

Environmental Monitoring Report

Semiannual Report
January 2019

Bhutan: SASEC Road Connectivity Project

Pasakha Access Road

Prepared by Department of Works, Ministry of Works and Human Settlements for the Royal Government of Bhutan and the Asian Development Bank.

ABBREVIATIONS

ADB	-	Asian Development Bank
CSC	-	Construction Supervision Consultant
DEC	-	District Environment Committee
PAR	-	Pasakha Access Road
DOF	-	Department of Forest
EC	-	Environment Clearance
EFRC	-	Environment Friendly Road Construction
EMP	-	Environmental Management Plan
ES	-	Environment Specialist
IEE	-	Initial Environmental Examination
NCE	-	National Environment Commission
NRDCL	-	Natural Resource Development Corporation Limited
NWF	-	National Work Force
OHS	-	Occupational Health and Safety
PC	-	Project Coordinator
PM	-	Project Manager
PMO	-	Project Management Office
RGOB	-	Royal Government of Bhutan
ROW	-	Right-of-way
BHU	-	Basic Health Unit
DGM	-	Department of Geology and Mines

WEIGHTS AND MEASURES

km	-	Kilometer
m	-	Meter

NOTES

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

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Executive summary

1. The Royal Government of Bhutan (RGOB) has received a grant from the Asian Development Bank (ADB) to finance part of the cost of South Asian Sub-regional Economic Cooperation (SASEC) Road Connectivity project and in particular for the improvement of Pasakha Access Road (PAR). The Department of Roads (DOR) under the Ministry of Works and Human Settlement (MoWHS) will implement the widening and rehabilitation of PAR.
2. The Pasakha Access Road (PAR) will consist of improving a 1.2km section of the existing improvement of the road from Phuentsholing to Pasakha and near to proposed additional international border crossing facilities and the associated roads. The 1.2km Pasakha Access Road or PAR is proposed in between Alay Land Custom Station and Pasakha Industrial Estate within Bhutan. It will connect the Indian SASEC Road from Hashimara under West Bengal, India to Alay in Bhutan.
3. PAR construction activities will include i) widening and rehabilitation of 1.2km of the existing access road to Pasakha from Phuentsholing; ii) construction of 50m multi-cellular culvert over Bhawanihora slide zone; iii) 123m span pre-stressed concrete bridge over Bhalujhora river; iii) construction of river training and check dams for minimizing the flow velocity; iv) construction of road side drains and culverts; v) road surfacing works; and upstream catchment improvement through bioengineering applications.
4. The Pasakha access road provides the principal access to the Pasakha industrial estate from Thimphu, Phuentsholing and India. The PAR is classified as a primary national highway and is managed by Department of Roads (DOR). The existing road infrastructure from Pasakha to the west needs to be improved because the standards and conditions are inadequate to meet rapidly growing demand for efficient traffic movement.
5. The overall progress of physical works is 18.25 % as of May 2018. EMP has been monitored and implemented on day to day basis by the Environmental Focal Persons from both Contractor's side and from CSC (S.I/ES). Contractor submits monthly EMP to CSC and ES from CSC checks the EMP and further submits to DTL. DTL incorporates in the monthly reports. Environmental Clearance has been obtained from National Environment Commission, Thimphu as per project's requirements.
6. This report is the third Semi Annual Environmental Monitoring Report of Pasakha Access Road under SASEC Project from December 2017 – June 2018. The overall level of compliance to the environmental safeguards is satisfactory. Improvements have to be made in areas of Occupational Health and Safety Measures. Pits at camp area need to be improved and only biodegradable waste should be thrown into the garbage pit available at site. All other non-biodegradables should be collected and transported for recycling and more dust bins should be provided within site office and camp area. Contractor shall make sure that all workers use the safety out fits such as helmets, gumboots, safety boots, safety jackets, breathing mask and etc at all time during construction hours. Construction package III need to provide gloves to the workers working in gabion construction site. Water tanker need to be deployed daily during dry season to subside the dust along the project road and within the project premises. Safety signboards are erected at the access point to the construction site with details as listed in the Environmental Clearance. BBPL must improve the drainage system around the camps and site office.

I. PROJECT DESCRIPTION

A. Project Scope

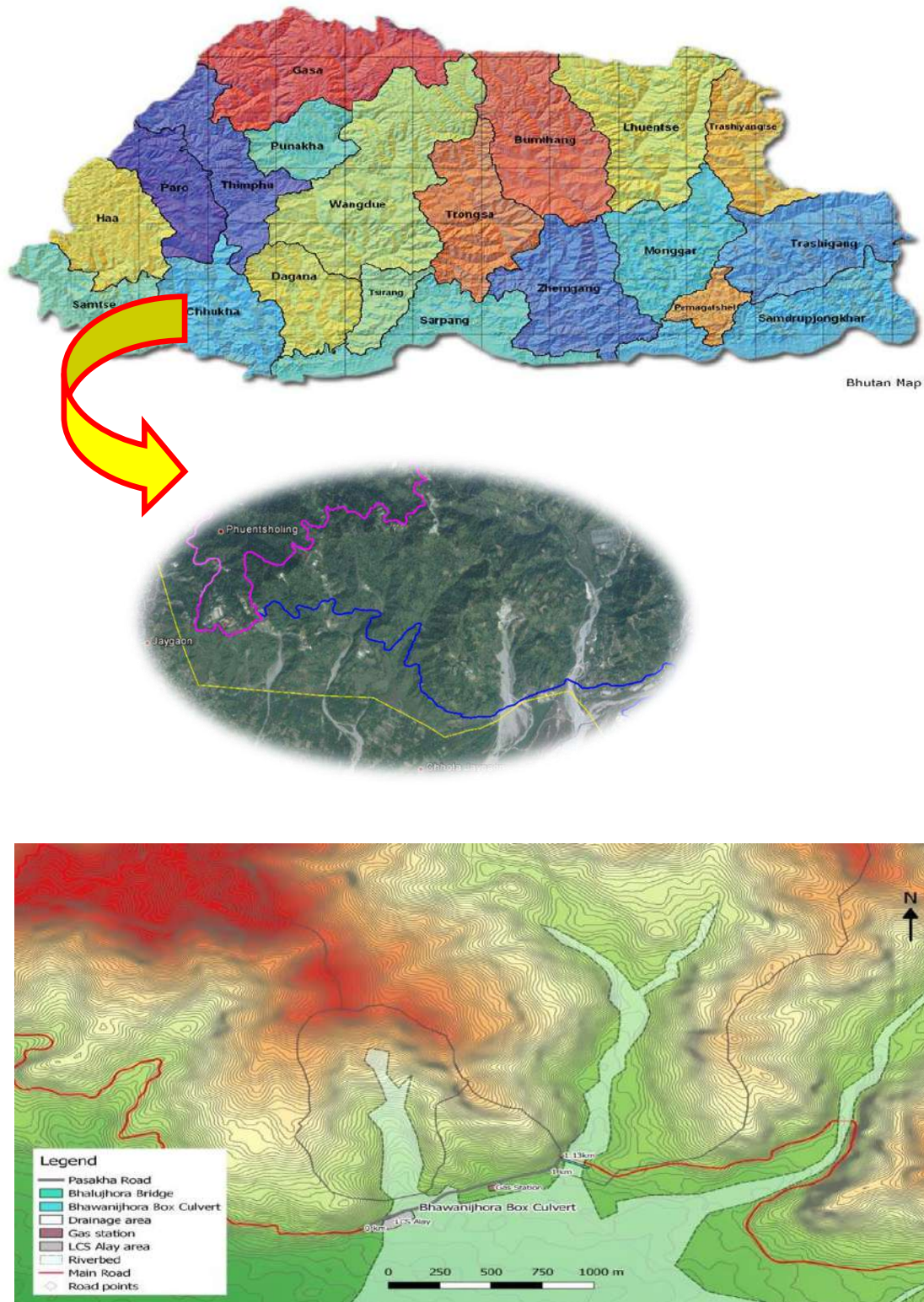
7. The proposed works will require widening and reconstruction of a 1.2 km section of the existing access road to Pasakha coming from Phuentsholing; reconstruction of the bridge over the Bhalujhora River (123 m) and construction of the multi-cellular culverts over Bhawanihora landslide debris flow.

8. The activities that are included are: i) earthworks to facilitate replacement and upgrading of the PAR carriageway, extended road base, multicellular culvert over the landslide sections of PAR; ii) re-construction of the bridge; iii) renewing and reconstructing culverts across the PAR route, providing better crossing drains and better side drains and lead off drainage facilities; and iv) surfacing works. The scopes of work for PAR connectivity project including Contractor's details are provided in Table 1.

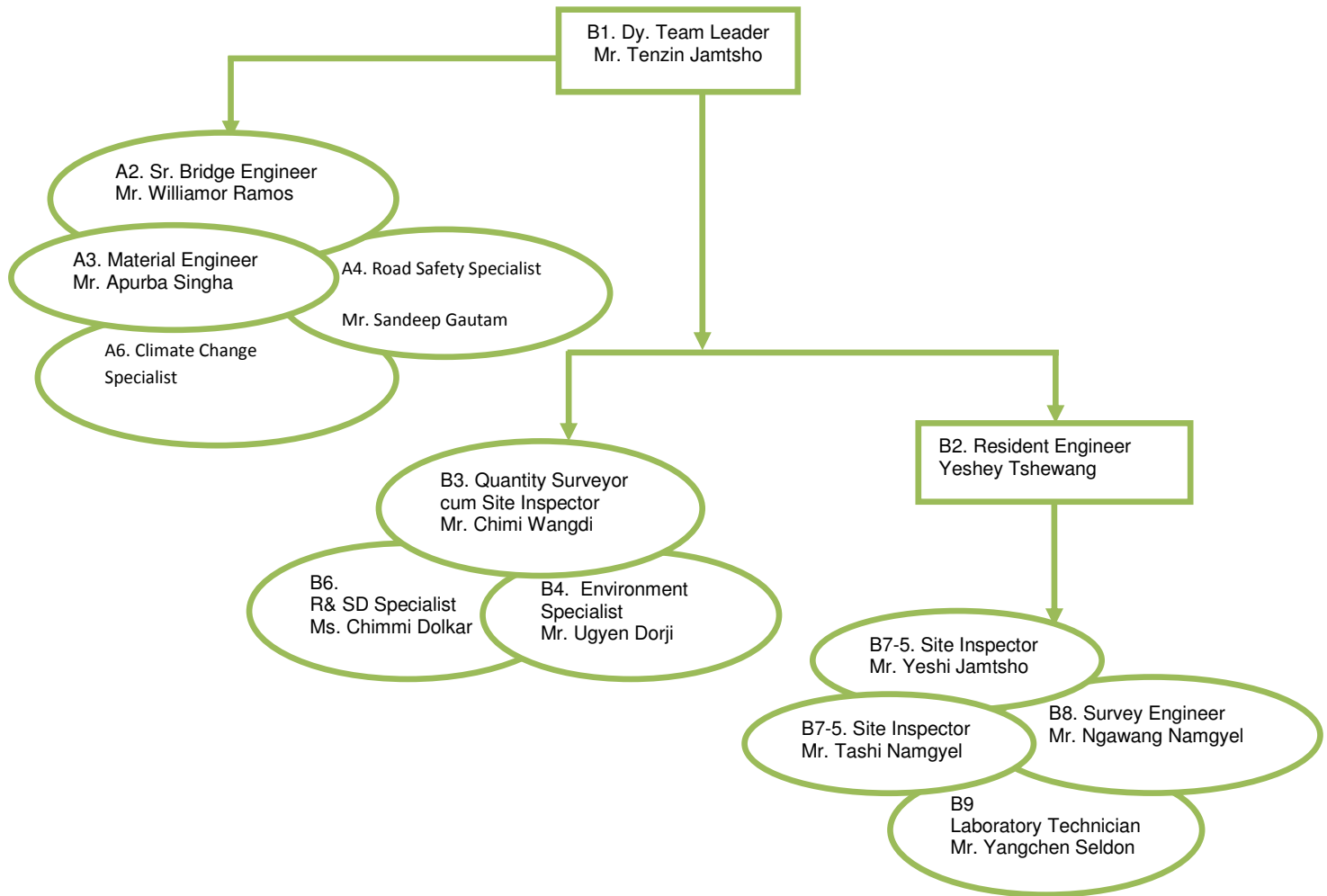
Table 1. Work item, contractor's schedule, date of award and completion date

Sl.No	Work item	Name of Contractor	Contract award date/start date	Contract completion date
1.	Construction of Bhalujhora Bridge (Package – I)	M/s Construction Development Corporation Limited	January 01, 2018	March 31, 2019
2.	Construction of multi-cellular box culverts, road works, LCS and gabion structures (Package – II)	M/s Bhutan Builder Pvt. Limited	March 01, 2018	May 31, 2019
3.	Construction of Gabion structures (Package – III)	M/s Druk Chapchab Construction Pvt. Limited & Gyalcon infrastructure Pvt. Limited JV	January 01, 2018	March 31, 2019

B. Figure 1: Location of Pasakha Access Road



C. Organizational Chat of Supervision team



D. Implementation Arrangement.

9. The Department of Roads (DOR) under the Ministry of Works and Human Settlement (MOWHS) is the implementing agency and PAR will be implemented through the Project Implementation Unit (PIU). Under the PIU there will be three Project Implementation Units (PIUs) responsible for day-to-day operation of Pasakha Access Road (PAR).
10. Project Manager (PM) from the PIU will be the environmental focal person for the DOR at the PIU level, who is responsible for ensuring the compliance of environmental conditions of the project. Construction Supervision Consultant (CSC) hired is part of the PIU.
11. CSC includes Team Leader (the Engineer) supported by Survey Engineer, Bridge Engineer, Material Engineer, Quantity Surveyor, Environmental Specialist (ES), Resettlement & Social Specialist (RS), and Resident Engineer (RE) and Site Inspector (SI).
12. RE and SI will be main the persons who will carry out the daily monitoring of construction works; and ensure the implementation of environmental mitigation measures as prescribed in the EMP, by the construction contractor (CC).
13. The contractor through its Project Manager/engineer will be responsible for submission of monthly EMP compliance report. Similarly, RE will also make the monthly project progress report which includes the section on compliance of environmental terms and conditions.
14. Environment Specialist (ES) will carry out intermittent environmental compliance monitoring of the project to ensure the environmental mitigation measures or conditions are adequately addressed. ES will be responsible for compiling and submitting the annual environmental monitoring report to the DOR through PIU; and to the ADB.
15. A District Environmental Committee (DEC) consists of Dzongkhag planning officer, Dzongkhag forest officer, Dzongkhag land record officer, Dzongkhag agriculture officer, Dzongkhag environmental officer, and Dzongkhag engineer. The District Environmental Officer (DEO) is district official of NECS.
16. DEC is responsible for issuing Environmental Clearance to some project activities mandated to the committee and for checking compliance of the projects to which it issues EC periodically. As part of its regular activities, NECS gives general training and orientation to DEOs before sending them to districts. These orientations focus mainly on Bhutan's environmental requirements.

E. Project Implementation Progress

17. The progress of work as of May 2018 is shown in Table 2.

Table 2. Work Progress as of May 2018

Item No.	Activities	% Completed	Remarks
1	Camp and site office establishment	100%	
2	Setting up of batching plant at Bhawanijhora	100%	
3	Pasakha Access Road widening work	0%	
4	Construction of Bhalujhora bridge	18.25%	
5	Construction of multicellular culverts over Bhawanijhora (sub-structure)	15.62%	
6	Construction of gabion check dams	26.71%	

F. Construction Approach and Methodology

18. PAR widening and reconstruction will be based on Environment Friendly Road Construction (EFRC) Technology with the principle of balanced cut and fill. Excess excavated materials will be disposed in pre-identified approved disposal sites.

19. Civil and bioengineering techniques will be applied to rehabilitate degraded or unstable Bhalujhora area along the road corridor.

G. Climate Change Adaption Measures.

20. In the detailed design study, surface geological investigation and subsoil investigation by seismic refraction technique was carried out at Pasakha Access road, across Bhawanijhora debris bed and at entire Bhawanijhora Slide. The slides have been apparently triggered due to the stream cutting at the toe of the slide which is composed of talcosephylite. Until such time the phyllite layer is completely moved down by the slide, the slope will remain active.

21. Most of the areas at the western slopes towards Phuentsholing show signs of distress mainly due to the stream cutting, steep angle of repose and saturated clay. On the contrary, the eastern side of the slide towards Pasakha is observed to be stable with bed rock of phyllite and quartzitic-phyllite at the base of slope.

22. The geology between Bhawanijhora slide and the stretch of Pasakha road that passes through this slide debris is characterized by sandy gravels, boulders of dark grey and pink quartzite and phyllite. The distance between the road and the base of the slide is almost 1000m. The Bhawanijhora slide covers about 1000m length by 500m width through the active zone. Based on the surface geology and seismic refraction results, presence of loose top soils

with debris of alluviums/colluviums at the widespread stream bed for a depth of about 5m is inferred. Below this layer there is possibility of weathered rock (possibly phyllite) and compact colluviums and alluviums of quartzite and phyllite with silt, sand and gravels.

23. The proposed mitigation measures are as follows:

- i) Construction of check dams of tentatively 5m high and 50m to 80m length at a spacing of 150m to 200m at the required location on the flood plain. This will help to control the debris flow.
- ii) Construction of about 300m of protection wall at the base of slope starting from the confluence of main Bhawanijhora stream with its tributary from Alay side to the start of the active slide. The slope (below Pradhan's house) is very unstable due to presence of highly weathered talcosephyllite.
- iii) Bio-engineering to be applied at the unstable area with local species of plants and grasses where ever possible especially in the stabilizing zones to prevent reactivation of the slide.

24. Besides mitigation measures, the following Climate Change Adaption measures have been designed:

- i) Design of drainage structures have been based on future predicted design discharge using rational method and Peak flow SCS method.
- ii) Culverts of higher discharge capacity, for example 1200 mm diameter hume pipes have been proposed as compared to 600 mm and 900 mm diameter hume pipe culverts.
- iii) Adequate wing walls and aprons both upstream and downstream, and scour protection works have been included in the design.
- iv) Trapezoidal drains with increased discharge capacity have been proposed in place of L- shaped drains.
- v) Sufficient river training structures, wing walls, aprons and scour protection structures have been considered for bridges and culverts.
- vi) The application of bio-engineering techniques for slope stabilization have been proposed to the maximum extent.
- vii) The drainage capacity of bridges & culverts (increased span and height) and side drains have been increased and number of relief culverts have been proposed according to the site requirement.

H. Project Cost

25. The total project cost is Nu. 308.969million of three Construction packages. The total figure reflected is based on the contract awards to I) CDCL (Nu. 77,201,627.20) II) BBPL (Nu. 99,628,321.53) III) DCCPL (Nu. 132,139,443.27)

I. Project Categorization

26. The project is classified as Category B in accordance with ADB's Safeguard Policy Statement (2009), as no significant impacts are envisioned.

II. COMPLIANCE TO SAFEGUARDS PROVISIONS IN AGREEMENTS UNDER THE PROJECT

A. Compliance to Financing Agreement (Special Operations)

27. The environmental safeguard requirements are indicated in Financing Agreement (Loan Number 3149-BHU and Grant Number 0400-BHU) between ADB and Kingdom of Bhutan dated 5 September 2014. These financing agreement provisions and compliance status are provided in Table 3.

Table 3: Status of Compliance to Environmental Provisions of the Financing Agreement

S.N.	Environmental Provision	Compliance Status
1	<p>Schedule 4. Item 6(a):</p> <p><u>Conditions for awards of contracts</u></p> <p>6. The Beneficiary shall ensure that no Works contract which involves environmental impacts is awarded until:</p> <p style="padding-left: 40px;">(a) the relevant environmental authority of the Beneficiary has granted the final approval of the EIA and/or IEE; and</p> <p style="padding-left: 40px;">(b) the Beneficiary has incorporated the relevant provisions from the EMP into the Works contract.</p>	<p>Complied. The EC was accorded as per IEE on February 12, 2018 while the civil works contract commenced on January 01, 2018.</p> <p>Complied. The EMP prepared and submitted by the Contractor has been approved for implementation which is being monitored from time to time.</p>
2	<p>Schedule 5. Item 2:</p> <p><u>Counterpart Funds</u></p> <p>2. The Beneficiary shall make available the Loan and Grant proceeds to the Project Executing Agencies under appropriate arrangements acceptable to ADB, and shall provide or cause each Project Executing Agency to provide, as necessary, respective counterpart staff, land, facilities, and funding required for timely and effective implementation of the Project, including, without limitation, any funds required (a) to meet any shortfall between cost and revenues for the</p>	<p>Complied.</p> <p>The counterpart funding from the RGOB is being disbursed timely for compensation to the affected parties. The Project Coordinator and Project</p>

	O&M of Project facilities; (b) to mitigate unforeseen environmental or social impacts; and (c) to meet any additional costs arising from design changes, price escalation in construction costs and/or unforeseen circumstances. The Beneficiary shall cause the relevant Project Executing Agency to make the resources thus required available on an annual basis for each fiscal year.	Manager have been appointed as counterpart staff to the project.
3	<p>Schedule 5. Item 5:</p> <p><u>Environment</u></p> <p>5. The Beneficiary shall ensure, or cause the relevant Project Executing Agency to ensure, that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (a) all applicable laws and regulations of the Beneficiary relating to environment, health and safety; (b) the Environmental Safeguards; and (c) all measures and requirements set forth in the EIA, the IEE, the EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.</p>	<p>Complied.</p> <p>The compliance requirements with regard to social and environmental safeguards, health and safety and EMP are being satisfactorily complied.</p>
4	<p>Schedule 5. Item 9:</p> <p><u>Human and Financial Resources to Implement Safeguards Requirements</u></p> <p>9. The Beneficiary shall make available, or cause the Project Executing Agencies to make available, necessary budgetary and human resources to fully implement the EMP and the RP.</p>	<p>Complied.</p> <p>DOR has a designated (PM) as Environment Focal Person who monitors the site from time to time.</p>
5	<p>Schedule 5. Item 10:</p> <p><u>Safeguards – Related Provisions in Bidding Documents and Works Contracts</u></p> <p>10. The Beneficiary shall ensure, or cause the Project Executing Agencies to ensure, that all bidding documents and contracts for Works contain provisions that require contractors to:</p> <p>(a) comply with the measures relevant to the contractor set forth in the EIA, the IEE, the EMP, the RP and any indigenous peoples plan (to the extent they concern impacts on affected people during design and/or construction), and any corrective or preventative actions set forth</p>	<p>No indigenous people located within project premises.</p>

	<p>in a Safeguards Monitoring Report;</p> <p>(b) make available a budget for all such environmental and social measures;</p> <p>(c) provide the Project Executing Agency with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or impacts that arise during design, construction, implementation or operation of the Project that were not considered in the EIA, the IEE, the EMP, and the RP;</p> <p>(d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and</p> <p>(e) Reinstatement pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.</p>	<p>Complied. The required funds for environmental and social measures are being disbursed on need basis. Impacts to environmental, resettlement or indigenous peoples are not anticipated.</p> <p>No affect to road and agricultural land.</p> <p>To be implemented upon project completion.</p>
6	<p>Schedule 5. Item 11:</p> <p><u>Safeguards Monitoring and Reporting</u></p> <p>11. The Beneficiary shall do the following or cause the Project Executing Agencies to do the following:</p> <p>(a) submit annual Safeguards Monitoring Reports to ADB for disclosure on ADB's website and disclose relevant information from such reports to affected persons promptly when requested;</p> <p>(b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the EIA, the IEE, the EMP, and the RP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan;</p> <p>(c) no later than 3 months from award of the first Works contract, engage or cause to be engaged qualified and experienced external experts or qualified non-governmental organizations under a selection process and terms of reference acceptable to ADB, to verify</p>	<p>The first and second annual environmental monitoring report is being prepared to comply with the clause.</p> <p>N/A (no unanticipated risk have been experienced)</p> <p>N/A (no major environment or social issues are anticipated in the project that warrant engagement of</p>

	<p>information produced through the Project monitoring process for environment, resettlement and indigenous peoples (if any), and facilitate the carrying out of any verification activities by such external experts; and</p> <p>(d) report any actual or potential breach of compliance with the measures and requirements set forth in the EMP and the RP promptly after becoming aware of the breach.</p>	<p>external expert)</p> <p>N/A (the compliance requirements of the EMP are being satisfactorily complied)</p>
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B. Compliance to Project Administration Manual

28. The Project Administration Manual¹ (PAM), describes how the Department of Roads, and Ministry of Works and Human Settlements will implement the project and deliver the results on time, with quality, within budget, and in accordance with government and Asian Development Bank (ADB) policies and procedures. The PAM is mandatory and serves as the main document describing implementation details. The status of implementing the environmental safeguards requirements set out in PAM is provided in Table 4.

Table 4. Status of Compliance to Environmental Provisions of the Project Administration Manual

S.N.	Environmental Provision	Compliance Status
1	<p>Schedule VIII. Item 31:</p> <p><u>Categorization</u></p> <p>31. The project is classified as category B in accordance with ADB's Safeguard Policy Statement (2009) (SPS). An Initial Environment Examination (IEE) report has been prepared for PAR.</p>	100 % complied.
2	<p>Schedule VIII. Item 32:</p> <p><u>Implementation of Environmental Management Plan (EMP)</u></p> <p>32. DOR will ensure that all environment safeguard requirements under the project will be implemented as required by the IEE for PAR. The EMP with detailed budget estimates are given in IEE for the PAR. An EMP has also been prepared for the PBR, MDP and</p>	

	<p>Alay LCS. However the detailed designs of PBR and Alay LCS are yet to be prepared, hence the EMPs will be updated by the design consultant in accordance with the detailed design. Since a design and build contract package is to be adopted for the procurement of MDP works, the contract agreement with the contractor for the subproject must include clauses for updating the EMP during the design stage by the contractor and proper implementation of the EMP during construction. For the new section of PAR, necessary clauses on environment safeguards will be included in the main text of the contract documents and the EMP matrix from the final IEE report will be attached to the bidding documents. The contractors will be required to include the costs for implementing the environmental clauses and EMP in their bids.</p>	Complied
3	<p>Schedule VIII. Item 33:</p> <p>33. The EMP is a plan for implementation and monitoring of environmental mitigation and enhancement measures during project construction and operation. Specific measures with details on location, time and responsible agency for implementation and monitoring is given in the EMP. Mitigation measures for implementation during the construction stage is implemented by the contractor and during operation stage by DOR and PT through PIU. The Environmental Specialist in the consulting services for both the DOR and PT subprojects will support DOR and PT to guide and monitor implementation of EMPs by contractors including climate adaptation activities. An Environmental Focal Person (EFP) will be appointed in each of the three Project offices under DOR. Similarly, an EFP will be appointed at the site level under the consulting services for conducting day to day monitoring of EMP implementation. An EFP will also be appointed by the contractor for each contract package to ensure proper implementation of the EMP.</p>	Complied
4	<p>Schedule VIII. Item 34:</p> <p>34. The EMP includes collection of baseline data on air and noise quality during the pre- construction stage. The Environmental Specialist in the consulting services will be responsible for procuring the monitoring equipment and organizing training on operation of the equipment by the supplier for the EFP under the PIUs, consulting services and contractors before the start of construction works. The Environmental Specialist in the consulting services will be responsible for baseline data collection on air, noise, and water quality before</p>	Complied

	construction works begin, during construction and during early stages of operation as given in the EMP. After the construction works are over, the monitoring equipment will be handed over to DOR for use by the EFP for other projects. An initial coordination cum training workshop will be organized by DOR with technical support from consulting services and ADB as necessary.	
5	<p>Schedule VIII. Item 35:</p> <p>35. All required clearances such as the environmental clearance and forestry clearance must be obtained by the PIUs before start of construction works for all project components.</p>	Complied
6	<p>Schedule VIII. Item 43:</p> <p><u>Grievance Redress Mechanism</u></p> <p>43. A grievance redress mechanism will be established to receive and facilitate the resolution of concerns, complaints and grievances of affected people and relevant agencies on the social and environmental performance of the project in a time bound and transparent manner. The project specific GRM is not intended to bypass the government's own redress process, rather it is intended to address project affected people's concerns and complaints promptly, making it readily accessible to all segments of affected persons and is scaled to the risks and impacts of the project.</p>	GRM yet to be established
7	<p>Schedule VIII. Item 44:</p> <p><u>Monitoring and Reporting</u></p> <p>44. Implementation of the EMP will be monitored by PIUs with the support of consulting services. The purpose of monitoring implementation of the RP will be to evaluate and report whether resettlement goals have been achieved. For environment safeguards records on implementation of the mitigation measures on site will be maintained by the contractor. Based on these records and spot checks of at least once a month by PIUs and consultants, <i>monitoring reports will be compiled by the Environmental Specialists in consulting services on an annual basis.</i></p>	Complied

C. Compliance to the Civil Works Contract Agreement
Table 5. Status of Compliance to Environmental Provisions of the Civil Works Contract Agreement

S.N.	Description	Compliance Status
1.	Orientation for Contractors, Workers on environmental and social management	Complied
2.	Loss of vegetation	N/A
3.	Drainage and Hydrological Impacts	Complied
4.	Procurement and storage materials	Complied
5.	Solid waste management	Complied
6.	Noise and Dust pollution	Complied
7.	Excavation and disposal	Complied

III. COMPLIANCE TO ENVIRONMENTAL MANAGEMENT PLAN

29. The environmental management plan (EMP) for the project was provided in Table 6. As per EMP, five environmental management activities were required to be implemented during the pre-construction stage; twenty-three (23) activities are required to be implemented during the construction stage; and three (03) activities are required to be implemented during the operation stage. The following Table 6 lists out the status of activities during the pre-construction and construction stage.

Table 6. Status of Compliance to Environmental Provisions of the Environmental Management Plan

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
PRE-CONSTRUCTION					
1	Design measures	-IEE for PAR submitted to NEC and environmental clearance is approved. -Public clearance from Phuentsholing Thromde was obtained. -IEE recommendations have been incorporated in the design. -Unnecessary stockpiling of rock and bitumen based materials near road is avoided. -Water and power supply is provided from different source from community.	Yes		
2	Environmentally responsible procurement	-Procured air and noise monitoring equipments. Contractor engineer is trained at site on day to day basis on environmental dos.	Yes The equipments for monitoring air and noise were procured on July 2016. Training was held on September 08, 2016		
3	Environmental capacity development	-Environment baseline (air and noise) monitoring equipment and required training on data collection and	Yes		

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
		assessment is conducted recently. - Health awareness campaign on STD/HIV/AIDS has been conducted at contractor's camp area.			
4	Protect and re-provision irrigation and utilities	Power, water supply, telecommunications and irrigation systems are not interrupted by project work till now.	Yes		
5	Tree cutting	-few trees felled only in required area with approval from Department of Forestry.	Yes		
CONSTRUCTION					
1	Orientation for Contractors, Workers on environmental and social management.	We oriented our contractor during the monthly meeting and workers at construction site. Awareness campaign has been conducted at camp area on health issues.	Yes		
2	Loss of vegetation and impacts to fauna	Impact on vegetation and fauna is very minimal.	Yes		
3	Drainage and Hydrological Impacts	- Provided adequate drainage at construction sites and camps to avoid pounding and flooding. -Implemented agreed designs for bridges and culverts sufficient to control flooding as designed and to dissipate energy of flow to reduce erosion.	Yes		
4	Materials exploitation and management of quarry and borrow areas	-Not required as construction materials are being transported from approved private mines	No	Not required as the mines/quarry is managed by private individual	
5	Spoil Disposal	-Till date there is no spoil disposal issues where we follow	Partial	Excavation work is being carried out	

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
		Environmental -- Friendly Road Construction method (cut and fill)			
6	General Construction Waste Disposal	-Contractor has made two pits for Organic waste/non organic, sufficient refuse bins within site camps and offices.	Yes		
7	Use of hazardous substances and hazardous waste disposal	-No hazardous substances and waste are generated at construction site, Contractor maintains their machines and vehicles in Phuentsholing workshops (7km away from construction site) -Project vehicles are fueled from Pasakha fueling station.	Yes		
8	Asphalt plant rock crushers, bitumen usage and soil contamination	-As per Contractor's work plan they will not establish asphalt plant and rock crushers. They will source from private firm. Therefore, there would be soil contamination	Yes		
9	Noise and dust nuisances	-Noise is very minimal as construction site is away from human settlements. -Project vehicles are maintained on time. -Water tanker is being deployed by contractor to subside the dust along the road within project area. -Air and noise have been monitored by CSC.	Yes		
10	Blasting (if required)	N/A	No	Project did not encounter rock till now.	Might require in future

SN	Activity	Mitigation measures	Compliance attained (Yes, No, Partial)	Comment/Reasons for Partial or Non-Compliance	Issues for further action and target dates
11	Erosion control / run-off	<ul style="list-style-type: none"> -Project has constructed gabion wall at different location within project. -temporary drainage has been constructed. -implementation of bio-engineering work is not applicable as of now. 	Partial	Gabion walls constructed.	Bio-engineering work will be implemented.
12	River protection and bridge repair	<ul style="list-style-type: none"> -Bridge work is carried out only in dry season. -Rocks and stones will not be disposed to block rivers and streams. -bridge repair and demolition work yet to start. - No cofferdams will be constructed. 	Yes		
13	Water quality	<ul style="list-style-type: none"> -Camps and site office are located away from Bhalujhora river. -No solid waste from construction are thrown in river. -washing of machinery and vehicles in river is strictly prohibited within project premises. 	No		
14	Water resources	<ul style="list-style-type: none"> -Water has been sourced from different source from community. -camps located away from the water source. 	Yes		

IV. COMPLIANCE TO ENVIRONMENTAL CLEARANCE

30. The Environmental Compliance of Pasakha Access Road (PAR) project is prepared as per terms and conditions of EC and implementation of Environmental Management Plan (EMP) of the project. Table 7 contains the compliance requirements and the status compliance of PAR.

Table7. Compliance with the Terms and Conditions of the Environmental Clearance

No.	Compliance Requirement	Status
1	Any modification of the proposal shall take place only with the prior approval of the NEC	There has been no modification in proposal so far
2	Construction complies with the National Environmental Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2002, Waste Prevention and Management Act of Bhutan 2009 and its Regulation 2012, and the Water Act 2011	Construction is going on as per the mentioned laws. The site is monitored by the Dzongkhag Environmental Officer, DoR as well as the site supervisor from the consultant firm.
3	Complies with the Environmental Standards 2010	
4	Construction is carried out as per the project's documents submitted for environmental clearance.	Construction is as per the IEE submitted and as per the Environmental Clearance issued
5	Environmental Clearance is valid only for the construction of the road widening and improvement of one point two (1.2) kilometer of Rinchending-Pasakha Highway, construction of 170m bridges and flood retention walls at Pasakha under Chhukha Dzongkhag.	No works other than the road widening and improvement of one point two (1.2) kilometer of Rinchending-Pasakha Highway, construction of 170m bridges and flood retention walls construction is being carried out
6	The construction is confined within the allotted Area	Construction is within the premises of the Pasakha Access Road (PAR) project.
7	Ensure compliance to all conditions of stakeholder clearances	Construction is being carried out as per stakeholder clearances
8	Local residents, households, communities, public, private parties, and any religious, historic and ecologically important sites are not adversely affected by the construction.	The construction does not affect any sites of this nature.
9	NEC is informed of any chance finds of precious metals or minerals or articles that have economic, religious or ecological significance	There have been no such chance findings yet
10	Holder shall be solely responsible for any disputes	As all disputes and settlements have been made during the IEE stage, the construction phase does not envisage any disputes.
11	Holder shall ensure that the import and use of Secondhand equipment and machineries are strictly prohibited	Equipments used at the site are all found to be in good condition.
12	Construction conforms to Safety Rules and Norms	Contractor has appointed Safety Officer.

No.	Compliance Requirement	Status
		From PIU, PM takes care of safety issues and from CSC side Environmental Focal Person monitors this
13	Felling of trees is done upon obtaining approval from the Divisional Forest Office	There are hardly any trees within the project area. Forest permit shall be obtained if necessary.
14	Excavated material is dumped at pre-identified Sites	Excavated materials have been dumped in designated dumping site and moreover cut and fill method is being implemented at site for minimizing disposal of excavated materials.
15	Spillage and roll over of excavated materials is Avoided	Due to the flat terrain excavated materials will not be rolled over.
16	The holder shall ensure that adverse visual impact of construction is minimized	There are no adverse visual effects that need to be covered
17	Safety signs are posted at strategic locations	There are no strategic locations which necessitate specific warning signs. However, the Contractor has erected a sign at the access to the site with the necessary information specified in the Environmental Clearance
18	Ensure that adequate safety gadgets are provided to the workers	Gum boots, helmets, and face masks have been issued to the workers.
19	Adequate sanitation facility is provided to the Workers	There are more than four toilets each at contractor's camps. The camp has adequate water for both cooking and washing.
20	Ensure that first Aid kit is available at site	First Aid kit made available at the site. Other than treating simple cuts and wounds at site, workers are taken to the hospital.
21	Copy of the Environmental Clearance is available at the site office	Copy of the EC is made available with the Contractor office

V. MONITORING ACTIVITIES UNDER TAKEN

A. Air Quality Monitoring

Air Quality Monitoring

Ambient air quality was monitored on February 28, 2018 to March 01, 2018 by Mr. Ugyen Dorji, Environmental Specialist from Gyaltsen Consultancy, Phuentsholing. The air quality monitoring was conducted over 24 hours at Pasakha Project at Bhalujhora, which falls under Industrial area. The results of the air quality monitoring are as shown in table 1 below:

Station No	Location	Date	Time	In Microgram per cubic meter	
				TSPM	PM 10
1	Pasakha Project area	28.02.2018		458 µg/m ³	150µg/m ³

Table 2: NEC's Ambient Air Quality Standards (Maximum Permissible Limits in µg/m³)

Parameter	Industrial Area	Mixed Area*	Sensitive Area**
Total Suspended Particulate Matter			
24 Hour Average	500 360	200 140	100 70
Respirable Particulate Matter (PM 10)			
24 Hour Average	200 120	100 60	75 50

The results show that the suspended particulate matter (SPM) and respirable particulate matter (TSPM & PM₁₀) are below the level prescribed in Environmental Standards, 2010.

Noise Level Monitoring

Noise level was also monitored on February 28, 2018 to March 01, 2018 by Mr. Ugyen Dorji, Environmental Specialist from Gyaltsen Consultancy, Phuentsholing. The noise level monitoring was conducted over 24 hours at Pasakha Access Road, which falls under Industrial area. The result of the noise level monitoring is as shown in table. 3 below:

S.No	Location	Date	Day (dBa)	Night (dBa)	Permissible limit (Industrial area)
1	PAR (Day)	28.02.2018	53dBa	-	75dBa
2.	PAR (Night)	28.02.2018	-	47dBa	65dBa

VI. CONCLUSION

31. This SASEC, PAR Connectivity Project annual environmental monitoring report is required to be prepared and disclosed in DoR and ADB website as required by SPS 2009 for the environment category-B project. There are different project component under SASEC, PAR connectivity project, in various stage of civil works.

32. The contract packages has been awarded by Department of Roads under Ministry of Works and Human Settlement to three main Contractors namely, M/s Construction Development Corporation Limited, M/s Bhutan Builders Private Limited and M/s Druk Chapchab Construction Private Limited & Gyalcon Infrastructure Private Limited JV.

33. The project is compliant with ADB's requirements as well as RGoB guidelines concerning environment safeguards as provided in IEE and EMP. The baseline data collection for air quality and noise level monitoring was conducted by the M/s Gyaltsen Consultancy on 13th June 2018 to 14th June 2018 (24 hours) at Pasakha Site Office.

34. The Environmental Clearance was obtained by Department of Road from National Environmental Commission, Thimphu for the execution of SASEC/PAR project. The EC is valid till 30th June, 2019. The public clearance was obtained from Phuentsholing Thomde for the construction activities and establishment of labour camps.

35. Occupational Health and Safety Measures are complied by issuing the necessary safety outfits like safety hamlet, safety gumboots, safety boots, safety jackets and dust mask. Excavation more than 1m depth is fenced for safety purposes. Water tanker is deployed to sprinkle the water along the project road as and when needed to suppress dust. All the necessary facilities are provided to the labours and staff living within Construction area.

36. In Pasakha Access Road Connectivity project under SASEC, no grievance was received during the reporting period.

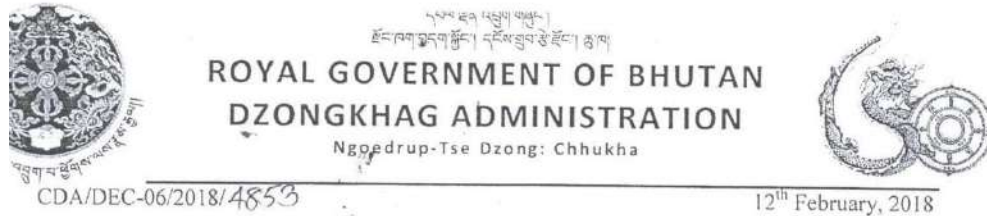
37. For monitoring the Construction site and EMP, ES input in the project is limited. Therefore, three SIs for three construction packages from CSC represents the ES and monitors the construction site daily. Mr. Nawang (material engineer) from M/s CDCL is appointed as Environmental Focal Person for construction package I, Mr. Beem (civil engineer) from M/s DCCPL is Environmental Focal Person for Package III and Mr. Chokey Dorji (civil engineer) from M/s BBPL is appointed as Environmental Focal cum Safety Officer (construction package II). Contractor submits the EMPs on monthly basis and the EMP is cross-checked by SI/ES and DTL.

APPENDICES

Appendix 1: Environmental Clearance for Pasakha Access Road

Appendix 2: Photo log.

Appendix 1: Environmental Clearance for Pasakha Access Road



Environmental Clearance

In accordance with Section 34.1 of the Environmental Assessment Act 2000, this Environmental Clearance (EC) is hereby issued to the Project Coordinator, PMU, SASEC Project, DoR, Thimphu for the 1.2km road widening and improvement of Rinchending-Pasakha Highway, 170m bridge construction, flood retention walls and other ancillary facilities establishment under Sampheling Gewog, Chhukha Dzongkhag with the following terms and conditions:

I. General

The holder shall:

- comply with provisions of the National Environment Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2016, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2016, The Water Act of Bhutan 2011 and its Regulation 2014;
- ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by this activity;
- restore the damage of any public or private properties caused by this activity;
- inform DEC and any other relevant authorities of any unanticipated or unforeseen chance-find of any precious metals or minerals or articles, that have economic, cultural, religious, archeological, and/or ecological importance;

II. Protection and management of water resources

The holder shall:

1. ensure that construction and operation of road does not disrupt the existing water flow and pollute the water bodies; and
2. ensure that 30 meter or 100 feet buffer is maintained from the water resources at all times.

III. Pollution control

The holder shall:

- ensure that adequate trenches and barriers such as check dams, log barriers or boulder barriers are constructed at the spoil dumpsites and other required areas depending on the site condition prior to dumping and excavations;
- ensure that all disturbed area are re-vegetated by adopting different bioengineering techniques depending on the site conditions;



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ཐོང་ཁག་འདུག་ཁྲིའི་ འཕུལ་གཞི་ཆ་མཉམ་ རྒྱལ་
ROYAL GOVERNMENT OF BHUTAN
DZONGKHAG ADMINISTRATION
Ngöedrup-Tse Dzong: Chhukha



- ensure that adequate bioengineering activities are carried out to minimize soil erosion and improve visual impacts;
- ensure that side drains, cross drains, causeways, culverts and other supporting structures such as retaining and breast walls are constructed and maintained at all required areas to prevent soil erosion/ landslide; and
- ensure that the dusts generated during the site development activity is adequately suppressed by spraying water;

IV. Waste prevention and management

The holder shall:

- manage wastes generated from the site development activity with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management;
- ensure that import and use of hazardous wastes are strictly prohibited.
- ensure that littering is avoided at all times;

V. Management of excavated materials and run-off

The holder shall:

- dispose overburden materials generated during the site development activity only at the area identified during the site visit; and
- put appropriate measures for management of surface run-off to avoid erosion and landslides.

VI. Monitoring and reporting

The holder shall:

- ensure that the effective day-to-day monitoring of the EC terms and conditions are carried out by the environmental unit or designated environmental focal person.
- ensure that a copy of this environmental clearance is available at the worksite at all times;

VII. Renewal and modification

The holder shall:

- ensure that renewal of this EC is processed at least three months prior to its expiry along with a copy of EC and a report on the implementation of its terms and conditions; and
- obtain prior approval from DEC for any modification to the existing proposal/application.

VIII. Reservation



- The DEC may stop the activity or impose additional terms and conditions, as may be deemed necessary; and
- The EC shall be subject to periodic review and modifications as per Article 25 of the EA Act 2000, without any liability on the part of the Royal Government.

The holder may adopt best practices in executing these terms and conditions to avoid adverse environmental impacts.

Failure to comply with any of the above terms and conditions shall constitute an offence and the proponent shall be liable in accordance to the Environmental Assessment Act 2000 and/or existing environmental laws.

Validity

This EC is issued with its validity from 12/02/2018 until 30/06/2019 only for the 1.2km road widening and improvement of Rinchening-Pasakha Highway, 170m bridge construction, flood retention walls and other ancillary facilities establishment under Sampheling Gewog, Chhukha Dzongkhag.


(DEC Chairman)

CC:

1. Chief Environment Officer, ESD, NECS, Thimphu for kind information.
2. Gup, Sampheling Gewog Administration for kind information.
3. Office Copy.

Appendix 2: Photo log



Picture 1: Batching Plant at Bhalujhora (CDCL) Package I



Picture 2: Contractors trucksat site (BBPL) package II



Picture 3: Labours with safety outfits (PPE/CDCL) package I



Picture 4: Contractor's site office (CDCL)



Picture 5: Labour camp at Bhalujhora (package I)



Picture 6: Supervision Consultant Site Office during air monitoring.



Picture : 7 Water Tanker at Bhawanihora site



Picture 8: Construction materials (package I)



Picture 9: Toilet at camp area (package II)



Picture 10: Contractors camp at Bhawanijhora (package II)



Picture 11 : Multi-cellular culverts bidge at Bhawanijhora. Package II



Picture 12: Bhalujhora Bridge (CDCL) package I



Picture 13: Gabion wall at Bhawanihora



Picture 14: Safety sign board at Bhutan Builder Private Limited (Package II)