ensuring compliance with applicable local and international regulations (which may include host country commitments). If any hazardous health care waste is foreseen to be produced in the medical laboratories and research facilities, there should be an health care waste management system adequate for the scale and type of activities which should include the components (i) waste minimization, reuse and recycling (ii) waste segregation strategies, (iii) on-site handling, collection, transport and storage, (iv) transport to external facilities, (v) treatment and disposal options.

105. All transportation vehicles and construction machinery need to meet the most stringent Vietnamese or International standards for noise, vibration and emissions and be regularly maintained to assure compliance. Dust generated during the site preparation phase will be mitigated through watering and all materials will be stored appropriately, following IFC EHS General Guidelines, HCF and THD and according to each material specification for safe storage.

106. Occupational health and safety in line with International Finance Corporation Environmental, Health, and Safety Guidelines (IFC EHS Guidelines) and other regulations are to be followed in order to avoid or minimize risk injuries to workers (usage of personal protective equipment (PPE), identification of pathways and working areas, clear identification of hazardous materials on site, and others).

107. Community health and safety mitigations will be outlined clearly and at minimum will include: engaging with local villages and communes along transportation corridors with traffic safety awareness campaigns, imposing speed limitations with zero tolerance clauses in the worker codes of conduct for non-compliance, traffic signs on entry and exit points of the construction site, signs inside villages of caution with the transportation machinery. It is

anticipated that there will be economic resettlement and therefore a Resettlement Plan will be prepared for HMU Phase 1 and mitigation measures will also include:

a. Select a resettlement site that does not affect connection to Tien Tan commune, food-security, and access to existing socio/cultural support networks and health and social services;

b. Provision of technical assistance and livelihood specialists to engage with households on the individual level to establish a resettlement household plan. This type of planning reduces the risk of stress-mediated disorders and food security;

c. Training of commune health staff and village health workers on signs of stress-mediated disorders and non-invasive preventative and treatment options.

108. It is considered that after implementation of mitigation measures these impacts will be, in general, minor, since the magnitude will be medium only and the sensitivity of the receptors is considered as low.

C. Project Impacts during Construction Phase

109. The potential impacts that are foreseen to directly affect the environment during construction are mainly related to construction activities and the presence of about 50 construction workers at site[11], who will stay in worker camps that will be built in the construction site.

110. It is expected that impacts will include (i) increased dust; vibrations, noise, and emissions from transportation of materials and other machinery (such as particulate matter (PM), nitrogen oxides (NO_x), SO_x, VOC), (ii) generation of construction and domestic wastes, wastewaters, and hazardous wastes from maintenance of machinery, (iii) and increased traffic in the Project area and surrounding villages and communes (traffic jams, traffic related accidents, and others).

111. Occupational Health and Safety Impacts are foreseen specially during this phase of construction and according to IFC EHS General Guidelines, employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers and preventive and protective measures should be introduced for (i) eliminating the hazard by removing the activity from the work process, (ii) controlling the hazard at its source with engineering controls, (iii) minimizing the hazard with the design of safe work systems and administrative or institutional control measures (iv) providing appropriate personal protective equipment (PPE) together with training, use and maintenance of PPE. More detailed considerations on communication and training physical hazards, chemical hazards, biological

[11] Calculated based on (a) Decision No.1091/QD-BXD dated 26 December on Announcing cost estimates norm for construction works – Construction part (supplement); (b) Decision No.1172/QD-BXD dated 26 December 2012 on Announcing cost estimates norm for construction works – Construction Part (amend and supplement); (c) Decision No. 588/QD-BXD dated 29 May 2014 on Announcing cost estimates norm for construction works – Construction part (supplement); (d) Decision No.235/QD.BXD dated 04 April 2017 on Announcing cost estimates norm for construction works – Construction part (supplement); and (e) Decision No.1264/QD-BXD dated 18 December 2017 on Announcing cost estimates norm for construction works – Construction part (amend and supplement).

hazards, PPE, special hazard environments, and monitoring should be followed according to the Vietnamese legislation and the IFC EHS General Guidelines, IFC EHS HCF and THD.

112. Other impacts associated with the presence and activities of construction workers include: their pressure on existing infrastructures and social and health services (housing, health care, other services); the potential for conflicts between workers and local community members; an increased risk for communicable diseases including sexually transmitted infections (depending on the work rotation scheduled); and increased risk for other air-born communicable diseases if worker accommodations are not adequate from a health and safety perspective and social evils.

113. According to IFC EHS general guidelines, there should be management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction. Community health and safety risks may arise from inadvertent or intentional trespassing, including potential contact with hazardous materials, contaminated soils and other environmental media, buildings that are vacant or under construction or excavations and structures which may pose falling and entrapment hazards. Community hazards associated with health care facility environments, particularly related to hazardous health care waste necessitate that members of the public receive adequate information regarding potential infection hazards within the facility, and at associated waste disposal sites.

114. Other expected impacts could come from vibration, noise, soil erosion, air pollutants (such as particulate matter (PM), nitrogen oxides (NO_x), SO_x, VOC), wastewater discharges, construction and domestic wastes, and hazardous wastes from the maintenance of machinery and contaminated land. The IFC HSE General Guidelines outline mitigation measures for each impact which will be described hereunder on Table 13.

115. It is considered these impacts are, in general, moderate, since they are medium in magnitude and the sensitivity of the receptors is considered as low. It is expected that impacts will considered to be minor if all mitigation measures are applied. Most of the impacts will also be temporary, due to construction works.

116. Measures to mitigate potential impacts will also be outlined in the EMP, Section IX, in order to meet ADB SPS 2009 and be in line with World Bank Environmental Health and Safety guidelines for construction, and international standards associated with worker and community health and safety and worker accommodations.

D. Project Impacts during Operation Phase

117. The main potential foreseeable impacts during the operational phase, when HMU Phase 1 would become operational, will be the noise, the increased density of traffic and its consequent emission of gases (containing NO_x, SO_x, CO, CO_2), the wastewater discharge and the domestic waste. On the social side, there will be a higher pressure on the social infrastructures (like public spaces, physical cultural resources, restaurants and other services) and the possible increase of social unrest and dissemination of new diseases. On the other hand, socially speaking, the Project will bring more benefits than negative impacts since the population will have better health care, there will be more work, the commerce will develop faster and on the long run, the living conditions in the Province will improve.

118. Best practices and guidance from IFC EHS Guidelines address some aspects of the Project activities taking place outside the traditional Project boundaries, which impact the

surrounding communities. These considerations demonstrate issues and impact measures on the community, related to water quality and availability, structural safety of Project infrastructure, life and fire safety, traffic safety, transport of hazardous materials disease prevention and emergency preparedness and response. The IFC EHS Guidelines for HCF outline that the community hazards associated with health care facility environments, necessitate that members of the public receive adequate information regarding potential infection hazards within the facility and at associated disposal sites.

119. The foreseeable adverse impacts for the operation phase are mainly considered as minor and even negligible after mitigation measures are applied. The Project is considered to be beneficial for the surrounding area of influence, the surrounding communes and the country in general.

120. Measures to mitigate potential impacts during the operation of the campuses entail the establishment of appropriate capacity of wastewater treatment system, which will be defined during the Technical Design Stage, after the Feasibility Study, the establishment of adequate sanitation facilities to prevent littering and dissemination of diseases (gender adapted), cleaning and watering of the paved areas to reduce dust, the collection of domestic waste, decrease of the road traffic speed inside and in the surrounding areas of the campus, assure the open spaces will be planted and maintained accordingly (preferably with local vegetation options), and ensure the campus and the ways for dormitories and other houses (if outside of the area) are safe and sufficiently lit.

121. There will be few hazardous wastes from the medical laboratories and research/teaching facilities which is only for research based guidelines of HMU local students during learning, and daily activities such as batteries from equipment etc. These wastes shall be collected and stored so as to prevent accidental releases to air, soil and water resources in area location where (i) the waste is stored in a manner that prevents the commingling or contact between incompatible wastes, allows for inspection between containers, (ii) stored in closed containers away from direct sunlight, wind and rain, (iii) containment systems should be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment, (iii) provide adequate ventilation where volatile wastes are stored. Storage activities should also be conducted by employees who have received specific training in handling and storage of hazardous wastes, the containers should be adequately labelled and delivered to waste treatment facilities collectors with the adequate authorization to manage these wastes.

E. Indirect, Cumulative or Induced Impacts

122. Indirect impacts are adverse and/or beneficial environmental impacts which cannot be immediately traced to a project activity but can be causally linked. Induced impacts are adverse and/or beneficial impacts on areas and communities from unintended but predictable developments caused by a project which may occur later or at a different location. Cumulative impacts are the combination of multiple impacts from existing projects, the proposed project,

and anticipated future projects that may result in significant adverse and/or beneficial impacts that would not be expected in case of a stand-alone project.[12]

123. Some indirect or induced impacts can be foreseen like the (i) in-migration, (ii) traffic congestion, (iii) accidents along community roadways owing to increases in transport activity in a project area of influence.

124. Furthermore, some cumulative impacts are expected, considering the development of the consequent Phases of the Project and the wider Nam Cao University Development: (i) the effects on ambient conditions such as the incremental contribution of pollutant emissions in the airshed, (ii) the increase in pollutant concentrations in the water bodies surrounding the Main Project and the Nam Cao University development, (iii) the reduction of water flow in the watershed due to multiple withdrawals, (iv) the increases in sediment loads on the watershed of the area or increased erosion, (v) the interference with any wildlife movements, (vi) the pressure on the carrying capacity or the survival of indicator species in the local ecosystems, (vi) the wildlife population reduction caused by increasing road kills and other forestry/agriculture operations, (vii) the depletion of a forest as a result of multiple logging concessions. While HMU Phase 1 will be constructed by 2024, the Main Project is expected to occupy an area of 40 to 50ha (among 80-100 ha of the whole Main Project) by 2030 (para. viii), and Nam Cao University Development will be implemented in the longer run. The cumulative impacts will be assessed under the Vietnamese regulations and other applicable environmental policies, if any, in the course of the preparation of these larger development projects.

F. Summary of the Impacts and Corresponding Mitigation Measures

125. Project impacts including the secondary or induced impacts and their corresponding mitigation measures are described in Table 13, as a proposal for the environmental management on-site. This table was compiled for HMU Phase 1 considering the IFC EHS General Guidelines, the IFC EHS Guidelines for HCF and the IFC EHS Guidelines for THD.

[12] ADB. 2011. Sourcebook for Safeguard Requirement 1: Environment. ADB, Manila.

Table 13: List and classification of foreseeable impacts and mitigation measures for HMU Phase 1

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
Pre-Construction					
1.	**General Impacts**	Moderate	- Establishment of GRM. - Consultation and Information Disclosure (cf. para.155 of the IEE) - Detailed Design: ✓ HMU Phase 1 may have its design adapted during detailing phase, if needed, to minimize impacts. ✓ Incorporation of EMP in design and contract. ✓ On top of other construction design criteria applicable to the infrastructures of HMU Phase 1, there should be considerations on: energy conservation, water conservation, waste management planning for prevention, recycling and reuse, treatment, disposal, storage and transportation, integrity of workplace structures, severe weather and facility shutdown, workspace and exit, fire precautions[13], lavatories and showers, potable water supply, clean eating area, lighting, safe access, first aid, air supply and work environment temperature, flood protection, wind circulation, landscape, building failure, sustainability, extreme weather events and earthquakes. ✓ The masterplan and posterior detailed design of the infrastructures should consider any valid contributions from the affected persons/people from neighboring villages (up to the extent possible). ✓ Select appropriate colors for the exterior of the new facilities. ✓ Select construction materials for the exterior of the new facilities in order to ensure blending with the surroundings. ✓ Before commencement of the works, determine the exact boundaries and location of the construction and scope of works. The construction area must be according to the design. ✓ Promote active modes of transportation (walking and cycling) inside the campus (e.g. through safe and wide sidewalks connecting all campus locations, dedicated/segregated cycle ways, docking stations on every location within the campus, safe crossing points at	Moderate	

[13] International Finance Corporation's Good Practice Note: IFC Life and Fire Safety: Hotels <https://www.ifc.org/wps/wcm/connect/6f82f5f7-1985-4bfb-b201-574758b77392/p_GPN_LFS-Hotels.pdf?MOD=AJPERES> shall be referred.

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			key areas along the road network, and others). Design walking and cycling routes to be direct, pleasant, well-marked and accessible. ✓ Promote a clear hierarchy of road users in the final design, prioritizing pedestrians and cyclists over motorized vehicles. ✓ Explore feasibility of using renewables (e.g. solar) for on-site energy production and use. ✓ Ensure that the whole site is accessible and uses 'universal' and 'all age' and physical, mental and sensory impairment friendly design principles. ✓ Ensure healthy design principles are included in the final Project architecture design. ✓ Design the built environment (building features, street furniture) to reduce potential for water accumulation that can promote vector breeding (e.g. mosquitos responsible for transmission of dengue). ✓ Make sure the appropriate solutions indicated in the design of the Project for avoidance of disruption of the water supply to farmers in neighboring operating rice paddies will be put in place. - Update of IEE and EMP if necessary. - Training and Capacity Building. - Conduct traffic risk assessment[14]. - Prepare Contractor Environmental Management Plan (CEMP) which includes: ✓ Traffic and noise/dust/vibration/emissions management plan; ✓ Waste management plan; ✓ Wastewater management plan; ✓ Worker accommodation management plan; ✓ Occupational and community health and safety management plan; and ✓ Grievance redress mechanism. - Make a contract with licensed waste collection/treatment company (Ha Nam Environment and Urban Joint Stock Company) to make sure they collect wastes on time. - Plan in advance to avoid and minimize all impacts on roads, pipelines and canals. If there will be any impacts on local infrastructures, foresee to repair them immediately. - Facilitate the access to the selected community surveillance team for the supervision of the		

[14] Traffic risk assessment will be conducted before the construction starts in 2021, to reflect the latest traffic condition.

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			construction activities.		
2.	**Clearance of Land and Resettlement Activities** on HMU Phase 1	Major	- Public consultation and disclosure of information should occur frequently to assure compensation is done fairly and grievances are addressed adequately. - A resettlement plan should be updated and monitored, in close collaboration with relevant organizations in accordance with the most updated regulations. - Acquisition of Land and Livelihood Restoration according to RP and any RP updates. - Support Affected Persons by providing available Project information accordingly. - Before construction and clearance of the impacted canals (grade-II and grade-III), assure the affected rice fields will not have their supply of water affected by applying the designated engineering solutions defined under the detailed design for the facilities and the HMU Phase 1 area. - Announce the scope and duration of the works before commencement, to affected peoples and all relevant authorities. - Publicly announce the clearance and construction plans. - Livelihood restoration must be frequently monitored, and any necessary assistance provided to the affected persons.	Moderate	People will have to adapt to alternative likelihoods and grievances may arise with time. Some people may have difficulties to change livelihoods, prolonged assistance may be needed
3.	Impacts on life and health of workers during **UXO clearance**	Moderate	- Full engagement and cooperation with demining related entities (public or private) to provide adequate working conditions and maximum prevention of accidents. - During this process warning signs will be in place to warn local residents.	Minor. Not expected	This activity may still result in unpredictable injuries on life and health of workers in case of an explosion, although it is most unlikely to happen
Construction Phase					
4.	Impact of **noise, dust, vibrations and emissions** from	Moderate	- Ensure that emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying the most stringent legislated standards, whether they would be national or current WHO Air Quality Guidelines, or other internationally	Minor and temporary	There will be some emissions from the clearance, levelling and

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
	construction activities on **air quality** of HMU Phase 1 and influence area		recognized sources - Ensure that emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards.[15] - Avoid, or when avoidance is not possible always use, whenever applicable and necessary, recommended prevention and control techniques for VOC emissions, particulate matter and ozone depleting substances. - Use canvas to cover piled materials and avoid erosion and dispersion of materials. - Selecting equipment with lower sound power levels - Installing silencers for fans - Installing suitable mufflers on engine exhausts and compressor components - Installing acoustic enclosures for equipment casing radiating noise - Improving the acoustic performance of constructed buildings, apply sound insulation - Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m^2 in order to minimize the transmission of sound through the barrier. Barriers should be located as close to the source or to the receptor location to be effective - Installing vibration isolation for mechanical equipment - Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas - Re-locating noise sources to less sensitive areas to take advantage of distance and shielding - Siting permanent facilities away from community areas if possible - Taking advantage of the natural topography as a noise buffer during facility design - Reducing project traffic routing through community areas wherever possible - Planning flight routes, timing and altitude for aircraft (airplane and helicopter) flying over community areas - Developing a mechanism to record and respond to complaints - After finishing a big part of a construction, the site will be cleaned immediately. - Minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone)		construction activities, which are impossible to mitigate, and for which they are considered to result in a minor impact

[15] As a general rule, this Guideline suggests 25 percent of the applicable air quality standards to allow additional, future sustainable development in the same airshed. (Impacts should be estimated through qualitative or quantitative assessments by the use of baseline air quality assessments and atmospheric dispersion models to assess potential ground level concentrations.

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			- Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content - Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements - Selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition - Managing emissions from mobile sources - Avoiding open burning of solid waste		
5.	Impacts from construction **vehicles and machinery** regarding **air quality, groundwater and surface water quality**	Minor	- Regardless of the size or type of vehicle, fleet owners / operators should implement the manufacturer recommended engine maintenance programs - Drivers should be instructed on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits - Operators with fleets of 120 or more units of heavy duty vehicles (buses and trucks), or 540 or more light duty vehicles21 (cars and light trucks) within an airshed should consider additional ways to reduce potential impacts including: ✓ Replacing older vehicles with newer, more fuel efficient alternatives ✓ Converting high-use vehicles to cleaner fuels, where feasible ✓ Installing and maintaining emissions control devices, such as catalytic converters ✓ Implementing a regular vehicle maintenance and repair program - All construction machinery is fully licensed and fully equipped with communication devices in order to avoid spillages to the soil or surface water. - Avoiding or minimizing project transportation through community areas - Use standard-tested construction equipment, (less emissions and toxic gases, dust ...). - Requiring the contractor to strictly use standard machines and follow the manuals. - Using noise control devices, such as temporary noise barriers and deflectors for impact activities, and exhaust muffling devices for combustion engines. - If a concrete mixer is used on site, the dry concrete mixing has to be conducted in a full covered area at least 500 m away from the residential area. Do not place the concrete-mixer or the asphalt-mixer near the boundaries of the construction site. - The construction machinery will be checked according to the emission standards of Vietnam for CO, hydrocarbons and smoke. - Maintain a regular inspection and maintenance of all machinery to ensure good technical conditions. - Foresee that cleaning of machinery or construction vehicles is done in appropriate facilities to	Minor and temporary	There will be some emissions from construction vehicles and machinery, which are impossible to mitigate, and for which they are considered to create a minor impact

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			impede contamination from any hazardous substances to surface and groundwater. - Understand the quality, quantity, frequency and sources of liquid effluents in the Project area. This includes knowledge about the locations, routes and integrity of internal drainage systems and discharge points - Plan and implement the segregation of liquid effluents principally along industrial, utility, sanitary, and storm water categories, in order to limit the volume of water requiring specialized treatment. Characteristics of individual streams may also be used for source segregation.		
6.	Impacts from **transportation of construction materials** and waste	Major	- Implementation of a traffic and noise/dust/vibration/emissions management plan (as part of the CEMP) that will include a purpose, scope, safe driving policy, roles and responsibilities (including roles for the contractor site EHS Manager, contractor workers, subcontractor workers and drivers); traffic management procedures; worksite requirements; community safety requirements; performance and monitoring; deliverables (site layout and traffic flow patterns and schedule; road safety rules and practices; training registries; vehicle inspection registries; records of road safety campaigns; monthly transportation performance reports; registry for accidents/incidents and major near misses. - Establish maximum speeds for ALL vehicles associated with the Project and impose strict penalties for non-compliance (zero-tolerance). The transportation vehicles on road must run properly with a specified speed. - The transporting material vehicles must be covered to avoid dust falling on the road and impeding the circulation process of surrounding vehicles. - Frequently clean and reinforce the road if necessary. - Increase the awareness of workers by organizing capacity building sessions, in order to avoid or minimize adverse social impacts. - Coordinate with local authorities the management of residents to ensure security in the province. - Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries: - Emphasizing safety aspects among drivers ✓ Improving driving skills and requiring licensing of drivers ✓ Adopting limits for trip duration and arranging driver rosters to avoid overtiredness ✓ Avoiding dangerous routes and times of day to reduce the risk of accidents ✓ Use of speed control devices (governors) on trucks, and remote monitoring of driver actions - Regular maintenance of vehicles and use of manufacturer approved parts to minimize	Minor, risks can be managed, and impacts avoided	There will be some emissions from the transportation of materials, which are impossible to mitigate, and for which they are considered to create a minor impact

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			potentially serious accidents caused by equipment malfunction or premature failure. - Since the project may contribute to a significant increase in traffic along existing roads, recommended measures include: ✓ Minimizing pedestrian interaction with construction vehicles ✓ Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. ✓ Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns) ✓ Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents ✓ Using locally sourced materials, whenever possible, to minimize transport distances. ✓ Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic - Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions		
7.	Impacts on local **hydrology**	Moderate	- Construction activities may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. Adequate portable or permanent sanitation facilities serving all workers should be provided at all construction sites. - Understand the quality, quantity, frequency and sources of liquid effluents in its installations. This includes knowledge about the locations, routes and integrity of internal drainage systems and discharge points - Plan and implement the segregation of liquid effluents principally along industrial, utility, sanitary, and stormwater categories, in order to limit the volume of water requiring specialized treatment. Characteristics of individual streams may also be used for source segregation. - Identify opportunities to prevent or reduce wastewater pollution through such measures as recycle/reuse within their facility, input substitution, or process modification (e.g. change of technology or operating conditions/modes). - Assess compliance of their wastewater discharges with the applicable: (i) discharge standard (if the wastewater is discharged to a surface water or sewer), and (ii) water quality standard for a specific reuse (e.g. if the wastewater is reused for irrigation). - Additionally, the generation and discharge of wastewater of any type should be managed through a combination of: ✓ Water use efficiency to reduce the amount of wastewater generation ✓ Process modification, including waste minimization, and reducing the use of hazardous	Minor	

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			materials to reduce the load of pollutants requiring treatment ✓ If needed, application of wastewater treatment techniques to further reduce the load of contaminants prior to discharge, taking into consideration potential impacts of cross-media transfer of contaminants during treatment (e.g., from water to air or land) - When wastewater treatment is required prior to discharge, the level of treatment should be based on: ✓ Whether wastewater is being discharged to a sanitary sewer system, or to surface waters ✓ National and local standards as reflected in permit requirements and sewer system capacity to convey and treat wastewater if discharge is to sanitary sewer ✓ Assimilative capacity of the receiving water for the load of contaminant being discharged wastewater if discharge is to surface water ✓ Intended use of the receiving water body (e.g. as a source of drinking water, recreation, irrigation, navigation, or other) ✓ Presence of sensitive receptors (e.g., endangered species) or habitats ✓ Good International Industry Practice (GIIP) for the relevant industry sector - When water quality criteria allow, stormwater should be managed as a resource, either for groundwater recharge or for meeting water needs at the facility. - Project activities should not compromise the availability of water for personal hygiene needs and should take account of potential future increases in demand. The overall target should be the availability of 100 liters per person per day although lower levels may be used to meet basic health requirements. Water volume requirements for well-being-related demands such as water use in health care facilities may need to be higher. - Irrigation canals that are permanently impacted, should be connected to the surrounding canals drainage system to insure flow is unaltered. - If any fields will be kept inside HMU Phase 1 area, foresee to include water supply in a natural way, similar to the one occurring on site. - Keep update and inform to local authorities on the status of pumping station to ensure the quality of pump operation once needed.		
8.	Impacts from generation of **hazardous and non-hazardous industrial waste and solid waste**	Moderate	- Implement waste management plan and wastewater management plan (as part of CEMP). - The waste collection from construction works should be done at designated points only. The waste collection points should be prepared for different types of wastes: construction, hazardous, non-hazardous and domestic solid wastes. - Clean the collection points every day. - Arrange an adequate ventilation system in the area. - Have procedures in place that ensure compliance with local laws and international	Minor	

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			requirements applicable to the transport of hazardous materials. - The procedures for transportation of hazardous materials (Hazmats) should include: ✓ Proper labelling of containers, including the identification and quantity of the contents, hazards, and shipper contact information ✓ Providing a shipping document (e.g. shipping manifest) that describes the contents of the load and its associated hazards in addition to the labelling of the containers. The shipping document should establish a chain-of-custody using multiple signed copies to show that the waste was properly shipped, transported and received by the recycling or treatment/disposal facility ✓ Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved ✓ Ensuring adequate transport vehicle specifications ✓ Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures ✓ Using labelling and placarding (external signs on transport vehicles), as required - Providing the necessary means for emergency response on call 24 hours/day.		
9.	Impacts from generation of **domestic/construction wastewater**	Moderate	- The Contractor will be responsible for compliance with the relevant Vietnamese regulations on wastewater discharges into surroundings. - Industrial wastewater generated from industrial operations includes process wastewater, wastewater from utility operations, runoff from process and materials staging areas, and miscellaneous activities including wastewater from laboratories, equipment maintenance shops, etc. The pollutants in an industrial wastewater may include acids or bases (exhibited as low or high pH), soluble organic chemicals causing depletion of dissolved oxygen, suspended solids, nutrients (phosphorus, nitrogen), heavy metals (e.g. cadmium, chromium, copper, lead, mercury, nickel, zinc), cyanide, toxic organic chemicals, oily materials, and volatile materials. , as well as from thermal characteristics of the discharge (e.g., elevated temperature). Transfer of pollutants to another phase, such as air, soil, or the sub-surface, should be minimized through process and engineering controls. - Sanitary wastewater from industrial facilities may include effluents from domestic sewage, food service, and laundry facilities serving site employees. Miscellaneous wastewater from laboratories, medical infirmaries, water softening etc. may also be discharged to the sanitary wastewater treatment system. Recommended sanitary wastewater management strategies include: ✓ Segregation of wastewater streams to ensure compatibility with selected treatment option	Minor	

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			(e.g. septic system which can only accept domestic sewage) ✓ Segregation and pre-treatment of oil and grease containing effluents (e.g. use of a grease trap) prior to discharge into sewer systems ✓ If sewage from the industrial facility is to be discharged to surface water, treatment to meet national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater discharges shown in Table 1.3.1 of Page 30 from IFC EHS General Guidelines ✓ If sewage from the industrial facility is to be discharged to either a septic system, or where land is used as part of the treatment system, treatment to meet applicable national or local standards for sanitary wastewater discharges is required. ✓ Sludge from sanitary wastewater treatment systems should be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources. - Construction wastewater will be directed to temporary detention and settling pits at the Project site, located away from surface waters and sized to the needs. - Portable or constructed toilets must be provided on site for construction workers if services are not available locally and must be emptied in an appropriate manned into an existing offsite septic systems or be equipped with functioning septic tanks.		
10.	**Changes in landscape**	Major	- Preserve existing vegetation when feasible. - Enforce compliance with building codes of the area - Proceed with a compact development approach that limits the consumption of the natural landscape and assuring low density development. - Plan, implement and maintain an appropriate landscaping program for the site that takes into account restoration or creation of native vegetation cover with local fauna and flora.	Moderate	Landscape will change permanently
11.	Impacts from **habitat loss**, disturbance by human presence and altered food availability on **local environment and biota**	Major	- Reducing noise, dust, vibration and traffic from construction activities as far much as possible. - Preserve existing vegetation and trees as much as possible. - Update IEE and EMP if necessary with any arising considerations on new biota or vegetation. - Do not cut down any trees or vegetation outside the construction area.	Moderate, no relevant biodiversity values found on site	Some area will be made impermeable and no vegetation will be present in the building areas
12.	**Impacts from materials**	Major	- Prioritize use of existing quarry sites of suitable materials with highest ratio between extractive capacity (both in terms of quality) and loss of natural state.	Minor, can be avoided	-

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
	extraction at quarry/borrow site		- Procure materials only from Department of Natural Resources and Environment (DoNRE) authorized quarries. If the contractor shall operate the quarry site, required environmental permits shall be secured prior to operation of quarry/borrow areas. Ensure borrow pits are left in a tidy state with stable side slopes and proper drainage in order to avoid creation of water bodies favorable for mosquito breeding.		
13.	**Occupational health and safety impacts**	Major	- Implement an occupational and community health and safety management plan (as part of the CEMP) to be prepared according to Section 2 on Occupational Health and Safety from the IFC EHS General Guidelines, IFC EHS HCF Guidelines and IFC EHS THD Guidelines. - IFC EHS Guidelines indicate that Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety on: ✓ General Facility Design and Operation: Integrity of workplace structures, severe weather and facility shutdown, workspace and exit, fire precautions, lavatories and showers, potable water supply, clean eating area, lighting, safe access, first aid, air supply, work environment temperature ✓ Communication and Training: OHS training, visitor orientation, new task employee and contractor training, basic OHS training, area signage, labelling of equipment, communicate hazard codes ✓ Physical Hazards: rotating and moving equipment, noise, vibration, electrical, eye hazards, welding/Hot work, Industrial vehicle driving and site traffic, working environment temperature, ergonomics, repetitive motion, manual handling, working at heights, illumination ✓ Chemical Hazards: air quality, fire and explosions; corrosive, oxidizing and reactive chemicals, asbestos containing materials (ACM) ✓ Biological Hazards ✓ Radiological Hazards ✓ Personal Protective Equipment (PPE) ✓ Special Hazards Environments: confined space, lone and isolated workers ✓ Monitoring: accidents and diseases monitoring - More in detail, some guidelines are essential: ensure the living conditions for workers like facilities for resting, clean water, food, accommodation, and others meet international standards for worker accommodations to prevent communicable, food-borne, water-borne and vector-borne illnesses; - Full (personal protective equipment) PPE in order to avoid the negative effects on health,	Minor, can be avoided	

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			prevent diseases and not affect the environment of the residential areas; - When executing works in height, transporting, handling and installing the machinery and equipment, workers should be equipped with all means of PPE such as protective helmets, masks, reflective clothing, lights and flags. - Workers will be trained on manipulation, testing, commissioning and technical correct and timely response when problems occur; - Provide a workforce health/emergency services on site		
14.	**Community health and safety impacts**	Major	- The IFC EHS General Guidelines, the IFC EHS HDF Guidelines and the IFC EHS THD Guidelines address some impacts that go beyond the project life and/or boundaries and indicate the following items to be analyzed: ✓ Water Quality and Availability, Structural safety of project infrastructure, life and fire safety, traffic safety, transport of hazardous materials, disease prevention, emergency preparedness and response. - Restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community. - Removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials. - The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising, and the adoption of procedures. - Environmental precautions must be taken to limit environmental impacts on the living standards of local people. - Deploy information, education and behavior change communication to workers on communicable diseases as appropriate (e.g. sexually transmitted infections, including HIV, vector-borne diseases), road traffic safety and driving behavior through communities, and respectful interaction with local populations.	Minor, can be avoided	
15.	Impacts on living standards due to an increase of **immigration**	Moderate	- Prioritize employment for local people. - Close collaboration with local authority and organization to monitor and control illegal activities related to construction workers. - Use of local suppliers of goods and services for both the construction and operation of the development where possible. - Examination of opportunities to improve the energy efficiency by: Demand/Load side	Minor	The flow of immigrants to the area will pressure on the existing infrastructure and local people

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			management by reducing loads on the energy system and Supply side management by: ✓ Reduce losses in energy distribution ✓ Improve energy conversion efficiency ✓ Exploit energy purchasing opportunities ✓ Use lower-carbon fuels - Implementation of water conservation actions and programs to promote continuous reduction in water consumption in water consumption and achieve savings in the water pumping, treatment and disposal costs. It may include water monitoring/management techniques, process and cooling/healing water recycling, reuse and sanitary water conversation techniques. - The contractor will make a list of temporary absences and residence of workers at site, and should enforce site rules at all times.		
16.	**Impacts on physical cultural resources**	Moderate	- Relocate according to local standards and traditions, existing scattered graves (if any are found) in the area. Construction activities will be immediately suspended if any physical cultural resources are encountered and can only be resumed after assuring these resources are conserved and avoidance of destroying and damaging is assured by providing for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation. Construction activities can resume only after thorough investigation and with the permission of the local Cultural Heritage Bureau. - The project will not remove any physical cultural resources unless the following conditions are met: ✓ No alternatives to removal are available. ✓ The overall benefits of the project substantially outweigh the anticipated cultural heritage loss from removal ✓ Any removal is conducted in accordance with relevant provisions of national and/or local laws, regulations, and protected area management plans and national obligations under international laws, and employs the best available techniques.	Negligible	All graves should be dealt accordingly, some pressure on the final location of the graves (for space, accessibility, and others) may arise.
Operational Phase					
17.	Impacts from **noise, emissions from transportation vehicles** in HMU Phase 1 and area of influence affecting	Minor	- Promote collective transportation to the area. - If needed, frequently water any internal roads to reduce dust and keep the roads cleaned. - Promote use of active modes of transportation (walking and cycling) inside the campus. Incentivize walking, cycling, and use of public transport by students and staff. (for example. through active transport campaigns, shared cycling schemes, cycling clubs).	Minor	

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
	the **air quality**				
18.	Impacts on road **traffic** inside HUM Phase 1, area of influence and neighboring communes	Moderate	- Increase the awareness of workers and students by organizing capacity building sessions, in order to avoid adverse social impacts; - Coordinate with local authorities the management of residents to ensure security in the province. - Ensure a vehicular speed limit on site. - Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries: - Emphasizing safety aspects among drivers ✓ Improving driving skills and requiring licensing of drivers ✓ Adopting limits for trip duration and arranging driver rosters to avoid overtiredness ✓ Avoiding dangerous routes and times of day to reduce the risk of accidents ✓ Use of speed control devices (governors) on trucks, and remote monitoring of driver actions - Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. - Since the project may contribute to a significant increase in traffic along existing roads, recommended measures include: ✓ Minimizing pedestrian interaction with construction vehicles ✓ Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. ✓ Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns) ✓ Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents ✓ Using locally sourced materials, whenever possible, to minimize transport distances. ✓ Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic - Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions	Minor	An increase of traffic in the area will be unavoidable
19.	Impacts of solid/liquid **waste including hazardous and**	Minor	- Review of new waste sources during planning, siting, and design activities, including during equipment modifications and process alterations, to identify expected waste generation, pollution prevention opportunities, and necessary treatment, storage, and disposal infrastructure	Minor	

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
	non-hazardous wastes		- Collection of data and information about the process and waste streams in existing facilities, including characterization of waste streams by type, quantities, and potential use/disposition - Establishment of priorities based on a risk analysis that takes into account the potential EHS risks during the waste cycle and the availability of infrastructure to manage the waste in an environmentally sound manner - Definition of opportunities for source reduction, as well as reuse and recycling - Definition of procedures and operational controls for onsite storage - Definition of options / procedures / operational controls for treatment and final disposal - Substituting raw materials or inputs with less hazardous or toxic materials, or with those where processing generates lower waste volumes - Applying manufacturing process that convert materials efficiently, providing higher product output yields, including modification of design of the production process, operating conditions, and process controls - Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off specification, contaminated, damaged, or excess to plant needs - Instituting procurement measures that recognize opportunities to return usable materials such as containers and which prevents the over ordering of materials - Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste to be managed - Evaluation of waste production processes and identification of potentially recyclable materials - Identification and recycling of products that can be reintroduced into the manufacturing process or industry activity at the site - Investigation of external markets for recycling by other industrial processing operations located in the neighborhood or region of the facility (e.g., waste exchange) - Establishing recycling objectives and formal tracking of waste generation and recycling rates - Providing training and incentives to employees in order to meet objectives - On-site or off-site biological, chemical, or physical treatment of the waste material to render it non-hazardous prior to final disposal - Treatment or disposal at permitted facilities specially designed to receive the waste. Examples include: composting operations for organic non-hazardous wastes; properly designed, permitted and operated landfills or incinerators designed for the respective type of waste; or other methods known to be effective in the safe, final disposal of waste materials such as bioremediation. - Waste is stored in a manner that prevents the commingling or contact between incompatible		

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			wastes, and allows for inspection between containers to monitor leaks or spills. Examples include sufficient space between incompatibles or physical separation such as walls or containment curbs - Store in closed containers away from direct sunlight, wind and rain - Secondary containment systems should be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment - Secondary containment is included wherever liquid wastes are stored in volumes greater than 220 liters. The available volume of secondary containment should be at least 110 percent of the largest storage container, or 25 percent of the total storage capacity (whichever is greater), in that specific location - Provide adequate ventilation where volatile wastes are stored.		
20.	**Impacts from land changes on landscape**	Major	- The campus will be planned accordingly to the adaptation to the actual landscape to imprint the least impacts possible.	Moderate	A change in the landscape of the area from agricultural land and abandoned ponds into teaching edifications and different activities will be unavoidable
21.	**Impacts related to occupational health and safety risks** by fire, failure of building safety features and accidental and natural hazards	Minor	- Provision of training on EHS to the staff - Prepare instruction board or post with practices and guidance on safety risk by fire etc. on public places inside the campus to teachers, students and other staff. - Training to all new employees to ensure they are apprised of the basic site rules of work and the necessary procedures for an emergency situation (fire, failure of buildings, accidental and natural hazards, others). - If visitors can access areas where hazardous conditions or substances may be present, a visitor orientation and control program should be established; - Hazardous areas, installations, materials, safety measures and emergency exits should be marked properly and in accordance to international standards; - Copies of the hazard coding system should be posted outside the facility at emergency entrance doors; - Information on the hazardous materials at the facility should be shared proactively.	Negligible	
22.	Impacts on local society and economy due to an	Minor	- Prioritize local people in training and employment in particular those who were directly affected by the land acquisition. - Organize and participate in campaigns to promote harmonious lifestyle and to prevent discord	Negligible	

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
	increase of **social crimes/tensions** from immigration		between workers and local people. - Ensure the public, green, recreational and cultural spaces within the campus are accessible to local populations. - Have adequate public consultation and information disclosure actions that the public opinion can be recorded and heard in a timely manner. Public consultation should be performed during all phases of the Project. - Create a grievance mechanism to collect, monitor and respond to arisen social and cultural issues during the HMU Phase 1 operation. - Capacity building and awareness of environmental sanitation to community in the region and participate in volunteering Labor Days for environmental protection. - Supervise and educate, inspect the implementation of regulations on hygiene, security and order, prevention of social evils. - Close collaboration with local authority and organization to monitor and control illegal activities related to workers or students. - Mitigate any impacts on the existing infrastructure arising from the 5,540 students and HMU employees, like accommodation, restaurants, supermarkets, health facilities, schools for the staffs and students children and any others: ✓ It is expected private business will rise in the area to accommodate the rising needs ✓ It is expected some of the directly affected people will apply their compensation into their own businesses to suppress the needs of the incoming immigration.		
23.	**Community health and safety risks** by fire, failure of building safety features and accidental and natural hazards	Minor positive	- Cooperate with local authorities such as firefighting department for training against fire, natural hazards - Provide visual safety instruction at public places for community - Provide instruction on first aid to reduce accidental damage. - Inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors, or other emissions - Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, tsunamis, wind, flooding, landslides and fire. To this end, all project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading, and other dynamic loads - Application of locally regulated or internationally recognized building codes to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response	Moderate to major positive	

No.	Impact	Impact Significance	Mitigation Measure	New Significance	Residual Impacts
			- Engineers and architects responsible for designing and constructing facilities, building, plants and other structures should certify the applicability and appropriateness of the structural criteria employed. - Depending on the nature of a project, guidance provided in the ICC or comparable codes should be followed, as appropriate, with respect to: ✓ Existing structures ✓ Soils and foundations ✓ Site grading ✓ Structural design ✓ Specific requirements based on intended use and occupancy ✓ Accessibility and means of egress ✓ Types of construction ✓ Roof design and construction ✓ Fire-resistant construction ✓ Flood-resistant construction - Project sponsors' architects and professional consulting engineers should demonstrate that affected buildings meet these life and fire safety objectives. - Life and fire safety systems and equipment should be designed and installed using appropriate prescriptive standards and/or performance based design, and sound engineering practices. Life and fire safety design criteria for all existing buildings should incorporate all local building codes and fire department regulations.		
Positive Impacts					
24.	**Job opportunities for local people**	Moderate			
25.	**Improvement of life quality / health services**	Major			
26.	**Improvement of educational level**	Major			
27.	**Improvement of infrastructures**	Moderate			
28.	**Increase of local GDP**				

VI.ANALYSIS OF ALTERNATIVES

126. HMU Phase 1's exact location is final although the definition of the general layout of the area and the exact considerations on the development of the future infrastructure is under study and evaluation and may change slightly.

127. Nevertheless, **the proposed site location** should not change and is **considered as adequate for the development**, in view of the fact that it is part of an approved zoning plan that the Nam Cao University Development is currently proposing for a 900 to 1300ha development which includes five other universities and will accommodate approximately 80,000 students, its strategic location and low level of expected environmental and social impacts.

128. Different options for the location of HMU Phase 1 development were studied in order to comply with all engineering and master planning, environment, social, financial and administrative requirements and are presented in Figure 15: Option A, entailing the development of plot B and Option B, entailing the development of plot A, and Option C, entailing the development of plot C which is no longer considered in the development of HMU Phase1.

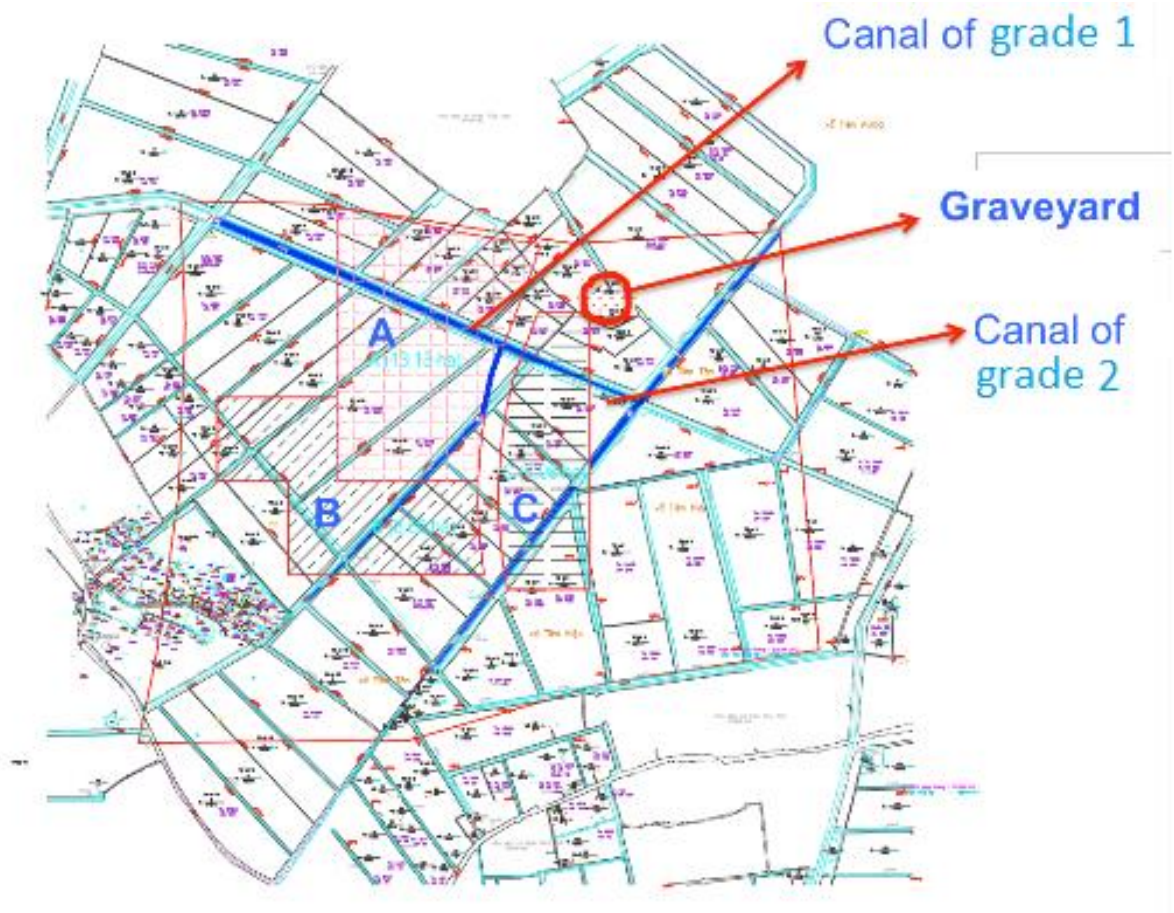


Figure 15: Options for location of medical campuses under HMU Phase 1 of development.

129. The chosen option for development was indicated by the MOH as **Option B**, in plot A. This decision was taken considering different factors like: (i) adequacy of development

according to the master planning for the Main Project; (ii) accessibility considering the already existing road that crosses the Main Project area, (para.38) for the Nam Cao development approved by the Ha Nam Province; (iii) avoidance of Mac village and its surroundings, and therefore resettlement and stronger impacts from noise, dust, emissions and others during construction phase; (iv) avoidance of the local cemetery and other scattered graves, therefore reducing the need for relocation of graves and (v) avoidance of water bodies. This preferred Option B is therefore considered as adequate for the development.

130. Some flexibility, resiliency and adaptation of the design of the buildings and general layout of the future area are already considered in the Pre-Feasibility Study though. The design of the buildings of the different universities / faculties that will be conceptualized as interchangeable amongst different universities will largely increase the resilience of the urban plan during its growth over the different phases. The internal organization of the buildings will also imprint a high flexibility in purpose, saving money on the execution stage and space on the operational stage.

131. To preserve the suitability of the new infrastructures under the local conditions, not only it will be considered as crucial to build a substantial community on the campus (offering sport and leisure facilities, library, public canteen, dorms, residences and the 'pilot' community care center), but also the social mixing will enhance the viability of the newly planned communities surrounding the campus.

132. It is conceptualized that the highly qualitative development of the green spaces of the campus can find more legitimacy if these spaces are not strictly fenced but partially open towards the surrounding communities and allow for limitative sharing.

133. The water management of the site today consists of larger canals (grade-I and Grade-II, managed by the district and the province) and smaller canals (managed by the village) that are used for both irrigating and draining the productive landscape of rice fields. Preliminary studies have shown that the water flows from the pumping station of the Ha Nam irrigation factory situated east of the site towards the western Nhue river.

134. When the Main Project (new health sciences campus) will be fully completed, the site will require sustainable and robust water drainage and flood relief system towards the grade-I canal along the site's eastern boundary. It is proposed to install this system in synergy with a natural green park for the campus, on the same position as the main irrigation canals that now cross the site. This not only as a reference to the former productive landscape but also as a tool to gradually transform the site's water system in a cost-efficient and sustainable way throughout the phased development of the campus, hereby limiting the impact on the larger environment.

135. For HMU Phase 1 development it is proposed to only transform the east west canal into a green drainage park if the diverting of this canal's irrigation function would prove feasible at this stage. This will allow creating a drainage park which will also have an important social role. In a second phase, when the campus reaches beyond the north-south canal with its new university hospital, the second canal will be transformed, resulting in a robust drainage park that becomes the main green backbone of the campus.

136. Vibrant and well-designed public green spaces will become an important challenge for the health sciences campus since the natural landscape is not offering a great deal of natural vegetation. The proposed water park, together with the smaller green spaces amidst and

internally in the campus buildings will take on the role of creating attractive 'outdoor settings' where social interaction and collaborative studying is promoted.

137. The mild climate in Hanoi region can allow for the creation of pleasant study environments in a lush green setting that can be created through a diversity of green elements; trees, plants, water ponds and even productive landscapes such as orchards. Crucial in this contemporary green social space will be the creation of an efficient and partially sheltered slow infrastructure system for pedestrians and bicycles that will provide access to these spaces and will weave them together into one interconnected system.

138. The built space tissue for the four main areas of the health sciences campus will be dominant north-south of the longest façades since it is the best orientation to cope with excessive heating and employ prevailing winds for ventilation. To avoid the built tissue becoming monotonous, other orientations will be introduced, but in the architectural detailing these spaces will mostly include programs where a less ideal orientation has a limited impact on their functionality and climate comfort.

139. The campus will work in synergy not only with sun and wind but also with water. While its landscape backbone remains on lower grounds to give space to the water, buildings will be protected by raising the land for built space and private road infrastructure, at least up till the level of the public roads as planned in the Nam Cao Urban University Area zoning plan. It is also under study to introduce a smaller lifting of the entrances of the buildings in relation to the roads, paths and gardens of the campus and program ground floor spaces in a smart way so that water damage can be limited in the case of exceptional flood events.

140. Finally, another important planning tool will be to use the existing landscape as a guide for zoning and for the creation of a strong and resilient backbone for developments. By developing in synergy with the landscape, the high cost of modifying landscape structures can be reduced, the sustainability of the development can be enhanced, and historical landscapes are never entirely erased but often remain subtly present in the new development as a reference to the past.

141. Giving space to the rivers of the area, promoting a sustainable water cycle system, transforming the landscape into generous green public spaces for the campus, accommodating a public road in a pedestrian and bicycle-oriented campus and an adaptation to local climate and climate change (with a construction approach adapted to flood risk) are included in the Pre-Feasibility Study considerations as alternatives for mitigation of environmental and social impacts.

VII. PUBLIC CONSULTATION AND DISCLOSURE OF INFORMATION

142. This section describes the process undertaken to involve the public in the Project design and recommended measures for continuing public participation; it summarizes major comments received from beneficiaries, local officials, community leaders, NGOs, and others, and explains how these comments were addressed.

143. Community participation will be one of the basic conditions to ensure the Projects' social license to operate as well as to mitigate adverse impacts and issues that the team conducting the environmental impact assessment is not aware of. In fact, if the community is involved as

early as possible in the Project preparation process, the easier it is to establish a close relationship between both the community itself and the Project and to contribute with valuable proposals for the Project, as well as to increase communication with the Owner, Design Consultant, Environmental Consultant and local authorities in the Project area. Consultation results may be used to evaluate, adjust design options, propose mitigation measures, and demonstrate community support in the implementation of the Project.

A. Public Consultation

144. Regarding the Vietnamese legislation, community consultations are carried out in accordance with the provisions of Paragraphs 1 and 2, Article 21 of the Law on Environmental Protection 2014 and are described in the Circular No. 27/2015 / TT-BTNMT dated 29/05/2015 by the Ministry of Natural Resources and Environment. In addition, for Projects receiving ODA from ADB, community consultation is important and necessary as required under ADB SPS 2009.

145. The community can contribute with valuable proposals for the Project. Stakeholders have been identified as organizations, individuals and communities directly affected by Project activities, including:

- Institutional Organizations such as: i) People's Committee/People's Council of Tien Tan; ii) CHPMU, iii) HMU;
- Affected Persons and Households from land acquisition when the Project is implemented;
- Other organizations and individuals that have an interest in the results and / or impact of the Project.

146. A public consultation meeting was held to (i) discuss general information about the Project; (ii) discuss possible impacts on local communities and mitigation measures; (iii) summarize and explain key findings from the public consultation; (iv) collect information for the proposed mitigation measures and compensation and resettlement plans and (v) collect the perception of responsibility of CHPMU and local authorities and proposed work between both sides. Public consultation was held in Tien Tan commune office, Phu Ly city, Ha Nam province.

147. The PPTA team performed several formal and informal meetings with most of the APs of HMU Phase 1 and one formal community consultation meeting was held by Tien Tan commune authorities on March 10, 2018 convening 50 impacted household representatives (18 women and 32 men) to discuss the potential environmental and social impacts of HMU Phase 1. During the consultation, the objectives, the location and development plan of the Project were introduced. The environmental expert of the PPTA team explained the ADB safeguard policy, the Vietnam environmental laws and regulations, anticipated environmental impacts of the Project, their corresponding mitigation measures, presented the grievance redress mechanism of the Project, and discussed other issues. All stakeholders freely raised their questions and comments.

148. Informal community consultations were also conducted several times at Tien Tan Commune with affected persons living in the Project area, to get more detailed information and the main comments of the community consultation meetings are as follow:

- Local people and authorities agreed to support Project;
- It is recommended to ensure that all mitigation measures are implemented in a rigorous

and effective manner;

- ¬ Construction schedule shall be provided in advance for better planning of local community on living, transportation safety and agriculture activities;
- ¬ Suggest Project owner and authorities to support vocational training for people who have land recovered and/or no alternative solution for a job and/or unstable job.

149. The opinions and questions of the stakeholders and the answers from the consultation meeting organizers are presented in Table 14.

Table 14: Summary of comments and responses during public consultation meetings for HMU Phase 1 Project

TT	Comments	Response from PPTA consultant on behalf of CHPMU
1	Construction works may impact 15 km of ditches from the drainage system for irrigation	The comments were appreciated and appropriate solutions to minimize the impacts to the irrigation system suggested, as described on Table 13, impacts on hydrology (#7).
2	If construction works affect canal A46, the Project Owner should have an adequate mitigation measure for this impact and must consult with the community on this before construction, because this canal is the main irrigation source in the area and may largely impact the agriculture in the area	The comments were appreciated and the mitigation measures will be suggested and implemented.
3	What are the long-term impacts of the Project to the community health?	The consultant explained that the Project may have some impacts during construction and operation stages (from noise, dust, traffic and immigration). However, the Project also has several positive impacts (providing education and new working positions, and improved healthcare services on a long term, in the region).
4	The Project must implement adequate mitigation solutions	The Project Owner and the contractor will commit to follow mitigation measures at all stages of Project development. The community also has the right to monitor the works.
5	It was recommended that there would be community surveillance joining the monitoring tasks to construction activities	When construction activities begin, the Project owner and contractors will conduct and coordinate to establish community surveillance to supervise construction activities, as described on Table 13 (#1).
6	It was suggested that the contractor should coordinate with local authorities to avoid incidents at construction site, disorder and ensure social security.	The contractor will make a list of temporary absences and temporary residence from workers at construction camp site, and workers will be required to follow camp rules.
7	If there is damage to roads, pipelines, canals or others, the contractor shall repair it immediately	The contractor will try to avoid and minimize the impacts and in case there is damage, the local infrastructure will be repaired promptly, as described on Table 13 (#1).
8	Note: if any graves need relocation, there should also be compensation for additional land for moving these graves	The comments were appreciated and the consultant will transfer to Project Owner and higher authorities.

150. The PPTA consultant team had a consultation with the representative of Ha Nam provincial DoNRE on 8 March 2018. This meeting was to consult and discuss the implementation of compensation, water resources planning, and other social issues related to the Project, with the following highlights:

- ¬ The planning for construction has been completed and announced, and 100% of the

agricultural land is not yet cleared. Agricultural land ownership certificates have been issued to all households (according to land law 2003). There is only one part of the land which is public.

- ¬ If there are any graves in the Project area, they should be relocated to the cemetery of the city. However, this should be discussed with local people and if the people don't want to move these graves, the Project should foresee an area to keep the existing cemetery and plant trees surrounding it.
- ¬ From the representative's personal point of view, there are some positive impacts from the Project (the conditions of medical examination will be better, higher quality of a team of doctors, increased incomes that will attract workers, land prices will also increase), and there will be some negative impacts (loss of agricultural land, loss of livelihood, and especially on older women that will lose their jobs).
- ¬ There has to be unemployment support, job conversion, mechanisms to compensate for local residents before and during land clearance.
- ¬ It is believed there will be a small impact to the drainage system, but that should be considered in detail.
- ¬ No special protected wild animals are found in the Project area and surroundings, only typical agriculture plain field animal mice, normal small fish, small birds and others.

151. The PPTA team also had a meeting with representatives of Agricultural Extension Center and the Deputy of the Provincial Department of Plant Protection on 9 March 2018 for the consultation on the current situation of agricultural development in the province and the following highlights can be mentioned:

- ¬ Rice is the main vegetation planted in the area, with about 31-32ha produced mainly in Ly Nhan, Dong Du-Binh Luc, Lien Tiet-Phu Ly. There are also some other plants such as corn, pumpkin, beans, cucumber, fruit trees and others, which cover about 7-8 thousand hectares.
- ¬ Ha Nam Province has 2 rice crops per year (one rice crop at the normal period and a spring rice crop). According to the latest statistics, paddy yields ranged between 66-67 quintals/ha in spring and about 54 quintals/ha in normal rice crop.
- ¬ The price for a normal rice crop is about 5,500-6,000 VND/kg for 60-65% of households working in agriculture. High quality rice has an average price of 7,500-8,000 VND/kg and is produced only by about 35-40% of people. There are also winter crops with an average price of 2.5-3 million/360m^2. The average area of rice land for a farmer is 500m^2.
- ¬ Considering that the road from Mac village to Truc Son village has been repaired recently, it would be important to follow similar measures of prevention of natural disasters, storms, floods in HMU Phase 1. The local people are dredging the water canals by themselves. Currently there are no special climate conditions or high pollution levels.
- ¬ Clearance could be difficult due to the impacts on the irrigation canals in the area, there are about 15 km of affected canals.

B. Information Disclosure

152. The disclosure of information on the Project aims to initiate a continuous process of information exchange and facilitate the participation of stakeholders throughout the Project implementation process starting from the pre-construction phase, through information exchange meetings.

153. Disclosure of the IEE is part of the communication strategy for the parties involved. ADB SPS 2009 requires the borrower to provide relevant environmental information, including information from IEE and environmental monitoring report in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. The published documents should be accessible both in terms of content and presentation.

C. Future Consultation Activities

154. Public Consultation is an important part of the EMP and should include the notification of local communities when Project activities are going to take place, with disclosure of the results of monitoring programs to local communities and other stakeholders.

155. Before implementing the Project, CHPMU will inform Ha Nam PPC of Tien Tan Communes about the time and progress of the construction work. Prior to construction, the Vietnamese EIA (para. 22) will be disclosed to affected peoples and other stakeholders at Tien Tan Commune office. The Environmental Safeguard Officer of the Construction Supervision Consultant (CSC ESO) will prepare a Project Information Booklet (PIB), which includes (i) the Project information, (ii) summary of this IEE and The Vietnamese EIA, and (iii) the information of the grievance redress mechanism and appeal procedures, in Vietnamese language. The PIB will be disseminated to all affected peoples mainly through the consultation meeting which will be held by CHPMU at Tien Tan Commune Office. CHPMU will prepare slideshow and present the content of the PIB to local authorities and commune representative residents in the meeting.

156. The key information of the semi-annual environmental monitoring reports will also be translated into Vietnamese by the CSC ESO and made available at Tien Tan Commune office and the Project site. This IEE will be available on the ADB website as will biannual environmental monitoring reports. During the construction process, the CHPMU will regularly inform the public about the construction activities and progress, measures to manage the environment and the operation of the information system.

157. Affected people will be informed about policies and procedures to ensure their lives will not be seriously affected. People in the Project area have also been informed that there will be a clue to the environmental issues of the CHPMU, which will receive feedback from complainants. If they have any questions or concerns about the Project, the CHPMU will be responsible for helping and resolving. The contact details of the clues must be made public for easy access by the community when they wish to make a complaint. All complaints must be recorded.

VIII.GRIEVANCE REDRESS MECHANISM

158. A well-defined grievance redress mechanism will be established to address affected persons grievances and complaints regarding environmental issues, land acquisition, compensation and resettlement in a timely and satisfactory manner. All affected persons will be made fully aware of their rights, and the detailed procedures for filing grievances and an appeal process will be published through an effective public information campaign. The grievance redress mechanism and appeal procedures will be explained in a Project Information Booklet (PIB), prepared by CSC and sent to the Commune People's Committee (CoPC) for consultation during a local Project consultation meeting.

159. Affected persons are entitled to 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. Affected persons complaints can be made verbally or in written form. In the case of verbal complaints, the committee on grievance will be responsible to make a written record during the first meeting with the affected persons.

160. The designated unit who is responsible for handling complaints shall exercise all efforts to settle affected persons issues at the commune level through appropriate community consultation. All meetings shall be recorded and copies shall be provided to affected persons. A copy of the minutes of meetings and actions undertaken shall be provided to the EA, and ADB upon request.

161. The procedures for grievance redress is defined below and summarized in Figure 16. The procedure described below should apply easily to both social and environmental issues and be consistent with the legal process for resolution of disputes in Vietnam.

a. Stage 1: Complaints from affected persons for the first time shall be lodged verbally or in written form to the Contractor. The complaints shall be received by the Contractor and discussed with the affected persons to seek possible solutions.

b. Stage 2: If no understanding or amicable solution can be reached or if no response is received from the Contractor, the affected persons can elevate the case to CHPMU, which is responsible to work with the Contractor and find the most adequate resolutions.

c. Stage 3: If no understanding or amicable solution can be reached again, the affected persons can appeal to Commune People's Committee (CoPC). The CoPC will review and issue a decision on the appeal within 15 days from the day the complaint is received. All meetings shall be recorded and copies of the minutes of meetings will be provided to affected persons.

d. Stage 4: If no understanding or amicable solution can be reached or if no response is received from the CoPC within 15 days from the day the complaint is received, affected persons can elevate the case to the City People's Committee (CiPC). The CiPC is expected to respond within 15 days upon receiving the affected persons appeal.

e. Stage 5: If the affected person is not satisfied with the decision of the City Office, or in the absence of any response, the affected persons can appeal to the Provincial People's Committee (PPC). The PPC will review and issue a decision on the appeal within 30 days from the day the complaint is received.

f. Stage 6: If the affected person is still not satisfied with the decision of the PPC or in the absence of any response within the stipulated time, the affected persons, as a last resort, may submit his/her case to the district court. The court will address the appeal by written decision and submit copies to the respective entities which include the EA, CoPC/CiPC/PPC and the affected persons. If however, the affected person is still not satisfied the court's decision, the case may be elevated to the Province court. If however, the decision of the Province court is still unsatisfactory to the affected persons, they may bring the complaints to the Higher Court.

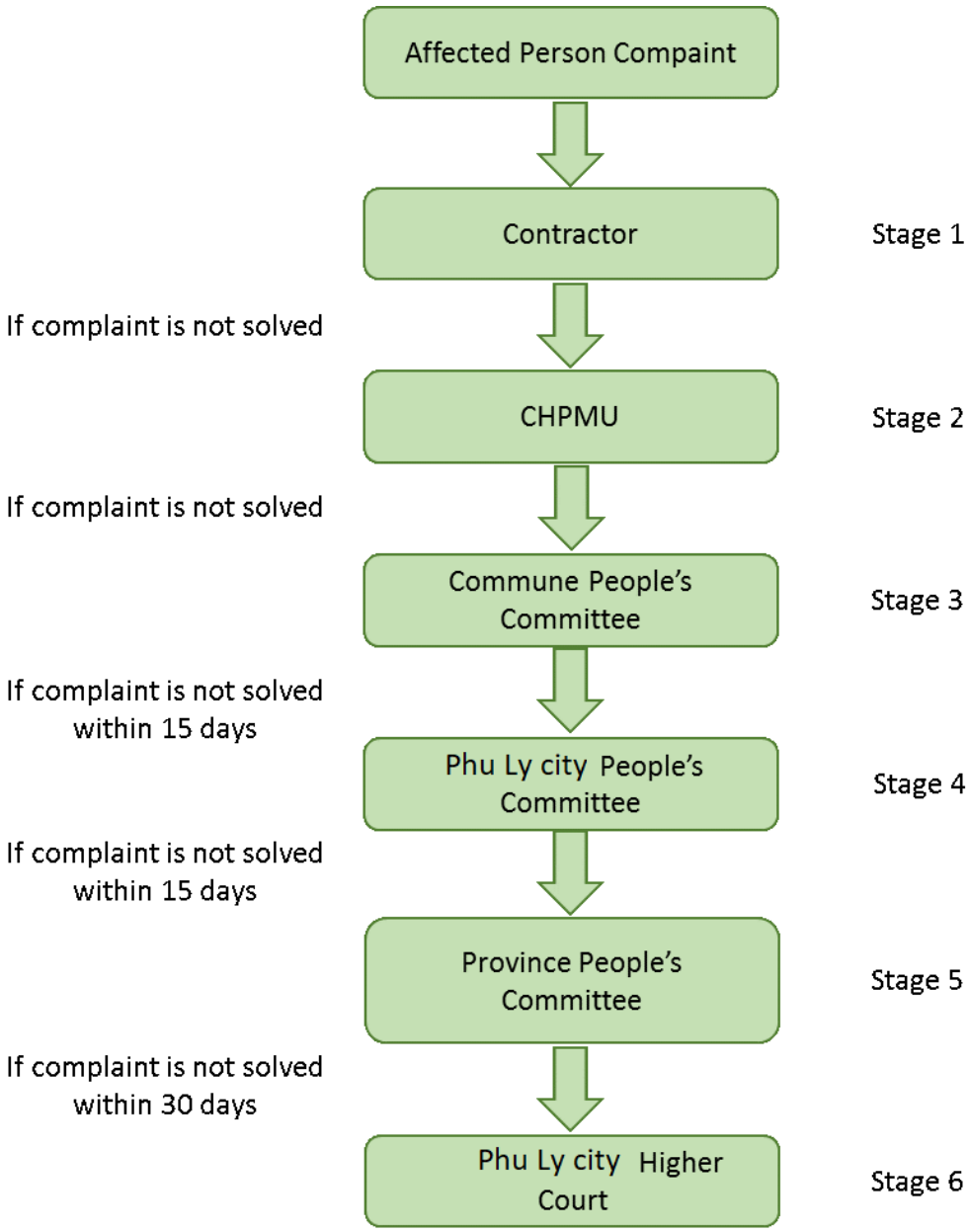


Figure 16: Summary of GRM

162. The Executing Agency (EA), and the Implementing Agency (IA) will be responsible for checking the procedures and resolutions of grievances and complaints. Therefore, the EA must have expertise and experience in social and environmental issues associated with infrastructure developments. The IA/EA may recommend further measures to be taken to redress unresolved grievances. C-PMU Environmental Safeguard Officer (ESO) assisted by CSC ESO will provide the necessary training to improve grievance procedures and strategy for the grievance committee members when required.

163. In cases where affected persons do not have the writing skills or are unable to express their grievances verbally, they are encouraged to seek assistance from the recognized local groups, NGOs, or other family members, village heads or community chiefs to have their

grievances recorded in writing, and to have access to documentation, and any survey or valuation of assets, to ensure that where disputes do occur, all the details have been recorded accurately enabling all parties to be treated fairly. Throughout the grievance redress process, the responsible committee will ensure that the concerned affected persons are provided with copies of complaints and decisions or resolutions reached.

164. If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, affected persons have the right to directly discuss their concerns or problems with the ADB Southeast Asia Department through the ADB Vietnam Resident Mission (VRM). If affected persons are still not satisfied with the responses of VRM, they can directly contact the ADB Office of the Special Project Facilitator (OSPF).

165. During the construction process, CHPMU must regularly inform the public about the construction activities and progress, measures to manage the environment and the operation of the information system.

IX.ENVIRONMENTAL MANAGEMENT PLAN (EMP)

166. The purpose of the Environmental Management Plan (EMP) is to implement the identified mitigation and management measures to avoid, reduce, mitigate and compensate anticipated adverse environmental and social impacts, implement a monitoring and reporting plan and assure the compliance of the Project with Vietnamese relevant laws, ADB SPS 2009 and the International Finance Institution Environmental, Health and Safety Guidelines (IFC EHS Guidelines). The EMP includes the results of the public consultations, part of the IEE, and a clear definition of the responsibilities and budget for each task. External to the EMP is a Resettlement Plan that addresses in detail the economic displacement and necessary management efforts to minimize resettlement induced impacts.

167. Environmental mitigation measures indicated in the (updated) IEE and EMP will be included in the contractor's bidding documents, technical specifications, and contracts.

A. Implementation Arrangements and Responsibilities

1. Executing Agency and Implementing Agency

168. The Ministry of Health (MOH) through the Central Health Project Management Unit (CHPMU)[16] is the executing agency and will have overall responsibility in project coordination and implementation of HMU Phase 1.[17]

[16] CHPMU is an existing unit within MOH responsible for health civil works projects.

[17] An MOH steering committee may be established to provide guidance and oversight on the project, which will be chaired by the minister or vice minister along with senior official from key MOH departments, presidents of HMU and UMP, representatives of the Ministry of Education and Training, Ministry of Finance, among others.

2. Project Management and Implementation

169. **CHPMU** will function as project coordinating unit for the Project and has overall management, coordination, implementation, monitoring and evaluation and reporting functions of the Project. It will prepare annual work plan, budget and reports and; consolidate reports for the Project to comply with the requirements of MOH and ADB; and other reports requested by MOH management and ADB. It will be headed by a full-time project director and a deputy director appointed by the MOH Minister. CHPMU will also be responsible for the management and disbursement of the project loan and government counterpart funds; coordination with ADB and other relevant government agencies and stakeholders; preparation of quarterly progress reports, semi-annual environmental monitoring report, midterm report, project completion reports, and ensure preparation and submission of annual audited project financial statements.

170. CHPMU will oversee the day-to-day implementation of the Project. Individual consultants will be hired to assist the CHPMU in managing the implementation of Project activities including: (i) preparation of detailed annual operation plan and budget; (ii) procurement and contract management of the civil works, equipment, goods and services contracts in accordance with the government and the ADB's requirements and procedures; (iii) recruitment of consulting services (firms and individual consultants) for the detailed engineering design (DED), construction supervision consultant (CSC) including environmental safeguards officer, social safeguards, baseline and midterm studies/surveys, and financial audit; (iv) establishment and management of the advance account set-up at MOH-CHPMU for the ADB loan including preparation of withdrawal applications and maintenance of financial records; and (v) provide overall administrative support for finance, procurement and translation services for the project.

171. A dedicated central project management unit (**C-PMU**) within CHPMU will consist of the following MOH assigned staff: (i) project manager; (ii) project implementation specialist; (iii) civil works officer; (iv) planning and monitoring and evaluation officer; (v) environmental safeguards officer (**C-PMU ESO**); (vi) social safeguards officer; (vii) accountant; and (viii) procurement officer. The project will hire the following consultants to provide technical and coordination support to CHPMU and its C-PMU: (i) project development and management specialist, (ii) financial management specialist, (iii) procurement specialist, and (iv) social safeguards specialists.

172. These organizations will be supported by a **construction supervision consultant (CSC)** which includes **a national environmental safeguard officer (CSC ESO)** who assists CHPMU and C-PMU in monitoring the implementation of the day-to-day EMP and supporting the contractor in preparing the monthly EMP implementation reports at the site along with the proposing improvements to the contractor for synthesis sent to CHPMU and maintaining contact with the local community.

173. **The contractor** will appoint an **Environment, Health and Safety Manager (EHS Manager)**. The EHS Manager will have overall responsibility for ensuring the implementation of the EMP by the contractor, development of Contractor Environmental Management Plan (CEMP) that outline the manner by which they will comply with the requirements of the IEE and EMP.

174. **HMU** will be the Operation Agency. CHPMU will make sure that HMU will be involved during the detailed design and its opinions are incorporated into the Project design.

175. **Department of Natural Resources and Environment (DoNRE) of Ha Nam province** will oversee the environmental management and take responsibility to monitor the compliance of governmental environmental requirements during Project implementation phases for all related Project activities (like the environmental monitoring of water, soil, air, others). There will also be a community surveillance to supervise all construction actions.

176. **ADB** will conduct due diligence on environmental matters during the Project review missions. ADB will review the semi-annual environmental monitoring reports submitted by CHPMU and will disclose the reports on its website. If CHPMU fails to meet safeguards requirements described in the EMP, ADB will seek corrective measures and advise the EA on items in need of follow-up actions.

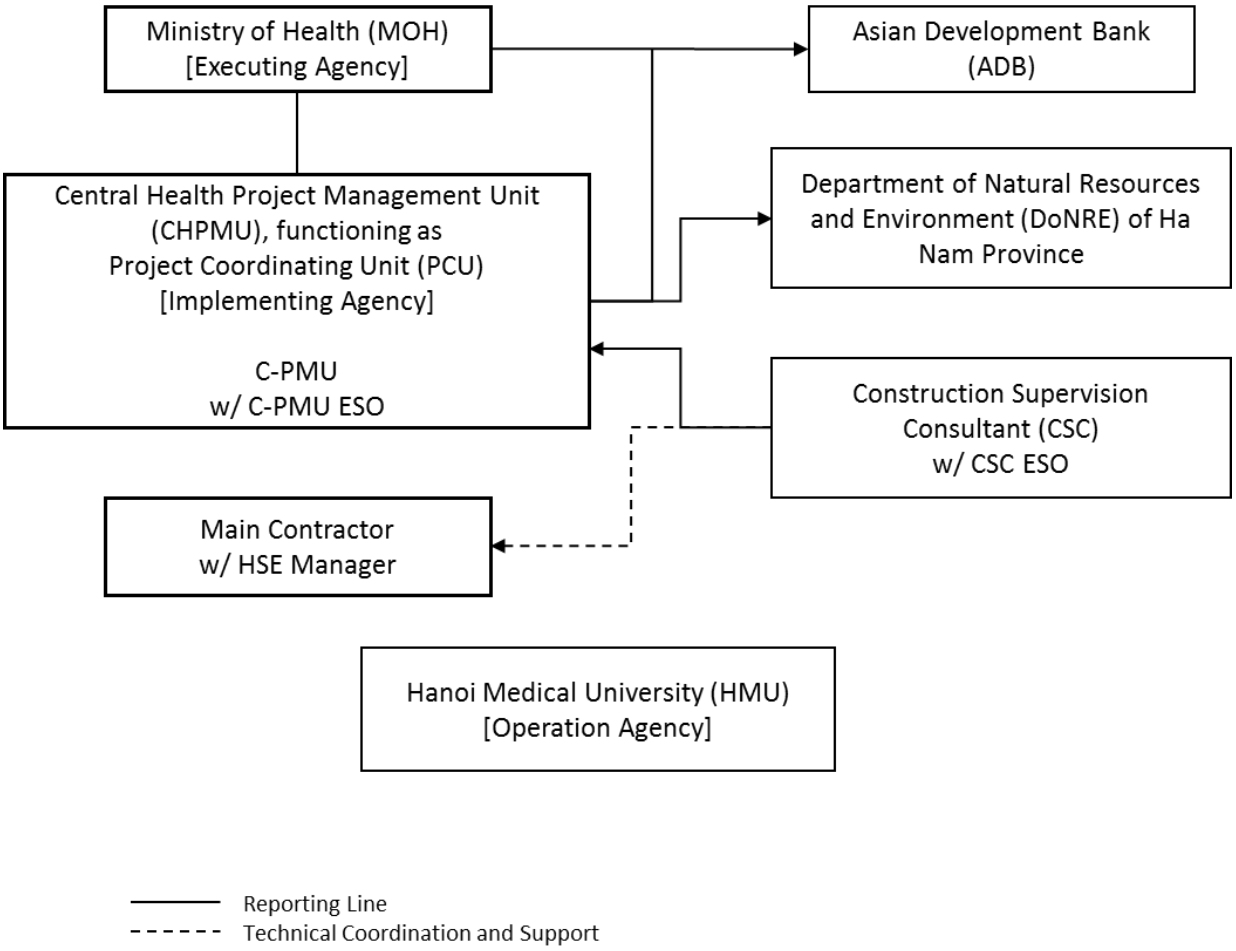


Figure 17: Project Management Structure

Table 15: Specific responsibilities for the implementation of the EMP

Entity	Responsibilities
Central healthcare Project management unit (CHPMU) (IA)	- Establish a Central PMU (C-PMU) within CHPMU to oversee the day-to-day implementation of the Project - Involve HMU during the detailed design and make sure its opinions are incorporated into the Project design - Assign a C-PMU ESO

Entity	Responsibilities
	- Mobilize CSC and ensure the assignment of CSC ESO. - Revise the IEE and EMP as required during detailed design. - Obtain all necessary environmental clearances and permits for the Project, including the approval of Vietnamese EIA - Ensure that Vietnamese EIA and (revised) IEE/EMP requirements are included in the bidding documents and civil works contracts. - Coordinate development and delivery of the institutional capacity building program described in this EMP. - Require the contractor to develop CEMP in compliance with the EMP, and review and approve EMP. - Ensure the contractor implements the CEMP properly and in compliance with the requirements of the EMP and the relevant requirements and regulations of the GOV and ADB, and with any Project environmental or social loan covenants and assurances. - Identify any environmental issues during implementation and propose necessary corrective actions. - Undertake ongoing outreach and communications with Project stakeholders and affected persons. - Ensure implementation of the GRM such that complaints from affected persons are efficiently and effectively resolved. - Ensure implementation of the EMoP presented in the EMP through the CSC / contractor. - Prepare and submit semi-annual environmental monitoring reports during the construction phase and submit to ADB. - Review the annual environmental monitoring reports submitted by HMU during the operation phase and submit to ADB. - Disclose the relevant information from the semi-annual environmental monitoring reports to affected persons promptly upon the reports submission to ADB.
Detailed Engineering Design (DED) Consultant	- Incorporate HMU's opinion as well as environmental safeguards requirements into the detailed design consistent with the approved project documents including but not limited to approved basic design, this IEE report, and Viet Nam Construction Law, Building Code, Climate Change Resilient Design Standard, Greenhouse Building Design, Fire Code, Electrical and Mechanical Codes, and Vietnamese and international environmental and social safeguards standards
Construction Supervision Consultant (CSC)	- Assign a CSC ESO as well as Sanitary Engineer (Water Supply and Sewerage/Drainage) and Safety Engineer. - The Safety Engineer will i. Coordinate with the contractor and require preparation and implementation of OHS plan; and ii. Ensure the safety of buildings, life and properties for contractor, workers and the community - The CSC ESO will; i. Review the updated IEE and EMP, if any; ii. Confirm that mitigation measures have been reflected in detailed engineering design; iii. Review Contractor Environmental Management Plan (CEMP) to ensure compliance with the EMP; iv. Prepare a Project Information Booklet (PIB) written in Vietnamese language which includes (a) the Project information; (b) summary of the IEEs and the Vietnamese EIA; and (c) the information of the grievance redress mechanism and appeal procedures, to be disseminated to the affected persons; v. Provide technical assistance and support to C-PMU and contractors on mitigation measures and EMP implementation; vi. Deliver the construction and operation phase capacity building programs to the staff of the C-PMU, HMU and contractor; vii. Ensure that environmental effect monitoring (sampling and analysis of air quality, noise level,

Entity	Responsibilities
	surface/ground water quality, soil quality, etc.) according to the environmental monitoring plan of the EMP is conducted under the CSC budget during the construction phase; viii. Submit the result of the environment effect monitoring to CHPMU and C-PMU; ix. Assist main contractor to prepare monthly environmental reports on EMP implementation, including any spills, accidents, fires and grievances received, and action taken; x. Conduct site inspections in compliance with the EMoP; and xi. Review and consolidate monthly reports prepared by contractor and assist CHPMU in preparing semi-annual environmental monitoring reports.
Main Contractor	- Assign an Environment, Health and Safety (EHS) Manager - Prepare CEMP which detail the means by which the contractors will comply with EMP (to be done either at the bidding stage or once contract is awarded). - Provide technical assistance and support to the contractor and CHPMU on mitigation measures and EMP implementation. - Conduct site inspections in compliance with EMP environmental motoring plan. - With the support by the CSC, prepare and submit to CHPMU and C-PMU monthly environmental reports on EMP implementation, including any spills, accidents, fires and grievances received, and action taken.
Hanoi Medical University (HMU)	- Take responsibility for environmental management during Project operation. - Implement mitigation measures during the operation phase. - Ensure implementation of the environmental monitoring presented in the EMoP during operation phase. - Prepare and submit annual environmental monitoring reports during the operation phase, until the issuance of ADB's Project Completion Report unless a longer period is agreed, and submit them to CHPMU who will review the report and submit to ADB for disclosure on ADB website
Department of Natural Resources and Environment (DoNRE)	- The provincial environmental management agency is the DoNRE of Ha Nam province, representing MoNRE for environmental management in the province. - DoNRE of Ha Nam province is responsible for monitoring the compliance of governmental environmental requirements during Project implementation phases for all related Project activities (like the environmental monitoring of water, soil, air, others).

EIA = Environmental Impact Assessment, CEMP = Contractor Environmental Management Plan, CSC = Construction Supervision Consultant, EMP = Environmental Management Plan, EMoP = Environmental Monitoring Plan, ESO = environmental safeguard officer, GRM = Grievance Redress Mechanism, IEE = Initial Environmental Examination, PMU = Project Management Unit

3. Capacity Building

177. Some strengthening programs are listed in Table 16. The calculation of costs for these programs is based on information from similar capacity building and training programs implemented in Vietnam, and in consultation with CHPMU and HMU.

Table 16: Institutional strengthening and training programs

Topic	Trainers	Attendees	Contents	Frequency	Total Budget	Source of Funds
Environmental Management during Construction	CSC ESO	CHPMU and Contractors	- GOV laws and regulations - ADB SPS 2009 - EMP Implementation during the construction phase - GRM - IFC EHS Guidelines	Prior to construction and annually during construction	USD 3,500	CSC Budget

Topic	Trainers	Attendees	Contents	Frequency	Total Budget	Source of Funds
Environmental Management during Operation	CSC ESO	CHPMU and HMU	- GOV laws and regulations - ADB SPS 2009 - EMP implementation during the operation phase - IFC EHS Guidelines	Prior to operation	USD 2,500	CSC Budget

ADB SPS 2009 = ADB Safeguard Policy Statement (2009), CHPMU = Central Health Project Management Unit, CSC = Construction Supervision Consultant, EMP = Environmental Management Plan, ESO = Environmental Safeguard Officer, GOV = Government of Vietnam, HMU = Hanoi Medical University, IFC EHS Guidelines = International Finance Corporation Environmental, Health, and Safety Guidelines

B. Impact Mitigation Plan

178. The potential impacts of the Project during pre-construction, construction and operation have been identified before under section 6, and are also presented in Table 17, a mitigation plan with assigned responsibilities and allocation of budget.

Table 17: Impact Mitigation Plan

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
Pre-Construction					
1.	**General Impact**	- Establishment of GRM. - Consultation and Information Disclosure (cf. para.155 of the IEE)	CHPMU budget	CHPMU	C-PMU assisted by CSC
		- Update of IEE and EMP if necessary. - Training and Capacity Building. - Conduct traffic risk assessment.	CSC budget	CHPMU	C-PMU assisted by CSC
		- Detailed Design: ✓ HMU Phase 1 may have its design adapted during detailing phase, if needed, to minimize impacts. ✓ Incorporation of EMP in design and contract. ✓ On top of other construction design criteria applicable to the infrastructures of HMU Phase 1, there should be considerations on: energy conservation, water conservation, waste management planning for prevention, recycling and reuse, treatment, disposal, storage and transportation, integrity of workplace structures, severe weather and facility shutdown, workspace and exit, fire precautions[18], lavatories and showers, potable water supply, clean eating area, lighting, safe access, first aid, air supply and work environment temperature, flood protection, wind circulation, landscape, building failure, sustainability, extreme weather events and earthquakes. ✓ The masterplan and posterior detailed design of the infrastructures should consider any valid contributions from the affected persons/people from neighboring villages (up to the	Detailed Design Consultant budget	CHPMU	Detailed Design Consultant

[18] International Finance Corporation's Good Practice Note: IFC Life and Fire Safety: Hotels <https://www.ifc.org/wps/wcm/connect/6f82f5f7-1985-4bfb-b201-574758b77392/p_GPN_LFS-Hotels.pdf?MOD=AJPERES> shall be referred.

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		extent possible). ✓ Select appropriate colors for the exterior of the new facilities. ✓ Select construction materials for the exterior of the new facilities in order to ensure blending with the surroundings. ✓ Before commencement of the works, determine the exact boundaries and location of the construction and scope of works. The construction area must be according to the design. ✓ Promote active modes of transportation (walking and cycling) inside the campus (e.g. through safe and wide sidewalks connecting all campus locations, dedicated/segregated cycle ways, docking stations on every location within the campus, safe crossing points at key areas along the road network, and others). Design walking and cycling routes to be direct, pleasant, well-marked and accessible. ✓ Promote a clear hierarchy of road users in the final design, prioritizing pedestrians and cyclists over motorized vehicles. ✓ Explore feasibility of using renewables (e.g. solar) for on-site energy production and use. ✓ Ensure that the whole site is accessible and uses 'universal' and 'all age' and physical, mental and sensory impairment friendly design principles. ✓ Ensure healthy design principles are included in the final Project architecture design. ✓ Design the built environment (building features, street furniture) to reduce potential for water accumulation that can promote vector breeding (e.g. mosquitos responsible for transmission of dengue). ✓ Make sure the appropriate solutions indicated in the design of the Project for avoidance of disruption of the water supply to farmers in neighboring operating rice paddies will be put in place.			
		- Prepare Contractor Environmental Management Plan (CEMP) which includes: ✓ Traffic and noise/dust/vibration/emissions management plan; ✓ Waste management plan; ✓ Wastewater management plan; ✓ Worker accommodation management plan; ✓ Occupational and community health and safety management plan; and ✓ Grievance redress mechanism. - Make a contract with licensed waste collection/treatment company (Ha Nam Environment and Urban Joint Stock Company) to make sure they collect wastes on time. - Plan in advance to avoid and minimize all impacts on roads, pipelines and canals. If there will be any impacts on local infrastructures, foresee to repair them immediately. - Facilitate the access to the selected community surveillance team for the supervision of the	Contractor (civil works) budget	CHPMU assisted by CSC	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		construction activities.			
2.	**Clearance of Land and Resettlement Activities** on HMU Phase 1	- Public consultation and disclosure of information should occur frequently to assure compensation is done fairly and grievances are addressed adequately. - A resettlement plan should be updated and monitored, in close collaboration with relevant organizations in accordance with the most updated regulations. - Acquisition of Land and Livelihood Restoration according to RP and any RP updates. - Support Affected Persons by providing available Project information accordingly. - Before construction and clearance of the impacted canals (grade-II and grade-III), assure the affected rice fields will not have their supply of water affected by applying the designated engineering solutions defined under the detailed design for the facilities and the HMU Phase 1 area. - Announce the scope and duration of the works before commencement, to affected peoples and all relevant authorities. - Publicly announce the clearance and construction plans. - Livelihood restoration must be frequently monitored, and any necessary assistance provided to the affected persons.	HMU and Ha Nam Province as counterpart fund	C-PMU ESO/ CSC ESO	Contractor
3.	Impacts on life and health of workers during **UXO clearance**	- Full engagement and cooperation with demining related entities (public or private) to provide adequate working conditions and maximum prevention of accidents. - During this process warning signs will be in place to warn local residents.	UXO budget	C-PMU ESO/CSC ESO, surrounding communities and the People's Committee of Tien Tan and Tien Hiep	BOMICEN
Construction Phase					
4.	Impact of **noise,**	- Ensure that emissions do not result in pollutant concentrations that reach or exceed relevant	Contractor	C-PMU	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
	dust, vibrations and emissions from construction activities on **air quality** of HMU Phase 1 and influence area	ambient quality guidelines and standards by applying the most stringent legislated standards, whether they would be national or current WHO Air Quality Guidelines, or other internationally recognized sources - Ensure that emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards.[19] - Avoid, or when avoidance is not possible always use, whenever applicable and necessary, recommended prevention and control techniques for VOC emissions, particulate matter and ozone depleting substances. - Use canvas to cover piled materials and avoid erosion and dispersion of materials. - Selecting equipment with lower sound power levels - Installing silencers for fans - Installing suitable mufflers on engine exhausts and compressor components - Installing acoustic enclosures for equipment casing radiating noise - Improving the acoustic performance of constructed buildings, apply sound insulation - Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m2 in order to minimize the transmission of sound through the barrier. Barriers should be located as close to the source or to the receptor location to be effective - Installing vibration isolation for mechanical equipment - Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas - Re-locating noise sources to less sensitive areas to take advantage of distance and shielding - Siting permanent facilities away from community areas if possible - Taking advantage of the natural topography as a noise buffer during facility design - Reducing project traffic routing through community areas wherever possible - Planning flight routes, timing and altitude for aircraft (airplane and helicopter) flying over community areas - Developing a mechanism to record and respond to complaints - After finishing a big part of a construction, the site will be cleaned immediately.	(civil works) budget	ESO/CSC ESO, surrounding communities and the People's Committee of Tien Tan and Tien Hiep	

[19] As a general rule, this Guideline suggests 25 percent of the applicable air quality standards to allow additional, future sustainable development in the same airshed. (Impacts should be estimated through qualitative or quantitative assessments by the use of baseline air quality assessments and atmospheric dispersion models to assess potential ground level concentrations.

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		- Minimizing dust from material handling sources, such as conveyors and bins, by using covers and/or control equipment (water suppression, bag house, or cyclone) - Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content - Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements - Selectively removing potential hazardous air pollutants, such as asbestos, from existing infrastructure prior to demolition - Managing emissions from mobile sources - Avoiding open burning of solid waste			
5.	Impacts from construction **vehicles and machinery** regarding **air quality, groundwater and surface water quality**	- Regardless of the size or type of vehicle, fleet owners / operators should implement the manufacturer recommended engine maintenance programs - Drivers should be instructed on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits - Operators with fleets of 120 or more units of heavy duty vehicles (buses and trucks), or 540 or more light duty vehicles21 (cars and light trucks) within an airshed should consider additional ways to reduce potential impacts including: ✓ Replacing older vehicles with newer, more fuel efficient alternatives ✓ Converting high-use vehicles to cleaner fuels, where feasible ✓ Installing and maintaining emissions control devices, such as catalytic converters ✓ Implementing a regular vehicle maintenance and repair program - All construction machinery is fully licensed and fully equipped with communication devices in order to avoid spillages to the soil or surface water. - Avoiding or minimizing project transportation through community areas - Use standard-tested construction equipment, (less emissions and toxic gases, dust ...). - Requiring the contractor to strictly use standard machines and follow the manuals. - Using noise control devices, such as temporary noise barriers and deflectors for impact activities, and exhaust muffling devices for combustion engines. - If a concrete mixer is used on site, the dry concrete mixing has to be conducted in a full covered area at least 500 m away from the residential area. Do not place the concrete-mixer or the asphalt-mixer near the boundaries of the construction site. - The construction machinery will be checked according to the emission standards of Vietnam for CO, hydrocarbons and smoke. - Maintain a regular inspection and maintenance of all machinery to ensure good technical	Contractor (civil works) budget	C-PMU ESO/ CSC ESO, surrounding communities and the People's Committee of Tien Tan and Tien Hiep	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		conditions. - Foresee that cleaning of machinery or construction vehicles is done in appropriate facilities to impede contamination from any hazardous substances to surface and groundwater. - Understand the quality, quantity, frequency and sources of liquid effluents in the Project area. This includes knowledge about the locations, routes and integrity of internal drainage systems and discharge points - Plan and implement the segregation of liquid effluents principally along industrial, utility, sanitary, and storm water categories, in order to limit the volume of water requiring specialized treatment. Characteristics of individual streams may also be used for source segregation.			
6.	Impacts from **transportation of construction materials** and waste	- Implementation of a traffic and noise/dust/vibration/emissions management plan (as part of the CEMP) that will include a purpose, scope, safe driving policy, roles and responsibilities (including roles for the contractor site EHS Manager, contractor workers, subcontractor workers and drivers); traffic management procedures; worksite requirements; community safety requirements; performance and monitoring; deliverables (site layout and traffic flow patterns and schedule; road safety rules and practices; training registries; vehicle inspection registries; records of road safety campaigns; monthly transportation performance reports; registry for accidents/incidents and major near misses. - Establish maximum speeds for ALL vehicles associated with the Project and impose strict penalties for non-compliance (zero-tolerance). The transportation vehicles on road must run properly with a specified speed. - The transporting material vehicles must be covered to avoid dust falling on the road and impeding the circulation process of surrounding vehicles. - Frequently clean and reinforce the road if necessary. - Increase the awareness of workers by organizing capacity building sessions, in order to avoid or minimize adverse social impacts. - Coordinate with local authorities the management of residents to ensure security in the province. - Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries: - Emphasizing safety aspects among drivers ✓ Improving driving skills and requiring licensing of drivers ✓ Adopting limits for trip duration and arranging driver rosters to avoid overtiredness ✓ Avoiding dangerous routes and times of day to reduce the risk of accidents ✓ Use of speed control devices (governors) on trucks, and remote monitoring of driver	Contractor (civil works) budget	C-PMU ESO/ CSC ESO, surrounding communities and the People's Committee of Tien Tan and Tien Hiep	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		actions - Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. - Since the project may contribute to a significant increase in traffic along existing roads, recommended measures include: ✓ Minimizing pedestrian interaction with construction vehicles ✓ Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. ✓ Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns) ✓ Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents ✓ Using locally sourced materials, whenever possible, to minimize transport distances. ✓ Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic - Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions			
7.	Impacts on local **hydrology**	- Construction activities may include the generation of sanitary wastewater discharges in varying quantities depending on the number of workers involved. Adequate portable or permanent sanitation facilities serving all workers should be provided at all construction sites. - Understand the quality, quantity, frequency and sources of liquid effluents in its installations. This includes knowledge about the locations, routes and integrity of internal drainage systems and discharge points - Plan and implement the segregation of liquid effluents principally along industrial, utility, sanitary, and stormwater categories, in order to limit the volume of water requiring specialized treatment. Characteristics of individual streams may also be used for source segregation. - Identify opportunities to prevent or reduce wastewater pollution through such measures as recycle/reuse within their facility, input substitution, or process modification (e.g. change of technology or operating conditions/modes). - Assess compliance of their wastewater discharges with the applicable: (i) discharge standard (if the wastewater is discharged to a surface water or sewer), and (ii) water quality standard for a specific reuse (e.g. if the wastewater is reused for irrigation). - Additionally, the generation and discharge of wastewater of any type should be managed through a combination of:	Contractor (civil works) budget	C-PMU ESO/ CSC ESO, surrounding communities and the People's Committee of Tien Tan and Tien Hiep	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		✓ Water use efficiency to reduce the amount of wastewater generation ✓ Process modification, including waste minimization, and reducing the use of hazardous materials to reduce the load of pollutants requiring treatment ✓ If needed, application of wastewater treatment techniques to further reduce the load of contaminants prior to discharge, taking into consideration potential impacts of cross-media transfer of contaminants during treatment (e.g., from water to air or land) - When wastewater treatment is required prior to discharge, the level of treatment should be based on: ✓ Whether wastewater is being discharged to a sanitary sewer system, or to surface waters ✓ National and local standards as reflected in permit requirements and sewer system capacity to convey and treat wastewater if discharge is to sanitary sewer ✓ Assimilative capacity of the receiving water for the load of contaminant being discharged wastewater if discharge is to surface water ✓ Intended use of the receiving water body (e.g. as a source of drinking water, recreation, irrigation, navigation, or other) ✓ Presence of sensitive receptors (e.g., endangered species) or habitats ✓ Good International Industry Practice (GIIP) for the relevant industry sector - When water quality criteria allow, stormwater should be managed as a resource, either for groundwater recharge or for meeting water needs at the facility. - Project activities should not compromise the availability of water for personal hygiene needs and should take account of potential future increases in demand. The overall target should be the availability of 100 liters per person per day although lower levels may be used to meet basic health requirements. Water volume requirements for well-being-related demands such as water use in health care facilities may need to be higher. - Irrigation canals that are permanently impacted, should be connected to the surrounding canals drainage system to insure flow is unaltered. - If any fields will be kept inside HMU Phase 1 area, foresee to include water supply in a natural way, similar to the one occurring on site. - Keep update and inform to local authorities on the status of pumping station to ensure the quality of pump operation once needed.			
8.	Impacts from generation of **hazardous and non-hazardous industrial waste**	- Implement waste management plan and wastewater management plan (as part of CEMP). - The waste collection from construction works should be done at designated points only. The waste collection points should be prepared for different types of wastes: construction, hazardous, non-hazardous and domestic solid wastes. - Clean the collection points every day.	Contractor (civil works) budget	C-PMU ESO/ CSC ESO, surrounding communities and the	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
	and solid waste	- Arrange an adequate ventilation system in the area. - Have procedures in place that ensure compliance with local laws and international requirements applicable to the transport of hazardous materials. - The procedures for transportation of hazardous materials (Hazmats) should include: ✓ Proper labelling of containers, including the identification and quantity of the contents, hazards, and shipper contact information ✓ Providing a shipping document (e.g. shipping manifest) that describes the contents of the load and its associated hazards in addition to the labelling of the containers. The shipping document should establish a chain-of-custody using multiple signed copies to show that the waste was properly shipped, transported and received by the recycling or treatment/disposal facility ✓ Ensuring that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved ✓ Ensuring adequate transport vehicle specifications ✓ Training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures ✓ Using labelling and placarding (external signs on transport vehicles), as required - Providing the necessary means for emergency response on call 24 hours/day.		People's Committee of Tien Tan and Tien Hiep	
9.	Impacts from generation of **domestic/construction wastewater**	- The Contractor will be responsible for compliance with the relevant Vietnamese regulations on wastewater discharges into surroundings. - Industrial wastewater generated from industrial operations includes process wastewater, wastewater from utility operations, runoff from process and materials staging areas, and miscellaneous activities including wastewater from laboratories, equipment maintenance shops, etc. The pollutants in an industrial wastewater may include acids or bases (exhibited as low or high pH), soluble organic chemicals causing depletion of dissolved oxygen, suspended solids, nutrients (phosphorus, nitrogen), heavy metals (e.g. cadmium, chromium, copper, lead, mercury, nickel, zinc), cyanide, toxic organic chemicals, oily materials, and volatile materials. , as well as from thermal characteristics of the discharge (e.g., elevated temperature). Transfer of pollutants to another phase, such as air, soil, or the sub-surface, should be minimized through process and engineering controls. - Sanitary wastewater from industrial facilities may include effluents from domestic sewage, food service, and laundry facilities serving site employees. Miscellaneous wastewater from laboratories, medical infirmaries, water softening etc. may also be discharged to the sanitary wastewater treatment system. Recommended sanitary wastewater management strategies	Contractor (civil works) budget	C-PMU ESO/ CSC ESO, surrounding communities and the People's Committee of Tien Tan and Tien Hiep	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		include: ✓ Segregation of wastewater streams to ensure compatibility with selected treatment option (e.g. septic system which can only accept domestic sewage) ✓ Segregation and pre-treatment of oil and grease containing effluents (e.g. use of a grease trap) prior to discharge into sewer systems ✓ If sewage from the industrial facility is to be discharged to surface water, treatment to meet national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater discharges shown in Table 1.3.1 of Page 30 from IFC EHS General Guidelines ✓ If sewage from the industrial facility is to be discharged to either a septic system, or where land is used as part of the treatment system, treatment to meet applicable national or local standards for sanitary wastewater discharges is required. ✓ Sludge from sanitary wastewater treatment systems should be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources. - Construction wastewater will be directed to temporary detention and settling pits at the Project site, located away from surface waters and sized to the needs. - Portable or constructed toilets must be provided on site for construction workers if services are not available locally and must be emptied in an appropriate manned into an existing offsite septic systems or be equipped with functioning septic tanks.			
10.	**Changes in landscape**	- Preserve existing vegetation when feasible. - Enforce compliance with building codes of the area - Proceed with a compact development approach that limits the consumption of the natural landscape and assuring low density development. - Plan, implement and maintain an appropriate landscaping program for the site that takes into account restoration or creation of native vegetation cover with local fauna and flora.	Contractor (civil works) budget	C-PMU ESO/CSC ESO	Contractor
11.	Impacts from **habitat loss**, disturbance by human presence and altered food availability on **local environment and**	- Reducing noise, dust, vibration and traffic from construction activities as far much as possible. - Preserve existing vegetation and trees as much as possible. - Update IEE and EMP if necessary with any arising considerations on new biota or vegetation. - Do not cut down any trees or vegetation outside the construction area.	Contractor (civil works) budget	C-PMU ESO/CSC ESO, surrounding communities and the People's Committee of	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
	biota			Tien Tan and Tien Hiep	
12.	**Impacts from materials extraction at quarry/borrow site**	- Prioritize use of existing quarry sites of suitable materials with highest ratio between extractive capacity (both in terms of quality) and loss of natural state. - Procure materials only from Department of Natural Resources and Environment (DoNRE) authorized quarries. If the contractor shall operate the quarry site, required environmental permits shall be secured prior to operation of quarry/borrow areas. Ensure borrow pits are left in a tidy state with stable side slopes and proper drainage in order to avoid creation of water bodies favorable for mosquito breeding.	Contractor (civil works) budget	C-PMU ESO/ CSC ESO, surrounding communities and the People's Committee of Tien Tan and Tien Hiep	Contractor
13.	**Occupational health and safety impacts**	- Implement an occupation and community health and safety management plan (as part of the CEMP) to be prepared according to Section 2 on Occupational Health and Safety from the IFC EHS General Guidelines, IFC EHS HCF Guidelines and IFC EHS THD Guidelines. - IFC EHS Guidelines indicate that Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. This section provides guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety on: ✓ General Facility Design and Operation: Integrity of workplace structures, severe weather and facility shutdown, workspace and exit, fire precautions, lavatories and showers, potable water supply, clean eating area, lighting, safe access, first aid, air supply, work environment temperature ✓ Communication and Training: OHS training, visitor orientation, new task employee and contractor training, basic OHS training, area signage, labelling of equipment, communicate hazard codes ✓ Physical Hazards: rotating and moving equipment, noise, vibration, electrical, eye hazards, welding/Hot work, Industrial vehicle driving and site traffic, working environment temperature, ergonomics, repetitive motion, manual handling, working at heights, illumination ✓ Chemical Hazards: air quality, fire and explosions; corrosive, oxidizing and reactive chemicals, asbestos containing materials (ACM) ✓ Biological Hazards ✓ Radiological Hazards ✓ Personal Protective Equipment (PPE) ✓ Special Hazards Environments: confined space, lone and isolated workers	Contractor (civil works) budget	C-PMU ESO/ CSC ESO	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		✓ Monitoring: accidents and diseases monitoring - More in detail, some guidelines are essential: ensure the living conditions for workers like facilities for resting, clean water, food, accommodation, and others meet international standards for worker accommodations to prevent communicable, food-borne, water-borne and vector-borne illnesses; - Full (personal protective equipment) PPE in order to avoid the negative effects on health, prevent diseases and not affect the environment of the residential areas; - When executing works in height, transporting, handling and installing the machinery and equipment, workers should be equipped with all means of PPE such as protective helmets, masks, reflective clothing, lights and flags. - Workers will be trained on manipulation, testing, commissioning and technical correct and timely response when problems occur; - Provide a workforce health/emergency services on site			
14.	**Community health and safety impacts**	- The IFC EHS General Guidelines, the IFC EHS HDF Guidelines and the IFC EHS THD Guidelines address some impacts that go beyond the project life and/or boundaries and indicate the following items to be analyzed: ✓ Water Quality and Availability, Structural safety of project infrastructure, life and fire safety, traffic safety, transport of hazardous materials, disease prevention, emergency preparedness and response. - Restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community. - Removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials. - The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising, and the adoption of procedures. - Environmental precautions must be taken to limit environmental impacts on the living standards of local people. - Deploy information, education and behavior change communication to workers on communicable diseases as appropriate (e.g. sexually transmitted infections, including HIV, vector-borne diseases), road traffic safety and driving behavior through communities, and respectful interaction with local populations.	Contractor (civil works) budget	C-PMU ESO/ CSC ESO	Contractor

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
15.	Impacts on living standards due to an increase of **immigration**	- Prioritize employment for local people. - Close collaboration with local authority and organization to monitor and control illegal activities related to construction workers. - Use of local suppliers of goods and services for both the construction and operation of the development where possible. - Examination of opportunities to improve the energy efficiency by: Demand/Load side management by reducing loads on the energy system and Supply side management by: ✓ Reduce losses in energy distribution ✓ Improve energy conversion efficiency ✓ Exploit energy purchasing opportunities ✓ Use lower-carbon fuels - Implementation of water conservation actions and programs to promote continuous reduction in water consumption in water consumption and achieve savings in the water pumping, treatment and disposal costs. It may include water monitoring/management techniques, process and cooling/healing water recycling, reuse and sanitary water conversation techniques. - The contractor will make a list of temporary absences and residence of workers at site, and should enforce site rules at all times.	Contractor (civil works) budget	Surrounding communities and People's Committee of Tien Tan and Tien Hiep Communes	PMU and People's Committee of Tien Tan and Tien Hiep Communes
16.	**Impacts on physical cultural resources**	- Relocate according to local standards and traditions, existing scattered graves (if any are found) in the area. Construction activities will be immediately suspended if any physical cultural resources are encountered and can only be resumed after assuring these resources are conserved and avoidance of destroying and damaging is assured by providing for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation. Construction activities can resume only after thorough investigation and with the permission of the local Cultural Heritage Bureau. - The project will not remove any physical cultural resources unless the following conditions are met: ✓ No alternatives to removal are available. ✓ The overall benefits of the project substantially outweigh the anticipated cultural heritage loss from removal - Any removal is conducted in accordance with relevant provisions of national and/or local laws, regulations, and protected area management plans and national obligations under international laws, and employs the best available techniques.	Contractor (civil works) budget	C-PMU ESO/ CSC ESO, Affected communities and People's Committee of Tien Tan and Tien Hiep Communes	Compensation and Resettlement Committees of PMU
Operational Phase					

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
17.	Impacts from **noise, emissions from transportation vehicles** in HMU Phase 1 and area of influence affecting the **air quality**	- Promote collective transportation to the area. - If needed, frequently water any internal roads to reduce dust and keep the roads cleaned. - Promote use of active modes of transportation (walking and cycling) inside the campus. Incentivize walking, cycling, and use of public transport by students and staff. (for example. through active transport campaigns, shared cycling schemes, cycling clubs).	HMU Operational Budget	HMU	HMU
18.	Impacts on road **traffic** inside HUM Phase 1, area of influence and neighboring communes	- Increase the awareness of workers and students by organizing capacity building sessions, in order to avoid adverse social impacts; - Coordinate with local authorities the management of residents to ensure security in the province. - Ensure a vehicular speed limit on site. - Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries: - Emphasizing safety aspects among drivers ✓ Improving driving skills and requiring licensing of drivers ✓ Adopting limits for trip duration and arranging driver rosters to avoid overtiredness ✓ Avoiding dangerous routes and times of day to reduce the risk of accidents ✓ Use of speed control devices (governors) on trucks, and remote monitoring of driver actions - Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. - Since the project may contribute to a significant increase in traffic along existing roads, recommended measures include: ✓ Minimizing pedestrian interaction with construction vehicles ✓ Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. ✓ Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns) ✓ Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents ✓ Using locally sourced materials, whenever possible, to minimize transport distances.	HMU Operational Budget	HMU	HMU

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		✓ Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic - Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions			
19.	Impacts of solid/liquid **waste including hazardous and non-hazardous wastes**	- Review of new waste sources during planning, siting, and design activities, including during equipment modifications and process alterations, to identify expected waste generation, pollution prevention opportunities, and necessary treatment, storage, and disposal infrastructure - Collection of data and information about the process and waste streams in existing facilities, including characterization of waste streams by type, quantities, and potential use/disposition - Establishment of priorities based on a risk analysis that takes into account the potential EHS risks during the waste cycle and the availability of infrastructure to manage the waste in an environmentally sound manner - Definition of opportunities for source reduction, as well as reuse and recycling - Definition of procedures and operational controls for onsite storage - Definition of options / procedures / operational controls for treatment and final disposal - Substituting raw materials or inputs with less hazardous or toxic materials, or with those where processing generates lower waste volumes - Applying manufacturing process that convert materials efficiently, providing higher product output yields, including modification of design of the production process, operating conditions, and process controls - Instituting good housekeeping and operating practices, including inventory control to reduce the amount of waste resulting from materials that are out-of-date, off specification, contaminated, damaged, or excess to plant needs - Instituting procurement measures that recognize opportunities to return usable materials such as containers and which prevents the over ordering of materials - Minimizing hazardous waste generation by implementing stringent waste segregation to prevent the commingling of non-hazardous and hazardous waste to be managed - Evaluation of waste production processes and identification of potentially recyclable materials - Identification and recycling of products that can be reintroduced into the manufacturing process or industry activity at the site - Investigation of external markets for recycling by other industrial processing operations located in the neighborhood or region of the facility (e.g., waste exchange) - Establishing recycling objectives and formal tracking of waste generation and recycling rates - Providing training and incentives to employees in order to meet objectives	HMU Operational Budget	HMU	HMU

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		- On-site or off-site biological, chemical, or physical treatment of the waste material to render it non-hazardous prior to final disposal - Treatment or disposal at permitted facilities specially designed to receive the waste. Examples include: composting operations for organic non-hazardous wastes; properly designed, permitted and operated landfills or incinerators designed for the respective type of waste; or other methods known to be effective in the safe, final disposal of waste materials such as bioremediation. - Waste is stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills. Examples include sufficient space between incompatibles or physical separation such as walls or containment curbs - Store in closed containers away from direct sunlight, wind and rain - Secondary containment systems should be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment - Secondary containment is included wherever liquid wastes are stored in volumes greater than 220 liters. The available volume of secondary containment should be at least 110 percent of the largest storage container, or 25 percent of the total storage capacity (whichever is greater), in that specific location - Provide adequate ventilation where volatile wastes are stored.			
20.	**Impacts from land changes on landscape**	- The campus will be planned accordingly to the adaptation to the actual landscape to imprint the least impacts possible.	HMU Operational Budget	HMU	HMU
21.	**Impacts related to occupational health and safety risks** by fire, failure of building safety features and accidental and natural hazards	- Provision of training on EHS to the staff - Prepare instruction board or post with practices and guidance on safety risk by fire etc. on public places inside the campus to teachers, students and other staff. - Training to all new employees to ensure they are apprised of the basic site rules of work and the necessary procedures for an emergency situation (fire, failure of buildings, accidental and natural hazards, others). - If visitors can access areas where hazardous conditions or substances may be present, a visitor orientation and control program should be established; - Hazardous areas, installations, materials, safety measures and emergency exits should be marked properly and in accordance to international standards; - Copies of the hazard coding system should be posted outside the facility at emergency entrance doors;	HMU Operational Budget	HMU	HMU

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		- Information on the hazardous materials at the facility should be shared proactively.			
22.	Impacts on local society and economy due to an increase of **social crimes/tensions**	- Prioritize local people in training and employment in particular those who were directly affected by the land acquisition. - Organize and participate in campaigns to promote harmonious lifestyle and to prevent discord between workers and local people. - Ensure the public, green, recreational and cultural spaces within the campus are accessible to local populations. - Have adequate public consultation and information disclosure actions that the public opinion can be recorded and heard in a timely manner. Public consultation should be performed during all phases of the Project. - Create a grievance mechanism to collect, monitor and respond to arisen social and cultural issues during the HMU Phase 1 operation. - Capacity building and awareness of environmental sanitation to community in the region and participate in volunteering Labor Days for environmental protection. - Supervise and educate, inspect the implementation of regulations on hygiene, security and order, prevention of social evils. - Close collaboration with local authority and organization to monitor and control illegal activities related to workers or students. - Mitigate any impacts on the existing infrastructure arising from the 5,540 students and HMU employees, like accommodation, restaurants, supermarkets, health facilities, schools for the staffs and students children and any others: ✓ It is expected private business will rise in the area to accommodate the rising needs ✓ It is expected some of the directly affected people will apply their compensation into their own businesses to suppress the needs of the incoming immigration.	HMU Operational Budget	HMU	HMU
23.	**Community health and safety risks** by fire, failure of building safety features and accidental and natural hazards	- Cooperate with local authorities such as firefighting department for training against fire, natural hazards - Provide visual safety instruction at public places for community - Provide instruction on first aid to reduce accidental damage. - Inclusion of buffer strips or other methods of physical separation around project sites to protect the public from major hazards associated with hazardous materials incidents or process failure, as well as nuisance issues related to noise, odors, or other emissions - Incorporation of siting and safety engineering criteria to prevent failures due to natural risks posed by earthquakes, tsunamis, wind, flooding, landslides and fire. To this end, all project structures should be designed in accordance with engineering and design criteria mandated by site-specific risks, including but not limited to seismic activity, slope stability, wind loading,	HMU Operational Budget	HMU	HMU

No.	Impact	Mitigation Measure	Source of Funds	Responsibilities	
				Supervision	Implementation
		and other dynamic loads - Application of locally regulated or internationally recognized building codes to ensure structures are designed and constructed in accordance with sound architectural and engineering practice, including aspects of fire prevention and response - Engineers and architects responsible for designing and constructing facilities, building, plants and other structures should certify the applicability and appropriateness of the structural criteria employed. - Depending on the nature of a project, guidance provided in the ICC or comparable codes should be followed, as appropriate, with respect to: ✓ Existing structures ✓ Soils and foundations ✓ Site grading ✓ Structural design ✓ Specific requirements based on intended use and occupancy ✓ Accessibility and means of egress ✓ Types of construction ✓ Roof design and construction ✓ Fire-resistant construction ✓ Flood-resistant construction - Project sponsors' architects and professional consulting engineers should demonstrate that affected buildings meet these life and fire safety objectives. - Life and fire safety systems and equipment should be designed and installed using appropriate prescriptive standards and/or performance based design, and sound engineering practices. - Life and fire safety design criteria for all existing buildings should incorporate all local building codes and fire department regulations.			

	Positive Impacts	
24.	**Job opportunities for local people**	Moderate
25.	**Improvement of life quality / health services**	Major

26.	**Improvement of educational level**	Major
27.	**Improvement of infrastructures**	Major
28.	**Increase of local GDP**	Moderate

C. Environmental Monitoring Plan

179. The environmental monitoring plan (EMoP) for the EMP (Table 23), focuses on all three phases (pre-construction, construction, operation) of the Project and it has a purpose to determine the effectiveness of the impact mitigations, and to document any unexpected positive or negative environmental impacts of the Project.

180. The environmental monitoring plan will be carried out by the CSC / Contractor and under the responsibility of CHPMU during construction phase and by HMU during operation phase. C-PMU ESO will function to coordinate and provide logistical support as needed for construction phase and HMU for the operational phase.

181. After the pre-construction and construction works are completed, the potential impact of the operations activities will be supervised by HMU.

182. The environmental standards of Vietnam should be applied for guidance and IFC EHS Guidelines should be followed to supplement standards that are not provided by the GOV.

Table 18: Applicable Environmental Standards - Air Quality Standards Applicable to the HMU Phase 1

Indicator	QCVN 05: 2013 / BTNMT - National technical standards on ambient air quality (µg/m³)				WHO Ambient Air Quality Guidelines, 2005 (µg/m³)			
	Avg 1h	Avg 8h	Avg 24h	Avg 1yr	Avg 1h	Avg 8h	Avg 24h	Avg 1yr
SO_2	350	-	125	50	-	-	20 (24h)	-
CO	30.000	10.000	-	-	-	-	-	-
NO_2	200	-	100	40	200 (1h)	-	-	40 (1yr)
O_3	200	120	-	-	-	100 (8h)	-	-
TSP	300	-	200	100	-	-	-	-
PM_{10}	-	-	150	50	-	-	50 (24h)	20 (1yr)
$PM_{2.5}$	-	-	50	25	-	-	25 (24h)	10 (1yr)

Table 19: Applicable Environmental Standards - Noise Quality Standards Applicable to the HMU Phase 1

	WHO Guidelines for Community Noise, 1999 One Hour L_{Aeq} (dBA)		QCVN 26: 2010 / BTNMT: National technical regulation on noise One Hour L_{Aeq} (dBA)	
Receptor	Daytime 7h00 – 22h00	Night time 22h00 – 7h00	Daytime 6h00 – 21h00	Night time 21h00 – 6h00
Residential, Institutional, Educational, Religious	55	45	55	45
Industrial, Commercial	70	70	70	55
An equivalence was considered between Residential areas from WHO and special areas from QCVN 26:2010 and between industrial and commercial areas and Normal areas from Vietnamese Legislation. The latter includes apartment buildings, hotels, guest houses and administrative offices, therefore there is a difference between thresholds from day time and night times.				

Table 20: Applicable Environmental Standards - Surface Water Quality Standards Applicable to HMU Phase 1

Compound (µg/l)	QCVN 08-MT: 2015 / BTNMT - National technical regulation on surface water			
	A1*	A2*	B1*	B2*
pH	6-8,5	6-8,5	5,5-9	5,5-9
BOD_5 (20^oC)	4	6	15	25
COD	10	15	30	50
DO	≥ 6	≥ 5	≥ 4	≥ 2
TSS	20	30	50	100
NH_4^+	0,3	0,3	0,9	0,9
NO^{-2}	0,05	0,05	0,05	0,05
NO^{-3}	2	5	10	15
Total N				
Cl-	250	350	350	_
F-	1	1,5	1,5	2
PO_4^{3-}	0,1	0,2	0,3	0,5
Total Phosphorus				
CN-	0,05	0,05	0,05	0,05
As	0,01	0,02	0,05	0,1
Cd	0,005	0,005	0,01	0,01
Pb	0,02	0,02	0,05	0,05
Cr^{6+}	0,01	0,02	0,04	0,05
Total Chromium	0,05	0,1	0,5	1
Cu	0,1	0,2	0,5	1
Zn	0,5	1	1,5	2
Ni	0,1	0,1	0,1	0,1
Mn	0,1	0,2	0,5	1
Hg	0,001	0,001	0,001	0,002
Fe	0,5	1	1,5	2
Surfactant	0,1	0,2	0,4	0,5
Aldrin	0,1	0,1	0,1	0,1
BHC	0,02	0,02	0,02	0,02
Dieldrin	0,1	0,1	0,1	0,1
DDTs	1,0	1,0	1,0	1,0
Heptachlor & Heptachlorepoxide	0,2	0,2	0,2	0,2
Total Phenol	0,005	0,005	0,01	0,02
Oils & Grease	0,3	0,5	1	1
Total Radioactivity α	0,1	0,1	0,1	0,1
Total Radioactivity β	1,0	1,0	1,0	1,0
Coliform	2500	5000	7500	10000
E.Coli	20	50	100	200

* - **A1** - Domestic water supply (after normal treatment), aquatic animal and plant conservation (and others like A2, B1 and B2).
A2 - Domestic water supply, but after suitable treatment technology or other uses like B1 and B2.
B1 - For irrigation or other purposes requiring water quality of similar uses.
B2 - Navigation and other purposes with low quality water requirements.

Table 21: Applicable Environmental Standards - Wastewater Discharge Quality Standards applicable to HMU Phase 1

Indicators	QCVN 14: 2008 / BTNMT - National technical regulation on domestic wastewater		Indicative Values for Treated Sanitary Sewage Discharges IFC EHS Guidelines**
	A*	B*	
pH	5-9	5-9	6-9
BOD_5 (20^{O}C)	30	50	
BOD			30
COD			125
TSS	50	100	50
TDS	500	1000	
Sulphur	1	4	
NH_4^+	5	10	
NO^{-3}	30	50	
Total Nitrogen			10
Oil and grease	10	20	
PO_4^{3-}	6	10	
Total Phosphorus			2
Coliforms	3000	5000	400

* - Column A defines the value of the pollutants for the calculation of the maximum allowable values in domestic wastewater discharged into water sources used for domestic water supply (with the quality of water in columns A1 and A2 of the National Technical Regulation on surface water quality). Column B defines the value of the pollution as the basis for calculating the maximum allowable value in daily-life wastewater discharged into water sources not used for domestic water supply (water quality equivalent to columns B1 and B2 of the National Technical Regulation on surface water quality or coastal waters).

** - Not applicable to centralized, municipal, wastewater systems which are included in EHS Guidelines for Water and Sanitation. Applicable as indicative guideline values applicable to sanitary wastewater discharges.

Table 22: Applicable Environmental Standards - Soil Quality Standards applicable to HMU Phase 1

TT	QCVN 03-MT:2015/BTNMT National technical standards on limits of some heavy metals in the soil					
	Parameter	Agricultural land	Forestry land	Land for living	Industrial land	Commercial land, services
1	Arsenic (As)	15	20	15	25	20
2	Cadmium (Cd)	1,5	3	2	10	5
3	Lead (Pb)	70	100	70	300	200
4	Chromium (Cr)	150	200	200	250	250
5	Copper (Cu)	100	150	100	300	200
6	Zink (Zn)	200	200	200	300	300

183. Regarding soil quality standards, International Standards are not so easily applicable to local samples. In general, soil pollution standards are related to the concentration of the pollutant, the current and future use of the area and the exposure pathways available to the receptors. Further the soil pollution standards are to be adapted according to their clay and organic matter content. As such, a universal scheme for this comparison should be a topic for further investigation, beyond this study.

184. **Reporting Requirements**: The contractor will submit monthly reports to CHPMU and C-PMU on the implementation and compliance with the CEMP, as per approved format of the C-PMU, including but not limited to information on all spills, accidents and near misses, grievances received and appropriate actions taken, contractors' activities, manpower, equipment, materials and workmanship compliance, actual vs targeted accomplishments, environmental monitoring

and compliance with EMP and with Gender, Social and occupational health and safety issues and concerns, variation orders, contractors' claims, consultants' personnel, activities, etc. Tentative schedule is within 7 days after the end of each month.

185. During the construction phase, based on the contractors' monthly reports and the compliance inspection and ambient monitoring results, C-PMU ESO will, with the support of CSC ESO, prepare Project environmental monitoring reports semi-annually and submit them to CHPMU who will review the reports and submit them to ADB for disclosure on ADB website.

186. During the operation phase, HMU will prepare Project environmental monitoring reports annually, until the issuance of ADB's Project Completion Report unless a longer period is agreed, and submit them to CHPMU who will review the report and submit to ADB for disclosure on ADB website.

187. CHPMU will disclose relevant information from these semi-annual and annual environmental monitoring reports to the affected people promptly upon submission of each report.

Table 23: Environmental Monitoring Plan (EMoP)

Environmental indicators	Location	Monitoring media and Reporting	Frequency	Implementation Responsibility	Source of Funds
Pre-Construction Phase					
General Impact	CHPMU and HMU Phase 1	Fieldwork, community consultation and information, literature review, secondary data collection, engagement of related stakeholders (CSC, CHPMU, HMU, contractor, Project's consultant…) to make plans	Once before HMU Phase 1 starts	CHPMU	Project management budget / Design budget / CSC budget / Civil works budget
Clearance of Land and Resettlement Activities on HMU Phase 1	HMU Phase 1	Fieldwork, Community Consultation and Information, Resettlement Plan and other necessary support plans	Once before HMU Phase 1 starts	HMU	HMU and Ha Nam Province as counterpart fund
UXO Clearance	HMU Phase 1	Consultation with appropriate legal authorities, Field Work to ensure the UXO plan is developed and implemented	Once prior to the beginning of the works	BOMICEN	UXO Budget
Construction Phase					
Air Quality Assessment (dust, PM_{10} or $PM_{2.5}$, CO, NO_x, SO_x), noise level	Construction site	Field works with analysis approved by DoNRE. (Include visual observations of dust and noise from the contractor and reported by people). Environmental Monitoring Report	Quarterly during Construction	CSC	CSC budget
Surface Water Quality (pH, TSS, DO, BOD, COD, oil and grease, E.coli and other parameters as necessary)	Construction Site	Field works with analysis methods approved by DoNRE. Environmental Monitoring Report	Quarterly during construction or more frequently if a major contamination is determined after detailed assessment	CSC	CSC budget
Waste Water Quality (pH, TSS, DO, BOD, COD, oil and grease, E.coli and other parameters as necessary)	Construction Site and Worker Camps	Field works with analysis methods approved by DoNRE. Environmental Monitoring Report	Quarterly during Construction	CSC	CSC budget
Soil Quality (As, Cd, Pb, Cr, Cu, Zn, oil and grease, TN, TP)	Construction Site	Field works with analysis methods approved by DoNRE. Environmental Monitoring Report	In case of soil contamination	CSC	CSC budget
Domestic and Construction **Wastes**	Waste collection and disposal sites at HMU Phase 1 and Worker Camps	Visual observations and reporting	Monthly	CHPMU/CSC	The project management budget managed by the PMU and CSC budget

Environmental indicators	Location	Monitoring media and Reporting	Frequency	Implementation Responsibility	Source of Funds
Grievances (**Social Impacts**)	Application of Grievance Mechanism, HMU Phase 1 and surrounding communities	Information hotline phone, forms	Continuous public input	CHPMU/CSC	Same as above
Occupational Health and Safety (near misses, incidents, or accidents resulting in injuries) and Emergency Response	Transport routes from/to and HMU site	Recurring reports of contractor	Continuously / Daily	CHPMU/CSC	Same as above
Mitigation of **Dust** (spraying water, cover transporting vehicles, maintenance of vehicles etc.)	Every location with construction activities inside HMU Phase 1 area	Recurring reports of contractor	Weekly when there are construction activities	CHPMU/CSC	Same as above
Mitigation of **Wastewater** (detention ponds, septic systems)	Construction sites, worker camps	Recurring reports of contractor	Monthly	CHPMU/CSC	Same as above
The **quality of the facilities** and quality of education	HMU Phase 1	Regular reports and documents	Annually	CHPMU/CSC	Same as above
Community Health and Safety	Area of Influence and Surrounding Communities	Regular reports and documents	Frequently and Randomly	CHPMU/CSC	Same as above
Operational Phase					
Quality of facilities and **education programs**	HMU facilities in Phase 1	Technical reports and other documentation	Annually	HMU	HMU Operational Budget
Impacts from **emissions from transportation** vehicles in the Project area and area of Influence affecting the air quality	HMU site area of influence	Regular reports and documents	Annually	HMU	Same as above
Impacts on **road traffic** in the Project area, area of Influence and neighboring communes	HMU site and surrounding road	Ongoing, random	Frequently and Randomly	HMU	Same as above
Impacts from non-hazardous **solid wastes**	HMU site area of influence	Daily	Daily	HMU	Same as above
Impacts from land changes on	HMU site area of	Ongoing, random	Frequently and Randomly	HMU	Same as above

Environmental indicators	Location	Monitoring media and Reporting	Frequency	Implementation Responsibility	Source of Funds
landscape	influence				
Impacts related to **occupational health and safety**	HMU site area of influence	Ongoing, random	Frequently and Randomly	HMU	Same as above
Impacts on local society and economy due to an increase of **social crimes/tensions**	HMU site area of influence	Ongoing, random	Frequently and Randomly	HMU	Same as above
Impacts from the pressure on **physical cultural resources** in surrounding communities	Area of Influence and Surrounding Communities	Ongoing, random	Frequently and Randomly	HMU	Same as above
Community Health and Safety	HMU site area of influence	Technical reports and other documentation	Frequently and randomly	HMU	Same as above

188. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents.

189. Performance monitoring is essential to assess the overall performance of EMP. A performance monitoring system with performance monitoring indicators is usually built by the EA for all phases of development of HMU Phase 1 Project. These should be updated with the evolution of the Project, if necessary (Table 24).

Table 24: Performance Monitoring Indicators

Concerns	Indicator	Goal
Environment	Habitat changes, disturbances, change of land use	Compliance with IFC EHS Guidelines section 4.1, more specifically on preservation of vegetation and biota up to a maximum extent and area. Limit project impacts to these receptors as much as possible.
	Water quality	Compliance with IFC EHS Guidelines, environmental laws and regulations and meet all required standards. Wastewater management plan in place.
	Air quality	Compliance with IFC EHS Guidelines, environmental laws and regulations and meet all required standards. Waste avoidance, Public Transports are primarily used inside the Project area and surroundings.
	Soil quality	Compliance with IFC EHS Guidelines, environmental laws and regulations and meet all required standards. Construction and operations are done without spillages of any kind.
	EMP Compliance and Update	EMP is strictly followed by the Contractor and Stakeholders participate in IEE monitoring and updates
	Raw materials and Hazardous wastes	Implement program with procedures to dispose, collect and store all the wastes
Community Consultation, Capacity Building and Trainings	The IA training	Up to last stage of construction, the compulsory courses will be defined, implemented and have total attendance
	Community consultation and disclosure of information	Meetings with stakeholders to participate in IEE. Stakeholders are invited to continue consultations and to introduce mechanisms to resolve complaints
	Education Programs	Aiming to improve the education level in medicine related courses and teach according to international levels of expertise.
Social Impacts	Public safety occupational health	Compliance with guidelines on safety and occupational health of the Government of Vietnam and ADB SPS 2009
	Physical cultural resources	No valuable physical cultural resources, or relics unearthed have damaged value
	Traffic	Zero accidents/injuries/fatalities; minimize disruption, blockage

D. Emergency Response Plan

190. The Emergency Response Plan (ERP) outlines the roles and responsibilities of the people involved in the Project, in case of an emergency, to assure there is an action plan to respond swiftly and adequately to the situation. The detailed requirements for the ERP system are described in the Annex 2. Inside the final version of the ERP should figure 2 appendixes, one with all the Project based contacts and local authorities relevant for the Emergency procedures and another appendix with the site facilities layout, muster points and evacuation routes. The update of the ERP and the development of these 2 appendixes should be part of the final adaptations on the EMP.

E. Implementation Schedule

191. The expected Project duration is 6 years from 2019 to 2024 including 3 years and 4 months of construction period (para.4). The implementation schedule of the Project is in Table 25.

F. Cost Estimation for the Implementation of the EMP

192. The funds for implementation of mitigation measures during pre-construction phase, include compensation, resettlement and site clearance is a separate package from Counterpart fund.

193. During the construction phase, funding for the implementation of mitigation measures falls under the responsibility of the contractor and is specified in the construction dossiers from construction budget. The cost of construction mitigation measures is included in the construction contract, which is estimated at 1% of the construction contract. The budget for the environmental monitoring program during this period was estimated and will be implemented by the CSC in the CSC budget. Cost estimate for environmental safeguards is described in Table 26.

194. During the operation period, the funds shall be managed by the Operation Agency which is HMU. The cost of mitigation measures in operation management is included in the cost of operating the facility.

Table 25: Project Implementation Schedule

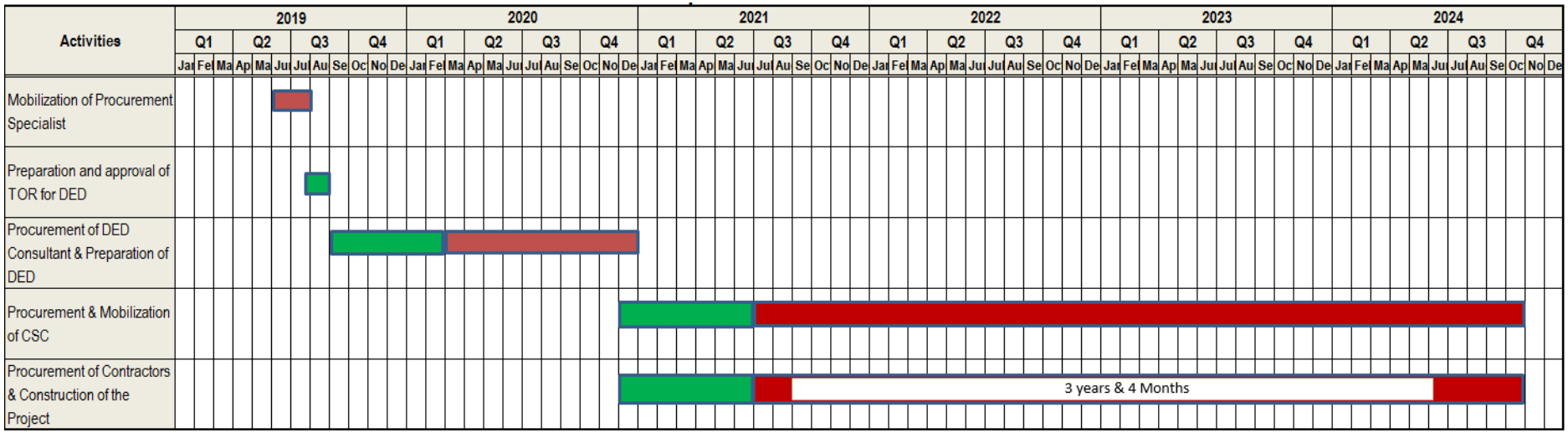


Table 26: Cost Estimate for HMU Environmental Safeguards

Item	Unit	Cost (USD)	Unit rate	Source of Funds
Pre-construction Phase				
Vietnamese EIA preparation				
Make an EIA report	1	44,550	Package	CHPMU budget
Verification of EIA report	1	1,550	Package	CHPMU budget
UXO clearance[20]	1	41,750	Package	CHPMU budget (ODA funds)
TOTAL Pre-construction Phase		**87,850**		
Construction Phase				
1. Environmental Effect Monitoring[21]				
Air, noise	Quarterly over 04 years at 04 locations	6,400	100 USD x 04 (time/year) x 04 (year)x 04 locations	CSC Budget
Surface water	Quarterly over 04 years at 01 location	1,600	100 USD x 04 (time/year) x 04 (year)x 01 locations	CSC Budget
Wastewater	Quarterly over 04 years at 02 locations[22]	4,800	150 USD x 04 (time/year) x 04 (year)x 02 locations	CSC Budget
Soil	Once in the beginning of the works	600	150 USD x 01 (time) x 04 locations	CSC Budget
2. Construction Supervision Consultant Environmental Safeguards Officer[23]	Person	37,960	3,046 USD x 10 months + traveling cost and per diem (150USD/person/day x 10days/year x 5years)	CSC Budget
3. Capacity Building[24]	Course Development and Delivery	3,500	Package	CSC Budget
TOTAL Construction Phase		***54,860***		
Operation Phase (first 2 years)				
1. Capacity Building	Course Development and Delivery	2,500	Package	CSC Budget
TOTAL Operation Phase		***2,500***		
GRAND TOTAL Construction + Operation		***145.210***		

[20] The cost for UXO clearance is 66,800 USD under Table 24 covering both HMU and HCMCUMP. The cost for each university was calculated based on the area size (16ha for HMU and 10ha for HCMCUMP).
[21] See Table 23: Environmental Monitoring Plan
[22] One of domestic wastewater and another one of construction wastewater.
[23] 1 month for PIB preparation, preparation and delivery of trainings and CEMP review, 8 months for monitoring reports preparation assuming 3 years and 4 months for construction, and 1 month for delivery of trainings and preparation of final reports
[24] See Table 16: Institutional strengthening and training programs

X.FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

195. The initial inspection of the HMU Phase 1 preliminary design, final location and environmental conditions on site showed that the foreseeable environmental impacts will be primarily related to the land acquisition and the changes in landscape and use of land, and impact of pollutants generated in the process of construction. These impacts can be minimized and managed. There is no identified sensitive biota at site and the biodiversity is common for the area. Most of the area is rice agricultural land, although there are also some water canals for irrigation.

196. Social impacts will be felt along all phases of development of HMU Phase 1 since they stem mainly from economic displacement during pre-construction, increased industrial traffic and the presence of a construction workforce during construction, and the increased affluence of teachers and students in the area (including the consequent pressure on the existing infrastructure, social structures, physical cultural resources, and others) during operation. These risks can also be avoided, minimized and managed, and in general the local population is in favor of the development of the Project since the benefits will surpass the predicted impacts.

197. IEE concluded that the description of the Project's feasibility design combined with the available information on the environmental factors affected is sufficient to determine the scope of the environmental impact of the Project.

198. No further assessments would be needed and the Project can be classified as Category B for Environment under ADB SPS 2009.

ANNEX 1: HEALTH PROFILE OF HA NAM

Health Profile of Ha Nam Province – Hanoi Medical University Phase 1

Determinants of health

Socio - Demographic Profile

The population of Ha Nam (Red River Delta Region) based on the Statistical Yearbook 2016 published by the General Statistics Office of Vietnam was 803,700 people with a population growth rate of 0.13% (Table 1). The average urban and rural population was 125,800 people and 677,900 people, respectively. While the sex ratio was 97.8 males/100 females, in which 1,437,000 were males and 1,526,800 were females[25]. The life expectancy in Ha Nam was 74.6 years[26].

With a total land area of approximately 862 km^2, the population density of the Ha Nam in 2016 was posted at 932 person/ km^2. This represents an increase of 20 person/ km^2 (19.81 percent) from the population density of 912 person/ km^2 in 2010.

Table 1. Population indicators

In-migration rate	3.0%
Out-migration rate	4.8%
Net-migration rate	-1.9%
Crude birth rate	14.3%
Crude death rate	6.2%
Natural increase rate	8.0%
Total fertility rate	2.11 children per women
Infant mortality rate	11.8/1,000 live births
Under-five mortality rate	17.7/1,000 live births
Population growth rate	0.13%
Percentage of literate population at 15 years of age and above	98.4%
Average age of first marriage	25.7 years

Source: General Statistics Office of Viet Nam. 2016. *Population and Employment. In: Statistical Yearbook of Vietnam 2016.* Hanoi: Statistical Publishing House. pp. 51-151.

The general shape of the age pyramid of Red River Delta in 2009 indicated that the age and sex composition of the population is similar to other developing countries with relatively smaller proportion in the older age categories and larger proportion of the population in the less than 20 years of age categories, as in Figure 1.

[25] Source: General Statistics Office of Viet Nam. 2016. *Population and Employment. In: Statistical Yearbook of Vietnam 2016.* Hanoi: Statistical Publishing House. pp. 51-151.
[26] Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

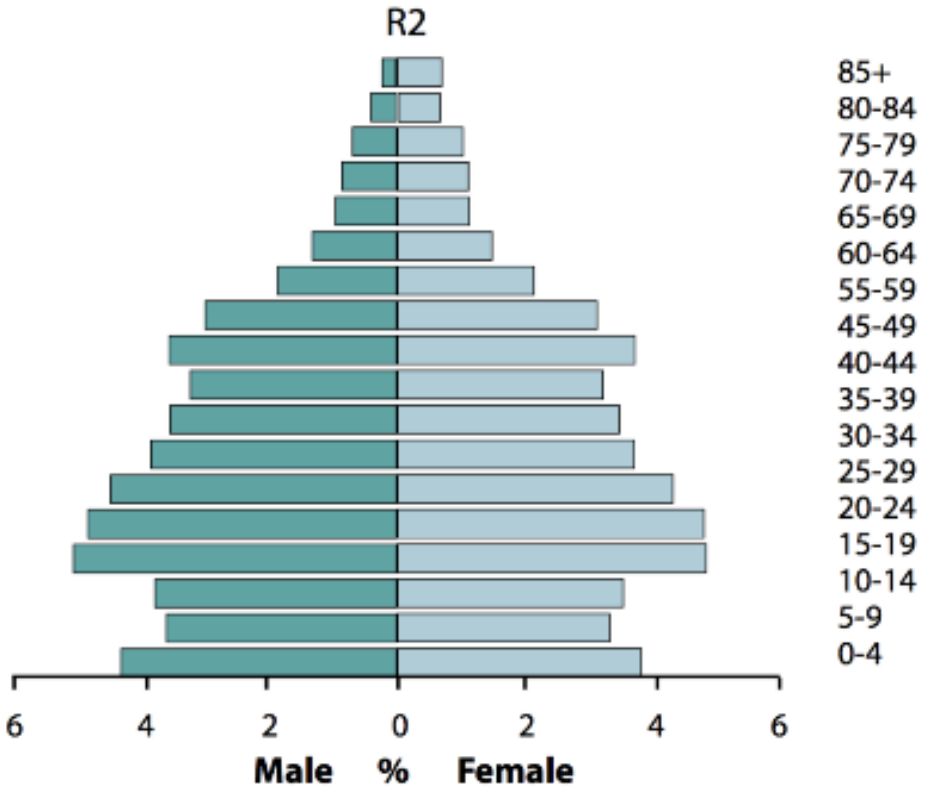


Figure 1: Age pyramid of Red River Delta in 2009

Source: Ministry of Planning and Investment. 2011. *Age-Sex Structure and Marital Status of the population in Viet Nam*.

The life expectancy trends in the population also showed marked improvement which indicates improvement in the health status of the population. Based from Table 2, the life expectancy at birth for the whole of Viet Nam had increased from 70.2 to 70.8 for males while it had increased from 75.6 to 76.1 for females from year 2006 to 2016, respectively. Several factors may have contributed to the increase in life expectancy such as improved accessibility of health services and improved diagnostic and other health services. Table 2 below shows the trend in life expectancy for years 2010-2016 (footnote 1).

Table 2. Life expectancy at birth from 2006-2016

Year	Male	Female	Viet Nam	Red River Delta
2006	70.2	75.6	72.8	74.3
2010	70.3	75.7	72.9	74.3
2013	70.5	75.9	73.1	74.3
2014	70.6	76.0	73.2	74.5
2015	70.7	76,1	73.3	74.5
2016	70.8	76.1	73.4	74.6

Source: General Statistics Office of Viet Nam. 2016. *Population and Employment. In: Statistical Yearbook of Vietnam 2016.* Hanoi: Statistical Publishing House. pp. 51-151.

Employment

The total labor force aged 15 years and above in Ha Nam was 473,400 persons in 2016 (Table 3). There was an increase of 1,300 thousand workers in comparison with that in 2015. The percentage of employed workers at age 15 years of age and above (as compared to population) was at 57.8%.

Table 3: Employment rate

Labor force at 15 years of age and above	473,400 persons
Percentage of employed workers at age 15 years of age and above as compared to population	57.8%
Percentage of trained employed workers at 15 years of age and above	16.3%

Source: General Statistics Office of Viet Nam. 2016. *Population and Employment. In: Statistical Yearbook of Vietnam 2016.* Hanoi: Statistical Publishing House. pp. 51-151.

With reference to the General Statistics Office, the total employed population aged 15 years and above working in Viet Nam reached 53.3 million persons in 2016. About 41.9 % of the employed population (22.3 million persons) worked in the agriculture, forestry and fishing sector.

The unemployment rate of labor force at working age for the Red Delta region was 2.24% in 2016, wherein the rates for the urban and rural areas were 3.23% and 1.73%, respectively, while the unemployment rate for male was at 2.60% and for female at 2.84% (footnote 1).

Education

In 2010, Ha Nam have had 120 kindergartens and 285 schools of general education. This correspond to a decrease of 2 kindergarten schools and 23 schools of general education from 2010 - 2016 (Table 4), however it did not affect the number of classes, teachers and pupils.

For the general education, there was a decline in the number of schools. As an example, in 2010 the number of primary school was at 140, and then in 2016 the number was reduced to 121 schools. The reason might be that due to the size and network of schools and classes in some mountainous provinces, the schools were rationalized and re-arranged[27].

Table 4: The number of schools, classes, teachers and children/pupils in Ha Nam province

	Number of schools	Number of classes	Number of teachers	Number of children/pupils
Kindergarten	118	1264	2051	44096
Number of schools of general education	262	3963	6970	131124
Primary schools	121	2149	3068	63609
Lower secondary	118	1270	2826	44159
Upper secondary	23	544	1076	23356

Source: General Statistics Office of Viet Nam. 2016. *Education. In: Statistical Yearbook of Vietnam 2016*. Hanoi: Statistical Publishing House. pp. 675 - 713.

[27] General Statistics Office of Viet Nam. Education. In: Statistical Yearbook of Vietnam 2016. Hanoi: Statistical Publishing House. pp 675 - 713.

Health Outcomes

Health Indicators

Tuberculosis

The number of TB case-detected in Ha Nam was at 855 (106.5/100,000) persons and AFB+ Smear positive pulmonary TB was at 367 (45.7/100,000 persons). There were 349 registered Smear positive patients treated with the cured rate of 89.7% and mortality rate of 1.7% (footnote 2).

Malaria

There were 335 malaria cases reported and the rate of malaria morbidity per 100000 inhabitants was at 41.73% (Figure 2) (footnote 2).

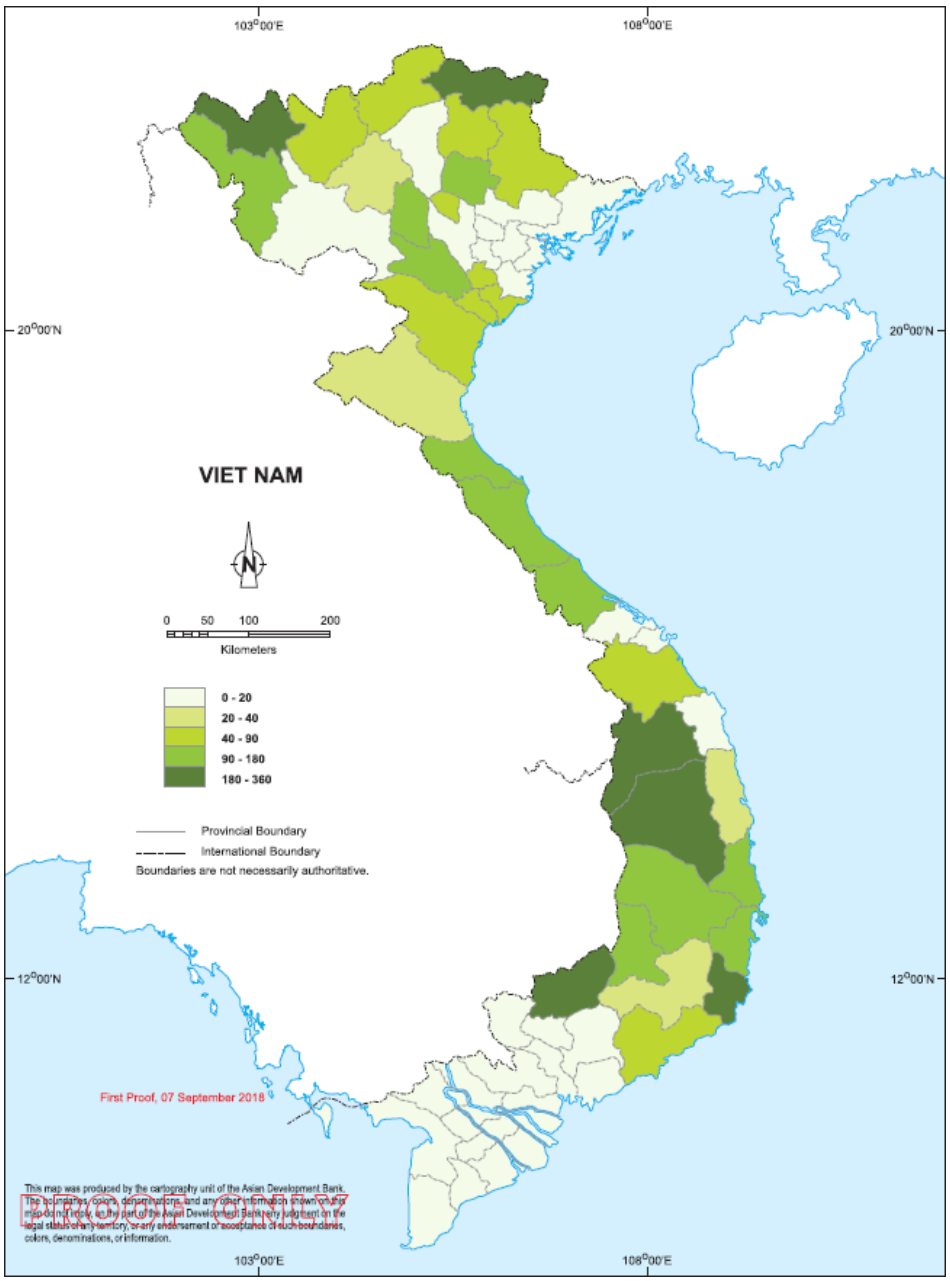


Figure 2: Rate of Malaria Morbidity over 100 000 Inhabitant

Source: Ministry of Health. 2017. Health Statistics Yearbook 2017. Hanoi: Medical Publishing House.

HIV/AIDS

The prevalence of HIV infected people and people with AIDS in Ha Nam were 1,129 (140.7/100,000) and 616, respectively. The number of deaths due to HIV/AIDS was 687. The number of new HIV infected people and people with AIDS were 40 (5.0/100,000) and 25, respectively. There were 11 deaths reported in 2015 (footnote 2).

Child Health

Past studies have shown that percentage of children under 5 years who are underweight in Viet Nam has gradually declined from 18.9% in 2009 to 14.1% in 2015. Similarly, stunting declined from 31.9% in 2009 to 24.6 % in 2015; wasting declined from 6.9% in 2009 to 6.4% in 2015 (Table 5).

Table 5: Trends in nutritional status of children less than five years

	Year		
Indicator	**2009**	**2012**	**2015**
Stunting	31.9	26.7	24.5
Wasting	6.9	6.7	6.4
Underweight	18.9	16.2	14.1

Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

For Ha Nam, the percentage of children under 5 years who are underweight (about 1,446 children were surveyed) was at 13.1% and stunting at 23.1%. The percentage for wasting was at 5.6%.

The province has had 17,211 infants (< 1 year of age) in 2016, in which 99.3% were fully vaccinated (footnote 2). The percentage for the other types of vaccine was as follows:

a. BCG (99.9%)

b. DPT, Hib3 and VGB (99.4%)

c. OPV (99.4%)

d. Measles (99.3%)

Reproductive Health

According to the 2015 data on reproductive health, a total of 104,061 persons in Ha Nam use contraceptives. Majority of the population prefers the use of IUD; wherein 71,647 cases were reported. This was followed by condom at 14,606 cases (footnote 2).

The table represents the reproductive health indicators for Ha Nam Province.

Table 6: Reproductive Health Indicators

Number of delivery received antenatal care ≥ 3 times in 3 trimesters	100%
Births were attended by healthcare workers	100%
Rate of postnatal care	100%
Percentage of child breastfed within one hour of birth	100%
Percentage of new-born received vitamin K1	100%

Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publish House.

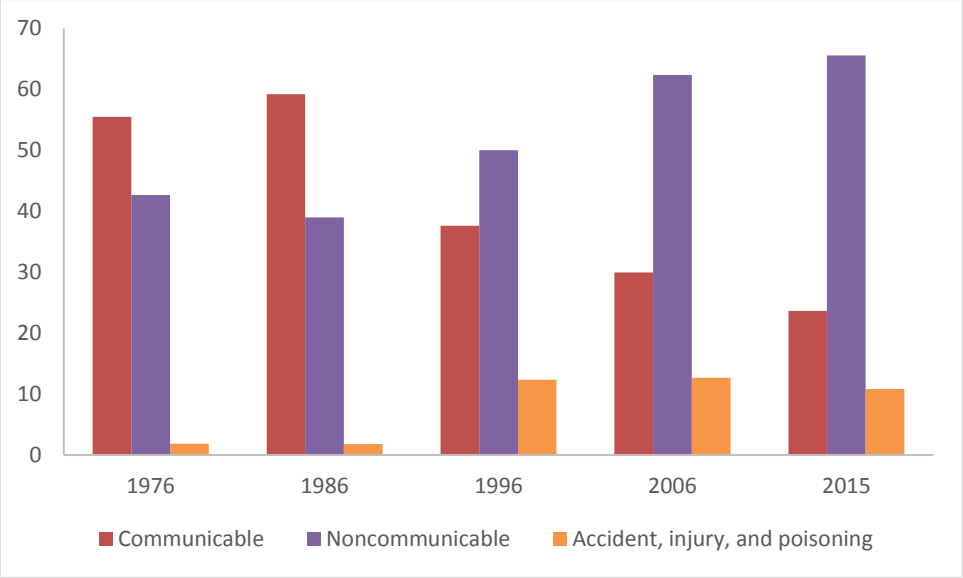
Mental Health

The rate of schizophrenia and epilepsy in Ha Nam were 417.3 and 217.8 per 100,000 population, respectively (footnote 2).

Morbidity

In Viet Nam, the leading cause of morbidity in 2015 was non communicable diseases (Figure 3). A total of 65.56% cases were reported while only 23.63% for communicable diseases with accidents, injury and poisoning at steady rate above 10% (footnote 2).

Figure 3: Trend of Morbidity by Category



Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

For the River Delta region of Viet Nam, the leading causes of morbidity in 2016 are presented in Table 7.

Table 7: Leading Causes of Morbidity

No.	Morbidities	Cases (per 100000 inhabitants)
1	Pneumonia	424.9
2	Acute pharyngitis and acute tonsillitis	296.0
3	Acute bronchitis and acute bronchiolitis	292.2
4	Essential hypertension	
5	Other acute upper respiratory infections	182.6
6	Gastritis and duodenitis	129.3
7	Other conditions originating in the perinatal period	113.9
8	Diabetes Mellitus	110.2
9	Diseases of Appendix	106.2
10	Bronchitis, emphysema and other chronic obstructive diseases	105.8

Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

Mortality

The leading cause of Morbidity in Viet Nam for 2016 were no communicable diseases (Figure 4). A total of 73.41% deaths were reported while only 11.40% for communicable diseases.

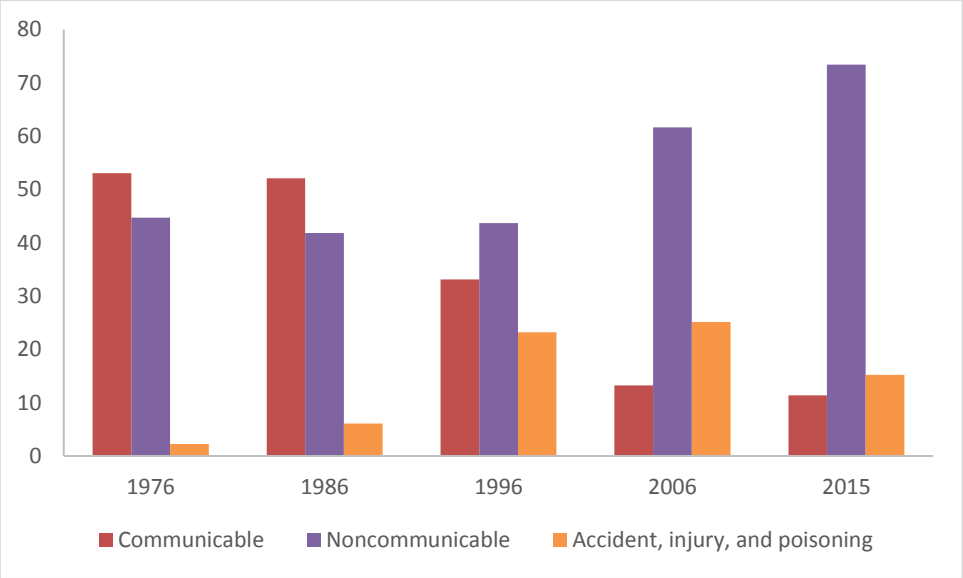


Figure 4: Trend of Morbidity by Category

Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

For the River Delta region of Viet Nam, the leading causes of mortality in 2016 are presented in Table 7, the highest being cardiovascular diseases.

Table 7. Leading Causes of Mortality

No.	Diseases	Cases (per 100000 inhabitants)
1	Conduction disorder and cardiac arrhythmias	0.98
2	Stroke, not specified as hemorrhage or infarction	0.59
3	HIV	0.50
4	Other respiratory disorder originating in the perinatal period	0.43
5	Pneumonia	0.40
6	Acute myocardial infarction	0.29
7	Slow fetal growth, fetal malnutrition and disorders related to short gestation and low birth weight	0.29
8	Intracranial Injury	0.26
9	Heart failure	0.25
10	Intracerebral hemorrhage	0.23

Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

Health Services

Curative Care

Table 8 shows the curative care and patient consultation in Ha Nam province for 2016.

Table 8: Curative care and consultation in Ha Nam province for 2016

Consultation times	1,505,851
Number of inpatients	86,1885
Number of blood tests	912,304
Number of X Rays	110,563
Number of ultrasound	112,611
Number of CT Scan	2,645

Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

Facilities

In 2016, Ha Nam had 16 provincial hospitals with 6015 beds, 6 district hospitals with 570 beds, and 2 inter-district polyclinics with 20 beds. The province had 116 community health centers with 864 beds (footnote 2). All health care facilities (100%) managed medical wastes and disposals by the standard requirements of the country.

The number of district hospitals will change substantially in the future as the Ministry of Health promulgated the Circular No. 37/2016/TT-BYT to merge district hospitals and district health center to avoid overlapping fulfilment of tasks, downsizing organizational structure, and improving operational efficiency28.

Manpower

All health communes (100%) have midwives, assistant pediatricians or assistant obstetricians. There were 70.7% health communes with medical doctors and 58.6% health communes reaching national criteria. All villages (100%) have volunteered health workers in communes and town districts (footnote 2). Data on manpower of the province is presented in Table 9.

[28]Ministry of Health. 2016. *Circular No. 37/2016/TT-BYT of October, 25, 2016 - "Guidance on functions, tasks, powers and organizational structures of medical centres of suburban, urban districts, provincial cities, and municipality-controlled cities*.

Table 9: Healthcare manpower of Ha Nam Province

	Total	Comm.	Dist.	Prov.
Total of health personnel	2369	629	632	1,111
Medical PhD and higher	1	0	0	1
Medical master sciences	46	0	2	44
Medical doctor	441	85	116	240
Public Health PhD	0	0	0	0
Master of Public Health	8	0	1	7
Bachelor of Public Health	18	0	8	10
Assistant doctors	382	226	110	16
Higher degree technician	2	0	0	2
Med technician	42	0	13	29
Element med technician	4	0	4	0
High degree nurses	132	6	37	89
2nd degree nurses	622	148	148	326
Element nurse	30	27	1	3
High degree nurses	19	4	4	11
2nd Midwives	145	80	31	34
Element Midwives	3	3	0	0
Pharmacists PhD	0	0	0	0
Pharmacists Master	3	0	0	3
Pharmacists	28	0	4	24
Pharmacists Technician	137	35	48	54
Element Pharmacists	7	1	3	3
Traditional medicine practitioners	2	2	0	0

Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

Health Coverage

The National Assemble promulgated the Law on Health Insurance in 2008[29] and Amendments to the Law on Health Insurance in 2014[30] which aimed to cover health insurance for the whole population of Viet Nam. Further, a resolution was passed with one of the targets was to achieve Economic Health insurance coverage over 80% of the population by 2020.[31]

The percentage of population that have health insurance increased from 21.10% in 2004 to 76.30% in 2015 (Table 10).

[29]The National Assembly. 2008. Law No. 25/2008/QH12 of November 14, 2008 - Health Insurance.
[30]The National Assembly. 2014. Law No. 46/2014/QH13 of June 13, 2014 - Amendments to the Law on Health Insurance.
[31]On Five-Year Socio-Economic Development Plan from 2016 - 2020, Resolution No. 142/2016/QH13

Table 10: Health Insurance subscription

YEAR	No. of people with health insurance ('000000)	Percentage of Population have insurance
2004	18.39	21.10
2006	36.87	43.90
2008	37.70	43.76
2010	52.41	60.92
2012	58.98	66.44
2014	65.00	71.00
2015	68.32	76.30

Source: Ministry of Health. 2017. *Health Statistics Yearbook 2017*. Hanoi: Medical Publishing House.

ANNEX 2: EMERGENCY RESPONSE PLAN

The Emergency Response Plan

Purpose:

This document describes a framework for emergency preparedness, incident management and emergency response of which the CONTRACTOR is required to implement. It defines functional roles within the CONTRACTOR for managing and supporting emergency response. It lays out actions to be taken by site personnel and visitors in the event of an emergency situation developing on, or in the vicinity of, the site. It sets out the basic key actions to effectively control and deal with any perceived emergency situation. Upon completion, all emergency response plans will be shared with the local authorities and communities with regular communication being maintained with all parties. In support of this Project, the CONTRACTOR shall maintain a record of all such correspondence and ensure that any alteration and updates to these plans are also shared with all parties with full records being kept. The emergency contacts of local and regional emergency and health authorities will be developed. The Project site Medical Provider is responsible for engagement with local medical services and health authorities in emergency situations. The appropriate method of communication in an emergency at the site will also be developed as part of the final environmental management plan package.

Scope:

These requirements apply to the CONTRACTOR, all Subcontractors, and suppliers engaged on any portion of the works associated with the Project where CONTRACTOR has a prevailing influence and responsibility over the performance of the works. The Emergency Response, including Medical, shall be permitted to attend any off-site incident that may be related to site works. This may include such things as road traffic accidents, personal injury or any emergency that may be related to the Project. After further investigation, the CONTRACTOR, or Subcontractor may have not been directly involved, and no further follow up action will be required, but Emergency services will be available to attend off-site incidents. This document is for guidance in the event of emergency and it is not intended to restrict those persons responsible from taking whatever actions they may deem necessary to aid other persons or contain an emergency by use of their on-site knowledge or their professional judgement. These procedures are applicable to all areas of the Project site including workers' accommodation camps and describe the role and responsibilities of all personnel in the event of emergencies originating within the site. All plans will be fully reviewed on an annual basis and each time site conditions or hazards are subject to change. Where there is a statutory requirement for certain plans to be produced (such as Fire Fighting and Oil Spill Response) these will be copied to the relevant local authorities for approval. Where hazards are identified which have the potential for significant internal or external impacts consideration shall be given for the development of Business Continuity contingencies. It will be the responsibility of CONTRACTOR Site Manager to review the potential impact and develop the necessary level of response. These business continuity

requirements shall also be subject to annual review or when site conditions or hazard impacts materially change.

Definitions:

Project Owner	CHPMU
Contractor:	TBD
ERT	Emergency Response Team
EERT	External Emergency Response Team
Level 1 Incident	An incident which is managed locally by on-site personnel and is self-contained.
Level 2 Emergency	A situation that has escalated from Level 1, cannot be managed independently by the Level 1 Site Activity Group and requires additional resources and/or the involvement of local authorities. Some incidents would default to Level 2 automatically such as the case of a major oil spill, large fire, off-site incident/accident or a Project related fatality on/off site.
Level 3 Crisis	An incident or emergency situation that is so significant in impact and consequences that it requires strategic management support at a senior level. Assistance from third parties external to the Project owner such as specialist contractors and Government Agencies may be required to contain and manage the situation.
Site Response Group	The Level 1 primary response group comprised of an On-Scene Commander, Emergency Response Team (Rescue Team/ Suppression Team) and Security Team.
Incident Management Team	The Level 2 response team mobilized to provide support to Level 1. Resources for the Incident Management Team would be located on and off-site from the incident and comprise: Incident Commander, CONTRACTOR EHS Manager, Local Authority representatives.
On-Scene Commander	The On-Scene Commander dictates initial Level 1 response strategy, deploys available resources and maintains communications with the Incident Management Team. The On-Scene Commander is the leader of the Site Activity Group and would normally be the CONTRACTOR Site EHS Manager.
Incident Commander	The Incident Commander leads the Incident Management Team in the event of a Level 2 & 3 situation. He will maintain

	communications with the On-Scene Commander on the incident, its management and resources deployed. The position of Incident Commander would normally be CONTRACTOR Site Manager.
Medical Provider	TBD

The contractor must implement an Emergency Response Plan (ERP) during construction that ensures:

- ¬ The contractor is ready to respond to emergencies;
- ¬ Involved parties during construction works and all workers know the actions to be undertaken in the event of an emergency.

The contractor shall also provide and maintain the financial and human resources required to respond swiftly in case of an emergency during the construction process.

Roles and responsibilities

Before the construction, the contractor in collaboration with EA/IA, should meet with the EERT to discuss the overall construction process, including, but not limited to:

- ¬ Location of the Project;
- ¬ Construction time frame;
- ¬ All engineering and special construction equipment that will be used;
- ¬ Any hazardous materials that will be taken to and stored at the school and the details about the use/handling systems and manage them;
- ¬ Emergency management plan of the contractor;
- ¬ The name and contact details of the emergency response team leaders and members.

The warning process

The signs of emergency may be a combination of: Sound alarms (alarm sirens, bells or others); Visual alarms (rotating lights in orange or red); Direct communication via telephone, mobile or two-way radio and Public loudspeaker system. Some best practices in Vietnam for sounding these alarms are:

- ¬ Immediate call the attention of the others where there is an emergency;
- ¬ Sound the most adequate alarm;
- ¬ Report emergency situations to ERT.

The responsible on site will be the ERT senior engineer, followed by the ERT manager and if both are absent, the remaining elements of the team are entitled to contact directly the EERT. In case there are some exceptions they should be defined inside the Emergency Management Plan.

When there is a contact with the EERT, it is important to report the following information: type of emergency, exact location of emergency, estimation of the extent of the emergency, estimated number of victims, time of occurrence, in case of a spillage of toxic materials indicate the type of substance spilled, and in case of fire or explosion there should be indication of the source of the event. These details will allow EERT to prepare an appropriate

response. On site, for a swift action, there should always be disclosure on the name and the contact details of the relevant organizations and people for emergency situations. The tables below show the standard procedures to be implemented on-site for evacuation.

Evacuation procedures

Process	**Note**
Moving out as quickly as possible as a group, avoiding running and panicking.	All the workers/employees, subcontractors, construction site visitors move out under the guidance of ERT.
To evacuate through the evacuation routes were regulated.	The ERT should determine a safe gathering point inside the facilities to where all people should go to. The ERT needs to check if all people left the premises safely.
Missing persons are reported to the ERT	ERT contact should contact EERT immediately.
Evaluate if any injured people need special care and support any wounded to be evacuated and transfer the people to the medical group from EERT	ERT should provide transportation if necessary.

Response procedures in case of health emergencies

Process	**Note**
Conduct first aid immediately if it is safe for both the assistant and the victim	ERT should have basic knowledge on first aids Don’t move the injured unless ERT cannot support the victim in their position, for example with under a collapsed structure
Call emergency medical services EERT and/or the nearest hospital.	ERT responsibles should contact EERT
Create the conditions to lead the EERT to position the emergency incident	An ERT member should be at the scene to meet EERT when approaching the location. This person is responsible for keeping the orange safety flag to attract their attention and the lead position

Firefighting response procedures

Process	Note
When there is a fire alarm	Call the attention of other people ERT team should communicate with the required agency Reports/emergency contact with ERT team
Stop all operations and evacuate	All the workers/employees, sub-contractors and customers should move to the gathering safe point following evacuation procedures.
ERT conducts fire/fire control measures (if applicable)	Following the instructions as trained, ERT members try to put the fire down if possible
Contact the fire station and the nearest police and, if possible, the emergency medical service.	When EERT is contacted, ERT team leader will provide the location, the cause of the fire, estimated the level of burns injuries, if any.
Facilitate EERT (or other firefighting team) to arrive at the location of the incident.	An ERT member at the scene should meet EERT when approaching the location. This person is responsible for keeping the orange safety flag to attract their attention and the lead position.
ERT should leave the area immediately when their safety is in danger	Follow proper evacuation procedures.

Training and Competence:

All persons visiting or working on site will receive training in the actions to be undertaken in the event of an emergency. This training will be provided as part of the site induction program and will include all CONTRACTOR, Subcontractors, occasional visitors and deliveries. This training will change as work activities evolve. The evacuation route and assembling point will be developed at each stage, and training to all workforce will be undertaken. This training will be re-enforced by the identification of site musters and undertaking of evacuations drills which will organized by the CONTRACTOR EHS Manager in conjunction with the CONTRACTOR Site Manager. Emergency Response exercises will be conducted quarterly at major mobilization stage, the nature and range of these exercises will reflect the number of persons on site and range of activities being undertaken, they will escalate as construction activities increase. All personnel with specific emergency duties will receive induction and training in the CONTRACTOR incident management and emergency response procedures.