Draft Initial Environmental Examination

June 2015

VIE: Power Transmission Investment Program Multi-Tranche Financing Facility Tranche 3

Subproject: 500 kV Duc Hoa substation and connections

Prepared by the National Power Transmission Corporation (NPT) of Viet Nam and Southern Power Viet Nam Power Project Management Board (SPPMB) for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 14 May 2015)

Currency unit	–	Vietnamese Dong (D)
D1.00	=	$0.000046
$1.00	=	D21,805.49

ABBREVIATIONS

ADB	-	Asian Development Bank
AP	-	Affected person/people
BIWASE	-	Binh Duong Water Supply Sewerage Environment Co. Ltd.
CEMP	-	Construction environmental management plan
CO	-	Carbon monoxide
CPC	-	Commune People's Committee
CSR	-	Corporate social responsibility
DED	-	Detailed engineering design
DMC	-	Developing member country
DONRE	-	Department of Natural Resources and Environment
DPC	-	District People's Committee
EA	-	Executing agency
EARF	-	Environmental Assessment and Review Framework
EEC	-	Energy and Environment Center
EHS	-	Environment, health and safety
EIA	-	Environmental impact assessment
EMF	-	Electromagnetic field
EMoP	-	Environmental monitoring plan
EMP	-	Environmental management plan
EPP	-	Environmental protection plan
ESU	-	Environmental and social unit
EVN	-	Viet Nam Electricity
GOV	-	Government of Viet Nam
GRM	-	Grievance redress mechanism
HW	-	Hazardous waste
IA	-	Implementing agency
IEE	-	Initial environmental examination
HIV/AIDS	-	Human immunodeficiency virus / acquired immune deficiency syndrome
MFF	-	Multi-tranche financing facility
MONRE	-	Ministry of Natural Resources and Environment
MPN	-	Most probable number
MSDS	-	Materials safety data sheet
NOx	-	Oxides of nitrogen
NPT	-	National Power Transmission Corporation
PCB	-	Polychlorinated biphenyl
PCP	-	ADB's Public Communications Policy (2011)
PCR	-	Project completion report
PDMP	-	GOV's Power Development Master Plan
PECC	-	Power Engineering Consulting Joint Stock Company
PIC	-	Project Implementation Consultant
PPE	-	Personal protective equipment

PTC4	-	Power Transmission Corporation No. 4
PVC	-	Polyvinyl chloride
REA	-	Rapid environmental assessment
SOx	-	Oxides of sulphur
SPPMB	-	Southern Viet Nam Power Project Management Board
SPS	-	ADB's Safeguards Policy Statement (2009)
STD	-	Sexually transmitted disease
SR	-	Safeguard requirement
TSP	-	Total suspended particulates
UXO	-	Unexploded ordnance
WB	-	World Bank

WEIGHTS AND MEASURES

cm^2	-	square centimeter
cm^3	-	cubic centimeter
^oC	-	degree centigrade
ha	-	hectare
m	-	meter
m^2	-	square meter
m^3	-	cubic meter
mg/l	-	milligram per liter
mg/m^3	-	milligram per cubic meter
MW	-	megawatt
km	-	kilometer
kVA	-	kilovolt ampere
kW	-	kilowatt
kV	-	kilovolt
MVA	-	megavolt ampere

NOTE

In this report, "$" refers to US dollars.

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I. EXECUTIVE SUMMARY

1. Recognizing the need to overcome constraints in the power sector due to the rapidly growing demand for electricity, the Government of Viet Nam (GOV) approved in 2011 the Power Development Master Plan (PDMP VII) consisting of multiple power generation and transmission projects to be implemented throughout the country from 2011 – 2020. The GOV has requested the Asian Development Bank (ADB) to support the financing of power transmission projects under the PDMP VII. The ADB approved the multi-tranche financing facility for the implementation of the Power Transmission Investment Program that includes expansion of Viet Nam's power transmission network through the construction and expansion of 500kV and 220kV transmission lines and associated substations. The facility is anticipated to consist of four financing tranches. ADB approved Tranche 1 in December 2011 and Tranche 2 in November 2012. There are nine (9) subprojects which have been identified under Tranche 3.

2. One of the subprojects identified under Tranche 3 is the construction of the 500 kV Duc Hoa substation and connections. The implementation of the subproject will have an investment cost of D3,730.45 billion. The National Power Transmission Corporation (NPT) of Viet Nam is the executing agency (EA) while the Southern Viet Nam Power Project Management Board (SPPMB) is the implementing agency (IA) of the subproject.

3. The SPPMB plans to implement the project in December 2015 for commissioning by June 2017.

4. The proposed subproject aims to:
   (i) Meet the demand for power of Long An and other neighboring provinces and create close linkage in the southern electric grid system;
   (ii) Create the My Tho – Duc Hoa – Cau Bong 500kV ring circuit and supply power to the center of Ho Chi Minh City;
   (iii) Transmit power from Long Phu switchgears to the national power network in order to meet the projected increasing power demand in the southern region; and
   (iv) Reduce power losses in the transmission system.

5. The proposed subproject includes the following components:

   (i) Construction of 500kV Duc Hoa substation including control room and other related facilities;
   (ii) Construction of 100m access road to 500kV Duc Hoa substation from Provincial Road N2;
   (iii) Construction of 500kV 4-circuit connection lines connecting the substation to the 500kV Pleiku – Phu Lam connection line with length of 12.4km;
   (iv) Construction of No. 1, 220kV 4-circuit transmission lines connecting to the 220kV Duc Hoa substation with length of 24.4km;
   (v) Construction of No. 2, 220kV 4-circuit transmission lines connecting to the 220kV Phu Lam – Long Angrid with length of 29.8km.

6. The substation site in Duc Hoa, Long An Province covers an area of 124 m^2 and is located in a flat rural area with agricultural land planted with rice, watermelon, and other crops. Figure 1 presents the location of the subproject.

7. A screening was carried out using ADB's Rapid Environmental Assessment (REA) checklist. (Appendix 1) The screening confirmed that the environmental impacts are not expected to cause irreversible and significant adverse environmental impacts and are easily controllable by appropriate and conventional mitigation measures. Therefore, the subproject is Category B for environment based on ADB Safeguard Policy Statement (SPS, 2009) and that Initial Environmental Examination (IEE) report will be required for submission to ADB.

8. This IEE report is prepared for the 500 kV Duc Hoa substation and connections based on ADB SPS (2009); ADB Operational Manual Section F1/BP; ADB Public Communications Policy (ADB PCP, 2011); Government of Viet Nam's (GOV) Decree No. 29/2011/ND-CP on environmental impact assessment (EIA) and other GOV applicable environmental laws, policies, rules and regulations for energy projects.

9. Information in the IEE is based on reports prepared by the Power Engineering Consulting Joint Stock Company No.3 (PECC3), secondary data from other agencies, field inspection, and information gathered during community and stakeholder consultations. The objectives and scope of the IEE are to: (i) establish current environmental conditions; (ii) identify key environmental issues; (iii) assess magnitude of impacts and provide mitigating measures; (iv) integrate the environmental issues in the project planning and design stage; and (v) develop an environmental management plan for implementation, monitoring and reporting of the environmental mitigation and enhancement measures.

10. In general, the subproject is expected to result to beneficial impacts to the community in Ben Luc and Duc Hoa districts and other neighboring provinces in the southern region brought about by proposed improvements in reliability and security of power supply. However, there are anticipated negative environmental impactsduring subproject implementation, which have to be considered in the design, construction and operational phases.

11. **Impacts related to project siting.** There are no significant sensitive areas that will be affected by the proposed construction of the 500kV substation, access road, and connection lines. The sites were selected to avoid environmentally sensitive areas, settlements, forests, and cultural/heritage sites. The vicinity is generally characterized as agricultural land used for planting rice and other crops.

12. The impact of the project on agricultural land comprises the loss of flat, agricultural land that is being used to plant rice and other crops. There are no trees in the affected land. Compensation for the loss of agricultural production will be paid to the affected households according to the resettlement action plan (RAP).

13. **Impacts during construction.** Most of the anticipated impacts are related to nuisances which may happen during the construction of the subproject components such as clearing of the existing vegetation, earth filling at the substation site that may cause inundation in surrounding areas, construction safety, temporary alienation of access, temporary disruption of community facilities, noise, release of dust and engine gas emissions. Recommendations formulated in the environmental management plan (EMP), its inclusion in the contractual framework, and an effective inspection of construction sites will reduce these risks to an acceptable level.

14. The impacts of the project during the construction phase are limited to the immediate area of the construction activities. The adverse impacts likely to occur during the construction phase are considered temporary in nature and could be mitigated through proper design and

implementation of the proposed mitigation measures. These are briefly described in the following paragraphs:

15. **Flooding of surrounding areas.** The substation and access road will be located in an area that is -1.5m from the existing road level, hence, will require earth-filling to raise the elevation of the site. Borrow materials for earthfilling will be sourced from permitted quarry sites only. Likewise, the design of the drainage plan will take into consideration the potential increased runoff and soil erosion from the site to adjacent land and canals. Engineering controls for erosion protection measures such as silt traps and sedimentation ponds will be integrated in the management plan.

16. **Impact of construction camps**. There will be waste generation, water pollution, sanitation, and health hazards due to the presence of workers camp. Adequate water supply and toilet facilities will be established at the existing construction camp. A construction health and safety plan shall be required from the Contractor, including provision of PPEs and first-aid facilities to provide immediate measures in addressing hazards to occupational health and safety at the construction site.

17. **Air pollution and noise.** The movement of construction vehicles along the access roads would contribute to the increase in ground level concentration of total suspended particulates (dust), noise, and could also result to accidents and hazards to communities living along the right-of-way of the transmission lines and access roads. Measures such as water sprinkling of areas prone to dust emission, limiting of construction hours and deliveries to the site at night and imposition of speed limit to vehicles will be implemented.

18. **Community health and safety.** Impacts related to community health and safety such as construction traffic, transport of materials, fires, emergency spill of materials, and unauthorized entry by villagers into dangerous working areas will be mitigated through the development of a Community Health and Safety Plan (CHSP) that incorporates good international practice and recognized standards that includes fencing of construction area, posting of warning signs in Vietnamese language, emergency response and preparedness procedures, communication systems and protocols, interaction with local and regional emergency and health authorities, provision of emergency equipment and facilities such as fire truck, emergency service vehicles, and fire drills will be established.

19. **Impacts during operational phase.**The operation and maintenance of the substation and connection lines may result to the generation of wastes, including hazardous materials such as used oil, spent lead acid batteries, and busted lamps which require appropriate management and disposal. There is also a potential for the substation and power lines to cause risks to occupational health and safety due to exposure to electromagnetic field (EMF) and high voltage electricity. Mitigation measures to address hazardous waste management and occupational and community health and safety need to be instituted.

20. The transmission lines may also expose the community to risks of electrocution and EMF. The required safety clearance from houses shall be considered and that there shall be regular inspection to check whether safety clearance requirements are compromised. In addition, warning signs in Vietnamese language will be posted on transmission lines.

21. An EMP has been prepared and will be implemented during all phases of subproject implementation. The EMP identifies the potential environmental impacts from the subproject

andincludes institutional arrangements for its implementation to ensure its sustainability and effectiveness.

22. **Public Consultation.** SPPMB and the consultant team have carried out consultations with affected communities of the substation and along the alignment of the connecting lines on March 18, 2015 to April 3, 2015 in 14 communes in Ben Luc and Duc Hoa Districts. Stakeholders who participated during the public consultation process included affected communities within the proposed substation site and along the alignment of the connection lines as well as commune leaders, representatives of mass organizations such as Women's Union and Farmer's Union. Local authorities requested the subproject's construction Contractor to strictly comply with the mitigation measures during the construction phase of the substation.

23. Major issues that were raised during these consultation meetings are related to the request by commune representatives for provision of the details of the resettlement and compensation plan to enable the affected households to plan in advance as well as information about the results of the EIA and the EMP. The participants also requested proper mitigation of impacts on roads, plants, waste generation, disposal of oil/grease, dust, pollution, and safety of the transmission lines. The stakeholders also raised their concerns related to electromagnetic field (EMF) and the effect to human health. The minutes of the public consultation meeting is presented in Appendix 2.

24. **Grievance Redress Mechanism.** As a general policy, the SPPMB will work proactively toward preventing complaints through the implementation of impact mitigation measures and through community liaison activities that anticipate and address potential issues before they become grievances. The subproject's Grievance Redress Mechanism (GRM) will consist of a system of receiving, evaluating, and addressing affected people's (AP) grievances related to the subproject.

25. A grievance resolution process for compensation was established during the pre-construction phase based on the provisions in Decree No. 44/2014/ND-CP of May 15, 2014. The GRM established for land acquisition and compensation will be applied for environment-related complaints of the community. The GRM during the construction phase will be supervised by the SPPMB and the decision will be based on the resolution of the district and provincial committees. For cases, wherein the complaint cannot be resolved at the district and provincial level, the final decision will be decided by the People's court. The details of the GRM are presented in this IEE.

26. **Associated Facility**. The new 220kV Duc Hoa substation is considered as an associated facility of the subproject. A separate IEE report has been prepared for this subproject under Tranche 3.

27. **Conclusion and Recommendation.** The results of the IEE show that the proposed subproject will not result to significant adverse environmental impacts and that the impacts are primarily confined within the site of the existing substation and along the ROW of the transmission lines. Environmental mitigation measures have been designed as outlined in the subproject EMP to address any adverse impacts during the various phases of project implementation. The EMP also presents the institutional responsibilities for implementing the mitigation measures.

28. In compliance with the requirements of GOV Decree No. 29/2011/ND-CP dated April 18, 2011, the proposed 500 kV Duc Hoa substation and connectionsis required to prepare and

submit an EIA to the Department of Natural Resources and Environment (DONRE) of Long An Province where the project is located. A Decision of Approval (Decision No. 3538/QD-UBND dated October 22, 2014) on the EIA for the project was issued by the DONRE Long An Province.

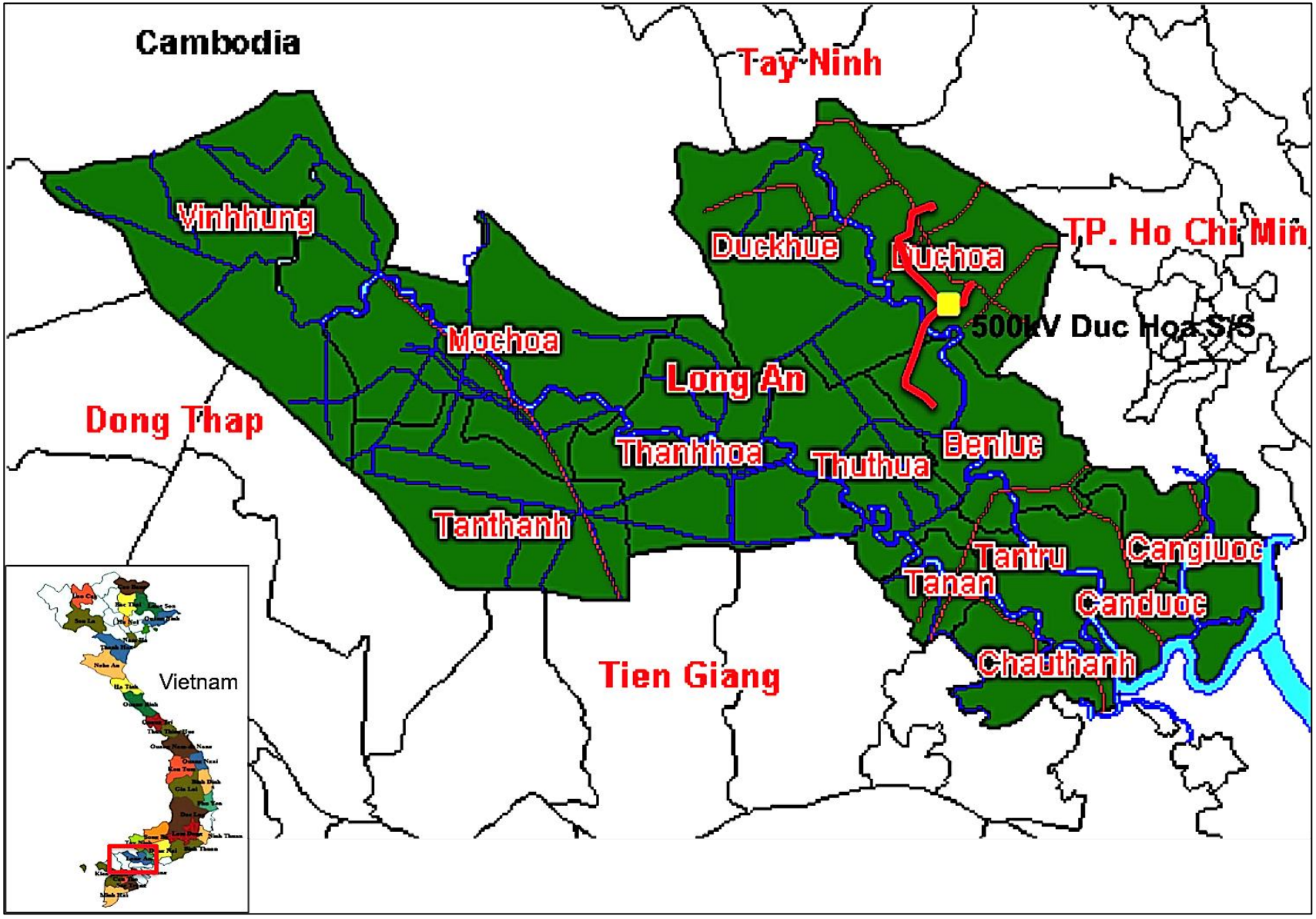


Figure 1: Location Map

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB'S Environmental Safeguards Policies

29. The environment safeguards requirements of ADB are presented in the following guidelines:

a) Safeguard Policy Statement (2009)
b) Operational Manual Section F1/BP[1] and
c) Public Communications Policy (PCP) 2011.

30. The environmental safeguards requirement follows ADB's Strategy 2020[2], which emphasizes the pursuit of environmentally sustainable and inclusive economic growth for developing member countries (DMCs) and requires mitigation to address environmental and social impacts of projects. The ADB's Safeguards Policy Statement (SPS, 2009) governs the environmental and social safeguards of ADB's operations. When a project has been identified for ADB financing, it is screened and categorized to determine the following:

a) Significance of potential impacts or risks of the project to the environment;
b) Level of assessment and institutional resources required to address the safeguard issues; and
c) Information disclosure and consultation requirements.

31. The Environmental Safeguard Requirements 1 (SR1) of the SPS outlines the requirements that borrowers/clients have to meet. These requirements include assessing impacts, planning and managing impact mitigations, preparing environmental assessment reports, disclosing information and undertaking stakeholder consultations, establishing a grievance redress mechanism, and monitoring and reporting. It also includes specific environmental safeguard requirements pertaining to biodiversity conservation and sustainable management of natural resources, pollution prevention and abatement, occupational and community health and safety, and conservation of physical cultural resources.

32. Through the use of environment screening checklists that have been developed by the ADB, the project is initially categorized for potential environmental impacts and risks. ADB assigns a proposed project to one of the following categories:

> **Category A** – if a proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented; impacts may affect an area larger than the sites or facilities subject to physical works. A full-scale EIA including an EMP is required.
>
> **Category B** – if a proposed project's potential environmental impacts are less adverse and fewer in number than those of category A projects; impacts are site-specific, few if any of them are irreversible, and impacts can be readily addressed through mitigation measures. An IEE, including an EMP, is required.

[1] Operations Manual Bank Policies (BP) issued on 1 October 2013, based on ADB Safeguard Policy Statement, 2009.
[2] ADB. 2008. Strategy 2020: The Long-Term Framework of the Asian Development Bank 2008-2020. Manila.

Category C – if a proposed project is likely to have minimal or no adverse environmental impacts. No EIA or IEE is required although environmental implications need to be reviewed.

Category FI – is assigned to projects that involve investment of ADB funds to or through a financial intermediary.

33. The category of the proposed project is determined by screening using the ADB's sector-specific Rapid Environmental Assessment (REA) checklist. The environmental categorization should be based on the most sensitive environmental component. For instance, if one component of the project has potential for significant adverse impacts, the entire project should be classified as Category A, even if all other components have no significant environmental impacts. If the most sensitive component falls under Category B, the project should be classified as Category B even if the other components are unlikely to have adverse environmental impacts.

34. The EIA or IEE Report should include the EMP that specifies the proposed mitigating measures specific to a potential impact,environmental monitoring requirements, institutional arrangements, and budget requirements.

35. ADB also requires public disclosure for Category A and B projects. For Category A, there should be at least two consultations, once during the early stages of the EIA and once when the draft EIA is available prior to ADB loan appraisal. For Category B, the draft IEE report should be available to interested stakeholders before project approval and posted on the ADB's website upon Board approval of a project.

B. Legal and Institutional Framework on Environmental Management in Viet Nam

1. Environmental Protection

36. National laws and regulations for environmental protection which are applicable to the proposed subproject are presented in Table 1. The Environment Protection Law (Law No. 55/2014/QH13 of June 23, 2014) is the main governing law on environmental management in Viet Nam. The implementation of this law was subsequently guided by implementation guidelines, amendments, regulations on impact assessments, sanctions on violations, incentives, regulations on waste management, and national technical regulations or standards on environmental quality. The Ministry of Natural Resources and Environment (MONRE) is the governing body in-charge of the implementation of the Environmental Protection Law in Viet Nam.

Table 1: Environmental Protection Laws and Regulations

Laws and Regulations	Description
A. Laws	
Law on Environmental Protection No. 55/2014/QH13, in effect on January 1, 2015	This Law provides statutory provisions on environmental protection activities; measures and resources used for the purpose of environmental protection; rights, powers, duties and obligations of regulatory bodies, agencies, organizations, households and individuals who are tasked with environmental protection.
Biodiversity Law No. 20/2008/QH12 dated	Pursuant to the 1992 constitution of the Socialist Republic of Viet Nam, which was amended and supplemented under

Laws and Regulations	Description
November 13, 2008	Resolution 5/2001/QH10dated December 25, 2001 of the 10th National Assembly, this law stipulates biodiversity conservation and sustainable development.
B. Decrees	
Decree No. 18/2015/ND-CP, dated Feb. 14, 2015	Provides the requirements for Environmental Protection Plan, Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Scheme.This Decree took effect on April 1, 2015.
Decree No. 19/2015/ND-CP, dated Feb. 14, 2015	Regulation detailing a number of articles of the Environmental Protection Law. This Decree took effect on April 1, 2015.
Decree No 80/2014/ND-CP issued on August 6, 2014	This Decree regulates drainage and treatment of wastewater in urban areas, industrial zones, economic zones, processing and export zones, and rural residential areas. It also prescribes the rights and obligations of organizations, individuals and households having activities related to drainage and treatment of wastewater within Viet Nam's territory.
Decree No.179/2013/ND-CP dated November 14, 2013	This Decree took effect on December 30, 2013 and prescribes the sanction on administrative violations on the domain of environmental protection.
Decree No.59/2007/NĐ-CP dated April 9, 2007	Prescribes the regulations on solid waste management
C. Circulars	
Circular No.26/2011/TT-BTNMT dated December 8, 2011	Guidance for Strategic Environmental Assessment, Environmental Impact Assessment, and Environmental Protection Commitment.
Circular No. 01/2012/TT-BTNMT dated March 16, 2012	Regulation on setting-up, assessment, approval, inspection and certification of the implementation of detailed environmental protection project; setting up and registration of simple environmental protection projects.
Circular No. 22/2014/TT-BTNMT dated May 5, 2014	Provides the guidelines for the implementation of the Government's Decree No. 35/2014/ND-CP of April 29, 2014, amending and supplementing a number of articles of the Government's decree No. 29/2011/ND-CP of April 18, 2011, providing strategic environmental assessment, environmental impact assessment and environmental protection commitment.
Circular No 12/2011/TT-BTNMT dated April 14, 2011	Regulation on the management of Hazardous Waste. Under this law, generators of hazardous waste are required to register with MONRE/DONRE and to have separate hazardous waste storage area. The treatment and disposal of hazardous waste should be contracted through a registered hazardous waste management company.
Circular No. 39/2010/TT-BTNMT dated December 16, 2010	National technical regulation on noise (QCVN 26/2010/BTNMT) and on vibration (QCVN 27/2010/BTNMT)
Circular No 25/2009/TT-BTNMT dated November 16, 2009	National technical regulation on hazardous waste threshold (QCVN 07:2009/BTNMT).
Circular No 32/2013/TT-BTNMT dated October 25,	National technical regulation on ambient air quality (QCVN 05/2013/BTNMT)

Laws and Regulations	Description
2013	
D. Decisions	
Decision No. 16/2008/QD-BTNMT dated December 31, 2008	National technical regulation on surface water quality (QCVN 08.2008/BTNMT); Underground water quality (QCVN 09/2008/BTNMT) and Domestic wastewater (QCVN 14/2008/BTNMT)

2. Environmental Assessment

37. Based on Decree No. 29/2011/ND-CP dated April 18, 2011, the 500kV substation and connection lines isrequired to submit an EIA report. The report is prepared by the investor and submitted to the Department of Natural Resources and Environment (DONRE) of Long An Province, where the project is located. The Decision of Approval of the project was issued by the People's Committee of Long An Province(Decision Ref. No. 3538/QD-UBND) on October 22, 2014. The Decision of Approval is presented in Appendix 3.

38. The duration for processing the submitted report is forty-five (45) working days. Once approved, a Decision of Approval is released for the project. Under the Circular 26/2011/TT-BTNMT of July 18, 2011, guided by Decree No. 29/2011/ND-CP of April 18, 2011, investors only needs to obtain the approval decision.

39. There are new provisions under the new Environmental Protection Law dated January 1, 2015 related to environmental impact assessment. Under Article 20 of the law, if a project is not executed within a period of 24 months from the date of the approval of the decision on the environmental impact assessment, a new EIA report is required for submission to DONRE or MONRE. In addition, the new law prescribes the licensing requirement for EIA consultants.

40. Under the new Decree No. 18/2015/ND-CP, dated Feb 14, 2015, the EIA requirements for investment projects were revised. The following outlines the revised requirements for power supply projects in GOV:

Table 2: EIA Requirements for Electricity Transmission Lines and Power Stations Projects

Type of Project	Scale	EIA Requirement
Substation	<220kV	EPP (Environmental Protection Plan)
	>220kV	EIA
Transmission Line	<110kV	EPP
	>110kV	EIA

Source: Decree No. 18/2015/ND-CP, Feb 14, 2015

3. Environmental Monitoring

41. The environmental monitoring requirements are prescribed in Clause 2, Article 16, Decree No. 18/2015/ND-CP. Under this Circular, environmental monitoring reports are to be prepared by the investor for submission to MONRE or DONRE on a semi-annual or annual basis, based on the approved program written in the EIA. The environmental monitoring report shall contain the progress of project implementation, status of implementation of the environmental management plan (EMP) and environmental monitoring plan (EMoP), and the results of the monitoring of emissions and wastewater discharges and other project-related parameters.

4. Electricity Law

42. The regulations regarding power supply and power network protection is prescribed in the Electricity Law No. 18/2004/QH11 of December 3, 2004. In general, the law prescribes electricity development planning and investment, electricity markets, rights and obligations of organizations and individuals conducting electricity activities and using electricity, protection of electric equipment and facilities, electricity works and electrical safety.

Table 3: Power Network Legislation and Associated Legal Instruments

Laws and Regulations	Description
A. Law	
Law No. 24/2012/QH13 issued on November 20, 2012	Amends and supplements a number of articles of the Electricity Law No. 28/2004/QH11 of December 3, 2004
Electricity Law No. 18/2004/QH11 dated December 3,2004	Prescribes the electricity development planning and investment; electricity saving; electricity markets; rights and obligations of organizations and individuals conducting electricity activities and using electricity; protection of electric equipment and facilities, electricity works and electric safety.
B. Decrees	
Decree No 81/2009/NĐ-CP, issued August 17, 2005	On the safety and protection of high-voltage power grids.
Decree No 14/2014/ND-CP dated February 26, 2014	Decree stipulates in detail the implementation of electricity law regarding electricity safety, including: safety in generation, transmission, distribution and use of electricity in production; compensation and assistance of housing, works, land and plants in the safety corridor of overhead power transmission line upon the construction of high-voltage grid.
C. Circular	
Circular No 22/2010/BXD issued on December 3, 2010	Regulation on labor safety in work construction, construction and installation of equipment which are newly built, repaired, renovated, relocated, embellished or restored; dismantling of works and warranty for maintenance works.
Ministry of Industry and Trade Circular No. 03/2010/TT-BCT, issued January 22, 2010	Regarding protection on high-voltage power network

5. Land and Construction

43. The Land Law No. 45/2013/QH13 of November 29, 2013 prescribes the requirements on land use, details of compensation, support and resettlement. The implementation guidelines and amendments are detailed in succeeding government decrees and ministry circular.

44. Regulations on construction management in investment projects including labor safety in construction and use of equipment are described in detail in Table 4.

Table 4: Land and Construction Laws and Regulations

Laws	Description
A. Law	
Land Law No 45/2013/QH13 dated November 29, 2013	This Law prescribes the regime of land ownership, powers and responsibilities of the State in representing the entire-people, owner of land and uniformly managing land, the regime of land management and use, and the rights and obligations of land users.
B. Decrees	
Decree No. 44/2014/ND-CP dated May 15, 2014	This Decree regulates methods for land pricing, adjustment to land price brackets and land price lists, specific land pricing and provision of consultancy on land pricing.
Decree No. 37/2014/ND-CP dated May 15, 2014	The Decree details some articles of the Law on Land concerning compensation, support, and resettlement upon land expropriation by the State.
C. Circulars	
Circular No. 36/2014 / TT-BTNMT dated June 30, 2014	Specifying detailed methods of valuation of land prices, construction, adjustment of land prices; specific land prices valuation and land prices valuation consulting service.
Circular No. 37/2014/TT-BTNMT dated June 30, 2014,	Providing detailed regulation on compensation, assistance, and resettlement when the State acquires land.
Document of Prime Minister No. 1665/TTg-CN, dated October 17, 2006	Regarding management of clearance of site, mine and explosive ordnance for construction

C. Milestones for Environmental Compliance of Subproject

45. In compliance with GOV environmental requirements, the proposed subproject was approved by the Prime Minister of Viet Nam, the NPT, the People's Committee of the provinces covered by the project, and by the People's Committee of Long An Province where the project substation is located. The EIA for the 500 kV Duc Hoa substation and connections was approved under Decision No. 3538/QD-UBND on October 22, 2014. The list of the legal documents and approvals required for the project are shown in Table 5.

Table 5: Legal Documents and Approvals of the 500 kV Duc Hoa substation and connections

Documents and approvals	Description
Prime Minister Decision No. 1208/QD-TTg Date issued: July 21, 2011	Approval of decision of the Prime Minister on the national electricity development plan from 2010-2020
Ministry of Industry and Trade Decision No. 4986/QD-BCT Date issued: June 3, 2014	Approval of the construction of the investment project
Long An Province People's Committee Decision No.891/UBND-CN Date issued: March 18, 2010	Agreement on the direction of the 500kV Thot Not-Duc Hoa and Duc Hoa 500kV substation and connection lines
Long An Province People's Committee Document No. 2883/UBND-CN	Route adjustment of No. 1, 220kV connection lines passing thru Tan Phu Industrial Park in

Documents and approvals	Description
Date issued: August 19, 2010	Duc Hoa District and No. 2, 220kV connection lines passing through Saigon – Mekong Urban area in Ben Luc District
Long An Department of Industry and Trade Document No. 977/SCT-QLNL Date issued: May 17, 2011	Route adjustment of No. 2, 220kV connection lines through wastewater treatment facilities in Tan Lap commune, Thu ThuaDistirct, Long An Province
Long An Province People's Committee Document No. 1300/UBND-NN Date issued: April 29, 2011	Expanding the corridor of the 500kV connection line
Ministry of Construction Document No. 23/BXD-HDXD Date issued: March 24, 2010	Agreed direction of 500kV O Mon-Thot Not-Duc Hoa and Duc Hoa 500kV substation and connection lines
Bureau of processing, commercial agriculture, forestry, fisheries and aquaculture Document No. 224/CB-CD Date issued: March 12, 2010	On the agreed direction of 500kV O Mon-Thot Not-Duc Hoa and Duc Hoa 500kV substation and connection lines
Ministry of Infrastructure Transport Decision No. 1814/BGTVT Date issued: May 26, 2010	Comments on the direction of 500kV O Mon-Thot Not-Duc Hoa and Duc Hoa 500kV substation and connection lines
Ministry of Industry and Trade Decision No. 2853/BCT-NL Date issued: March 23, 2010	On the agreed direction of 500kV O Mon-Thot Not-Duc Hoa and Duc Hoa 500kV substation location and connection lines
Ministry of Information and Telecommunications Decision No: 1441 / MIC-VT Date issued: 15/04/2010	On the agreed direction of 500kV O Mon - Thot Not - Duc Hoa and Duc Hoa 500kV substation location and connecting lines.
Ministry of Industry and Trade Decision No:6805/QĐ-BCT Date issued: 25/12/2011	Approval of the electricity development planning in Long An province in 2011 - 2015 toward 2020.
Long An Province People's Committee Document No: 3538/QD-UBND Date issued: 22/10/2014	Approval Environmental impact assessment report for the project "Duc Hoa 500kV substation and transmission lines"

Source: PECC 3. Feasibility Study for the Duc Hoa 500 kV Substation and Connection Lines. Unpublished.

III. DESCRIPTION OF THE PROJECT

46. The Power Transmission Investment Program supports partial implementation of the GOV's Power Development Master Plan VII (PDMP VII) to meet the growing electricity demand of industrial, commercial and residential consumers throughout Viet Nam and to ensure reliable electricity supply. The program was approved by the ADB for financing through multi-tranche financing facility (MFF). Components of the investment program contribute to expanding Viet Nam's power transmission network by financing construction of 500kV and 220kV transmission lines and associated substations. The facility is anticipated to consist of four financing tranches. ADB approved Tranche 1 in December 2011 and Tranche 2 in November 2012.

47. Nine subprojects have been identified for inclusion under Tranche 3. The proposed 500 kV Duc Hoa substation and connections in Long An Province is one of the subprojects under Tranche 3. The subproject was identified because Long An Province, located in Southern delta region of Viet Nam, is one of the important provinces requiring power security and development. The province is located within the economic growth areas of Ho Chi Minh City – Dong Nai – Long An – Binh Duong – Ba RiaVung Tau. Adjacent to the province is the region's major industrial center in the south. In recent years, economic development in Long An Province has resulted to gross domestic product (GDP) average growth of 11.8%[3]. Recognizing the strategic importance of Long An Province, the provincial leaders and the EVN planned for the construction of electricity infrastructure to meet current and future load demand of Long An Province and HCMC.

48. Currently, Long An Province is primarily supplied from the national grid by regional transmission grids and power stations. The Master Plan for National Electricity Development VII which included plans for the improvement and development of the grid of the Long An power was approved by the Ministry of Industry and Trade. According to the results of feasibility study conducted in March 2014, there is a need to build a 500 KV substation and connection lines to meet the goals of the master plan.

A. Sub-Project Scope

49. The 500 kV Duc Hoa substation and connections will have the following components:

a) 500 KV substation (140,000 m^2)
b) 100m access road (9mx100m)
c) 500kV double circuit transmission line (12.4 km),
d) 1st220kV double circuit transmission line(24.4 km)
e) 2nd 220kV double circuit transmission line (29.8km).

50. The substation design provides for an initial capacity of 1 x 900MVA (3 x 300 MVA single phase autotransformers), with provision for a future second 900 MVA transformer bank. The 500 kV switchyard design will be a breaker-and-a-half scheme to allow flexible operation and ensure optimum reliability. This means that the major equipment can be maintained without load interruption. This will comprise of dual 500kV bus bars, with design for a total of 16 x 500kV feeders, including: 14 line feeders and 2 transformer feeders. Of these, 4 line feeders and 1 transformer feeder will be installed under this Tranche 3 subproject. The 220kV switchyard design is double plus transfer busbar, with a total of 21 x 220kV bays including: 14 line feeders, 4 transformer feeders, 1 bus-coupler feeder, 1 connected feeder and 1 by-pass circuit feeder.

[3]Summary Report – Feasibility Study for the 500 KV DucHoa substation and connection lines

There will be 4 line feeders: 1 transformer feeder, 1 connector feeder, and 1 ring circuit breaker feeder that will be installed under this Tranche 3 subproject.

51. The transmission lines will traverse two districts, namely, Ben Luc and Duc Hoa. Figure 2 presents the overview of the right-of-way (ROW) of the transmission line while Table 6 summarizes the location of the transmission towers by province, district, and commune.

Table 6: Location of transmission towers by district and commune

District	Commune	Tower
500kV transmission line, 12.4km		
Duc Hoa	Hoa Khanh Dong	G51.1, G51.2, G51.3
	Duc Hoa town	G51.4
	Duc HoaThuong	G51.5
	My Hanh Nam	G51.6, G51.7, G51.8, G51.9A, G51.9B
1st 220kV transmission line, 24.4km		
Duc Hoa	Hoa Khanh Dong	G21.0, G21.1B, G21.1A, G21.1,
	Hoa Khanh Nam	G21.2
	Hoa KhanhTay	G21.3
	Tan Phu	G21.4
	HauNghia	-
	Tan My	G21.5, G21.6, G21.7
2nd 220kV transmission line, 29.8km		
Duc Hoa	Hoa Khanh Dong	ĐĐ, G22.0
	HuuThanh	G22.1, G22.2, G22.3, G22.3A
Ben Luc	ThanhLoi	G22.B, G22.C, G22.4
	ThanhHoa	G22.5A
	BinhDuc	G22.5B, G22.6, G22.7
	ThanhDuc	G22.8, G22.9, G22.9A, G22.9B

Source: Line Route Layout, 500 kV Duc Hoa substation and connections. March 2014.

52. In general, the transmission lines will pass through flat, agricultural terrain which is being used for planting rice, corn, coconut, lemon, sugarcane, melaleuca, and other crops. The transmission lines will traverse 27.5km of rice land and 3 km of crop plantation. Table 7 outlines the location of the route of the transmission lines.

Table 7: Major Infrastructures and Land Traversed by the Connection Lines

Infrastructure/Land	Number of Crossing
Total length of transmission lines: 66.5km	
Length of TL passing through land for crop plantation: 3 km	
Length of TL passing through rice paddy land: 27.5 km	
Highway SaiGon – TrungLuong	1
Provincial road	4
Communal road	100
Vam Co Dong river dike	1
Vam Co Dong river	1
Canal, width <10m	38
Canal, width >10m	2
Pond, width <100m	3
Pond, width >100m	5

Infrastructure/Land	Number of Crossing
500kV TL	0
110kV TL	1
0.4÷35kV TL	8
Houses in transmission line ROW	40

Source: Feasibility Study Summary Report, 500 kV Duc Hoa substation and connections. March 2014. PECC3

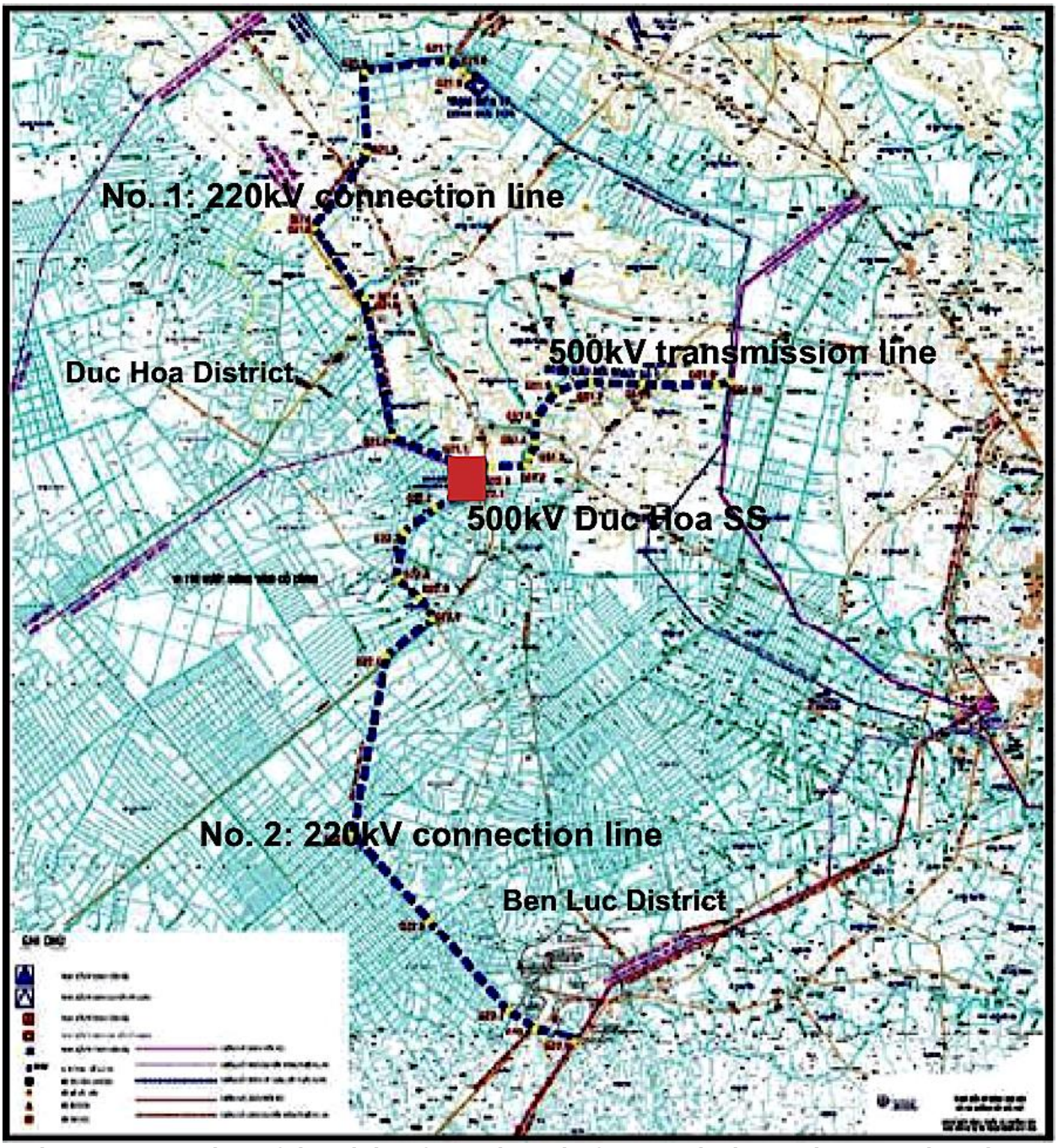


Figure 2: Overview of the Right-of-Way (ROW) of Transmission and Connection Lines

53. The major components of the subproject are described in the succeeding sections and are summarized in Table 8.

54. **500kV Duc Hoa Substation.** The substation will consist of 500/220kV, 2 x 900MVA transformers. The location of the 500kV connections will use two diagrams, with 14 compartments and 2 transformer compartments. The 220kV connections will have two bar diagram with ring bar. The maximum number of compartments for the 220kV connections is 21.

55. The substation will be built in sync with the control system, security, communications and SCADA, and fire protection system that comply with the standards and current regulations.

56. **Access road.** The access road will have a length of 100m and will connect to Provincial Road N2. The access road will have two lanes with a total width of 6.0m and gutter of 1.0m on both sides. The total width of the road including gutters is 8.0m. The radius of curve of the road to the station is located 15.0m, corresponding to speed, V = 20km/h.

57. The access road will be roadbed with 0.3m thick layer of crushed stone and paved with 12cm thick asphalt and concrete.

58. **500kV Transmission Line.** The 500kV transmission line will have a total length of 12.4 km. The starting point will be the 500kV Duc Hoa substation in Hoa Khanh Dong commune. It will pass through the Duc Hoa town, Duc HoaThuong commune, Duc Hoa District. The ROW is characterized as relatively flat.

59. **1st 220kV Connection Line.** The 1st 220kV Transmission Line will have a total length of 24.4km, starting from 500kV Duc Hoa in Hoa Khanh Dong commune and passing through Hoa Khanh Nam, Hoa KhanhTay, Tan Phu, HauNghia town, then connecting to 220/110kV Duc Hoa substation in Tan My commune, Duc Hoa district. The ROW is characterized as relatively flat.

60. **2nd 220kV Connection Line.** The 2nd 220kV connection line will have a total length of 29.8km. The starting point will be at 500kV Duc Hoa substation in Hoa Khanh Dong commune, passing through the HuuThanh-Duc Hoa District, ThanhLoi, ThanhHoa-Ben Luc District, Tan Thanh, ThanhDuc-Ben Luc District, then connecting to 500-220kV Phu Lam – O Mon mixed transmission grid in ThanhDuc commune, Ben Luc District. The ROW is characterized as relatively flat.

Table 8: Main Features of the 500 kV Duc Hoa substation and connections Project

Item	500KV transmission line	1st 220 kV connection line	2nd 220 kV connection line
Starting point	At 500kV Duc Hoa substation (500kV distribution system of 500kV Duc Hoa substation)	At 500kV Duc Hoa substation (220 kV distribution system of 500kV Duc Hoa substation)	At 500kV Duc Hoa substation (220kV busbar of 500kV Duc Hoa substation)
Ending point	500 kV Pleiku (Cau Bong) – Phu Lam transmission grid	220/110kV Duc Hoa substation	500 -220 kV Phu Lam – O Mon mixedtransmission grid; connecting to 220kV Phu Lam – Long An circuit
Length of line	12.4 km	24.4 km	29.8 km
ROW width	30m	23m	24m
Voltage	500KV	220 kV	220 kV

Item	500KV transmission line	1st 220 kV connection line	2nd 220 kV connection line
Number of circuits	02	04	04
Conductors	Steel-coredaluminum alloyconductors: ACSR 330/42 Phases: 4 lines/phase 4xACSR666.6MCM – Code name Flamingo (equivalent to 4xACSR330);	Steel-coredaluminum alloyconductors: ACSR330/43 Phases: divided 2 lines, pull strings at this stage. Duc Hoa 220kV circuit Use wireACSR400 / 51 classification	Steel-coredaluminum alloyconductors: :ACSR330/43 Phases:2 lines, pull strings at this stage. Duc Hoa 220kV circuit Use wireACSR330/43 classification
Lightning rods	Aluminum Alloy Wire PASTEL 181, lightning rods combined optical fiber OPGW180	Aluminum Alloy Wire PASTEL 147, lightning rods combined optical fiber OPGW150	Aluminum Alloy Wire PASTEL 147, lightning rods combined optical fiber OPGW150
Earth wire	pile-ray combining pile	pile-ray combining pile	pile-ray combining pile
Insulators	Polymer	Polymer	Polymer
Tower	Galvanized steel	Galvanized steel	Galvanized steel
Tower foundation	Site-precast steel Reinforced concrete	Site-precast steel Reinforced concrete	Site-precast steel Reinforced concrete

61. Figures 3 and 4 present the typical diagrams of the 500/220kV transmission tower and tension towers while Table 9 summarizes the number of towers in each connection line.

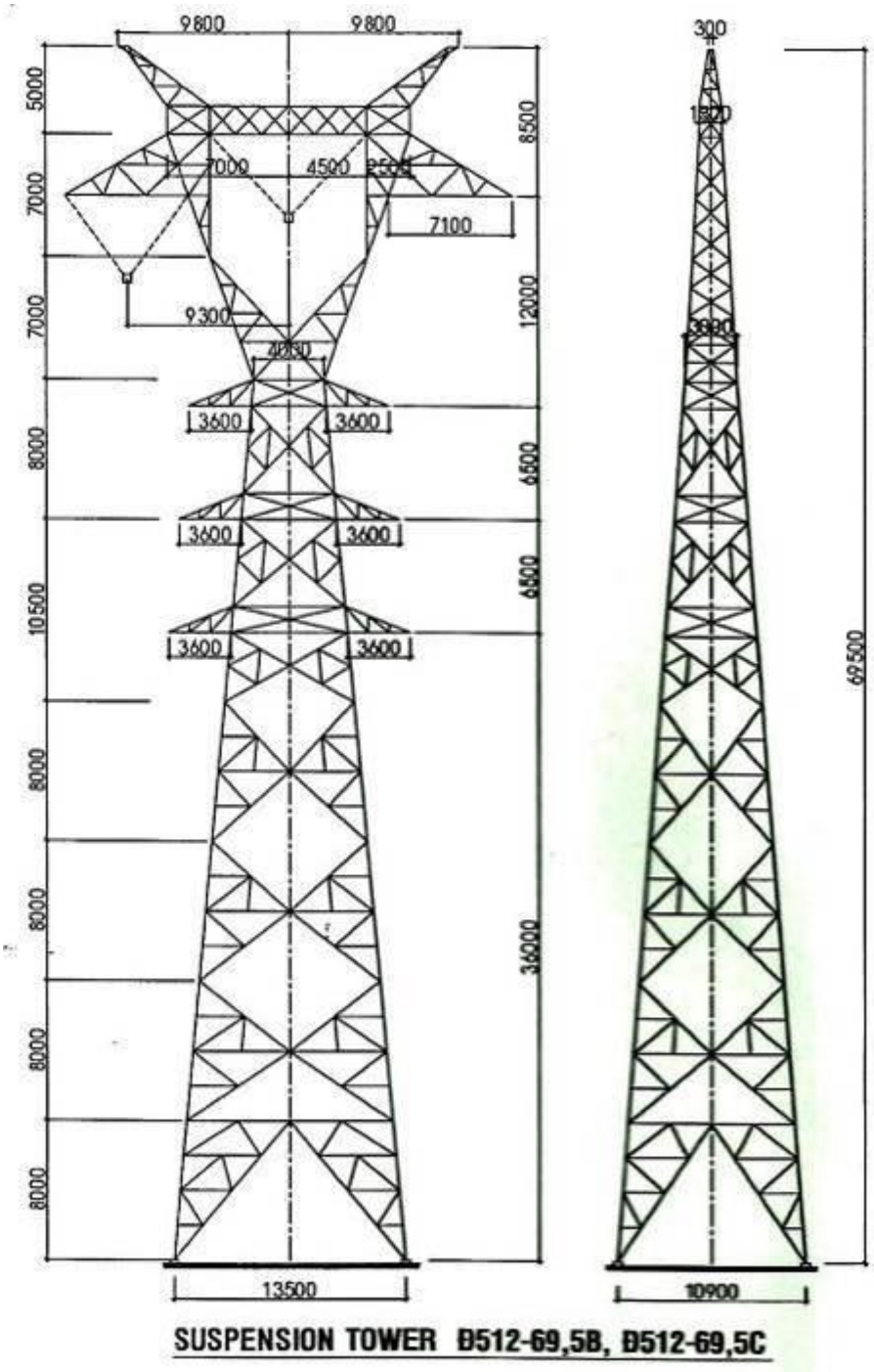


Figure 3: Diagram of Typical Transmission Tower, 500/220kV Transmission Line Project

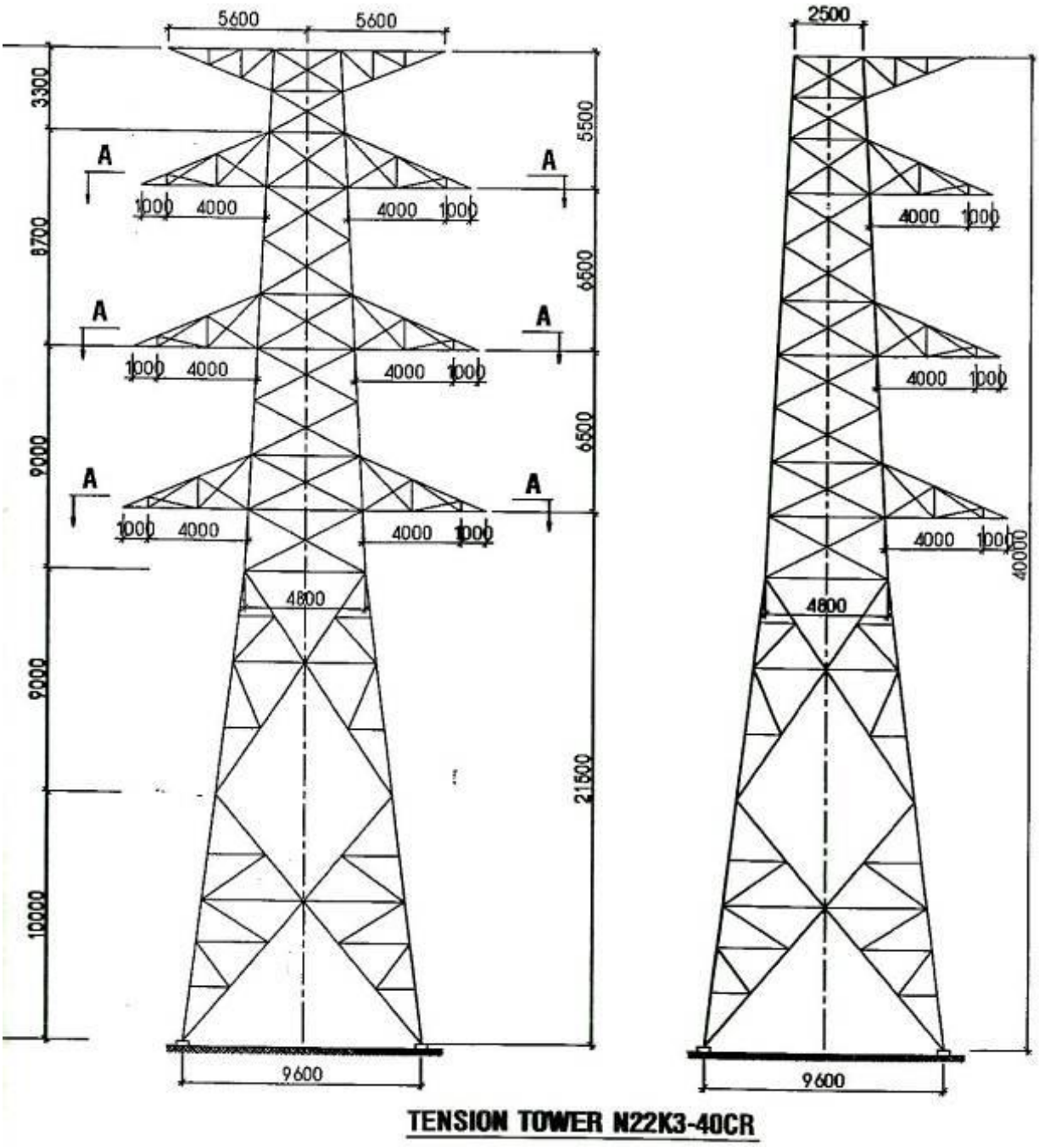


Figure 4: Diagram of Typical Tension Tower, 500/220kV Transmission Line Project

Table 9: Towers of the Transmission Lines Project

No.	Type of tower	Max angle	Weight (kg)	Number of Tower	Total of weight (kg)
A. 1ST 220 TRANSMISSION LINE					
1	Đ22K-47,5B		18,217.84	2	36,435.68
2	Đ24K-64B		53,367.30	18	960,611.40
3	Đ24K-68B		63,607.40	42	2,671,510.80
4	N22K2-38C		41,827.90	1	41,827.90
5	N22K-37C	≤60^0	29,502.30	2	59,004.60
6	N24K3-57BR	≤90^0	99,755.57	1	99,755.57
7	N24K2-61A	≤15^0	84,593.50	1	84,593.50
8	N24K2-61B	≤45^0	93,181.90	3	279,545.70
9	N24K2-61C	≤60^0	104,963.60	2	209,927.20
10	N24K2-61CR	Last anchor	115,553.30	1	115,553.30
11	N24K2-61D	≤90^0	115,745.30	1	115,745.30
TOTAL				**74**	**4,674,510.95**
B. 2ND 220 TRANSMISSION LINE					
1	Đ24K-60B		47,598.90	12	571,186.80
2	Đ24K-64B		53,367.30	18	960,611.40
3	Đ24K-68B		63,607.40	35	2,226,259.00
4	Đ24K-83B		85,605.18	2	171,210.36
5	N22K-37C	≤60^0	29,502.30	1	29,502.30
6	N21K-36C	≤90^0	26,852.10	2	53,704.20
7	N24K2-56A	≤15^0	75,345.50	2	150,691.00
8	N24K2-61A	≤15^0	84,593.50	4	338,374.00
9	N24K2-56B	≤45^0	83,876.20	1	83,876.20
10	N24K2-61B	≤45^0	93,181.90	4	372,727.60
11	N24K2-56C	≤75^0	92,657.90	1	92,657.90
12	N24K2-56CR	Last anchor	111,247.60	1	111,247.60
13	N24K2-61C	≤75^0	104,963.60	2	209,927.20
14	N24K2-61D	≤90^0	115,745.30	1	115,745.30
TOTAL				**86**	**5,487,720.86**
C. 500kV TRANSMISSION LINE					
1	Đ52-59A		36,026.52	8	288,212.16
2	Đ52-63A		39,598.40	16	633,574.40
3	Đ52-69A		48,730.20	22	1,072,064.40
4	Đ52-79D		91,863.78	2	183,727.56
5	N513-38C	≤90^0	48,367.80	4	193,471.20
6	N52-55A	≤20^0	82,714.80	8	661,718.40
7	N52-55B	≤45^0	90,057.13	6	540,342.78
8	N522-60C	≤75^0	93,097.30	2	186,194.60
9	N522-68C	≤75^0	120,268.00	1	120,268.00
TOTAL				**69**	**3,879,573.50**

Source: Feasibility Study Summary Report. 500 kV Duc Hoa substation and connections. March 2014. EVN/PECC3.

62. **Foundations.** The foundations of the steel towers will be reinforced concrete, cast in-situ. An average of 312.45 m^3 of concrete and 25 tons of steel will be utilized for the tower foundations.

63. The size of tower foundations varies from 13m x 14m to 25m x 25m while the excavation depth is about 2.0 – 5.0m, depending on the type of tower. All excavated soil will be utilized for refilling and banking-up of the tower foundations..

64. For the substation, a total of 534,613 m^3 of excavated soil will be generated while 349,567m^3will be utilized as fill material. Construction of the 229 transmission line towers will require a total 78,446.6 m^3 of concrete.

B. Sub-Project Schedule and Activities

65. The subproject will be implemented from December 2015 to June 2017. Table 10 presents the activities and implementation schedule of the subproject.

Table 10: Implementation Schedule

Activity	Schedule
Feasibility Study	04/2009– 10/2014
Preparation and approval of the Feasibility Study	10/2014 – 12/2014
Preparation of equipment list	12/2014– 04/2015
Organization of bidding and bid evaluation	05/2015 – 06/2015
Review bid evaluation results and Contracts	07/2015 – 08/2015
Delivery of equipment and materials	11/2015 – 12/2015
Construction, installation and commissioning	12/2015– 06/2017
Start of operation	06/2017

1. Pre-Construction

66. **Survey and Design.** PECC3 was commissioned by SPPMB to conduct the technical surveys, technical design, cost estimate, and the bid documents for the construction of the project and procurement of equipment. The SPPMB shall undertake the preliminary review and submit the technical project design to NPTfor final approval.

67. The detailed design of the transmission line shall be undertaken through site investigation, soil testing, and survey of siting of towers. Cadastral survey shall be undertaken to determine any further adjustments in the route, if necessary. The soil investigation is necessary to determine the subsurface conditions at the site of the towers.

68. Contractor will be chosen based on the set bidding procedure. The Bid & Contract (B&C) Documents will include implementation of construction phase mitigation measures discussed in the chapter on Environmental Management Plan (EMP).

69. **Land Acquisition and Compensation.** The construction of the project will require the acquisition of land for the 500kV substation and transmission towers. A survey of affected land use and ownership, vegetation and other structures is being undertaken and a separate Resettlement Plan (RP) is being prepared. Compensation of affected land shall be designed in accordance with the requirements of the ADB and the Government of Viet Nam.

2. Construction

70. **Construction of Substation and Access Road.** Upon mobilization of the Contractor, the construction works will initiate with the construction of the temporary access road to the substation site. Construction activities for the substation will include the civil works for the foundation for the transformer banks, gate tower, electric box, cable trench, oil containment system, installation of equipment, and construction of the operations house and other buildings. These will also include preparation of site and storage area, transportation of equipment and materials, construction of foundations involving excavations and placement of concrete, installation and commissioning of equipment, and site restoration.

71. There will be a construction campat the substation site.

72. **Construction of Transmission Line and Connection Lines.** Temporary access roads or paths from the main roads or commune roads to the site of the tower foundation will be developed. Construction materials such as cement, sand, stone, and equipment parts of the tower lattices, insulators, and conductors will be transported to the site of the towers using trucks and then unloaded along roadside near the sites of each tower. Consent of the local authorities shall be secured during the construction of the towers. The materials and equipment will then be transported using small vehicles or manually transported along the paths to avoid significant disturbance of land.

73. After verification of the location of the tower foundation, construction will begin with the excavation of the tower foundations and then casting of concrete. All excavated soil will be retained, for backfilling of the tower foundations.

74. The electrical materials such as conductors, lightning wire, and optical cables will be transported to a temporary storage facility near the tower site. The transmission towers are then assembled on site with bolts and nuts and raised in sections.

75. When the towers have been installed, the conductor and lightning wire are then stretched at each anchor in a mechanical and tension stringing operation to prevent damage to the wires and conductors caused by scrubbing on the ground or vegetation. Workers will be provided with radio communication equipment to ensure safe and smooth line stringing operation.

76. The tensioning of wires and conductors shall be carried out in accordance with the prescribed international procedures, taking into consideration safety to prevent workers accident and damage to facilities and properties. The lines shall be tested and adjusted prior to full commissioning.

77. **Manpower during Construction.** A total of 269 workers will be required during the construction phase. Hiring of work force will be entirely dependent on the Contractor. However, the SPPMB will encourage the Contractor to hire majority of the local workers for construction activities.

3. Operation

78. The activities that will be undertaken during the operational phase of the substation and transmission lines will include regular checking and maintenance of equipment. Routine monitoring and inspection of the lines will be conducted to check if the required clearance of

trees and houses below the transmission line is maintained. Maintenance activities include the trimming of trees if above 3 m high and checking of nuts and bolts to ensure structural stability. The regular maintenance and trimming of vegetation within the ROW is necessary to prevent damage to overhead power lines and towers.

79. Under the provisions of EVN and NPT, insulating oil, which does not contain PCB, will be used. In terms of the workforce in the substation, there will be 30 officers and employees that will maintain and operate the substation and transmission lines. Monitoring of equipment shall be complemented by a SCADA system. There will also be a waste management and fire protection system that will be designed for the subproject.

IV. DESCRIPTION OF THE ENVIRONMENT

80. Baseline information on the relevant physical, biological, and socio-economic conditions of the environment at the subproject area is described in this chapter. Aspects on various environmental parameters, which are likely to be affected (either directly or indirectly) by the proposed 500kV Duc Hoa substation and connection lines, are discussed. Current and proposed development activities within the subproject's area of influenceare also presented.

A. Geography

81. Viet Nam lies in the eastern part of the Indochina Peninsula. It has a land area of 331,211.6 km^2. International borders are shared with the People's Republic of China on the north, the Lao People's Democratic Republic on the west, and the Kingdom of Cambodia on the southwest. It is bounded by the East Sea on the east and south[4].

82. The 500kV Duc Hoa substation will be located in Hoa Khanh Dong Commune, Duc Hoa District, Long An Province. The connection lines will traverse the communes of Ben Luc District (Thanh Loi, Thanh Hoa, Binh Duc, Thanh Duc) and Duc Hoa District (Hoa Khanh Dong, Hoa Khanh Nam, Hoa KhanhTay, Duc HoaThuong, Duc Hoa town, HauNghia town, Tan Phu, Tan My, HuuThanh, My Hanh Nam). All communes are located in the rural and industrial zones of Long An Province. The Tan An Town and the Hoc Mon District (HCMC) is in the east border of Ben Luc District. The Duc Hoa District in Long An Province is bordered by Cu Chi District and Hoc Mon District of HCMC in the north.[5]

83. The area within the immediate vicinity of the substation is sparsely populated. The nearest household to the substation site is located about 500m away. Rice paddy field and cropland surround the proposed substation site. (Figure 5).

B. Topography

84. Located in the central delta, the terrain of Long An Province is relatively flat and with no hills.[6]The substation is at an area where the surrounding environment is relatively flat and low. The site is about 1.5m lower than the existing Provincial Road N2, which therefore, requires earth-filling to raise the ground level of the access road and substation.

85. In general, Ben Luc District has flat and uneven low terrain that slopes from northwest to southeast at average elevations ranging from 0.6m to 0.8m. The topography is similar to Duc Hoa District that is also relatively flat but with slopes mainly from the north to south and from west to east, as influenced by the flow of the Vam Co Dong River.

[4]Viet Nam National Administration of Tourism.The Socialist Republic of Viet Nam. http://vietamtourism.com/e_pages/country/overview.asp

[5]Power Engineering and Consulting Joint-stock Company No. 3 (PECC3). Initial Environmental Examination for the DucHoa 500 kV Substation and Connection Lines.Unpublished.

[6]People's Committee of Long An. Land and Terrain. http://longan.gov.vn/vi-vn/Pages/Article.aspx?ChannelId =276&articleID=7598

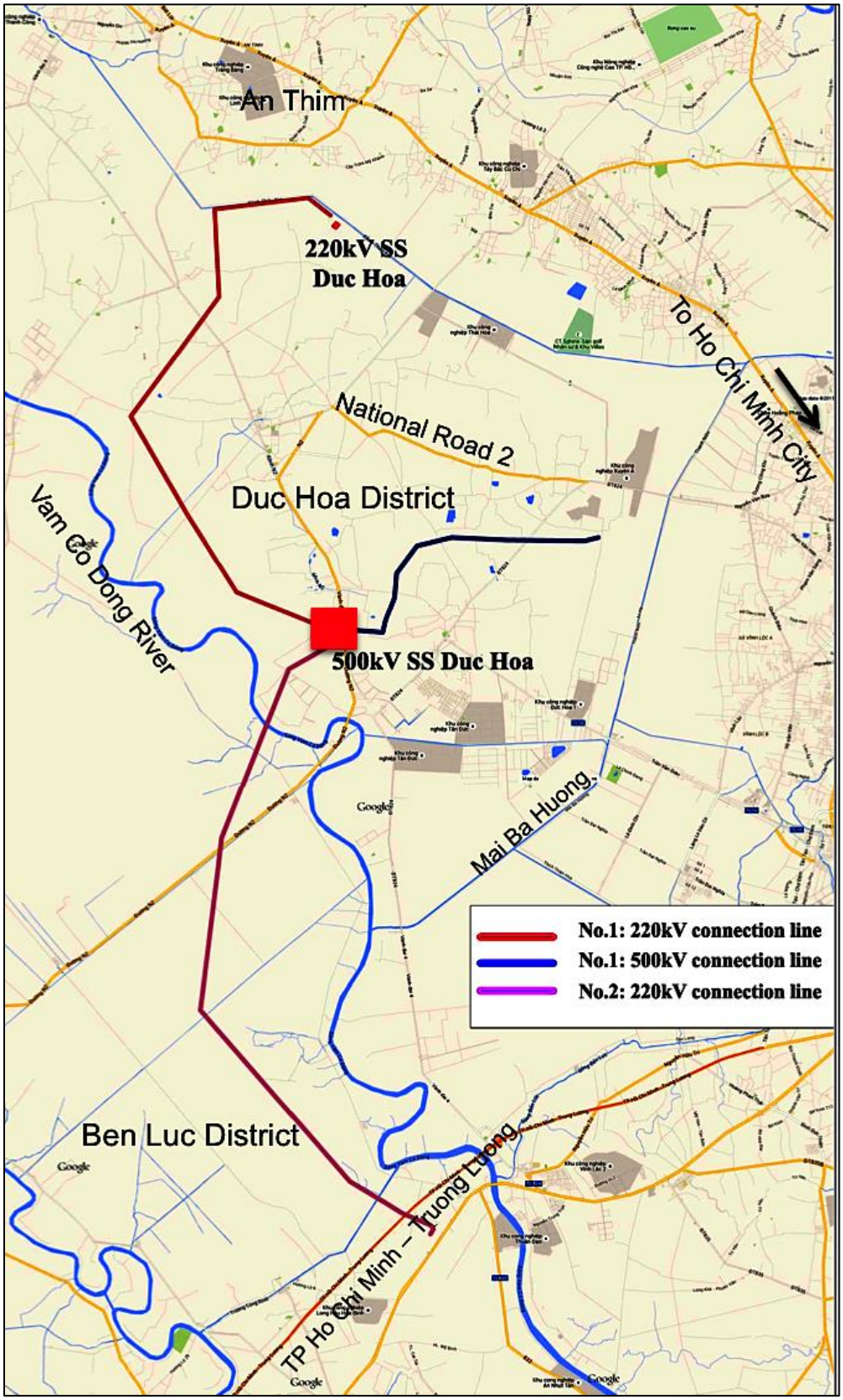


Figure 5: Vicinity Map of 500 kV Duc Hoa substation and connections
Base Map: https://www.google.com/maps

C. Geology

86. Based on the field exploratory drilling performed up to a depth of 10–35 m, the subsurface structure comprises of quaternary aged alluvium composed of unconsolidated sediments that range from clay to sand. Drilling results further showed that the groundwater isstoredin the soft plastic clayandsandlayers and appeared to stabilizeat depths from2.5 – 6.5m.The soft plastic clay in the area can be a critical subsurface problem in the foundation in addition to the high and fluctuating water table in the area.[7]

Table 11: Geological Condition at the Project Area

Subproject	Province	Geological condition		
		Layer	Thickness (m)	Characteristics
Duc Hoa 500kV Substation 500 kV, 220 kV, 22kV Connection line	Long An	1	3 – 10	Dark brown and white gray silty sand, little dark gray and yellow brown mica flakes, status: tight, water saturation.
		2	11 – 35	Mixed sediments alternating: White gray and soft plastic clay mud, Reddish brown and yellow patchy clay, Status: moderate to hard plastic, Silty sand, dark brown fine-grained sandy, Status: plastic.

Source: PECC3

D. Climate

87. The province is influenced by tropical monsoon climate. Climate data were taken from Long An province's Statistical Yearbook. Annual average temperaturesfor 2012 are seasonably constant at 26.6^{o}C. The highest temperatures recorded are in the month of May with 27.5^{o}C. The lowest temperatures occur in the month of January with 25.2^{o}C. Monthly average temperature recorded at Tan AnMeteorological Station from 2009 – 2012 is presented in Table 12.

Table 12: Average Temperature at Tan An Meteorological Station (2009-2012), ^{o}C

Month / Year	Ave.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	26.4	23.4	25.5	27.1	27.9	27.2	27.6	26.4	27.2	26.5	26.4	26.4	25.3
2010	26.7	25.0	25.7	26.8	28.7	29.2	27.6	26.8	26.5	26.8	26.2	25.9	25.4
2011	26.3	24.6	24.8	26.1	27.2	27.9	26.9	26.7	26.8	26.9	26.5	26.5	25.0
2012	26.6	25.2	25.6	26.9	27.6	27.5	27.2	26.3	27.0	26.1	26.5	26.8	26.4

Source: Statistical Yearbook of Long AnProvince, 2012

[7]Power Engineering and Consulting Joint-stock Company No. 3 (PECC3). Initial Environmental Examination for the DucHoa 500 kV Substation and Connection Lines.Unpublished.

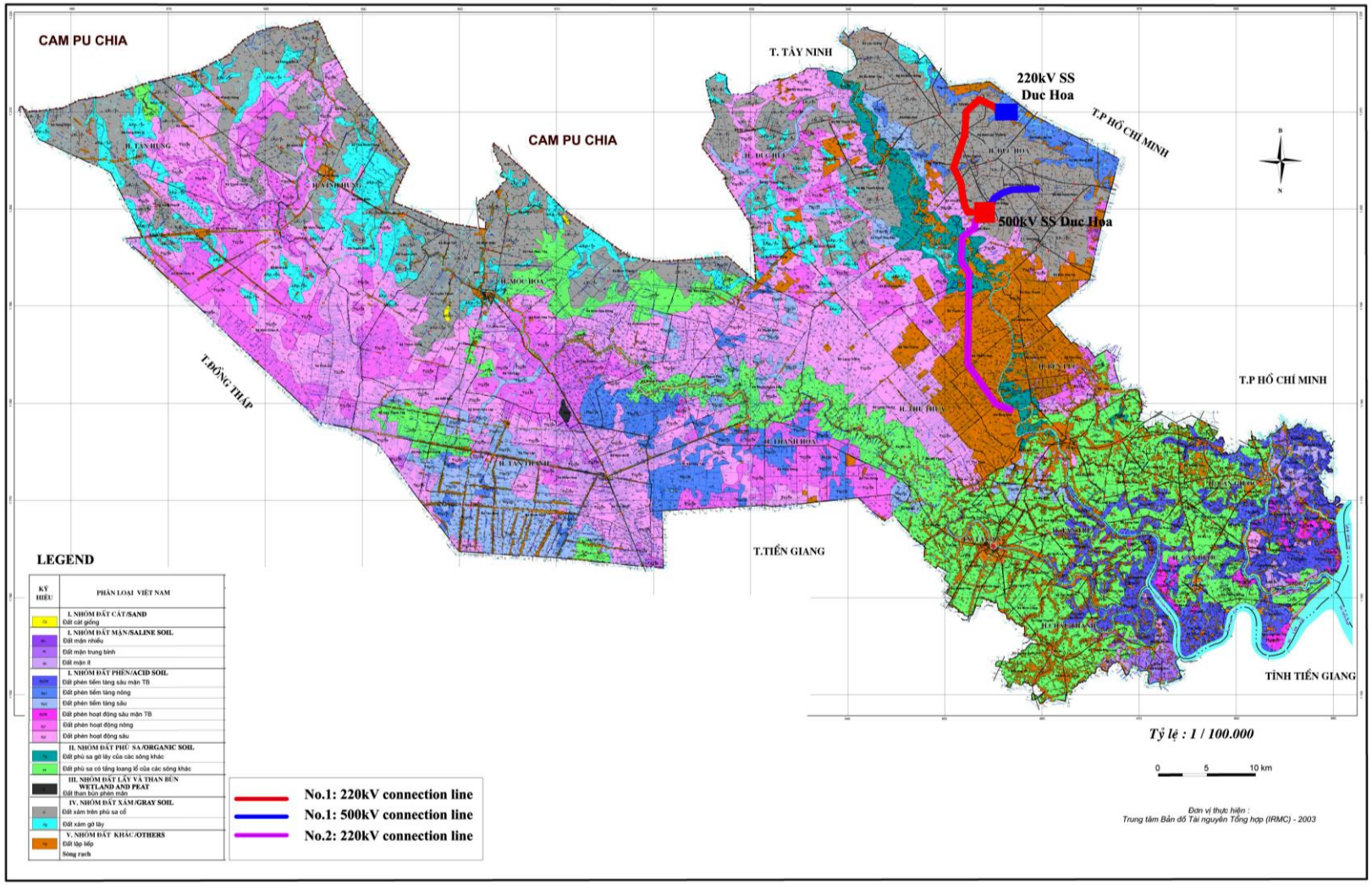


Figure 6: Soil Map of Long An Province
Source: PECC3

88. The annual average humidity in the province range from 87% – 90%, with maximum humidity occurring in the month of September while the minimum humidity occurs in February or March (Table 13)

Table 13: Average Humidity in Long An Province, %

Month / Year	Ave.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	87.6	87	87	84	84	89	88	90	89	91	91	84	87
2010	87.7	87	88	84	80	85	90	90	91	90	90	91	86
2011	85.8	86	84	82	80	85	87	87	88	87	91	88	85
2012	87.0	85	84	84	84	87	88	92	89	91	89	87	84

Source: Statistical Yearbook of Long AnProvince, 2012

89. Rainfall levels in Long An province are relatively low in comparison with some provinces in Cuu Long delta. Average annual rainfall in Long An is 1,442mm. The rainy season starts from May to October, with rainfall amounts accounting for 86% - 90% of the total and with little variation from year to year. The dry season occurs from November to April, which accounts for 10% to 14% of the total rainfall and significantly changes from year to year.

90. There are about 159 rainy days in a year. For 2012, the maximum rainfall occurs in July with an average of 343.1mm and the minimum rainfall happens in December with an average of 15.8mm. For 2010 and 2011, there is no recorded rain for the month of February. The yearly rainfall intensity recorded in Tan Anmeteorological station from 2009 to 2012 in shown in Table 14.

Table 14: Yearly Rainfall Intensity in Long An Province, mm

Month / Year	Ave.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	123.8	4.9	9.2	6.0	50.9	243.0	74.0	301.5	134.6	305.7	294.9	49.1	11.2
2010	142.8	37.0	-	33.4	0.20	136.8	172.2	306.2	260.6	132.6	228.9	369.0	36.1
2011	153.9	10.4	-	95.9	52.0	182.6	251.0	356.5	189.1	171.7	176.7	269.5	91.6
2012	149.1	30.1	28.4	48.2	96.0	170.5	143.4	343.1	135.5	328.5	361.6	88.2	15.8

Source: Statistical Yearbook of Long An Province, 2012

91. The number of hours of sunshine per year is 2,100 – 2,200 hours. For 2012, there are more hours of sunshine in April and least in September (Table 15).

Table 15: Number of sunlight hours in Long An Province, 2009-2012

Month / Year	Ave.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2009	179.9	192.0	182.0	257.0	195.0	165.0	189.0	157.0	165.0	116.0	156.0	177.0	208.0
2010	187.6	189.0	270.0	241.4	239.9	224.4	192.8	173.6	150.2	159.4	118.6	148.2	144.2
2011	176.8	164.0	207.0	176.0	199.0	156.0	176.0	172.0	198.0	144.0	186.0	183.0	161.0
2012	190.6	186.0	215.0	233.0	240.0	198.0	159.0	153.0	219.0	116.0	175.0	181.0	212.0

Source: Statistical Yearbook of Long An Province, 2012

92. The direction of wind varies with the season. The average annual wind speed recorded is about 1.7 – 2.0 m/s. From November to April, the wind is mainly from northeast while from May to October; the wind is mainly from southwest and brings heavy rainfall to the region. Cyclones, hurricanes and storms in Cuu Long delta is considered to be little but recently due to climate change several sudden natural disasters occurred. In November 2007, typhoon "Lina" landed in the coastal area of southwestern area of Viet Nam causing heavy damage to property. However, the project area is situated quite far from the sea and the effect of typhoons to the subproject sitemay be insignificant.

93. During the last 20 years, climate has varied much. Based on the Climate Change Knowledge Portal of the World Bank Group, monthly mean and historical rainfall and temperature data were taken. For Long An Province, the month of September registered the highest average monthly rainfall (313 mm) and from May to November at least 200 mm was recorded. The months of December to April registered below 100 mm, with February being the least (4.97 mm). In these months, the temperature pattern increased, with January the least (25.44^{o}C) and April the highest (28.76^{o}C)(Figure 7).

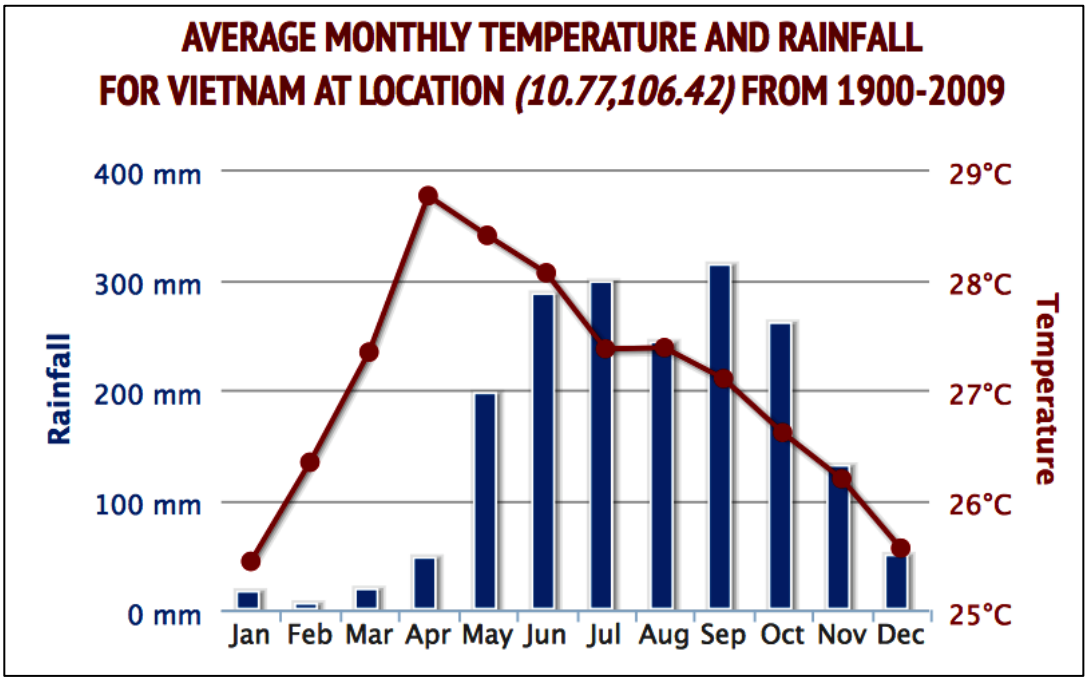


Figure 7: Average monthly temperature and rainfall at Duc Hoc District, Long AnProvince from 1990 – 2009

Source: The World Bank Group Climate Change Knowledge Portal (2015). Average monthly temperature and rainfall for Viet Nam at location (11.08, 106.82) from 1990-2009.http://sdwebx.worldbank.org/climateportal/

E. Water Resources

94. **Surface Water.** Surface water sources in the project area are irrigation systems which are prevalent due to the paddy fields planted with rice and other crops. In Duc Hoa District where the substation is located, the irrigation system flows into and out of the Vam Co Dong River. The river is 1.5 km away from the proposed substation.[8]

[8]Power Engineering and Consulting Joint-stock Company No. 3 (PECC3). Initial Environmental Examination for the

95. The area is located in the delta of Vam Co Dong and Vam Co Tay rivers and has low terrain ranging in height from 0.1m – 6.5m above the sea level. The Province is profoundly influenced by flood heights from Vam Co Dong and Vam Co Tay rivers during the rainy season, which can also be backed up by sea level rise.Because of the low-lying topography, the project areasare affected by flooding from the overflowing of rivers during extreme rainfall events. Canals and dikes provide protection to the area against inundation.

96. The connection lines crossby many canals which serve to both drain and provide irrigation for intensive rice and crops. In the vicinity of the substation is a canal which runs parallel to the Provincial Road N2 and then another, the Xang canal on the north. Photo 3 shows canals in the vicinity of the proposed 500kV substation.

Irrigation canal at western area of S/S

X'angcanal at northern area of S/S

Photo 1: Irrigation canals in the vicinity of the proposed 500kV Duc Hoa substation

97. To examine the quality of surface water in the subproject area, PECC3 contracted Minh Tri Co. Ltd. to take samples for laboratory analysis. The samples were taken at N1: Lang Den canal in Duc Hoa town, Duc Hoa district where the transmission route will pass and another at N2: CauDuyen canal, representing the inner canals where the route cross in Tan Quy commune, Duc Hoa District. The results are shown in Table 16.

Table 16: Results of surface water analysis at the subproject area

No.	Parameter	Unit	N1	N2	QCVN 08:2008/BTNMT
					B1
1	pH	-	6.8	7.1	5.5 – 9.0
2	T^0	^oC	26.4	27.5	-
3	COD	mg/l	21	19	30
4	BOD_5	mg/l	12	13	15
5	TSS	mg/l	45	50	50
6	Total P	mg/l	0.05	0.07	0.3

DucHoa 500 kV Substation and Connections.Unpublished.

No.	Parameter	Unit	N1	N2	QCVN 08:2008/BTNMT
					B1
7	Total N	mg/l	4.5	3.8	10
8	Total Coliform	MPN/100ml	4.7×10^3	4.2×10^3	7,500

Source: Minh Tri Co. Ltd., April 2014

98. The above results show that all parameters of the surface water sampling meet the national standard 08:2008BTNMT column B1. The quality of surface water in the project area is still considered good.

99. **Groundwater.** Due to depositional geology, adequate rainfall, and low-lying topography in the area, the hydrogeological characteristics of the groundwater reserve is quite large, averaging 400,000 m^3/day. The ground aquifer is on average 3 – 5 m from the land surface. It is about 40m thick and produces good quality water. Groundwater abstraction by industries and residential communitiesin the surrounding area is through pumping.

F. Air and Noise Quality

100. Ambient air quality and noise sampling was also performed by Minh Tri Co. Ltd. in April 2014. The representative samples were taken at five (5) sampling stations along the route, namely: K1: substation in Hoa Khanh Dong commune; K2: 500kV transmission line at My Hanh Nam commune, Duc Hoa District; K3: at Km 35, Province Road No. 825, HauNghia Town, Duc Hoa District, near the proposed No. 1, 220kV connection line; K4: near the proposed No. 2, 220kV connection line at ThanhLoi commune, Ben Luc District; and K5: near the No. 2, 220 kV connection line at ThanhDuc commune, Ben Luc District.

101. **Ambient Air Quality.** Total suspended particulates (TSP), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and carbon monoxide(CO) were analyzed. Table 17 presents the results of the ambient air quality sampling.

Table 17: Ambient Air Quality Sampling Results

Sampling Station	Description	TSP (mg/m^3)	SO_2 (mg/m^3)	NO_2 (mg/m^3)	CO (mg/m^3)
K1	Substation in Hoa Khanh Dong commune	0.17	0.065	0.051	2.4
K2	500kV TL at My Hanh Nam commune, Duc Hoa District	0.13	0.054	0.062	3.1
K3	Km 35, Province Road No. 825, HauNghia Town, Duc Hoa District (Connection Line No. 1)	0.11	0.048	0.070	2.8
K4	ThanhLoi commune, Ben Luc District (Connection Line No. 2)	0.12	0.052	0.068	2.3
K5	ThanhDuc commune, Ben Luc District	0.20	0.071	0.075	4.3

Sampling Station	Description	TSP (mg/m^3)	SO_2 (mg/m^3)	NO_2 (mg/m^3)	CO (mg/m^3)
	(Connection Line No. 2)				
QCVN 05:2013/BTNMT		0.3	0.35	0.2	30

Source: Minh Tri Co. Ltd., April 2014

102. Results show that air quality in the area is good and that all parameters are below the permitted levels in QCVN 05:2013/BTNMT.

103. **Noise.** Noise was measured at the same monitoring stations for ambient air quality. The results were compared with the permitted level of noise in the area. Noise levels also show that it is within the limit of 70dBA as prescribed by QCVN 26:2010/BTNMT. At night (2100H to 0500H), the level is expected to be lower.

Table 18: Noise Level Measurements

Sampling Station	Description	Noise, dBA
K1	Substation in Hoa Khanh Dong commune	60 – 62
K2	500kV TL at My Hanh Nam commune, Duc Hoa District	61 – 63
K3	Km 35, Province Road No. 825, HauNghia Town, Duc Hoa District (Connection Line No. 1)	62 – 64
K4	ThanhLoi commune, Ben Luc District (Connection Line No. 2)	63 – 65
K5	ThanhDuc commune, Ben Luc District (Connection Line No. 2)	62 – 65
QCVN 05:2013/BTNMT		70

Source: Minh Tri Co. Ltd., April 2014

G. Biological Resources

1. Flora

104. There are no rare plant species found in the affected areas of the project. Vegetation is mainly rice and cropsin farmlands. Plants such as lemon, sugar cane, and legumes are abundant in the area. However, crops affected by the project include rice, sugar cane and crops in the paddy fields and several mango and lemon trees.[9] The land area of the paddy fields and the number of mango and lemon trees affected are all accounted for. Presented in Table 19 is the summary of the affected plants based on the survey performed on the substation area and on the routes of the connection and transmission lines.

Table 19: Summary of Affected Vegetation in the Subproject Area, m^2

No.	Type of vegetation	Connection lines			Substation
		500kV No.1	220kV No.1	220kV No.2	
1	Rice	693,100	324,800	141,400	133,360
2	Crop field	39,600	108,600	30,480	
3	Fruit (lemon and guava)		15,700	19,200	-
4	Mango		5,680	10,290	-
5	Sugar cane		32,145	278,700	-

Source: Resettlement Action Plan for the Duc Hoa 500kV Substation and Connection Lines. PECC3. Unpublished.

[9] Power Engineering and Consulting Joint-stock Company No. 3. Resettlement Action Plan for the DucHoa 500 kV Substation and Connection Lines.Unpublished.

Rice land at the proposed site of 500kV Duc Hoa substation

Vegetables and other crops in the vicinity of the substation site

Photo 2: Typical vegetation surrounding the proposed 500kV Duc Hoa substation

2. Fauna

105. Based on the survey performed and interviews with key informants, there are no rare animal species found living in the project area.[10]

H. Land Use

106. During the survey process, consultations and agreements had been made with the local authorities about the direction of routes in order to ensure the least impact on houses, land, and people. The direction of routes is approved by the People's Committee of Long An province. Table 20 presents the land uses that will be affected by the 500kV Duc Hoa substation, access road and the areas traversed by the transmission lines.

107. The substation will be located in an area that is primarily agricultural land. The route of the transmission and connection lines will mainly cross agricultural areas that are planted with rice, pineapple, lemon trees, sugar cane and eucalyptus. In Ben Luc District, most of the affected areas are planted with lemon trees, rice and eucalyptus while in Duc Hoa District, there are paddy field, sugar cane, and lemon trees.

Table 20: Affected land uses at the 500 kV Duc Hoa substation and connections

No.	District	Commune	Affected land uses, m^2				Total
			Annual crop	Perennial trees	River/canal & road	Residential area	
Substation and Access Road							
1	Duc Hoa	Hoa Khanh Dong	133,260	-	200	1,500	134,960
500kV connection line							
1	Duc Hoa	Hoa Khanh Dong	6,532	-	-	-	6,532
2		Duc	8,314	-	-	-	8,314

[10]Power Engineering and Consulting Joint-stock Company No. 3 (PECC3). Initial Environmental Examination for the DucHoa 500 kV Substation and Connection Lines.Unpublished.

No.	District	Commune	Affected land uses, m^2				Total
			Annual crop	Perennial trees	River/canal & road	Residential area	
		HoaThuong					
3		Duc Hoa Township	8,908	-	-	-	8,908
4		My Hanh Nam	5,938	-	-	-	5,938
No. 1: 220kV connection line							
1	Duc Hoa	Hoa Khanh Dong	4,850	3,251	-	-	8,101
2		Hoa Khanh Nam	3,397	4,064	-	-	7,461
3		Hoa KhanhTay	2,038	306	-	-	2,344
4		Tan Phu	1,495	1,788	-	-	3,283
5		HauNghia Township	1,767	2,113	-	-	3,880
6		Tan My	2,174	2,601	-	-	4,775
No. 2: 220kV connection line							
1	Duc Hoa	Hoa Khanh Dong	1,958	2,219	-	-	4,177
2		HuuThanh	2,937	3,329	-	-	6,266
3	Ben Luc	ThanhLoi	2,545	2,885	-	-	5,430
4		ThanhHoa	3,328	3,773	-	-	7,101
5		BinhDuc	3,916	4,438	-	-	8,354
6		ThanhDuc	3,524	3,995	-	-	7,519
Total			**196,881**	**34,762**	**200**	**1,500**	**236,333**

Source: Resettlement Action Plan for the Duc Hoa 500kV Substation and Connection Lines. PECC3. Unpublished.

108. There may be impacts associated with land use changes brought about by the project. There are existingand planned industrial zones in the Long An Province, HCMC and nearby provinces. Because of the area's proximity to HCMC, agricultural land continues to be converted for industrial or residential uses.

1. Ecologically protected areas

109. There are no ecologically protected or conservation areas in the vicinity of the substation and along the connection/transmission lines.

2. Cultural and heritage sites

110. Cultural and heritage resources within 500m surrounding the route are rarely found, however, there are several infrastructure such as primary and secondary schools, commune's offices and clinics, which are located more than 500m from the center of the transmission lines. It can be confirmed that the subproject activities will not have an impact on those cultural heritage sites. The PECC3 confirms that the separation distances are acceptable and as such none of these structures will be affected by the subproject. A list of sites in the area and distance from the transmission lines is shown in Table 21.

Table 21: Cultural heritage sites and public infrastructure within 500m of subproject areas/ROW

No	Distances to centre of line		Cultural heritage sites / Public infrastructures	Location
	Left (m)	Right (m)		
No. 1: 220kV connection line				
1		1800	HauNghia High School	HauNghia township, Duc Hoa District
2		2100	HauNghia Martyrs Cemetery	HauNghia township, Duc Hoa District
3		1400	HauNghia Hospital	HauNghia township, Duc Hoa District
4		3500	Duc Hoa High School (3.5km)	Duc Hoa township, Duc Hoa District
No. 2: 220kV Connection Line				
5	3000		HoaThanh clinic	HoaThanh commune
6	4000		ThanhDuc High School	ThanhDuc commune
7		3000	Nguyen TrungTruc temple	ThanhDuc commune
8		2000	ThanhLoi commune office	ThanhLoi commune
500 kV Transmission Line				
9		1000	Martyrs Memorial	Duc HoaThuong commune
10		1500	Spirit temple	My Hanh Nam commune
500 kV Duc Hoa Substation				
11	5000		Elementary school	Hoa Khanh Dong commune
12		3000	Elementary school	Hoa KhanhTay commune
13		1500	Hoa Khanh Dong Committee office	Hoa Khanh Dong commune
14		1500	Commune clinic	Hoa Khanh Dong commune
15		4000	Kindergarten	Hoa Khanh Dong commune
16		6000	LinhPhuoc Pagoda	Hoa Khanh Dong commune

Source: PECC3

3. UXO Contaminated areas

111. The risk of encountering unexploded ordnances (UXO) and land mines is most significant in the southern region of Viet Nam due to previous decades of war.The presence of UXO was confirmed by Long An and Tien Giang military commands in which the ROW is located. The military commands told PECC3 that UXO clearance is necessary before construction. Appendix 4 presents the letter from the Military Zone 7, Long An Province No. 369/QSLA on UXO clearing dated April 7, 2010.

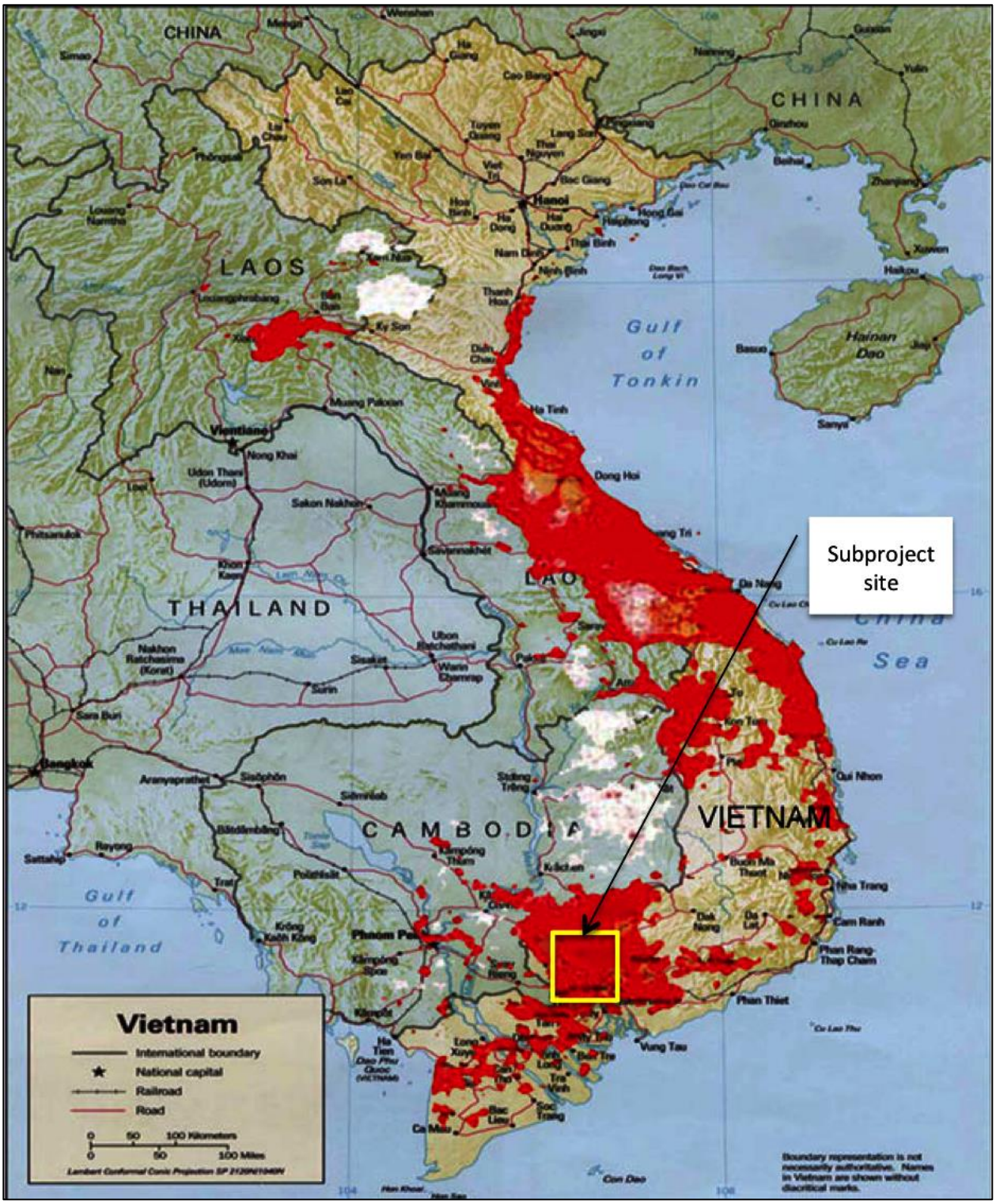


Figure 8: UXO contamination in Viet Nam

Base map: http://www.jmu.edu/cisr/journal/17.1/notes/images/171N_YenT_Fg1.jpg

I. Socio-Economic Condition

1. Population

112. As of 2012, the population of Duc Hoa district is 227,563 persons, of which 116,660 (51.2%) are female. The population density is 476 person/km^2, which is higher than the Long An provincial density of 323 person/km^2. The population is unevenly distributed, often concentrated in the towns and along the main roads. The highest population is concentrated in the towns of Duc Hoa, HauNgia and HiepHoa.

113. Almost all of Duc Hoa District population belongs to the Kinh group, representing 99% of the total population. The other groups are composed of the Khmer, Cham, Chinese, and Nung ethnic groups.

2. Economy

114. In recent years, Duc Hoa District continues to become more and more industrialized and urbanized. A 2010 statistics show the strong proportion of the industrial sector in the local gross domestic product (GDP), with almost 69% as compared to 17% in agriculture and 14% in services and trade. There are five industrial parks and 14 industrial clusters, with over 1,500 companies operating. The largest industrial park in the province has about 35,000 workers.

115. Table 22 lists the industrial zones in Duc Hoa District while Figure 9 presents the location of industrial zones in Long An Province and adjacent provinces.

Table 22: List of industrial zones in Duc Hoa District

No	Industrial zone	Area (ha)
1	Duc Hoa 1 – HanhPhuc	274.33
2	Duc Hoa 2 – Xuyen A	483.13
3	Duc Hoa 3	2300
4	Tan Duc	569
5	Duc Hoa Dong	500

Source: PECC3

116. The dominant cultivated crops are rice, beans, corn, and vegetables. Due to the low productivity and income from farming, a large number of farmers seek work in other sectors. As of April 2015, only 20.9% of households work in farms and 79.1% are now into commerce and services in 159 self-operated shops. The district's poverty level is low with 33% in 2014. Table 23 presents the income and poverty levels in Duc Hoa District.

117. The local handicraft industry and trade in Duc Hoa District remains at a steady state and generates low revenue. These activities are diverse and involve bamboo bucket weaving, production of bamboo screen, palm-leaf conical hat, fish sauce, rice milling, farm product processing, among others. Although small-sized and diverse, the handicraft industry helps generate jobs and income for farmers in off-season. On the average, a household can employ 2 – 3 workers and a production unit creates jobs for 20 – 25 people.

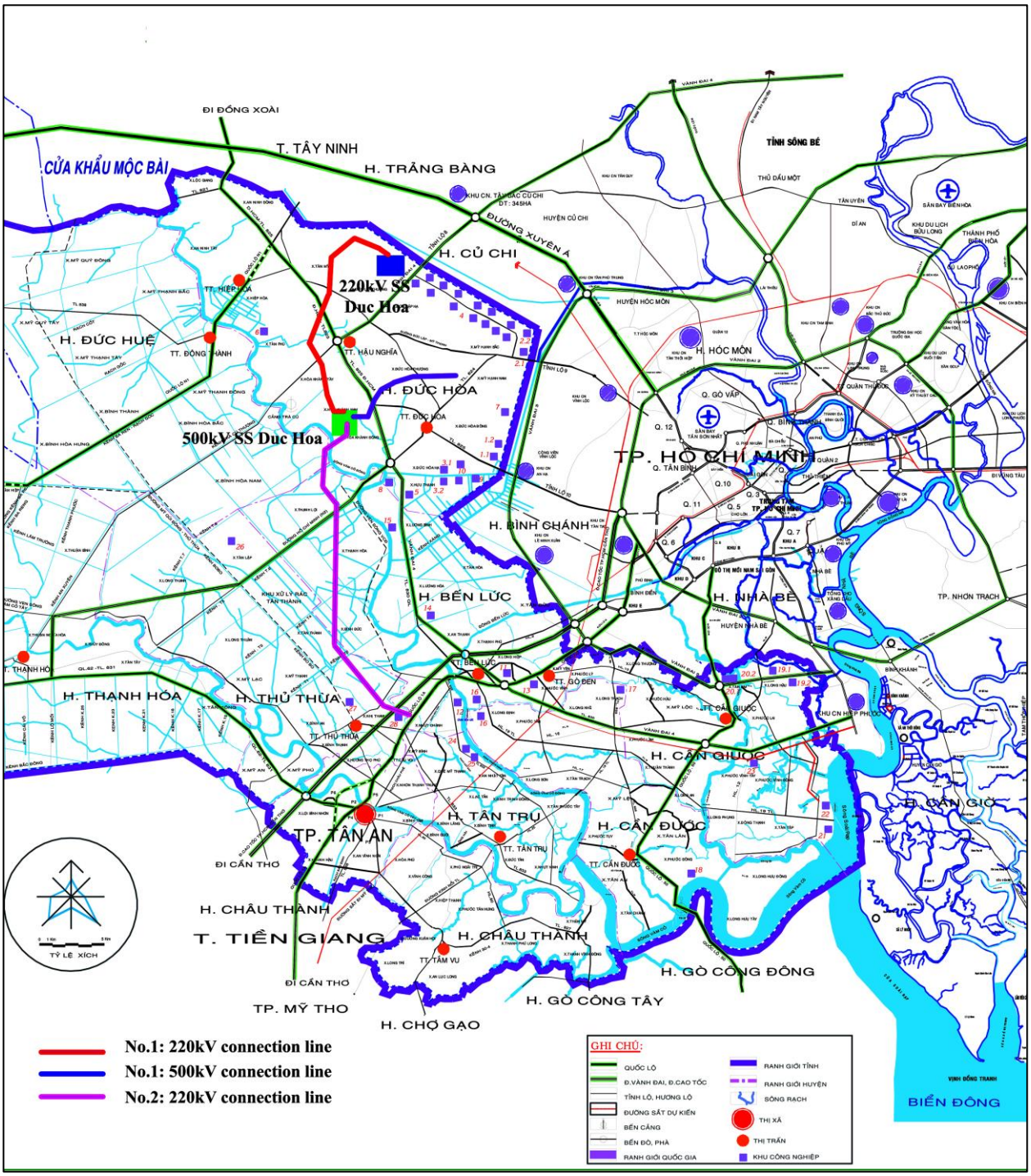


Figure 9: Industrial zones in Long An Province and adjacent provinces
Source: PECC3

Table 23: Income and Poverty in Duc Hoa District, 2014

No	Commune/Town	No. of households	Monthly income (VND)	No. of poor households
1	Tan My	2691	4,200,000	403
2	Tan Phu	2451	3,060,000	123
3	HauNghia Town	1851	4,350,000	37
4	Hoa KhanhTay	2344	4,500,000	117
5	Hoa Khanh Nam	1551	4,150,000	31
6	Duc Hoa Town	2487	2,500,000	373
7	Duc HoaThuong	2514	3,100,000	126
8	My Hanh Nam	3151	4,800,000	63
9	Hoa Khanh Dong	2811	2,150,000	27
10	HuuThanh	2757	2,400,000	45
	Total	24608		819

3. Power and Water Supply

118. The subproject area is supplied by 11 water systems, which cover 83% of the District's households (Table 24). The main water source by households is shallow wells. There are about 50,000 wells with depths ranging from 150 – 250m.

119. In terms of electricity, as of 2015, 100% of commune households have access to electricity.

Table 24: Water supply in Duc Hoa District, 2015

No	Commune/Town	Total HHs	Tap water	Drilled well	Dug well	Rivers, ponds, streams
1	Tan My	2691	2557	81		53
2	Tan Phu	2451	2156	221		74
3	HauNghia Town	1851	1795		37	19
4	Hoa KhanhTay	2344	2227	70		47
5	Hoa Khanh Nam	1551	1504		31	16
6	Duc Hoa Town	2487	2350	94		43
7	Duc HoaThuong	2514	2389		50	75
8	My Hanh Nam	3151	3056		63	32
9	Hoa Khanh Dong	2811	1176	963	672	
10	HuuThanh	2757	1369	1253	135	

4. Health

120. **HealthcareFacilities**. The location of Duc Hoa substation and connection lines is close to HCMC which means that the communities have good access to medical services. Local medical facilities include healthcare stations at the commune level, which has first aid and medical assistance services for minor illnesses and maternal services. Medical emergencies

are referred to district hospitals while the more complex surgery is carried out in the main hospitals in HCMC.

121. **HIV/AIDS**. The incidence of HIV/AIDS in HCMC is the highest in Viet Nam. According to the "Analysis and Advocacy" project of the USAID, the total number of people living with HIV in HCMC is expected to rise from 72,400 in 2006 to 89,900 in 2010 and 105,800 in2020. In 2006, there were about 4,800 new AIDS cases in HCMC. In 2012, there were about 1,099 new cases, which is 18.5% of the total new cases in the entire country.[11] The number of people with HIV is 49,429 people according to statistics in the first quarter of 2012. Table 25 presents the HIV/AIDS statistics.

Table 25: HIV/AIDS Statistics in the Southeast Region (2011)

Southeast Region	New cases in 2011		Accumulation as of December 31, 2011		Number of AIDS deaths
	HIV infected people	AIDS patients	HIV infected people alive	AIDS patients alive	
Binh Duong	108	71	2455	691	18
BinhPhuoc	100	52	1423	341	13
Ba Ria – Vung Tau	342	75	4157	657	76
Dong Nai	250	123	4926	623	42
TayNinh	230	231	1985	682	68
Ho Chi Minh City	1,943	1,470	46,507	17,826	481
Southeast Region Total	2,973	2,022	61,453	20,820	698
Country Total	14,113	6,429	197,072	48,717	2,413

Source: General Statistics Office of Viet Nam. 2015. Number of people infected with HIV/AIDS and number of AIDS deaths by province. http://www.gso.gov.vn/

5. Education

122. The education system in Long An province covers pre-school to tertiary level. At the provincial level, there are 422 schools from elementary to high school; 2 universities and 6 technical and vocational colleges. There are 32 educational institutions in Duc Hoa District, of which 10 are kindergarten schools, 11 elementary schools, 9 secondary schools, and 1 high school. 100% of children of schooling age receive education.

6. Communications

123. Many telephone networks such as Viettel and VNPT telecoms serve the area. Communication services are conveniently available.

7. Transportation

124. Infrastructure development for transportation is constantly being improved in the area to improve access and the standard of living of people. The road network is reasonably well-developed throughout the subproject area. A network of provincial, district, commune and village roads serve the community. Roads in the substation area are linked to many important roads such as the Provincial Road No. 2, which are then linked to district and commune roads.

[11] According to the report No. 755/BC-BYT, Ministry of Health dated September 4, 2012

V. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Methodology

125. Formal disclosure to stakeholders about the proposed 500 kV Duc Hoa substation and connectionsoccurred during the preparation of the initial environmental examination (IEE). A stakeholder consultation strategy was developed to meet the requirements of conducting meaningful consultation with stakeholders as stipulated by the ADB SPS (2009). The strategy embodied the principles of meaningful engagement, transparency, participation, and inclusiveness to ensure that the affected and marginalized groups such as women and the poor are given equal opportunities to participate in the planning of the subproject.

1. Identification of Stakeholders

126. Stakeholders were identified and were engaged in a participatory manner. Stakeholder consultation focused on institutional stakeholders, affected communities, and persons directly affected by proposed subproject interventions. The stakeholders of the subproject which have been identified include:

a) Institutional stakeholders such as: (i) People's Committee and Commission (PCC), (ii) District People's Committee (DPC); (iii) Project EA, (iv) PECC3, and (v) commune leaders.The Project EA and PECC3 provided information for the design of the subproject and in the implementation of measures and interventions;

b) Mass organizations such as Women's Union and Farmer's Union;

c) Affected households and businesses along the transmission lines and near the substation site who may be directly and/or adversely affected, and who have an interest in the identification and implementation of measures to avoid or minimize negative impacts; and

d) Other institutions or individuals with vested interest in the outcomes and/or impacts of the subproject.

2. Public consultation meeting

127. Consultation meeting with the People's Committee and Commission was previously held by the Vietnamese EIA team (PECC3) in October 2014. Follow-up formal community consultation meetings were again held to discuss the location and potential impacts on the environment and people of the 500 kV Duc Hoa substation and connections. The community consultation meeting was held on March 18 to April 3, 2015 at 14 communes in Ben Luc and Duc Hoa districts.

128. The public meeting consisted of the following component procedures:

a) The engineering consultant introduced the subproject, including the substation location and design.
b) The environmental consultant presented ADB's environmental policy, safety regulations in Viet Nam power sector, anticipated environmental impacts and mitigation measures to

be developed in the IEE, the grievance redress mechanism for environment and resettlement issues;
c) The social/resettlement consultants presented ADB's resettlement policy, impacts due to acquisition of land and properties, policies of the GOV and local authorities, the subproject's policies on compensation as required by the State;
d) Open discussion of issues and concerns by the stakeholders.

B. Issues and Concerns Raised During the Public Consultation

129. During the meeting, the participants raised their questions and comments on the subproject. The PECC3 consultants and IEE national consultant answered and explained all questions to the participants. While some locals directed their concerns on the proposed components of the subproject, a larger number of the concerns were related to the adverse impacts from operation of the substation and transmission lines. The following are the comments raised by during the consultation meetings:

a) The local commune authorities agree and support the subproject but want to know the details of the resettlement plan as soon as possible so that people can plan in advance. The compensation and resettlement schedule should be provided soon.
b) The effects during construction on roads, plants, wastes, and disposal of oil/grease should be reduced.
c) The local people need to be informed about the results of the EIA and also the EMP.
d) Construction methods to reduce dust and pollution should be implemented.
e) Information on the effects of electromagnetic field to human health.
f) Construction activities may affect farming.
g) Safety of the transmission line should be assured during special weather conditions such as typhoon or heavy rains and also the possible effects to people near the ROW.
h) Compliance with the vertical safety clearance.
i) Compensation for damage to plants and roads during construction.
j) SPPMB needs to provide the details of the construction schedule.
k) There should be a method to minimize the effects of materials handling.

130. The summary of the comments and questions from the authorities and local people and the responses from the consultants are summarized in Table 26.

C. Follow-up Stakeholder Consultations

131. Follow-up consultations will be managed through the Grievance Redress Mechanism of the subproject. In addition, as part of the information disclosure strategy, the IEE/EMP must be readily available to stakeholders in local Vietnamese language. The IEE should be available on the NPT and SPPMB offices and at the substation site. Similarly, all subproject environmental reports with specific reference to minutes of stakeholder consultation, environmental monitoring, and reports on EMP implementation submitted by the SPPMB and the Power Transmission Corporation (PTC) No. 4 should be available at the same offices.

Table 26: Summary of Issues and Concerns Raised by Stakeholders and Responses from Consultants and SPPMB

Location and time	Comments/questions from local authorities[12]	Responses of SPPMB and consultants	Project Response[13]
Duc Hoa Ward- District Duc Hoa- Long An Province March 25, 2015	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
	Local commune agrees and supports the project but wants to know in detail the resettlement plan as soon as possible to have better life arrangements.	People will know about the information at least 6 months before the commencement of construction	As per RP
ThanhHoa Ward- District Ben Luc- Long An Province March 19, 2015	What will be done to reduce the effects during construction on roads, plants, oil/grease, and waste?	Construction work will be conducted at short sections each for one day. Wastes will be collected and roads will be fixed. Compensation will be applied for 100% of all damage or loss of tree, vegetation, houses or construction.	As per EMP As per RP
	Local people need to be informed about the environmental impact assessment	As regulated on Decision 29/ND-CP, SPPMB will post the approved EMP in the Committee office before doing construction.	The conditions will be included in contract with the construction Contractor.
	What are the construction methods to reduce dust and pollution?	We will follow the approved environmental methods in minimizing dust and air emissions.	The conditions will be included in contract with the construction Contractor.
	What are the effects of electromagnetic fields to the human health?	Impacts of electro-magnetic field on human health and infrastructures under the corridor of the line were discussed with local people, and that if the height of houses under the safety corridor meet electrical safety regulations, they shall be allowed to exist.	Included in EMP during operation phase of project

[12] Questions, issues raised during public consultation meetings recorded in table as received
[13] Issues to be addressed by EMP

Location and time	Comments/questions from local authorities[12]	Responses of SPPMB and consultants	Project Response[13]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
Hoa Khanh Dong Ward- District Duc Hoa- Long An Province 24th March 2015	Will the construction affect farming?	We will try to minimize affected land by undertaking clearing and construction works during dry season. Compensation will be applied to all losses.	Included in the contract with Contractors
	Will the T/L have effects on human life? Is it safe in special weather conditions such as typhoon or heavy rains?	We included in the design the safety methods under expected weather conditions.	According to design.
	During operation phase of T/L, can the people live and plant trees as usual?	The minimum vertical clearance of 6m for houses, trees, and other structures will be designed in the ROW, in accordance with GOV requirements. Land will be permanently acquired by SPPMB for the construction of the tower foundations and the area for the substation. Tall trees within the ROW will be removed as necessary to comply with the minimum conductor clearance. In addition, to maintain conductor clearances and to establish safe operating distances within 16 – 60m wide of each side for the earthing zone, households will be required to install lightning arresters.	As per design and safety guidelines of NPT.
BinhDuc Ward- District Ben Luc- Long	How many meters is the safety height?	The minimum height is 18m from the line to the surface of 220 KV, and the safety distance is 6m so the house can be constructed up to 12m in	Included in the design of project

Location and time	Comments/questions from local authorities[12]	Responses of SPPMB and consultants	Project Response[13]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
An Province March 25, 2015		height.	
	How to solve the problem of the electro-magnetic effect to human health and household electric equipment?		Included in EMP
Hoa Khanh Nam Ward- District Duc Hoa- Long An Province 26th March 2015	Compensation and resettlement schedule should be provided soon to have a better plan for living and livelihood.	To prevent these hazards, SPPMB needs to implement the following improvements: • Regularly check compliance of the transmission lines with the safety clearances. • Conduct monitoring of EMF levels along the lines • Provision of warning signs at transformer towers, particularly in built-up areas • Grounding of conducting objects such as fences or other metallic structures near power lines	Included in EMP
Hoa KhanhTay Ward- District Duc Hoa- Long An Province March 27, 2015	How big is each foundation?	60-80m^2	As per design
	Will the affected plants and roads be compensated during construction phase?	The affected plants and roads will be avoided as much as possible. Compensation will be done for any losses.	Included in the contract with Contractors
	Will houses under ROW removed?	During the final design of the transmission line, it will be sited to avoid houses to the maximum extent possible. The minimum vertical clearance of 6m for houses, trees, and other structures will be designed	Follow NPT safety guidelines

Location and time	Comments/questions from local authorities[12]	Responses of SPPMB and consultants	Project Response[13]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
		in the ROW, as allowed in Viet Nam. Land will be permanently acquired for the construction of the tower foundations and area for the substation.	
HuuThanh Ward- District Duc Hoa- Long An Province March 30, 2015	Specific construction schedule is necessary	Local people will be informed of construction schedule in advance.	As part of continued public consultation, the affected community will be given the schedule of all construction activities
	Should have the method to minimize the effect of material handling	Water spray to minimize the dust Fix the road if causing damage	Included in the EMP
Duc HoaThuong Ward- District Duc Hoa- Long An Province March 31, 2015	Will the construction and operation of T/L affect farming and living conditions of people?	The impact of the project on agricultural land comprises of loss of flat, agricultural land that is being used to plant rice and other crops. There are no trees in the affected land. Compensation for the loss of agricultural production will be paid to the affected households according to the resettlement action plan.	Included in the EMP
	Will the house under ROW be removed?	During the final design of the transmission line, it will be sited to avoid houses to the maximum extent possible. The minimum vertical clearance of 6m will be designed and maintained.	Follow the Electricity Law
	What are the effects to life and farming during construction phase?	The impact of the project on agricultural land comprises of loss of	Included in EMP

Location and time	Comments/questions from local authorities[12]	Responses of SPPMB and consultants	Project Response[13]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
		land planted with rice and other crops. Compensation will be paid for affected land.	
	How many meters is the safety height? What are the safety conditions to live and plant under ROW?	The minimum height is 18m from the line to the surface of 220kV and the safe vertical distance is 6m so the house can be constructed up to 12m in height.	Included in the design of the transmission line
My Hanh Nam Ward- District Duc Hoa- Long An Province April 1, 2015	Local people need to be informed about safety level of the T/L to human health when passing My Hanh Nam Committee	According to Decision 29/ND-CP, SPPMB will post the approved EMP in the Committee Office before doing construction.	This will be included in the contract conditions with the construction Contractor.
	The farming under ROW during operation phase is safe or not?	It is safety if there is full compliance with the safety regulations of the Electricity Law.	Follow NPT safety guidelines
HauNghia Ward- District Duc Hoa- Long An Province April 2, 2015	Agree with the suggestions		
Tan My Ward- District Duc Hoa- Long An Province	How many meters is the width of safety corridor? Can farming and planting be applied in this area?	The minimum height is 18m from the line to the surface of 220kV and the safety distance is 6m. House can be constructed up to 12m in height. Farming and planting can be allowed as long as safety clearance is	Included in the design of the project

Location and time	Comments/questions from local authorities[12]	Responses of SPPMB and consultants	Project Response[13]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
April 3, 2015		complied.	
	Can we construct the house under ROW during operation phase of the 220 KV T/L?	The minimum vertical clearance is 6m for houses, trees and other structures.	Based on Electricity Law
	What are the effects of electromagnetic field to human health?	Impacts of EMF on human health and infrastructures under the corridor of the line were discussed with local people. If the height of houses under the safety corridor meets the electrical safety regulations, they shall be allowed to exist.	Included in the design and EMP
Tan Phu Ward- District Duc Hoa- Long An Province April 4, 2015	Can the project support to upgrade house under ROW?	We will support.	Included as part of the contract with Contractors and compensation policies of SPPMB
	Explain more about the direction passing thru Committee	Route was explained further using map of the alignment.	
Conclusion	All 14 Ward People's Committee (CPC), and affected households agree and will support the construction of 500 KV Duc Hoa substation and connection lines		Follow-up consultations of community views of subproject will occur.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

132. The environmental impacts were identified based on the project activities that may occur in each environmental component and by evaluating the environmental and social baseline situation at the subproject area. The identification of environmental impacts was mainly based on the technical information related to project components design and operation, field visits, information from stakeholder consultations, and the ADB REA checklist of potential impacts of the subproject.

133. The impacts are presented according to those that are related with the design, selection and location of the project facilities; impacts associated with construction activities; and impacts related to the actual operation of the substation.

A. Anticipated Benefits from the Project

134. The 500 kV Duc Hoa substation and connections will be beneficial to Long An Province, HCMC and other neighboring provinces. The subproject will ensure development of power in the area, improve reliability and continuity of supply, and reduce power outages. The implementation of the subproject is in line with the socio-economic development direction of the province, whereby investment in electricity development is prioritized to meet the demand in the industrial sector and the general public.

B. Impacts Related to Pre-Construction Phase

135. The potential impacts during the design and pre-construction phase of the project are related to the siting and survey of the substation site, road and alignment of the connection lines. There is potential for the substation, access road and connection lines to affect houses, canals, agricultural land, river, and national/district/commune roads. The construction of the towers may also have visual impacts for local residents.

1. Land acquisition and damage to vegetation and crops

136. **Impacts.** A total of 236,267 m^2 of land will be permanently affected by the construction of the 500kv substation and the transmission line towers while about 2,009.108 m^2 will be temporarily acquired for use as material storage site or temporary access road during the construction of the project and the transmission line corridor. Table 27 shows the area of land that will be permanently acquired and temporarily affected by the project.

Table 27: Affected Property

No.	Iterm	Total Affected Land (m^2)	
		Permanently Affected Land (m^2)	Temporarily Affected Land (m^2)
1	500 kV substation	134,960	
2	Transmission lines:		
2.1	- 500kV transmission line	29,692	708,308
2.2	- 1st 220 transmission line	29,845	585,600
2.3	- 2nd 220 transmission line	41,770	715,200
Total		**236,267**	**2,009,108**

137. **Mitigation Measures.** During the final design of the transmission line, it will be sited to avoid houses to the maximum extent possible. The minimum vertical clearance of 6 m for houses, trees, and other structures will be designed in the ROW, as allowed in Viet Nam. Land will be permanently acquired for the construction of the tower foundations and area for the substation by SPPMB. Tall trees within the ROW will be removed as necessary to comply with the minimum conductor clearance. In addition, to maintain conductor clearances and to establish safe operating distances within 16 – 60m wide of each side for earthling zone, households will be required to install lightning arresters.

138. Landowners will be compensated for temporary loss of access to crop areas during conductor stringing and damage brought about by transportation of materials to sites. The SPPMB will design and provide an appropriate land acquisition and compensation plan for the affected areas of the substation, ROW of the connection lines and access road in accordance with ADB and the national requirements.

2. Impact on aesthetics

139. The impact of the project on aesthetics has not been identified as a significant issue in the local context. There are existing transmission lines in the vicinity and the construction of the new lines will not have a significant effect to the aesthetics of the project area.

3. Impact on drainage and flooding

140. **Impacts.** The substation area and ROW of the connection lines are located in low-lying and flat areaswhichare reportedly vulnerable to inundation. Some areas of the province are subject to flooding during the rainy season, which lasts from the beginning of August until November. The overflowing of the major rivers of Vam Co Dong and Vam Co Tay makes the area susceptible to floods resulting from sea level rise due to climate change.

141. **Mitigation Measures.** According to the design, the substation will require the establishment of a raised platform to ensure adequate protection of the facility in the event of flooding.

142. The existing drainage system associated with the surrounding agricultural land is composed of network of irrigation and canals. The design of the substation will ensure that the existing canals will be protected and where necessary additional drainage diversion structures will be included in the works. This is to ensure that the construction and operation of the substation will not have significant impact on existing canals and adjacent land.

C. Impacts and Mitigation during Construction Phase

143. Construction activities will include excavation of the oil containment and transformer pad, filling, movement of construction vehicles, operation of heavy equipment, and installation of electrical equipment. Construction activities of the proposed subproject are expected to generate the following impacts:

a) Sediment generation and soil runoff caused by excavation and earthworks
b) Effect on air quality from vehicle and equipment exhaust and dust generated from construction activities
c) Noise and vibration caused by vehicle and equipment
d) Contamination of soil and groundwater due to spill or leakage of construction chemicals

e) Effect on rice fields, cropland, and canals, from disposal of construction wastes, including domestic waste
f) Traffic hazards and road degradation during the transport of heavy construction equipment and materials
g) Effect on health and safety of workers.

1. Impact of borrow sites

144. **Impacts.** The establishment of an elevated substation platform and access road will be necessary to level the substation and access road with the existing Provincial Road N2. Suitable fill materials for soil embankment from quarry or borrow pit will be required to establish the platform.

145. There are a number of potential impacts associated with the establishment of quarry/borrow pits. These include the loss of land values, potential loss of vegetation and wildlife, loss of aesthetics, soil erosion, and impact of the downstream water quality.

146. **Mitigation Measure.** The Contractor will be required to source the fill materials only from approved borrow area which has already been approved by the Government.

2. Soil runoff

147. **Impacts.** The No.2 220 KV connection line will affect a river crossing in Vam Co Dong River and an irrigation canal. The river is located approximately 1.5km at the southern section of the substation site and is also likely to be the receiving point of potential runoff from the substation. The irrigation canal is located about 700m on the south and is bordered by rice land areas. Runoff may be transported to the irrigation canals and creeks causing sedimentation and turbidity, i.e. reduction of water quality. The adjacent rice plantations and cropland at the substation site may also be affected by soil runoff coming from the construction activities.

148. The canals and agricultural land in the immediate vicinity and along the ROW of the transmissions lines will also likely be impacted to some extent by runoff and from frequent movement of vehicles to the sites during the construction phase. Appropriate mitigating measures to prevent soil runoff will be required during the construction phase.

149. **Mitigation Measures.** Timing is also one of the critical factors involved in erosion and sedimentation control in construction sites. Careful scheduling of construction operations can minimize the exposed area during the rainy season. Site clearing, earthworks, and other civil works will be scheduled during the dry season.

150. In order to prevent erosion and runoff of sediments, silt traps or temporary sedimentation facilities should be set-up to trap and settle out runoff from the construction area. Likewise, temporary barriers and trenches should be constructed around the stockpiles of materials to control surface runoff.

151. The effect of sedimentation during project construction is only temporary. Upon completion of the construction stage, exposed surfaces will be concreted while other areas will have trees and plants as part of the architectural landscape.

152. The Contractor will be required to institute proper preventive and control measures that includes the following:

a) Excavation activities should be scheduled during the dry season.
b) Stockpile of excavated soil may be covered and stabilized to prevent runoff.
c) Provide sediment trap or inlet protection (fabric barriers around inlet entrances or block and gravel protection) to slow runoff velocity and catch sediment and other debris at the drain inlet.

3. Impact of fugitive dust and other emissions

153. **Impacts.** Air quality can be affected by the operation of vehicle and equipment, excavation and backfilling of soil, and transport of materials. There will be exhaust gas emissions containing TSP, SOx, NOx, and CO during operation of vehicle and equipment. Dust generation is expected with an increase in TSP ground level concentration due to earthworks, contact of machinery with bare soil, and exposure of bare soil and soil piles to wind.

154. Use of vehicle and equipment will be periodic and temporary. Therefore, impact on air quality to the community is low and localized within the substation site and at tower locations. Directly affected receptors are the residents living near the access roads to the construction sites.

155. **Mitigation Measures.** Best management practices will be applied to minimize impacts coupled with effective environmental monitoring. An Air Emission and Dust Control Plan will be prepared and implemented by the Contractor as part of the Construction Environmental Management Plan (CEMP). Mitigation measures to be applied include:

a) Stockpile of excavated soil will be covered and kept moist.
b) Vehicles and equipment will be maintained regularly to ensure emissions comply with the standards.
c) Construction materials such as cement, sand and aggregates will be covered during transit and while stored on-site.
d) Burning of waste materials will be prohibited.
e) Inform and educate workers on the Air Emission and Dust Control Plan in the CEMP prior to start of construction works.
f) Require construction haulers to cover materials with tarpaulin or other suitable materials during transport of materials.
g) Impose speed limits on construction vehicles.

4. Noise and Vibration

156. **Impacts.** Noise and vibration are generated by activities such as operation of earthmoving and excavation equipment, concrete mixers, and cranes. Furthermore, vehicles transporting construction materials will add to the average noise level along the transport route. Immediate and nearest receptors are households and establishments along routes of materials transport. Impacts may be immediately felt by these receptors and can create nuisance to the normal living conditions.

157. Noise produced during construction within the substation site and transmission line towers will have negligible impact on the community because the villages are located far from the site to be affected by construction noise. However, noise due to the movement of vehicles along the village access road and also some areas along the ROW of the transmission lines may potentially result to nuisance.

158. **Mitigation Measures.** Measures that can be applied to minimize impacts of noise and vibration are:

a) Operate construction equipment only at daytime and minimize works at night.
b) Install suitable mufflers on engine exhausts when appropriate
c) Maintain regularly all vehicle and equipment to ensure good-working condition.
d) Require drivers to minimize blowing of horn and to comply with speed limits, particularly when passing through residential areas.
e) The Contractors should coordinate with the concerned communities on the agreed schedule of construction and transport of materials.

5. Spill or leakage of hazardous construction chemicals

159. **Impacts.** Hazardous chemicals such as oil, grease, fuel, paint, lead-acid batteries, etc. will be used during construction. Improper management, storage, handling, and use can lead to spill or leakage to the soil, groundwater, and biological resources. Impact of a spill is high although localized for a short-term.The rice and crop plantations and irrigation canals should be protected against disposal of any waste materials as advised during the consultation meetings.

160. **Mitigation Measures.** A Hazardous Chemicals Management Plan will be prepared and implemented by the Contractor as part of the CEMP. Mitigation measures to be applied include:

a) Minimize, if not avoid, storage of hazardous materials onsite.
b) Implement proper labeling and storage in leak-proof containers, on areas with concrete surface and secondary containment to prevent potential spills and leakages reaching soil or groundwater.
c) Display the Materials Safety Data Sheet (MSDS) of all hazardous chemicals used in work areas.
d) Designate areas of impervious surface for equipment services and refueling.
e) Provide oil and grease traps.
f) Provide portable spill containment and cleanup equipment.
g) Train workers on safe use, handling, storage, disposal, and spill response for the hazardous chemicals.
h) Provide workers with personal protective equipment (PPE).
i) Inform and educate workers about the Hazardous Chemicals Management Plan in the CEMP prior to the start of construction.

6. Generation of construction wastes

161. **Impacts.** Different types of construction wastes are expected from project construction. These are domestic solid waste, domestic wastewater, inert construction waste, hazardous waste, and excavated soil.

a) **Domestic solid waste.** In general, construction workers generate the domestic solid waste,which may include food wastes, plastic and glass bottles, paper, cardboard, and packaging wastes, among others. The impact is considered low, localized and short-term.

b) **Domestic wastewater.** The direct discharge of domestic wastewater by construction workers may result to unsanitary conditions within the substation. There will be about

269 workers during the construction phase, which will generate approximately 51 m^3/day of wastewater. If disposed untreated, the wastewater will cause degradation of water quality and contamination of groundwater that may lead to spread of water-borne diseases.

c) **Inert construction waste.** These wastes can be scrap wood and metals, cement bags, aggregates and concrete debris, among others. These wastes are generally disposed of and/or landfilled in appropriate sites and represent no direct danger to health and thus considered of low impact.

d) **Hazardous waste.** Hazardous waste may include contaminated soils and machinery maintenance materials such as oily rags, used oil filters, used oil, empty paint and solvent containers, spent batteries, and spill cleanup materials. Potential release activities may be during storage, transfer, and disposal of these wastes. Wastes generated are anticipated to be small yet harmful to the environment and public health. The impact is considered high and localized for a short-term.

e) **Excavated soil.** Most of the excavated soils are intended as fill material onsite.There is no anticipated waste from excavated soil.

162. **Mitigation Measures.** The Contractor will be required to prepare and implement a Waste Management Plan as part of the CEMP. Mitigation measures to be applied include:

a) Provision of adequate onsite sanitation facilities to prevent untreated sewage from being channeled into the drainage canals, irrigation canals, river and on land.
b) Implementation of appropriate solid waste and construction waste collection and disposal system, with provision for stringent waste segregation of hazardous and non-hazardous waste.
c) Designation of areas of impervious surface for equipment services, refueling, and wash down. The maintenance area should be provided with oil and grease traps to prevent oil from being washed into the offsite drainage canals.
d) Prohibit burning of wastes.
e) Provide properly labeled waste disposal bins.
f) Implement proper labeling and storage in leak-proof containers for hazardous wastes, on areas with concrete surface and secondary containment to prevent potential spills and leakages reaching soil or groundwater.
g) Contract only an accredited company by MONRE for wastes collection, transport and disposal.
h) Provide oil and grease traps.
i) Provide portable spill containment and cleanup equipment.
j) Inform and educate workers on the Waste Management Plan in the CEMP prior to start of construction.

7. Traffic hazard and road degradation

163. **Impacts.** There will be increase movement of heavy vehicles to the site during the transport of materials and equipment. This will result to an increase in risk of traffic-related accidents and injuries to local communities and local road degradation. Local road networks particularly the 2-lane commune roads to the substation and transmission lines and Provincial Road No. 2,will be used and large vehicles containing special loads may cause traffic if unplanned and uncontrolled.

164. Road degradation particularly of the commune road is anticipated due to use of cranes (10 and 90 tons) and repeated use of trucks (5 – 15 tons) for transport of other construction materials. Delivery of construction materials by trucks is only for a short and intermittent period of time. For the 90-ton crane, it will only be used once during transformer installation. Duration of use will be within the day the transformer is delivered onsite. Therefore, impacts on traffic are anticipated to be moderate and short-term.

165. **Mitigation Measures.** The Contractor will be required to prepare and implement a Traffic Management Plan as part of the CEMP. Mitigation measures to be applied will include:

a) Schedule of movement of heavy vehicles will avoid peak hours of local road network wherever practicable.
b) Monitor traffic at access roads to ensure project vehicles are not causing congestion.
c) Ensure vehicles are maintained regularly.
d) Implement road safety training and adherence to speed limits.
e) Rehabilitate any damage to existing roads that may be caused by the movement of construction vehicles to the site.
f) Manage traffic by posting warning signs and assigning flag persons to direct traffic on affected roads.

8. Impact on health and safety

166. **Impacts.** Construction activities may cause harm and danger to the lives and welfare of workers.Hazards during project construction and equipment installation include exposure to electromagnetic field (EMF), live power lines/equipment, chemicals and fire and explosion. General construction impacts include physical hazards, trip and fall hazards, exposure to dust and noise, falling objects, and ergonomic injuries and illnesses. These impacts are anticipated to be high during line synchronization.

167. **Mitigation Measures.** The Contractor will be required to prepare and implement a Health and Safety Plan as part of the CEMP. Mitigation measures to be applied will include:

a) Implement associated plans and mitigation measures previously mentioned as part of the CEMP (Air Emission and Dust Control Plan, Hazardous Chemicals Management Plan, Traffic Management Plan, and Waste Management Plan).
b) Contractor must prepare and implement an Electrical Safety Plan; Fire Prevention, Safety and Management Plan; Education and Awareness Plan for HIV/AIDS and other STDs; and Integrated Control Strategy for Mosquito and Other Arthropod-borne Diseases as part of the Health and Safety Plan of the CEMP.
c) Provision of first-aid facilities readily accessible by workers.
d) Post safety signs, reminders, or warning notices at visible areas onsite.
e) Follow electrical safety regulations and good practices.
f) Hire only trained and certified workers on electrical works.
g) Plan work site layout to minimize need for manual transfer of loads.
h) Provide appropriate and accessible fire-fighting equipment.
i) Ensure unobstructed access of fire responders and egress of vehicles.
j) Provide security personnel in areas where appropriate.
k) Strictly implement a “No Alcohol and Drug Policy”.
l) Prohibit illegal activities such as but not limited to gambling.
m) Inform and educate workers on the Health and Safety Plan.

9. Community health and safety

168. **Impacts.**The project construction will result to moderate impacts associated with community health and safety such as construction traffic, transport of materials, fires, emergency spills of materials, and unauthorized entry by the villagers into dangerous working areas.

169. **Mitigation Measures.** To mitigate these potential impacts, the civil works Contractor will be required to develop a Community Health and Safety Plan (CHSP) that incorporates good international practice and recognized standards. The CHSP should include emergency response and preparedness procedures to be developed in close consultation with potentially affected communities and local authorities. The plan should include specific emergency response procedures, communication systems and protocols, interaction with local and regional emergency and health authorities, provision of emergency equipment and facilities such as fire truck, emergency service vehicles, and fire drills.

170. The CHSP should also include a plan for fencing of the entire construction area and procedures for posting warning signs as required protecting local community members from dangerous work areas. The warning signage should be printed clearly in Vietnamese language for better understanding of the villagers. In order to minimize risks from construction traffic, all delivery vehicles will be required to observe the speed limit when passing through built-up areas.

10. Impact on Natural Resources and Protected Areas

171. There are no environmentally sensitive areas in the immediate vicinity of the subproject sites.

11. Impact on Culturally Sensitive Areas

172. The subproject will not affect any culturally sensitive area such as mosques, temples, and burial sites since the route of the transmission lines already avoided these sensitive areas.

D. Impacts and Mitigation during Operational Phase

173. The potential impacts of the operation and maintenance of the substation and transmission lines are generally related to the occupational and community health and safety issues as well as management of hazardous wastes. The impacts are reversible, manageable, and can be mitigated with proper engineering and management controls. Among the significant environmental impacts of the substation operation are:

a) Hazards to occupational and community health and safety such as exposure to high-voltage electrical equipment, working in high elevation, exposure to electromagnetic field (EMF).
b) Generation of domestic and hazardous wastes.

1. Occupational health and safety hazards

174. **Impacts.** The occupational health and safety issues inherent to the operation of the transmission lines and substation include hazards due to exposure to live power lines and high voltage systems, working in heights and risks of accidents, and potential exposure to

electromagnetic fields (EMF). Accidents that may occur include electrocution, fires, and explosion.

175. Workers may come in contact with live power lines during the maintenance of the facilities and electrocution from direct contact with high-voltage electricity. Electrocution is a hazard directly related to power substations and facilities.[14] Furthermore, electric utility workers have higher exposure to EMF than the general public because of working in close proximity to electric power lines.

176. Accidents may also happen when working in high elevation. However, a worker safety plan will be implemented to reduce risks that include testing of structural integrity prior to proceeding with the work and the use of fall protection measures.

177. **Mitigation Measure.** Once the subproject is turned over by SPPMB to PTC4, all matters related to the operation and maintenance of the substation and transmission lines shall be supervised by PTC4, including compliance with environment, health, and safety measures. The PTC4 shall be guided by the "Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution" (IFC) dated 30 April 2007 when working at the substation facilities. Some of the prevention and control measures for health and safety when working with live high-voltage electrical equipment are:

(i) Restricting access to electrical equipment by workers only trained and certified to work on electrical equipment. Personnel should wear PPEs at all times when entering safety zones.
(ii) Adherence to electrical safety standards.
(iii) Proper grounding and deactivation of live power equipment during maintenance work or if working in close proximity to the equipment.
(iv) Provision of personal safety devices or PPEs for workers and other precautions.
(v) Observe guidelines to minimum approach distances when working around operational substation equipment. The entrance to all buildings, vaults, rooms, or enclosures containing exposed live parts or exposed conductors should be kept locked unless such entrances are under the observation of a qualified person at all times.
(i) Identification of potential exposure levels in the work area including surveys of exposure levels and establishment of safety zones.
(ii) Posting of safety reminders and warning signs.

178. Switchboards, panel boards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized should be field marked to warn qualified persons of potential electric arc flash hazards.

2. Community health and safety

179. **Impacts.** The community may also be exposed to electrocution hazards as a result of direct contact with high voltage electricity or from contact with tools, vehicles, or other devices that come in contact with high-voltage electricity.

[14] International Finance Corporation (IFC), *Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution.*30 April 2007.

180. In terms of exposure to EMF, the transmission frequency commonly used in transmission systems ranges from 50–60Hz, which is considered as extremely low frequency[15], with impacts becoming low with distance. Trees, buildings, and other materials that conduct electricity shield the electric fields. In general, the electric fields are strongest close to the source and diminish with distance.The World Health Organization (WHO) reported that there is still weak evidence about substantive long-term health issues related to low frequency electric fields at levels generally encountered by members of the public.The potential health effects associated with exposure to EMF are not well established due to lack of empirical data demonstrating adverse health effects. However, the public should be warned about the safety distances from the transmission system and power lines through warning signs.

181. **Mitigation Measures.** To prevent these hazards, SPPMB needs to implement the following improvements:

(i) Regularly check compliance of the transmission lines with the safety clearances
(ii) Conduct monitoring of EMF levels along the lines
(iii) Provision of warning signs at transmission towers, particularly in built-up areas
(iv) Grounding of conducting objects such as fences or other metallic structures near power lines.

3. Generation of domestic and hazardous wastes

182. **Impacts.** Chemicals that are commonly handled in the transmission lines and substationare mineral oil in transformers and other electrical components and liquid petroleum fuel. There are potential hazardous materials and oil spills associated with the maintenance and repair of equipment. Storage facilities of liquid petroleum fuels for the generator sets and for vehicles and other equipment are also potential sources of accidental spills. Other hazardous wastes from substations include used lead acid batteries, oily rags from maintenance activities, and busted lamps. Oil leak and accidental spills of hazardous waste could give rise to contamination of soil and groundwater.

183. There are also domestic wastes such as garbage and sewage from workers at the substation. Improper disposal may lead to unsanitary conditions around the substation. It is therefore important for the substation workers and PTC4 to observe good housekeeping at the substation and to avoid disposal of the waste materials at adjacent areas.

184. **Mitigation Measures.** The transformers and equipment should meet international standards including regular maintenance and inspection program to check leaks. The areas around the substation transformers and oil storage areas should be provided with secondary containment with impervious bund capable of holding the oils, fuels, and hazardous wastes in the area. Discharges from these spill bunds with the potential to be contaminated with oil should be directed to the oil-water separators. These are particularly necessary within the substation site and at the maintenance yard.

185. Waste segregation system of the substation needs to be improved including the provision of waste bins at the workers quarters. Guidelines on waste segregation should be issued to workers to direct everyone to use these waste bins properly and to avoid indiscriminate dumping at adjacent agricultural land.

[15]Footnote 1.

4. Emergency Preparedness at Substation

186. **Impacts.** There are several risks that could occur with the operation of the substation. Among these are the likelihood of cable being damaged, corrosion of the towers and equipment over time which could compromise its structural integrity, potential fire events, explosion of equipment, and being hit by lightning.

187. **Mitigation Measures.** Lightning arresters are to be provided in the substation and along the transmission lines. There should also be provision for ensuring security of the substation equipment to avoid vandalism. Regular inspections of the facilities would help identify missing or corroded parts.

188. In case of fire events, explosion, and other related situations, a fire management program is included in the emergency preparedness and response plan of the subproject. Sufficient number of fire protection equipment, fire suppressants, and fire water tank are available to address the emergency requirements of the substation.

189. Workers are also trained on emergency preparedness and response procedures and a manual on safety and emergency procedures is prepared and disseminated to workers. The health and safety guidelines include measures for fighting oil fires, e.g. from transformer.

5. Associated Facilities

190. The new 220kV Duc Hoa substation is considered as an associated facility of the subproject.A separate IEE report has been prepared for this subproject under Tranche 3.

6. Cumulative Impacts

191. The operation of the proposed substation and connection lines are expected to result to beneficial social impacts to the community, particularly in Long Anand adjacent provinces, because of improvement in power supply. Furthermore, there are anticipated impacts associated with land use changes because of the subproject. Rural urbanization and economic restructuring from agricultural to non-agricultural sectors is anticipated. The remaining agricultural land of Duc Hoa and Ben Luc districts may be converted and developed into industrial or residential areas.

7. Climate Change

192. The sensitivity of the 500 kV Duc Hoa substation and connectionsto climate change is considered high as determined by the rapid environmental assessment of the subproject and from projected changes in weather patterns in Long An Province. The project sites are in proximity to the major rivers of Vam Co Dong and Vam Co Tay and numerous canals and creeks, which increases exposure to flooding from severe and frequent rainfall events.

193. In a study by the Climate Change Research Institute at Can Tho University, 49% of Long An Province is expected to be flooded if sea levels rise by 1 meter. Figure 10 presents the map of flood-prone areas from predicted 1m sea level rise in 2020 to 2100.

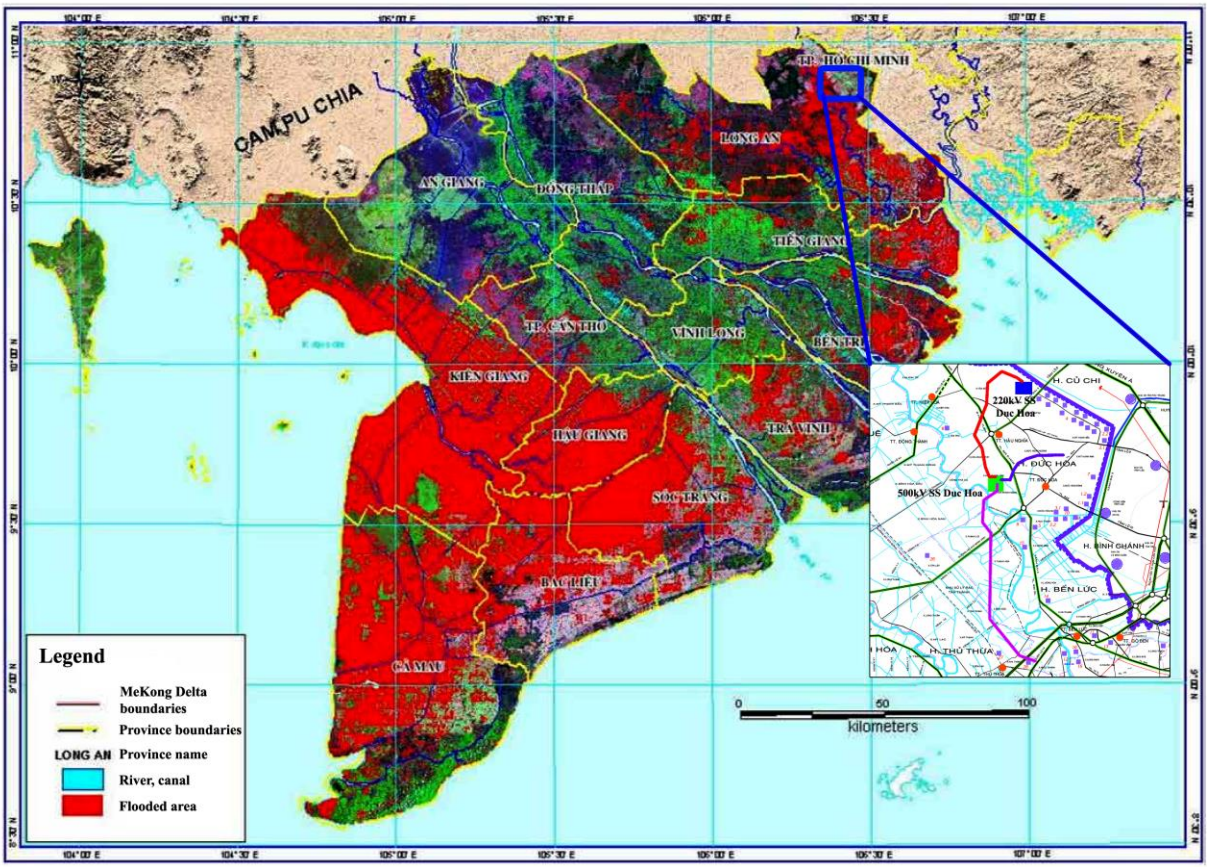


Figure 10: Flooded area from 1m sea level rise from 2020 to 2100
Source: PECC3

VII. GRIEVANCE REDRESS MECHANISM

A. Type of Grievances

194. Any affected person (AP) can submit a grievance with SPPMB or PTC4 if they believe a practice is having a detrimental impact on the community, the environment, or on their quality of life. Grievances may include:

- Negative impacts on a person or a community (e.g. health and safety issues, nuisances, etc.).
- Dangers to health and safety or the environment.
- Social impacts due to construction activities or impacts on social infrastructure.
- Failure to comply with standards or legal obligations.
- Improper conduct or unethical behavior of Contractor leading to nuisance of affected person(s).

B. Grievance Redress Mechanism

195. A subproject grievance can be defined as an actual or perceived subproject-related problem that gives ground for complaint by an affected person (AP). As a general policy, SPPMB (during construction) and PTC4 (during operation) will work proactively toward preventing grievances through the implementation of impact mitigation measures and community liaison activities that anticipate and address potential issues before they become grievances. Nonetheless, during construction and operation it is possible that unanticipated impacts may occur if the mitigation measures are not properly implemented, or unforeseen issues occur. In order to address complaints, a project grievance redress mechanism (GRM) will be developed in accordance with ADB requirements and Government procedures.

196. The GRM will be established to provide an effective and transparent channel for lodging complaints and for addressing grievances. The GRM will be established prior to the construction of the subproject and will be maintained during operation and maintenance.

197. For complaints received about the construction works, the SPPMB will involve the Contractor. When these are not resolved, any complaint is then facilitated by the SPPMB through the Environment and Social Unit (ESU) under the Compensation Department. For complaints about substation operation, the PTC4 will act on the complaint. These will be entry points to whom the AP could directly register their complaints. Contact details for the entry point of complaints will be publicly disseminated on information boards at the substation. Mechanisms to contact the point of entry will be through face-to-face meetings, written complaint, telephone conversations, or email.

198. The following are the steps for the GRM: (Figure 11)

199. **Step 1:** For complaints occurring during the construction phase, affected persons can register the complaint directly to the Contractor and the head of the commune by means of contact information prescribed in the information boards at the substation site. Upon receipt of the complaint, the Contactor is required to record/document all complaints and to coordinate

with the complainant immediately and to provide mitigation actions to the complaint within two weeks. The Contractor is required to report complaints received, resolved, and unresolved to the SPPMB through the monthly progress report.

200. **Step 2:** If the complainant is not satisfied with the action(s) undertaken by the Contractor, the affected person can inform the head of the commune about the matter, which will document the complaint in the complaints register. The commune head/authority through the Commune People's Committee will then call a meeting of the complainant, SPPMB-Compensation Department and the Contractor to resolve the complaint. After discussion of the possible solutions, the SPPMB monitors the resolution of the complaint. The Contractor shall be required to report any action to the SPPMB in the monthly project progress reports.

201. **Step 3:** If the complainant is not satisfied with the action(s) undertaken at the level of Commune People's Committee, the affected person may elevate the case to the district level for resolution.

202. **Step 4:** Complaints not resolved at the district level is elevated to the People's Committee at the provincial level for resolution.

203. **Step 5:** When the complaint is not resolved at the People's Committee at the provincial level, the complaint is then elevated to the People's Court. The decision of the People's Court becomes the final legal basis for the decision on the complaint.

C. Legal Guarantees for Complaints and Grievances

204. Under the regulations in Viet Nam, APs having complaints or grievances will not be responsible for paying any administrative and legal fees in filing their complaints. Any site clearing is not allowed while the resolution of the complaint is still pending.

205. In cases where the AP is illiterate, the AP can ask assistance from one representative of his household who can then write all the complaints and grievances to be submitted to the district level for resolution.

206. Under the law, all meetings to resolve complaints and grievances should be documented and the minutes of meetings should be disclosed and posted at the Commune People's Committee.

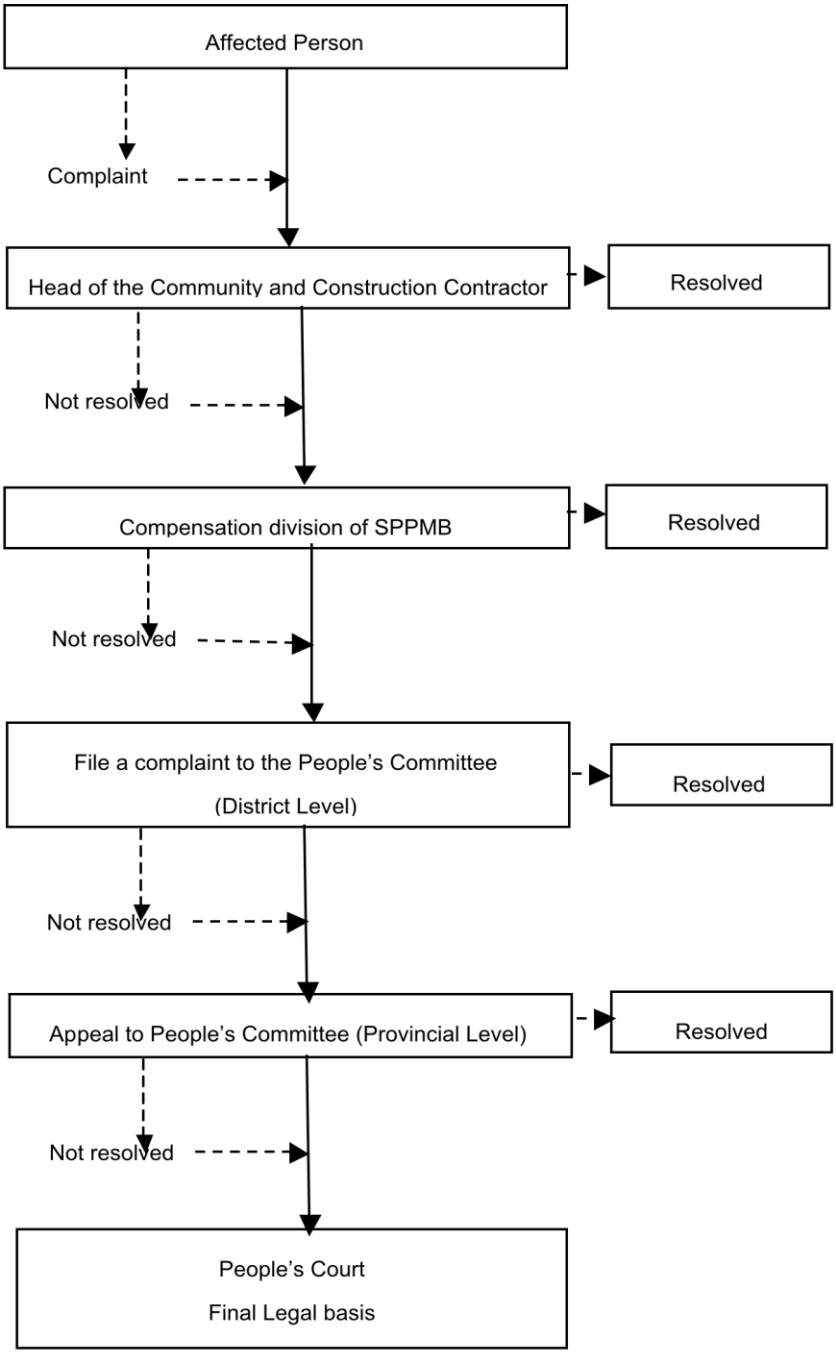


Figure 11: Steps in the Grievance Resolution Process

VIII. ENVIRONMENTAL MANAGEMENT PLAN

207. This Chapter presents the mitigation and management measures for the proposed 500 kV Duc Hoa substation and connections. Information includes the mitigation measures to the implemented, required monitoring associated with the mitigating measures, and the implementation arrangements. The institutional set-up presents the responsibilities during construction and operation phases.

A. Implementation Arrangements

208. The NPT, SPPMB and PTC4 are the key institutions that will play crucial roles in the implementation of the subproject as well as in ensuring environment safeguards. These institutions will be supported by the Project Implementation Consultant (PIC) and an Environment Monitoring Consultant (EMC). The following are the administrative and environmental management responsibilities of these institutions:

1. National Power Transmission Corporation (NPT) / Viet Nam Electricity (EVN)

209. The NPT of the Viet Nam Electricity is the Executing Agency (EA) for the subproject and the primary point of contact with ADB. The NPT will assume overall responsibility in implementation and compliance with loan assurances, including all the requirements specified in the EMP.

210. The NPT will be responsible for the following:

a) Overall project planning and management, coordination, monitoring and supervision of the project and
b) Preparation and submission to ADB of progress reports and evaluation reports.

211. In relation to environment safeguards, the NPTwill be responsible for the following:

a) Monitor, coordinate and supervise that environmental management measures are incorporated in the project design and construction activities of SPPMB and Contractor.
b) Ensure that the SPPMB has conducted an EIA, prepared an EMP, and secured the necessary environmental clearance and permit for the subproject.
c) Develop guidelines and capacity development programs for SPPMB and PTC4 in relation to the preparation and implementation of EMP.
d) Provide training to the SPPMB and PTC4 on ADB SPS (2009), World Bank Environmental, Health and Safety (EHS) Guidelines, EMP implementation, and grievance redress mechanism.
e) Identify any environmental issues during implementation and propose necessary corrective actions.
f) Review the environmental monitoring reports submitted by SPPMB.

2. Southern Power Project Management Board (SPPMB)

212. The SPPMB is the implementing agency (IA) of the subproject during the construction phase. Under supervision of the NPT/EVN, the SPPMB through its implementation unit will be responsible for the field surveys, detailed engineering and design (DED), preparation of bid

documents, pre-qualification of bidders, bidding and award of contracts, contract administration and construction supervision, and the testing and handover of facilities.

213. With regards to environment safeguards, the SPPMB through its Environmental and Social Unit (ESU) will be responsible for the following.

- Ensure that environmental management is taken into consideration in the design and construction of the subproject.
- Ensure that the EIA/IEE/EMP and approved environmental clearance are included in the bidding documents and civil works contracts.
- Review and approve Contractors' construction environmental management plan
- Ensure sufficient funding for implementation of required mitigation and monitoring measures in the EMP throughout the construction phase.
- Provide oversight on the environmental management aspects of the subproject and ensure that Contractors implement the EMPs properly.
- Ensure that the Contractors comply with the GOV environmental rules and regulations.
- Review and consolidate the monthly environmental monitoring reports submitted by construction Contractors for submission to the NPTon a semi-annual basis.

214. Prior to project construction, the SPPMB through the ESU will require the construction Contractor to develop a Construction Environmental Management Plan (CEMP) that will include sub-plans for air emission and dust control, hazardous chemicals management, waste management, traffic management, and health and safety plan, among others.

215. Specifically, the SPPMB through the ESU will be responsible for the following:

a) Conduct bid evaluations, including evaluation of completeness of CEMP
b) Coordinate with the substation officers and PTC4 regarding the schedule of construction activities, environment, health and safety procedures
c) Assign a staff within ESU to undertake regular construction site inspections to ensure the proper implementation of the CEMP by the Contractor
d) Ensure that the project implementation is in accordance to the requirements of the GOV and ADB on environmental management and protection
e) Ensure that necessary actions and resolution of complaints by communities related to environment are implemented
f) Ensure the monitoring of environmental parameters specified in the EIA/IEE report through the EMC
g) Consolidate the monthly monitoring reports prepared by the Contractor and EMC and prepare the semi-annual environmental monitoring reports for submission to NPTand ADB.

3. Power Transmission Corporation No. 4 (PTC4)

216. Once the subproject is turned-over by the SPPMB, the PTC4 will act as the subproject implementing unit during the operational phase. The PTC4 will be involved in the day-to-day operations including the monitoring of waste management and health and safety of workers.

217. Specifically, the PTC4 through its designated Environment Officer will have the following tasks with regards to environment safeguards:

a) Ensure that environment, health and safety management is taken into consideration during substation operation.
b) Ensure overall compliance of the subproject with all GOV environmental rules and regulations.
c) Through the EMC, conduct tests on environmental parameters such as air quality, wastewater quality, noise, EMF and other parameters outlined in the environmental monitoring plan.
d) Conduct regular inspections on the implementation of environmental mitigation measures during the operational phase.
e) Act on community complaints related to the subproject operation.
f) Prepare and submit semi-annual environmental monitoring reports to DONRE and NPT/EVN.

218. The following summarizes the tasks of the key institutions involved in subproject implementation:

Table 28: Responsibilities on Environment Safeguards

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	**Detailed Engineering Design**	**Tendering and Pre-construction**	**Construction**	**Operation**
NPT/EVN	The Executing Agency (EA) responsible for overall implementation and compliance with loan assurances and the EMP.				
	• Ensure that SPPMB has conducted an EIA, prepared an EMP and secured the necessary environmental clearance.	• Confirm that mitigation measures have been included in detailed engineering design.	• Oversee the procurement process of SPPMB	• Review the quarterly project progress reports and semi-annual environment monitoring reports of SPPMB prior to submission to ADB.	• Instruct PTC4 on environment management and monitoring requirements. • Review semi-annual environmental monitoring reports of PTC4 until a Project Completion Report (PCR) is issued.
SPPMB	The Implementing Agency (IA) for the subproject component during the construction phase. The IA will ensure that Contractor implements the CEMP, through regular inspection and monitoring of construction works and environmental mitigation measures.				
	• Engage consultants to prepare the FS, EIA report, RP. • Check alignment of subproject proposal with the Power Development Plan.	• Engage consultants to assist SPPMB with the DED, preparation of bid documents, pre-qualification of bidders, tender administration, award of contracts. • Contract administration	• Incorporate EIA/EMP clauses in tender documents and contracts • Appoint at least one environment specialist staff from the ESU to review and evaluate the Contractor CEMP.	• Supervise contractors and ensure compliance with the CEMP. • Coordinate construction supervision and quality control • Coordinate with EMC on environmental monitoring according to the environmental monitoring program in the approved	

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	**Detailed Engineering Design**	**Tendering and Pre-construction**	**Construction**	**Operation**
				CEMP. • Review and consolidate monthly environmental monitoring reports submitted by construction Contractors. • Submit semi-annual environmental monitoring reports to NPT/EVN. • Testing and handover of the subproject to PTC4.	
Contractors			• Prepare site-specific CEMP containing method statements on implementation of pollution control and mitigation measures listed in the EMP. • Submit the CEMP to SPPMB/ESU for review and approval. • Ensure sufficient funding for proper and timely implementation of required mitigation and monitoring	• Appoint an environment, health and safety (EHS) officer to oversee EMP implementation. • Coordinate with substation officers and comply with the substation's security, environment, health and safety procedures. • Ensure health and safety of workers. • Act as the local entry point for the	

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	**Detailed Engineering Design**	**Tendering and Pre-construction**	**Construction**	**Operation**
			measures in the CEMP throughout the construction phase.	project GRM. • Prepare monthly construction progress and status of implementation of CEMP for submission to SPPMB / ESU.	
PTC4	The PTC4 will be the IA during the operational phase and will ensure continued implementation of the EMP.				
					• Ensure proper operation of the subproject according to design standards. • Act on community complaint(s) related to the project operation. • Undertake regular inspection and environmental monitoring. • Submit semi-annual environmental monitoring results to DONRE and EVN/NPT.
Consultants					
Project Implementation Consultant (PIC) – International and		• Assist in the completion of the detailed subproject designs	• Work with the SPPMB and Contractor to update the CEMP	• Assists work of the EHS Officer (EO) of Contractor in implementing	• Ensure EMP measures are in-place during commissioning

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	**Detailed Engineering Design**	**Tendering and Pre-construction**	**Construction**	**Operation**
National Consultants (Environment)		• Provide technical direction and support to SPPMB/ESU for implementation of EMP	• Deliver capacity development and training to the SPPMB/ESU	CEMP • Provide advise and support to EMC in their monitoring activities • Conduct inspections at the construction sites relative to EMP implementation. • Review reports prepared by Contractors and EMC	• Deliver capacity development and training to PTC4
Environmental monitoring consultant (EMC)				• Field sampling with ESU • Prepare semi-annual environmental monitoring reports and provide copies to SPPMB/ESU.	• Field sampling with Environment Officer of PTC4 • Evaluate compliance of subproject with the EMP and determine corrective actions, if necessary. • Prepare semi-annual environmental monitoring reports.

B. Mitigation Plan

The following tables present the environmental mitigation measures to be implemented to address potential adverse impacts of the proposed subproject, according to stages of implementation.

Table 29: Environmental Management Plan during Pre-construction Phase

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
Update of EMP	EMP does not reflect final subproject design	Review mitigation measures defined in this EMP, update as required to reflect detailed design. Include updated EMP in all bid documents.	SPPMB	Part of design cost	Include EMP in bid documents and contract
Grievance redress mechanism	Handling and resolving complaints	Establish a GRM	SPPMB	Part of design cost	Include EMP in bid documents and contract
Tender documents and works contracts	Environmental clauses in all tender documents and contracts	Include environmental clauses in the EMP in tender documents and works contracts	SPPMB	Part of design cost	Include EMP in bid documents and contract

Table 30: Environmental Management Plan during Construction Phase

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
Sediment runoff	Erosion and surface soil runoff Damage to rice fields and irrigation canals	Inspect if runoff of soil flows into nearby rice fields, cropland and irrigation canals. Schedule excavation work during the dry season. Cover stockpile of excavated soil Install silt traps, deviation channels mounting, barriers or trenches around the stock piles.	SPPMB / Contractor	Part of construction management cost	Include EMP in bid documents and contract
Dust emission from the earthworks and movement of vehicles.	Air pollution	Contractor will be required to prepare an Air Emission and Dust Control Plan in theCEMP. Measures to be applied include: • Cover and keep moist excavated soil and stockpiles • Regularly maintain vehicles and equipment to ensure emissions comply with standards • Prohibit burning of waste materials. Unauthorized burning of construction materials and refuse shall be subject to penalties for the Contractor. • Inform and educate workers on the Air Emission and Dust Control Plan. • Cover materials with tarpaulin or other suitable materials while in transit. • Impose speed limits on construction vehicles	SPPMB /Contractor	Part of construction cost	Include EMP in bid documents and contract
Noise and vibration	Noise from vehicles and construction activities	Noise levels from equipment and machinery shall conform to the GOV standard for noise limits and WB EHS standards Property maintain machinery to minimize noise	SPPMB / Contractor	Part of construction management cost	Include EMP in bid documents and contract

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
		No construction shall be allowed between nighttime hours of 22:00 to 06:00 Prohibit drivers of construction vehicles to minimize blowing of horn and limit speed when passing through residential areas.			
Use of hazardous construction chemicals	Spill or leakage of hazardous chemicals which could contaminate land and groundwater	Contractor will be required to prepare Hazardous Chemicals Management Plan in theCEMP. Measures to be applied include: • Prepare a list of hazardous chemicals to be brought at the site including information on quantity and hazard classification. • Minimize or avoid long storage of hazardous materials onsite. • Comply with the labeling and storage requirements of hazardous chemicals, including provision of MSDS • Conduct refueling and equipment servicing only in designated areas with impervious surface. • Provide oil and grease traps and other spill containment measures. • Contractor to provide readily available clean-up equipment. • Inform and educate workers about the Hazardous Chemicals Management Plan in the CEMP through training and orientation. • Provide workers with PPE.			
Generation of construction wastes	Domestic solid wastes, domestic wastewater, inert construction	Contractor will be required to prepare Waste Management Plan in theCEMP. Measures to be applied include: • Provision of adequate onsite sanitation	SPPMB / Contractor	Part of construction cost	Include EMP in bid documents and contract

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
	wastes,and hazardous wastes during construction may result to pollution of land.	facilities to prevent untreated sewage from being channeled into drainage canals, river and on land. • Undertake waste reuse and recycling, where possible, and dispose only in approved sites. • Undertake segregation of hazardous and non-hazardous wastes, including properly labeled waste disposal bins. • Instruct workers not to indiscriminately dispose wastes particularly at surrounding areas • Comply with the GOV requirements on hazardous waste labeling, temporary storage, transport, and disposal. • Store hazardous wastes on leak-proof containers with proper label and place on areas with concrete surface and secondary containment. • Contract only accredited company by MONRE for waste collection, transport and disposal. • Prohibit burning of wastes • Conduct refueling and equipment servicing only in designated areas with impervious surface. • Provide oil and grease traps and other spill containment measures. • Contractor to provide readily available clean-up equipment. • Inform and education workers about the Waste Management Plan in the CEMP through training and orientation.			
Traffic hazard and road degradation	Risks to community health and safety and road degradation due	Contractor will be required to prepare Traffic Management Plan in theCEMP. Measures to be applied include:	SPPMB / Contractor	Part of construction cost	Include EMP in bid documents and contract

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
	to movement of heavy vehicles during transport of materials and equipment.	• Movement of heavy vehicles to avoid peak hours of local road network, wherever practicable • Monitor traffic at access roads • Ensure vehicles are maintained regularly • Conduct road safety training for drivers • Impose speed limits particularly when passing through settlement areas. • Rehabilitate damaged sections of roads. • Manage traffic by posting warning signs and assigning flag persons to direct traffic on affected roads.			
Occupational health and safety	Workers may be exposed to dangers of live power lines/equipment, chemicals, fire and explosion, physical hazards, exposure to dust and noise, falling objects, and ergonomic injuries	Contractor will be required to prepare Health and Safety Plan in theCEMP. Measures to be applied include: • Implementation of electrical safety plan, fire prevention, safety and management plan, education and awareness plan for HIV/AIDS and other diseases • Provision of first-aid facilities readily accessible by workers • Posting of safety signs, reminders or warning notices • Hire only trained and certified workers on electrical works • Plan work site layout to minimize need for manual transfer of loads • Provide appropriate and accessible fire-fighting equipment • Ensure unobstructed access of fire responders and egress of vehicles • Provide security personnel in areas where	SPPMB / Contractor	Part of construction cost	Include EMP in bid documents and contract

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
		appropriate • Strictly implement a "No Alcohol and Drug Policy" • Prohibit illegal activities including gambling • Inform and educate workers on the Health and Safety Plan.			
Community health and safety	Nuisances and hazards due to construction traffic, transport of materials, fires, emergency spill of materials, and unauthorized entry of villagers into dangerous working areas	Contractor will be required to develop a Community Health and Safety Plan (CHSP) in the CEMP that includes: • Emergency response and preparedness procedures • Provision of communication systems and protocols • Coordination with local and regional emergency and health authorities • Provision of emergency equipment and facilities • Fencing of the construction area • Posting of warning signs in dangerous work areas in Vietnamese language.	SPPMB / Contractor	Part of construction cost	Include EMP in bid documents and contract

Table 31: Environmental Management Plan during Operational Phase

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
Occupational health and safety	Exposure of workers to hazards due to exposure to live power lines and high voltage systems, working in heights, fires, explosion, and potential exposure to EMF.	All workers will be required to undergo orientation on security and EHS procedures and to strictly follow these guidelines when inside the premises. Only authorized and trained personnel will be allowed to work or have access to electrical equipment. Adhere to electrical safety standards. Provide proper grounding and deactivation of live power equipment during maintenance work or if working in close proximity to equipment. Provide PPE for workers Observe guidelines to minimum approach distances when working around operational substation equipment. Identify potential exposure levels in work area including surveys of exposure levels and establish safety zones at the substation. Post safety reminders and warning signs. Warn personnel of potential electric arc flash hazards when inspecting or working with energized equipment. Comply with the WB EHS guidelines for electric power transmission and distribution (April 2007)	PTC4 thru the Environment Officer	Part of the operational cost	Health and safety guidelines

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
Generation of hazardous waste	Potential oil spill from maintenance or retrofitting of equipment and accidental spills of hazardous waste may contaminate soil and groundwater.	Transformers and equipment should comply with the international standards and should not contain PCB. Provide secondary containment with impervious bund around the transformers and oil storage areas. Provide a hazardous waste storage area Undertake labeling of hazardous wastes Register all generated hazardous waste with MONRE and regularly report storage and disposal measures.	PTC4 thru the Environment Officer	Part of the operational cost	Hazardous waste storage area Registration of hazardous waste with MONRE Reports of hazardous waste generated, stored and disposed.
Emergencies and accidents	Possible fire events, explosion of equipment, lighting strikes, damage to cables, and corrosion of equipment may result to emergency situations at the substation	Install lightning arresters at the substation and transmission lines. Ensure security of cables and equipment Conduct regular inspection of facilities to identify missing or corroded parts Implement the fire management program that includes adequate fire protection equipment, fire suppressants, fire water tank, and fire extinguishers within the substation. Conduct training of workers on emergency preparedness and response procedures.	PTC4 thru the Health and Safety Officer	Part of the operational cost	Manual on safety and emergency procedures for the substation operation
Community health and safety	Community risks due to exposure to electrocution hazards, direct contact with	Regularly check compliance of TL with safety clearances Conduct monitoring of EMF levels along the	PTC4 thru the Health and Safety Officer	Part of the operational cost	

Environmental Aspect	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost	Guarantee/ Financial Arrangements
	high voltage electricity, exposure to EMF	ROW Provision of warning signs at transmission towers Grounding of conducting objects such as fences or other metallic structures near power lines			

C. Monitoring Plan

219. Monitoring reports as required by DONRE will be prepared by the EMC and copies of these reports shall be provided to SPPMB/ESU and PTC4 for evaluation and review and submission to EVN/NPT and ADB. The following tables present the proposed environmental monitoring plan of the subproject during the construction and operations phases.

Table 32: Environmental Monitoring Plan during Construction Phase

Item	Monitoring Parameter	Location of Monitoring	Method of Monitoring	Monitoring Frequency	Implementing Entity	Supervising Entity
Groundwater quality	pH, hardness, ammonia, COD, chloride	Nearest household well	Sampling and laboratory testing	Quarterly	EMC	SPPMB / ESU
Surface water	pH, temp, COD, BOD, TSS, Total P, Total N, total coliform	N1: Lang Den canal, Duc Hoa town N2: CauDuyen canal, Tan Quy commune, Duc Hoa	Sampling and laboratory testing; compare results with QCVN 08:2008/BTNMT, column B1)	Quarterly	EMC	SPPMB / ESU
Wastewater quality	pH, TSS, BOD, nitrate, phosphate, coliform	Substation discharge point	Sampling and laboratory testing; compare results with QCVN 14:2008/BTNMT, column A)	Quarterly	EMC	SPPMB / ESU
Air quality	PM_{10}, TSP, SOx, NOx, CO	K1: Substation, Hoa Khanh Dong commune K2: 500kV TL at My	24-hours continuous ambient air sampling and laboratory testing; compare	Once per month	EMC	SPPMB / ESU

Item	Monitoring Parameter	Location of Monitoring	Method of Monitoring	Monitoring Frequency	Implementing Entity	Supervising Entity
		HanhNam commune, Duc Hoa K3: Km35, N825, HauNghia, Duc Hoa (connection line 1) K4: ThanhLoi commune, Ben Luc (connection line 2) K5: ThanhDuc commune, Ben Luc (connection line 2)	results with QCVN 05:2013/BTNMT			
	Dust generation, stockpile of bare soil, exhaust gases from equipment/vehicles and complaints	Construction site	Inspection and checking of implementation of air emission and dust control plan	Daily	EHS Officer of Contractor	SPPMB / ESU
	Dust	Local road and village nearby where trucks pass through and construction sites	Monitor and inspect dust condition in areas that are sprayed with water. Conduct interviews with villagers on comments on dust pollution	Weekly, continuous throughout construction period	EHS Officer of Contractor	SPPMB / ESU
Noise	Noise levels, dB	K1: Substation, Hoa Khanh Dong commune K2: 500kV TL at My Hanh Nam commune, Duc Hoa K3: Km35, N825, HauNghia, Duc Hoa (connection line 1) K4: ThanhLoi commune, Ben Luc (connection line 2) K5: ThanhDuc commune, Ben Luc (connection line 2)	Use noise meter; compare results with QCVN 26:2010/BTNMT	Daily or everytime high-noise generating equipment is used	EMC	SPPMB / ESU
	Mufflers, noise barriers, complaints	Construction site	Inspection and checking of noise management	Daily	EHS Officer of Contractor	SPPMB / ESU
	Noise complaints	Local road and village nearby	Monitor noise during	Weekly,	EHS Officer of	SPPMB / ESU

Item	Monitoring Parameter	Location of Monitoring	Method of Monitoring	Monitoring Frequency	Implementing Entity	Supervising Entity
		where trucks pass through	delivery of materials which is allowed only at daytime hours Conduct interviews with villagers on concerns about noise and vibration	continuous throughout construction period	Contractor	
Vibration	Vibration	K1: Substation, Hoa Khanh Dong commune K2: 500kV TL at My Hanh Nam commune, Duc Hoa K3: Km35, N825, HauNghia, Duc Hoa (connection line 1) K4: ThanhLoi commune, Ben Luc (connection line 2) K5: ThanhDuc commune, Ben Luc (connection line 2)	Use vibration meter; compare results with QCVN 27:2010/BTNMT	Daily or everytime high-vibrating equipment is used	EMC in coordination with EHS Officer of Contractor	SPPMB / ESU
	Vibration complaints	Local road and village nearby where trucks pass through	Monitor vibration during delivery of materials which is allowed only at daytime hours Conduct interviews with villagers on concerns about noise and vibration	Weekly, continuous throughout construction period	EHS Officer of Contractor	SPPMB / ESU
Waste management	Domestic waste, hazardous waste, inert construction waste, presence of leaks/spills and complaints	Construction site and at adjacent rice fields and irrigation canals	Inspection and checking of waste management and hazardous chemicals / waste management	Daily	EHS Officer of Contractor	SPPMB / ESU
Traffic management	Traffic congestion, delivery schedule, and complaints	Construction site and access roads	Site inspection and random interviews with residents along roadsides	Daily at construction site	EHS Officer of Contractor	SPPMB / ESU

Item	Monitoring Parameter	Location of Monitoring	Method of Monitoring	Monitoring Frequency	Implementing Entity	Supervising Entity
				Monthly spot interviews with residents		
	Damage to road transportation infrastructure	Access roads	Monitoring and inspect road condition and measures used to protect road and ensure public safety	Weekly, continuous throughout construction period	EHS Officer of Contractor	SPPMB / ESU
Occupational health and safety	Implementation of occupational health and safety plan, wearing of PPEs, safety reminders, sanitation at construction area, training/orientation on safety	Construction site	Review and audit implementation of Contractor/construction worker health and safety plan and training activities on health and safety	At least monthly review of Contractor's health and safety plan	EHS Officer of Contractor	SPPMB / ESU

Table 33: Environmental Monitoring Plan during Operational Phase

Item	Monitoring Parameter	Location of Monitoring	Method of Monitoring	Monitoring Frequency	Implementing Entity	Supervising Entity
Groundwater quality	pH, hardness, ammonia, COD, chloride	Nearest household well	Sampling and laboratory testing	Every 6 months	EMC in cooperation withEnvironment Officer of substation	PTC4
Surface water	pH, temp, COD, BOD, TSS, Total P, Total N, total coliform	N1: Lang Den canal, Duc Hoa town N2: CauDuyen canal, Tan Quy commune, Duc Hoa	Sampling and laboratory testing; compare results with QCVN 08:2008/BTNMT, column B1)	Every 6 months	EMC	PTC4
Wastewater quality	pH, TSS, BOD, nitrate, phosphate, coliform	Substation discharge point	Sampling and laboratory testing; compare results with QCVN 14:2008/BTNMT, column A)	Every 6 months	EMC in cooperation with Environment Officer of substation	PTC4
Soil quality	Pb, Zn, As, Cd	Transformer area	Sampling and laboratory testing; compare results with QCVN 05:2013/BTNMT)	Every 6 months	EMC in cooperation with Environment Officer of substation	PTC4
Air quality	PM_{10}, TSP, SOx, NOx, CO	K1: Substation, Hoa Khanh Dong commune K2: 500kV TL at My Hanh Nam commune, Duc Hoa K3: Km35, N825, HauNghia, Duc Hoa (connection line 1) K4: ThanhLoi commune, Ben Luc (connection line 2) K5: ThanhDuc commune, Ben Luc (connection line 2)	24-hours continuous ambient air sampling and laboratory testing; compare results with QCVN 05:2013/BTNMT	Every 6 months	EMC in cooperation with Environment Officer of substation	PTC4
Noise	Noise levels, dB	K1: Substation, Hoa Khanh Dong commune K2: 500kV TL at My Hanh Nam commune, Duc Hoa K3: Km35, N825, HauNghia,	Use noise meter; compare results with QCVN 26:2010/BTNMT	Every 6 months	EMC in cooperation with Environment Officer of substation	PTC4

Item	Monitoring Parameter	Location of Monitoring	Method of Monitoring	Monitoring Frequency	Implementing Entity	Supervising Entity
		Duc Hoa (connection line 1) K4: ThanhLoi commune, Ben Luc (connection line 2) K5: ThanhDuc commune, Ben Luc (connection line 2)				
Electromagnetic field	EMF, kV/m	1: SS 2: TL (various points) 3: Connection Line No. 1 (various points) 4: Connection Line No. 2 (various points)	EMF meter; compare results with Decree 14/2014/NDD-CP	Every 6 months	EMC in cooperation with Environment Officer of substation	PTC4
Waste management	Waste segregation, presence of leaks/spills, quantity of hazardous waste stored onsite and collected by third party HW treater, HW labels	Domestic waste segregation and disposal area Temporary hazardous waste storage area	Inspection and checking of domestic waste management and hazardous chemicals / waste management Check hazardous waste manifest and permits	Daily	EMC in cooperation with Environment Officer of substation	PTC4
Occupational health and safety	Implementation of occupational health and safety plan, wearing of PPEs, safety reminders, training/orientation on safety, annual emergency and fire drill, accidents at substation and along TL	Substation and TL	Review and audit implementation of worker health and safety plan; training activities on health and safety; emergency and fire drill	At least monthly review of substation's health and safety plan implementation	EMC in cooperation with Health and Safety Officer of substation	PTC4

D. Reporting

220. **Construction Phase.** Throughout the construction period, the Contractor will submit monthly progress reports to SPPMB through the ESU while the SPPMB will submit semi-annual reportsto the NPT/EVN. The semi-annual reports of SPPMB will consolidate the monthly reports submitted by the Contractor and will highlight a summary of the progress of construction, results of site inspections, progress made in EMP implementation,status of compliance with GOV environmental regulatory requirements, record of community complaints, unforeseen environmental impacts and suggested remedial actions for the next monitoring period.

221. The ESU will supervise and validate the implementation of the mitigation measures specified in the EMP through site visits once a month or more frequently as necessary and review of EMP implementation reports of the Contractor. The SPPMB will also coordinate environmental monitoring in accordance with the monitoring plan and prepare the semi-annual environmental monitoring reports in English to be submitted to NPTand then to ADB.

222. Once the monthly reports from the Contractor are received by the SPPMB, these will be reviewed by the ESU under the Compensation Department relative to subproject compliance with the indicators defined in the EMP. Likewise, environmental monitoring reports prepared and submitted by the EMC shall be reviewed by SPPMB/ESU for inclusion in the semi-annual environmental monitoring reports to be submitted to EVN/NPT and ADB.

223. Within three months after subproject completion, environmental acceptance monitoring and audit reports for each subproject completion shall be prepared by the NPTthrough the SPPMB and submitted to the ADB.

224. **Operational Phase.** The EMP monitoring during the operational phase of a subproject will continue through a contracted environmental monitoring consultant (EMC). The environmental monitoring report shall contain the project's adherence to the EMP, information on project implementation, and environmental compliance. The operation and performance of the project environmental institutional strengthening and training, and compliance with the EMP and EMoP and other environmental requirements of the GOV.

225. The following presents the reporting plan.

Table 34: EMP Reporting Plan

Type of Report	Basic Content	Prepared by	Submitted to	Frequency
Construction Phase				
Construction progress report	Progress of construction, including EMP monitoring results	Contractors	SPPMB	Monthly
Environmental Monitoring Report	Progress of construction,EMP implementation, environmental monitoring, compliance with GOV environmental requirements, complaints received and actions undertaken	SPPMB	NPT/EVN	Semi-annual until project completion report (PCR)

Type of Report	Basic Content	Prepared by	Submitted to	Frequency
Reports to ADB	Subproject progress report, including section on EMP implementation and monitoring	NPT/EVN	ADB	Semi-annual until PCR
Operational Phase				
Environmental monitoring report	Subproject progress report, EMP implementation and monitoring	EMC	PTC4	Semi-annual
Reports to DONRE	Subproject progress report, EMP implementation and monitoring	PTC4	DONRE	Semi-annual

E. Environmental Management and Monitoring Costs

226. The cost for the environmental safeguard activities, i.e. environmental assessment, review, and monitoring, for the subproject will be primarily borne by NPT and SPPMB, as subproject proponent. The indicative cost is presented in Table 35.

Table 35: Activities and Indicative Cost for Environmental Management for 500 kV Duc Hoa substation and connections

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating EMP	$1,000.00
Construction Phase	
Environmental quality monitoring	$12,000.00
Public consultation	$1,000.00
Training and capacity development of SPPMB / ESU Orientation of Contractors on EHS	$3,000.00
Operation Phase	
Environmental quality monitoring	$6,000.00
Training and capacity development of PTC4 / EHS Officers	$4,000.00
Total	**$27,000.00**

IX. CONCLUSION AND RECOMMENDATIONS

227. The environment assessment process has highlighted the environmental issues and concerns on the proposed 500 kV Duc Hoa substation and connections. The assessment has considered that the subproject would result to improvements in the current power supply situation in Long Anand nearby provinces. The anticipated impacts are not expected to cause irreversible and significant adverse environment impacts and that these impacts are manageable by appropriate and conventional mitigation measures. Therefore, the subproject category is confirmed as B for environment based on ADB Safeguard Policy Statement (SPS, 2009).

228. Based on the assessment of environmental impacts, the anticipated negative impacts which have to be considered during project design and implementation are mainly related to construction activities such as health and safety of workers, waste generation, traffic hazard, fugitive dust and exhaust emissions, noise and vibration, and general construction hazards, among others. Construction activities may also generate impacts and damage on adjacent rice fields, irrigations canals and along commune access roads to the site. These can be generally reduced to acceptable levels through practical mitigation measures associated with good engineering practices and also with proper coordination with affected stakeholders. Recommendations formulated in the EMP and its inclusion in the construction contract documents will reduce these impacts to an acceptable level.

229. During the operation of the substation and connection lines, the main impacts identified are hazards to occupational and community health and safety and generation of domestic and hazardous waste materials. These impactsare manageable with proper implementation of the health and safety guidelines. In the EMP, it is recommended that management of the substation will continually review, update and upgrade its Occupational Health and Safety Plan including the Emergency Response Plan to prevent occupational risks. Refresher trainings are also recommended for employees in the aspect of engineering safety and emergency response preparedness.

230. In general, the results of the IEE show that the proposed subproject will not result to significant adverse environmental impacts. Environmental mitigation measures have been designed as outlined in the subproject EMP to address any adverse impacts during the various phases of project implementation. The EMP also presents the institutional responsibilities for implementing the mitigation measures.

Appendix 1: Rapid Environmental Assessment Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	VIE: Power Transmission Investment Program MFF Tranche 3 Subproject: 500 kV DucHoa substation and connections
Sector Division:	SEEN

Screening Questions	**Yes**	**No**	**Remarks**
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
Cultural heritage site		X	
Protected Area		X	
Wetland		X	
Mangrove		X	
Estuarine		X	
Buffer zone of protected area		X	
Special area for protecting biodiversity		X	
B. Potential Environmental Impacts Will the Project cause…			
Encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?		x	The project will not cut through the temples and cemetery. The Contractors will manage and ban their workers to encroach into these sites. The Project owner and Contractors will strictly implement mitigation measures in construction phase.
encroachment on precious ecosystem (e.g. sensitive or protected areas)?		x	

Screening Questions	Yes	No	Remarks
alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?		x	
damage to sensitive coastal/marine habitats by construction of submarine cables?		x	
deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?		x	Low impact level during construction phase. Domestic wastewater from construction camp will flow into septic tank. No chemicals used in construction Mitigation measures will be implemented.
increased local air pollution due to rock crushing, cutting and filling?		x	Low level. There is no rock crushing, cutting in the project. However, rock is used to mix concrete and filled into dug channel. The mitigation measures will be implemented to reduce air pollution
risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		x	Low impact level due to electromagnetic fields in the operation phase. To minimize potential risks, an Occupational Health and Safety Plan (OHSP) will be developed and implemented.
chemical pollution resulting from chemical clearing of vegetation for construction site?		x	
noise and vibration due to blasting and other civil works?		x	Medium impact level due to noise and vibration occurred during road cutting andmovement of construction vehicles along access road in construction phase. Mitigations for noise and vibration caused by construction-related activities are specified by the EMP for the subproject.
dislocation or involuntary resettlement of people?		x	Required resettlement and compensation for land loss is addressed by RP for subproject.
dis-proportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		x	

Screening Questions	Yes	No	Remarks
social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?	x		The constructionalong road ways may obstruct traffic during TL installation. Also, noise and dust from excavation and construction works will affect household who are living along the transmission lines. However,the Project owner, Contractors will implement the proposed mitigation measuressuch as: constructing completely each section (50m/section) per day, puttingsigns, and barricades, clean the site daily to ensure temporary traffic back to normal, repair damaged road after the construction.
Hazardous driving conditions where construction interferes with pre-existing roads?		x	
Creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?		x	
Dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?		x	
Environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?		x	No tree with height higher than 6 m under transmission line
Facilitation of access to protected areas in case corridors traverse protected areas?		x	No protected areas within 10 km of the project area
Disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?		x	No herbicides will be used to control vegetative height
Large population influx during project construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)?		x	Potential local social issues with construction worker population are identified, addressed by the Mitigation Plan of PO.
Social conflicts if workers from other regions or countries are hired?		x	Majority of workers will be from the locality and are all Vietnamese. Workers from other regions or countries are not hired
Poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	x		Moderate impact. The Contractor shall implement measures to ensure hygiene and health of workers and local people, such as providing sanitary accommodation and commissioning specialized units to collect waste daily.

Screening Questions	Yes	No	Remarks
risks to community safety associated with maintenance of lines and related facilities?			
community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?		x	Minor impact. No land subsidence, lowered groundwater table, and salinization would happed. Electromagnetic fields occur in operation phase - 500kV substation and transmission lines are designed according to the electromagnetic current standards should not impact public health. - Electromagnetic field of the substation will not affect surrounding communities. Safety corridor will be observed.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		x	There is minimal risk that accidents could happen but not expected to be significant. If so, measures will be in place to deal with them.
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		x	Low risk level. These risks maybe happen only at locations of the connecting towers of the substation. The towers will be built taking into consideration the structural integrity and weather elements.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: VIE: Power Transmission Investment Program MFF Tranche 3

Subproject: 500 kV Duc Hoa substation and connections

Sector :Energy

Subsector:

Division/Department: SERD

Screening Questions		Score	Remarks[16]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	Possible effects of flooding in the area have been considered in the design. S/S will be earth-filled to counter effects of flooding from extreme rain events.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	The design of the S/S and connection lines has considered the projected extreme rainfall, flooding, temperature and peak wind speed.
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	The project inputs will not be affected by climate conditions.
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	Not applicable. Maintenance works can be scheduled any time.
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	Project outputs and goals will remain the same.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High): LOW
Other Comments:_____
Prepared by: _____

[16] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Appendix 2: Summary, Minutes,Attendance and Photo of Consultation Meeting

Location and time	Comments/questions from local authorities[17]	Responses of SPPMB and consultants	Project Response[18]
Duc Hoa Ward- District Duc Hoa- Long An Province March 25, 2015	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
	Local commune agrees and supports the project but wants to know in detail the resettlement plan as soon as possible to have better life arrangements.	People will know about the information at least 6 months before the commencement of construction	As per RP
ThanhHoa Ward- District Ben Luc- Long An Province March 19, 2015	What will be done to reduce the effects during construction on roads, plants, oil/grease, and waste?	Construction work will be conducted at short sections each for one day. Wastes will be collected and roads will be fixed. Compensation will be applied for 100% of all damage or loss of tree, vegetation, houses or construction.	As per EMP As per RP
	Local people need to be informed about the environmental impact assessment	As regulated on Decision 29/ND-CP, SPPMB will post the approved EMP in the Committee office before doing construction.	The conditions will be included in contract with the construction Contractor.
	What are the construction methods to reduce dust and pollution?	We will follow the approved environmental methods in minimizing dust and air emissions.	The conditions will be included in contract with the construction Contractor.
	What are the effects of electromagnetic fields to the human health?	Impacts of electro-magnetic field on human health and infrastructures under the corridor of the line were discussed with local people, and that if the height of houses under the safety corridor meet electrical safety regulations, they shall be allowed to	Included in EMP during operation phase of project

[17] Questions, issues raised during public consultation meetings recorded in table as received
[18] Issues to be addressed by EMP

Location and time	Comments/questions from local authorities[17]	Responses of SPPMB and consultants	Project Response[18]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
		exist.	
Hoa Khanh Dong Ward- District Duc Hoa- Long An Province 24th March 2015	Will the construction affect farming?	We will try to minimize affected land by undertaking clearing and construction works during dry season. Compensation will be applied to all losses.	Included in the contract with Contractors
	Will the T/L have effects on human life? Is it safe in special weather conditions such as typhoon or heavy rains?	We included in the design the safety methods under expected weather conditions.	According to design.
	During operation phase of T/L, can the people live and plant trees as usual?	The minimum vertical clearance of 6m for houses, trees, and other structures will be designed in the ROW, in accordance with GOV requirements. Land will be permanently acquired by SPPMB for the construction of the tower foundations and the area for the substation. Tall trees within the ROW will be removed as necessary to comply with the minimum conductor clearance. In addition, to maintain conductor clearances and to establish safe operating distances within 16 – 60m wide of each side for the earthing zone, households will be required to install lightning arresters.	As per design and safety guidelines of NPT.
BinhDuc Ward- District Ben	How many meters is the safety height?	The minimum height is 18m from the line to the surface of 220 KV, and the safety distance is 6m so the house	Included in the design of project

Location and time	Comments/questions from local authorities[17]	Responses of SPPMB and consultants	Project Response[18]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
Luc- Long An Province March 25, 2015		can be constructed up to 12m in height.	
	How to solve the problem of the electro-magnetic effect to human health and household electric equipment?		Included in EMP
Hoa Khanh Nam Ward- District Duc Hoa- Long An Province 26th March 2015	Compensation and resettlement schedule should be provided soon to have a better plan for living and livelihood.	To prevent these hazards, SPPMB needs to implement the following improvements: • regularly check compliance of the transmission lines with the safety clearances. • Conduct monitoring of EMF levels along the lines • Provision of warning signs at transformer towers, particularly in built-up areas • Grounding of conducting objects such as fences or other metallic structures near power lines	Included in EMP
Hoa KhanhTay Ward- District Duc Hoa- Long An Province March 27, 2015	How big is each foundation?	60-80m^2	As per design
	Will the affected plants and roads be compensated during construction phase?	The affected plants and roads will be avoided as much as possible. Compensation will be done for any losses.	Included in the contract with Contractors
	Will houses under ROW removed?	During the final design of the transmission line, it will be sited to avoid houses to the maximum extent possible. The minimum vertical clearance of 6m for houses, trees,	Follow NPT safety guidelines

Location and time	Comments/questions from local authorities[17]	Responses of SPPMB and consultants	Project Response[18]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
		and other structures will be designed in the ROW, as allowed in Viet Nam. Land will be permanently acquired for the construction of the tower foundations and area for the substation.	
HuuThanh Ward- District Duc Hoa- Long An Province March 30, 2015	Specific construction schedule is necessary	Local people will be informed of construction schedule in advance.	As part of continued public consultation, the affected community will be given the schedule of all construction activities
	Should have the method to minimize the effect of material handling	Water spray to minimize the dust Fix the road if causing damage	Included in the EMP
Duc HoaThuong Ward- District Duc Hoa- Long An Province March 31, 2015	Will the construction and operation of T/L affect farming and living conditions of people?	The impact of the project on agricultural land comprises of loss of flat, agricultural land that is being used to plant rice and other crops. There are no trees in the affected land. Compensation for the loss of agricultural production will be paid to the affected households according to the resettlement action plan.	Included in the EMP
	Will the house under ROW be removed?	During the final design of the transmission line, it will be sited to avoid houses to the maximum extent possible. The minimum vertical clearance of 6m will be designed and maintained.	Follow the Electricity Law
	What are the effects to life and farming	The impact of the project on	Included in EMP

Location and time	Comments/questions from local authorities[17]	Responses of SPPMB and consultants	Project Response[18]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
	during construction phase?	agricultural land comprises of loss of land planted with rice and other crops. Compensation will be paid for affected land.	
	How many meters is the safety height? What are the safety conditions to live and plant under ROW?	The minimum height is 18m from the line to the surface of 220kV and the safe vertical distance is 6m so the house can be constructed up to 12m in height.	Included in the design of the transmission line
My Hanh Nam Ward- District Duc Hoa- Long An Province April 1, 2015	Local people need to be informed about safety level of the T/L to human health when passing My Hanh Nam Committee	According to Decision 29/ND-CP, SPPMB will post the approved EMP in the Committee Office before doing construction.	This will be included in the contract conditions with the construction Contractor.
	The farming under ROW during operation phase is safe or not?	It is safety if there is full compliance with the safety regulations of the Electricity Law.	Follow NPT safety guidelines
HauNghia Ward- District Duc Hoa- Long An Province April 2, 2015	Agree with the suggestions		
Tan My Ward- District Duc Hoa- Long An	How many meters is the width of safety corridor? Can farming and planting be applied in this area?	The minimum height is 18m from the line to the surface of 220kV and the safety distance is 6m. House can be constructed up to 12m in height. Farming and planting can be allowed	Included in the design of the project

Location and time	Comments/questions from local authorities[17]	Responses of SPPMB and consultants	Project Response[18]
Duc Hoa Ward- District Duc Hoa- Long	The language should be more common so that the commune can understand the project information and environmental impacts	Details of the project were further explained	Revised the format and information for better appreciation of PC
Province April 3, 2015		as long as safety clearance is complied.	
	Can we construct the house under ROW during operation phase of the 220 KV T/L?	The minimum vertical clearance is 6m for houses, trees and other structures.	Based on Electricity Law
	What are the effects of electromagnetic field to human health?	Impacts of EMF on human health and infrastructures under the corridor of the line were discussed with local people. If the height of houses under the safety corridor meet the electrical safety regulations, they shall be allowed to exist.	Included in the design and EMP
Tan Phu Ward- District Duc Hoa- Long An Province April 4, 2015	Can the project support to upgrade house under ROW?	We will support.	Included as part of the contract with Contractors and compensation policies of SPPMB
	Explain more about the direction passing thru Committee	Route was explained further using map of the alignment.	
Conclusion	All 14 Ward People's Committee (CPC), and affected households agree and will support the construction of 500 KV Duc Hoa substation and connection lines		Follow-up consultations of community views of subproject will occur.

Public consultation in Duc Hoa

PC in HuuThanh, Ben Luc

PC in ThanhDuc, Ben Luc

PC in ThanhLoi

Photographs of the Public Consultation Activities

Appendix 3: EIA Approval Letter for 500 kV Duc Hoa substation and connections

ỦY BAN NHÂN DÂN TỈNH LONG AN	CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập - Tự do - Hạnh phúc
Số: 3518 /QĐ-UBND	*Long An, ngày 22 tháng 10 năm 2014*

QUYẾT ĐỊNH

Về việc phê duyệt báo cáo đánh giá tác động môi trường Dự án trạm biến áp 500kV Đức Hoà và các đường dây đấu nối của Ban Quản lý Dự án các Công trình Điện Miền Nam

ỦY BAN NHÂN DÂN TỈNH LONG AN

Căn cứ Luật tổ chức HĐND và UBND ngày 26 tháng 11 năm 2003;

Căn cứ Luật Bảo vệ môi trường ngày 29 tháng 11 năm 2005;

Căn cứ Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường;

Căn cứ Thông tư số 26/2011/TT-BTNMT ngày 18 tháng 7 năm 2011 của Bộ Tài nguyên và Môi trường quy định chi tiết một số điều của Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường;

Căn cứ Quyết định số 2437/QĐ-UBND ngày 12 tháng 10 năm 2006 của UBND tỉnh Long An về việc ủy quyền cho Sở Tài nguyên và Môi trường tiếp nhận hồ sơ và tổ chức thẩm định hồ sơ môi trường của các dự án đầu tư trên địa bàn tỉnh;

Theo đề nghị của Hội đồng thẩm định báo cáo đánh giá tác động môi trường họp ngày 22 tháng 8 năm 2014 tại Sở Tài nguyên và Môi trường tỉnh Long An;

Xét văn bản số 7204/AMN-ĐB ngày 01 tháng 10 năm 2014 của Ban Quản lý Dự án các Công trình Điện Miền Nam;

Xét đề nghị của Sở Tài nguyên và Môi trường tại văn bản số 1766/STNMT-CCBVMT ngày 20 tháng 10 năm 2014,

QUYẾT ĐỊNH:

Điều 1. Phê duyệt nội dung báo cáo đánh giá tác động môi trường của Dự án **trạm biến áp 500kV Đức Hoà và các đường dây đấu nối** được lập bởi **Ban Quản lý Dự án các Công trình Điện Miền Nam** (sau đây gọi là chủ dự án) với các nội dung chủ yếu sau đây:

1. Phạm vi, quy mô, công suất của dự án

a) Địa điểm: huyện Đức Hoà, Bến Lức, Thủ Thừa, tỉnh Long An.

b) Quy mô: trạm biến áp 500kV và các đường dây đấu nối.

2. Yêu cầu bảo vệ môi trường đối với dự án

a) Chủ dự án cần phải thực hiện các công trình khống chế ô nhiễm như đã giải trình trong báo cáo đánh giá tác động môi trường và những yêu cầu sau đây:

- Bụi, khí thải phải được xử lý đạt quy chuẩn QCVN 05:2013/BTNMT.
- Tiếng ồn phải xử lý đạt quy chuẩn QCVN 26:2010/BTNMT.
- Nước thải phải được thu gom và xử lý đạt QCVN 14:2008/BTNMT cột A, K = 1,2 trước khi thải ra nguồn tiếp nhận.

Trường hợp có văn bản pháp luật quy định quy chuẩn mới thay thế hoặc bổ sung quy chuẩn hiện hành thì chủ dự án phải tuân thủ việc áp dụng các quy chuẩn mới.

b) Chất thải rắn phát sinh trong quá trình hoạt động chủ dự án có trách nhiệm thực hiện đúng theo Nghị định 59/2007/NĐ-CP ngày 09 tháng 4 năm 2007 của Chính phủ về quản lý chất thải rắn. Đối với chất thải nguy hại phát sinh từ các hoạt động của dự án phải thu gom, lưu giữ, vận chuyển và xử lý theo đúng quy định tại Thông tư số 12/2011/TT-BTNMT ngày 14 tháng 4 năm 2011 của Bộ Tài nguyên và Môi trường quy định về quản lý chất thải nguy hại.

c) Định kỳ 3 tháng/1 lần chủ dự án phải tiến hành đo đạc các thông số về khí thải, nước thải và gửi báo cáo về Sở Tài nguyên và Môi trường.

Điều 2. Chủ dự án phải lập, phê duyệt và niêm yết công khai kế hoạch quản lý môi trường của dự án; nghiêm túc thực hiện các yêu cầu về bảo vệ môi trường trong giai đoạn chuẩn bị đầu tư và giai đoạn thi công xây dựng Dự án; lập hồ sơ đề nghị kiểm tra, xác nhận việc đã thực hiện các công trình, biện pháp bảo vệ môi trường phục vụ giai đoạn vận hành của Dự án gửi cơ quan có thẩm quyền để kiểm tra, xác nhận trước khi đưa dự án vào vận hành chính thức theo quy định tại Thông tư số 26/2011/TT-BTNMT ngày 18 tháng 7 năm 2011 của Bộ Tài nguyên và Môi trường quy định chi tiết một số điều của Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường.

Điều 3. Trong quá trình thực hiện, nếu có những thay đổi so với các khoản 1 và 2 Điều 1 của Quyết định này, chủ dự án phải có văn bản báo cáo và chỉ được thực hiện những thay đổi sau khi có văn bản chấp thuận của UBND tỉnh Long An.

Điều 4. Quyết định phê duyệt báo cáo đánh giá tác động môi trường của dự án là căn cứ để quyết định việc đầu tư dự án; là cơ sở để các cơ quan quản lý nhà nước có thẩm quyền kiểm tra, thanh tra việc thực hiện công tác bảo vệ môi trường của dự án.

Điều 5. Ủy nhiệm Sở Tài nguyên và Môi trường thực hiện việc kiểm tra, giám sát việc thực hiện các nội dung bảo vệ môi trường trong báo cáo đánh giá tác động môi trường đã được phê duyệt tại quyết định này.

Điều 6. Quyết định này có hiệu lực thi hành kể từ ngày ký./.

Nơi nhận:
- CT, PCT.UBND tỉnh;
- Chủ dự án;
- Các Sở: Tài nguyên-Môi trường, Khoa học Công nghệ, Công Thương, Xây dựng, Y tế; Nông nghiệp&PTNT;
- UBND huyện: Đức Hoà, Bến Lức, Thủ Thừa;
- Phòng TN&MT huyện Đức Hoà, Bến Lức, Thủ Thừa; Phòng CSPCTP về môi trường;
- Lưu: VT, STNMT,Nh.

DTM-TRẠM BIEN AP 500KV DUC HOA

TM. ỦY BAN NHÂN DÂN
KT. CHỦ TỊCH
PHÓ CHỦ TỊCH

Nguyễn Thanh Nguyên

LONG AN's PEOPLE COMMITTEE **SOCIALIST REPUBLIC OF VIET NAM**

Independent - Freedom - happiness

Ref. No. 3538/QD-UBND *Long An, October 22, 2014*

DECISION

Approval Environmental impact assessment report for the project "Duc Hoa 500kV substation and transmission lines" of Southern Viet Nam Power Project Management Board

LONG AN'S PEOPLE COMMITTEE

Pursuant to the Law on Organization of People's Councils and People's Committees November, 26th, 2003; November 26th 2003;

Pursuant to the Environment protection law dated on June 6, 2014;

Pursuant to the Decree No.80/2006/ND-CP, dated August 9, 2006 by the GOV concerning instruction on environment protection law implementation;

Pursuant to the Decree No.29/2011/ND-CP, dated on Apr 18, 2011 by the GOV concerning instruction on implementation of the environment protection law;

Pursuant to the Circular No. 26/2011/TT-BTNMT dated on Junly18, 2011 by Ministry of Natural Resources and Environment (MONRE), concerning instruction on strategic enviromental impact assessment, enviromental impact assessment and environmental protection commitment;

Basedon the decision No.2437/QĐ-UBND dated 10/12/2006 of Long An' People Committee about authorizing to Environment and Natural Resource department receiving records and holding appraise records of environmental for investment projects in the province.

At the request of the Board evaluation report on environmental impact assessmentconference August 22th, 2014 at the Environment and Natural Resource department Long An Province.

Considering document No. 7204/AMN-ĐB dated October 1st, 2014 of Southern Viet Nam Power Project Management Board.

At the request of Long An Environment and Natural Resource department Chief on Doccument No. 1766/STNMT-CCBVMT dated October 20th, 2014,

DECISION

Article 1: Approval on contents of EIA report of "Duc Hoa 500kV substation and transmission lines project established by Southern Viet Nam Power Project Management Board with following main contents:

1. **Bound, size and capacity of Project**:

a) Location: Duc Hoa – Ben Luc – Thu Thua District, Long An Province.

b) Size: 500kV substation and transmission lines.

2. Requirementsforenvironmental protectionprojects

a) Project Owner (PO) is responsible for implementing exactly contents mentioned in approved EIA report and the following compulsory requirements:

- Dust, exhaust gas must be treated achieving QCVN 05: 2013/BTNMT.
- Noise must be treated achieving QCVN 26: 2010/BTNMT.
- Wastewater must be collected and treated achieving QCVN 14: 2008/BTNMT, column A, K = 1.2, before discharged into the receiving water.
- In the case, there are new laws replacing or supplementing old standards, PO must comply with the new standards.

b) Collection, storage and disposal of hazardous waste in accordance with the provisions of Circular No.12/2011/TT-BTNMT dated Apr. 14th 2011 of the Ministry of Natural Resources and Environment on hazardous waste management.

c) Implementation of environmental monitoring program as mentioned in the report of environmental impact assessment. The results of monitoring should be updated and provided to the Department of Natural Resources and Environment inspection, periodic monitoring (3 months / time).

Article 2.PO must be approve and publicly listed environmental management plan of the project before the project implementation; Implement strict requirements on environmental protection provisions; Documentation suggest checking, validation work performed works, environmental protection measures serve the operational phase of the project submitted to the competent authorities for inspection and certification prior to project into full operation as stipulated in Circular No. 26/2011/TT-BTNMT dated Jul. 18th 2011 of the Ministry of Natural Resources and Environment Regulations detailing a number of articles of Decree No. 29/2011/ND-CP dated Apr. 18th 2011 regulations on strategic environmental assessment, environmental impact assessment and environmental protection commitment.

Article 3. In the course of project implementation if there are changes compared with paragraphs 1 and 2 of Article 1 of this Decision, the project owner must provide written reports and shall be made only after the change documents approval of Long An province's People Committee.

Article 4. The decision to approve the report of environmental impact assessment of the project as a basis for decisions on investment projects; the basis for the state agency authorized test and inspect the implementation of environmental protection project.

Article 5. Authorizing the Department of Natural Resources and Environment carried out the inspection and supervision of the implementation of environmental protection issues in reporting environmental impact assessment has been approved in this decision.

Article 6. This decision takes effect from the date of signing./.

Recipients:
-Same as above;
-Saveoffice;

ON BEHALF OF THE COMMUNE PEOPLE'S COMMITTEE
Vice CHAIRMAN
(Signed and sealed)

Nguyen Thanh Nguyen

Appendix 4: Letter on UXO Clearing

BỘ TƯ LỆNH QUÂN KHU 7
BỘ CHỈ HUY QUÂN SỰ
TỈNH LONG AN

Số: 369QSLA

V/v trả lời bom mìn, vật nổ còn sót lại sau chiến tranh.

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Long An, ngày 07 tháng 4 năm 2010

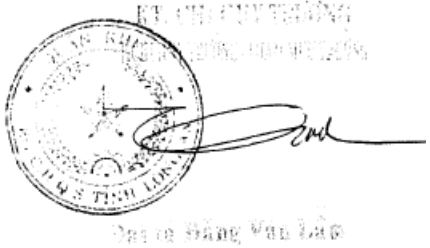
Kính gửi: Công ty cổ phần tư vấn xây dựng Điện lực 3.

Căn cứ vào công văn số 0862/TVĐ3-TR ngày 01 tháng 4 năm 2010 của Công ty cổ phần tư vấn xây dựng Điện lực 3 việc xin ý kiến về tình hình bom mìn, vật nổ còn sót lại sau chiến tranh khu vực dự kiến xây dựng hướng tuyến đường dây 500kV từ Thốt nốt / Châu Đốc - Đức Hòa, xây dựng các trạm biến áp 500kV và đường dây đấu nối đi qua địa bàn huyện Tân Thạnh - Thạnh Hoá - Đức Huệ - Đức Hoà và Bến lức, tỉnh Long An.

Qua nghiên cứu hồ sơ, địa hình các địa bàn nêu trên. Bộ CHQS tỉnh Long An có ý kiến như sau: Sau khi kết thúc chiến tranh chống Mỹ và biên giới Tây Nam, Bộ CHQS tỉnh đã chỉ đạo lực lượng Công binh và các đơn vị địa phương dò tìm xử lý bom mìn, vật nổ trên mặt đất, để bảo đảm an toàn cho nhân dân khai hoang sản xuất; Hiện nay các loại bom, đạn còn sót lại nằm sâu dưới mặt đất không kết luận được.

Để bảo đảm an toàn tuyệt đối cho người và phương tiện thi công. Bộ CHQS tỉnh Long An đề nghị Công ty cổ phần tư vấn xây dựng Điện lực 3 có phương án dò tìm xử lý bom mìn, vật nổ các địa bàn nêu trên trước khi thi công công trình./.

Nơi nhận:
-Như trên;
-Lưu: VT, BCB, D03b.



CTY CP TƯ VẤN XD ĐIỆN 3
ĐẾN Số: 1194
Ngày: 12/4/10
Chuyển:

The headquarter of Military Zone 7
Military Commands of Long An Province
No.369/QSLA
Re: the matter of mines and explosive Remnants of war.

Social Republic of Viet Nam
Independence – Freedom- Happiness

Long An, April 7th , 2010

To: Power Engineering Consulting Joint Stock Company 3

According to the Official Letter No. 0862/TV3-TR on 1st April 2010 of Power Engineering Consulting Joint Stock Company 3 about the consultation on the situation of mine, explosive remnants of war in planned area for 500kV Thot Not (Chau Doc) - Duc Hoa transmission line, build up 500KV substation and connection lines passing thru Tan Thanh, ThanhHoa, Duc Hoa, Duc Hue and Ben Luc district, Long An province.

After considering the profile and terrain of the area above, The Military Commands of Long An province has comments as following: Before 1975, Duc Hoa district was the place where fierce fighting happened in the Resistance War against America and Army of Republic of Viet Nam, with a huge bombardment of bombs.

After the Southern was completely liberated, the Provincial Military Commands has directed Engineer Forces and local agencies to detect, collect and handle landmines as well as unexploded ordnance on the ground to ensure the safety of the people's production. Currently, the munitions remnants beneath the ground can not be concluded.
To ensure the absolute safety for persons and facilities in construction, the Military Commands of Long An Province requires Power Engineering Consulting Joint Stock Company 2 should have a plan in detecting and handling mines on the planned alignment for 500kV transmission line before construction implementation.

Attention:

- As above
- Filing

On behalf of the Commandant
Deputy Commander
Dang Van Lap
(signed)

Appendix 5: Emergency Response Plan

1. The Contractor must develop emergency or incident response procedures (ERP) during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase should ensure:

i) Emergency Response Team (ERT) of the Contractor as initial responder;
ii) the District fire and police departments, emergency medical service, the Department of Public Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

2. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

Table 1. Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	- Communicates / alerts the EERT. - Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary and requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	- Solves the emergency/incident
Contractor Resources	- Provide and sustain the people, equipment, tools and funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response and adequate protection, by keeping them informed of Subproject progress.

3. The ERT will be led by the senior Contractor engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

4. The Contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

5. Prior to the mobilization of civil works, the Contractor, through its Construction Manager, ERTL, in coordination with the EA/IA, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

i) subproject sites;
ii) construction time frame and phasing;
iii) any special construction techniques and equipment that will be used;
iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
v) the Contractor's Emergency Management Plan
vi) names and contact details of the ERT members

6. The objective of this meeting is to provide the ultimate response institutions the context for:

i) their comments on the adequacy of the respective Emergency Management Plans
ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
iii) the arrangements for coordination and collaboration.

7. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

i) set up the ERT;
ii) set up all support equipment and facilities in working condition
iii) made arrangements with the EERT;
iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force;
v) conducted orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and
vi) conducted drills for different possible situations.

8. To sustain effective emergency response throughout Subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

Alert Procedures

9. Means of communicating, reporting and alerting an emergency situation may be any combination of the following: i) audible alarm (siren, bell or gong); ii) visual alarm (blinking/rotating red light or orange safety flag); iii) telephone (landline); iv) mobile phone; v) two-way radio; and vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

(i) Whoever detects an emergency situation first shall immediately :

- call the attention of other people in the emergency site,
- sound the nearest alarm, and/or
- report/communicate the emergency situation to the ERT.

(ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.

(iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: i) the type of emergency situation; ii) correct location of the emergency; ii) estimated magnitude of the situation; iii) estimated persons harmed; iv) time it happened; v) in case of a spill, which hazardous substance spilled; and vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions. For an effective reporting/alerting of an emergency situation:

(i) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication

equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:

- Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
- EERT institutions/organizations
- Concerned village authority/ies
- IA Office, SS

(ii) All Subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.

(iii) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

Emergency Response Situations

The following tables suggest general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the Contractor.

Table 2.Evacuation Procedure

Procedure	Remarks
▪ Move out as quickly as possible as a group, but avoid panic.	▪ All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
▪ Evacuate through the directed evacuation route.	▪ The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL and immediately communicated to ERT members.
▪ Keep moving until everyone is safely away from the emergency site and its influence area.	▪ A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
▪ Once outside, conduct head counts.	▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.
▪ Once outside, conduct head counts.	▪ Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.
▪ Report missing persons to EERT immediately.	▪ ERTL/Deputy ERTL to communicate with the EERT.
▪ Assist the injured in evacuation and hand them over to the ERT first-aiders or EERT medical group	▪ ERT to manage injured persons to ensure proper handling.
▪ If injury warrants special care, DO NOT MOVE them, unless necessary and instructed/directed by the EERT.	▪ ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 3.Response Procedure During Medical Emergency

Procedure	Remarks
▪ Administer First Aid regardless of severity immediately.	▪ Fundamentals when giving First Aid: - Safety first of both the rescuer and the victim. - Do not move an injured person unless: - victim is exposed to more danger

Procedure	Remarks
	when left where they are, e.g., during fire, chemical spill - it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure - instructed or directed by the EERT. ▪ First AID to be conducted only by a person who has been properly trained in giving First Aid.
▪ Call the EERT emergency medical services and/or nearest hospital.	▪ ERTL/Deputy ERTL or authorized on-site emergency communicator
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: - an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention and lead them to site. - Other ERT members to clear access road for smooth passage of the EERT.
▪ If applicable, vacate site and influence area at once, restrict site, suspend work until further notice.	▪ Follow evacuation procedure.

Table 4.Response Procedure in Case of Fire

Procedure	Remarks
▪ Alert a fire situation.	▪ Whoever detects the fire shall immediately: - call the attention of other people in the site, - sound the nearest alarm, and/or - Foreman or any ERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) - report/communicate the emergency situation to the ERTL/Deputy ERTL.
▪ Stop all activities/operations and evacuate.	▪ All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
▪ Activate ERT to contain fire/control fire from spreading.	▪ Guided by the training they undertook, ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.

Procedure	Remarks
▪ Call the nearest fire and police stations and, if applicable, emergency medical services.	▪ When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: - an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. - some ERT members to stop traffic in, and clear, the access road to facilitate passage of the EERT.
▪ ERT to vacate the site as soon as their safety is assessed as in danger.	▪ Follow appropriate evacuation procedure.

Appendix 6: Photographs of the Site and Surroundings

Site of proposed 500kV Duc Hoa Substation

Site of the proposed access road

Section 3: No. 1 500 KV connection line: 12.3 km passing thruHoa Khanh Dong, Duc HoaThuong, Duc Hoatown, MyHanh Nam commune

Section 4: No.1 220 KV connection line: 24.4 km passing thruHoa Khanh Dong, Hoa Khanh Nam, Hoa Khanh Tay, Tan Phu, HauNghiatown, Tan My commune

Section 5: No.2 220 KV connection line: 29.8 km passing thruHoa Khanh Dong, Huu Thanh, Thanh Loi, ThanhHoa, Binh Duc, Thanh Duc commune