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VIE: Basic Infrastructure for Inclusive Growth in the Northeastern Provinces Sector Project-Construction and Widening of Domestic Water Supply System for Vinh Quang Town, Tu Nhan and Ban Nhung Communes, Hoang Su Phi District, Ha Giang Province

Prepared by Planning and Investment Department of Ha Giang province for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 27 April 2017)

Currency unit	–	Viet Nam Dong (D)
D1.00	=	$0.000044
$1.00	=	Đ 22,730

ABBREVIATIONS

ADB	–	Asian Development Bank
CPC	–	Commune People's Committee
CSC	–	Construction Supervision Consultant
CWMS		Center for Water Management and Supply
DARD	–	Department of Agriculture and Rural Development
DONRE	–	Department of Natural Resources and Environment
DOT	–	Department of Transportation
DPC	–	District People's Committee
DPI	–	Department of Planning and Investment
ECT		Emergency Control Team
EIAR	–	Environmental Impact Assessment Report
EMP	–	Environmental Management Plan
EPP	–	Environmental Protection Plan
ESO	–	Environmental Safeguards Staff
ESS	–	Environmental Safeguard Specialist
IEE	–	Initial Environmental Examination
LEP	–	Law on Environmental Protection
lpd	–	Liters / person / day
MASL	–	Meters above sea level
MONRE	–	Ministry of Natural Resources and Environment
MPN	–	Most Probable Number of viable cells of a pathogen - a measure of water quality
PPC	–	Provincial People's Committee
PPE	–	Personal Protective Equipment
PMU	–	Project Management Unit
PPTA	–	Project Preparatory Technical Assistant
ROW	–	Right of Way
SPS	–	Safeguard Policy Statement

The PPTA	–	The Project Preparatory Technical Assistant Consultants
The Project	–	Basic Infrastructure for Inclusive Growth in the Northeastern Provinces Sector Project
The Subproject	–	Construction and Expanding Water Supply System of Vinh Quang Town and Nhan, Ban Nhung Communes, Hoang Su Phi District, Ha Giang Province
UXO	–	Unexploded ordnance
WTP	–	Water Treatment Plant

WEIGHTS AND MEASURES

Km^2 (square kilometer)	–	unit of length
m^3 (cubic meter)	–	A measure of volume

Note:

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

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I. EXECUTIVE SUMMARY

1. The proposed Basic Infrastructure for Inclusive Growth in the Northeastern Provinces Sector Project (BIIG 1) will invest in the recently completed Four Northeastern Provinces (FNEP) Overall Development Plan (2015). The development plan responds to the Government of Vietnam's strategy of targeting the investment into poorer provinces and regions. The use of a sub-regional approach seeks to build the interrelationship between provinces as one of the foundations for accelerating growth in the more remote regions. As such the plan targets investment into outputs that build areas of comparative advantage in a manner that increases the competitiveness of economic activity in the sub-region. The expected impact is to improve socio-economic wellbeing of local communities through the improved financial returns and through lower costs of accessing public health services, education, water supply and markets.

2. The project has four outputs being (i) FNEP road network connectivity improved, (ii) rural water supply improved, (iii) ARVCs in Lang Son improved, and (iv) decentralized public asset management processes implemented.

A. Subproject Summary

3. The subproject "Construction and Expanding Water Supply System of Vinh Quang Town and Tu Nhan, Ban Nhung Communes, Hoang Su Phi District, Ha Giang Province" and is an output 2 representative subproject: Improved Rural Water Supply. The Subproject aims to expand water services in the district of Hoang Su Phi, Ha Giang. Its objectives are to improve public hygiene, improve the landscape and appearance of the urban area, and to improve the health status and living conditions of people living in the town.

4. A suitable water source on the Pin Ho stream has been identified, and using a time horizon of 2030, the water demand has been projected based on national guidelines. Consultation with the Hoàng Su Phi DPC, village heads and community representatives have confirmed demand for a metered 24 hour potable water service and indicate a willingness to pay. A set of engineering drawings, bill of quantities, construction cost estimate, and tender/contract documentation have been prepared with supporting social assessments, ADB safeguard documentation and a financial and economic assessment.

5. The feasibility study has identified an adequate supply of water (volume and quality) in the Pin Ho stream. A reinforced concrete weir will be constructed to raise river water levels for the in stream offtake via a gated off-take. Abstracted water will flow by gravity to a treatment plant from where it passes to a clean water tank. The clean water tank supplies the 18km distribution network to connections using a long gravity main. The networks pass through challenging terrain, and will in places need protection. Some sections will be encased in concrete and need anchoring to withstand external pressures (vertical and lateral) and high hydraulic heads generated by the nature of the topography.

6. The intake structure is located on the true right (on creek 1), Pin Ho stream located in Ta Su Choong commune, Hoang Su Phi District, Ha Giang Province. The site for extraction is modified by constructing a weir, made of M200 Reinforced concrete; length L = 12m, height H = 4.0m, width of dam crest B = 2.0m.

7. The elevation of the new treatment plant enables gravity feed but requires an access road. The field surveys established the feasibility of the selected alignment (vertical and horizontal) and provided a preliminary assessment of the geological and geotechnical design

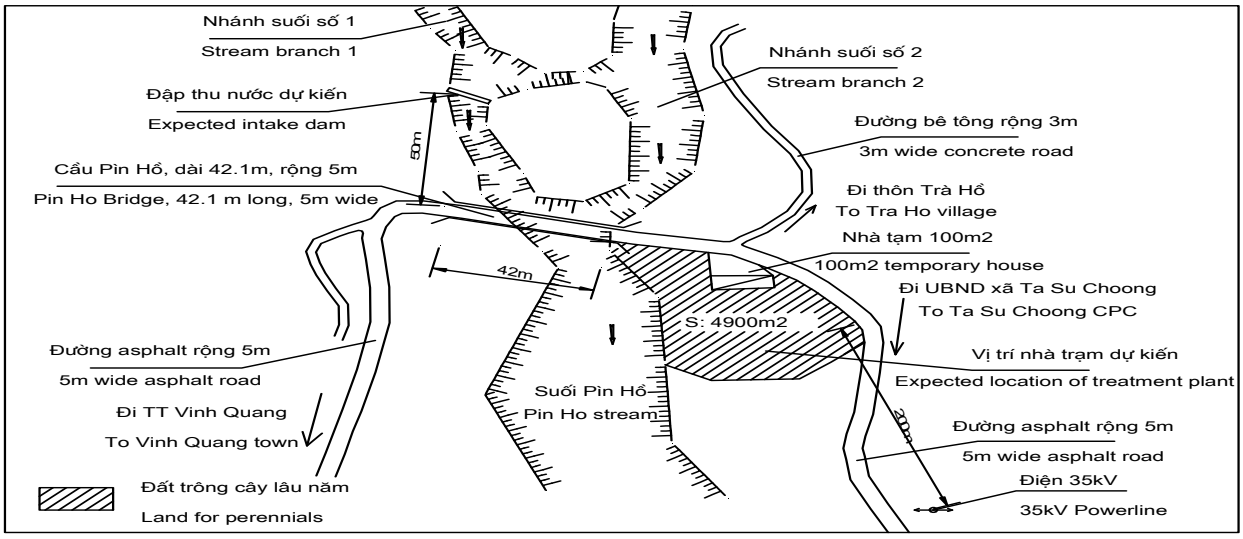
parameters. Other civil engineering earthworks examined include: the identification of suitable and conveniently located construction materials; and a location to dump surplus material (excavated soil) and waste (concrete detritus from road crossings).

8. The treatment plant consists of a vertical clarifier tank - rapid filter with capacity of 2200m^3/day, clean water tank of 400m^3, an operational office, a management office, a sludge tank and other auxiliary works. From the clean water tank water distribution pipelines run alongside existing roads to minimize disruption and avoid costly land compensation. They will transition down from large to small diameters and ultimately provide a metered house connection to each household.

9. For the proposed water supply network, with the treatment plant located at a higher elevation and distant from Vinh Quang town center two distribution networks are proposed. Network 1 supplies from the treatment plant to a pressurized tank to supply Vinh Quang town center. The total length of network 1 pipeline is 18.3km (excluding services pipelines). Network 2 starts from the network 1 pressurized tank in Vinh Quang town serves households of Vinh Quang town (excluding Po Lung hamlet) and Tu Nhan commune. The total length of pipeline of network 2 is 4.76km (excluding services pipelines).

10. Locations of subproject items are presented in the Figure below.

Figure 1: Locations of subproject items



11. Upon completion, the water supply scheme will have capacity to supply clean potable water for domestic use and production to 2,045 households with 8,263 people and 78 locally based organization, administrative units. The subproject will help local people access sanitary and hygienic water source that meets standards of Ministry of Health, which contributes to fulfillment of National Targets on clean water usage rate and will contribute to Viet Nam's commitment to Sustainable Development Goal number 6.

12. The current scheme is limited by (i) insufficient water with current daily supply is 900m^3/day compared to the expected design standard of 1500m^3/day, (ii) poor water quality, and (iii) inadequate electricity supply. Phase 1, sourced water from the Chay River, however water availability is inadequate and water quality is often below required standards. Both of these issues were not identified at design. Current plant and operational management standards are high well organized and managed with supporting records and financial statements.

Table 1: Water supply for Xuan Quang, Tu Nhan commune, Ban Nhung commune, from the Ta Su Choong stream of Hoang Su Phi District

Representative Subproject	Vinh Quang Town Hoang Su Pi
Project Daily Water Capacity (m3 per day)	2,200
Number of households supplied	2,045
Number of Govt Inst.'s	35
Total Population supplied	11,301
Reservoir capacity (m3)	500m3
Dam Height (m)	Dam Length Lđ=12m, Dam Height Hđ=4,0m, Dam Width Bđ =2,0m
Supply Area Town	Vinh Quang
Commune Name	Tu Nhan(961 hh) Ban Nhung (640 hh)
Number of admin units	3
Name of Operating unit	Hoang Su Phi Clean Water Supply and Management Centre
Total Investment (USD mill)	$2.3

13. The Hoang Su Phi Center of Water Management and Supply currently operate the existing water supply scheme. The Center was established in 2009 and has operated as a public service delivery agency. The Center has responsibilities (i) to supply water to residents and agencies located in Vinh Quang Township; (ii) for operation and maintenance of the WS scheme and (iii) collection of water fees in order to cover operation cost including recurrent costs, taxes (revenue tax, tax on exploitation of natural resources, VAT) electricity fees and small repairing/ maintenance costs.

14. Nearly half of households in Vinh Quang town center are currently supplied from CWMS managed infrastructure. Service is not possible on a 24 hour basis and as such supply is rotated between areas to maximize the number of households that receive water. Connected households indicate a strong desire for improved service and are willing to pay for reliability and quality of water supplied. The growth in the number of households connected or registering to be connected is high with the number of new connection requests in the first six months of 2016 being 30% higher than for the same period in 2015.

15. Current water pricing (tariffs) are set at the Provincial level. The current tariffs levied and collected from consumers by the CWMS are based on metered supply (measured by cubic meter of consumption) are as follows:

(i) Households; Đ 5,800 /m^3;
(ii) Business services: Đ 8,700 /m^3;
(iii) Other services: Đ 12,000 /m^3.

16. The main components of the subproject:

(i) Construction of a small weir to collect raw water at Ta Su Choong stream.
(ii) Installation of 0.15 km raw water pipeline leading water from raw water pump station to the WTP using HDPE material. This pipeline is light, easy to install, low roughness and corrosion resistance.

(iii) Construction of WTP with the capacity of 2,200 m^3/day, located about 150 m downstream of the reservoir near the bridge on the way from Pin Ho Bridge to Ta Su Choong commune, Hoang Su Phi district.
(iv) The utility works: the operating house; chemical house; factory; warehouse; gate; fence; trees; road; drainage; electricity.
(v) Construction of transmission pipe system with the estimated length of 16.7 km from WTP to Vinh Quang town, Ban Nhung and Tu Nhan communes.
(vi) a distribution pipeline network made of HDPE pipe, of total length 20.428 km.

B. Environment impacts and mitigation

17. The project has very limited impacts on the natural environment, ecological resources and cultural assets. Most of the likely impacts are common for construction activities such as dust, noise, traffic disruptions, and waste can be prevented or minimized by standard mitigation measures.

18. During operation of the WTP, it is necessary to ensure that the management of chemical treatment process and new sludge tanks under the design meet the GOV discharge standards and water source protection management, hygiene condition of the WTP in accordance to Circular No.50/2015/TT-BYT[1].

19. In some proposed areas, the project may increase the volume of grey water produced by water users receiving new connections. It is recommended that before installing the new water connection in each subproject area, construction supervision consultants, PMU, and representatives of local sewerage unit make a general inspection to confirm that there is a combination of drainage system and grey water in the central area of Vinh Quang town, Ban Nhung, Tu Nhan communes to be able to handle the increased wastewater load. On the other hand, they will identify additional works to be carried out by the drainage system and / or the local community before the new connection is made.

20. The EMP for the subproject includes mitigation measures and monitoring processes to manage and assess the expected and unexpected impacts of this project. The EMP also specifies responsibilities for implementation, and capacity development and training requirements of CWMS and the appointed PMU to monitor the implementation of the EMP. The implementation of the EMP will require assistance from an environmental specialist (ESS), and a construction supervision consultant (CSC) to take part in the audit work of the EMP.

C. Information Disclosure, Public Consultation, and Grievance Redress

21. According to Vietnamese law, for a water supply facility with a capacity of less than 50,000 m^3/day, it is not necessary to prepare an Environmental Impact Assessment Report (EIA) including public consultation but in accordance with the ADB Safeguard Policy Statement, for category B subprojects, it is necessary to conduct public consultation. As such, consultation on option of construction of WTP, technology processes, water supply alternatives, etc. is essential as a part of actual survey in project preparation. Public information and consultation activities were carried out as part of a baseline survey of local environmental conditions along the projects sites. Meeting with local authorities took place on 21 September 2013. Two public meetings were held in Ban Nhung CPC and Vinh Quang Town PC on 23 September 2016.

[1] Circular No.50/2015/TT-BYT dated 11 December 2015 of the Ministry of Health, providing for the inspection of drinking water and domestic water's sanitation and quality

22. During the consultation on environmental matters, local leaders and members of some households were given an introduction to the project, anticipated environmental impacts and mitigation measurements, the project implementation schedule and relevant environmental issues. Overall, there was no opposition raised with respect to the proposed subproject.

23. Three-step grievance redress mechanism will be established for the project, common to social as well as environmental safeguards, to handle environmental impacts and land occupation. As a guideline, any complaints to any project's aspects will be solved through negotiation to get agreement. Complaints will be submitted toward 3 levels of entities: First through commune/town's PC, then the Town's PC and finally through PPC. If an agreement was not reach, then they will be law court as the final method. The Center of Water Management and Supply (CWMS) will be responsible for the administration and costs of dispute resolution procedures in the operation phase.

D. Institutional arrangement

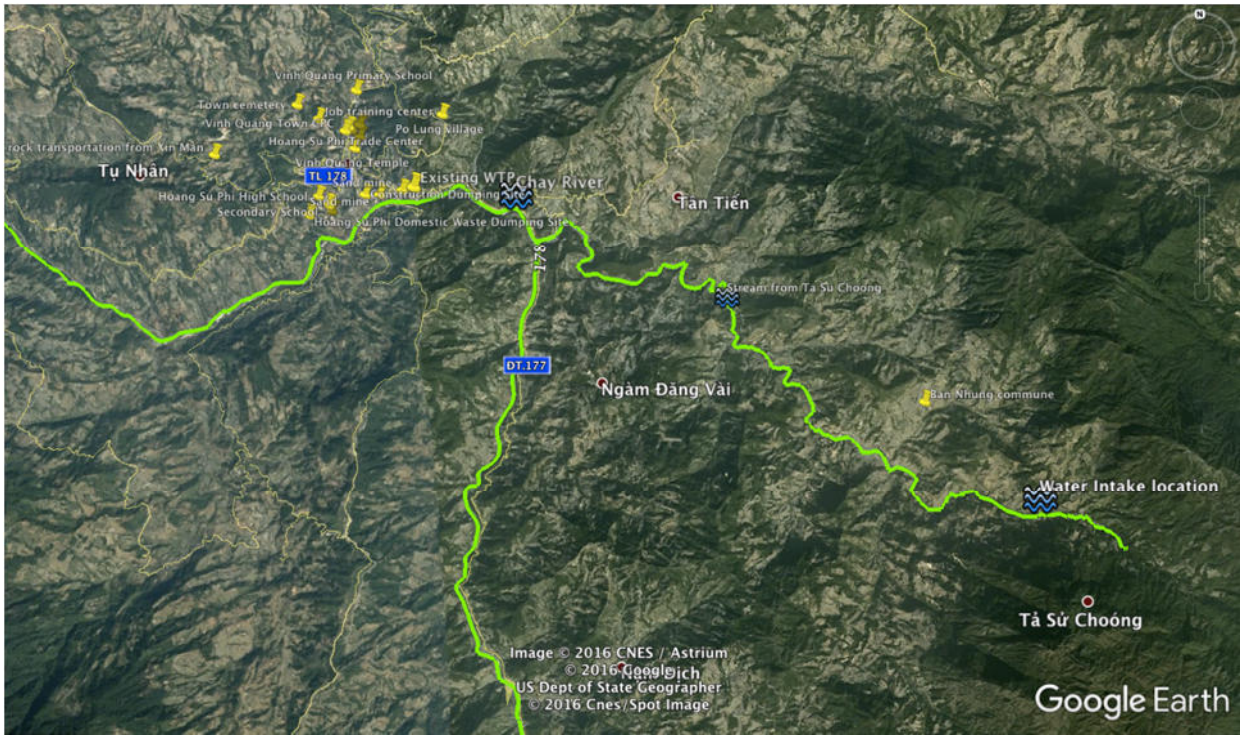
24. Ha Giang DPI will establish an Official Development Assistance (ODA) Project Management Unit (PMU) and assigned relevant staff to support the preparation of the subproject in the PPTA period. One member of the PMU has been assigned as the Environmental Safeguards Officer (ESO). Three staff, including the ESO, have been participating in a training course on "Fundamental Safeguard and Gender Safeguard Policy Statement (SPS) of ADB" under TA8902-Vie Capacity Building for Project Management Unit Professionalization - organized by ADB in August 2016. Environmental specialist (ESS) for subproject implementation will organize a formal training course and on-the-job training for relevant PMU staff, Construction Supervision (CSC), communities, contractors; and support for establishment and operation of the subproject environment management system in construction phase. The ESS will also support PMU's capacity building by reviewing and evaluating the capacity for environmental protection of the PMU and CWMS – subproject management organization in the operation phase.

25. To ensure that environmental protection and mitigation measures are included in the civil works contracts, the EMP will be included in the bidding documents and civil works contracts. Any omission of environmental management costs will create high risks for implementing mitigation measures during the construction phase due to lack of resources and capacity, thus the environmental protection cost and responsibilities need to be involved from the beginning. Bid documents will also specify that contractors shall engage capable and trained staff to take responsibility for the environmental management and safety issues at the working level and to monitor the effectiveness and review mitigation measures as the subproject proceeds.

E. Conclusion

26. The IEE concludes that the feasibility study of the subproject combined with available information is sufficient to identify the scope of potential environmental impacts and formulate mitigation measures for the subproject. Providing that significant changes to the subproject description do not occur at the detailed design phase, and that new sensitive environmental, or cultural resources are not encountered, further detailed environmental impact assessment (EIA) is not required. The ESS will update EMP on finalization of detailed design, the ESS will update EMP in accordance with changes in design, if any.

Figure 2 – General Map of Ha Giang and Subproject Area



II. BACKGROUND

A. Objectives of the Subproject

27. The objectives of the subproject will be achieved through upgrading the water supply system, providing greater access to clean water, especially for people in the mountainous areas, including poor households. Specifically, including Water supply system for domestic use for Vinh Quang town, Ban Nhung and Tu Nhan commune, Hoang Su Phi district.

28. The subproject is initially categorized as 'B' for environmental safeguards, and this IEE is required according to the ADB Safeguards Policy Statement (SPS) of 2009. The objectives and scope of this IEE are to (i) assess the existing environmental conditions in the vicinity of the subproject road; (ii) identify potential environmental impacts from the proposed water supply system subproject; (iii) evaluate and determine the significance of the impacts; (iv) develop an environmental management plan (EMP) detailing mitigation measures, monitoring activities, reporting requirements, institutional responsibilities and cost estimates to address adverse environmental impacts; and (v) carry out public consultations to document any issues/ concerns that stakeholders may have on the subproject and to ensure that such concerns are addressed in the subproject design and mitigation measures.

III. POLICY AND LEGAL FRAMEWORK

29. The subproject shall comply with requirements of ADB SPS 2009 and the GOV's Guidelines on Implementation of Law on Environmental Protection 2014. Decree No. 18/2015/ND-CP has detailed information on environmental protection assessment, environmental impact assessment and environmental protection plans. However certain activities commonly associated with infrastructure subproject such as quarry operations, extraction of gravel, etc., will also require permission from the relevant provincial level authorities. Depend on the scale; some constructions on the proposed road such as bridge or spillway shall require separated environmental impact assessment.

A. ADB SPS Requirements

30. ADB safeguard policy statement (SPS) 2009 imposes safeguard requirements for all projects. The SPS 2009 clarifies the rationale, scope and contents of the environmental assessment. It emphasizes environmental and social sustainability in progress of economic growth and poverty reduction in Asia and the Pacific, with the following aims:

(i) Avoid adverse impacts of projects on the environment and affected people, where possible;

(ii) Minimize/mitigate and/or compensate for adverse impacts on environment and affected people when avoidance is not possible; and

(iii) Help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks

31. For environmental safeguards, the Project is initially categorized as 'B' for environmental safeguards. Any subproject which is classified as category A on environmental safeguards will not be supported by the Project as it will rescale the whole Project to category A on environment.

B. Legal and Administrative Framework for Environmental Protection in Vietnam

32. The subproject has to comply with the environmental legal framework of Vietnam, which is outlined in this section. The main components of the framework, if not, the more applicable ones are shown here.

1. Laws

(i) Law No. 55/2014/QH13 of 23 June 2014 by the National Assembly on environment protection

(ii) Law No. 17/2012/QH13 of 21 June 2012 by the National Assembly on water resources

(iii) Law No. 20/2008/QH12 of 13 November 2008 by the National Assembly on Biodiversity Conservation

(iv) Law No. 68/2006/QH11 of 29 June 2006 by the National Assembly on standards and technical regulations

2. Decrees and Regulations

(i) Decree No. 18/2015/ND-CP dated February 14, 2015 on environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plans.

(ii) Circular No. 27/2015/TT-BTNMT dated May 29, 2015 on strategic environmental assessment, environmental impact assessment and environmental protection plans.

(iii) Circular No.50/2015/TT-BYT dated 11 December 2015 of the Ministry of Health, providing for the inspection of drinking water and domestic water's sanitation and quality.

(iv) National Technical Regulations on air and noise quality

- QCVN 05: 2013/BTNMT on ambient air quality
- QCVN 26: 2010/BTNMT on noise
- QCVN 27: 2010/BTNMT on vibration

(v) National Technical Regulations on water quality

- QCVN 01: 2009/BYT on drinking water quality
- QCVN 02: 2009/BYT on domestic water quality
- QCVN 08: 2008/BTNMT on surface water quality
- QCVN 09: 2008/BTNMT on underground water quality
- QCVN 14: 2008/BTNMT on domestic wastewater

3. Other legislation applicable to the subproject are the following

(i) Decision No. 3733/2002/QD-BYT of 10 October 2002 by the Ministry of Health promulgating 21 labor hygiene standards, 5 principles and 7 labor hygiene measurements

(ii) Law No. 50/2014/QH13 of 18 June 2014 by the National Assembly on construction

(iii) Circular No. 22/2010/TT-BXD of 03 December 2010 by the Ministry of Construction on labor safety in work construction

(iv) Law No. 10/2012/QH13 of 18 June 2012 by the National Assembly on labor code.

IV. PROJECT DESCRIPTION

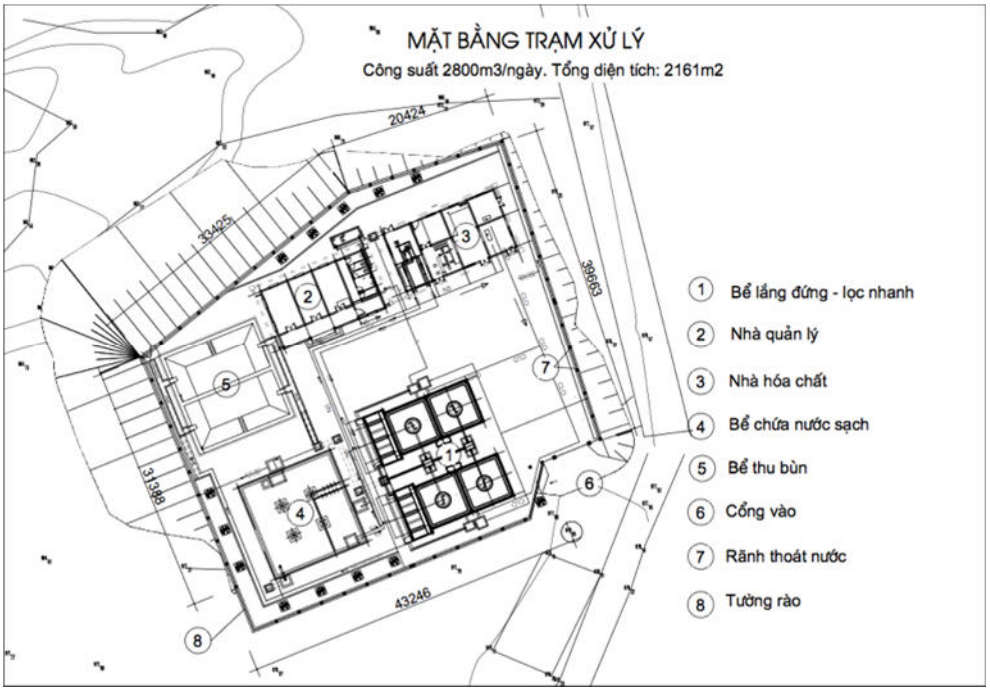
A. The need for subproject

33. The Vinh Quang water supply scheme was built in 2008 as phase I of a two-phase development. Phase 1 has 1,070-metered connections and is over-subscribed. Connected households fail to receive supply or supply at the design standard due to insufficient water (only 900 m^3/day) relative to design requirements (1,500 m^3/day). The current head works, treatment and pumping facilities are estimated to have a residual economic life of 5 years or less.

34. Phase II was planned to address the lack of water for households already connected to the system and increase the number of households receiving water by 2,500. Water is currently sourced from the Chay river but the lack of sufficient water and high turbidity were not anticipated at the design stage and a cleaner supplementary source, namely the Ta Su Chhong stream, has been identified. Current plant and operational management standards are generally high, being well organized and managed with supporting records and financial statements.

35. The feasibility study confirms that on completion, the subproject will supply a secure twenty four hour water supply service to approximately 8,263 beneficiaries based on the projected population and demand forecasts for 2030. The system can support an expected population growth rate of 2.2% / year in 10 years (increase to 11,630 people). The general location of the proposed Water Treatment Plant (WTP) is shown in Figure 3.

Figure 3 - Sketch map of the subproject works



(i)

B. Location and scope

36. The location of the proposed water source is the Pin Ho stream which flows into the Ta Su Choong stream in Ta Su Choong commune about 18km southeast from Vinh Quang town. According to aq rapid inspection of the PPTA and consult with people in Ta Su Choong commune, the stream originates from area near the peak of Ta Su Choong, divided into two branches at the proposed small dam. The dam will be constructed to collect water from the left branch. The water source is strong with low turbidity, continuous flow and an average flow depth of around 1.2m. The stream water has low turbidity and can be readily treated to feed a potable water supply system.

(i) Total estimated investment cost of the subproject is $2.3 million
(ii) The capital cost per household is $1,146.
(iii) Duration of construction period 12 months
(iv) The main components of the subproject:
- Construction of small dam to collect raw water at Ta Su Choong stream.
- Installation of 0.15 km raw water pipeline leading water from raw water pump station to the WTP using HDPE material. This pipeline is light, easy to install, low roughness and corrosion resistance.
- Construction of WTP with the capacity of 2,200 m^3/day, located about 150 m downstream of the reservoir near the bridge on the way from Pin Ho Bridge to Ta Su Choong commune, Hoang Su Phi district.
- The utility works: the operating house; chemical house; factory; warehouse; gate; fence; trees; road; drainage; electricity.
- Construction of transmission pipe system with the estimated length of 18 km from WTP to Vinh Quang town, Ban Nhung and Tu Nhan communes.

37. The distribution system is planned as an integrated network delivering water from the new WTP together with the existing system. A transmission pipeline will be installed to link the new WTP with the distribution network to create a completed network to transfer water effectively to the service area of Vinh Quang town, Ban Nhung and Tu Nhan communes (both existing and new water supply system could serve only two small residential areas of Ban Cay village with about 90 households in total 500 households of Tu Nhan commune).

C. Cost estimate

38. A construction cost estimate has been prepared for the Sub project based on the feasibility study outline designs. The unit rates used in estimating cost are published by the province and are current, and regularity updated.

39. The bill items have been rearranged in order to reflect more accurately common practice (civil engineering, treatment plant, distribution works, and construction management) and ADB procurement procedures, although still not in total agreement. The reordered bill of quantities is as follows.

Table 2 – Subproject Construction Estimate

No	Cost items	Base cost (Đ)	Tax (Đ)	Total Cost (Đ)	Total Cost (USD)
1	Construction costs	36,222,534,912	3,622,253,490	39,844,788,402	1,782,765
	Pipeline	24,547,591,505			

No	Cost items	Base cost (Đ)	Tax (Đ)	Total Cost (Đ)	Total Cost (USD)
			2,454,759,150	27,002,350,655	1,208,159
	Clean water tank (after treatment)	1,684,849,362	168,484,936	1,853,334,298	82,923
	Intermediate water tank (on the hill, before distribute to the town)	1,326,719,776	132,671,978	1,459,391,754	65,297
	Clarifying tank	3,662,979,797	366,297,980	4,029,277,777	180,281
	Sludge tank	90,055,699	9,005,570	99,061,269	4,432
	Water collector (intake tank)	116,714,723	11,671,472	128,386,195	5,744
	Gate, surrounding wall	1,153,201,675	115,320,167	1,268,521,842	56,757
	Internal power	394,587,850	39,458,785	434,046,635	19,420
	Operation house	552,212,783	55,221,278	607,434,061	27,178
	Management house	823,219,426	82,321,943	905,541,369	40,516
	Water trench for treatment station	131,610,102	13,161,010	144,771,112	6,477
	Ground leveling	1,738,792,215	173,879,221	1,912,671,436	85,578
2	Equipment costs	531,964,444	53,196,444	585,160,888	26,182
3	Management costs	624,311,926	62,431,193	686,743,119	30,727
4	Construction investment consultation costs	3,395,011,305	339,501,131	3,734,512,436	167,092
5	Other costs	1,723,427,468	165,829,850	1,889,257,319	84,531
5.1	General costs (temporary hut for workers, etc.)	1,332,151,962	133,215,197	1,465,367,159	65,565
5.2	Cost of design verification (Circular 75/2014/TT-BTC)	36,193,557	3,619,356	39,812,913	1,781
5.3	Cost of estimate verification (Circular 75/2014/TT-BTC)	34,976,480	3,497,648	38,474,128	1,721
5.4	Cost of examination and approval of final account	65,128,973	0	65,128,973	2,914
5.5	Independent audit	100,854,346	10,085,435	110,939,781	4,964
5.6	Works insurance	108,667,605	10,866,760	119,534,365	5,348
5.7	Management and operation training cost	45,454,545	4,545,455	50,000,000	2,237
6	Peripheral electricity costs	181,818,182	18,181,818	200,000,000	8,949
7	Compensation cost for land clearance	306,798,150	30,679,815	337,477,965	15,100

No	Cost items	Base cost (Đ)	Tax (Đ)	Total Cost (Đ)	Total Cost (USD)
8	Contingency cost	4,298,586,639	429,858,664	4,728,445,303	211,564
	Total	47,284,453,025	4,721,932,406	52,006,385,431	2,326,908
	Rounding			52,006,385,000	2,327,000

V. DESCRIPTION OF THE ENVIRONMENT

A. Natural Conditions

40. Ha Giang has a complex topography with large altitude variation. The average elevation of Ha Giang is 800m - 1200m Meters above sea level (MASL) with 5 mountains with the height varied from 2,000m to 2,500m. In general, Ha Giang topography could be divided into three main areas - they are:

41. **Area I**: the high stone mountains in the North, called Dong Van Karst Plateau, lying on the administrative areas of four districts (Quan Ba, Yen Minh, Dong Van, Meo Van). 90% of the natural area is karst mountain, typical for karst topography. Dong Van Karst Plateau has become a member of Global Geological Park network in 03 October 2010.

42. **Area II**: High area in the West including 3 districts of Hoang Su Phi, Xin Man and Quang Binh. This is the subproject area and is part of Bac Ha plateau, called Chay River stilted arch with average elevation from 1,000m to 2,000m. The mother rock in this area is mainly granite with feralit topsoil, from red to light yellow, grey yellow and some parts of humus allitic soil in the mountain.

43. **Area III**: The low soil mountains including the administrative area of Bac Me, Vi Xuyen, Bac Quang districts and Ha Giang city. The mother rock in this area is mainly metamorphic rock with topsoil, that varies from red to light yellow, grey yellow and the thickness of the layer is varied from 0.8 to 2m. The dominant topography of the area is low slope mountain; create large cultivation area above 50ha. This are is also has some dense forest strip in the flat and narrow valley along rivers and streams.[2]

44. The subproject area includes Vinh Quang town, Ban Nhung and Tu Nhan communes, Hoang Su Phi district, shown in Figure 2Figure 4 below. The location is described as follows:

(i) Bordering with Po Lo, Dan Van, Tan Tien communes, Hoang Su Phi district to the North
(ii) Truong Son commune, Vi Xuyen district to the East
(iii) Ban Peo, Ngam Dong Vai, Ban Luoc, San Sa communes, Hoang Su Phi district to the South
(iv) Po Li, Chien Pho communes, Hoang Su Phi district to the West.

45. The Hoang Su Phi district is mostly 1,300m -1,700m above sea level with two of the highest mountains in Vietnam being Tay Con Linh peak (2,423m), and Chieu Lau Thi peak (2,402m). Hoang Su Phi district terrain is basin shaped with the lowest levels in Vinh Quang town, neighbouring villages, and adjacent communes.

46. The site of the proposed treatment works (elevation 980m asl) requires the pipe network to be laid through steep terrain however this provides sufficient head to serve Vinh Quang town (average altitude approximately 550m), as well as surrounding communes (average altitude approximately 620m). At a service distribution level, Vinh Quang town has somewhat flatter terrain than the communes of Tu Nhan, Ban Nhung, but little flat area over 1ha exists. Not all households in the three administrative units will be served by the scheme.

[2] Status of Environment report (SOE) of Ha Giang province 2015 prepared by Environment Analysing and Technique Joint Stock Company under the Assignment of Ha Giang DONRE 07/2015

Figure 4 - Subproject Location

1. Weather, natural disaster and climate change

47. Ha Giang usually received deflect cold movement from the plain area and the Northeast mountainous area so there is no extreme cold condition period like in the Northeast mountainous area. Only in some high area, near the peak of the mountain like in Pho Bang area - 1,400m MASL, where the lowest temperature could fall down to 5.6^0C.

48. The topographical conditions of Viet Bac Mountainous area and Hoang Lien Son Range where Ha Giang is lying on has support the Province a high humidity conditions. The average humidity usually high, from 80 to 87%.

49. The annual rainfall is different between regions, from 1,031mm in Thuong Phung commune, Meo Vac district to 4,721mm in the subproject district of Bac Quang and 4,846 in Quang Ngan commune, Vi Xuyen district. The largest rainfall center of the country has been formed in two districts of the subproject: Bac Quang - Vi Xuyen, reached to 4,700 - 4,800mm. The rainy season lasts 6 - 7 months from April to October with the rainfall make up 83-91% of the total annual rainfall. December and January are the driest months of the year with the rainfall of 25mm. The rainfall of Hoang Su Phi is 1,388 mm.

50. The climate in Ha Giang is diversified not only based on the elevation but also the direction of mountain range. Ha Giang is not usually suffered from tropical storm but

thunderstorm, hailing and frost fog are happen frequently. The "thunderstorm" day could be reached to 90 - 100 days per year[3].

2. Hydrology

51. Ha Giang is situated upstream of 3 river basins including Lo River, Gam River and Chay River. Chay River originated from Tay Con Linh, flow Northeast - Southwest direction though the subproject area of Hoang Su Phi district then to Xin Man district before enter Yen Bai province. The total length of Chay River in Ha Giang is 44km and the water basin area is 816km^2 [4]. Chay River has a deep riverbed and steep riverbank with bank height of 400 to 450m. There are several mountain ranges run along the river and make many difficulties for local people to get water for their daily purpose[5].

52. Ta Su Choong stream originated from Ta Su Choong Mountain about 18km southeast from Vinh Quang town. The stream pours in Chay River at about 2km from the town.

53. Groundwater exists in both shallow and deep aquifers, however shallow aquifers (up to 10m) are often turbid and risk surface contamination from open streams and sinks holes. Groundwater is almost non-existent at higher elevations. Groundwater exists at greater depths (50m or more) and water in these aquifers is generally good quality. Reserves are difficult to evaluate, primarily as explorative drilling and pump testing has yet to be undertaken. Economically exploitable groundwater is difficult to evaluate.

3. Seismicity

54. Vietnam has been classified as a low seismicity region although earthquakes of up to degree VI on the Modified Mercali Scale have occurred in much of the northern mountain region, including Ha Giang province[6]. Ninety percent of the earthquakes that have occurred in Vietnam have taken place in the Northwestern Provinces. As Ha Giang lies along the Lai Chau - Dien Bien Fault, earthquakes could happen but mostly with low intensity (under degree IV) and the earthquakes center usually along the fault next to Thanh Thuy Border Gate in Thanh Thuy commune, Vi Xuyen district. At 12h45, July 17, 2005, a magnitude 4.5-richter scale earthquake occurred in the area of Lung Cu, Dong Van district causing minor damage but no fatalities[7]. Before that, a small earthquake was recorded at 8h54 on May 13, 2011 in the area of Piabioc Mountain, 50km from Ha Giang city with the magnitude of 4.7-richter scale[8].

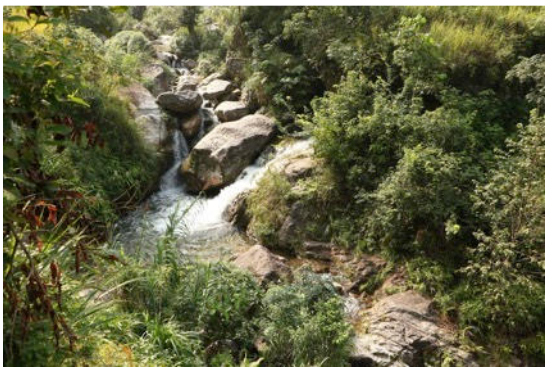
B. Ecological environment

55. The Pin Ho stream is fast flowing and follows a winding course, with steep banks. The vegetation on the stream banks is mainly shrub vegetation, which has colonized on the steep, rocky terrain. Species are well represented in forester and seep stream bank and hillside locations in the area. Water will be collected from the branch in the left then raw water pipe will cross the other branch, connect to the proposed WTP, on the side of the small mountain,

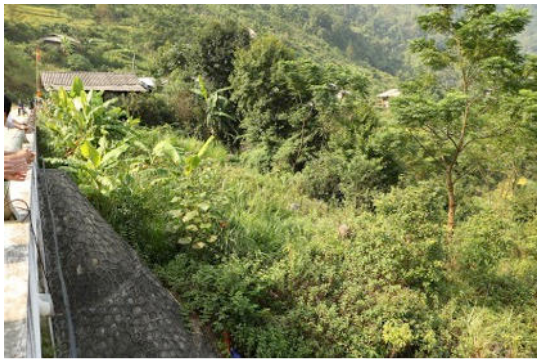
[3] Status of Environment report (SOE) of Ha Giang province 2015 prepared by Environment Analysing and Technique Joint Stock Company under the Assignment of Ha Giang DONRE 07/2015. SOE has analyzed hydrological data of 35-50 years from 5 hydrological stations and 32 rainfall stations in Ha Giang.
[4] Status of Environment report (SOE) of Ha Giang province 2015
[5] Status of Environment report (SOE) of Ha Giang province 2015
[6] UN Office of the Coordination of Humanitarian Affairs (OCHA) Viet Nam: Natural Hazard Risks issued March 2011. http://www.preventionweb.net/files/23469_ochavnmhazardv3110606.pdf
[7] http://vietbao.vn/Xa-hoi/Dong-dat-o-Ha-Giang-du-chan-o-Dien-Bien/10918673/157/
[8] http://vietbao.vn/Xa-hoi/Dong-dat-o-Ha-Giang/10770031/157/

roadside of the road from Pin Ho Bridge (Bac Quang - Xin Man road) to Ta Su Choong commune, about 150m from the proposed dam.

Figure 5 – Location of proposed dam and WTP



Location of proposed water intake



Proposed WTP location - next to the house

C. Social- economic Context

1. Administration areas and population

56. The total population in the three target communes is 9,680 people of 952 households but the number of beneficiaries will be 6,038 people in 13 villages out of 21 villages. The total number of households most likely to benefit is about 1,473, this represents 66% of the population of the three target communes. There are at least 389 households (10%) with female headed directly benefited from the proposed Project. Almost beneficiaries are ethnic minorities (85%). (See Table 3).

57. Three ethnic minority communities dominate in these communes/townships included Tay, Nung and Hoa (Chinese). In Vinh Quang Township, four main ethnic groups are Kinh (23%), Tay (23%), Nung (21%) and Dao (20%). Tu Nhan commune is home of three ethnic minorities of Tay (26%), Nung (32%) and Hoa- Chinese (36%), while almost inhabitants in Ban Nhung commune are Nung (89%) and Tay (10%).

Table 3 – Population and Ethnicity in Subproject Area

	Whole commune/township			Beneficiary area			
	Vinh Quang	Ban Nhung	Tu Nhan	Vinh Quang	Ban Nhung	Tu Nhan	Total
Number of Villages	8	8	5	8	3	2	13
Population (person)	3644	2458	3578	3644	1017	1377	6038
By sex							
Women	1786	1345	1672	1786	480	659	2925
Men	1858	1113	1906	1858	537	718	3113
Number of Households	952	499	778	952	206	315	1473
By ethnic group							
Kinh	217	4	3	217	4	2	223

Tay	216	49	120	216	38	82	336
Nung	198	446	524	198	164	100	462
Dao	187	0	1	187		1	188
Hoa (Chinese)	59	0	113	59		113	172
Hmong	15	0	2	15		2	17
Khac	60	0	15	60		15	75
Female headed households	342	30	60	342	9	38	389

Source: Data collected from Vinh Quang, Tu Nhan and Ban Nhung CPC, 2016

2. Economic development and income

58. Agriculture production is the dominant income source in the two communes, while trade and services are the main income source the Vinh Quang Township. In Vinh Quang township, agricultural gross value contributes 15% of the town's GRDP, while in Tu Nhan and Ban Nhung, agricultural production contributes about 90% of the commune's GRDP. Main crops are paddy, maize, soybean and ground nut. Agriculture occupies 21%, 58% and 50% of the total land area in Vinh Quang town, Tu Nhan Commune and Ban Nhung commune respectively. Plantation forestry occupies about 44% of total land area but has limited direct economic contribution as it is mostly protection forest.

3. Social services

59. Health facilities including quality clinic facilities, doctors and nurses are available to provide health care services at commune level. Every commune has a clinic located in the commune center with one doctor and three nurses/midwives. In Quang Vinh Township, there is a district hospital. At site visits, participants in the focus group discussion stated that they are satisfied with the health care services and more ethnic minority women now give birth at the commune clinic.

4. Historical, cultural and religious presence

60. The terraced field located in Ban Luoc, San Sa Ho, Ban Phung, Ho Thau, Nam Ty and Thong Nguyen communes of Hoang Su Phi district has received the certifications of National Heritage on 16 September 2012. The area is about 40km to the west of Vinh Quang town and it is the cultivation area of La Chi, Red Dao, Dao Ao Dai and Nung people from hundred years ago.

5. Unexploded Ordnance

61. There has been no armed conflict in the site in recent decades. Nonetheless, nearly 40 years after Vietnamese - Chinese border war ended, unexploded ordinance (UXO) remains from aircraft, booby traps and land mines, all of which are indiscriminate and all of which result in concealment of the ordinance and information on the extent and location of UXO is sparse. In some locations, such as the sites of former combat bases or military supply routes, the scale of the risk is high. For most of the rest of the country, the level of risk for any one site is largely unknown. Prior to earthworks and especially for the pipeline excavation corridors, survey for the presence UXOs has to be conducted by an authorized bomb and mine Clearance Company.

D. Surface Water Resources

62. The water source of the proposed Water supply system is the Ta Su Choong stream, which starts from natural spring from Ta Su Choong mountain, Ta Su Choong commune, Hoang Su Phi district. It flows westwards to the center of Vinh Quang town and then pour in Chay River, about 2km from the town.

63. The water intake is located less than 500m downstream of the stream head, where the stream is divided into two branches. The site was inspected by the PPTA team. The water source is clean, appears to flow steadily and has an average depth of around 2 m.[9]

64. The intake is located in the upper reaches of the catchment area. While there are offtakes for irrigaiton further downstream, Due to steep terrain and sparse population in the valley, there is limited competing use for the stream water.

E. Water Quality

65. The quality of the source water at the of Ta Su Choong stream is good, not polluted by cultivation activities as the proposed dam location is less than 500m from the stream head. Ta Su Choong stream meets the water needs for Vinh Quang town, Ban Nhung and Tu Nhan communes as the input for clean water demand at present and long term.

66. The Ta Su Choong (Pin Ho) water was sampled in September 2016 and tested by an accredited testing laboratory (Vilas). High levels of turbidity are a source of concern when sourcing water in upland mountainous catchments like the Pin Ho river as the treatment process is more laborious and produces filtered material (sludge). The turbidity in the sample was 0.52 NTU and well within WHO guidelines, which establishes that the turbidity of drinking water shouldn't be more than 5 NTU, and ideally be below 1 NTU. An earlier set of samples tested in March and May 2016 recorded higher levels of turbidity (9.31 and 3.2). The latter of these is within the WHO limit but the former is high and may have been after a rainy period. Tested result in May 2016 is showed in Table 4 below.

67. There are currently no known upstream sources of sanitation pollution (town, industry, agribusiness, etc.) that might threaten water quality. However, the coliform value of the water sample testing September 2016 is high (800 MPN/100ml), no coliforms or E.coli should be detectable in 100 ml. The earlier samples recorded levels of 2,400 and 2,500 (MPN/100ml), which suggests that dwellings along the river are discharging wastewater into the water and causing localized pollution. To address chlorine dosing will be used in the treatment works.

68. The test results were checked against the relevant national standards (QCVN 08-MT 2015, 01-2009 and TCVN 33-2006) and confirm the proposed water source is suitable provided the scale and level of treatment plant technology is appropriate. The Subproject O&M plan would include a regular water testing program to detect any changes in the ambient quality in the water source and confirm that the water in the clear water tank distributed through the pipeline network meets national treated water standards.

[9] The PPTA Consultants strongly recommend that ADB seek assurance from Ha Giang PMU that the subproject establish water gauging stations at the proposed water source prior to Fact Finding and that where the gauge data differs by more than 10% from current reported data a detailed hydrological assessment be undertaken prior to subproject approval. Concurrently monthly water quality tests should be undertaken

69. Based on the survey results, the quality of water in Ta Su Choong stream met the requirement as raw water for Water supply system for domestic use as stated in QCVN 08:2015-MT/BTNMT[10].

Table 4 - Test result of Ta Su Choong Stream's raw water source[11]

No	Properties	Unit	Result	QCVN 08:2015-MT/BTNMT	Testing method
1	pH	-	7.6	6 – 8.5	APHA 4500-pH
2	Turbidity	NTU	9.31	-	APHA 2130- Turbidity
3	Color	Pt – Co	11	-	A PHA 2120
4	Alkalinity	mg $CaCO_3$/l	200		APHA 2320-Alkalinity
5	Hardness	mg $CaCO_3$/l	130	-	APHA 2340-Hardness
6	Oxidization	mg O_2/l	2	-	APHA 4500-KMnO4
7	Total Suspended Solid (TSS)	mg/l	1	20	APHA 2540
8	COD	mg O_2/l	2	10	APHA 5220-COD
9	Ammonium (NH_4+ - N)	mg/l	0.04	0.3	APHA 4500-NH3 TCVN 5988-1995
10	Nitrite (NO_{2-} - N)	mg/l	0	0,05	APHA 4500 TCVN 6180-1996
11	Nitrate (NO_{3-} - N)	mg/l	0.12	2	APHA 4500 TCVN 6178-1996
12	Arsenic (As)	mg/l	< 0.01	0.01	APHA 3500 - As
13	Manganese	mg/l	0.01	0.1	APHA 4500-Mn
14	Total Iron (Fe)	mg/l	0.01	0.5	APHA 3500-Fe
15	Iron (II)	mg/l	< 0.01	0.5	APHA 3500-Fe
16	Chloride	mg/l	8.51	250	HACH 4500-Chloride B
17	Coliform	MPN/100ml	-	0	

[10] QCVN 08-MT:2015/BTNMT National Technical Regulation on Surface Water Quality Column A1: Water quality for domestic water supply and other purposes

[11] Water sampled at Ta Su Choong bridge on 12 May 2016 by Environment Analysing and Technique Joint Stock Company

VI. IMPACT, ALTERNATIVE AND MITIGATION MEASURES

A. Area of influence of the subproject

70. The area of influence of the subproject includes the water intake area, the adjacent water treatment plant site, the area involving the pressure tank at Vinh Quang town and the areas served by the two pipe distribution networks and the area along the raw water transmission pipe. It includes Vinh Quang town, Tu Nhan, Ban Nhung and Ta Su Choong communes, Hoang Su Phi district.

B. Expected benefits

71. The benefits of the subproject are improved public health by ensuring full time reliable access to clean water for most of the local people in Vinh Quang town, Ban Nhung and Tu Nhan communes. The water will be safe for drinking and cooking, reducing the incidence of water related disease, which in turn improves the quality of life for beneficiaries, reducing the need to purchase safe water, and reduces productive time lost to illness.

72. Many households in the region seek other water sources by themselves for the purposes of catering and drinking. Commonly, groups of about 3-5 households invest together in a tank system and water pipeline directly from small stream heads to their house for catering. The capacity of these supplies is inadequate and also reportedly declining so households use dual systems of mountain water for consumption and stream, and river water for washing.

C. Alternative; Design and Location Consideration

73. To meet the investment objective of sufficient water for domestic use for the 2,045 households, 17 businesses, and 61 Government agencies with total 8,263 people – being the demand requirement forecast for 2030, the estimated scope of the subproject is:

(i) Small dam for water collection
(ii) Water extraction pumping station
(iii) Fresh water treatment station with capacity of 2,200 m3/day (1 station).
(iv) Installation of a distribution pipeline network of total length 18 km.
(v) Household connections

74. Potential sources of water examined during the field study for the Sub project include the Vinh Quang, Phu Lung, Nam Pung, Ta Su Choong, and Pin Ho streams. A summary of their suitability is as follows:

(i) The Vinh Quang stream flow varies between 0.3 m^3/s and 2.1 m^3/s but is heavily polluted from gravel and sand extraction and unsuitable;
(ii) The Phu Lung stream has a minimum flow of around 0.6m^3/s and highest of 4.2 m^3/s. It currently supplies water for two small hydropower stations and is an unsuitable water supply source as dry season abstraction would seriously affect their operation;
(iii) Flows in the Nam Pung stream vary from 0.36 m^3/s and 2.52 m^3/s although during the field survey, flows were negligible and this source is clearly incapable of supplying water for the Sub project;

(iv) The Ta Su Choong stream is served by a waterfall located at an altitude at about 1,100m and has been ruled out as a potential water supply source because of poor access; and,
(v) The Pin Ho Stream (Hoang Su Phi district's meteorological centre), the smallest volume is 0.97 m³/s with a maximum estimated flow of 6.14 m³/s.

75. The Pin Ho Stream (Ta Su Choong stream) is recommended as the water source for the implementation of the subproject.

D. Pre-construction activities

76. The preconstruction activities under the subproject area are site clearance along the raw water pipeline, WTP and distribution networks. A small house located where the proposed 150m raw water pipelines will be relocated for the construction activities. A Resettlement and Ethnic Development Plan (REMDP) has been prepared to cover compensation and assistance based on ADB SPS.

77. **Slope stability**. The 150m-access road to the WTP will follow an existing track but will involve widening to form the road bench. This will involve some cutting into the hillside, and will also alter the existing water flows on the hillside. Risks are to be mitigated by design measures to protect the slopes and manage drainage. This will include (i) careful design of the access road, minimizing the amount of cutting necessary to form the road, (ii) providing for retention on the downslope side (iii) a geotechnical assessment of slopes to be cut should be made, and suitable retention or revetment structures included in the design as necessary (iv) a hydrological assessment and design of road drains and culverts, including cascades to direct runoff water as necessary (v) provision for cut slopes to be re-vegetated with grass and shrub species.

78. **Protection of the water source**. Provision will be made in the detailed design to include a perimeter fence around the water sources to exclude animal traffic and reduce contamination from animal waste.

E. Potential Impacts and Mitigation Measures in the construction phase

1. Loss of trees and impact to fauna

79. **Impacts:** Construction work will involve some removal of trees along 150m access road and WTP proposed position itself. The trees on the hill of proposed WTP are mainly young trees, shrubs and terraced fields. These species are well represented in nearby wooded areas, and strips of riparian vegetation and forests in the area and as such the vegetation on the hill does not present a unique habitat. The number of trees that will be cut down as part of the works will be very few, so the impact is not large.

80. Mitigation measures: Trees owned by local residents that will be removed, will be compensated under the provisions of the REMDP. To reduce the impact on further trees and vegetation, the DARD office of Hoang Su Phi district will be informed about the number of tree to be cut down, construction time and schedule. The contractor will not use or permit the use of fuel wood for construction activities or for cooking and water heating in worker's camps. The contractor will prohibit staff from collecting fuel wood from nearby forests and will not buy or use wood from illegal sources. The PMU assisted by the ESS and CSC will strictly supervise and monitor the protection of trees and other vegetation.

2. Generation of surplus soil

81. **Impacts:** Soil from excavation activities to construct the access road and building platform, which could not be reused as piled fill soil will release silt and cause possible soil erosion on slopes if discarded in situ.

82. **Mitigation measures:** Most of the excavated soil will be reused as filling soil to cover the pipe system. Thus, large amounts of excavated soil will not need to be discarded. The remaining surplus will be reused to the extent possible as a base material for the WTP site, for access road construction if suited for the purpose, or provided to local people for use on public or private land, as they desire. Any further surplus soil will be transferred to a disposal site, to be agreed with the CSC and local authorities.

3. Generation of construction waste

83. **Impacts:** Solid waste that will be generated from construction mainly includes waste from workers' camps, debris, and packaging of materials and equipment cement cover, oil containers, crates and cardboard. Some may be contaminated with hazardous or semi hazardous substances. Domestic waste from workers camps may include organic waste, as well as plastic and other packaging and semi toxic items such as used batteries. Other waste will be generated at workshops, storage sites, refueling sites and depots. This is a minor impact, as the main construction site is the proposed WTP, small access road.

84. **Mitigation measures:** Contractors will be required to (i) reuse construction waste such as cement bag cover, metal tools where possible and (ii) install rubbish bins at work sites and in worker's camps to allow efficient collection of waste and transport the solid waste to a disposal site approved by the CSC.

4. Impact from noise, dust and vibration generated by the construction activities

85. **Impacts:** Earthworks and rock crushing activities will be the main sources of dust. Construction machines and vehicles will generate gaseous emissions (NOx SOx, CO, CO_2, etc.) when they are in operation. These gaseous emissions and dust could cause health problems for residents who live near the construction site and along the transportation route and along the distribution pipeline network. The impact is considered as minor as the WTP and access road will be constructed at a hill near Ta Su Choong mountain, about 3 km from the nearest residential area of Ban Nhung commune. The installation of distribution network will be done mainly by manual work.

86. **Mitigation measures:** The contractors should not locate any large or noisy construction machines near residential area of Ban Nhung, Tu Nhan communes and especially Vinh Quang town and will work with 3 CPCs, with the representative of ESS and PMU, to identify suitable materials transportation route. During the dry period, the sites and patches near residential areas, especially the sensitive receivers like Hoang Su Phi Ethnic Boarding High school, Vinh Quang secondary school, Hoang Su Phi high school, Vinh Quang kindergarten, Vinh Quang primary school, Vinh Quang temple... should be sprayed with water regularly to suppress dust generated PMU and CSC will responsible to monitor these mitigation measures.

5. Impact on local traffic

87. **Impacts:** Distribution pipelines installation is likely to cause hindrance in traffic flow along PR177 and road from Pin Ho Bridge to Ta Su Choong commune center if not mitigated properly especially in the area of Vinh Quang town. Pupils will get difficulties on their way to schools and local people will get difficulties on their way to Hoang Su Phi trade center. The impact duration will be short, during the distribution pipelines installation in 12 months construction phase.

Mitigation measures: To minimize the disturbance to local people, the contractor will inform Tu Nhan, Ban Nhung CPCs, Vinh Quang town PC the construction schedule for distribution pipelines in advance and will also coordinate with traffic police of Hoang Su Phi district to implement appropriate traffic diversion schemes (if needed) to avoid inconvenience due to pipelines installation, setup clear traffic signal boards and traffic advisory signs at the trade center and school areas.

6. Safety of construction workers

88. **Impacts:** Workers are at risk of accidents associated with construction, particularly the installation of the long distribution water pipe from Ta Su Choong stream to Vinh Quang town and Tu Nhan commune.

89. **Mitigation measures:** The contractors will (i) conduct training for workers on safety, including roles and responsibilities, safe site practices and environmental hygiene (ii) institute site and camp rules such as wearing proper safety apparel such as safety boots, helmets, protective clothes, gloves and ear protection, (iii) ensure all excavation sites are fenced with sign boards and perimeter markers; (iv) allocate responsibility to supervisor staff to ensure that all safety rules are followed by all staff at all times. The project will take note of opinions and complaints from local people and authorities on safety.

F. Potential Impacts and Mitigation Measures in the Operation Phase

1. Risk of water pollution and pipe breakages

90. **Impacts:** The water source of Ta Su Choong stream could be polluted by the cultivation activities and animal waste along the upstream; increasing the turbidity and contamination level for the raw water pumped to the WTP. Treated water could also be polluted due to the failure of the treatment system or inappropriate operation procedures like the chemical control. The water pipe could be broken, leading to waste of water and contamination.

91. **Mitigation measures:** CWMS will install fences surround the water intake location to avoid cattle trespassing and install warning boards at the intake location as well as some main points along the distribution pipeline system. CWMS will also inspect the water intake, pipeline system regularly and fix any system failure in time to ensure adequate water supply and quality. CWMS, in collaboration with DARD office of Hoang Su Phi district, will conduct propagandas to raise awareness of local people for water quality protection.

2. Risk of accident during WTP operation process

92. **Impacts:** Chemicals using in the WTP, like chlorine, especially in powder form, could be leaked and impact on the health of operation workers. Other work accident could happen if the worker not to be trained properly and follow the safe working procedures.

Mitigation measures: The WTP must be equipped with a fire control system and protective gear for workers. Workers should be trained in the principles of safe working, emergency steps and proper handling and storage of chemicals. Among the chemicals, chlorine is the most toxic and therefore requires safe storage and handling. The operating procedures of the plant should include an inspection and maintenance schedule for all chemical storage and treatment equipment. Chlorine containers must be kept in a dry place and stored separately from non-hazardous materials.

VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. The purpose of information disclosure, consultation and participation

93. Public consultation shall include: the following aspects:

(i) A summary of the proposed works under the subproject;

(ii) A summary of subproject objectives and likely positive and negative environmental impacts, covering the impacts in design, construction and operation phases for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders;

(iii) Invitation for feedback in respect of any areas of concern that the public may have, and suggested means of implementation; Summarizes comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Indigenous Peoples;

(iv) Acceptability of the proposed works to the public; and

(v) Request for information on the known occurrence of unexploded ordinance in the area where the scheme components will be built and facilitating participation of affected people during project implementation.

B. Method of consultation and participation

94. The method of information dissemination and consultation and participation includes the rapid assessment methodology and stakeholders participation and consultation using the following techniques:

(i) In-depth interview (live-interview): organizing dialogues, meetings and discussions with local authorities, including interview via phone for additional information. At the commune level, the participants are usually deputy chairman and land administrative staff of the CPC.

(ii) Obtaining information on the questionnaire (integrated with the social survey)

(iii) Public consultation meeting at the CPC with the participant of affected households; representatives of commune, district and provincial level.

C. Consultation process

95. The PPTA in collaboration with the local authorities held consultations. These were conducted as part of the baseline survey on local environmental conditions along the pipeline corridor and the location of the WTP.

96. The main content of the consultation meeting was to announce the main information of the Water Supply System for Vinh Quang town and neighboring communes; the adverse environment impacts, proposed mitigation measures to be applied during the construction phase and operation phase. The participants also expressed their views as well as other opinions related to the Subproject and other issues.

D. The result of information disclosure and public consultation

97. In general, there is no arising opposition against the proposed subproject. All the local people have showed their supportive altitude and looking the construction commencement as soon as possible.

98. The public consultation meeting was held in Vinh Quang Town PC's meeting room for people of Vinh Quang town and Tu Nhan commune with the participant of 11 people, of whom 4 are women; and in Ban Nhung CPC's meeting room for people of Ban Nhung commune with the participant of 8 people, of whom 1 is woman. These two meetings are also organized with the participant of local authorities of Vinh Quang Town, Ban Nhung and Tu Nhan communes. The meetings were held in September 23, 2016.

99. IEE, including Environmental Management Plan (EMP) will be translated in Vietnamese and will be made available at the office of the People's Committees (PC) of Vinh Quang town, Tu Nhan and Ban Nhung communes.

VIII. GRIEVANCE REDRESS MECHANISM

A. Purpose of the mechanism

100. During the preparation of the subproject, information is disseminated to local people on the scope of the subproject; environmental, social impacts and the grievance redress mechanism. Negative impacts of an environmental or social nature, or resettlement impacts, may occur during the construction and operational phases. Any comments/ suggestions of local people will be solved quickly, transparently in accordance with protected the law, particularly for people affected by the subproject. This grievance redress mechanism is classified by level and responsibilities of involved parties/ The GRM will be disclosed with the IEE and other safeguard documents to ensure that potentially affected persons are aware of it and their entitlement to raise complaints. During construction, the Contractor will appoint a member of his staff to act as the focal point, who will liaise with the Community Supervision Board and, if appropriate, the complainant(s) to address and seek solutions to any grievance that relates to the Contractor's actions.

B. Grievance redress process

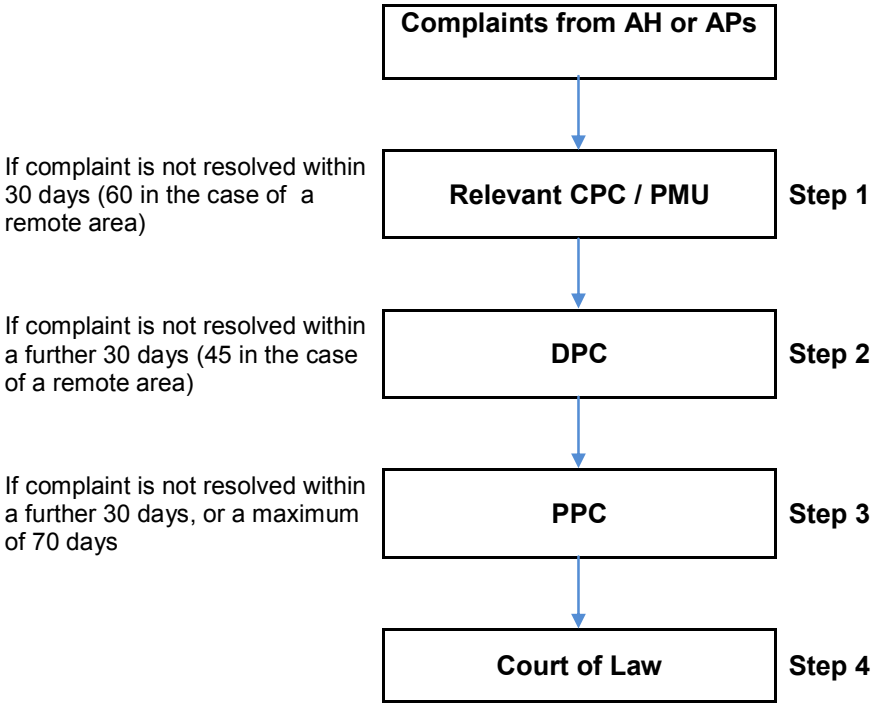
101. There are three steps to address complaints received from stakeholders:

***Stage 1*:** If a household or individual has any complaint he/she can submit a complaint in written or verbal form to the representative of the CPC-community monitoring board (usually the Deputy Chairman of the commune/town). The CPC will work with PMU to solve complaints and a representative PMU will respond in written form to the complainant. The CPC, as a whole body will meet personally with the aggrieved affected household and will have 30 days and a maximum of 60 days after the lodging of the complaint to resolve the complaint, however, depending upon whether it is a complicated case or case comes from a remote area. The CPC secretariat is responsible for documenting and keeping file of all complaints that it handles.

Stage 2: If after 30 days or 45 days (in remote areas) the aggrieved affected household does not hear from the CPC, or if the affected household is not satisfied with the decision taken on his/her complaint, the affected household may bring the case, either in writing, to any member of the DPC. The DPC in turn will have 30 days or a maximum of 70 days after the lodging of the complaint to resolve the case, however, depending on whether the case is complicated or in remote area. The DPC is responsible for documenting and keeping file of all complaints that it handles and will inform the District Resettlement Committee (DRC) of any decision made and the DRC is responsible for supporting DPC to resolve AH's complaint. The DPC must ensure that the complainant is notified of the decision made

Stage 3: If after 30 days or 45 days (in remote area) the aggrieved affected household does not hear from the DPC, or if the affected household is not satisfied with the decision made on his/her complaint, the affected household may bring the case, either in writing, to any member of the PPC. The PPC has 30 days or a maximum of 70 days to resolve the complaint to the satisfaction of all concerned. However, depending if the case is complicated or from a remote area The PPC is responsible for maintaining records of complaints received, action taken and outcomes.

Stage 4: If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, after a period of thirty days, complainants have the right to bring the case to a Court of law for adjudication. The decision of the Court is binding on all parties.



C. Stake holder communication strategy

102. Messages to be delivered and disclosures to be made to the whole range of stakeholders involved in the subproject are also being made cleared by the PPTA. Details are showed in the Appendix

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Imolementation Arragements

103. Ha Giang PMU will recruit one Environment Safeguard Specialist (ESS) under Loan Implementation Consultants (LIC) to support subproject implementation in Ha Giang. ESS will support PMU updated EMP and as well as monitor the compliance of the contractors during construction phase. ESS will also responsible for training and capacity building on the implementation of EMP.

104. PMU will engage Construction Supervision Consultant (CSC) for the monitoring and supervision of the subproject in general and for environmental monitoring as well. CSC will ensure that the contractors implement the provisions of the subproject EMP.

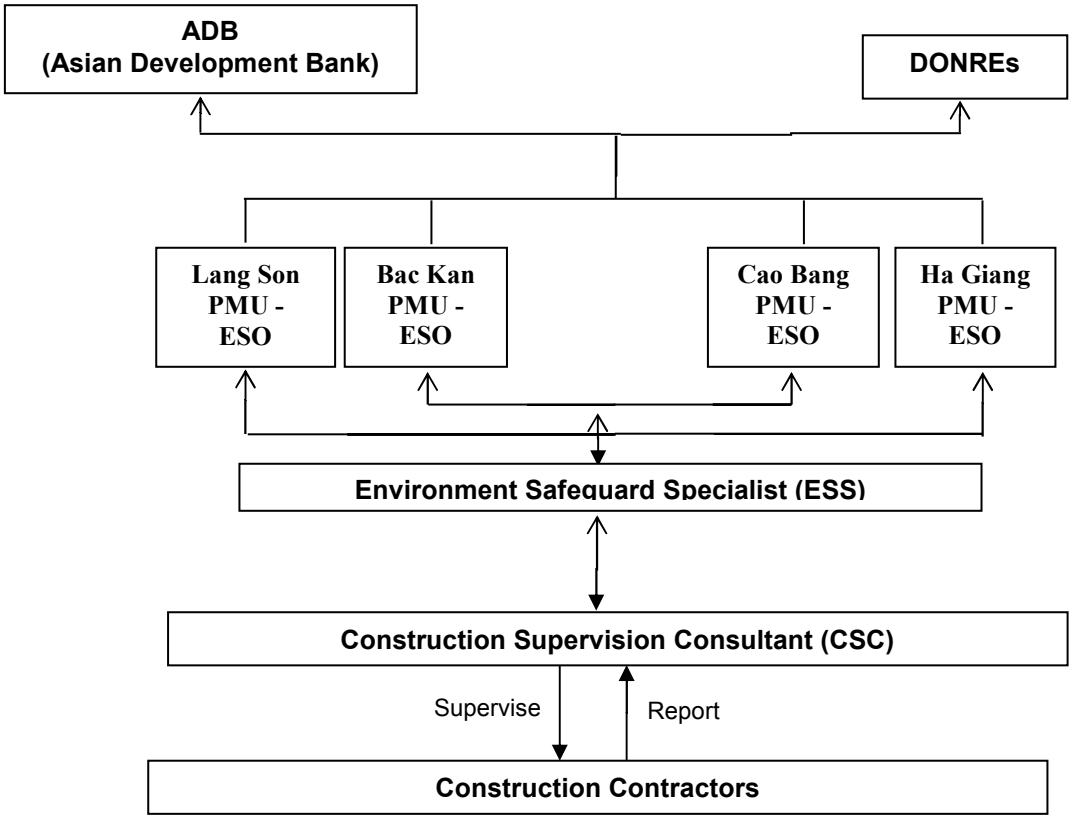
Table 5 – Responsibilities for EMP implementation

Agency	Responsibilities
Ha Giang Project Management Unit under DPI (PMU)	- Ensure that EMP provisions are strictly implemented during various subproject phases (design/pre-construction, construction and operation) to mitigate environmental impacts to acceptable levels. - Undertake monitoring of the implementation of the EMP (mitigation and monitoring measures) with assistance from CSC and ESS. - Ensure that Subproject implementation complies with ADB's environmental policy and safeguards policy statement (SPS 2009) principles and requirements - For subproject duration, commit and retain a dedicated staff within PMU as environment and safeguards staff to oversee EMP implementation - Ensure that environmental protection and mitigation measures in the EMP are incorporated in the detailed design. - With the support from ESS, updated EMP to suitable with any changing in subproject scope or any unanticipated impact rise. - Obtain necessary environmental approval(s) from DONRE prior to award of civil works contracts - Include the Subproject updated EMP in the bid and contract documents for civil works - Establish an environmental grievance redress mechanism, as described in the IEE, to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the Subproject's environmental performance - With assistance from ESS, prepare semi-annual environmental monitoring reports for submission to ADB - Based on the results of EMP monitoring, identify environmental corrective actions and prepare a corrective action plan, as necessary, for submission to ADB.
Environmental Safeguards Staff (ESO)	- PMU staff support for EMP implementation - Work closely with ESS to daily supervise of EMP implementation and preparation of EMP monitoring report
Environment Safeguard Specialist (ESS)	- Update EMP to make it suitable with the current condition or whenever subproject scope change or any unanticipated impact rise. - Ensure that the environmental protection and mitigation measures identified in the EMP for the design stage has been incorporated in the detail design; - Assist PMU to ensure that all environmental requirements and mitigation measures from the IEE and EMP are incorporated in the bidding documents and contracts. - During detailed design phase carry out baseline data collection on air quality, noise and surface water quality (as specified in the EMP) - Review the Contractor's method statements on waste management and spoils

	disposal to ensure compliance with the EMP - Implement all mitigation and monitoring measures for various subproject phases specified as ESS's tasks in the EMP - Work with PMU to execute any additional environmental assessment prior to subproject construction as required in the EMP (e.g., preparation of new or supplementary environmental assessment in case of change in alignment that will result to adverse environmental impacts that are not within the scope of the IEE prepared during loan processing, etc.) - Undertake environmental management capacity building activities for PMU as described in the IEE and EMP. - Engage international and national environment specialists to ensure proper implementation of EMP provisions. Through these specialists, the ESS shall: (i) ensure proper and timely implementation of ESS's tasks specified in the EMP, (ii) conduct environmental training as specified in the IEE/EMP for PMU, (iii) conduct workers' orientation on EMP provisions, (iv) undertake regular monitoring of the contractor's environmental performance, as scheduled in the EMP (v) conduct field measurements for surface/ground water quality, dust and noise as required in the EMP, and (v) prepare environmental baseline report and environmental semi-annual environmental monitoring reports , as specified in the EMP, for submission to ADB.
Construction Supervision Consultant (CSC)	- Provide the ESS relevant information as well as full access to the subproject site and all project-related facilities (such as construction yards, workers' camps, borrow and quarry areas, crushing plants, concrete mixing plants, etc.) to monitor contractors' implementation of the subproject EMP, assess environmental impacts resulting from on-going site works and operation related facilities, undertake environmental effects monitoring and orientation of workers on EMP implementation. - Undertake day-to-day subproject supervision to ensure that contractors properly implement the EMP. - Orient workers on EMP implementation, and health and safety procedures - Document and report to PMU on occupational accidents, diseases and incidents - As part of regular progress report submission to PMU, prepare reports on the status of the contractors' implementation of the EMP and health and safety issues - Engage an environmental staff to ensure proper implementation of the above tasks.
Contractors	- Recruit qualified environmental officer to ensure compliance with environmental statutory and contractual obligations and proper implementation of the Subproject EMP - Ensure full understanding of the EMP and resources require for its implementation when preparing the bid for the work - Implement additional environmental mitigation measures, as necessary - During detailed design phase, prepare method statement (Waste Management and Spoils Disposal Plan) described in the IEE/EMP.
Center for Water Management and Supply (CWMS)	- Responsible for operation and maintenance of subproject assets - Implement EMP monitoring during operation
Ha Giang Department of Natural Resources and Environment (DONRE)	Review and approve environmental assessment reports required by the Government. - Undertake monitoring of the subproject's environmental performance based on their mandate

105. The organization structure of Environmental Management Plan is showed in the chart below:

Figure 6*:* EMP Implementation Organization Chart



B. Environment Impact Mitigation

106. The anticipated environmental impacts and mitigation measures discussed in the previous section is presented in Table 6. The table also shows responsibilities and timeframe/schedule for implementation of mitigation measures and monitoring.

107. Table 6 shows that most mitigation activities during pre-construction are to be implemented by the ESS while during construction, measures shall be primarily implemented by the contractors. During operation stage, DARD shall undertake environmental mitigation and monitoring requirements specified in the EMP. To ensure implementation of mitigation measures during construction, the EMP shall be included in the tender and contract documents for civil works. Contractors' conformity with environmental contract procedures and specifications shall be regularly monitored by PMU with assistance from CSC and results shall be reported semi-annually to ADB.

Table 6 - Detail Environmental Mitigation Plan

Environmental Concern	Objective	Proposed Mitigation Measures	Locations	Timing	Responsible to implement	Budget
Preconstruction Detailed Designs Phase						
1. Land acquisition and resettlement	Control the impact of land acquisition and resettlement	1. Affected persons well informed ahead of project implementation 2. Monitor the compensation process to ensure it is suitable with the Land Acquisition and Resettlement Report	N/A	Before subproject starts	PMU	Included in the operation cost of PMU
2. Slope stability	Minimize the impact on the stability of the slope by access road construction activities	1. Minimize the amount of cutting necessary to form the road in the design 2. Design for retention on the downslope side. 3. Conduct geotechnical assessment and include suitable retention or revetment structures in the design. 4. Conduct hydrological assessment and design of road drains and culverts. 5. Design the re-vegetated with grass and shrub species for cut slopes.	In all subproject area	Before subproject starts	Design consultants	Included in the contract with the consultant
3. Protection of water source	Avoid water source pollution	1. Include a perimeter fence around the water sources in the detailed design	At the water intake area	Before construction start	Design consultants	Included in the contract with the consultant
Construction Phase						
1. Loss of trees and impact to fauna	Avoid and minimize impact to flora and fauna in the subproject area	1. Minimize vegetation covers clearances. 2. All replanting works to utilize locally available non-invasive species. 3. The contractors will not use or permit the use of wood,as fuel for the execution of any part of the works and to the extent practicable will ensure that fuels other than wood are used for cooking, and water heating in all camps and living accommodations. 4. Contractors will not buy or use wood from the illegal sources (that come from the illegal logging)	At the WTP construction area, along the proposed access road to the WTP	Through out the construction phase	CPCs, Contractors	Included in the contract with the contractors
2. Generation of surplus soil	Control surplus soils	1. Reuse excavated soil as filling soil to cover the pipe system. 2. Surplus soil will be reused to the extent possible as a base material for the WTP site 3. Further surplus soil will be transferred to a disposal site as agreed with the CSC and local authorities	Through out construction site	Through out construction phase	Contractors	Included in the contract with the contractors
3. Generation of construction waste and domestic waste from workers	Control waste disposal	1. Reuse construction waste such as cement bag cover, metal tools where possible. 2. Install rubbish bins at work sites and in worker's camps. 3. Transport the solid waste to a disposal site approved by the CSC.	Through out construction site and worker camps area	Through out construction phase	Contractors	Included in the contract with the contractors

4. Dust, noise and vibration	To minimize negative impacts from dust, noise and vibration during construction period	1. Large or noisy machines will not be located near residential area of Ban Nhung, Tu Nhan communes and Vinh Quang town. 2. Work with Ban Nhung, Tu Nhan CPCs, Vinh Quang town PC, ESP and PMU to identify suitable materials transportation route. 3. Spray water regularly to suppress dust generated at the sites and patches near residential areas during the dry period	Along the pipe installation line, WTP and access road construction site, material transportation road	Through out construction phase	Contractors	Included in the contract with the contractors
5. Traffic management	Minimize disturbance of traffic	1. Inform Ban Nhung, Tu Nhan CPCs, Vinh Quang town PC in advance the construction schedule for distribution pipelines. 2. Coordinate with traffic police of Hoang Su Phi district to implement appropriate traffic diversion schemes (if needed) 3. Setup clear traffic signal boards and traffic advisory signs at the Hoang Su Phi trade center and school areas.	Along the distribution pipelines and materials transportation route, especially area near Hoang Su Phi trade center.	Through out construction phase	Contractors	Included in the contract with the contractors
6. Safety precautions for workers and public safety	Ensure worker and local people safety	1. Conduct training for workers on safety, including roles and responsibilities, safe site practices and environmental hygiene 2. Institute site and camp rules like wearing protective tools properly. 3. Ensure all excavation sites are fenced and sign boards, perimeter markers installed 4. Liaison with the power company to ensure that qualified technicians are on site to ensure that safety procedures are followed 5. Assign responsibility to supervisor staff to ensure that all safety rules are followed	Through out the construction site	Through out the construction phase	Contractors	Included in the contract with the contractors
Operation phase						
1. Water pollution and pipe breakages	Ensure the quality of the water supply	1. Install fences surround the water intake location to avoid cattle trespassing 2. Install warning boards at the intake locations and some main points along the pipeline. 3. Inspect the water intake, pipeline system regularly and fix any system failure in time. 4. Collaborate with DARD office of Hoang Su Phi district to conduct propagandas to raise awareness of local people for water quality protection	Water intake area, along the pipeline	Continuously	CWMS	Included in the operation budget of CWMS

C. Environmental monitoring

108. An environmental monitoring program will be outlined to monitor the environmental impacts arising during project implementation, including:

(i) Monitoring the surrounding environment: only typical pollutants arising from the project construction is required to be monitored in accordance with existing standards and regulations of Vietnam with a frequency of at least once in every 6 months, the supervisory positions will be expressed explicitly in a diagram with annotation and coordinate under current regulations.
(ii) Monitoring will capture impacts identified during contract supervision including erosion impact, sediment, changes of surface water level, groundwater, and impact on the socio-economic objects (if any).
(iii) The monitoring locations will also be shown in a diagram with annotation and coordinate under current regulations.

109. Ha Giang PMU or ESS under Loan Implementation Consultants will implement environmental monitoring program during the construction phase. In the operation phase, CWMS and DARD office in Hoang Su Phi district will implement environmental monitoring program.

Compliance Monitoring

110. Table 7 below shows the program for monitoring the compliance on various provisions of the EMP during construction and operation phases. ESS needs to implement a number of measures during detailed design phase (e.g., incorporation of environmental design measures into the detailed design, update EMP, etc.) and this will be confirmed by PMU to ADB. During construction, most of the mitigation the contractors shall implement measures and CSC and ESS shall monitor their environmental performance, in terms of implementation of such measures. The timing or frequency of monitoring is also specified in Table 7. During operation EMP implementation shall be the responsibility CWMS.

111. Prior to implementation of the subproject the IEE and EMP will be updated and amended, as necessary, by ESS after the detailed designs are complete and contracting arrangements are known. Such updating shall be based on reconfirmation and any additional information on the assumptions made at this feasibility stage on location scale and expected conditions of the subproject.

Environmental Effects Monitoring

112. ESS undertakes baseline environmental monitoring for air quality, noise and surface water quality. Sampling will be conducted prior to start of site works at the specified locations. During construction, ESS shall undertake quarterly monitoring of surface water quality and air quality and noise in the same locations sampled during pre-construction. Additional sampling occasions shall be carried out and additional parameters shall be analyzed (as necessary) to validate complaints and/or investigate pollution events caused by the subproject. CWMS will responsible for treated water quality monitoring in the first year of the operation phase.

Table 7 - Environmental Compliance Monitoring

Environmental Concern	Parameter to monitor	Location	Frequency & verification	Responsible to monitor	Estimated Cost
Design and Pre-construction Phase					
1. Land acquisition and resettlement	Compensation documents	N/A	Once, before construction start	Ha Giang DPI, DONRE and PMU	Included in the operation budget of Ha Giang PMU
2. Slope stability	Design documents	N/A	Once, before construction start	Ha Giang PMU	Included in the operation budget of Ha Giang PMU
3. Pollution of water source	Perimeter fence in design documents	N/A	Once, before construction start	Ha Giang PMU	Included in the operation budget of Ha Giang PMU
Construction phase					
4. Loss of tree and impact to fauna	Check of implementation	At the WTP construction site, along the access road to the WTP	Before construction commencement and through out construction phase. Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC
5. Waste and surplus soil disposal	Check of implementation	Through out construction site, designated disposal area	Bi-weekly Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC
6. Dust, noise and vibration	Check of implementation	Through out construction site	Bi-weekly and spot checks Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC

7. Traffic management	Check of implementation	Through out construction site, along material transportation route, near Hoang Su Phi trade center in Vinh Quang town	Bi-weekly Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC
8. Safety precautions for workers and public safety	Check of implementation. Check compliance to Labor Code of Vietnam and other relevant Decision, Decree and Circular under Government requirements	Through out construction site	Bi-weekly Part of daily construction supervision	ESS/ PMU CSC	Included in the operation budget of PMU/ ESS/ CSC
Operation of WTPs & Pipeline Network					
9. Water pollution and pipe breakages	Public complaints of operation of WTPs, drinking water availability & quality, and malfunctions with pipelines (e.g., leaks).	On property of WTP, pipelines, and pump stations, water intake location	Continuously	CWMS	Included in the operation budget of CWMS

Table 8 - Environmental Effect Monitoring

Environmental Concern	Parameter to monitor	Location	Frequency & verification	Responsible to monitor	Estimated Cost
Design and Pre-construction Phase					
1. Air quality (dust, CO, NOx, SOx, noise, wind, and vibration levels) to supplement baseline air quality data collected during PPTA and reported in IEE Water quality parameters sampled in Ta Su Choong stream during PPTA & reported in IEE.	Using field and analytical methods described in QCVN and TCVN standards for ambient air and surface water quality sampling & analysis.	Representative sites of heavy civil & earthwork including along truck routes At raw water intake location	One day and one night measurement	ESO	Included in the operation budget of Ha Giang PMU
Construction phase					
A) Air quality: dust, CO, NOx, SOx, noise, wind, and vibration levels B) Surface water quality: TSS, heavy metals (As, Cd, Pb,) oil and grease, total & fecal coliform, pH, DO, COD, BOD_5, temperature, NH_3, and other nutrient forms of N & P. C) Public comments and complaints D) Incidence of worker or public accident or injury	A – B: Using field and analytical methods described in QCVN and TCVN standards for ambient air and surface water quality monitoring. Include visual observations of dust and noise from contractor & public reports. C) Information transferred by telephone hotline number D) Regular reporting by contractors/ Ha Giang PMU	A – B): At the intake water area C): Using hotline number placed at construction areas D): At all construction	(A–B): Quarterly during construction periods (1 time for baseline data and 4 times in 1 year construction) C) Continuous public input D) Continuous	Quarterly	A) &B) (60$ & 500$) per sample times under cost norm of Ha Giang[12] C) & D) With (no extra cost)
Operation of WTPs & Pipeline Network					
Treated water quality: total & fecal coliform, pH, DO, NH_3, NO_3, NO, chlorine, PAC, NaCl, and heavy metals (As, Cd, Pb,).	Using field and analytical methods described in QCVN & TCVN standards for water quality monitoring, and parameters of QCVN 14:2008/BTNMT & TCXDVN 33:2008/BXD. Follow the procedures under Circular No.50/2015/TT-BYT providing for the inspection of drinking water and domestic water's sanitation and quality	At WTP & random user locations along distribution network	Biannually for parameter under B column, or when public complaint arises	CWMS	Included in the operation budget of CWMS

[12] Figures have been estimated base on Ha Giang cost norm.

D. REPORTING

113. PMU will submit the following reports to ADB:

(i) ***Monitoring report for baseline environment****:* this report shows the result of baseline environment as implemented by ESS on ambient air quality, surface water quality... This report will be submitted to ADB before the construction start.

(ii) ***Environmental monitoring reports****:* Environmental monitoring reports will cover the status of EMP implementation in terms of required mitigation measures for different phases of the subproject, results of environmental effects monitoring (air quality, noise and surface water quality), necessary remedial actions to effectively address negative environmental impacts due to subproject implementation, status of environmental capacity building activities as well as documentation of complaints received and corresponding action/resolution. The environmental monitoring reports will be submitted to ADB semi-annually during the construction phase and annually for two years after completion of construction.

Table 9 – Reporting procedures

Project Phase	Type Of Report	Frequency	Responsibility	Submitted To Whom
Construction	**Environmental Performance Report** indicating compliance with EMP and monitoring results at the contractor site	Daily	Construction contractor	CSC
	Subproject EMP Compliance Report indicating compliance with subproject EMP and monitoring results	Quarterly	CSC	PMU
	EMP Compliance Report indicating compliance with subproject EMP and monitoring results	Semi-annually during construction phase	ESS/ PMU	ADB
Operation	**EMP Compliance Report: Operation** indicating compliance with subproject EMP commitments during operation	Annually in the first year of operation. On-going frequency to be determined based on review after 1 year.	CWMS	DONRE Office of Hoang Su Phi DPC

Table 10 – Estimated cost for EMP Implementation (1-year construction/ 2-year in total)

Item	Estimated cost (US$)
Staff Costs	
1. Environment Safeguard Specialist (ESS)	***9,568***
1 National ESS - 03 man-months (intermittent in 1 year construction) – 2,000 US$/ man-month	6,000
Per diem for ESS: 48 US$ x 22 days x 3 months	3168
Travelling cost for 2 round trips: 200 US$ x 2 trips	400
EMP Budget	
2. Environmental effects monitoring (implemented by ESS)	***800***
Ambient air quality: 1 monitoring location x 5 times x 60 US$/sample[13]	300
Surface water quality: 1 monitoring location x 5 times x 100 US$/sample[14]	500
3. Training/orientation, local transportation, supplies (by ESS)	***1700***
a) Training/orientation: 1 formal training course for PMU, CSC, Contractors, CWMS and DARD office of Hoang Su Phi district and other "on the job" training	750
b) Local transportation and supplies	950
4. Printing Environmental monitoring report by ESS (2 reports)	***500***
Subtotal (2+3+4)	**3,000**
5. Contingency	**150**
Total (2+3+4+5)	**3,150**

E. CAPACITY BUILDING

114. In Viet Nam, the environmental assessment process is established but environmental awareness and capability for implementation of EMP in infrastructure projects of both the executing agency and the implementation agency (PMU) are limited and in development. The safeguards staff of the PMU is usually responsible for many different task and do not have good background on safeguards issues. Usually, the engineer will also be in charge of the environmental monitoring and his/ her capacity is not suitable to check the adequacy of the subproject EMP. The IEEs and EMP are referred to the environmental department in DONRE for approval. During the Project PPTA phase, a Project Preparation Unit has been established under Ha Giang DPI with one staff has been assigned as ESO.

115. The most significant challenge is the lack of human and financial resources and necessary infrastructure. To address this constraint, Ha Giang DPI/PMU will designate a full time

[13] Figures have been estimated base on environmental monitoring cost norm of Ha Giang province.
[14] Figures have been estimated base on environmental monitoring cost norm of Ha Giang province.

staff as environmental safeguards officer (ESO) to handle the environmental aspects of the subproject during implementation stage. The ESO and other relevant staff of PMU will be trained by the Environment Safeguard Specialist (ESS) during subproject implementation as “on the job” training or by formal training courses.

Table 11 – Detail capacity building program

Objective	1. Build capacity and procedures in undertaking systematic environmental assessments in accordance with Government regulations and ADB guidelines 2. Provide training on international best practice on environmental management, monitoring and reporting. 3. Provide guidance on how to effectively incorporate environmental measures into project design and how to incorporate EMP provisions into tender and contract documents.
Tasks/Scope of Work	1. Undertake training needs analyses and review prevailing government regulations and donor guidelines governing the assessment and management of environmental impacts for road development. 2. Review the skills of PMU and CWMS staff to establish existing capacity on environmental assessments, environmental monitoring and implementation of mitigation measures for road development project. 3. Prepare the training plan and relevant training materials. 4. Deliver the training, which may be through a combination of hands-on assistance, on-the-job training, and training workshops. 5. Evaluate the effectiveness of the training measuring improvements in attitudes and skills achieved. 6. Modify the training documents/materials as necessary. 7. Hand-over the amended training documents/ material to the project manager for use in the delivery of the training. 8. Prepare report on result of training.
Time frame	Possible within 2 months after construction commencement
Target participant	Staff in PMU and CWMS who responsible for environmental management
Staff resources	National environmental specialist with at least 15 years experience on environmental management water supply subprojects and must possess relevant graduate degrees in civil engineering, environmental management and other relevant courses.

X. CONCLUSIONS AND RECOMMENDATIONS

116. This IEE study was carried out in the Technical Assistant for Project Preparation (PPTA) phase. Primary and secondary data were used to assess potential environmental impacts in a comprehensive manner and public consultation and route reconnaissance were carried out in order complete the environmental assessments and recommend suitable mitigation measures. The IEE report provides a picture of potential environmental impacts associated with the upgrading of the subproject road and suitable mitigation measures have been recommended.

117. The implementation of the subproject "Construction and Expanding Water Supply System of Vinh Quang Town and Tu Nhan, Ban Nhung Communes, Hoang Su Phi District, Ha Giang Province" will improve conditions and enhance water supply services for project beneficiaries especially people in the mountainous areas and the poor people so that they can access the qualified and sanitary water resource for their domestic, production and tourism demand. Several actions are required during the detailed design stage to minimize impacts to acceptable levels. The negative environmental impacts from the upgrading works will mostly take place during the construction stage. All of the impacts during construction phase should be very predictable and manageable and with appropriate mitigation and few residual impacts are likely. Additional human and financial resources will be required to improve environmental capability and to progress and achieve necessary statutory compliance and environmental clearance certification for the subproject or associated activities that also require environmental permits under the environmental laws of Viet Nam – LEP 2014.

118. No further or additional impact assessment is considered necessary at this stage. At the implementation stage, PMU through ESS will develop detail EMP to monitor the schedules of mitigation measures and conduct of environmental effects monitoring activities. EMP must be updated to ensure effective environmental monitoring and should be develop follow-monitoring plan as specified in the EMP. With these measures in place, environmental impacts of the subproject should be manageable and will not result in any residual impacts, which are above accepted environmental standards.

XI. APPENDIX

A. Appendix 1: Photos of the subproject area

Overview of water intake area (Pin Ho bridge

Water intake of the existing water supply in Chay River

Grass grow on top of sludge tank as a natural cooling system

Public consultation in Ban Nhung commune

B. Appendix 2: Source of Reference Information

1. *Ha Giang Status of Environmental Report 2015*
2. *Ha Giang Climate Change Adaptation Plan (2011-2020)*
3. *Report on Pollution control under Environmental Protection Plan in 2015 Ha Giang Environmental Agency*
4. *The PO reports of the PPTA for Ha Giang Province*
5. *Social and Resettlement Report of the PPTA*
6. *The subproject Feasibility Study*

C. Appendix 3: Environmental Mitigation Measures to Include into Bidding Documents

1. Loss of trees and impact to fauna	1. Minimize vegetation covers clearances. 2. All replanting works to utilize locally available non-invasive species. 3. The contractors will not use or permit the use of wood,as fuel for the execution of any part of the works and to the extent practicable will ensure that fuels other than wood are used for cooking, and water heating in all camps and living accommodations. 4. Contractors will not buy or use wood from the illegal sources (that come from the illegal logging)
2. Generation of surplus soil	1. Reuse excavated soil as filling soil to cover the pipe system. 2. Surplus soil will be reused to the extent possible as a base material for the WTP site 3. Further surplus soil will be transferred to a disposal site as agreed with the CSC and local authorities
3. Generation of construction waste and domestic waste from workers	1. Reuse construction waste such as cement bag cover, metal tools where possible. 2. Install rubbish bins at work sites and in worker's camps. 3. Transport the solid waste to a disposal site approved by the CSC.
4. Dust, noise and vibration	1. Large or noisy machines will not be located near residential area of Ban Nhung, Tu Nhan communes and Vinh Quang town. 2. Work with Ban Nhung, Tu Nhan CPCs, Vinh Quang town PC, ESP and PMU to identify suitable materials transportation route. 3. Spray water regularly to suppress dust generated at the sites and patches near residential areas during the dry period
5. Traffic management	1. Inform Ban Nhung, Tu Nhan CPCs, Vinh Quang town PC in advance the construction schedule for distribution pipelines. 2. Coordinate with traffic police of Hoang Su Phi district to implement appropriate traffic diversion schemes (if needed) 3. Setup clear traffic signal boards and traffic advisory signs at the Hoang Su Phi trade center and school areas.
6. Safety precautions for workers and public safety	1. Conduct training for workers on safety, including roles and responsibilities, safe site practices and environmental hygiene 2. Institute site and camp rules like wearing protective tools properly. 3. Ensure all excavation sites are fenced and sign boards, perimeter markers installed 4. Liaison with the power company to ensure that qualified technicians are on site to ensure that safety procedures are followed 5. Assign responsibility to supervisor staff to ensure that all safety rules are followed

D. Appendix 4: National Technical Regulations of Vietnam

NATIONAL TECHNICAL REGULATION

ON SURFACE WATER QUALITY

1. GENERAL PROVISIONS

1.1. Scope of application

1.1.1. This regulation specifies the limit value of surface water quality parameters.

1.1.2. This regulation applies to assess and control the quality of surface water source, as a basis for the protection and use of water appropriately.

1.2. Explanation of terms

Surface water referred to in this Regulation is water flowing through or stagnate on the ground, streams, canals, ditches, gullies, arroyos, lakes, ponds, swamps, ...

2. TECHNICAL REGULATIONS

Limit values of the surface water quality parameters are specified in Table 1.

Table 1. Limit values of the surface water quality parameters

No.	Parameters	Unit	Limit values			
			A		B	
			A1	A2	B1	B2
1	pH		6-8,5	6-8,5	5,5-9	5,5-9
2	Dissolved oxygen (DO)	mg/l	≥ 6	≥ 5	≥ 4	≥ 2
3	Total suspended solidss (TSS)	mg/l	20	30	50	100
4	COD	mg/l	10	15	30	50
5	BOD_5 (20^0C)	mg/l	4	6	15	25
6	Ammonium (NH^+_4) (as N)	mg/l	0,1	0,2	0,5	1
7	Clorua Chloride (Cl^-)	mg/l	250	400	600	-
8	Florua Fluoride (F^-)	mg/l	1	1,5	1,5	2
9	Nitrite (NO^-_2) (as N)	mg/l	0,01	0,02	0,04	0,05
10	Nitrate (NO^-_3) (as N)	mg/l	2	5	10	15
11	Phosphate (PO_4^{3-}) (as P)	mg/l	0,1	0,2	0,3	0,5
12	Xianua Cyanide (CN-)	mg/l	0,005	0,01	0,02	0,02
13	Asen (As)	mg/l	0,01	0,02	0,05	0,1
14	Cadimi (Cd)	mg/l	0,005	0,005	0,01	0,01
15	Lead (Pb)	mg/l	0,02	0,02	0,05	0,05
16	Chrom III (Cr^{3+})	mg/l	0,05	0,1	0,5	1
17	Chrom VI (Cr^{6+})	mg/l	0,01	0,02	0,04	0,05

18	Copper (Cu)	mg/l	0,1	0,2	0,5	1
19	Zinc (Zn)	mg/l	0,5	1,0	1,5	2
20	Nickel (Ni)	mg/l	0,1	0,1	0,1	0,1
21	Iron (Fe)	mg/l	0,5	1	1,5	2
22	Mercury (Hg)	mg/l	0,001	0,001	0,001	0,002
23	Surface-active substances	mg/l	0,1	0,2	0,4	0,5
24	Total oil & grease	mg/l	0,01	0,02	0,1	0,3
25	Phenon (Total)	mg/l	0,005	0,005	0,01	0,02
26	Organic chlorine pesticide					
	Aldrin + Dieldrin	µg/l	0,002	0,004	0,008	0,01
	Endrin	µg/l	0,01	0,012	0,014	0,02
	BHC	µg/l	0,05	0,1	0,13	0,015
	DDT	µg/l	0,001	0,002	0,004	0,005
	Endosunfan(Thiodan)	µg/l	0,005	0,01	0,01	0,02
	Lindan	µg/l	0,3	0,35	0,38	0,4
	Chlordane	µg/l	0,01	0,02	0,02	0,03
	Heptachlor	µg/l	0,01	0,02	0,02	0,05
27	Organic phosphorus pesticide					
	Parathion	µg/l	0,1	0,2	0,4	0,5
	Malathion	µg/l	0,1	0,32	0,32	0,4
28	Herbicide					
	2,4D	µg/l	100	200	450	500
	2,4,5T	µg/l	80	100	160	200
	Paraquat	µg/l	900	1200	1800	2000
29	Total radioactivity α	Bq/l	0,1	0,1	0,1	0,1
30	Total radioactivity β	Bq/l	1,0	1,0	1,0	1,0
31	E.coli	MPN/ 100ml	20	50	100	200
32	Coliform	MPN/ 100ml	2500	5000	7500	10000

Note: The classification of surface water to assess and control the quality of water for various purposes of water use:

A1 - Good use for the purpose of domestic water supply and other purposes, such as type A2, B1 and B2.

A2 – Used for the purpose of domestic water supply but applying the appropriate treatment technology; aquatic plant and animal conservation, or purposes of use as type B1 and B2.

B1 - Use for irrigation and drainage purpose or other purposes with similar water quality requirements or other purposes of use such as type B2.

B2 – Water transportation and other purposes with low water quality requirements.

3. METHOD FOR DETERMINATION

3.1. Sampling for surface water quality monitoring conducted under the guidance of national standards:

- TCVN 5992:1995 (ISO 5667-2: 1991) - Water quality - Sampling. Guidance on sampling techniques.

- TCVN 5993:1995 (ISO 5667-3: 1985) - Water quality - Sampling. Guidance on storage and handling of samples.

- TCVN 5994:1995 (ISO 5667-4: 1987) - Water quality - Sampling. Guidance on sampling in natural and artificial lakes and ponds.

- TCVN 5996:1995 (ISO 5667-6: 1990) - Water quality - Sampling. Guidance on sampling in rivers and streams.

3.2. Analytical methods to determine the parameters of surface water quality shall comply with the guidance of the national standards or corresponding analytical standards of international organizations:

-TCVN 6492-1999 (ISO 10523-1994) - Water quality - Determination of pH.

-TCVN 5499-1995. Water quality - Determination of dissolved oxygen - Winkler method.

- TCVN 6625-2000 (ISO 11923-1997) - Determination of suspended solids by filtration through glass-fibre filters

- TCVN 6001-1995 (ISO 5815-1989) - Water quality - Determination of biochemical oxygen demand after 5 days (BOD 5) - Dilution and seeding method.

- TCVN 6491-1999 (ISO 6060-1989) - Water quality - Determination of the chemical oxygen demand.

- TCVN 6494-1999 - Water quality - Determination of ions of fluoride, chloride, nitrite, Orthophotphat, bromide, nitrate and soluble sulphate in liquid ion chromatography.

- TCVN 6194-1996 (ISO 9297-1989) - Water quality - Determination of chloride. The method of titration of nitrate silver with chromate indicator (MO method).

- TCVN 6195-1996 (ISO 10359-1-1992) - Water quality - Determination of fluoride - Electrochemical probe method for potable and lightly polluted water

- TCVN 6178-1996 (ISO 6777-1984) - Water quality - Determination of nitrite. Molecular absorption spectrometric method.

- TCVN 6180-1996 (ISO 7890-3-1988) - Water quality - Spectrometric method using sulfosalicylic acid

- TCVN 5988-1995 (ISO 5664-1984) - Water quality - Determination of ammonium - Distillation and titration method.

- TCVN 6181-1996 (ISO 6703-1-1984) - Water quality - Determination of total cyanide.

- TCVN 6336-1998 (ASTM D 2330-1988) - Test method for Methylene Blue Active Substances

- TCVN 5991-1995 (ISO 5666-3-1984) - Water quality - Determination of total mercury by flameless atomic absorption spectrometry - Method after digestion with bromine

- TCVN 6002-1995 (ISO 6333-1986) - Water quality - Determination of manganese - Formaldoxime spectrometric method

- TCVN 6053-1995 (ISO 9696-1992) - Water quality - Measurement of gross alpha activity in non-saline water - Thick source method

- TCVN 6177-1996 (ISO 6332-1988) - Water quality - Determination of iron - Spectrometric method using 1,10 - phenanthroline

- TCVN 6193-1996 (ISO 8288-1986) - Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead - Flame atomic absorption spectrometric methods

- TCVN 6197-1996 (ISO 5961-1994) - Water quality - Determination of cadmium by atomic absorption spectrometry

- TCVN 6222-1996 (ISO 9174-1990) - Water quality. Methods for the determination of total chromium by atomic absorption spectrometry

- TCVN 6626-2000 (ISO 11969-1996) - Water quality - Determination of arsenic - Atomic absorption spectrometric method (hydride technique)

- TCVN 6216-1996 (ISO 6439-1990) - Water quality - Determination of phenol index - 4-Aminoantipyrine spectrometric methods after distillation

- TCVN 5070-1995 - Water quality - Weight method for determination of oil and oil products

- TCVN 6053-1995 (ISO 9696-1992) - Water quality - Measurement of gross alpha activity in non-saline water - Thick source method

- TCVN 6219-1995 (ISO 9697-1992) - Water quality - Measurement of gross beta activity.

- TCVN 6187-1-1996 (ISO 9308-1-1990) - Water quality - Detection and enumeration of coliform organisms, thermotolerant coliform organisms and presumptive Escherichia coli - Part 1: Membrane filtration method

The parameters specified in this Regulation not having national standards guiding the analytical method shall apply the corresponding analytical standards of the international organizations

4. IMPLEMENTATION ORGANIZATION

This Regulation shall apply in substitution for TCVN 5942:1995 - Water quality - surface water quality standards in the List of Vietnamese standards on environment which is mandatorily applied and issued together with Decision No. 35/2002/QD-BKHCNMT dated June 25, 2002 of the Minister of Science, Technology and Environment.

In case the national standards referred in this Regulation amended and supplemented or superseded shall be applied under new documents.

QCVN 09 : 2008/BTNMT

NATIONAL TECHNICAL REGULATION

ON UNDERGROUND WATER QUALITY

Introduction

QCVN 09:2008 / BTNMT was written by the Compilation Board of national technical regulations on water quality, submitted by the General Department of Environment and Legal Department for approval and issued under the Decision No. 16/2008/QD-BTNMT dated December 31, 2008 of the Minister of Natural resources and Environment.

NATIONAL TECHNICAL REGULATION

ON UNDERGROUND WATER QUALITY

1. GENERAL PROVISIONS

1.1. Scope of application

1.1.1. This regulation specifies the limit value of underground water quality parameters.

1.1.2. This regulation applies to assess and control the quality of underground water source, as a basis for the orientation of various purposes of use.

1.2. Explanation of terms

Underground water in this Regulation is the water in the soil and rocks underground.

2. TECHNICAL REGULATIONS

Limit values of the underground water quality parameters are specified in Table 1.

Table 1: Limit values of the underground water quality parameters

No.	Parameters	Unit	Limit values
1	pH	-	5,5 - 8,5
2	Hardness (as CaCO3)	mg/l	500
3	Total solids	mg/l	1500
4	COD ($KMnO_4$)	mg/l	4
5	Ammonium (as N)	mg/l	0,1
6	Chloride (Cl-)	mg/l	250
7	Fluoride (F-)	mg/l	1,0
8	Nitrite (NO^-_2) (as N)	mg/l	1,0
9	Nitrate (NO^-_3) (as N)	mg/l	15
10	Sulgreasee (SO_4^{2-})	mg/l	400
11	Cyanide (CN-)	mg/l	0,01
12	Phenol	mg/l	0,001
13	Asenic (As)	mg/l	0,05

14	Cadimi (Cd) Cadmium (Cd)	mg/l	0,005
15	Lead (Pb)	mg/l	0,01
16	Chromium VI (Cr6 +)	mg/l	0,05
17	Copper (Cu)	mg/l	1,0
18	Zinc (Zn)	mg/l	3,0
19	Manganese (Mn)	mg/l	0,5
20	Mercury (Hg)	mg/l	0,001
21	Iron (Fe)	mg/l	5
22	Selenium (Se)	mg/l	0,01
23	Total radioactivity α	Bq/l	0,1
24	Total radioactivity β	Bq/l	1,0
25	E.Coli	MPN/100ml	Not found
26	Coliform	MPN/100ml	3

3. METHOD FOR DETERMINATION

3.1. Sampling for underground water quality monitoring conducted under the guidance of national standards:

- TCVN 5992:1995 (ISO 5667-2: 1991) - Water quality - Sampling - Guidance on sampling techniques

- TCVN 5993:1995 (ISO 5667-3: 1985) - Water quality -sampling -Guidance on the preservation and handling of samples

- TCVN 6000:1995 (ISO 5667-11: 1992) - Water quality -sampling -Guidance on the sampling of groundwaters

3.2. Analytical methods to determine the parameters of underground water quality shall comply with the guidance of the national standards or corresponding analytical standards of international organizations:

- TCVN 6492-1999 (ISO 10523-1994) - Water quality - Determination of pH

- TCVN 2672-78 – Potable water – Method for determining the general hardness

- TCVN 6178-1996 (ISO 6777-1984) - Water quality -Determination of nitrite - Molecular absorption spectrometric method

- TCVN 6180-1996 (ISO 7890-3-1988) - Water quality - Determination of nitrate - Spectrometric method using sulfosalicylic acid

- TCVN 6200-1996 (ISO 9280-1990) - Water quality - Determination of sulgreasee - Gravimetric method using barium chloride

- TCVN 6181-1996 (ISO 6703-1-1984) Water quality - Determination of total cyanide

- TCVN 5988-1995 (ISO 5664-1984) - Water quality - Determination of ammonium -Distillation and titration method

- TCVN 6194-1996 (ISO 9297-1989) Water quality -Determination of chloride - Silver nitrate titration with chromate indicator (Mohr's method)

- TCVN 6195-1996 (ISO 10359-1-1992) - Water quality - Determination of fluoride - Part 1: Electrochemical probe method for potable and lightly polluted water

- TCVN 6216-1996 (ISO 6439-1990) - Water quality - Determination of phenol index -4-Aminoantipyrine spectrometric methods after distillation

- TCVN 6626-2000 (ISO 11969-1996) - Water quality - Determination of arsenic - Atomic absorption spectrometric method (hydride technique)

- TCVN 6193-1996 (ISO 8288-1986) - Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead - Flame atomic absorption spectrometric methods

- TCVN 6197-1996 (ISO 5961-1994) - Water quality - Determination of cadmium by atomic absorption spectrometry

- TCVN 6002-1995 (ISO 6333-1986) - Water quality - Determination of manganese - Formaldoxime spectrometric method

- TCVN 6177-1996 (ISO 6332-1988) - Water quality - Determination of iron - Spectrometric method using 1,10 - phenanthroline

- TCVN 6183-1996 (ISO 9965-1993) -Water quality - Determination of selenium - Atomic absorption spectrometric method (hydride technique)

- TCVN 59910-1995 (ISO 5666-3-1984) Water quality - Determination of total mercury by flameless atomic absorption spectrometry - Method after digestion with bromine

- TCVN 6222-1996 (ISO 9174-1990) - Water quality -Determination of chromium - Atomic absorption spectrometric methods

- TCVN 6187-1-1996 (ISO 9308-1-1990) - Water quality - Detection and enumeration of coliform organisms, thermotolerant coliform organisms and presumptive Escherichia coli - Part 1: Membrane filtration method

The parameters specified in this Regulation not having national standards guiding the analytical method shall apply the corresponding analytical standards of the international organizations

4. IMPLEMENTATION ORGANIZATION

This Regulation shall apply in substitution for TCVN 5944:1995- Water quality - underground water quality standards in the List of Vietnamese standards on environment which is mandatorily applied and issued together with Decision No. 35/2002/QD-BKHCNMT dated June 25, 2002 of the Minister of Science, Technology and Environment.

In case the national standards referred in this Regulation amended and supplemented or superseded shall be applied under new document

QCVN 05:2013/BTNMT

NATIONAL TECHNICAL REGULATIONS ON AMBIENT AIR QUALITY

Introduction

QCVN 05:2013/BTNMT was written by the Compilation Board of national technical regulations on ambient air quality, submitted by the General Department of Environment and Legal Department for approval and issued under the Circular No. 32/2013/TT-BTNMT dated October 25, 2013 of the Minister of Natural resources and Environment.

National Technical Regulation on Ambient Air Quality

1. GENERAL PROVISIONS

1.1. Scope of applications

1.1.1. This Regulation deals with limitations on values of basic factors including sulphur dioxide (SO2), carbon monoxide (CO), dioxide nitrogen (NO2), ozone (O3), total suspended particles (TSP), PM10, PM2.5, particles, and lead (Pb) in ambient air.

1.1.2. This Regulation applies to supervision and assessment of ambient air quality.

1.1.3. This Regulation does not apply to air within manufacturing facilities and indoor air.

1.2. Interpretation of terms

In this Regulation, the terms below are construed as follows:

1.2.1. Total suspended particles (TSP) is total particles with aerodynamic diameter less than or equal to 100 μm.

1.2.2. Particle PM_{10} is total suspended particles with aerodynamic diameter less than or equal to 10 μm.

1.2.3. Particle $PM_{2,5}$ is total suspended particles with aerodynamic diameter less than or equal to 2,5 μm.

1.2.4. Average 1 hour: The arithmetic average of the measured values over a period of 1 hour.

1.2.5. Average 8 hours: The arithmetic average of the measured values over a period of 8 consecutive hours.

1.2.6. Average 24 hours: The arithmetic average of the measured values over a period of 24 consecutive hours (a day).

1.2.7. Annual average: The arithmetic average of the 24-hour average values measured over a period of one year.

2. Technical Reputation

Maximum value of basic parameters of ambient air is specified in Table 1.

Table 1: Maximum value of basic parameters of ambient aire

Unit: Micro gram over cubic meter ($\mu g/m^3$)

No.	Paramater	Average 1 hour	Average 8 hours	Average 24 hours	Annual average
1	SO_2	350	-	125	50

2	CO	30.000	10.000	-	-
3	NO_2	200	-	100	40
4	O_3	200	120	-	-
5	Total Suspended Particle (TSP)	300	-	200	100
6	Dust PM_{10}	-	-	150	50
7	Dust $PM_{2,5}$	-	-	50	25
8	Pb	-	-	1,5	0,5
Note: (-) unspecified					

E. Appendix 5: Stakeholder Communication Strategy

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
Disseminate information on project design, key impacts anticipated as well as any mitigation measures, to project Aps and beneficiaries	Language/Culture Literacy Managing expectations, including that of free water delivery and compliance with Viet Nam law (full cost recovery) Reach of information, especially in isolated or remote settlements in peri-urban areas and communes Lack of confidence in local authorities	Subproject Aps Community members (men & women in urban/peri-urban/rural communes) Women headed HH Poor HH	Subproject design, key benefits (including those of treated water supply), implementation arrangements and schedule of civil works Opportunities for temporary employment as construction workers, community mobilizes or IEC campaign facilitators Main impacts of subproject (positive and negative) through disclosure Planned mitigation measures, especially for female APs (including compensation rates, entitlements, grievance redress mechanism) View water as a commercial good and stress the importance of user cost recovery, including for poor HHs Targeted subsidies, including free connections and lifeline tariffs	Public information meetings Resettlement committee meetings in affected areas Printed information in local language(s) posted in accessible public areas Gender-sensitive IEC campaign, including community-level training and public media campaign Meetings, consultations and other interactions between PMUs/WSCs and CSBs in the subproject area's service zones	Ongoing prior to implementation of activities Early in each phase of subproject preparation Subproject detailed design Ongoing during civil works Post evaluation after project completion	Primary: PMUs WSCs Contractors/ subcontractors for civil works Local authorities at commune-, ward-, city- and district-level (CPCs, WPCs, CPCs and DPCs) VWU Community Health Centers (CHCs) Secondary: PPCs DPI DOLISA	Costs will be covered in part by the RPs, GAPs as well as basic project implementation budgets under PMU Incremental Cost and Construction Supervision Contract Resettlement Specialist WSC/PMU Social Development & Safeguards Specialists Compensation and Resettlement Committees (CRCs) Community Supervision Boards (CSBs) Community health workers (under respective DOHs)

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
			included in tariff by law to poor and women-headed households.				
Deliver information on labor opportunities and good labor practices	Language/Culture Literacy and low levels of awareness	Community members as well as outsiders hired as semi-skilled and skilled construction workers, community mobilizers and IEC campaign facilitators in subproject areas Contractors/ subcontractors for civil works	Opportunities for appropriate skills training/upgrading during period of hire, with quotas reserved for women (GAP) Core labor standards, including no forced labor and child labor Gender parity in work related compensation, i.e., equal pay for equal work, for women and men, and the right to separate living & toilet facilities at work sites Schedule of civil works Labor safety regulations Risks and prevention of HIV/AIDS transmission and Human Trafficking	Public information meetings Printed information in local language(s) and language(s) of migrant workers (on pamphlets and billboards), posted in accessible public areas, especially at or near construction sites IEC campaign for HIV/AIDs and Human Trafficking, including community-level training and public media campaign	Early in each phase of sub project preparation Ongoing during civil works and conduct of IEC campaigns	Primary: PMUs WSCs Local authorities at commune-, ward-, city- and district-level VWU CHCs Secondary: PPCs DOLISA	Costs will be covered in part by the GAPs as well as basic project implementation budgets under PMU Incremental Cost and Construction Supervision Contract PMU Social Development & Safeguards Specialists CSBs Community health workers Health NGOs
Highlight responsibility of provincial government agencies in enabling access of disadvantaged groups to	Lack of political willingness to implement decrees and decisions Provincial budget constraints	PPCs DOLISA PCs at other administrative levels in provinces, i.e., local authorities	Basic project design, anticipated impacts and any planned mitigation and grievance redress measures as they apply to APs, beneficiary groups and workers in the province	WSC meetings with relevant local authorities and government agencies authorities, attended by VWU officials at the appropriate level	From outsets of the project	MPI (as CA) WSCs VWUs at all levels	Costs will be covered by the GAP and basic project implementation budgets under PMU Incremental Cost and

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
municipal water supply			State support for water related subsidies to poor and women headed HHs, and other vulnerable groups (including EMs, disabled, etc.), in accordance with Decrees 117 & 124				Construction Supervision Contract WSC management PMU Director PMU Social Development & Safeguards Specialists
Inform Provincial VWUs about project design and entry points for their participation – community mobilization, IEC, and ensuring women's access to all project benefits	Lack of sectoral capacity Relative lack of resources and decision making authority compared to other departments and agencies, including WSCs	Vietnam Women's Union (VWU)	Basic project design and anticipated impacts, as they matter to women Disseminate information on improved HH water management, sanitation and hygiene to communities in collaboration with Community Health Centers.	Public information meetings IEC campaign (including materials) to raise awareness on links between gender and WASH issues Training materials integrating gender	From outsets of the project	VWU WSCs Local authorities at commune-, ward-, city- and district-level CHCs	Costs will be covered by the GAP budget PMU Director PMU Social Development & Safeguards Specialists CSBs Community health workers
Inform network of Community Health Centers in project areas about project design and the role they are expected to play in disseminating information on improved WASH as well	Relative lack of resources and decision making authority compared to other departments and agencies, including WSCs	Community Health Centers (and community health workers), Department of Health	Disseminate information on health benefits of improved water supply, sanitation and hygiene to communities in collaboration with VWC Design and propagate training module about HIV/AIDS	Public information meetings, IEC sanitation and hygiene awareness materials, including community based training and public media campaign HIV/AIDS training module	Early in each phase of sub project preparation Ongoing during civil works and conduct of IEC campaigns	VWU PMUs WSCs Local authorities at commune-, ward-, city- and district-level CHCs	Costs will be covered by the project implementation budget (social development) PMU Social Development & Safeguards Specialists CSBs Community health workers

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
as HIV/AIDS causes & prevention							
Promote community involvement in resettlement and project monitoring	Identifying valid community representatives Newly formed, slow to build up capacity required Functions vaguely defined	Community Supervision Boards (CSBs) Compensation and Resettlement Committees (CRCs)	Information on resettlement areas, affected households, resettlement plan and compensation policies Core labor standards integrating gender concerns and labor safety regulations Special consideration of community members from poor and/or women-headed HHs in all aspects of the project Risks and prevention of HIV/AIDS transmission and Human Trafficking	Meetings between WSCs/PMUs and CSBs and CRCs Public information meetings presided over by CSBs or CRCs Direct interactions between affected HHs and CSBs or CRCs Printed information in local language(s) posted in accessible public areas Gender-sensitive IEC campaign, including community-level training and public media campaign	Early in each phase of sub project preparation Ongoing during civil works and conduct of IEC campaigns	VWU PMUs WSCs Local authorities at commune-, ward-, city- and district-level	Costs will be covered by the GAPs and basic project implementation (social development component) budgets PMU Social Development & Safeguards Specialists CSBs Community health Workers
Ensure understanding of HIV/AIDS transmission and Human Trafficking risks, and prevention measures for both	Language/Culture Literacy and low levels of awareness	Communities in or near project area construction sites Workers on construction site	Key risks and mitigation measures of HIV/AIDS transmission and Human Trafficking	Public information meetings Printed information in local language(s) and language(s) of migrant workers (on pamphlets and billboards), posted in accessible public areas, especially at or near construction sites IEC campaign for HIV/AIDs and Human Trafficking, including community-level training and public media campaign	Prior to commencement of civil works and throughout civil works	PMUs VWU CHCs Civil works contractors/ subcontractors	Costs will be covered in part by the GAPs as well as basic project implementation budgets PMU Social Development & Safeguards Specialists CSBs Community health workers Local NGOs

Objective	Key Risks Challenges	Stakeholder Group	Messages	Means of Communication	Timeline	Responsibility	Resources
							with a health focus
Strengthen business processes and institutions, integrating gender issues	Inertia to change; tendency to maintain institutional and socioeconomic status quo	All WSC and PMU staff, especially women in executive and non-executive positions VWU members at all levels within the province	Reasons why profit generation, user cost recovery and tariff roadmap are core principles of business viability Negotiate sharing of capital costs and underwriting of any subsidies to consumers with state agencies (PCs and DOLISA) Opportunities for training, exposure visits, with quotas reserved for female staff and VWU members to learn more about the sector Gender parity in work related compensation, i.e., equal pay for equal work, for women and men in WSCs	Resettlement committee meetings and/or meetings with affected households, Printed information in local language posted in accessible public areas Training workshops and exposure visits to raise awareness about benefits of community participation in all aspects of project planning, implementation, and M&E Financial and technical training workshops Training materials to promote gender sensitivity Routine consultation with VWUs on gender-related matters relevant to project outputs Routine consultations between WSC management and women employees, in executive and non-executive positions, about professional issues that matter to them	From outset of each subproject Ongoing prior to implementation of activities Early in each phase of subproject preparation At project detailed design Ongoing during civil works	Water Supply Companies (WSCs) as independent commercial & legal entities MPI PPCs PMUs VWUs	Costs will be covered in part by the GAPs and project implementation budgets PMU Director PMU Social Development & Safeguards Specialists Staff welfare committees of WSCs

Key: ADB - Asian Development Bank; PMU –Projects Management Board; APs – Affected Persons; CSB – Community Supervision Board; CPC – Commune Peoples Committee; CWU – Commune Women's Union; DARD – Department of Agriculture & Rural Development; DOC – Department of Construction; DONRE – Department of Natural Resources & Environment; DOT – Department of Transport; DPI – Department of Plan and Investment DRCs – District Resettlement Committees; GAP – Gender Action Plan; IAs – Implementing Agencies; IPP – Indigenous Peoples Plan; PP – Project Proposal; O & M – Operation & Maintenance; PPC – Provincial peoples Committee; of RIs –Rural Infrastructure; RP – Resettlement Plan; VWU – Vietnam Women's Union;

F. Appendix 6: Meeting minute and Public Consultation Meeting Attendance List

Dự án Hạ tầng Cơ bản Phát triển Toàn diện các tỉnh Đông Bắc

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

PHIẾU ĐIỀU TRA KHẢO SÁT MÔI TRƯỜNG

Ngày 21 tháng 9 năm 2016
Tại Sở Tài nguyên và Môi trường tỉnh Hà Giang

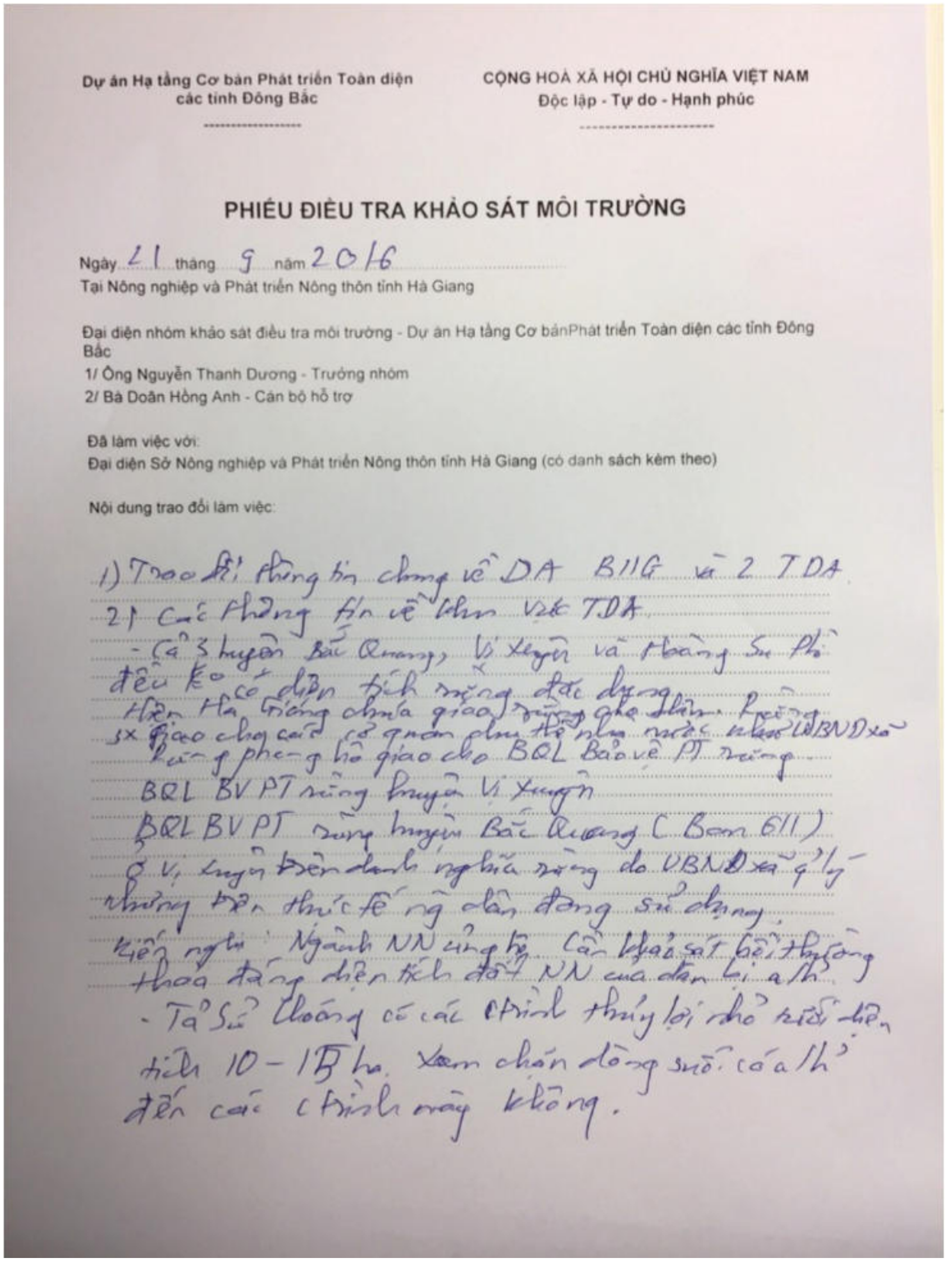
Đại diện nhóm khảo sát điều tra môi trường - Dự án Hạ tầng Cơ bảnPhát triển Toàn diện các tỉnh Đông Bắc
1/ Ông Nguyễn Thanh Dương - Trưởng nhóm
2/ Bà Doãn Hồng Anh - Cán bộ hỗ trợ

Đã làm việc với:
Đại diện Sở Tài nguyên và Môi trường tỉnh Hà Giang (có danh sách kèm theo)

Nội dung trao đổi làm việc:

1) Trao đổi các thông tin chung về DA Hạ tầng Cơ bản PT Toàn diện các tỉnh Đông Bắc
- TDA: Nâng cấp tỉnh lộ 184 từ Đồng Tâm đi Ngọc Linh
- TDA: NSH thị trấn Vinh Quang và xã Bản Nhùng, Hoàng Su Phì

2) Các thông tin về khu vực TDA:
Hà Giang có 6 khu bảo tồn, khu dự trữ sinh quyển nhưng không nằm trong khu vực 2 TDA này.
NSH thị trấn Vinh Quang hiện công suất 500 m^3/ngày đêm vận hành từ 2.10.2011 nhưng do tiền điện quá cao nên vô hiệu quả.
Hoàng Su Phì hay bị mưa bão, lũ quét, sạt lở. Các huyện thị đều đã có bãi rác tập trung.
Cần nâng cao đào tạo về Giám sát, quan trắc, bảo vệ theo quy định của ADB.



Dự án Hạ tầng Cơ bản Phát triển Toàn diện các tỉnh Đông Bắc

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

PHIẾU ĐIỀU TRA KHẢO SÁT MÔI TRƯỜNG

Ngày 21 tháng 9 năm 2016
Tại Nông nghiệp và Phát triển Nông thôn tỉnh Hà Giang

Đại diện nhóm khảo sát điều tra môi trường - Dự án Hạ tầng Cơ bảnPhát triển Toàn diện các tỉnh Đông Bắc
1/ Ông Nguyễn Thanh Dương - Trưởng nhóm
2/ Bà Doãn Hồng Anh - Cán bộ hỗ trợ

Đã làm việc với:
Đại diện Sở Nông nghiệp và Phát triển Nông thôn tỉnh Hà Giang (có danh sách kèm theo)

Nội dung trao đổi làm việc:

1) Trao đổi thông tin chung về DA BIIG và 2 TDA
2) Các thông tin về khu vực TDA
- Cả 3 huyện Bắc Quang, Vị Xuyên và Hoàng Su Phì đều ko có diện tích rừng đặc dụng.
Hiện Hà Giang chưa giao rừng cho thôn. Rừng sx giao cho các cơ quan đơn vị như nước [illegible] UBND xã.
Rừng phòng hộ giao cho BQL Bảo vệ PT rừng
BQL BVPT rừng huyện Vị Xuyên
BQL BVPT rừng huyện Bắc Quang (Ban 611)
Ở Vị Xuyên trên danh nghĩa rừng do UBND xã q/lý nhưng trên thực tế ng dân đang sử dụng.
Kiến nghị: Ngành NN ủng hộ. Cần khảo sát bồi thường thoả đáng diện tích đất NN của dân bị a/h.
- Tả Sử Choóng có các c/trình thủy lợi nhỏ tưới diện tích 10 - 15 ha. Xem chắn dòng suối có a/h đến các c/trình này không.

TRIỂN TOÀN DIỆN CÁC TỈNH ĐÔNG BẮC (PPTA – 8957)

.................., ngày......... tháng 9 năm 2016

Nhóm Tư vấn môi trường thực hiện khảo sát tại

Xã......Bản Nhùng.........huyện H.S.P..................tỉnh....Hà Giang

I. **Danh sách các đại biểu nhận tiền hỗ trợ**

No.	Họ tên	Ký nhận
1	Tân Thị Hạ	Hạ
2	Vàng Văn Tích	[illegible]
3	Vàng Pó Hợp	Hợp
4	Nguyễn Văn Minh	minh
5	Hoàng Văn Thành	[illegible]
6	Vàng Pó Điệp	[illegible]
7	Nguyễn Văn Tường	[illegible]
8	Tân Văn Đồn	Đồn
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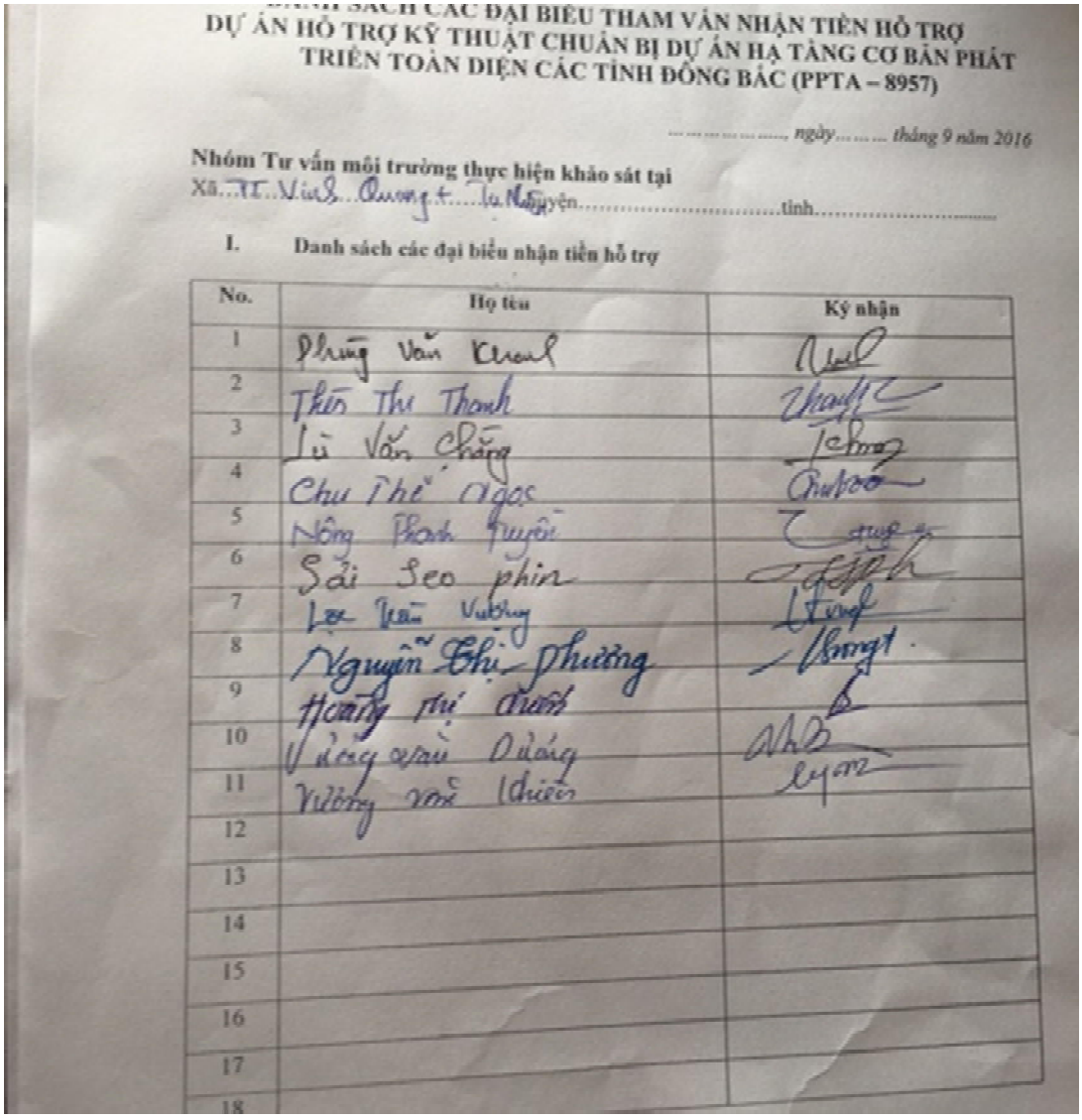

DANH SÁCH CÁC ĐẠI BIỂU THAM VẤN NHẬN TIỀN HỖ TRỢ
DỰ ÁN HỖ TRỢ KỸ THUẬT CHUẨN BỊ DỰ ÁN HẠ TẦNG CƠ BẢN PHÁT TRIỂN TOÀN DIỆN CÁC TỈNH ĐÔNG BẮC (PPTA – 8957)

....., ngày..... tháng 9 năm 2016

Nhóm Tư vấn môi trường thực hiện khảo sát tại
Xã..... huyện..... tỉnh.....

I. Danh sách các đại biểu nhận tiền hỗ trợ

No.	Họ tên	Ký nhận
1	Phùng Văn Khanh	
2	Thèn Thị Thanh	
3	Lù Văn Chăng	
4	Chu Thế Ngọc	
5	Nông Phanh Huyên	
6	Sải Seo phìn	
7	Lộc Văn Vương	
8	Nguyễn Thị Phương	
9	Hoàng Thị Thanh	
10	Vàng Seo Dáng	
11	Vương Văn Chiến	
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DANH SÁCH CÁN BỘ LÀM VIỆC VỚI NHÓM

TƯ VẤN MÔI TRƯỜNG

22.09.2016

STT	Họ tên	Chức vụ	Số điện thoại
1.	Phạm Kim Sơn	P. CT UBND xã Trung Thành	0945561616
2	Trần Thị Linh	phòng Tài nguyên & MT	0972193748
3	Đặng Ngọc Tuyết	phó CT UBND xã Ngọc linh	0968661970
4.	Lê Bích phương	CB Địa chính NLinh	09868952[illegible]
5.	Bàn Văn Bình	CT UBND xã Đồng Tâm	0942 35056[illegible]
	Trần Thị Thảo	CBộ địa chính xã Đồng Tâm	0918225980
6.		Nhân viên Phòng TN & MT	0973031299
7	Bế Thị Thanh Nga	Cán bộ Phòng Kinh tế Hạ tầng	0983645786
8	Hoàng Ngọc Thiện	CT UBND Bản Nhùng	0965729789
9.	Nguyễn Quang Vinh	CB: Ban QLDA ĐTXD Huyện	091210979[illegible]
10	Âu Văn Năm	PCT UBND xã Tụ Nhân Sủ phìn	01649019999
11	Nguyễn Mạnh Duy	PCT UBND thị trấn	0974586[illegible]
12	Trần việt phong		