Environmental Management Plan

August 2019

Lao PDR: Greater Mekong Subregion East-West Economic Corridor Towns Development Project

Kaysone Phomvihane Wastewater Management - Houay Longkong Channel

TABLE OF CONTENT

CURRENCY EQUIVALENTS

(as of 1 September 2017)

Currency Unit	–	kip (KN)
KN1.00	=	$0.00012
$1.00	=	KN8,200

ABBREVIATIONS

ADB	–	Asian Development Bank
BOD	–	biological oxygen demand
CEMP	–	Contractor's EMP
COD	–	chemical oxygen demand
DED	–	detailed engineering design
DEWATS		Decentralize Waste Water Treatment System
DMF	–	Design and monitoring framework
DONRE	–	Department of Natural Resources and Environment
DPH	–	Department of Public Health
DPWT	–	District Public Works and Transport Office
EA	–	Executing Agency
ECC	–	Environmental Compliance Certificate
ECO	–	Environmental Control Officer
EERT	–	External Emergency Response Team
EHS	–	Environmental, Health, and Safety
EIA	–	environmental impact assessment
EMAP	–	Environmental Management Plan
EMoP	–	Environmental Monitoring Plan
EMP	–	environmental management plan
ER	–	Environmental Representative
ERT	–	Emergency Response Team
ERTL	–	Emergency Response Team Leader
ESIA	–	Environment and Social Impact Assessment
ESO	–	environmental site officer
EWEC	–	East-West Economic Corridor
GMS	–	Greater Mekong Subregion
GPP	–	Grievance Point Person
GoL	–	Government of Lao PDR
GRM	–	Grievance Redress Mechanism
HGF		Horizontal Flow Planted Gravel Filter
IA	–	implementing agency
IEE	–	initial environmental examination
Lao PDR	–	Lao People's Democratic Republic
LAK	–	Lao Currency
MONRE	–	Ministry of Natural Resources and Environment
MPWT	–	Ministry of Public Works and Transport

MRF	–	materials recovery facilities
MRC	–	Mekong River Commission
NTP	–	Notice to Proceed
O&M	–	operation and maintenance
OPWT	–	office of public work and transport (District)
PDPWT	–	Provincial Department of Public Works and Transport
PIT	-	Project Implement Team (of District)
PMU	–	project management unit
RP	–	Resettlement Plan
TSS	–	total suspended solids
UDAA	–	Urban Development and Administration Authority
USD	–	United States Dollar
UXO	–	unexploded ordnance
WREA	–	Water Resources and Environment Agency

WEIGHTS AND MEASURES

km	–	kilometer
kg	–	kilogram
ha	–	hectare
mm	–	millimeter

I. BACKGROUND

1. This Environmental Management Plan (EMP) for the Kaysone Phomvihane Wastewater Management - Houay Longkong Channel subproject updates the relevant parts of the EMP for Kaysone Phomvihane, dated July 2012.

2. The Initial Environmental Examination (IEE), 2012 considered the preliminary project design, the baseline environmental conditions, possible impacts and mitigation measures, and institutional arrangements to implement the same. Based on the findings of the IEE, the subproject was assigned Category “B” under ADB categorization. The last updated IEE, 2018 and the EMP update confirm the original categorization.

3. In comparison with the preliminary project design, the scope of the subproject was reduced significantly to exclude wastewater collection and treatment. The subproject is following this reduction in scope primarily a drainage and flood protection project.

4. DEWATS is additional work under the Kaysone Phomvihane Wastewater Management-Houay Longkong Channel subproject, which was proposed and signed in MOU of Mid Term Loan Review during 18-25 March 2019. The mission requested EA to prioritize the DEWATS investment from the saving, it was crucial additional construction that will move closer to achieve DMF target. Therefore, the EMP for Kaysone Phomvihane Wastewater Management-Houay Longkong Channel subproject should be updated to include DEWATS component.

A. Subproject Investments

5. The scope of the Houay Longkong Channel subproject is summarized below:

Kaysone Phomvihane Wastewater Management - Houay Longkong Channel	▪ About 850 meters of channel concrete-lining and improvement, linking the existing channel to the outfall; ▪ New flood gates to prevent the high water from the Mekong River from entering the drainage channel, equipped with automatic system for operating these; ▪ A new pumping station to empty the channel during rainfall events, when the Mekong river levels are high and the flood gates closed, incorporating natural reservoir volumes in the design of capacities by utilizing flood storage in a flood retention area within the existing flood plain, to reduce the size and capacity of the pumping station. ▪ A new Decentralize Waste Water Treatment System (DEWATS) is recreation ponds for treating the waste water during the dry season, low water level before release to channel again and flow to Mekong River.

6. The duration of project phases is presented below.

Table 1. Duration of project phases

Phase	Duration
Construction phase + (DEWAT)	2 years + 9 months
Defects Liability Period	1 year

7. An aerial view of the lower part of the Houay Longkong channel with proposed channel lining and alternative pumping station locations superimposed is presented below.

Figure 1: Aerial view of Subproject location included DEWATS.

8. The typical cross sections used in the design are presented below.

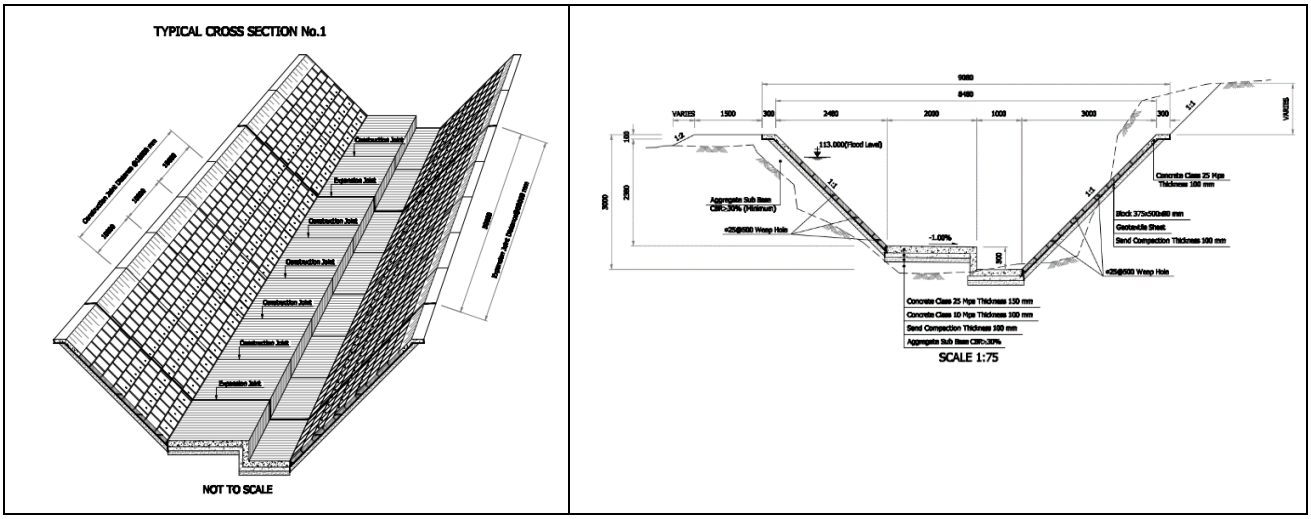


Figure 2. Cross sectional profiles for the concrete-lining of the Houay Lonkong Channel

9. The longitudinal profile of the Houay Longkong channel is presented below.

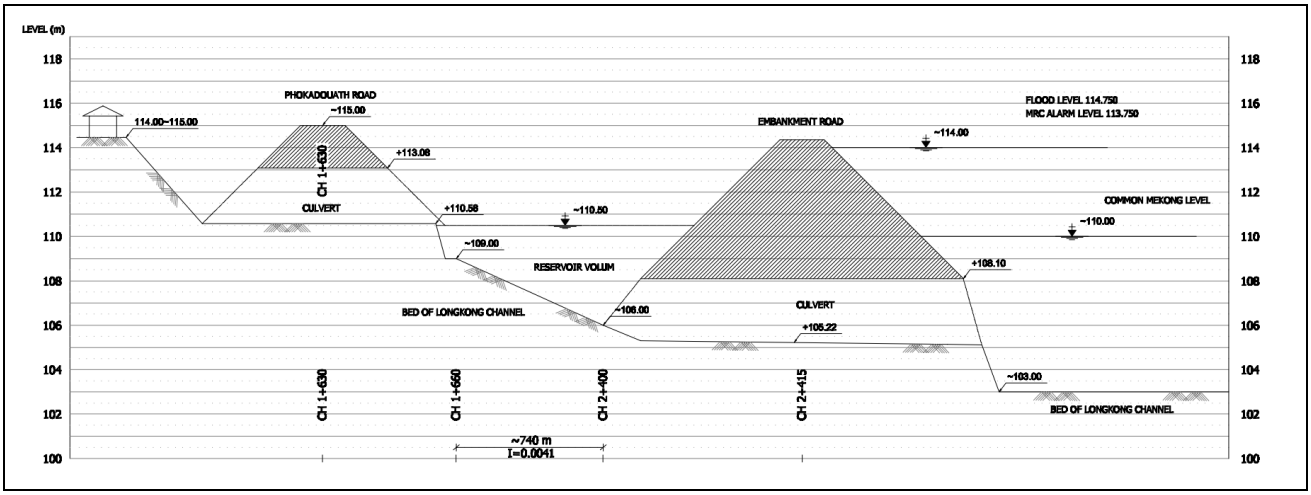


Figure 3. Longitudinal profile of the Houay Longkong channel with indication of levels in m Lao Geodetic Datum[1]

B. Specification of Activities and Facilities

10. The specification of activities and facilities to be implemented by the Contractor is presented in the table below. The works comprise the below specified main parts. The three parts are interlinked and the Contractor is required to ensure that construction interfaces are coordinated.

A. Concrete lining of approximately 850 m earth channel.
B. Construction of a new pumping station and
C. Replacement of the existing flood gates with new hydraulically operated Flood Gates.

[1] The offset between mean sea level (MSL) and the Lao Geodetic Datum has been established to be -23.272m, refer Houay Longkong Rehabilitation – Design Basis, PMSCD, September 2016

D. Decentralize Waste Water Treatment System (DEWATS)

Table 2. Specification of activities and facilities

Part	Title	Specification of activities and facilities
A	Concrete lining of approximately 850 m earth channel.	About 850 meters of channel concrete-lining and improvement for the following sections: • Chainage 0,000 to approximately 686,000: From outlet existing culvert at Phokadouth road to inlet existing culvert at the Mekong Embankment Road. • Connection and interfacing with pump station by concrete lined channel. • Chainage approximately 714,000 to 840 From outlet embankment to outlet of Hoauy Long Kong to Mekong river. All works related to the connecting and interfacing of Houay Long Kong with the new Pumping station are included in the works.
B.	Construction of a new pumping station	• Implementation of geotechnical investigation, including borehole • Excavation for inlet and outlet to the pump station. • Excavation for pump station with sheet piling. • Construction of pump station with inlet area, forebay and pumpbay for two pumps. • Construction of inlet screen. • Installation of two submersible axial flow propeller pumps or mixed flow pumps. • Installation of two DN900 column pipes for the pumps. • Installation of two Formed Suction Intake for the pumps. • Installation of two discharge DN900 pipes with check valves . • Construction of two DN900 discharge pipes under the embankment road • Construction of channel with trays for hydraulic hoses and cables under the embankment road • Construction of an outlet support wall for the discharge DN900 pipes located on outlet to Mekong River. • Electrical connection to Public Power Supply with substation transformer. • Installation of emergency generator with soundproof canopy for pump and hydraulic power unit. • Construction of Motor Control Centre (MCC) for pumps. • Construction of control panel for hydraulic power unit and the sluice/weir gates. • Installation of field instrumentation for control of pumps and sluice/weir gates. • Installation of cable trays/ conduit and trunking. • Installation of trays/ conduit and trunking for hydraulic hoses. • Installation of power cables and control/field instrumentation cables. • Construction of a pump building with electrical control room inclusive internal light/socket and air-condition • Installation of external light and sockets. • Paved areas between the road and the pump station, including parking areas and turning areas. • Water Supply with piping. • Septic tank for toilet in pump building. • Installation of level sensors in outlet reservoir at the outlet of the embankment culvert. • Lighting protection

C.	Replacement of the existing flood gates with new hydraulically operated Flood Gates.	• Replacement of existing manual flap gates with new hydraulic controlled sluice/weir gates. • Installation of hydraulic power unit inclusive hydraulic hoses to the sluice/weir gates.
D	DEWATS	• Decentralize Waste Water Treatment System which is recreated ponds including (1) Pond number one and pond number 2 (Pond 1 & Pond2), (2) Horizontal Flow Planted Gravel Filter number 1 (HGF1), HGF2, HGF3, (3) Walkway, & parking and (4) three Ditches; with total 27,000 square meters.

II. DESCRIPTION OF THE BASELINE ENVIRONMENT

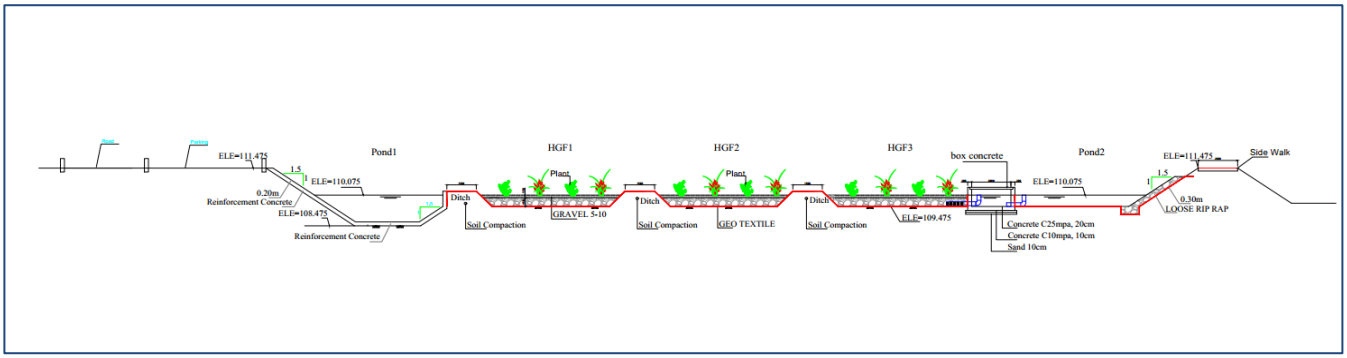
A. DEWATS Description

11. Figure 4 below presents the layout of DEWATS, which provides details of DEWATS detailed engineering design, that includes pond1, pond2, HGF1, HGF2, HGF3, Ditches and walkway and parking areas and fence. The 27,000 square meters of surface areas will be occupied for recreation of DEWATS, which has capacity of minimum discharge of 4,619.9 cubic meters per day.

Figure 4: DEWAT Layout

12. The general concept from figure 4 is provided the flow direction from inlet to the pond 1, the organic or soil sediment will be stored at the pond 1, after that flow to the U-ditch and flow to HGF1, the same procedure untill HGF3 and flow to pond2, basically the pond2 is proposed to store sediment from HGFs. The pond2 is possible design for aquatic animal or fishes living as the criteria for water treatment, before release to outlet and flow to HLK channel and Mekong River. There three main treatment sections as Pond1, HGFs and Pond2 as (1) First pond (pond 1) is sedimentation pond (Anaerobic pond) as pre-treatment process (2) Second treatment state is Horizontal Gravel Filter is a shallow tank filled with graded gravel or pebbles, and special plants are planted in this gravel filter. The filters clean the wastewater by retaining particles and ingesting them with the help of bacteria growing naturally on the gravel/pebbles. The plants help with transporting oxygen through their roots. (3) Last treatment state is Aerobic Ponds are designed for pathogen removal. If Aerobic Ponds are additionally used in combination with algae and/or fish harvesting, this type of pond is effective at removing the majority of nitrogen and phosphorus from the effluent.

Figure 5: Typical Cross Section of DEWATS

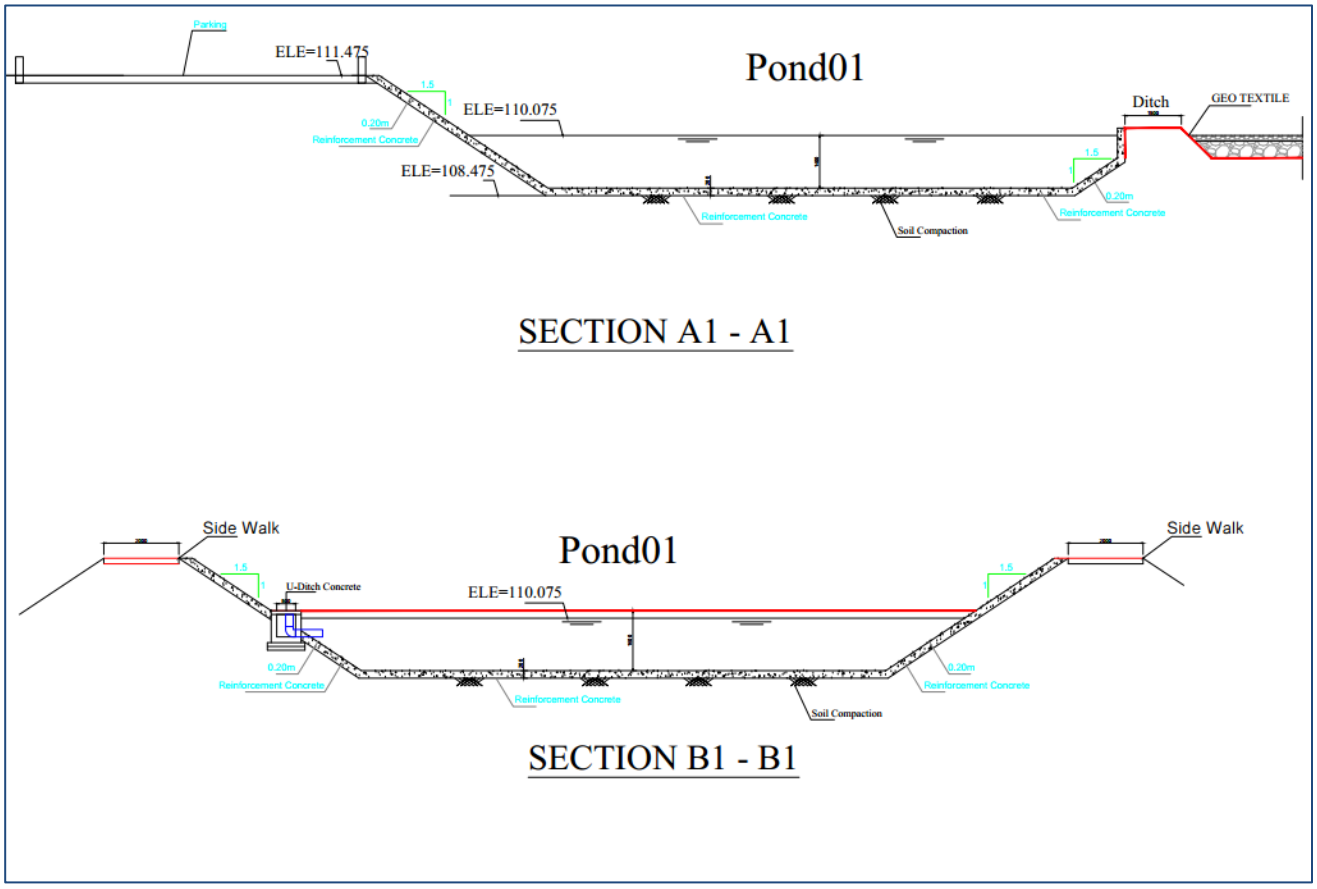


a. Pond 1 & Pond 2

13. The Pond1 is designed as reinforcement concrete at bottom slap, pond 1 for discharging the waste water from Houay Long Kong channel through inlet, this pond1 cover 2,070 square meters, it will be served the wastewater with sediment, the solid waste will be separate at the inlet gate. The pond 1 is designed as anaerobic treatment pond, it is 1.6 meters depth, the main function is sediment storage, however, this pond will be grown lotus plant. This plant will be supported to reduce the bad odor from the sediment storage. Thus, this Pond 1 is pre-treatment process for storing or accumulate the sediment from HLK channel.

14. Pond 1 is estimated to be cleaned approximately every 5 years, when sludge in the pond is covered 50 % or equivalence 0.8 meters height, the sludge will be removed and transported to landfill for treating at sludge building. The removing sludge in the pond 1 is depended on the volume of sediment that store in the pond, as stated in the O&M, when sludge is reached 50 %, it is required to removed and disposed at the landfill as landfill has sludge building for treating sludge. Sludge removing from the pond are required to pump water out to the channel, temporary remove the lotus plant and excavatd the sludge, then transport to landfill, the lotus plant will be re-plant again. Water quality in pond 1, some fishes can survive in the pond and it will be considered as cat fish or Gourami. The cost for maintenance and specific on removing the sludge is presented in the estimate budget table.

Figure 6: Typical Cross Section of Pond 1



15. The Pond 2 is designed as aerobic pond for the final treatment stage for pathogen removal stage, aquatic plant will be planted in this pond and fishes will be breed as well. It is designed to construct with soil compacting and Geomembrane on the bottom, the slope will be installed loose riprap 0.3 meters, this pond 2 is 0.6 meters depth with total 2,756 square meters. The pond 2 is aquatic living resources criteria, fishes and aquatic plant will be indicators for water quality and final stage for removing pathogens by reaction among UV light, included plants and fishes. Last treatment stage is Aerobic Pond that is designed for pathogen removal. If Aerobic Pond is additionally used in combination with algae and/or fish harvesting, this type of pond is effective at removing the majority of nitrogen and phosphorus from the effluent.

16. The pond 2 is post treatment process, Oxygen intake also depends on the actual oxygen de-ficid up to saturation point so may vary at 20°C between 40g O2 /m2×d for fully anaerobic conditions and 10g O2 /m2×d in the case of 75% oxygen saturation (Mudrak&Kunst, 1991)[2]. Regarding to the performance of UV light from the sun, the percentage of the pathogen's reduction is not absolutely defined, it is depending on the location conduction and there are no any researches on this issue in Laos. However, sunlight is one of the most important factors for viral and bacterial pathogen removal in

[2] Mudrak, K. and Kunst, S., "Biologie der Abwasser-reinigung", 3.Auflage, Gustav Fischer Verlag, Stutt- gart, 1991

aerobic pond. Escherichia coli *(E. coli)* loses viability almost 20 times faster in the aerobic pond with sunlight exposure compared to dark conditions, and it is also inactivated faster in shallower aerobic pond, (Maiga et al., 2009a)[3].

17. Pond 2 is water resource cultivation, fish breading, thus, this pond is required to annual maintain, it is considered as fish pond and aquatic vegetable, fishes will be removed annually and release fingerling to the pond again with adequate numbers. Basically, pond 1 & Pond 2 will be managed and maintained by affected persons from land acquisition, household/family can benefit from the ponds as First pond for selling lotus and second pond is fish harvesting, and gain benefit from the monthly maintenance as well.

Figure 7: Pond 2/Aerobic Pond

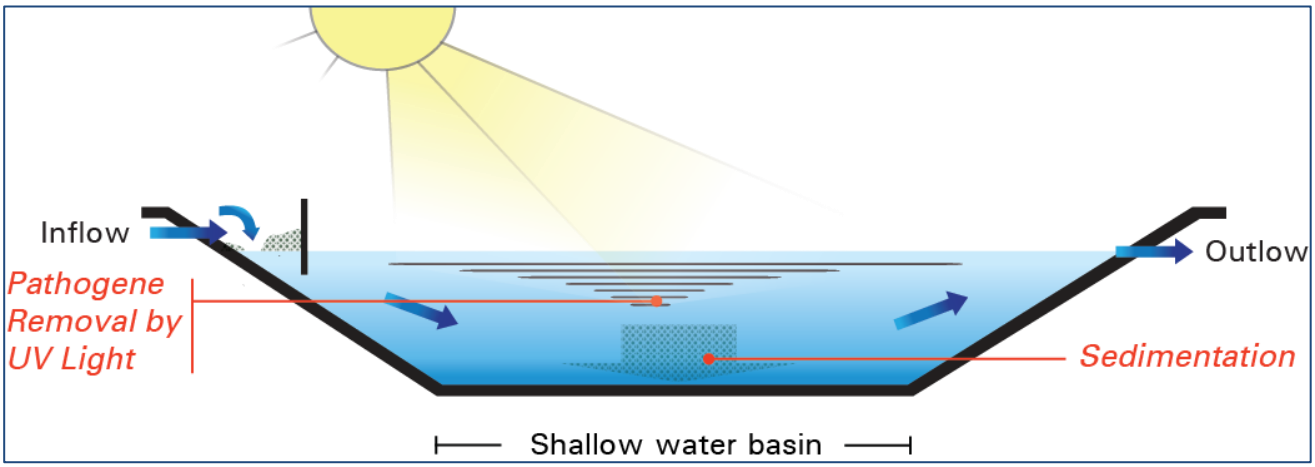
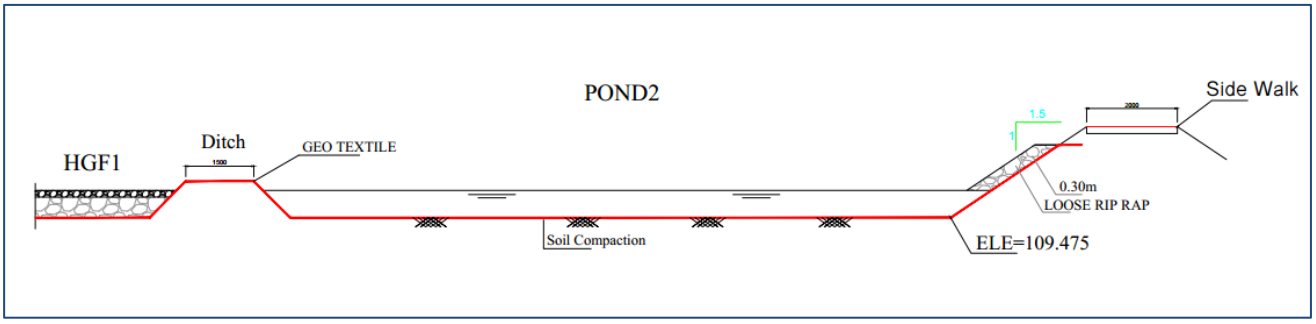


Figure 8: Pond 2 Typical Cross Section

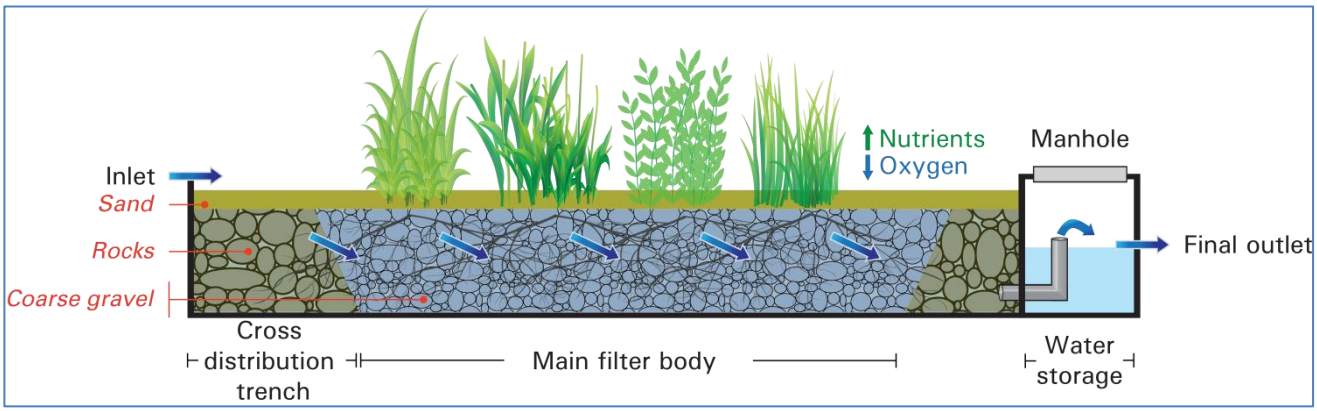


[3] Maïga, Y, Denyigba, K, Wethe, J and Ouattara, ASidiki (2009). Sunlight inactivation of Escherichia coli in waste stabilization microcosms in a sahelian region (Ouagadougou, Burkina Faso).. Journal of photochemistry and photobiology. B, Biology. 94, Elsevier B.V.pp. 113–9.

b. Horizon Flow Planted Gravel Filter Zone

18. Horizon Flow Planted Gravel Filter (HGF), These plots are filter with small rocks/course gravels, aggregation as different layers, the top layer with sand, and plant with water botany species for absorbing the pollutants or treating the waste water by plant and air as filter from gravels. The HGF1 covers 2,568, HGF2 covers 6,399 and HGF3 covers 4,812 square meters, detail waste water treatment function is presented below. The Second treatment state is HGF is a shallow tank filled with graded gravel or pebbles, and special plants are planted in this gravel filter. The filters clean the wastewater by retaining particles and ingesting them with the help of bacteria growing naturally on the gravel/pebbles. The plants help with transporting oxygen through their roots.

Figure 9: Horizon Gravel Filter Function for waste water treatment



19. Three water plant species were proposed for planting the horizon gravel filter as (1) Arundo donax (Giant reed), (2) Typha angustifolia (Typha latifolia, Typha domingensis) and (3) Canna edulis as presented in the figure below.

Figure 10: Proposed Plant Species (1,2,3 respectively)

c. Ditches

20. Ditches are designed for accessing to the ponds and HGFs for cleaning during the operation, ditches/dikes will be 1.5 meters width, as the Ditch 1 has 103.8 meters length, Ditch 2 has 135.6 meters length and Ditch 3 has 174.02 meters length. The slope of embankment is estimated 0.8 meters width for one side, so both sides of ditch has 1.6 meters width. Thus, Ditches cover 1,281 square meters of surface areas. Subbase material compacting is designed for installing the ditch/dike, it must be resilience with water and stable for long term operation.

d. Walkway, Parking and Fence

21. The Parking Lot is designed near the pond 1, this parking lot aim for parking the vehicle of maintenance during the DEWATS operation, gravels pavement was designed for constructing the parking lot areas as similar to basecourse foundation, it covers 925 square meters. The parking is not just for maintenance vehicle, but it proposed for citizen's vehicles, who will exercise around the DEWATS or HLK Channel in the future.

22. Surrounding the DEWATS areas will be installed fence approximately 632 meters length, except the HLK channel roadside. The fence aims to prevent the cattle or other animal enter to the DEWATS areas. It is designed barbed wire fencing system for protecting the animal only.

23. Walkway is designed as roadside around the DEWATS areas, it has 706 meters length with 6 meters width, the slope of embankment is 7.5 meters inside and outside slope embankment is 3 meters. This roadside is designed for DBST pavement. The roadside aim for light vehicles can drive across the DEWATS area.

e. DEWATS Maintenance and Operation

24. The training covers all activities of operation and maintenance of all module components. A manual for operation and maintenance will be developed and handed over which can be used to review the requirements and steps. The manual includes standard operating procedures that shall be followed by operating personnel. The topics shall include the following:

1) Overall DEWATS areas:

25. Monthly check and clean overall DEWATS areas are required, weeds and shrubs, where are not necessary, they will be removed and cleaned, this monthly check and clean can combine with HGF check and clean or remove biomass. The solid waste that will be separated at the inlet is required manually support for collecting and segregate the solid waste. Solid waste at the inlet will be regular checked and removed as weekly basic.

2) Sediment Pond (Pond 1)

26. Sediment in the pond 1 will be regular check at least once year, if sediment pond is covered with sludge 50% total sediment pond or 0.8 meters height of sludge, the sludge should be removed. Based on initiatively estimated, it will take approximately 5 years, the sediment volume will be reached to 50% of total pond volumes. Sludge removal procedure: (i) Pump water out from the pond to the channel, (ii) Temporary remove lotus plants (iii) excavate sludge to the dump truck (iv) transport sludge to landfill for treating the sludge at the sludge building for turning it to bio-fertilizer, and (v) replant the lotus plan to pond again. Detail cost for removal of the sludge in sediment pond is presented in estimate budget table.

3) Horizonal Flow Planted Gravel Filter

27. Monthly check and remove dead leaves or weeds included the roots from the HGFs areas, these works require two labors for two days per month. The monthly check and maintain also included, replanting the dead plants, waterflow-in and flow-out among pipes and HGFs. Monthly obtain water levels, water flow and adjust them to adequate level.

28. The big cleaning, when the filter materials were clogged and make inadequate function of HGFs, then big cleaning is required to obtain, it is estimated around 7-10 years, it is depended on the quality of HLK wastewater. The big cleaning steps included (i) remove plant to outside for temporary (ii) remove sand on the top of the layer (iii) spray water to clean the gravels (iv) re-installed gravel layer, sand and re-planting it again.

4) Aerobic Pond (Pond 2)

29. As mentioned above, some aquatic plants will be plant in this pond, particular the hyacinth species and algae, in the same time, fish will be released to this pond as well, both fish and plant can obtain some economic benefit for the labors, who maintain the DEWATS. Hyacinth will be regular obtain with the adequately amount, in the same time, fishes also observe and take care as regularly, the algae can be food for the fishes.

30. Aerobic pond will be regular checked and cleaned as weekly basic for removing the dead leaves and adjusting the suitable plants to be adequate and provide some food extra food for fishes in the pond. The big cleaning will be conducted annually as (i) remove plant temporary, (ii) fishing/remove fished from the pond (iii) clean the ground (iv) obtain water level and re-plant the hyacinth and algae again (v) release new fishes to the pond again.

5) Water Quality Monitoring

31. The water quality monitoring is environment quality control procedure to ensure that treatment system is function and affective. Two locations will be selected as permanent sample location. (i) inlet will be selected for monitor the waste water before treatment system, (ii) outlet will be selected for monitor the water quality after treatment system.

32. The water quality monitoring will be hired the reliable institute such university or reliable laboratory, this water quality monitoring will be conducted as specific for dry season, because this treatment objective focus on waste water treatment in the dry season only. The main substance will be monitored, included (i) PH, (ii) COD, (iii) BOD, (iv) TSS, (v) Fat, Oil & Grease

B. Baseline Environment

33. A general description of the baseline environment is contained in the IEE. Key points are summarized below and additional information added. In particular, the impacts associated with the change of the alignment has been assessed.

a. Existing situation – Houay Longkong channel

34. The Houay Longkong drainage channel serves the southern catchment of the city; the catchment area is approx. 538ha and has low topography. Refer the longitudinal profile for elevations and map of the catchment area below.

Figure 11. Houay Longkong catchment area

35. Stormwater collected in the drainage system (as well as domestic wastewater from households discharged to the road drains which subsequently collect into the drainage system) discharge via the Houay Longkong drainage channel to the Mekong River. However, when the Mekong River level is high, wastewater is retained in the drainage channel. Further, during the rainy season, the drainage channel overflows, resulting in flooding in the catchment, with health risks made worse by the wastewater flowing to the drainage channel and discharging to the environment.

b. Existing Situation of DEWATS Proposed Areas

36. The proposed DEWATS area is located on the Left side of the channel at the box culvert or Km0+00 of HLK channel. it is state land with total 27,126 square meters as presented in the figure 11. These 27,000 square meters were paddy field for planting rice by local people, after judgment announced government won the case over the land 27,126 square meters since 2017. This land was left without development. During rainy season, it become marsh, dry season local people rent from government for growing the vegetable along the channel. this plot of land has boundary with channel on the west, Phor Ka Douad road and on the east and the south share boundary with private land owner. Figure below is presented the location of recreation of DEWATS

Figure 12: Proposed of DEWATS Location

Figure 13: Current Situation of Proposed DEWATS Area

c. Climate

37. The climate of Savannakhet Province is the typical tropical monsoon (wet-dry) climate of the region. During the rainy season (June to October), the winds of the southwest monsoon is responsible for an average monthly rainfall of >200 mm, occasionally reaching >500 mm. The dry season (November to April) is dominated by the northeast monsoon. The average rainfall in Savannakhet is approximately 1,600 mm per year, which is about 170 mm less than the Lao average.

38. The temperatures in Savannakhet range from a minimum low of 13°C in January to a maximum high around 39°C in April. Savannakhet is the hottest and driest province of Lao PDR: the average temperature is estimated to be 26.1 degrees centigrade, which is about 2 degrees higher than the national average. The average number of hours of sunlight per year is estimated to be 2,280, which is about 256.8 hours longer than the national average.

d. Subproject area sensitive receptors

39. The subproject affected area is located in the three villages of Ban Saphantai on the left bank, Ban Thahae on the right bank, and Ban Phonsavanh in the downstream area on the left and right bank. While Ban Saphanthai is an agricultural area, a shop and residential houses in Ban Thahae have backyards facing the channel, while residential houses in Ban Phonsavanh are located at a distance of 30 meters or more. The receptors are not considered sensitive with respect to the construction (civil works) related impacts.

e. Air quality and noise

40. Ambient air quality data and no noise monitoring data for the subproject area has not been reviewed as part of the IEE and no monitoring has been conducted. The nearest sensitive receptors are the residential houses located in Ban Thahae with backyards facing the channel. According to the Lao PDR noise standards, the noise standard for residential areas is 55-, 55-, and 45 dB(A) in daytime, evening, and nighttime. Considering the distance to the construction work, it is not considered necessary to monitor air quality and noise during construction.

f. Surface Water Quality and flow rate

41. DEWATS design is used two water quality parameters to determine surface water quality as Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) in the surface water quality. This surface water baseline was applied the result of surface water monitoring date March 12, 2019 at the upstream point and compared with baseline in December 2018 result. The result is shown that BOD is equivalence 39 Mg/L & 49 Mg/L in baseline; and COD is equivalence 75 Mg/L and 121 Mg/L in the baseline. According to Lao PDR national environment standard for wastewater discharged BOD is 30 Mg/L for natural creek and COD = 60 Mg/L for discharged from septic tank/sludge. The design of DEWATS will be improved water quality by reducing amount of BOD and COD that suitable for general surface water as presented in the table below

42. HLK Channel was estimated that has flow rate 4,619.9 cubic meter per daily, the average hourly flowrate is 192.5 cubic meter per hour and peak hourly flowrate is 543.5 cubic meters per hour. The

filter volume is approximately 9,210.618 cubic meters[4], it was designed as waste water will be increased and discharged more wastewater in the future.

Table 3: Efficiency of Treatment System

Organic load reduction	COD	BOD	Unit
Treatment efficiency	24%	26%	%
Effluent concentration	92	36	mg/L
Minimum effluent conc.	*64*	*25*	*mg/L*
Maximum effluent conc.	*119*	*47*	*mg/L*
National Environment Standard for Bathroom Wastewater Discharge (No. 81/GoL, 2019)	*125*	*30*	*mg/L*

43. Based on treatment ponds that design for wastewater treatment, the efficiency of COD treatment is 24% and efficiency of BOD treatment is 26%, thus, effluent concentration will remain 92 mg/L for COD (121 mg/l) and 36 mg/l for BOD (49 mg/l). the minimize effluent concentration in the table mean high efficiency of the treatment system and opposite, maximize effluent concentration mean lowest efficiency of treatment system. As presented in Table 3, the COD is absolutely under the national environment standard value of Lao PDR, because COD is defined 125 mg/L, but information from monitoring point at the upstream point shown that COD = 121 mg/L and after treatment it will be decreased to 64 mg/L as minimum effluent concentration. BOD is defined in the national standard value 30 mg/L, if minimum effluent concentrate, there will be remained BOD 25 mg/L, which is lower than national environment standard, however, an average will be higher than national environment standard value, in the same time, if compare to category 5 of the surface water quality, both BOD and COD are not defined for the wastewater from town and for transport. Eventual, some factors many not comply to national environment standard value, but DEWATS will solved the solid biomass, debris will be removed within DEWATS during the dry season, and it also can reduce certain BOD & COD value as well.

g. Land use

44. The landuse in the subproject affected area includes an agricultural area on the left bank in Ban Saphantai, urban area and backyards in Ban Thahae on the right bank, and in the downstream area in Ban Phonsavanh an area with mixed fishing, animal grazing, and some tree and vegetation cover.

[4] BORDA, July 2019. Engineering Design Report-subproject wastewater treatment (Horizontal Flow Planted Gravel Filter at Houay Longkong), Lao PDR GMS-EWEC

h. Flora and fauna

45. The subproject affected area is considered a modified habitat and includes an agricultural area on the left bank in Ban Saphantai, urban area and backyards in Ban Thahae on the right bank, and in the downstream area in Ban Phonsavanh an area with mixed fishing, animal grazing, and some tree and vegetation cover. There are no natural or critical habitats directly affected by the project.

46. The specific DEWATS area, there will be removed 15 trees, in the completion 40 trees will be planted along the slope of embankment on the walkway.

III. SUMMARY OF ISSUES AND POTENTIAL IMPACTS

47. The straightening and lining of the Houay Longkong Channel and construction of pumping station is undertaken in an area that forms the boundary between an urban area and an area used for farming. No vulnerable ecosystems will be disrupted by the project.

48. The flood risk in the southern catchment was assessed as part of the preparation of the Design Basis, which also included an assessment of the impact of the proposed pumping station on flood events. The pumping station is dimensioned with a capacity to manage a 50 mm rainfall. The installation and correct operation of the flood gates will prevent flooding of the lower catchment with high Mekong water. Neither will the lower catchment be subject to flooding with water from the runoff of urban storm water if the pumping station is operated correctly.

49. The main negative environmental impacts are temporary and short-term impacts during the construction phase associated with the construction work, including storm water management, noise, dust, solid and liquid waste, construction traffic, and reduced community access. Construction during the wet season will be associated with additional impacts associated with flooding of the construction site and storm water runoff from the construction site. To mitigate these impacts earthworks will not be permitted during the rainy season and should be undertaken in dry weather. The Contractor will establish a coffer dam or similar upstream of the channel construction site and pump the water downstream of the construction site. The Contractor will be required to have in place a contingency plan in case of a significant rainfall event during construction.

50. The construction related impacts are of limited duration and extent and can be mitigated through standard methods and procedures of good housekeeping and good engineering practice.

51. The operation related impacts are assessed as mostly positive as the subproject will improve drainage of the southern catchment area and reduce the risk of flooding of the area along the channel, especially the lower lying rice fields. A secondary impact is reduction of stagnant diluted wastewater in the channel during dry spells when the Mekong water level is high.

52. A summary of issues and impacts associated with the subproject is presented in the table below. The potential negative impacts of the infrastructure developments are primarily construction-related and therefore short-term and can be mitigated.

Table 4. Summary of Potential Environmental Impacts and Measures

Issues and Impacts	EMP measures
I. Pre-Construction Phase	
Finalization of Detailed Engineering Design (DED) to include recommendations of the Design Basis reports	Assessment of risk of flooding of the southern catchment area and impact of the flood gate and

	new pumping station as part of the preparation of the Design Basis. Assessment of surface water quality, flow rate and surface water quality after treatment
Land acquisition and resettlement	Addressed in RP
Displacement of people, loss of assets & income	Addressed in RP
II. **Construction Phase**	
Civil works related environmental impacts	
Land clearing, loss of farm land and trees	Tree and vegetation removal, and site restoration actions. Trees to be maintained as much as possible and native species used in replantation
Dust/suspended particles/air pollution	Dust management plan and monitoring
Noise and vibration	Noise management plan and monitoring
Generation of spoils, solid waste and hazardous waste	Spoil and waste management plans
Land, surface water and groundwater pollution	Construction materials, transport, and storage measures; spoil and waste management plans, erosion control measures Timing of construction in dry season and dry weather. Coffer dam upstream of construction and pumping of water to downstream. Contingency plan in the event of significant rainfall during construction.
Traffic	Traffic Plan
Reduced access, and disrupted community activity	Construction and traffic planning and community engagement
Accidental damage to properties/structures	Good construction practice; protection of cultural and religious sites; access to Grievance mechanism
Community health and safety hazard	Public safety plan
Workers' health & safety hazard	Occupational Health and Safety Plan
III. **Operation Phase**	
Improved drainage in the southern catchment.	Ensure cleaning of channel to maintain drainage capacity.
Reduced risk of flooding along the channel.	
Reduction of stagnant diluted wastewater in the channel during dry spells at high Mekong water level.	

Increase expenditure in the O&M	UDAA will be provided enough personal & budget
Odor generated from DEWATS particular in pond 1 & pond 2, where are proposed for storing the biomass sediment	BORDA Laos will develop O&M manual of DEWATS included Capacity building for O&M UDAA will regular clean as O&M guideline
The humid can be potentially Mosquito breeding places in the DEWATS	Ensure DEWATS is regular clean and mosquito killer spray during the wet season.

IV. REGULATORY FRAMEWORK AND GUIDELINES

53. The specific regulations and guidelines are summarized in Table 5. The regulations and guidelines, inter alia, specify how the infrastructure investment should be located, constructed, and managed to prevent or minimize negative impacts on the environment. The complete list of environment-related laws and regulations of GoL are described in Appendix A.

54. Environmental standards are listed in Appendix B. Where Lao PDR regulations differ from the environmental standards provided by the Environmental, Health and Safety Guidelines of the World Bank (2007), the reference will be whichever is more stringent.

Table 5. Environmental Standards

Environmental Standards
• Lao PDR Government Decree on National Environmental Standard No. 81/GoL (2017): See Appendix B.

V. CONTRACTOR REQUIREMENTS

55. In the context of the project the construction Contractor should commit to respect the following during the whole period of the construction activities:

(i) Establish an operational system for managing environmental impacts;
(ii) To submit Contractor's Environmental Management Plan (CEMP), addressing at a minimum the subproject EMP, including subplans;
(iii) To carry out the monitoring and mitigation measures specified in the EMP, to ensure adherence to the EMP throughout the construction stage, and to efficiently implement measures outlined in the EMP;
(iv) To allocate sufficient budget to ensure that such measures are carried out;
(v) To prepare and submit environmental monitoring reports as specified in the EMP;
(vi) To comply with any corrective or preventative actions/measures identified in safeguards monitoring reports or as outcome of audits;
(vii) Appoint an Environmental Representative to be the primary point of contact within his organization for all matters relating to environmental management;
(viii) To comply with GoL and ADB requirements and to provide self-monitoring to ensure compliance;
(ix) To prepare a corrective action plan with respect to non-compliance issues identified by the Project Manager and to implement by the date agreed;
(x) To participate in pre-construction consultation as and if required by the PMU;

(xi) To elaborate and manage the Occupational Health and Safety Plan;
(xii) To respect internationally recognized good practices;
(xiii) To provide effective environmental briefing/induction to personnel employed or contracted on environmental issues and the requirements for environmental management, maintain records of attendance of training, and provide ongoing training such as on site briefings or tool-box meetings;
(xiv) to develop grievance management procedures, signpost contact points signpost contact information;
(xv) to conduct informal consultations with affected persons and village heads in the project area;
(xvi) to monitor the construction and impacts and submit regular monitoring reports as specified in the EMP; and
(xvii) Admit regular monitoring and auditing of activities.

56. All contractual and legal obligations relating to the EMP should apply to both the construction contractors and their subcontractors. It should be the responsibility of the construction contractors to provide adequate resources to ensure effective implementation and control of the EMP. Each subcontractor should be accountable to its respective contractor for compliance with the measures presented in the EMP. Construction contractors and their subcontractors should ensure that the entire project staff is briefed and procedures are understood and followed.

VI. MITIGATION MEASURES AND PLAN

57. Environmental mitigation and management issues concerning the subproject arise mostly in the construction phase. Mitigation should thus be centered on the need to ensure that the contractor acts in an environmentally responsible way. Therefore, an environmental management plan (EMP) is part of the contract for construction. The EMP specifies the approach to construction site preparation and operation including pollution control and waste management.

58. The mitigation measures of the EMP are presented in a comprehensive mitigation plan for the subproject component summarized in Table 6. The plan includes the environmental issues and concerns raised at the stakeholder meetings. The plan identifies responsible parties, location, and timing. Indicative costs are tabled separately.

Table 6. Environmental Impacts Mitigation Measures Plan

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost	Responsibility	
							Super-vision	Implemen-tation
Pre-Construction Phase								
Consultation/ Disclosure, & community engagement	Community grievances	1. Pre-construction consultation with affected people, including dissemination of project level Grievance Redress Mechanism (GRM).	For all construction sites.	Before construction (but not later than 3 months after NTP)	Once regular GRM reporting	Management cost/ integrated in PMU budget	IA/PMU	PIT/GPP
GoL approvals	-	2. Subproject EMP submitted to DONRE for approval. 3. Updated EMP shall be submitted to EAs/IAs for approval and endorsement to ADB. 4. The Contractor shall ensure that required permits and clearances have been obtained from relevant government agencies.	Entire subproject	Before bidding Before construction	Once As required	Management cost/ integrated in PMU budget	IA/PMU	IA/PMU
UXO survey, & removal	Injured worker or public	5. Obtain the appropriate GoL certification on UXO (certificate of UXO clearance or no UXO clearance needed)	All construction sites.	Before construction (but not later than 3 months after NTP)	Once	GoL cost	EA/GoL	GoL
Bid documents	-	6. Updated EMP included in contractor tender documents, and tender documents specify that requirements of EMP must be budgeted. 7. Bid documents specify that contractor must have experience with implementing EMPs, or provide staff with the experience.	Entire subproject	Before bidding	Once	Management cost/ integrated in PMU budget	IA/PMU	IA/PMU
Construction Phase								
Initiate EMP & subplans	Prevent or minimize impacts	8. Contractor to submit Contractor's Environmental Management Plan (CEMP) for approval, addressing at a minimum the subproject EMP, including subplans (refer below).	For all construction sites	Before construction	Once	Integrated in Contractor's contract	CSCS	Contractor
Community engagement	Community grievances	9. Contractor to establish Grievance management procedures in line with project level GRM and signpost contact information (phone number and website).	For all construction sites	Before construction	Once	Integrated in Contractor's contract	CSCS/GPP	Contractor

		10. Contractor's Environmental Representative to conduct ongoing consultations with the affected persons in the project area through random site walks and consultations.						
Obtain & activate permits and licenses	Prevent or minimize impacts	11. Contractors to comply with all statutory requirements set out by GoL for use of construction equipment.	For all construction sites	Beginning of construction	Once	Integrated in Contractor's contract	CSCS	Contractor
Implement Construction materials acquisition, transport, and storage subplan	Pollution, injury, increased traffic, disrupted access	12. All topsoil and overburden removed should be stockpiled for later restoration. 13. Define & schedule how materials are transported, and handled & stored at sites. 14. All aggregate loads on trucks should be covered. 15. Piles of aggregates at sites should be used/or removed promptly, or covered and placed in non-traffic areas. 16. All construction fluids such as oils, and fuels should be stored and handled well away from vegetated areas.	For all construction areas	Throughout construction phase	Monthly	Integrated in Contractor's contract	CSCS	Contractor
Implement Spoil management subplan	Contamination of land and surface waters from excavated spoil, and construction waste	17. Where possible spoil should be used for backfilling. 18. Spoil to be disposed of in GoL-designated sites, clearly marked and identified. 19. Spoil must not be disposed of on sloped land, near cultural property or values, ecologically important areas, surface waters, or on/near any other culturally or ecologically sensitive feature. 20. A record of type, estimated volume, and source of disposed spoil must be recorded. 21. Contaminated spoil disposal must follow GoL regulations including handling, transport, treatment (if necessary), and disposal. 22. Suspected contaminated soil must be tested, and disposed of in designated sites identified as per GoL regulations. 23. Before treatment or disposal contaminated spoil must be covered with plastic and isolated from all human activity.	All excavation areas	Throughout construction phase	Monthly	Integrated in Contractor's contract	CSCS	Contractor
Implement Solid and liquid construction waste subplan	Contamination of land and surface waters from construction waste	24. Management of general solid and liquid waste of construction will follow GoL regulations, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force.	All construction sites and work camps	Throughout construction phase	Monthly	Integrated in Contractor's contract	CSCS	Contractor

		25. Areas of disposal of solid and liquid waste to be determined in line with regulation. 26. Disposed of waste should be catalogued for type, estimated weigh, and source. 27. Construction sites should have large garbage bins. 28. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible. 29. Solid waste should be separated and recyclables sold to buyers in community. 30. Hazardous Waste: Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow GoL regulations. 31. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents) 32. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors. 33. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil subplan.						
Implement Dust subplan	Dust	34. Regularly apply wetting agents to exposed soil and construction roads. 35. Cover or keep moist all stockpiles of construction aggregates, and all truck loads of aggregates. 36. Minimize time that excavations and exposed soil are left open/exposed. Backfill asap.	All construction sites.	Fulltime	Monthly	Integrated in Contractor's contract	CSCS	Contractor
Implement Noise subplan	Noise	37. Establish a schedule (hours during the day) of construction activities, acknowledging daytime, evening, and night time noise limits and minimize noise intrusive impacts during most noise sensitive hours. 38. Restrict working time to daytime when working close to residential areas. 39. Schedule truck loading, unloading, and hauling operations so as to minimize noise levels near residences. 40. Configure the construction site in a manner that keeps noisier equipment and activities as far as possible from nearby buildings. Orient plant and equipment known to emit noise strongly in a direction away from residences.	All construction sites.	Fulltime	Monthly	Integrated in Contractor's contract	CSCS	Contractor

		41. Establish temporary noise barriers around excessively noisy activity areas. 42. Provide acoustic enclosures for diesel generators. 43. Construction equipment manufactured or modified to reduce noise and vibration emissions shall be favoured, such as electric instead of diesel-powered equipment and hydraulic tools instead of pneumatic impact tools.						
Implement Tree and vegetation removal, and site restoration subplan	Damage or loss of trees, vegetation, and landscape	44. Restrict tree and vegetation removal to within the construction area and the 2 meters reservation and no unnecessary cutting of trees. 45. Within the construction area and the 2 meters reservation, minimize removals, and install protective physical barriers around trees that do not need to be removed. 46. Re-vegetate and landscape using native plant and tree species for revegetation	All construction sites.	Beginning and end of subproject	Monthly	Integrated in Contractor's contract	CSCS	Contractor
Implement Erosion control subplan	Land erosion	47. Berms and plastic sheet fencing should be placed around all excavations and earthwork areas. 48. Earthworks not permitted during the rainy season and to be conducted in dry weather. 49. Maintain a stockpile of topsoil for immediate site restoration following backfilling. 50. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready. 51. Re-vegetate all soil exposure areas asap.	All construction sites	Throughout construction phase	Monthly	Integrated in Contractor's contract	CSCS	Contractor
Implement worker safety subplan	Worker injury and health	52. Worker safety guidelines of GoL or IFC EHS Guidelines should be followed, whichever is more stringent. 53. Elaborate and manage the Plan for Occupational Health and Safety (OHS)) for the works (refer Basic Specifications). 54. Worker education and awareness seminars for construction hazards should be given. A construction site safety program should be developed and distributed to workers. 55. Appropriate safety clothing and footwear should be mandatory for all construction workers. 56. Adequate medical services must be on site or nearby all construction sites. 57. Drinking water must be provided at all construction sites. 58. Adequate worker facilities, including toilets, rest room, and washing facilities to be provided.						

		59. Sufficient lighting be used during necessary night work. 60. All construction sites should be examined daily to ensure unsafe conditions are removed.						
Implement public safety subplan	Public injury, and health	61. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites. 62. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites. 63. Public safety guidelines of GoL should be followed. 64. Speed limits should be imposed on all roads used by construction vehicles. 65. Standing water suitable for disease vector breeding should be filled in.	All construction sites	Throughout construction phase	Monthly	Integrated in Contractor's contract	CSCS	Contractor
Civil works	Degradation of water quality	66. Establish a coffer dam or similar upstream of the channel construction site and pump the water downstream of the construction site. 67. Establish protective coffer dams, berms, plastic sheet fencing, or silt curtains should be placed between all earthworks and surface waters. 68. Erosion channels must be built around aggregate stockpile areas to contain rain-induced erosion. 69. Earthworks not permitted during the rainy season and should be conducted during dry weather. 70. All construction fluids such as oils, and fuels should be stored and handled well away from surface waters. 71. No washing or repair of machinery near surface waters. 72. No unnecessary earthworks in or adjacent to water courses. 73. All irrigation canals and channels to be protected the same way as rivers, streams, and lakes.	All construction sites	Throughout construction phase	Monthly	Integrated in Contractor's contract	CSCS	Contractor
Implement Construction traffic subplan	Traffic disruption, accidents, public injury, community access	74. Schedule construction vehicle activity during light traffic periods. Use sufficient signage & warning lights. 75. Enforce speed limits, and create dedicated construction vehicle roads or lanes. 76. Allow community to continue to use footbridges over the channel to the extent possible and signpost alternative route.	All construction sites	Construction phase	Monthly	Integrated in Contractor's contract	CSCS	Contractor
Implement Construction Drainage /	Loss of drainage & flood storage	77. Develop and submit to the Construction Supervisor a Contingency Plan in case of a significant rainfall event during construction.	All areas with surface waters	At the start, and throughout	Monthly	Integrated in Contractor's contract	CSCS	Contractor

Flood Risk subplan		78. Provide adequate short-term drainage away from construction sites to prevent ponding and flooding. 79. Install temporary storm drains or ditches for construction sites. 80. Ensure connections among existing drainage infrastructure and surface waters (ponds, streams) are maintained or enhanced to sustain existing stormwater storage and drainage capacity. 81. Protect surface waters from silt and eroded soil.		construction phase				
Civil works	Damage to cultural property or values, and chance finds	82. Ensure protection of cultural and religious sites during construction. 83. Chance-finds of valued relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. 84. Upon a chance find all work stops immediately, find left untouched, and PMU notified. If find deemed valuable, provincial cultural authorities must be notified. 85. Work at find site will remain stopped until authorities allow work to continue.	All construction sites	At the start, and throughout construction phase	Monthly	Integrated in Contractor's contract	CSCS	Contractor

Subproject Activity	**Potential Environmental Impacts**	**Proposed Mitigation Measures**	**Location**	**Timing**	**Activity Reporting**	**Estimated Cost**	**Responsibility**	
							Super-vision	**Implemen-tation**
Post-Construction Operation of channel, pumping station, flood gates and DEWATS								
Operation of drainage channel	Flood events caused by inadequate maintenance of channel.	86. Ensure regular cleaning of channel to prevent buildup of sediments, waste, etc. in the channel that blocks the drainage capacity.	Drainage channel	Prior to onset of wet season, regularly	Biannual	Management cost	UDAA/OPWT	
Operation of flood gates and pumping station	Energy usage associated with pumping operation	87. Optimize pumping operation by adjusting the Mekong River water level required for initiation of pumping stations on the basis of experience gathered during pumping operations.	Pumping Station	Operation	Annual	Management cost	UDAA/OPWT	
Operation of DEWATS	Emission and odor from	88. Minimize and efficiency of using the equipment for cleaning the ponds, equipment should be checked & obtain quality	Ponds & HGFs	Operation	Annual for equipment	O&M cost	UDAA/OPWT	

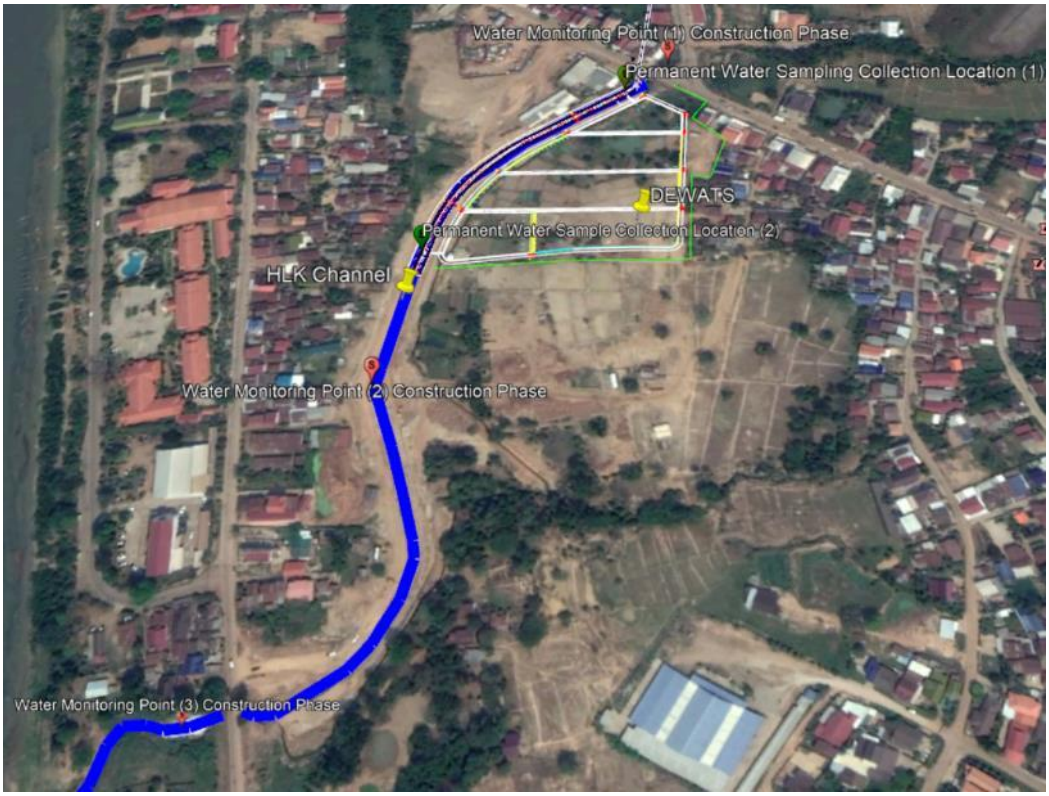
	biomass sediment	89. Pond1 is required to be checked twice per year, if sediment covered 50% of water depth, sludge should be removed and transport to landfill		5 years for removed sludge			
		90. HGFs should be regular checked as monthly basis for removing the litters, dead leaves, dead plants from the HGFs or remove it from the pond2, if they were flowed to the pond2.	HGFs	Monthly	annual	O&M cost	UDAA/OPWT
		91. Annual clean & re-plant aquatic plant & release new fishes in the pond 2 will be conducted	Pond 2	Annually	Annual	O&M cost	UDAA/OPWT
	Mosquito breeding places	92. Should regular clean & removed the unnecessary weeds from the DEWTS areas	DEWATS areas	Monthly	Annual	O&M cost	UDAA/OPWT
		93. Mosquito killer spray will be used during wet season by supporting from Public health office	DEWATS areas	Two time in wet season	Annual	O&M cost	UDAA/OPWT
	Solid Waste from HLK channel	94. Inlet will be regular check & remove solid waste to the garbage bin that provide	Inlet & DEWATS	Weekly	Monthly	O&M cost	UDAA/OPWT

VII. MONITORING AND REPORTING

59. The environmental monitoring plan for the EMP is provided in Table 7. The monitoring plan focuses on the construction and operation phases of the subproject and consists of environmental indicators, the sampling locations & frequency, method of data collection, and responsible parties. Estimated costs are tabled separately. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected positive or negative environmental impacts of the subproject.

60. Surface water quality will be monitored both construction and operation phase, as presented in paragraph 31 regarding water monitoring sample locations during operation phase and paragraph 32 the substances that will be checked in operation phase. The substances will be monitored during the construction as annual and quarterly are defined in Table 7. Environmental Monitoring Plan. The construction phase has defined three locations for water sample collection as (i) upstream location is located above box culvert along few meters, this point is selected to observe the waste water quality before flow down to the construction areas. (ii) middle point of the construction, it is selected to monitor the water quality during construction, the water is diverted to small channel and water easy flow due to the gravity and slope and, (iii) the third point is selected at the down stream after box culvert down to the Mekong. This point is selected for monitoring the water quality after construction areas, because during construction had discussed that final section might not constructed any, it will leave as natural creek.

Figure 14: Water Sample Collection Location



A. Environmental Standards for Subproject and Water Quality Monitoring

61. Environmental standards are listed in Appendix B. Where Lao PDR regulations differ from the environmental standards provided by the Environmental, Health and Safety Guidelines (General and applicable) of the World Bank (2007), the reference will be whichever is more stringent.

B. Performance Monitoring

62. Performance monitoring is required to assess the overall performance of the EMP. Select indicators of major components of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 8.

63. Under the CSCS, Environmental Specialists will be employed to support the implementation of the environmental monitoring program. The IA/PMU and PIT will provide logistical support where necessary for the implementation of the environmental monitoring plan.

64. After the construction phase is completed and the components are in operation the incidence of flooding upstream of the flood gates should be monitored.

C. Reporting

65. Regular reporting on the implementation of mitigation measures, and on monitoring activities during construction phase of the subproject is required. Reporting should document progress and the results of mitigation. The Reporting will be conducted at different levels and is the overall responsibility of the PMU. The mitigation and monitoring plans (Table 7 and Table 8) summarize proposed timing of reporting. The Contractor will report on monthly basis on implementation of the mitigation plan and on the monitoring plan. Environmental monitoring reports will be prepared quarterly for the EA by the PMU and PIT supported by the CSCS Environmental Specialists and send to the DONRE and ADB. A semi-annual Safeguards Monitoring Report will be submitted to ADB. A draft format and outline for the Environmental Monitoring Report is provided in the Appendix Draft format for Environmental Monitoring Report.

Table 7. Environmental Monitoring Plan

Aspect/Parameter to be monitored	Location	Means of Monitoring	Frequency	Reporting	Responsibility	
					Compliance Monitoring	Implement
Construction Phase						
Environmental mitigation implemented according to the CEMP/EMP	All construction sites	Field observations Consulting affected residents Review of grievances	Regular and random Random Regular	Monthly	CSCS	Contractor
Water quality in the Houay Longkong channel upstream and downstream of construction against GoL surface water quality standards. Baseline and annual monitoring of: TSS, heavy metals (As, Cd, Pb,) oil and grease, total & faecal coliform, pH, DO, COD, BOD_5, temperature, TDS, NH_3, NH_4, other nutrient forms of N & P, sulphides, surfactants, turbidity (NTU). Quarterly monitoring of: Temperature, pH, COD, BOD_5, TSS, turbidity (NTU), oil and grease. Establish baseline prior to construction and periodically during construction.	Upstream and downstream and middle of construction site	Following recognized methodology, method specified in Decree 81/GoL, 2017	Prior to construction (but not later than 3 months after NTP) Large group as baseline and annually Small group quarterly	Before construction Quarterly	CSCS	Contractor
Monthly Environmental Monitoring Report submitted following prescribed outline	Subproject	Review of Contractor's Report	Regular	Monthly	CSCS	Contractor
Lodged grievances acted upon and grievance mechanism observed	Subproject	Review of grievances Consultation with village authorities	Regular Regular	Monthly	CSCS	Contractor

Aspect/Parameter to be monitored	Location	Means of Monitoring	Frequency	Reporting	Responsibility	
					Compliance Monitoring	Implement
a) Incidence of worker or public accident or injury; b) incidence investigation; c) corrective measures identified; and d) corrective measures implemented.	All construction sites	Review of incidents and sick leave Review of investigation and corrective measures	Regular Regular	Monthly	CSCS	Contractor
a) Environmental incidences/accidents; b) incidence investigation; c) corrective measures identified; and d) corrective measures implemented.	All construction sites	Review of incidents register Review of investigation and corrective measures	Regular Regular	Monthly	CSCS	Contractor
Quarterly Environmental Monitoring Report submitted following prescribed outline	Subproject	Review of Report	Quarterly	Quarterly	DONRE / ADB	PMU/PIT
Semi-Annual Safeguards Monitoring Report submitted following prescribed outline	All subprojects	Review of Report	Semi-Annual	Semi-Annual	ADB	PMU
Operation of channel, pumping station, and flood gates and DEWATS						
Worker or public injury associated with O&M.	Pumping station, flood gates, and channel.	Regular record keeping.	Continuously	For each event	IA/PMU based on information from UDAA/OPWT	
Incidence of flooding	Upstream of flood gates	Surveys, public complaints	Seasonal for 5 years	Seasonal	IA/PMU based on information from UDAA/OPWT	
Water quality check with detail parameters including Temperature, pH, COD, BOD_5, TSS, oil and grease	Inlet & Outlet	Water quality test by hiring reliable laboratory	Quarterly for the first yearly and seasonal from second years	Quarterly Semiannual	OPWT/UDAA	
Biomass monitoring in treatment ponds and wetland system	Treatment ponds	Labour check & remove litter or dead leaves from treatment ponds	Monthly	Monthly	OPWT/UDAA	

Table 8. Performance Monitoring Indicators for Houay Longkong Channel Subproject

Major Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation & Disclosure	Affected public & stakeholders	Meetings with stakeholders contacted during IEE & new stakeholders convened for follow- up consultation & to introduce grievance mechanism.	Minutes of meeting, and participants list
Bid Documents	Requirements of EMP (CEMP)	EMP appended to bidding documents with clear instructions to bidders for CEMP.	Bid documents
Construction Phase			
Air quality	Dust and suspended particles from construction sites not exceeding Lao PDR standards at receptors.	Dust control measures implemented.	Contractor and CSCS monitoring reports
Noise	Noise from construction sites not exceeding Lao PDR standards at receptors.	Noise control measures implemented, work scheduling to minimize nighttime work.	Contractor and CSCS monitoring reports
Soil quality	Solid & liquid waste from all construction activities quantified and notified to the CSCS and disposed of in line with regulations and requirements.	Rigorous program of procedures & rules to collect and store all waste from sites practiced.	Contractor and CSCS monitoring reports
Water quality	No significant impact on the water quality in the Houay Longkong Channel attributed to construction activities.	Water quality monitoring implemented and results show no significant impact to water quality attributed to the construction activities. Water quality protection measures implemented to prevent pollution of surface water.	Contractor and CSCS monitoring reports
Hazardous materials & waste	Hazardous materials & waste quantified and notified to CSCS and disposed of in line with	Rigorous program of procedures to manage and store all waste from construction sites practiced.	Contractor and CSCS monitoring reports

	regulations and requirements		
Public & worker safety	Frequency of injuries	Adherence to GoL policy and site-specific procedures to prevent accidents. Incidents are investigated and corrective actions identified and implemented.	Contractor reports
Cultural property	Incidence of damage, or complaints	No valued cultural property, or unearthed valuable relic is damaged in any way.	Public input, contractor reports and CSCS reports
Grievances and Grievance Redress Mechanism	Grievances lodged	Lodged grievances are acted upon and the Grievance Redress Mechanism (GRM) is followed.	Hotline number posted at construction site, grievances/complaints received through website, GRM reports.
Traffic	Frequency of disruptions & blocked footbridges over the channel and surrounding roadways	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports and CSCS reports
Operation Phase of Components			
Worker or public injury associated with O&M of pumping station, flood gates, channel and DEWATS.	Frequency of accidents	Zero incidents.	Records of UDAA/OPWT
Flooding upstream of flood gates.	Frequency of events	No increase in pre-construction frequency.	UDAA/OPWT monitoring.
Surface water quality	Water quality check with detail parameters, including Temperature, pH, COD, BOD_5, TSS, oil and grease as quarterly/twice per year	Check the efficiency of treatment system	UDAA/OPWT
Aquatic resources	Plants and fishes in the treatment ponds as monthly basic	Check quality of aquatic resources and maintenance of treatment	UDAA/OPWT

VIII. ESTIMATED COST OF EMP

66. The cost for implementing the EMP includes costs for implementing the environmental mitigation, management, and monitoring measures. The costs for implementing impact mitigation measures are

integrated in the Construction contract. The costs for implementing monitoring measures should be priced by the Contractor in their bid.

67. The estimated cost for the budgeted items of the implementation of the EMP for Houay Longkong Channel is USD 19,800 (Table 9), excluding the costs that should be are integrated in the Construction Contract, Construction Supervision Contract, or the PMU budget.

Table 9. Cost Estimation of EMP for Houay Longkong Channel

Activity	Indicative Cost (USD)			
	Integrated into Construction Contract	Integrated into Supervision Contract (CSCS)	Integrated into PMU Budget	Training, Technical Assistance & Services Budget
Environmental Mitigation				
Construction Phase Implementation of Mitigation Plan	Subproject cost	Subproject cost		
Environmental Monitoring				
Construction Phase Monitoring of community & workers' health and safety	Subproject cost¨	Subproject cost	Subproject cost	
Monitoring of Environmental mitigation and management	Subproject cost	Subproject cost	Subproject cost	
Baseline and quarterly monitoring of water quality upstream and downstream	Subproject cost	Subproject cost		
Subject to complaints/grievances, additional air quality and noise monitoring against standards may be required of Contractor	Subproject cost	Subproject cost		
Performance Monitoring Project audits, including DONRE audit	8,000			
Seminars/Workshops				10,000
Maintenances and Operation Cost for DEWATS, (Operation & maintenance cost will not includ in the project budget)	**An average per annual**			**2,208**
Training for operation & Maintenances (first year approximately 2 training)				800
Labor for removing biomass and cleaning as monthly basic (cost per annual)				430

Remove sludge from the pond 1 & Pond 2 (approximately once in 5 years)				3,350
Big cleaning gravels and plants in HGFs/ every 10 years				11,650
Water Quality Monitoring (hired reliable laboratory two time per year during dry season) cost per annual				198
Sub-Total specific for construction Phase (USD)				18,000
Contingency at 10%				1,800
Total Specific for construction phase (USD)				**19,800**

IX. INSTITUTIONAL ARRANGEMENTS & RESPONSIBILITIES

68. The primary management framework overseeing the implementation of the environmental management plan (EMP) is defined by the: 1) Ministry of Public Works and Transports (MPWT) who is the executing agency (EA) of the subproject; 2) the Provincial Department of Public Works and Transport (PDPWT) Savannahket province who is the implementing agency (IA) of subproject; 3) a project management unit (PMU) formed by the IA to oversee implementation of the subproject in Kaysone and the subprojects in Phine and Dansavanh; and 4) the project implementation team (PIT) established in Kaysone Phomvihane, Phine, and Dansavanh to coordinate project activities at the district level.

69. The project has designated an Environmental Control Officer (ECO) in the PMU and PIT, while the construction contractor will nominate an Environmental Representative (ER). A Construction Supervision Consulting Services (CSCS) Consultant with environmental expertise will be appointed. The CSCS will be responsible to ensure that the Contractor implements the EMP during the Contract Period, to establish monitoring programme, review the EMP, and supervise its implementation. During the construction phase, the Contractor will generally be responsible for implementation of the mitigation measures as specified in the mitigation plan and the CSCS will supervise the implementation.

70. The Environmental Control Officer (ECO) will be responsible for monitoring, reviewing, and verifying compliance with the EMP by the construction contractor. In addition, the ECO will be responsible for ensuring that mitigation and compensation measures developed in the EMP are implemented where applicable. Monitoring these measures will also be the responsibility of the ECO, supplemented by additional staff if required. The ECO should be a local government official with the necessary training, equipment, and access to specialist support, if required.

71. The Contractor’s Environmental Representative (ER) will be the construction contractor’s focal point for all environmental matters and is routinely on-site for the duration of the construction works. The ER is an appropriately briefed technical officer (often the CC site engineer). The ER carries out regular inspections of the CC activities in relation to environmental issues, and provides day-to-day advice to contractor personnel about environmental issues. The Environmental Representative will have the authority to instruct any area of the Contractor’s operations to implement the requirements of the Environmental Management Plan and any instructions from the Project Manager.

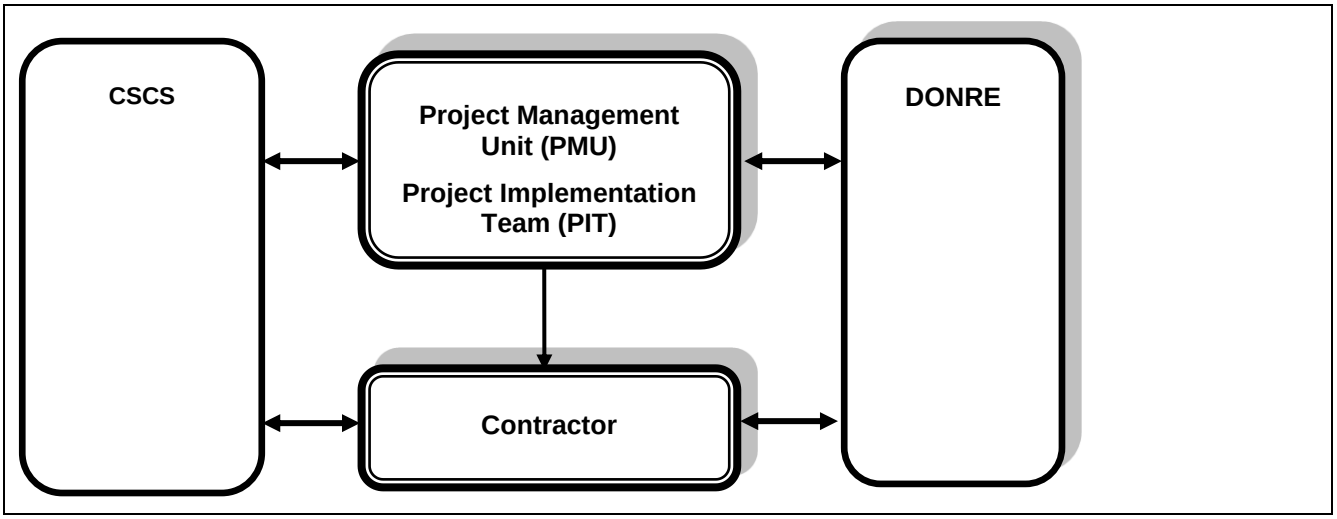


Figure 15. Organizational chart for EMP implementation

72. The responsibilities of the IA/PMU are summarized below:

1. Overall responsibility for project implementation and coordination of project activities;
2. Supervise the activities of the Project Implementation Teams organized within the District Authorities;
3. Undertake procurement of goods, works and services including recruitment of consultants for project management support, capacity development and training, independent audit and safeguards monitoring;
4. Develop and adapt a project performance management system in monitoring project activities using indicators and parameters in the design and monitoring framework;
5. Obtain necessary approvals and clearances of environment and resettlement from MONRE prior to awarding of civil works contracts;
6. Manage separate project financial records and accounts, and prepare financial reports;
7. Supervise the implementation of social and environmental safeguards and including timely disclosure of safeguards documents;
8. Supervise the implementation of the Consultation and Participation Plan, Gender Action Plan, and Stakeholder Communication Strategy;
9. Supervise the implementation of the resettlement plans including adequate measures to mitigate adverse resettlement impacts;
10. Ensure that environment management plans and gender considerations are incorporated in the detailed engineering designs and included in the civil works contracts;
11. Undertake regular quality control inspection of project facilities;
12. Manage the handover of project facilities to agencies responsible for operation and maintenance;

13. Prepare and submit quarterly and annual physical and financial progress reports to the EA; and
14. Undertake monitoring of compliance of social and environmental safeguards.

73. The responsibilities of the PIT are summarized below:

1. Coordinate the implementation of project activities at the district level;
2. Ensure the implementation of the approved work plans and program of activities;
3. Prepare and submit regular quarterly and annual physical and financial progress reports to the PMU;
4. Oversee and coordinate civil works and construction activities;
5. Ensure the implementation of social and environmental safeguards and including timely disclosure of safeguards documents;
6. Ensure the implementation of the Consultation and Participation Plan, Gender Action Plan, and Stakeholder Communication Strategy;
7. Ensure implementation of resettlement plans including adequate measures to mitigate adverse resettlement impacts;
8. Coordinate implementation of environmental management plan, and submit regular monitoring reports to the PMU;
9. Coordinate the updating of the resettlement plans and monitor implementation of resettlement activities; and
10. Undertake monitoring of project activities based on the indicators and parameters in the Design and Monitoring Framework (DMF) and prepare regular reports to the PMU on project achievements.

74. The PMU with assistance from the DED ensures that the EMP becomes part of the construction contract and with assistance from the CSCS that the EMP is implemented and that the Contractor abides by the EMP. The ECO should undertake regular site inspections and the results should be recorded and submitted to the relevant authorities as part of progress reporting.

A. Consultation and Public Participation Process

75. Information disclosure and stakeholder consultations were conducted as part of the environmental assessment process. The consultations involved in-depth key informant interviews with relevant Government agencies and focus grouped discussions.

76. The consultations aimed on environmental issues and concerns affecting the community. Specifically, the objectives of the consultation meetings are the following:

- To present the proposed projects to the stakeholders;
- To solicit views of the stakeholders relative to the proposed project;
- To identify the most important project components for the locals;
- To identify possible environmental issues inherent on the proposed project and
- To identify mitigation measures to address these issues in the project design.

77. Subsequent information dissemination to, consultation with and participation of affected people and involved agencies will reduce the potential for conflicts and minimize the risk of project delays. Further information and consultations will be carried out before construction starts (during the first year of the project) and during the construction period.

78. Prior to the start of the construction, consultation will be carried out in all the areas where the proposed project activities are anticipated. The objective will be to provide the local population with accurate information on activities to be undertaken, on the schedule of these activities and on the potential nuisances for them during construction. This information stage, which concerns all the project sites, will be carried out jointly with the team in charge of RP preparation in those areas concerned by compensation and/or resettlement.

79. During the construction stage, consultation will be carried out with local population in specific area where construction activities are expected to start within 1 month. This will be carried out through focus group discussion with residents and key stakeholders (police station, ward heads) on possible nuisances (noise, dust, traffic/access constraint, temporary suspension of public utility, etc.), on safety measures they will have to respect (regarding engines under activity, risks of fall in excavations, risks specific to children etc.) and on the detailed schedule of activities.

80. At the end of the construction activities in a dedicated site, inspection of site to ensure cleaning and rehabilitation has been done by the Contractor will include interview of residents to possibly identify non-compliance in the rehabilitation of the site.

81. During the preliminary design, design and final design, consultation with key stakeholders and public were organized in three consultation and information disclosures in different levels, the First consultation on preliminary designed was organized in April 30, 2019 at Savannakhet DPWT Meeting Hall with total 15 participants, included 3 females, the Second consultation on final design presentation was organized in the same venue, on July 8, 2019 with total 18 participants included 2 female and the Third consultation was organized at Saphantai village meeting hall on September 2, 2019, with total 12 participants and included 4 females, the detail of public consultation is presented in below table.

Table 10: Results of Public Consultation

DATE, VENUE, PARTICIPANTS, FEMALE & TITLE	SUMMARY OF DISCUSSION
APRIL 30, 2019 AT SAVANNAKHET DPWT MEETING HALL, 18 PERSONS-INCLUDED 3 FEMALES- DEWATS PRELIMINARY DESIGN	(1) BORDA is German INGO, who are engineer design team that presented preliminary design of DEWATS (2) the consultation workshop has invited different stakeholders, experts from different fields, as engineer, environment, management. the participants from DPWT, PMU, CSCS, and other departments as PoNRE, Governance Office, UDAA, and Kaysone Phomvihane Municipality governor office. (3) the key discussion results at the workshop are presented below A. Workshop agreed to applied the concept/approach of DEWATS for HLK-Channel in the temporary wastewater pond, before release to Mekong River. B. Agreed to allow BORDA to design DEWATS that based location environment such deeper bottom ponds and dike for diversion wastewater to ensure that there be no stagnant water surround the community. C. BORDA should closely cooperate with GMS EWEC TDP Office to collect more information to support detail engineering design D. GMS-EWEC TDP office should cooperate with PoNRE to define accurate location and land will be installed DWETS, If it is state land, project should make document on behalf of DPWT to relevance organization. E. BORDA/designer should cooperate with PoNRE for water quality after treatment, to ensure that it is matched with standard. F. Designer team should complete detail engineering design with suitable times as (2-3 weeks) G. after DEWATS detail engineering design completed, technical consultation workshop should be organized for finalizing or commencing for further improvement of design.
JULY 8, 2019 AT SAVANNAKHET DPWT MEETING HALL, 18 PERSONS-INCLUDED 3 FEMALES- DEWATS DETAIL ENGINEERING	(1) detail engineering design consultation workshop of DEWATS are presented by designer team from BORDA. (2) the consultation workshop has invited different stakeholders, experts from different fields, as engineer, environment, management. the participants from DPWT, PMU, CSCS, and other departments as PoNRE, Governance Office, UDAA, and Kaysone Phomvihane Municipality governor office, especially, contractor of HLK was also participated .

DATE, VENUE, PARTICIPANTS, FEMALE & TITLE	SUMMARY OF DISCUSSION
DESIGN WORKSHOP	(3) The DEWATS detail engineering design was agreed in general and minor comments at the workshop are presented below A. Integrate fence surrounding the DEWATS areas for protecting people and animal to enter to the areas. B. integrate tree plantation, where are suitable areas for shade and green areas. C. The wastewater from households, where are exclusive from DEWATS should be continue design and include to water treatment system.
SEPTEMBER 2, 2019, BAN SAPHANTAI MEETING HALL, WITH TOTAL 12 PARTICIPANTS AND INCLUDED 4 FEMALES. PUBLIC CONSULTATION AT COMMUNITY LEVEL	(1) The public consultation was organized for information disclosure on environment, health, safety, included grievance procedure and result of resettlement assessment. (2) There are participants from Ban Saphantai village, where is DEWATS located that included villager authorities and villagers, and affected persons from resettlement assessment. (3) The Key discussions during the public consultation are presented below 1. Q: a household asked for a state land for his access where they daily use, if the government does not agree on this, no choice will be made. *A: the answer and implementation will be given after consulting with Department of Natural Resources and Environment.* *2.* Q: the residents will get bad odors from wastewater treatment ponds. *A: the design has included gravel filter, water planting, it will reduce the bad smell during operation, and it will be flowed all the times and regular maintenance.* 3. Q: Request for construct access road to Huay Longkong directly for people who live near the left side of the DWATS or on the main road. This means that the project workers can travel via this way into the construction site during the construction period as well. *A: it will not matter if the governmental property is used by several households in common. The implementation will be discussed with the PoNRE before giving final answer.* 4. Q: the Huay Longkong bridge which is planned to construct at two points. One point is proposed to construct in the opposite of the market, so people from Thahae can cross conveniently. *A: inform the project after agreeing by most voices.*

DATE, VENUE, PARTICIPANTS, FEMALE & TITLE	SUMMARY OF DISCUSSION
	5. Q: the contractor made a verbal agreement to use the land for excavation for drainage conversion, when it is completed, the drainage will be re-surfaced. It is required to be-official agreement, concerning contractor might not comply with verbal agreement. *A: the project will force the contractor company to re-surface drainage as agreed. If not, there will be measures against the contractor.* 6. Q: there is drainage between Mr. Okhuanchai and Mr. Bounthoua's land next to the wastewater treatment area, is possible for project lay pipes and villagers will used their pipes in their land areas. *A: the project has pipelines which dug out from the A1 road, if the residents are interested in using, they can put where they want to.* 7. Q: families who live in this area proposed to continue farming *A: the project team will discuss with each family the solutions whether about occupations and living pattern in the future*

Figure 16:Selected Photos of Public Consultation at Saphantai Village Meeting Room

Figure 17: Attendant List of DEWATS Preliminary Design Consultation

ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ

ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

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ຜູ້ເຂົ້າຮ່ວມປະຊຸມ

ກອງປະຊຸມ: ຜ່ານແຜນແບບລະບົບບຳບັດນ້ຳເປື້ອນທ້ອງຖິ່ນ ແບບດີວັດ (DWAT)

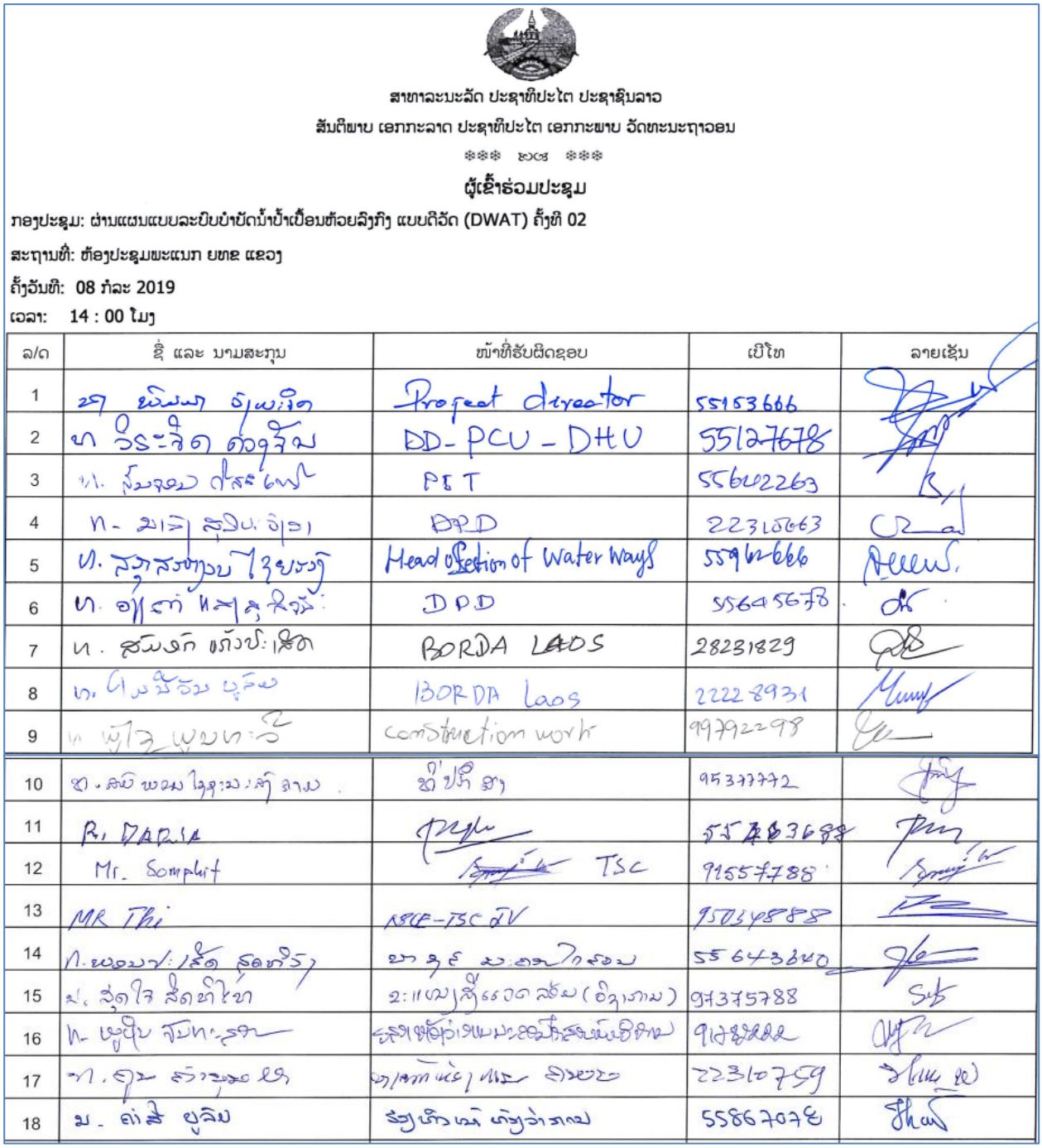
ສະຖານທີ່: ຫ້ອງປະຊຸມພະແນກ ຍທຂ ແຂວງ

ຄັ້ງວັນທີ: 30 ເມສາ 2019

ເວລາ: 09 : 00 ໂມງ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ໜ້າທີ່ຮັບຜິດຊອບ	ເບີໂທ	ລາຍເຊັນ
1	[illegible]	[illegible]	55642062	
2	[illegible]	[illegible]	97558999	
3	[illegible]	[illegible]	55641661	
4	[illegible]	[illegible]	55640488	
5	[illegible]	[illegible]	59556059	
6	[illegible]	[illegible]	55642263	
7	[illegible]	[illegible]	22310603	
8	[illegible]	[illegible]	55339555	
9	R. Davia	Team leader - CSC	55403688	
10	Mr. Somphone Xangsamssaengkham	DTL	95377772	
11	[illegible]	[illegible]	95372662	
12	[illegible]	[illegible]	22306685	
13	[illegible]	[illegible]	99192298	
14	[illegible]	ພທຂ	5564 1111	
15	[illegible]	[illegible]	55962661	

Figure 18: DEWATS-Detail Engineering Design Public Consultation at DPWT



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ

ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນະຖາວອນ

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ຜູ້ເຂົ້າຮ່ວມປະຊຸມ

ກອງປະຊຸມ: ຜ່ານແຜນແບບລະບົບບຳບັດນ້ຳປ້ຳເປື້ອນຫ້ວຍລີງກິ່ງ ແບບດີວັດ (DWAT) ຄັ້ງທີ 02

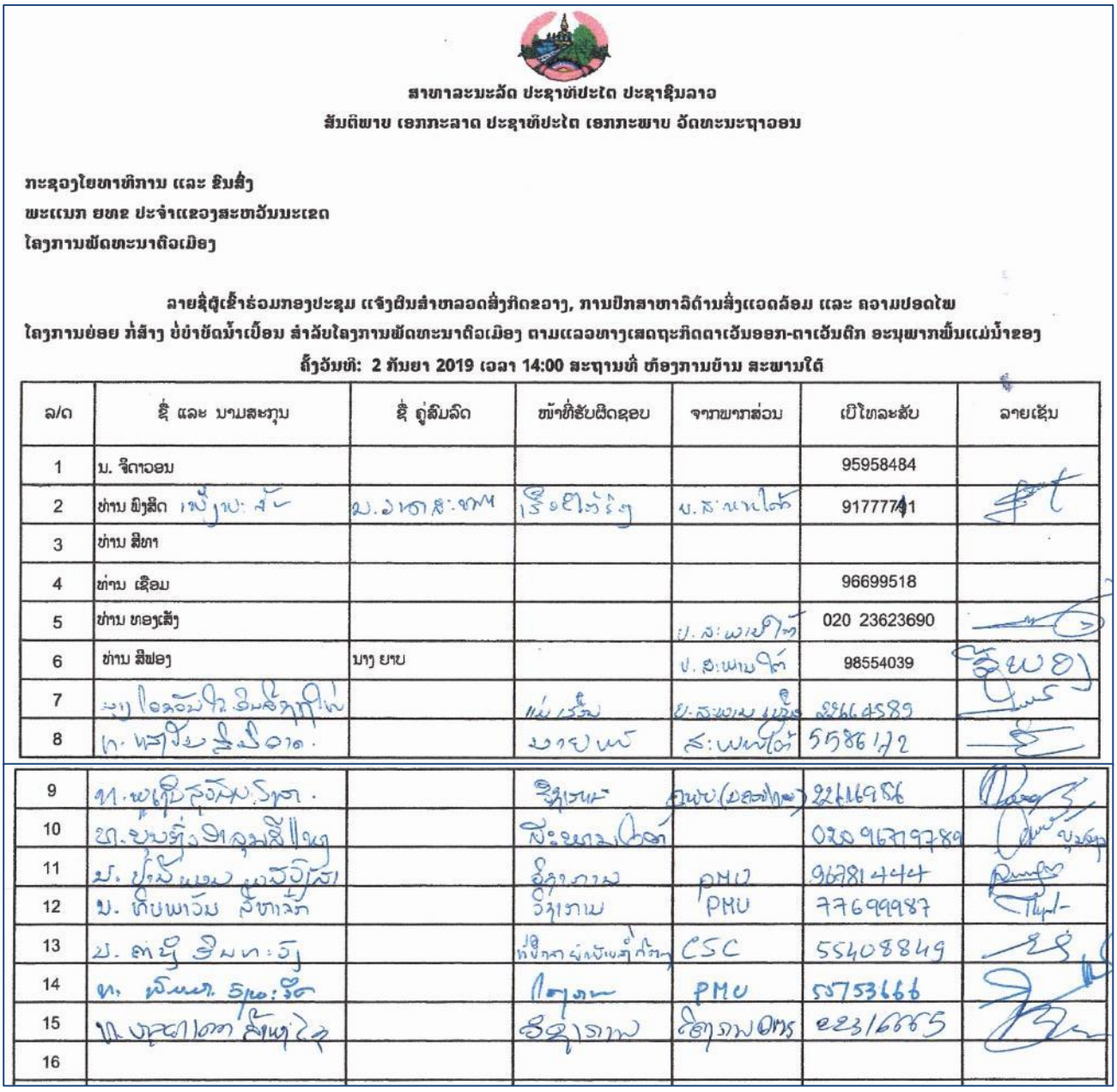
ສະຖານທີ: ຫ້ອງປະຊຸມພະແນກ ຍທຂ ແຂວງ

ຄັ້ງວັນທີ: 08 ກໍລະ 2019

ເວລາ: 14 : 00 ໂມງ

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ໜ້າທີ່ຮັບຜິດຊອບ	ເບີໂທ	ລາຍເຊັນ
1	... ...	Project director	55153666	
2	...	DD-PCU-DHU	55127678	
3	...	PIT	55642263	
4	...	DPD	22305663	
5	...	Head of Section of Water Ways	55962666	
6	...	DPD	55645678	
7	...	BORDA LAOS	28231829	
8	...	BORDA Laos	22228931	
9	...	construction work	99792298	
10	...	...	95377772	
11	...	...	55...	
12	Mr. Somphit	TSC	91557788	
13	MR Thi	ASCE-TSC DV	95...	
14	...	...	55...	
15	...	...	97375788	
16	...	...	91...	
17	...	...	22...	
18	...	...	55...	

Figure 19: DEWATS Public Consultation At Saphantai Village



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ສັນຕິພາບ ເອກກະລາດ ປະຊາທິປະໄຕ ເອກກະພາບ ວັດທະນະຖາວອນ

ກະຊວງໂຍທາທິການ ແລະ ຂົນສົ່ງ

ພະແນກ ຍທຂ ປະຈຳແຂວງສະຫວັນນະເຂດ

ໂຄງການພັດທະນາຕົວເມືອງ

ລາຍຊື່ຜູ້ເຂົ້າຮ່ວມກອງປະຊຸມ ແຈ້ງຜົນສຳຫລວດສິ່ງກີດຂວາງ, ການປົກສາຫາລືດ້ານສິ່ງແວດລ້ອມ ແລະ ຄວາມປອດໄພ
ໂຄງການຍ່ອຍ ກໍ່ສ້າງ ບໍ່ຍ້ຳຫ້ວຍນ້ຳເບ້ືອນ ສຳລັບໂຄງການພັດທະນາຕົວເມືອງ ຕາມແລວທາງເສດຖະກິດຕາເວັນອອກ-ຕາເວັນຕົກ ອະນຸພາກພື້ນແມ່ນ້ຳຂອງ

ຖ້ືງວັນທີ: 2 ກັນຍາ 2019 ເວລາ 14:00 ສະຖານທີ່ ຫ້ອງການບ້ານ ສະພາມໃຕ້

ລ/ດ	ຊື່ ແລະ ນາມສະກຸນ	ຊື່ ຄູ່ສົມລົດ	ໜ້າທີ່ຮັບຜິດຊອບ	ຈາກພາກສ່ວນ	ເບີໂທລະສັບ	ລາຍເຊັ່ນ
1	ນ. ຈິດາວອນ				95958484	
2	ທ່ານ ພິງສິດ	ນ.			91777741	
3	ທ່ານ ສີທາ					
4	ທ່ານ ເຊືອນ				96699518	
5	ທ່ານ ທອງເສັ່ງ				020 23623690	
6	ທ່ານ ສີຟອງ	ນາງ ຍາຍ			98554039	
7						
8						
9						
10						
11				PMU		
12				PMU		
13				CSC		
14				PMU		
15						
16						

B. Grievance Redress Mechanism

82. A summary description of the Grievance Redress Mechanism is included below. For a more detailed description, please refer APPENDIX C: PROJECT LEVEL GRIEVANCE REDRESS MECHANISM.

83. The PMU will appoint a Grievance Point Person (GPP) to handle environmental grievances lodged prior to construction, during construction and during operation. The PMU will provide sufficient support system, i.e., communication facilities, recording, and reporting system and funds, among others, shall have been set up to sustain the effective implementation of the mechanism. The GPP shall ensure that the mechanism, including names and contact details of responsible persons in the affected villages, PMU, UDAA and DPWT, is publicly disclosed, and posted in the offices of the affected villages and in strategic places of the Project's area of influence. During operation, the GPP will liaise with the UDAA and the DPWT (the operators) for the management of the mechanism until loan closure.

84. The affected person lodge complaints to any of the following: i) village officers; ii) Contractor, during construction; iii) DPWT or UDAA; iv) PMU, through its GPP, or v) third parties, e.g., NGO, religious groups. The AP may also lodge complaint through ADB's accountability mechanism. Complaints may be acted on immediately by the responsible party. However, it shall be made a policy that all informally lodged and acted on complaints shall have to be registered with the PMU as soon as possible for record purposes.

85. The Contractor is required to establish grievance management procedures in line with the project level GRM and signpost contact information (phone number and website) on the construction site. The Contractor's Environmental Representative is required to conduct ongoing consultations with the affected persons in the project area through random site walks and consultations.

86. The CSCS and the GPP will conduct site visits and site walks and conduct consultations with affected persons and village heads to obtain information on grievances.

X. EMERGENCY RESPONSE PLAN

87. The Contractor must develop emergency and incident response procedures for the construction phase. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. In the construction phase the key players include: a) Emergency Response Team (ERT) of the Contractor as initial responder; b) the District and City fire and police departments, emergency medical service, and the Department of Public Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders. The Contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

Table 11. Roles and Responsibilities in Emergency Incident Response in construction phase

Entity	Responsibilities
Contractor Team (ERT)	• Communicates/alerts the EERT. • Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. • When necessary & requested by the EERT, lends support/ provides assistance during EERT's response operations.

External Emergency Response Team (EERT)	• Solves the emergency/incident
Contractor Resources	• Provide and sustain the people, equipment, tools & funds necessary to ensure Subproject's quick response to emergency situations. • Maintain good communication lines with the EERT to ensure prompt help response & adequate protection, by keeping them informed of Subproject progress.

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

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

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

a) Subproject sites;

b) construction time frame and phasing;

c) any special construction techniques and equipment that will be used;

d) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;

e) the Contractor's Emergency Management Plan

f) names and contact details of the ERT members

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

a) their comments on the adequacy of the respective Emergency Management Plans

b) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated

c) the arrangements for coordination and collaboration.

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

a) set up the ERT;

b) set up all support equipment and facilities in working condition

c) make arrangements with the EERT;

d) conduct proper training of ERT members, and encouraged and train volunteers from the work force;

e) conduct orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and

f) conduct drills for different possible situations.

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

A. Alert Procedures

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

a) Whoever detects an emergency situation first shall immediately:
   - Call the attention of other people in the emergency site,
   - sound the nearest alarm, and/or
   - report/communicate the emergency situation to the ERT.

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

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

95. For an effective reporting/alerting of an emergency situation:

a) The names and contact details of the relevant persons and institutions should be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:
   - Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
   - EERT institutions/organizations
   - Concerned village authority/ies
   - PMU Office, ECO

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

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

B. Emergency Response Situations

96. The following tables suggest general procedures that will be described in more detail in the Emergency Management Plans of the Contractor.

Table 12. Evacuation Procedure

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

Table 13. Response Procedure During Medical Emergency

Procedure	Remarks
• Administer First Aid regardless of severity immediately.	• Fundamentals when giving First Aid: • Safety first of both the rescuer and the victim. • Do not move an injured person unless: • victim is exposed to more danger when left where they are, e.g., during fire, chemical spill it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure instructed or directed by the EERT. • First AID to be conducted only by a person who has been properly trained in giving First Aid.

• Call the EERT emergency medical services &/or nearest hospital.	• ERTL/Deputy ERTL or authorized on-site emergency communicator
• Facilitate leading the EERT to the emergency site.	• ERTL/Deputy ERTL to instruct: • an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention & lead them to site. • Other ERT members to clear access road for smooth passage of the EERT.
• If applicable, vacate site & influence area at once, restrict site, suspend work until further notice.	• Follow evacuation procedure

Table 14. Response Procedure in Case of Fire

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

• Facilitate leading the EERT to the emergency site.	• ERTL/Deputy ERTL to instruct: • an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. • some ERT members to stop traffic in, & clear, the access road to facilitate passage of the EERT.
• ERT to vacate the site as soon as their safety is assessed as in danger.	• Follow appropriate evacuation procedure.

XI. APPENDIX A: ENVIRONMENTAL PROTECTION LAWS & STRATEGIES

Law or Decree	Article	Relating To	Content
Constitution of the Lao PDR People's Democratic Republic (1991, amended 2003)	17	Environment in general	"All organizations and citizens must protect the environment and natural resources: land, underground, forests, fauna, water sources and atmosphere."
Environmental Protection Law (2013) Revised version)	5	Environmental Protection Policy(s) (new**)**	The State promotes protection and rehabilitation of social and natural environment through dissemination of regulations and Environmental information, building of awareness and knowledge, training and conducting campaigns for individuals and organizations; both domestic and international, to recognize importance of social and natural environment in daily livelihoods and in strictly implement the Environmental protection regulations, methods and measures.
	10	Impact on Social Environment (new)	An impact on social environment is an adverse impact on human life and health, properties and livelihoods, including shelters of people, and on cultural and historical heritages.
	11	Impact on Natural Environment (new)	An impact on natural environment is an adverse impact on natural ecological fundamentals, natural resources, biodiversity, arable land, water sources, climate change and natural heritages.

	13	Environmental Protection Practices (new)	Environmental protection consists of these key following practices: (i) Environmental prevention(ii) Pollution control(iii) Toxic chemical control and waste disposal (iv) Environmental certification and permission (v) Promotion and public participation
	14	Environmental Prevention (revised)	Environmental prevention is an action of safeguarding and preventing against any natural or manmade events, which may possibly happen, are happening or already happened, leading to damages or depletions of social and natural environment
	19	Strategic Environmental Assessment (new)	A strategic environmental assessment (SEA) is a process of anticipating an impact that may affect social and natural environment, while developing policies, strategic plans, and programs, including considerations towards impacts of climate change. This impact assessment shall determine methods and measures to avoid or mitigate impacts on social and natural environment in order to accomplish sustainable development goals. While developing the policies, strategic plans, and programs, particularly of energy and mining, agriculture and forestry, industry and commerce, public works and transportation, post-telecommunication and communication, information-culture and tourism sector, a strategic environmental assessment shall be conducted, except a plan, which applies to uses of small-scale areas and subject to the Integrated Spatial Plans.
	21	Initial Environmental Examination (new)	Initial Environment Examination (IEE) is a data examination, exploration and analysis to anticipate possible minor environmental impacts, while identifying appropriate methods and measures to prevent, avoid or mitigate environmental impacts from investment projects or activities including considerations of climate change.
	22	Environmental Impact Assessment (revised)	Environment Impact Assessment (EIA) shall be a process of addressing an issue in order to anticipate impacts that may affect the environment, society and nature, derived from investment projects or activities, along with considerations related to climate change in Lao PDR, and development of reports. Apart from reporting, there shall be development of Environmental Social Management and Monitoring Plans. Both the report and the plan shall be approved by MONRE prior to functioning investment projects and activities. The process of assessing impacts from the investment project and the activity on the environment, society and nature, shall comply with the specific regulations.
	29	Pollution control (revised)	Pollution is a chemical substance, radiation, dust, smoke, including noise, light, odour, vibration and heat mixing in the air, soil, and water with concentration exceeding the National Environmental Quality Standards or National Pollution Control Standards, as the results of manmade or nature, affecting human life and health, animals, plants, other living creatures and ecosystem

	32	National Pollution Control Standards (new)	The National Pollution Control Standards are identification of pollutant concentrations emitted by persons, legal entities and organizations with permission, from any sources into the air, soil or water. The Government shall identify the National Pollution Control Standards based on the proposal from MONRE upon coordinating with line sectors.
	36	Toxic Chemical Control	The natural resources and environmental sector is directly responsible in coordinating with other line sectors for inspection and endorsement of toxic chemical lists, which are under periodical Management by the sector.
	38	Waste Disposal (new)	Disposal of general wastes, particularly rubbish, shall be separation for different purposes such as recycle, reuse, reprocess as new products and elimination with methods and techniques within identified areas based on regulations.
	55	Responsibilities in Environmental Rehabilitation (new)	Persons, legal entities or organization implementing investment projects or activities, which create environmental and social impacts, shall correct, improve, rehabilitate and remunerate damages within the affected areas.
		Environmental Protection Fund (revised)	The State promotes establishment of the Environmental Protection Fund used in environmental researches, prevention, correction, and rehabilitation. Implementation and performance of the EPF shall be stipulated by the specific regulations.
Water and Water Resources Law 24/Dec-2007	4	Rights to use water resources	Defines rights, obligations, and procedures to gain approval for use of water resources
	18	Permission for use	Stipulates that medium and large scale uses require feasibility studies, EIAs, and mitigation plans, before permission is granted for use of the resource
	22	Principles in water resource development management	Stipulates that water resource development must be consistent with national and sector plans, must ensure preservation of the natural beauty of the resources, and must protect against harmful effects of water
Lao Forestry Law (amended 24-Dec-2007)	5	Policy on forest and forest land	The GOL has the policy to preserve, regenerate, and develop forests and forest land to help preserve the environment, water resources, biodiversity, and people's livelihoods.
	9 to 13	Forest types	Classify the various types of forests according to use, including forests for village use
	26	Preservation of water resources in forest zones	Stipulates the preservation of water resources in forest zones for those areas where waterways originate and flow, including strict management and regulations to control logging, shifting cultivation, and destructive forest uses

	70	Conversion of forestland	Stipulates that forestland can be converted to other land type if it brings a high level of benefits to the nation and to livelihoods of the people, and is included in the national development plan
	71	Types of converted forestland	Stipulates that for uses such as dam construction, the timber and forest resources to be harvested in those areas are property of the State
Wildlife and Aquatic Law (24 Dec-2007)	31	Use for Household purposes	Allows use by village households of wildlife and aquatic species in the common and general category list in particular seasons or permitted areas, using tools or equipment that do not adversely affect habitats or compromise the species population.
	32	Customary Use	Allows use of wildlife or aquatic species in the common and general category list by village households for "necessary cultural beliefs."
	52	Prohibitions	Prohibits taking of wildlife, including parts of the animals, from their habitats; tormenting wildlife and aquatics; illegal catching, hunting, trading and possession; catching aquatic and hunting in conservation zones, in breeding season, or when pregnant; devastation of habitats and feeding zones.
Land Law (2003)	6	Protection of Land and Environment	Declares that all individuals and organizations are obliged to protect the land from degradation,
	14	Changes in Land Category	Land use can be changed if it does not cause social or environmental harm and if prior approval is obtained from the authorities.
Decree on Land Lease or Concession (2009)	39	Obligation of Person or Legal Entity Who Leases or Obtains Concession	The person or legal entity that leases land or obtains a concession is obligated, among other things, "not to cause any damage to the quality of land and negative impact to the natural environment and the society."
Road Law (1999)	15	Public Road Construction	The public road contractor shall perform the work in accordance with design documents, and shall ensure quality, safety and environmental protection.
	19	Compensation for Land Acquired for Public Road Activities	If, in the construction of various kinds of public roads, it is necessary to use land that is legally owned by a private person or by an organization, the owner of the expropriated land used for public road construction shall receive reasonable compensation
Prime Ministerial Decree No. 112/PM on Environmental Impact Assessment (2010)		Stipulates the need for Environmental Impact Assessment	Stipulates rights of those affected by projects, and need for participation. Outlines the process of conducting the EIA, preparing environmental management and monitoring plans, social management and monitoring plans, issuing environmental compliance certificates, monitoring compliance with the various plans, establishing the institutional framework including grievance procedures.
Ministerial Instruction on the Process of Initial Environmental		The process of Initial Environmental Examination of	Instruction for implementing and extending the provisions prescribed under Article 21 of the Law on Environmental Protection

Examination of the Investment Projects and Activities. No. 8029/MONRE, 17 December 2013		investment projects and activities.	(Amended) No. 29/NA, Dated 18 December 2012.
Ministerial Instruction on the Process of Environmental and Social Impact Assessment of the Investment Projects and Activities. No. 8030/MONRE, 17 December 2013		The Process of Environmental and Social Impact Assessment of the Investment Projects and Activities.	Instruction for implementing and extending the provisions prescribed under Article 22 of the Law on Environmental Protection (Amended) No. 29/NA, Dated 18 December 2012.
Ministerial Agreement on the Endorsement and Promulgation of List of Investment Projects and Activities Requiring for Conducting the Initial Environmental Examination or Environmental and Social Impact Assessment. No. 8056/MONRE, 17 December 2013	1	Screening decision on conduct of IEE or ESIA	To endorse and promulgate a list of Investment Projects and Activities which shall conduct the Initial Environmental Examination or Environmental and Social Impact Assessment (Amended).

XII. APPENDIX B: ENVIRONMENTAL STANDARDS

Environmental standards are presented below. Where Lao PDR regulations differ from the environmental standards provided by the general and applicable Environmental, Health and Safety Guidelines of the World Bank (2007), the reference will be whichever is more stringent.

The basis for the Lao PDR standards are:

- Environmental Protection Law (Improved) No. 041/NA, dated 18 December, 2012.
- Lao Government Decree on National Environment Standards in Laos, No 81/GoL, 2017.
- Water and Water Resource Law (Improved) No. 010/NA, dated 11 May 2017.
- Decree on Environment Impact Assessment No. 21/PMO, date 31 January 2019

Table 15. Surface water quality standards in Lao PDR

No	Substances	Symbol	Unit	Standard Value					Method of Measurement
				1	2	3	4	5	
1	Color, Odor and Taste	-	-	N	N	N	N	N	
2	Temperature	t	°C	N					Thermometer
3	Potential of Hydrogen	pH	-	6-8	6-8	5-9	5-9	ND	Electronic pH Meter
4	Dissolved Oxygen	DO	mg/l	>7	6	4	2	<2	Azide Modification
5	COD	COD	ml/l	<5	5-7	7-10	10-12	>12	Potassium permanganate
6	BOD_5	BOD_5	mg/l	1.5	1.5	1.5	1.5	1.5	Azide Modification at 20 degrees C, 5 days
7	Total Coliform Bacteria	Coliform Bacteria	MPN/100 ml	N	5000	20,000	None	ND	Multiple Tube Fermentation Technique
8	Fecal Coliform Bacteria	Fecal Coliform	MPN/ 100 ml	N	1000	4000	None	ND	
9	Nitrate-Nitrogen	NO_3-N	mg/l	N	5	5	5	ND	Cadmium Reduction
10	Ammonia-Nitrogen	NH_3-N	mg/l	N	0.5	0.5	0.5	ND	Distillation Nesslerization
11	Phenols	C_6H_3-OH	mg/l	N	0.005	0.005	0.005	ND	Distillation, 4-Amin anti-pyrenne
12	Copper	Cu	mg/l	N	1.5	1.5	1.5	ND	Atomic Absorption Direct Aspiration
13	Nickel	Ni	mg/l	N	0.1	0.1	0.1	ND	
14	Manganese	Mn	mg/l	N	1.0	1.0	1.0	ND	
15	Zinc	Zn	mg/l	N	1.0	1.0	1.0	ND	
16	Cadmium	Cd	mg/l	N	0.003	0.003	0.003	ND	
17	Chromium, Hexavalent	Cr^{6+}	mg/l	N	0.05	0.05	0.05	ND	

18	Lead	Pb	mg/l	N	0.01	0.01	0.01	ND	
19	Mercury	Hg	mg/l	N	0.001	0.001	0.001	ND	Atomic Absorption Cold Vapor
20	Arsenic	As	mg/l	N	0.01	0.01	0.01	ND	Atomic Absorption Direct Aspiration
21	Cyanide	CN^-	mg/l	N	0.7	0.07	0.07	ND	Pyridine-Barbituric
22	Alpha ¬Radioactive	α	Becquerel/l	N	0.1	0.1	0.1	ND	Counting machine
23	Beta ¬ Radioactive	β	Becquerel/l	N	1.0	1.0	1.0	ND	
24	Total Organochlorine	-	mg/l	N	0.05	0.05	0.05	ND	Gas Chromatography
25	DDT	$C_{14}H_9Cl_5$	mg/l	N	1.0	1.0	1.0	ND	
26	Alpha -BHC	αBHC	mg/l	N	0.02	0.02	0.02	ND	
27	Dieldrin	$C_{12}H_8Cl_6O$	mg/l	N	0.1	0.1	0.1	ND	
28	Aldrin	-	mg/l	N	0.1	0.1	0.1	ND	
29	Heptachlor and Heptachlor Epoxide	-	mg/l	N	0.2	0.2	0.2	ND	
30	Endrin	-	mg/l	N	None	None	None	ND	

Remark:

Category 1: High water quality as natural, with production processing or contaminate any chemic element and without any waste water contamination

Category 2: Source of water for drinking and consumption with clean processing and omits diseases, this type of water is suitable for aquatic animal conservation, fishery, water sport and other

Category 3: Source of water for drinking and consumption with clean processing and omits diseases, this type is suitable for agriculture, animal feeding and other

Category 4: Source of water for drinking and consumption with clean processing and omits diseases, this type is suitable for industry, waste water treatment from the town or community and other.

Category 5: Water source for transportation, water treatment place or basin from the town.

Source: National Environment Standard, Decree No: 81/GoL 2017.

Table 16. Soil Quality Standards for Residential and Agriculture

No.	Substances	Symbol	Unit	Standard Value	Method of Measurement
I. Volatile Organic Compound					
1	Benzene	C_6H_6	mg/kg	6.5	
2	CarbonTetrachloride	CCl_4	mg/kg	2.5	
3	1,2 Dichloroethane	CH_2Cl- CH_2Cl	mg/kg	3.5	
4	1,1 Dichloroethylene	$CCl_2=CH_2$	mg/kg	0.5	

5	Cis 1,2 Dichloroethylene	CHCl=CHCl	mg/kg	43	*Gas Chromatography or Gas Chromatography/. Mass Spectrometry (GC/MS) or other methods approved by DONRE*
6	Trans-1.2- Dichloroethylene	CHCl=CHCl	mg/kg	63	
7	Dichloromethane	CH_2Cl_2	mg/kg	89	
8	Ethly benzene	$IC_2ClC-CH_3$	mg/kg	230	
9	Styrene	C_6H_5- CH=CH_2	mg/kg	1.700	
10	Tetrachloroethylene	C_2Cl_4	mg/kg	57	
11	Toluene	C_6H_5-CH_3	mg/kg	520	
12	Trichloroethylene	Cl_2C=CHCl	mg/kg	28	
13	1.1.1 Trichloroethane	Cl_3C-CH_3	mg/kg	630	
14	1.1.2 Trichloroethane	Cl_2CH- CH_2Cl	mg/kg	8.4	
15	Total Xylenes	(CH_3-C_6H_4- CH_3)	mg/kg	210	
II. Heavy Metals					
1	Arsenic	As	mg/kg	3.9	Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP/AES) or Inductively Coupled Plasma-Mass Spectrometry (ICP/MS) or Atomic Absorption (AA)/Furnace Technique or Gaseous Hydride or Manganese Borohydride Reduction
2	Cadmium and its compounds	Cd	mg/kg	37	ICP/AES or ICP/MS or AA/Direct Aspiration or AA/Furnace Technique
3	Hexavalent Chromium	Cr^{+6}	mg/kg	300	Co-precipitation or Colorimetric or Chelation/Extraction
4	Lead	Pb	mg/kg	400	ICP/AES or ICP/MSorAA/Direct Aspiration or AA/Furnace Technique
5	Manganese and its compounds	Mn	mg/kg	1,800	
6	Mercury and its compounds	Hg	mg/kg	23	AA/ cold Vapor Technique
7	Nickel, soluble salts	Ni	mg/kg	1,600	ACP/AES or ICP/MS or AA/Direct Aspiration or AA Furnace Technique
8	Selenium	Se	mg/kg	390	ICP/AES or AA Furnace Technique or AA Gaseous Hydride or AA Borohydride Reduction
III. Other Subtends					
1	Benzo A pyzene	$C_{20}H_{12}$	Mg/kg	0.6	GC/MS or TE/GC/MS, or GC/FT-IR
2	Cyanide compound	CN^-	Mg/kg	11	Distillation, or Total Amenable Cyanide (Automated Colorimetric, with offline Distillation), or Cyanide Extraction Procedure for Solids and Oils
3	Lead Polychlorobiphenyls	PCBs	Mg/kg	2.2	GC or GC/MS
4	Vinyl Chloride	CH2 =CHCl	Mg/kg	1.5	GC or GC/MS

Table 17. Ambient Air Quality Standard

Parameters	Symbol	Average Time Unit: mg/m3					Method of Measurement
		Hours			1	1	
		1 hr	8 hr	24 hr	month	year	
Carbon monoxide	CO	30	9	-	-	-	Non-dispersive infrared detection
Nitrogen dioxide	NO_2	0.11	-	-	-	0.2	Chemilumine scene method
Sulphur dioxide	SO_2	0.13	-	0.05	-	0.10	UV Fluorescence (1hr, 24hr, 1yr) or Pararosaniline (1hr,4hr)
Total Suspended Particulate	TSP	-	-	0.33	-	0.10	Gravimetric
Particulate Matter less than 10 microns	PM-10	-	-	0.12	-	0.05	Gravimetric or Beta Ray or Taper Element Oscillating Microbalance or Dichotomous
Ozone	O_3	0.20	0.14	-	-	-	Chemiluminescence or UV Absorption Phoptometry
Lead	Pb	-	-	-	1.5	-	Atomic Absorption Spectrometer

Table 18. Noise Standard

Standards	Method of Measurement
Maximum Sound Level (L_{max}) should not exceed 115 dB(A)	Equivalent Sound Level (L_{eq}) from Fluctuating Noise
L_{eq} 24 hour not exceeding 70 dB(A)	Equivalent Sound Level (L_{eq}) from Steady Noise

Table 19. Ambient Noise for disturbing constantly

Sound level Standard	Measure Method
Sound level during the normal and disturbing must not excess 10 dB (A)	In the case noise disturbing less than 1 hour, measure the sound level as one-hour Leq 1hour
	Noise disturbing continues over 1 hour, measure base on the real condition
	Noise disturbing not continue in 1 hour, measure for one-hour (Leq 1 hour)
	Specific quiet areas like school, hospital, government office and other quiet places during 22:00-6:00 and measure as sound average 5 minutes (Leq 5min) and plus with 3 dB (A)

XIII. APPENDIX C: PROJECT LEVEL GRIEVANCE REDRESS MECHANISM

Purpose of the Mechanism

The grievance redress mechanism (or, the mechanism) is meant for persons seeking satisfactory resolution to their complaints on the environmental performance of the Subproject. The mechanism will ensure that: i) the basic rights and interests of every person affected by poor environmental performance of a Subproject are protected; and ii) their concerns arising from the poor environmental performance of a Subproject during the conduct of pre-construction, construction and operation activities are effectively and timely addressed.

Access to the Mechanism

Any person who has complaint regarding the environmental performance of the Subproject during pre-construction, construction and operation phases shall have access to the mechanism free of charge. The Project Management Unit (PMU), through its Grievance Point Person (GPP), shall ensure that the mechanism, including names and contact details of responsible persons in the affected villages, PMU, UDAA and DPWT, is publicly disclosed, and posted in the offices of the affected villages and in strategic places of the Project's area of influence so that the mechanism is accessible to all segments of the affected villages.

The Grievance Redress Mechanism

Grievances raised on environmental impacts are critical to the health and wellness of APs. Hence, prompt responses/actions are critical to avoid prolonging the misery of affected persons (APs). Prior to the public disclosure of the mechanism, the PMU shall have engaged/designated a Grievance Point Person (GPP) to handle environmental grievances lodged prior to construction, during construction and during operation. Sufficient support system, i.e., communication facilities, recording, and reporting system and funds, among others, shall have been set up to sustain the effective implementation of the mechanism. During operation, the GPP will liaise with the Kaysone Phomvihane UDAA and the DPWT (the operators) for the management of the mechanism until loan closure.

Informally, an AP can approach or call the village heads, Contractor, the PMU, UDAA or DPWT to raise his/her complaints/concerns. Complaints may be acted on immediately by the responsible party. However, it shall be made a policy that all informally lodged and acted on complaints shall have to be registered with the PMU as soon as possible for record purposes. If informally lodged complaint is not acted on promptly, or if AP is not satisfied with the resolution undertaken, he/she can then avail of the formal mechanism, as follows:

Step 1: Lodging complaint

It is possible that APs lodge complaints to any of the following: i) village officers; ii) Contractor, during construction; iii) DPWT or UDAA; iv) PMU, through its GPP, or v) third parties, e.g., NGO, religious groups. The AP may also lodge complaint through ADB's accountability mechanism[5].

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[5] *ADB's accountability mechanism provides a forum where people adversely affected by ADB-assisted projects can voice and seek solutions to their problems and report alleged noncompliance of ADB's operational policies and procedures. It consists of two separate but complementary functions: problem solving and compliance review function. Complaints must be in writing and addressed to the Complaints Receiving Officer. More information can be found at: (http://www.adb.org/site/accountability-mechanism/main).*

Step 2: Grievance Documentation/Registration

The GPP as appointed by the PMU will be responsible for documenting and registering complaints received during construction. In operation the responsibility will be of the DPWT and UDAA depending on the asset. Other potential complaint recipients shall make sure that the received complaints are directed to, documented by, and registered with, the GPP as soon as possible. The GPP shall make sure that documented/registered complaints are acknowledged, duly referenced.

Step 3: Screening of complaint

The AP shall immediately be informed if the grievance is within, or outside, the purview of the mechanism. If it is outside the scope, AP shall be directed to the proper institution and/or proper mechanism for the complaint.

Step 4: Reviews, Investigation and Discussion

If it is covered by the mechanism, the AP shall be informed/reminded of the expected action timelines as set forth in the established mechanism. If both the AP and the other party, Contractor or PMU, are available, the complaint shall be immediately reviewed, investigated and discussed. If not, the review, investigation and discussion should immediately take place on the next day. The discussion will center on the measures to implement based on the review and investigation.

Step 5: Action/Resolution

If complaint is minor, the Contractor/DPWT/UDAA shall immediately act on the complaint. Minor complaint will be those impacts/issues that would not require thorough review and investigation and will be easy to resolve. If impact/issue will need thorough review and investigation, more work to be done, and/or supplies/parts to be procured, to resolve, the Contractor/DPWT/UDAA shall immediately provide the most suitable interim measure to reduce the magnitude of the impact; and to start work on the final measure not later than 5 days from the day discussion meeting is held.

Step 6: Acceptance of Resolution

If, according to the AP, the impact has been resolved satisfactorily, the GPP shall obtain a written confirmation of satisfaction from the AP, which will form part of the grievance documentation.

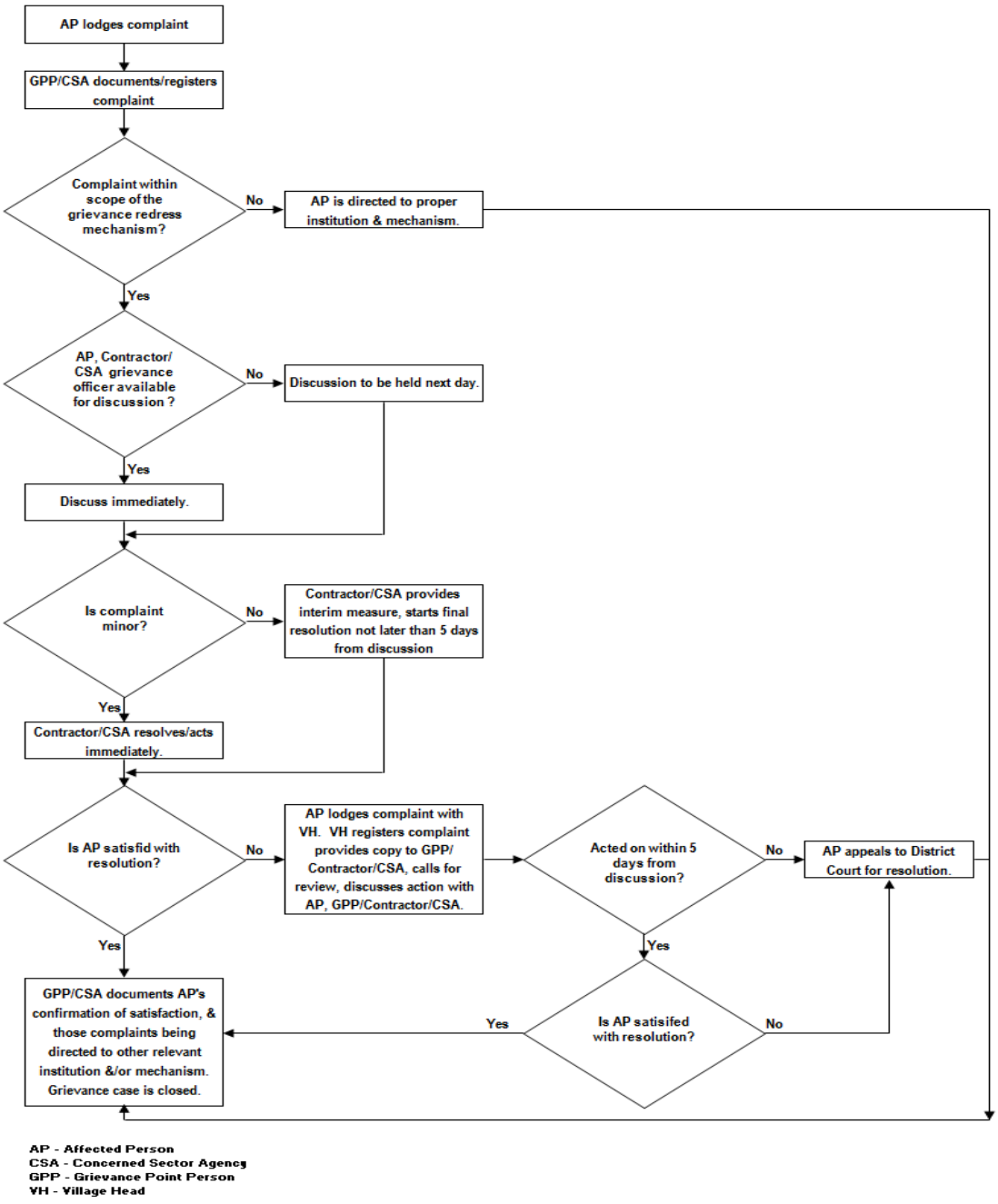
Step 7: Monitoring and Evaluation

For at least a week after closure of grievance (that is, when action implemented has been satisfactorily confirmed in writing by the complainant), the GPP shall monitor the effectiveness of the resolution. Monitoring and evaluation shall be properly documented and included in the Project Environmental Monitoring Report of the PMU.

Step 8: Lodging of Appeal by Dissatisfied APs

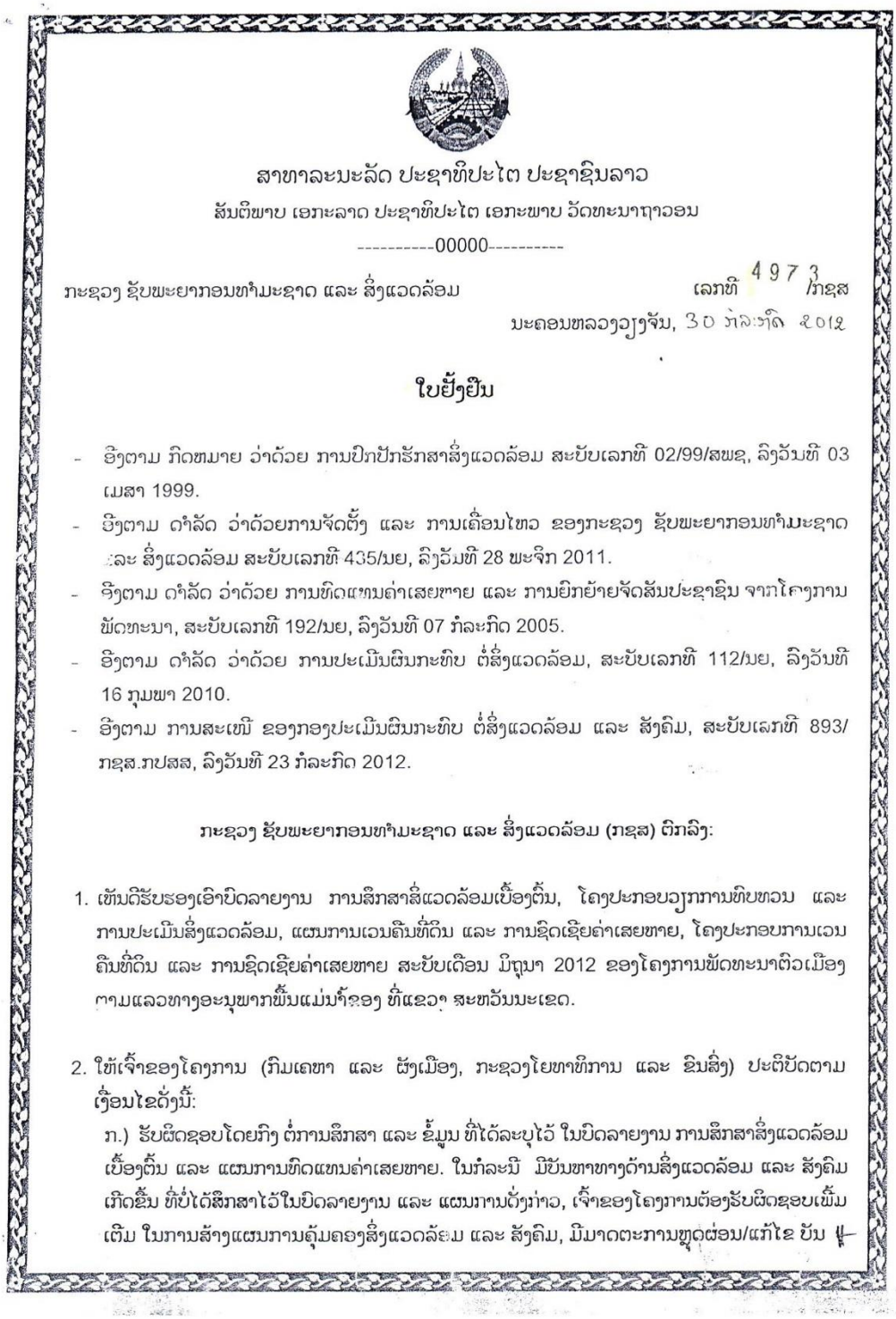
In the event the issue/impact persists, AP can lodge an appeal to his/her village head. The village head shall immediately: (i) record the appeal; (ii) contact the GPP, Contractor/DPWT/UDAA and provide them with copy of the appeal; and (iii) call for a meeting to review the history of the grievance and discuss the appeal and quick resolution of the issue. If the agreed on action/measure has not started within 5 days from the time of formal lodging of the appeal, or if the issue still persists despite the second action, AP can seek assistance from village head to raise the grievance to the District Court. It is highly unlikely that grievance redress process will reach the level wherein APs need to go through the “appeal” stage.

Figure 20. Flow-chart over the Grievance Redress Procedure



XIV. APPENDIX D: APPROVAL BY MONRE/DONRE

Copy of Environmental Compliance Certificate for IEE and English translation, 2012:



ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ

ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນາຖາວອນ

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ກະຊວງ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ເລກທີ 4973 /ກຊສ

ນະຄອນຫລວງວຽງຈັນ, 30 ທັນວາ 2012

ໃບຢັ້ງຢືນ

- ອີງຕາມ ກົດໝາຍ ວ່າດ້ວຍ ການປົກປັກຮັກສາສິ່ງແວດລ້ອມ ສະບັບເລກທີ 02/99/ສພຊ, ລົງວັນທີ 03 ເມສາ 1999.
- ອີງຕາມ ດຳລັດ ວ່າດ້ວຍການຈັດຕັ້ງ ແລະ ການເຄື່ອນໄຫວ ຂອງກະຊວງ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ສະບັບເລກທີ 435/ນຍ, ລົງວັນທີ 28 ພະຈິກ 2011.
- ອີງຕາມ ດຳລັດ ວ່າດ້ວຍ ການທົດແທນຄ່າເສຍຫາຍ ແລະ ການຍົກຍ້າຍຈັດສັນປະຊາຊົນ ຈາກໂຄງການ ພັດທະນາ, ສະບັບເລກທີ 192/ນຍ, ລົງວັນທີ 07 ກໍລະກົດ 2005.
- ອີງຕາມ ດຳລັດ ວ່າດ້ວຍ ການປະເມີນຜົນກະທົບ ຕໍ່ສິ່ງແວດລ້ອມ, ສະບັບເລກທີ 112/ນຍ, ລົງວັນທີ 16 ກຸມພາ 2010.
- ອີງຕາມ ການສະເໜີ ຂອງກອງປະເມີນຜົນກະທົບ ຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ, ສະບັບເລກທີ 893/ ກຊສ.ກປສສ, ລົງວັນທີ 23 ກໍລະກົດ 2012.

ກະຊວງ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ (ກຊສ) ຕົກລົງ:

1. ເຫັນດີຮັບຮອງເອົາບົດລາຍງານ ການສຶກສາສິ່ງແວດລ້ອມເບື້ອງຕົ້ນ, ໂຄງປະກອບວຽກການທົບທວນ ແລະ ການປະເມີນສິ່ງແວດລ້ອມ, ແຜນການເວນຄືນທີ່ດິນ ແລະ ການຊົດເຊີຍຄ່າເສຍຫາຍ, ໂຄງປະກອບການເວນ ຄືນທີ່ດິນ ແລະ ການຊົດເຊີຍຄ່າເສຍຫາຍ ສະບັບເດືອນ ມິຖຸນາ 2012 ຂອງໂຄງການພັດທະນາຕົວເມືອງ ຕາມແລວທາງອະນຸພາກພື້ນແມ່ນ້ຳຂອງ ທີ່ແຂວງ ສະຫວັນນະເຂດ.

2. ໃຫ້ເຈົ້າຂອງໂຄງການ (ກົມເຄຫາ ແລະ ຜັງເມືອງ, ກະຊວງໂຍທາທິການ ແລະ ຂົນສົ່ງ) ປະຕິບັດຕາມ ເງື່ອນໄຂດັ່ງນີ້:

   ກ.) ຮັບຜິດຊອບໂດຍກົງ ຕໍ່ການສຶກສາ ແລະ ຂໍ້ມູນ ທີ່ໄດ້ລະບຸໄວ້ ໃນບົດລາຍງານ ການສຶກສາສິ່ງແວດລ້ອມ ເບື້ອງຕົ້ນ ແລະ ແຜນການທົດແທນຄ່າເສຍຫາຍ. ໃນກໍລະນີ ມີບັນຫາທາງດ້ານສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ ເກີດຂຶ້ນ ທີ່ບໍ່ໄດ້ສຶກສາໄວ້ໃນບົດລາຍງານ ແລະ ແຜນການດັ່ງກ່າວ, ເຈົ້າຂອງໂຄງການຕ້ອງຮັບຜິດຊອບເພີ່ມ ເຕີມ ໃນການສ້າງແຜນການຄຸ້ມຄອງສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ, ມີມາດຕະການຫຼຸດຜ່ອນ/ແກ້ໄຂ ບັນ ╬

ຫາຜົນກະທົບເຫຼົ່ານັ້ນ ພ້ອມທັງຮັບປະກັນ ໃຫ້ມີງົບປະມານພຽງພໍ ໃນການຈັດຕັ້ງປະຕິບັດ ມາດຕະການ ດັ່ງກ່າວ;

ຂ.) ຮັບປະກັນໃຫ້ມີງົບປະມານພຽງພໍ ເພື່ອເຮັດໜ້າທີ່ ຕິດຕາມກວດກາ ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ;

ຄ.)ໃນເວລາຂຸດຄົ້ນເອົາດິນ, ຫີນ ແລະ ຊາຍ ເພື່ອໃຊ້ໃນການກໍ່ສ້າງ ຕ້ອງໄດ້ຮັບອະນຸຍາດຈາກ ອົງການປົກຄອງ ທ້ອງຖິ່ນ ແລະ ຂະແໜງການຕ່າງໆ ທີ່ກ່ຽວຂ້ອງ;

ງ.) ຫັດແທນຄ່າເສຍຫາຍ ສຳລັບເນື້ອທີ່ດິນ ແລະ ຊັບສິນອື່ນໆ ຂອງປະຊາຊົນ ທີ່ໄດ້ຮັບຜົນກະທົບ ຈາກການ ດຳເນີນໂຄງການ ໂດຍປະຕິບັດຕາມລະບຽບກົດໝາຍຢ່າງເຂັ້ມງວດ ບົນພື້ນຖານການປຶກສາຫາລື ແລະ ເປັນ ເອກະສານນຳກັນ ລະຫວ່າງຜູ້ທີ່ໄດ້ຮັບຜົນກະທົບ ແລະ ເຈົ້າຂອງໂຄງການ;

ຈ.) ໃນເວລາກໍ່ສ້າງ ໃຫ້ຈຳກັດຢູ່ໃນເຂດເນື້ອທີ່ກຳນົດ ແລະ ໃຫ້ມີຜົນກະທົບໜ້ອຍທີ່ສຸດ ໂດຍເອົາໃຈໃສ່ ເປັນພິເສດ ໃນການຈັດຕັ້ງປະຕິບັດຕາມແຜນການຄຸ້ມຄອງສິ່ງແວດລ້ອມ ໃນການກຳຈັດສິ່ງເສດເຫຼືອ, ຄາບນ້ຳມັນ, ຂີ້ຝຸ່ນ ແລະ ການຕິດປ້າຍເຕືອນໄພຕ່າງໆ;

ສ.) ແຕ່ງຕັ້ງຜູ້ປະສານງານໂຄງການ ເພື່ອຈັດຕັ້ງປະຕິບັດ ແຜນການຄຸ້ມຄອງສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ, ພ້ອມທັງເອົາໃຈໃສ່ຕິດຕາມກວດກາ ຜູ້ຮັບເໝົາຢ່າງເຂັ້ມງວດ ໃນການຈັດຕັ້ງປະຕິບັດແຜນການດັ່ງກ່າວ;

ຊ.) ພາຍຫຼັງສຳເລັດການກໍ່ສ້າງ ເຈົ້າຂອງໂຄງການຕ້ອງໄດ້ປັບປຸງ ແລະ ຟື້ນຟູພື້ນເຂດທີ່ຖືກຜົນ ກະທົບ ຍ້ອນການກໍ່ສ້າງ ໃຫ້ຄືນສູ່ສະພາບທີ່ສາມາດນຳໃຊ້ໄດ້ເປັນປົກກະຕິ;

ຈ.) ເຮັດບົດລາຍງານປະຈຳໄຕມາດ, 6 ເດືອນ ແລະ ປະຈຳປີ ກ່ຽວກັບ ການຈັດຕັ້ງປະຕິບັດວຽກງານສິ່ງ ແວດລ້ອມ ແລະ ສັງຄົມ ຂອງໂຄງການ ສົ່ງໃຫ້ ກຊສ, ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງສະຫວັນນະເຂດເພື່ອຊາບຕິດຕາມ.

3. ມອບໃຫ້ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງສະຫວັນນະເຂດ ສົມທົບກັບພັນທະ ຂະແໜງການ ແລະ ອົງການປົກຄອງເມືອງໄກສອນ ພົມວິຫານ, ເມືອງພີນ ແລະ ເມືອງເຊໂປນ ປະຕິບັດ ໜ້າທີ່ຕິດຕາມກວດກາ ການຈັດຕັ້ງ ປະຕິບັດ ມາດຕະການຫຼຸດຜ່ອນ/ແກ້ໄຂຜົນກະທົບ ທີ່ອາດຈະເກີດຂຶ້ນ ຕໍ່ສິ່ງແວດລ້ອມ ແລະ ສັງຄົມ ຂອງໂຄງການດັ່ງກ່າວ ແລ້ວລາຍງານໃຫ້ ກະຊວງຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ເປັນປົກກະຕິ.

ໃບຢັ້ງຢືນສະບັບນີ້ ມີຜົນນຳໃຊ້ໄດ້ ນັບແຕ່ວັນລົງລາຍເຊັນເປັນຕົ້ນໄປ.

ລັດຖະມົນຕີ ວ່າການ
ກະຊວງ ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ

ສີສະຫວັດ ວິຍະ

Lao People's Democratic Republic
Peace Independence Democracy Unity Prosperity

Ministry of Natural Resource and Environment

No: 4973/MONRE
Vientiane Capital, Date: 30 July 2012

Certificate

- Reference to the Law on Environmental Protection No 02/99/NA date 03 April 1999
- Reference to MONRE's role and responsibility No 435/MN date 28/11/2011
- Reference to the Decree on compensation No192/MN Date 07 July 2005
- Reference to the Decree IEA No 112/MN date 16 Feb. 2010
- Reference to the proposal from IEA Meeting No 893/MONRE date 23 July 2012

The Ministry of Natural Resource and Environment agree:

1. To accept the report on the IEE, the Environmental Assessment Structure, Compensation Plan, Compensation structure with the cost dated Jun 2012 of EWECTD in Savannakhet Province.
2. And request the Department of Housing and Urban Planning, MPWT to proceed the following:
    a. The Department assumes direct responsible for the studies required in the environmental assessment and as reported in the IEE, including in the event of occurrence of social and environmental issues not yet studied in the report and plan. The project owner is responsible in addition to prepare the social and environmental plan, to set up the measure to reduce the impact and ensure sufficient budgets for implementation.
    b. To ensure sufficient budget for the implementation of those measures.
    c. During the excavation of soil, stone and sand for the construction purpose, to obtain required permission from local authority and concerned sectors.
    d. To compensate the loss of land and other properties of people affected by the project implementation and conduct consultation in accordance with rules and legislation and ensure completed compensation documentation is signed by the project affected persons and the Project owner.
    e. During the construction, the construction work should be minimized and limited to the identified area and specially to implement the Environmental Management Plan to mitigate impacts from solid waste, oil, and dust and ensure proper use of required warning signals and signs.
    f. To ensure nomination of a Project Coordinator to implement the plan and to monitor the contractor's implementation of the plan.
    g. After completion of the construction the project management should improve the impact area from the construction to the same situation as before.
    h. To prepare Quarterly, 6 month and annual monitoring reports concerning the implementation of social and environmental management measures for submission to MONRE and DONRE of Savannakhet Province.

3. Giving to DONRE of Savannakhet Province in cooperation with the other Department and District Authority of Kaisone Phomvihane, Phine and Sepone responsibility to monitor, reduce and solve the impacts of the project, then to report to MONRE regularly.

This certificate is going in force after the signature of the Minister.

For Minister of
MONRE

Mr Sisavath Vithaxay

Copy of Environmental Compliance Certificate for IEE, 2017:

ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ
ສັນຕິພາບ ເອກະລາດ ປະຊາທິປະໄຕ ເອກະພາບ ວັດທະນາຖາວອນ

049

ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງ ເລກທີ...../ພຊສ.ສຊ

ແຂວງສະຫວັນນະເຂດ, ວັນທີ 22 MAY 2017

ໜັງສືຕໍ່ອາຍຸ ໃບຢັ້ງຢືນ ກ່ຽວກັບ ສິ່ງແວດລ້ອມ

- ອີງຕາມກົດໝາຍ ວ່າດ້ວຍ ການປົກປັກຮັກສາສິ່ງແວດລ້ອມ ສະບັບປັບປຸງ ເລກທີ 29/ສພຊ, ລົງວັນທີ 18 ທັນວາ 2012;
- ອີງຕາມ ດຳລັດ ວ່າດ້ວຍ ການທົດແທນຄ່າເສຍຫາຍ ແລະ ການຍົກຍ້າຍຈັດສັນປະຊາຊົນ ຈາກໂຄງການພັດທະນາ ສະບັບເລກທີ 84/ລບ, ລົງວັນທີ 05 ເມສາ 2016;
- ອີງຕາມ ຂໍ້ຕົກລົງ ວ່າດ້ວຍ ການຈັດຕັ້ງ ແລະ ການເຄື່ອນໄຫວ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງ ສະບັບເລກທີ 1467/ກຊສ ລົງວັນທີ 9 ມິນາ 2012
- ອີງຕາມ ຄຳແນະນຳ ຂະບວນການສຶກສາເບື້ອງຕົ້ນ ກ່ຽວກັບ ຜົນກະທົບຕໍ່ສິ່ງແວດລ້ອມ ຈາກໂຄງການລົງທຶນ ແລະ ກິດຈະການຕ່າງໆ ສະບັບເລກທີ 8029/ກຊສ, ລົງວັນທີ 17/12/2013;
- ອີງຕາມບົດບັນທຶກ ລະຫວ່າງຫົວໜ້າພະແນກ ຊສ ແຂວງ ແລະ ຫົວໜ້າພະແນກໂຍທາທິການ ແລະ ຂົນສົ່ງ ແຂວງ ກ່ຽວກັບການຕໍ່ໃບຢັ້ງຢືນໃຫ້ກ່ອນ ສະບັບລົງວັນທີ 05 ພຶດສະພາ 2017.

ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມ ແຂວງສະຫວັນນະເຂດ ຕົກລົງ:

1. ຕໍ່ອາຍຸ ໃບຢັ້ງຢືນ ກ່ຽວກັບ ສິ່ງແວດລ້ອມ ຮັບຮອງເອົາ ແຜນການຄຸ້ມຄອງ ແລະ ຕິດຕາມກວດກາສິ່ງແວດລ້ອມ ສັງຄົມ ແລະ ທຳມະຊາດ ສະບັບປັບປຸງ ເດືອນ....., ປີ..... ສຳລັບ ໂຄງການພັດທະນາຕົວເມືອງ ຕາມແລວເສດຖະກິດ ຕາເວັນອອກ-ຕາເວັນຕົກ ອະນຸພາກພື້ນແມ່ນ້ຳຂອງ ທີ່ເປັນໂຄງການຂອງກົມເຄຫາ ແລະ ຜັງເມືອງ ກະຊວງ ໂຍທາທິການ ແລະ ຂົນສົ່ງ.
2. ເຈົ້າຂອງໂຄງການ ຕ້ອງປະຕິບັດຢ່າງເຂັ້ມງວດ ບັນດາເງື່ອນໄຂ ທີ່ໄດ້ກຳນົດໄວ້ໃນ ບົດບັນທຶກ ລະຫວ່າງຫົວໜ້າ ພະແນກຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງ ແລະ ຫົວໜ້າພະແນກໂຍທາທິການ ແລະ ຂົນສົ່ງແຂວງ ກ່ຽວກັບການຕໍ່ໃບຢັ້ງຢືນໃຫ້ກ່ອນ ສະບັບລົງວັນທີ 05 ພຶດສະພາ 2017.
3. ໃບຢັ້ງຢືນ ກ່ຽວກັບ ສິ່ງແວດລ້ອມ ສະບັບນີ້ ມີຜົນໃຊ້ໄດ້ 3 ປີ ນັບຕັ້ງແຕ່ວັນລົງລາຍເຊັນເປັນຕົ້ນໄປ.

ຫົວໜ້າພະແນກ
ຊັບພະຍາກອນທຳມະຊາດ ແລະ ສິ່ງແວດລ້ອມແຂວງ

ພູທອນ ຍອດມະນີ

XV. APPENDIX E: DRAFT FORMAT FOR ENVIRONMENTAL MONITORING REPORT

1. Introduction and Project Overview

Project Number and Title:		
Safeguards Category	Environment	
	Indigenous Peoples	
	Involuntary Resettlement	
Reporting period:		
Last report date:		
Key sub-project activities since last report:	This section can include, among others, the following: • Activities of Proponent • Progress of Work (% physical completion) • Changes of Surrounding Environment • Status of Permits / Consents	
Report prepared by:		

2. Environmental Performance Monitoring

a. Summary of Compliance with EMAP Requirements (Environmental Performance)

EMAP Requirements	Compliance Status (Yes, No, Partial)	Comment or Reasons for Non-Compliance	Issues for Further Action
Use environmental impact as main heading and EMAP as listing (see example below)	Use EMoP list as basis for rating/evaluating compliance (see example below)		
Rise of employment opportunities: • Job openings of the project should give priority to local communities. • Recruitment of local laborers should be stipulated in the contract for construction	• Field inspections and interviews with communities - DONE • Note each complaint case in the field – 3 COMPLAINTS RECEIVED • Set up grievance centre and report as part of monitoring action plan – NOT DONE		

b. Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of EMoP measures or activities not completed (last column of previous table)			
New Issues from This Report			

c. Other activities

- Other issues not covered by EMAP/EMoP
- Environmental monitoring as required by GOI (e.g., air quality, water sampling)

3. Involuntary Resettlement Performance Monitoring

a. Summary of Compliance with RP Requirements

RP Requirements	Compliance status Yes/No/Partial	Comment or Reasons for Compliance, Partial Compliance/Non-Compliance	Issues for Further Action[6]
Establishment of personnel in PMU/PIU			
Public consultation and socialization process		Provide information on: • Public consultation, participation activities carried out • Inclusive dates of these activities To be elaborated on in Item 5	
Land area to be acquired is identified and finalised			
Land acquisition completed			

[6] To be elaborated further in table 3.b (Issues for Further Action)

Establishment of Resettlement Site(s)		Please state: • Number of AHs to be relocated as per agreed RP • Number of AHs already relocated • Number of houses built • Status of installation of community facilities to be provided as per agreed RP	
Compensation payments for affected assets is completed		Please state: • Total Number of Eligible AHs and APs (as per agreed RP) • Number of AHs and APs compensated as of this monitoring period • Total Budget allocation as per agreed RP • Total budget disbursed to AHs as of this monitoring period	
Transport assistance for relocating affected households		As above	
Additional assistance to vulnerable affected household		Please state: • Total Number of vulnerable AHs and APs (as per agreed RP) • Agreed forms of assistance as per RP • Number of AHs and APs assisted as of this monitoring period	
Income Restoration Program		Please state progress per income restoration feature/activity and actual period of implementation	
Temporary impacts have been addressed (affected properties restored to at least pre-project conditions)		Please state: • Total Number of AHs affected by temporary impacts as per agreed RP • Actual Number of AHs and total area affected by temporary impacts (if this differs from the projected number, such as in cases of unforeseen project impacts) • Status of restoring affected property	
Capacity building activities			

b. Issues for Further Action

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
List of RP activities not completed (last column of previous table)			
New Issues from This Report			

4. Occupational, Health and Safety (OHS) Performance Monitoring

a. OHS for worker

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

b. Public Safety

Issue	Required Action	Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

5. Information Disclosure and Socialization including Capability Building

- Field Visits (sites visited, dates, persons met)
- Public Consultations and meetings (Date; time; location; agenda; number of participants disaggregated by sex and ethnic group, not including project staff; Issues raised by participants and how these were addressed by the project team)
- Training (Nature of training, number of participants disaggregated by gender and ethnicity, date, location, etc.)
- Press/Media Releases
- Material development/production (e.g., brochure, leaflet, posters)

6. Grievance Redress Mechanism

Summary:

- Number of new grievances, if any, since last monitoring period: ____
- Number of grievances resolved: _____
- Number of outstanding grievances: _____

Type of Grievance	Details (Date, person, address, contact details, etc.)	Required Action, Responsibility and Timing	Resolution
Old Issues from Previous Reports			
New Issues from This Report			

7. Conclusion

- Important results from the implementation of EMAP/EMoP and RP monitoring
- Recommendations to improve EMAP/EMoP and RP management, implementation, and monitoring

8. Attachments

1. Consents / permits
2. Monitoring data (water quality, air quality, etc.)
3. Photographs
4. Maps