

# Environmental Monitoring Report

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Annual Report (January–December 2020)  
January 2021

## Bhutan: South Asia Subregional Economic Cooperation Road Connectivity Project

Northern Bypass Road I and II

Prepared by the Phuentsholing Thromde for the Government of Bhutan and the Asian Development Bank.

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2021

ANNUAL ENVIRONMENT MONITORING REPORT,  
31 January 2021  
BHU SASEC Road Connectivity Project, Northern Bypass  
Road I & II

**Prepared by Phuentsholing Thromde, Royal Government of Bhutan for the Asian Development Bank**

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## CURRENCY EQUIVALENTS

(as of 31<sup>th</sup> January 2021)

Currency unit	–	Bhutanese Ngultrum
Nu. 1.00	=	\$ 0.0137
\$ 1.00	=	Nu. 72.75

## ACRONYMS

ADB	Asian Development Bank
BPCL	Bhutan Power Corporation Limited
CC	Construction Contractor
CSC	Construction Supervision Consultant
DFPS	Department of Forest & Park Services
EFRC	Environment Friendly Road Construction
EIA	Environment Impact Assessment
EMP	Environmental Management Plan
ES	Environmental Specialist
MDP	Mini Dry Port
NBR	Northern Bypass Road
NCD	Nature Conservation Division
NECS	National Environment Commission Secretariat
NRDCL	Natural Resource Development Corporation Limited
PMO	Project Management Office
PT	Phuentsholing Thromde
ROGB	Royal Government of Bhutan
ROW	Right of way

## WEIGHTS AND MEASURES

ha	-	Hectare
km	-	Kilometer
m	-	Meter

## NOTES

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

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## I. EXECUTIVE SUMMARY

1. The Royal Government of Bhutan (RGOB) and the Asian Development Bank approved the SASEC Road Connectivity Project (the Project) in July 2014. The project includes the following components: (i) 68-km of National Highway between Nganglam and Dewathang; (ii) 1.2km access road from an Indian border constructed at Pasakha area; (iii) A mini-dry port (MDP) in Phuentsholing and Alay land custom station; and (iv) The construction of about 2.7km of bypass road in Phuentsholing city, or the Northern Bypass Road (NBR).
2. Phuentsholing Thromde is one of the Executing Agencies of the Project, where it is in charge of implementing components 3 and 4 of the Project – the Mini Dry Port (MDP) in Phuentsholing and Alay land custom station; and the 2.7-km Northern Bypass Road in Phuentsholing. Both components are being implemented by the Phuentsholing Thromde (PT). The Project Management Unit (PMU) is supported by personnel from Phuentsholing Thromde, where they work with supervision consultants to monitor all construction activities.
3. The Northern Bypass Road is a 4-lane road that starts at the second Indo-Bhutan gate, near the mini dry port and ends at the existing Phuentsholing – Thimphu road. The bypass road will decongest the traffic flow within urban core of Phuentsholing.
4. The NBR I & II are categorized as B for environment under ADB's SPS guidelines. Initial environmental examinations (IEEs) were prepared and disclosed in ADB website on March 2014. The project administration manual (PAM) requires the submission
5. This is the fourth environmental monitoring report prepared for the Northern Bypass Road I & II. As of January 2021, the overall progress of the Northern bypass I is 100% and Northern bypass II is 92.17%.
6. Environmental Clearances were obtained from the National Environment Commission Secretariat (NECS). The clearance for the bypass was obtained on September 27, 2017. Refer to **Appendix 1**.
7. EMPs for the project has been monitored and implemented on day to day basic by the Environmental Focal Persons from both Contractor's side and from CSC (SI/ES).

## II. PROJECT DESCRIPTION

### A. NORTHERN BYPASS ROAD I & II (NBR)

#### i. Project Scope

8. The Project will include construction of (i) earthworks to facilitate replacement of existing roads and upgrading of the NBR carriageway and extended road base, and surfacing works (ii) construction of bridges and underpass (iii) construction, renewing and reconstructing culverts and drains serving the NBR route (iv) providing better crossing drains and better side drains and lead off drainage facilities.
9. The project works require widening, reconstruction and a new section of road and additional crossing over the Om Chhu River. The total road length is about 2.7km. The span of the bridge is 120m and width is 19m. The works will generally be within or adjacent to existing road corridor for 2km, and 0.7 km will be new construction.
10. The scopes of work for NBR 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.	Earthworks to facilitate replacement of existing roads and upgrading of the NBR carriageway and extended road base, and surfacing works	M/s Marushin Shitaka – Rigsar Construction (J/V)	17/08/2017/ and 1/9/2017	NBR I: 31/08/2019  NBR II: 28/02/2020
2.	Construction of bridges 120m length and 19m width.			
3.	Construction of culverts and drains serving the NBR route			
4.	Construction of underpass			
5	Road widening works			
6	Reconstruction and a new section of road			



Figure 1: Project Location of Phuentsholing Northern Bypass Road

## ii. Implementation Arrangement

11. The Phuentsholing Thromde (PT) under the Ministry of Works and Human Settlement (MOWHS) is the implementing agency and NBR will be implemented through the Project Implementation Unit (PIU). Under the PIU there are three Project Implementation Units (PIUs) responsible for day-to-day operation of Northern Bypass Road Project.
12. Project Manager (PM) from the PIU will be the environmental focal person for the PT 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.
13. CSC includes Team Leader (the Engineer) Bridge Engineer, Material Engineer, Quantity Surveyor, Environmental Specialist (ES), Resettlement & Social Specialist (RS), and Resident Engineer (RE) and Site Inspector (SI).
14. RE and SI will be the main 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).
15. 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.
16. 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 PT through PIU; and to the ADB.
17. 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.
18. 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.

## iii. Project Implementation Progress

19. The progress of work as of January 1<sup>st</sup>, 2021 is shown in **Table 2**.

**Table 2: Work Progress as of January 1st, 2021**

Item No.	Activities	% Completed	Remarks
1	Camp and site office establishment	100%	
2	Setting up of concrete batching plant	100%	
3	Road work	95%	
4	Construction of boundary wall	100%	
5	Construction of Sewerage and Drainage system	100%	



6	Construction of Road Network (flexible)	90%	
7	Underpass	100%	
8	Construction of bridge	100%	
9	Earthwork	100%	
10	Sub-Base work	100%	
<b>Overall project completion</b>		95%	

#### iv. Construction Approach and Methodology

20. NBR construction will be carried out in an environment friendly manner following the principles of balance cut and fill. Excess excavated materials will be disposed in the pre- identified at ToorsaRiver side approved by Phuentsholing Thromde. The identified place currently falls under the PTDP project area and the materials have been used by the project for backfilling work.

#### v. Project Cost / Implementation Schedule

21. The total quoted cost for NBR is Nu.444.532 million (NBR I Nu.198.408& NBR II Nu. 246.124) project started on September 01, 2017 and will be completed on February 28, 2020 (NBR I start date 17/08/2017 and completion 30/08/2019, NBR II start date 1/09/2017 and completion 28/02/2020) as per the contract.

#### vi. Project Categorization

22. The Project is classified as category B in accordance with ADB's Safeguard Policy Statement (2009) as no significant impacts are envisioned.

### III. SAFEGUARDS COMPLIANCE

#### A. Compliance to Financing Agreement (Special Operations)

23. The environmental safeguard requirements are indicated in Financing Agreement (Grant Number 0400-BHU) between ADB and Kingdom of Bhutan dated 5<sup>th</sup> 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	Environment Provision	Compliance Status
		Northern Bypass Road I & II
1	<p><b>Schedule 4. Item 6(a):</b> <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>(a) The relevant environmental authority of the Beneficiary has granted the final approval of the EIA and/or IEE; and</p>	<p>Complied. The EC was accorded as per IEE on 27/9/2017 while the civil works contract commenced on 1/9/2017.</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>

	The Beneficiary has incorporated the relevant provisions from the EMP into the Works contract.	
<b>S.N</b>	<b>Environmental Provision</b>	<b>Compliance Status</b>
2	<p><b>Schedule 5. Item 2:</b></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 O&amp;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.</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 Manager have been appointed as counterpart staff to the project</p>
3	<p><b>Schedule 5. Item 5:</b></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>
<b>S.N</b>	<b>Environmental Provision</b>	<b>Compliance Status</b>
4	<p><b>Schedule 5. Item 9:</b></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</p>	<p>Complied.</p> <p>Project Manager and the Project Engineer from PT monitors the site from time to time.</p>

	available, necessary budgetary and human resources to fully implement the EMP and the RP.	
5	<p><b>Schedule 5. Item 10:</b></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 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>Reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.</p>	<p>Not applicable. No indigenous people are located within project premises.</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><b>Schedule 5. Item 11:</b></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>The fourth environmental monitoring report is being prepared to comply with the clause.</p> <p>N/A (no unanticipated risks have been experienced so far)</p> <p>N/A (no major environment or social issues are anticipated in the project that warrant engagement of external expert)</p> <p>N/A (there has been no breach in compliance so far)</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 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>	
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## B. Compliance to Project Administration Manual

24. The Project Administration Manual<sup>1</sup> (PAM) describes how the Phuentsholing Thromde, 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.
25. 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**

SN	Environmental Provision	Compliance Status
		Northern Bypass Road I & II
1	<p><b>Schedule VIII. Item 31:</b> <b><u>Categorization</u></b></p> <p>31. The subprojects Northern Bypass Road (NBR) and Phuentsholing Mini Dry Port (MDP) are category B. Initial Environment Examination (IEE) reports have been prepared for Northern Bypass Road (NBR) and Phuentsholing Mini Dry Port (MDP).</p>	100 % complied
2	<p><b>Schedule VIII. Item 32:</b> <b><u>Implementation of Environmental Management Plan (EMP)</u></b></p> <p>32. PT will ensure that all environment safeguard requirements under the project will be implemented as required by the IEEs for NBR and MDP. An EMP has also been prepared for the NBR and MDP. The EMP matrix from the final IEE reports 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 as per detailed design.
3	<b>Schedule VIII. Item 33:</b>	Complied.

	<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 PT through PIU. The Environmental Specialist in the consulting services for both the PT subprojects will support PT to guide and monitor implementation of EMPs by contractors. An Environmental Focal Person (EFP) will be appointed under PT. 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>	<p>Environmental Focal Person (EFP) has been appointed from Consultant site Inspector and from the Contractor Project Engineer</p>
4	<p><b>Schedule VIII. Item 34:</b></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 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 PT for use by the EFP for other projects. An initial coordination cum training workshop will be organized by PT with technical support from consulting services and ADB as necessary.</p>	<p>Complied. The air and noise monitoring equipment were procured and air and noise monitoring are being conducted every few months.</p>
5	<p><b>Schedule VIII. Item 35:</b></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>	<p>Complied. All the necessary environmental clearance and forest permits are obtained by PMU before starting construction works.</p>
6	<p><b>Schedule VIII. Item 43:</b></p> <p><b><u>Grievance Redress Mechanism</u></b></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</p>	<p>GRM has been established. If there are project affected people, they can approach to PMU and the Dzongkhag Land Committee.</p>

	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.	
7	<p><b>Schedule VIII. Item 44:</b> <b><u>Monitoring and Reporting</u></b></p> <p>44. Implementation of the EMP will be monitored by PIUs with the support of consulting services. 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, monitoring reports will be compiled by the Environmental Specialists in consulting services on a semi-annual basis. If there are any changes in the design or alignment, the EMP and RP of the respective subproject will be updated to account for any additional or new impacts. Further, the need for revising the IEE reports will also be reviewed and confirmed in discussion with ADB</p>	<p>Complied.</p> <p>Reporting system is being followed by the Contractor and the process is being followed for compiling the environmental monitoring report.</p>

### C. Compliance to the Civil Works Contract Agreement

**Table 5: Status of Compliance to Environmental Provisions of the Civil Works Contract Agreement**

SN	Description	Compliance Status
		Northern Bypass Road I & II
1	Orientation for Contractors, Workers on environmental and social management	Orientation for contractor and worker on environment was conducted. Almost 70% compliance has been achieved.
2	Loss of vegetation	217 trees for NBR I and 159 trees for NBR II were cut down and handed over to NRDCL.
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	N/A

### IV. COMPLIANCE TO ENVIRONMENTAL MANAGEMENT PLAN

26. The environmental management plan (EMP) for Northern Bypass Road I & II are provided in **Table 6, 7 & 8**.

**Table 6: Status of Compliance to Environmental Provisions of the Environmental Management Plan – Northern Bypass I**

S.N	Activity	Mitigation Measures	Compliance attained (Yes, No, Partial)	Location	Comment/Reasons for Partial or Non-Compliance
1.	Tree Felling or Site Clearance	<ul style="list-style-type: none"> <li>Tree felling done with approval from Department of forest.</li> <li>Tree felling with procedure set in Forest and Nature Conservation Rules (2006) with necessary trees marked by the DOF.</li> <li>Economically valuable timber will have to be handed over to NRDCL.</li> <li>Compensatory Plantation depending on the availability of vacant or barren Government Land.</li> </ul>	<ul style="list-style-type: none"> <li>Approximately 217 trees were marked and felled till date along the NBR-01.</li> <li>Tree felling has been done with approval from Department of Forest.</li> <li>All timber has been handed over to NRDCL.</li> <li>No compensatory Plantation done as per contract provision, and nature of the project.</li> </ul>	NBR-01	Complied
2	Baseline Environment data(Air and Noise)	<ul style="list-style-type: none"> <li>As part of institutionalization and capacity building for environmental compliance monitoring and reporting, ADB will finance the procurement of environmental monitoring equipment and provide the necessary training.</li> <li>Baseline data on air quality and noise levels of all sensitive area (commercial, residential and institutional) will be assessed before commencement of civil works. These data will help in assessing project impacts during implementation.</li> </ul>	<ul style="list-style-type: none"> <li>Environment equipment of Mini Dry Port Project is being used. Baseline environment data (Air and noise) is being monitored throughout the project construction phase.</li> </ul>	NBR-01	Complied
3	Safety Precautions for the workers.	<ul style="list-style-type: none"> <li>Worker's occupational health and safety will be generally governed by Labour and Employment Act of Bhutan 2007. Construction works will generally result in accidents and injuries or even demise of the workers if no health and safety measures are followed.</li> <li>Mitigation measures implemented by contractors to ensure health and safety of workers are as follows:</li> <li>The contractor will instruct workers in health and safety matters as required by law and by good engineering practice and provide first aid facilities.</li> <li>The contractors will instruct and induct all workers in health and safety matters (induction course)</li> </ul>	<ul style="list-style-type: none"> <li>A required health and safety measure has been followed as per Labour and Employment Act of Bhutan 2007</li> <li>Workers have been instructed for health and safety matters required.</li> <li>Deep excavation has been barricaded with information and safety sign boards.</li> </ul>	NBR-01	Complied

		<p>including construction camp rules and site agents/foremen will follow up with tool box talks on a weekly basis. Work force training for all workers starting onsite will include safety and environmental hygiene.</p> <ul style="list-style-type: none"> <li>Fencing on all areas of excavation greater than 1m deep and sides of temporary works shall be observed.</li> <li>Workers shall be provided with appropriate personnel safety equipment such as safety boots, helmets, gloves, protective clothes, dust mask, goggles, and ear protection at no cost to the workers.</li> <li>Contractor will at all-time keep the first aid kit at the construction sites.</li> <li>Contractor will be responsible for evacuation injured person to the nearest medical center and bear all the medical expenses.</li> </ul>	<ul style="list-style-type: none"> <li>All workers have been provided basic safety equipment's like: Helmets, boots, gloves, dust masks etc.</li> <li>First Aid Kit has been kept at construction site.</li> <li>Necessary arrangement for evacuation injured person to nearest medical center has been managed.</li> </ul>		
4	Public safety	<ul style="list-style-type: none"> <li>Install barriers (e.g., temporary fence) at construction area as to deter pedestrian access to the roadway except at designated crossing points.</li> <li>The general public/local residents shall not be allowed in high-risk areas e.g., excavation sites and areas where heavy equipment is in operation and such sites have a watchman to keep public out.</li> <li>Speed restrictions shall be imposed on Project vehicles and equipment when travelling within 50 m of sensitive receptors (e.g. residential, schools, temples, etc)</li> </ul>	<ul style="list-style-type: none"> <li>Necessary barricading of construction site and use of green nets on the barricaded portions have been managed.</li> <li>Caution information board at construction site for public awareness has been maintained.</li> </ul>	NBR-01	Complied
5	General Construction Waste Management	<ul style="list-style-type: none"> <li>Contractor will try to minimize waste at source.</li> <li>Waste products will be segregated, recycled and reused whenever possible.</li> <li>Recyclable waste will be sold to the scrap dealers.</li> <li>Organic waste such as plant materials will be composted.</li> <li>Residual non-hazardous waste will be disposed of in the municipal landfill.</li> <li>Construction/workers' camps will be provided with sufficient refuse bins.</li> </ul>	<ul style="list-style-type: none"> <li>Minimized wastage at source.</li> <li>Re-use of wastage has been maintained as far as possible.</li> <li>Refuse bins have been kept at appropriate locations.</li> <li>Burning of construction wastes has been strictly prohibited.</li> </ul>	NBR-01	Complied



		<ul style="list-style-type: none"> <li>Burning of construction and domestic wastes will be prohibited.</li> <li>Disposal of solid wastes into flood ways, wetland, rivers, other watercourses, farmland, forest and associated places of worship or other culturally sensitive areas or areas where a livelihood is derived canals, agricultural fields and public areas will be prohibited.</li> </ul>	<ul style="list-style-type: none"> <li>Proper disposal of wastage with approval from concern authority.</li> </ul>		
6	Use of hazardous substances and hazardous waste disposal	<ul style="list-style-type: none"> <li>Hazardous substances including oil and lubricants will be disposed correctly.</li> <li>Hazardous substance disposed of will not be directly disposed surrounding environment and downstream water body.</li> <li>Mitigation measures will seek to control access to and the use of hazardous substances such as oils and lubricants and control waste disposal.</li> <li>Contractor will carry out following measures to minimize the impacts:</li> <li>Oil and lubricants will be safely stored. Secondary containment around fuel storage area will be ensured.</li> <li>Use of hazardous substances including oil and lubricant shall be controlled or if waste is not disposed correctly.</li> <li>Hazardous substance disposed of into open area and drainage system will directly harm surrounding environment and downstream water body.</li> <li>Mitigation measures will seek to control access to and the use of hazardous substances such as oils and lubricants and control waste disposal.</li> <li>Contractor will carry out following measures to minimize the impacts:</li> </ul>	<ul style="list-style-type: none"> <li>Fuel has been filled directly from fuel pumps.</li> <li>Oil, Lubricants has been stored with proper management.</li> <li>Strictly prohibition on disposal of hazard substances into open areas and water body.</li> <li>Hazardous materials are stored away from water bodies.</li> </ul>	NBR-01	Complied
7	Drainage and Hydrological Impacts	<ul style="list-style-type: none"> <li>Contractor will ensure the proper disposal of spoil and other waste.</li> <li>Hazardous waste such as oil and lubricants will be properly stored and sent for recycling.</li> <li>Solid municipal waste will be disposed of in a municipal landfill.</li> </ul>	<ul style="list-style-type: none"> <li>Proper disposal of spoil and other waste maintained.</li> </ul>	NBR-01	Complied

8	Traffic Management	<ul style="list-style-type: none"> <li>• In coordination with local traffic authorities, implement appropriate traffic diversion schemes to avoid inconvenience due to project operations to road users, ensure smooth traffic flow and avoid or minimize accidents, traffic hold ups and congestion.</li> <li>• In coordination with local traffic officials, schedule transport of materials to avoid congestion, set up clear traffic signal boards and traffic advisory signs at the roads going in and out the road and bridge construction sites to minimize traffic build-up.</li> <li>• Provide safe vehicle and pedestrian access around construction areas.</li> <li>• Install bold diversion signs that would be clearly visible even at night and provide flag.</li> <li>• Persons to warn of dangerous conditions (24 hours, as necessary)</li> <li>• Provide sufficient lighting at night with in and in the vicinity of construction sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Proper traffic diversion and management has been maintained with informatively appropriate sign boards.</li> <li>• Safety barricades and caution signals provided within construction areas.</li> <li>• Safe Vehicle and pedestrian access around construction areas have been maintained.</li> </ul>	NBR-01	Complied
9	Sanitation and Diseases	<ul style="list-style-type: none"> <li>• Standing water will not be allowed to accumulate in the temporary drainage facilities or along the road side to prevent proliferation of mosquitoes.</li> <li>• Temporary and permanent drainage facilities have been designed to facilitate the rapid removal of surface water from all areas and prevent the accumulation of surface water ponds.</li> <li>• Malaria controls (e.g., provision of insecticide treated mosquito nets to workers, installation of proper drainage to avoid formation of stagnant water, etc.) and HIV-AIDS education will be implemented in line with social plans for the project.</li> <li>• HIV/AIDS awareness and prevention program shall be implemented in line with social plans under the Project.</li> </ul>	<ul style="list-style-type: none"> <li>• Proper flow of existing drainage has been maintained.</li> </ul>	NBR-01	Complied
10	Asphalt Plant, rock crushers, bitumen usage	<ul style="list-style-type: none"> <li>• Locate asphalt plant and rock crushers (wherever practical) at least 500m from nearest sensitive receivers (residential areas, schools, hospital,</li> </ul>	<ul style="list-style-type: none"> <li>• Asphalt plant installed at bank of Toorsa river, away from river and settlements.</li> </ul>	NBR-01	Complied

	and soil contamination	etc.) and rivers and install and maintain dust suppression equipment. • Bitumen Drums stored in dedicated area not scattered along Project Roads and other project facilities. • Bitumen will not be allowed to enter drainages system. • Bitumen storage and mixing areas shall be protected against spillage. • All accidental spills of bitumen or chemicals should be cleaned up immediately with the top 2cm of any contaminated soil underneath and disposed of as chemical waste to a site approved by the local authority.	• Mitigation measures implemented.		
11	Noise and dust nuisances	<ul style="list-style-type: none"> <li>• Water sprinkling or spraying using tanker done twice a day to reduce dust generation.</li> <li>• Water can be sourced from Amochhu River</li> <li>• Fuel-efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions. Regular maintenance will be carried out.</li> <li>• Vehicles transporting soil, sand and other construction materials will be covered with tarpaulin sheets to reduce the release of dust and avoid impacts from dust.</li> <li>• Speed limits of such vehicles within the works site and on unpaved edge areas of the Project road will be established and agreed with the PMU.</li> <li>• Noise and dust monitoring has been carried out.</li> <li>• Working hours should be restricted from 8 am to 5 pm to avoid disturbances to nearby residents during the night.</li> </ul>	<ul style="list-style-type: none"> <li>• Water sprinkling on the roads around construction sites has been maintained for dust control.</li> <li>• Periodic maintenance and emission check from concerned authority has been maintained.</li> <li>• Proper cover provided during transportation of construction materials</li> <li>• Strictly informed for speed limit.</li> <li>• Limit in working hours</li> </ul>	NBR-01	Complied
12	Construction equipment's, machinery and vehicles	<ul style="list-style-type: none"> <li>• Regular maintenance of all machinery, equipment's and vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>• Regular maintenance and check-up of vehicle maintained.</li> </ul>	NBR-01	Complied
13	Identification of disposal sites for construction debris	<ul style="list-style-type: none"> <li>• Identify suitably located disposal sites for construction debris</li> </ul>	<ul style="list-style-type: none"> <li>• Disposal of construction debris to specified disposal site.</li> </ul>	NBR-01	Complied

14	Closure of equipment yards and camps	<ul style="list-style-type: none"> <li>Removable of structures, clean up construction camp debris and backfill latrines; grade, re-vegetate the area and tree planting under the compensatory forest program.</li> </ul>	No compensatory Plantation done as per contract provision, and nature of the project. The Phuentsholing throumde will be planting plants along the dividers and in the round about.	NBR-0I	Complied
15	Operation of equipment storage and repair yards, and fuel depots	<ul style="list-style-type: none"> <li>Prevent oil and fuel spills, control runoff from contaminated areas.</li> </ul>	<ul style="list-style-type: none"> <li>Cleanliness maintained at equipment yard /repair yard.</li> </ul>	NBR-0I	Complied
16	Management of Workers	<ul style="list-style-type: none"> <li>Prohibit fishing, hunting and gathering of firewood among workers.</li> <li>Provide construction camps with food supplies from purchased stores.</li> </ul>	<ul style="list-style-type: none"> <li>Maintained</li> </ul>	NBR-0I	Complied
17	Set up of construction camps	<ul style="list-style-type: none"> <li>Camp facilities should be located at a distance from nearby communities.</li> <li>Provide sanitary facilities (dry pit or pour flush latrines) for workers and arrange for disposal of solid waste in accordance with local practice</li> </ul>	<ul style="list-style-type: none"> <li>Labor Camps are established away from community.</li> <li>Sanitary latrines with septic tank provided at labor camps.</li> <li>Proper drinking water facility provided.</li> <li>Disposal pits with sufficient refuse bins has been maintained.</li> </ul>	NBR-0I	Complied
18	Operation of construction camps	<ul style="list-style-type: none"> <li>Workers hired by contractors should be screened in advance for HIV/AIDS.</li> <li>HIV/AIDS awareness-raising campaign in must be conducted as per social plan of the project.</li> </ul>	<ul style="list-style-type: none"> <li>Workers are only recruited after the medical check-up.</li> <li>STD/HIV/AIDS awareness campaign was conducted at MDP site on November 17, 2017.</li> </ul>	NBR-0I	Complied

**Table 7: Status of Compliance to Environmental Provisions of the Environmental Management Plan – Northern Bypass II**

S.N	Activity	Mitigation Measures	Compliance attained (Yes, No, Partial)	Location	Comment/Reasons for Partial or Non Compliance
<b>PRE-CONSTRUCTION</b>					
1	Design Measures	<ul style="list-style-type: none"> <li>• IEE for NBR submitted to NEC and environmental clearance was approved.</li> <li>• Public clearance from Phuentsholing Thromde was obtained.</li> <li>• IEE recommendations have been incorporated in the design.</li> <li>• Unnecessary stockpiling of rock and bitumen-based materials near road is avoided.</li> <li>• Water and power supply is provided from different source from community</li> </ul>	<p>Yes.</p> <p>Environmental clearance for NBR has been received.</p> <p>See Appendix 2 (Environmental Clearance of Northern Bypass Road)</p>	NBR II	Complied
2	Environmentally responsible procurement	<ul style="list-style-type: none"> <li>• Contractor engineer is trained at site on day to day basis</li> <li>• Procured air and noise monitoring equipment</li> </ul>	<p>Yes.</p> <p>The equipment of MDP is being used for air and noise monitoring.</p>	NBR II	High level of air pollution in certain locations along the NBR site. Compliance letter was sent to contractor on 30/01/2019. Refer to appendix 1.
3	Environmental capacity development	<ul style="list-style-type: none"> <li>• Required training on data collection and assessment for Environment baseline (air and noise) monitoring equipment was conducted recently.</li> <li>• Health awareness campaign on STD/HIV/AIDS has been conducted at contractor's camp area</li> </ul>	<p>Training on baseline data collection was not conducted by the equipment supplier.</p> <p>Yes.</p> <p>STD/HIV/AIDS awareness campaign was conducted at MDP site on November 17, 2017. 50 labourers and 10 site engineers were present during the campaign.</p>	NBR II	Complied
4	Protect and re-provision irrigation and utilities	<ul style="list-style-type: none"> <li>• Power, water supply, telecommunications being monitored in consultation with PT, BPC &amp; BT and irrigation systems are not interrupted by project work till now.</li> </ul>	<p>Yes</p>	NBR II	Complied

S.N	Activity	Mitigation Measures	Compliance attained (Yes, No, Partial)	Location	Comment/Reasons for Partial or Non Compliance
5	Tree Cutting	<ul style="list-style-type: none"> <li>159 trees felled only in required areas with approval from Department of Forestry.</li> </ul>	Yes	NBR II	Complied
<b>CONSTRUCTION</b>					
1	Orientation for Contractors, Workers on environmental and social management	<ul style="list-style-type: none"> <li>We oriented our contractor during the monthly meeting and workers at construction site. Awareness campaign has been conducted at camp area on health issues.</li> </ul>	Yes	NBR II	Complied
2	Loss of vegetation and impacts to fauna	<ul style="list-style-type: none"> <li>Impact on vegetation and fauna is very minimal.</li> </ul>	Yes	NBR II	Complied
3	Drainage and Hydrological Impacts	<ul style="list-style-type: none"> <li>Provided adequate drainage at construction sites and camps to avoid pounding and flooding</li> </ul>	Yes	NBR II	Complied
4	Materials exploitation and management of quarry and borrow areas	<ul style="list-style-type: none"> <li>Not required as construction materials are being transported from approved private mines</li> </ul>	No	NBR II	Not required as the mines/quarry is managed by private individual
5	Spoil Disposal	<ul style="list-style-type: none"> <li>Spoils are dumped at identified dumping area near Toorsa River.</li> <li>Contractor follows cut and fill.</li> </ul>	Yes	NBR II	Complied
6	General Construction Waste Disposal	<ul style="list-style-type: none"> <li>Contractor has made two pits for organic waste &amp; non -organic waste, with sufficient refuse bins within site camps and offices.</li> </ul>	Yes	NBR II	Complied
7	Use of hazardous substances and hazardous waste disposal	<ul style="list-style-type: none"> <li>No hazardous substances and waste are generated at construction site</li> <li>Contractor maintains their machines and vehicles in Phuentsholing workshops</li> <li>Project vehicles are fuelled from Phuentsholing fuelling station.</li> </ul>	Yes	NBR II	Complied
8	Asphalt plant rock crushers, bitumen usage	<ul style="list-style-type: none"> <li>Asphalt plant is at site, but strict mitigation measures are being implemented. No rock crushers</li> </ul>	Yes	NBR II	Complied

S.N	Activity	Mitigation Measures	Compliance attained (Yes, No, Partial)	Location	Comment/Reasons for Partial or Non Compliance
	and soil contamination	at site. They will source from private firm. Therefore, there would not be soil contamination			
9	Noise and dust nuisances	<ul style="list-style-type: none"> <li>Construction site is near human settlement, but noise is monitored throughout the day, to make sure no complaints are filed. No overtime work is encouraged, as the noise from site will impact the people.</li> <li>Project vehicles are maintained on time.</li> <li>Water tanker is being deployed by contractor to subside the dust along the road within project area.</li> <li>Air and noise have been monitored by CSC.</li> </ul>	Yes	NBR II	Complied
10	Blasting (if required)	<ul style="list-style-type: none"> <li>Silent blasting</li> </ul>	Yes	NBR II	Complied
11	Erosion control / run-off	<ul style="list-style-type: none"> <li>Temporary drainage has been constructed</li> </ul>	Yes	NBR II	Complied
12	Water quality	<ul style="list-style-type: none"> <li>Camps and site office are located away from river.</li> <li>No solid waste from construction are thrown in river.</li> <li>Washing of machinery and vehicles in the river is strictly prohibited within project premises</li> </ul>	No	NBR II	Complied
13	Water Resources	<ul style="list-style-type: none"> <li>Water has been sourced from different source within the community</li> <li>Camps are located away from the water source</li> <li>Contractor transports water by water tanker</li> </ul>	Yes	NBR II	Complied
14	Operation of workers camps	<ul style="list-style-type: none"> <li>Worker camps and facilities are located away from settlements and river</li> <li>Toilets &amp; bathrooms with continuous water supply &amp; electricity is made available</li> </ul>	Yes	NBR II	Complied
15	Sanitation and diseases	<ul style="list-style-type: none"> <li>Temporary drainage has been constructed</li> <li>Health awareness campaign conducted by the Health official from Consultancy as per the social plan at work site to the labors</li> </ul>	Yes	NBR II	Complied

S.N	Activity	Mitigation Measures	Compliance attained (Yes, No, Partial)	Location	Comment/Reasons for Partial or Non Compliance
16	Safety precautions for the workers	<ul style="list-style-type: none"> <li>Safety helmet, gumboots, safety gloves and safety jackets are provided to labors at site &amp; made sure they use it all the time at site</li> <li>First Aid Kit box is made available at construction site</li> </ul>	Yes	NBR II	Complied
17	Public Safety	<ul style="list-style-type: none"> <li>Excavated area has been barricaded with information and safety sign boards</li> <li>Caution information board &amp; Cautionary Plastic Ribbon along footpath &amp; road side as Temporary measures for public awareness has been maintained</li> </ul>	Yes	NBR II	Complied
18	Traffic Conditions	<ul style="list-style-type: none"> <li>Safety barricades and caution signals provided within construction areas.</li> <li>Proper traffic diversion and management has been maintained with informatorily and appropriate sign boards to control the traffic</li> <li>Provided with sufficient lighting at night within and in the vicinity of construction sites</li> </ul>	Yes	NBR II	Complied
19	Archaeological and cultural artifacts	<ul style="list-style-type: none"> <li>No historical, Cultural and Religious artifacts found along NBR-2 premises</li> </ul>	N/A	NBR II	Complied
20	Compensatory Plantation	<ul style="list-style-type: none"> <li>Not yet</li> </ul>	N/A	NBR II	Complied

**Table 8: Status of Compliance to Environmental Provisions of the Environmental Management Plan – Northern Bypass I & II Site Specific**

SN	Activities at Construction site.	Impacts	Mitigation Measures	Mitigation Measures Implemented	Remarks	Deficiencies/Remarks/ Observations (To be completed by CSC)
1.	Rural Electricity Supply Pole and Lines	Power Supply	<ul style="list-style-type: none"> <li>Avoid dumping spoil towards electric pole location</li> <li>If damages are unavoidable, then the poles have to be relocated to safer place in</li> </ul>	<ul style="list-style-type: none"> <li>41 electric poles (falling inside ROW) have been dismantled and handed over to concerned authorities. Most of them were street lights, which will be reinstated in near future as per the design. Other electric poles carrying</li> </ul>	60 electricity poles will have to be relocated.	Complied



SN	Activities at Construction site.	Impacts	Mitigation Measures	Mitigation Measures Implemented	Remarks	Deficiencies/Remarks/ Observations (To be completed by CSC)
			coordination with BPCL with prior information to the affected people	<p>power supply to communities have been relocated to safer place.</p> <ul style="list-style-type: none"> <li>Underground power supply cables were damaged at some locations during road and drain excavation which have been reinstated immediately.</li> </ul>		
2.	Telecommunication poles	Public Communication	<ul style="list-style-type: none"> <li>Avoid dumping spoil towards telephone poles location</li> <li>If damages are unavoidable, then the poles have to be relocated to safer place in coordination with Telecom with prior information to the affected people.</li> </ul>	<ul style="list-style-type: none"> <li>1 telecommunication pole (falling inside ROW has been dismantled and handed over to concerned authorities. The pole was relocated to safer place.</li> <li>Underground telecommunication cables were damaged at some locations during road and drain excavation which have been reinstated immediately.</li> </ul>	<p>Around 10 poles falls within right of the project road, this may have to be relocated.</p>	Complied
3.	Footpath	Accident	<ul style="list-style-type: none"> <li>316 meters of footpath will be dismantled since the project road alignment falls on the existing footpath.</li> </ul>	<ul style="list-style-type: none"> <li>Most of the walkway in embankment have been damaged which was inevitable for the construction of roadside drain. Temporary footpaths have been managed till the reconstruction of new footpath over the drain is compelled.</li> </ul>	<p>Project will be restoring the footpath during Construction phase.</p>	Complied

SN	Activities at Construction site.	Impacts	Mitigation Measures	Mitigation Measures Implemented	Remarks	Deficiencies/Remarks/ Observations (To be completed by CSC)
4.	Crocodile zoo	Relocation	<ul style="list-style-type: none"> <li>Two different species 8 mugger crocodile &amp; 15 small Juvenile crocodiles, in total there are 23 crocodiles have to be relocated/ transported to Jigmeling, about 13 KM from Gelephu town.</li> </ul>	<ul style="list-style-type: none"> <li>The initial plan was to relocate the entire crocodile farm to Gelephu. However, the Phuentsholing Thromde decided to retain a section of crocodile farm for tourist purposes and to generate income. The relocation of the reptiles to Gelephu was carried out by the Department of Forests. Gelephu is about 200 km or 5 hours through the Indian highway. There was no casualty of any reptiles. Due to the current COVID pandemic, the farm has been closed to the public.</li> </ul>	A total of 23 crocodiles have been relocated/transported to Gelephu.	Complied
5.	Water Supply	Water Supply lines should not be disturbed	<ul style="list-style-type: none"> <li>In the event of unavoidable damages, the water supply has to be immediately reinstated through alternative arrangement.</li> <li>Water supply has to be reinstated immediately</li> </ul>	<ul style="list-style-type: none"> <li>Underground water supply lines were damaged at some locations during road and drain excavation which have been reinstated immediately.</li> </ul>	Discussion with Phuentsholing Thromde.	Complied
6.	Encroachment, disturbance and damage of religious and holy sites	Historical sites/ damage to archaeological monuments and unearthed evidence	<ul style="list-style-type: none"> <li>No historical, Cultural and Religious sites found along PBR premises/upon discovery of archaeological relics.</li> <li>Notify the PMO to contact relevant government authority to</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable</li> </ul>	Inform PT/MoHCA	Complied Not found anything yet.

SN	Activities at Construction site.	Impacts	Mitigation Measures	Mitigation Measures Implemented	Remarks	Deficiencies/Remarks/ Observations (To be completed by CSC)
			investigate and undertake recovery.			

## V. COMPLIANCE TO ENVIRONMENTAL CLEARANCE

27. The Environmental Compliance of Northern Bypass Road (NBR) project is prepared as per terms and conditions of EC and implementation of Environmental Management Plan (EMP) of the project. **Table 9** contains the compliance requirements and the status compliance of NBR.

**Table 9: Northern Bypass Road's Compliance with the Terms and Conditions of the Environmental Clearance**

No.	Compliance Requirement	Status
<b>I. GENERAL</b>		
1	The holder shall comply with provisions of the National Environmental Protection Act 2007, Environmental Assessment Act 2000 and its Regulation 2016, Waste Preservation and Management Act of Bhutan 2009 and its Regulation 2016, and the Water Act of Bhutan 2011 and its Regulation 2014	Construction is going on as per the mentioned laws. The site is monitored by the Dzongkhag Environmental Officer and Project Officials, PT as well as the site supervisor from the consultant firm.
2	The holder shall ensure that construction activities are in line with Initial Environmental Examination report submitted for EC	Construction is as per the IEE submitted and as per the Environmental Clearance issued
3	The holder shall ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by the activities	The construction does not affect any sites of this nature.
4	The holder shall restore the damage of any public or private properties caused by the activities	No damage caused to public or private properties so far.  Any damages caused to private properties will be discussed and the damages will be restored. Any damages caused to public properties will be reported to relevant authorities and damages will be restored.
5	The holder shall inform NECS 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, archaeological, and/or ecological importance	Such incident has not yet occurred.  If such an incident occurs, NECS and relevant authorities will be informed.
6	The holder shall erect a signboard at the take-off point of the main entry of the activities stating the name of the activities and contact address	Safety signboards are at strategic locations which necessitate specific warning signs.
<b>II. ENVIRONMENTAL STANDARDS</b>		
7	The holder shall comply with the existing Environmental Standards	Complied
<b>III. IMPORT AND USE OF SECONDHAND EQUIPMENT</b>		
8	The holder shall ensure that import and use of second-hand equipment and machineries are strictly prohibited.	No second-hand equipment was used at the site. All required equipment's were purchased and were all found to be in good condition.
<b>IV. WATER USE AND MANAGEMENT</b>		
9	The holder shall ensure that activities does not disrupt the water flow and pollute the water bodies	The NBR project area is along the Amo Chhu river bank, but mitigation measures are being taken to ensure the water body does not get polluted.
10	The holder shall ensure that 30 meters or 100 feet buffer is maintained from the water resources at all times	

No.	Compliance Requirement	Status
<b>V. WASTE PREVENTION AND MANAGEMENT</b>		
11	The holder shall manage wastes generated from the activities (activity site, labour camps, offices etc.) with the application of 4R (reduce, reuse, recycle, responsibility) principle and other environmentally friendly methods of waste management	Two pits were made for organic & non-organic waste, with sufficient refuse bins within site camps and offices. Tarpaulin was used to cover lightweight materials at site.
12	The holder shall ensure that import and use of hazardous wastes are strictly prohibited	The project does not require any use or import of hazardous materials. Thus, such waste will not be generated.
<b>VI. MANAGEMENT OF EXCAVATED MATERIALS AND RUN-OFF</b>		
13	The holder shall dispose off excess excavated materials at the pre-identified approved dumpsite only	Excavated materials are disposed at disposal site near Toorsa river approved by the Phuentsholing Thromde. The site currently falls under PTDP project and the materials have been reused for their project activity.
14	The holder shall put appropriate measures to avoid erosion and landslides	Erosion/landslide issues occurred at site during monsoon season, but mitigation measures were taken.
<b>VII. IMPLEMENTATION PLAN</b>		
15	The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to NECS within three (3) months from the date of issue of this EC	The EMP has been updated to incorporate requirements of NEC's terms and conditions
<b>VIII. MONITORING AND REPORTING</b>		
16	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	Contractor has appointed Safety Officer. From PIU, PM takes care of safety issues and from CSC side Environmental Focal Person monitors this
<b>IX. RENEWAL AND MODIFICATION</b>		
17	The holder shall ensure that renewal of this EC is processed at least three (3) months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions	Yes
18	The holder shall obtain prior approval from NECS for any modification to the existing proposal / application	There has been no modification in proposal so far
<b>X. RESERVATION</b>		
19	The NECS may stop the activity or impose additional terms and conditions, as maybe deemed necessary	N/A
20	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	N/A
21	The holder may adopt best practices in executing these terms and conditions to avoid adverse environmental impacts.	N/A

## VI. MONITORING ACTIVITIES UNDERTAKEN

### A. Air and Noise Quality Monitoring

28. Ms. Sonam Deki, Environmental Specialist from Gyaltsen Consultancy, Thimphu conducted the final ambient air quality monitoring along NBR I from January 15 –19<sup>th</sup>, 2019. NBR II project is

continuing and an air quality monitoring was conducted from 28 – 30<sup>th</sup> January 2021. The purpose of the ambient air quality monitoring was established to collect ambient air quality for the project area during construction phase, so that future air quality variation could be assessed during or after the project completion (operation phase). To ensure that the project does not cause or contributes towards the growing pollution in Phuentsholing town tests were conducted in various locations within and outside the project vicinity. The air quality monitoring was conducted over 24 hours in four at the MDP site. The results of the air quality monitoring from September 2017 – January 2021 is reflected below in a bar graph.

#### i. Ambient Air Monitoring of NBR I & II Project Area

##### Ambient Air Quality Monitoring From September 2017 – January 2021

**Table 10: Air Quality Monitoring for NBR II (January 28 - 30 2021)**

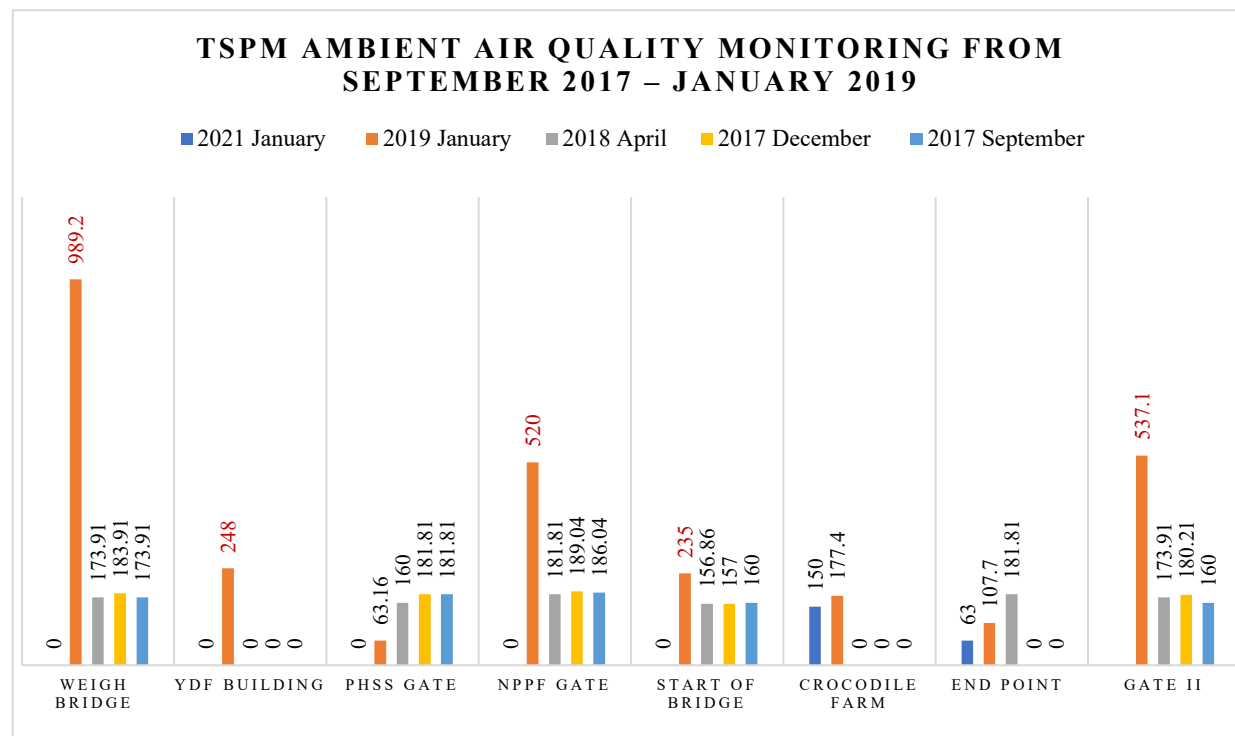
Table 16: Air Quality Monitoring for NBR II (January 28 – 30, 2021)						
S.N	Location	Date	In Microgram per cubicmeter		Environmental Standards, 2010	
			TSPM	PM 10	TSPM	PM 10
Northern Bypass Road						
1	Crocodile Farm	28/01/2021	150	125	200µg/m³	100µg/m³
2	End point	30/01/2021	63	119	200µg/m³	100µg/m³

##### Result and Interpretation of Air Quality Monitoring

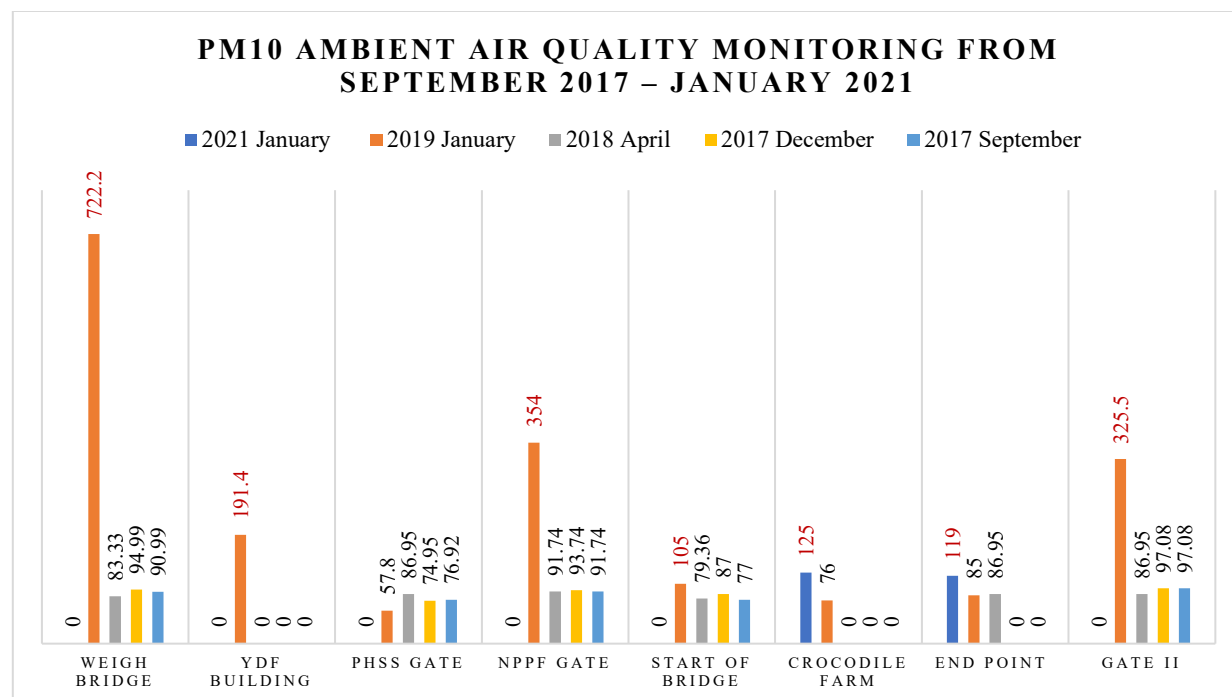
29. The **NBR I** is along the main commuting route to the Phuentsholing – Samtse Highway, the Phuentsholing High School and RICB Colony. Due to this reason the air quality along the NBR testing locations over the years have always been a little above the NEC's mixed area permissible limits. Apart from the project activities, issues such as constant movement of speeding heavy and light vehicles, dusty roads, multiple private constructions activities and wind are all a contributing factor towards the high air pollution. The project overall did not contribute enormously towards the air pollution of Phuentsholing town.
30. As reflected on **Table 10** above the TSPM in both the locations for NBR II testing conducted on January 28 – 30<sup>th</sup> 2021 were within the permissible limits. Whereas the PM10 for both the locations were above the permissible limits.
31. There are multiple external factors that are contributing towards the high level of air pollution at the two locations. First and foremost, the test was conducted during the winters, which is a dry season, with hardly any rain and strong winds. The NBR II is not the only ongoing project in Phuentsholing town, the evening winds could be blowing away construction materials which are not covered properly which are another contributing factor.
32. The two locations are also commonly used routes for commuter and people traveling from various town into Phuentsholing. The movement of vehicles causes the settled dust spiraling into the air and remain suspended in the atmosphere, before settling away from the main source.

##### Mitigation Measure

33. To ensure that the air pollution was controlled, activities such as sprinkling of water along the construction area and beyond. It was also ensured that all construction materials were covered, and all vehicles were encouraged to use tarpaulin during transporting of materials. For the safety of the worker, the contractor and the consultant engineer at site were informed and encouraged to wear suitable gears and were provided with N95 or equivalent mask.
34. To get a clear comparison of all past tests, a bar graph of Ambient Air Quality Monitoring from September 2017 – January 2021 is reflected below. As you can see the air qualities monitored are either slightly on the higher spectrum or above the permissible limits of the NEC's mixed area emission standards.



**Figure 2: TSPM Ambient Air Quality Monitoring from September 2017 - January 2021**



**Figure 3: PM10 Ambient Air Quality Monitoring from September 2017 - January 2021**

## ii. Noise Quality Monitoring of NBR I & II Project area

35. The Noise test is conducted to ensure that the project does not generate too much sound to impact the community. The locations for the noise testing were dispersed similar to the air quality monitoring to ensure that the noise was not only generated from project activities but from activities outside the project and natural factors. The overall noise quality in the NBR area over the years have mostly been within the permissible limits of the NEC's mixed area, except for a few tests. Apart from the project activities being a contributing factor towards the high noise pollution, it could have also been due to human activities from the residents along the project area, movement of heavy vehicles, natural factors such as heavy winds, thunderstorms and from private construction activities. The project overall did not contribute enormously towards the air pollution of Phuentsholing town.

### Result and Interpretation of Ambient Noise Level Monitoring

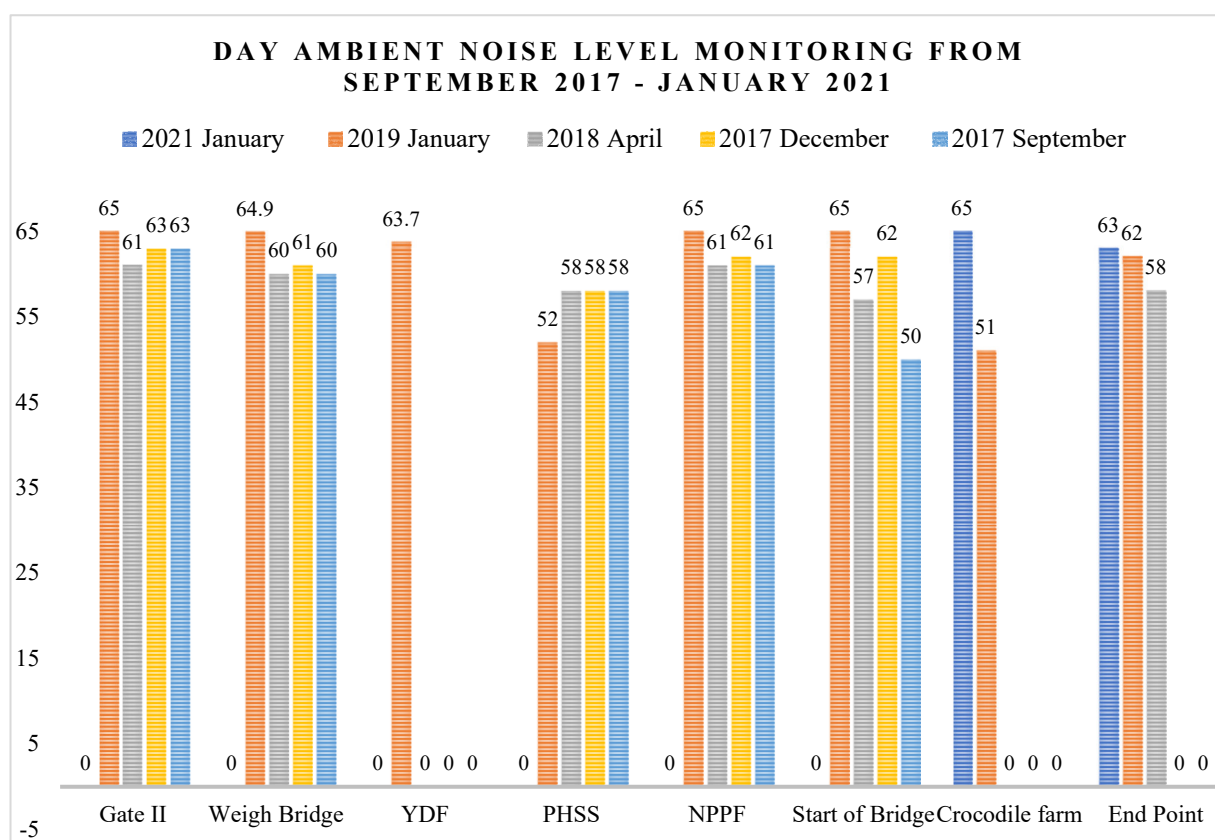
**Table 11: Noise Level Monitoring (Dba) for NBR II**

S.N	Location	Date	Day (Leq)	Night (Leq)
1	Crocodile Farm	28/01/2021	65	42
2	Endpoint	30/01/2021	63	45

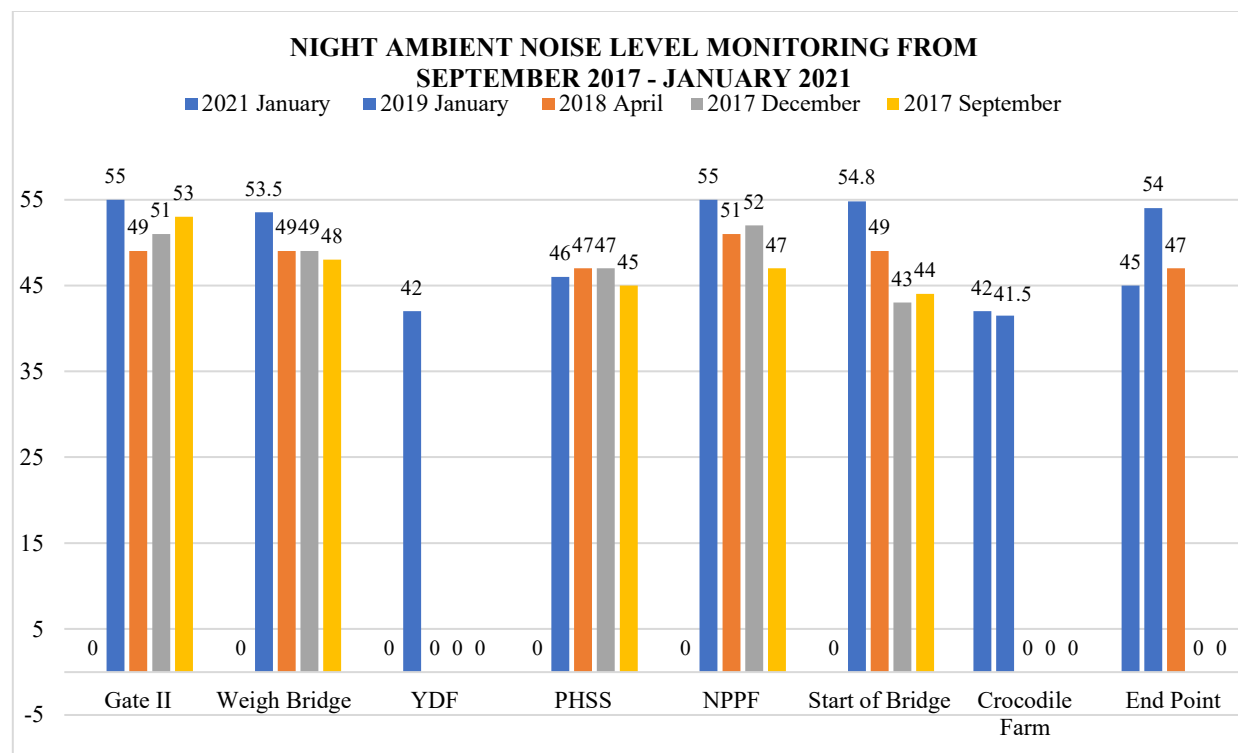
36. The **NBR I** being along the main commuting route to the Phuentsholing – Samtse Highway, the Phuentsholing Highschool and RICB Colony. **NBR II** is along the main highway coming into Phuentsholing town, some of the main reasons for noise during the morning house was due to movement of vehicles, machinery, drilling, digging, and other construction activities along the project area. During the evening hours, the primary cause of noise pollution was from movement of vehicles, machinery and from natural factors like the wind, and animals. All the noise caused by manmade activities are temporary and will not have long term impact.



37. As reflected above in **Table 11** the noise monitoring for both day and night for the two locations along the NBR II are within on the higher spectrum but within the permissible limits of NEC's mixed area. This could also be because of the limited movement of vehicle due to restrictions by the Government to avoid unnecessary movement during the pandemic.
38. To ensure that the communities do not get affected by the noise generated from the project activities, all loud noise generating work was stopped after work hours. Drivers were also informed not to unnecessarily honk. The project could only monitor the noise from the project activities. The Noise monitoring test is conducted once during the day and the other at night time. The noise generated during the testing are not permanent, and will not have any future impact.
39. Below is a graphical representation of noise monitoring for both day and night from September 2017 – January 2021. As represented below the noise at all locations in the NBR I & II Project area have been within the permissible limits of the NEC's mixed area.



**Figure 4: Day Ambient Noise Level Monitoring From September 2017 - January 2021**



**Figure 5: Night Ambient Noise Level Monitoring From September 2017 - January 2021**

## VII. CONCLUSION

40. This Annual Environmental Monitoring Report covering the Northern Bypass Road under the SASEC Connectivity Project, was prepared in compliance to the requirements of SPS 2009.
41. The contract package for Northern Bypass Road has been awarded by Phuentsholing Thromde under Ministry of Works and Human Settlement to M/s MarushinShitaka - Rigsar Construction (J/V).
42. Baseline data collection for air quality and noise level monitoring for the two projects was conducted by M/s Gyaltsen Consultancy. For NBR II air and noise monitoring was from January 28 – 30<sup>th</sup>, 2021.
43. The Environmental Clearances (EC) for both NBR was obtained from the National Environmental Commission. The EC for NBR is valid until September 26<sup>th</sup> 2020.
44. Occupational health and safety measures are being 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 and the proposed mini dry port facilities as and when needed to suppress dust. All the necessary facilities are provided to the labours and staff living within construction area.
45. There were no complaints nor grievances lodged with Phuentsholing Thromde during the reporting period for NBR.
46. Contractor will have to submit the EMP on monthly basis and the EMP is cross-checked by SI/ES/RE and TL. Approved EMP is attached with the monthly progress report and submitted to Phuentsholing Thromde.

47. The construction of NBR was started on 1<sup>st</sup> September 2017 and will be completed by 26<sup>th</sup> February 2021 as per the revised schedule. The NBR I is completed on 10<sup>th</sup> February 2020.
48. The crocodile farm is under the management of the Department of Forests, Ministry of Agriculture and Forests (MOAF). The initial plan was to relocate the entire crocodile farm to Gelephu. However, the Phuentsholing Thromde decided to retain a section of crocodile farm for tourist purposes and to generate income. The relocation 23 reptiles, 8 Big crocodiles 15 Small Juvenile to Gelephu was carried out by the Department of Forests. Gelephu is about 200 km or 5 hours through the Indian highway. There was no casualty of any reptiles during the relocation. The crocodile farm is located at Jigmeling, about 13 km from Gelephu main town.
49. The Phuentsholing Crocodile Farm currently has three species of crocodile, four big mugger crocodiles, six small Gharial and five small Juvenile. The farm is closed to the public due to the COVID-19 pandemic.
50. No compensatory Plantation done as per contract provision, and nature of the project. However, the Phuentsholing thromde will be planting plants along the dividers and in the round about.
51. Air and noise monitoring for the NBR II was restricted to two locations because in the other locations there is no one to ensure the safety of the project and with the outbreak of COVID the risk was higher. Also, most of the previously tested locations were outside the project vicinity or in the NBR I location, and with the limited time frame to work on the report, the locations were limited to two main stations located along the NBR II.

## VIII. PHOTO LOG OF NBR I & II

### NBR I & II initial Stages









## NBR I & II Near Completion











## NBR II: KITCHEN AND TOILET

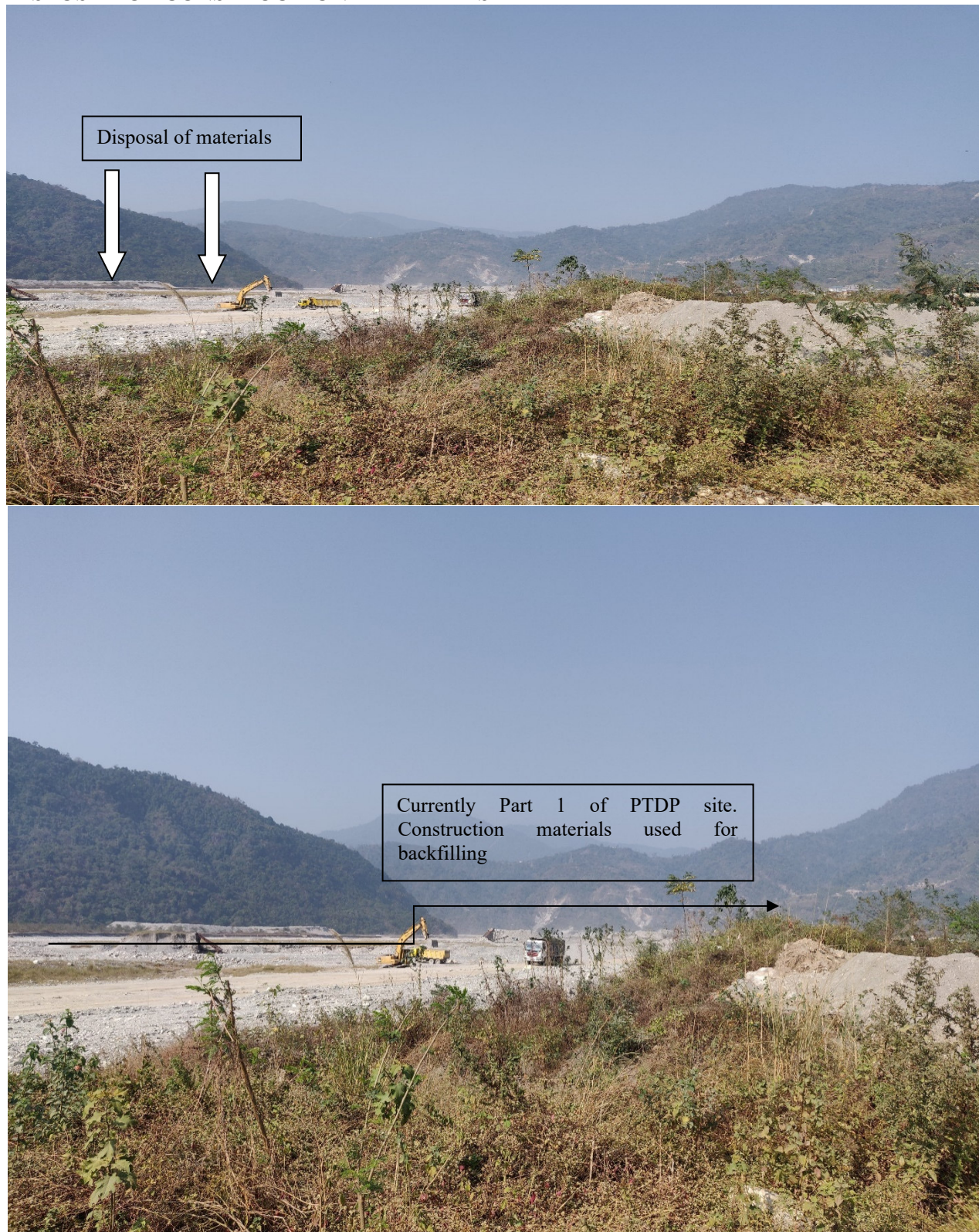








## DISPOSAL OF CONSTRUCTION MATERIALS



## APPENDIX 1: ENVIRONMENTAL CLEARANCE OF NBR



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དཔལ་ལྷན་འབྲུག་གཞུང་།  
**National Environment Commission**  
Royal Government of Bhutan



NECS/ESD/Dzo-Chukha/3477/2017/ 1376

September 27, 2017

### Environmental Clearance

In accordance with Section 34.1 of the Environmental Assessment Act 2000 and Section 34 of the Water Act 2011, this Environmental Clearance (EC) is hereby issued to Dasho Thrompon, Phuentsholing Thromde for the construction of Northern Bypass Road at Phuentsholing Throm under Chukha Dzongkhag with the following terms and conditions:

#### I. General

The holder shall:

1. 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, and The Water Act of Bhutan 2011 and its Regulation 2014;
2. ensure that construction activities are in line with Initial Environmental Examination report submitted for EC;
3. ensure that local communities, properties and any religious, cultural, historic and ecologically important sites are not adversely affected by the activities;
4. restore the damage of any public or private properties caused by the activities;
5. inform NECS 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; and
6. erect a signboard at the take-off point of the main entry of the activities stating the name of the activities and contact address.

#### II. Environmental standards

The holder shall comply with the existing Environmental Standards.

#### III. Import and use of secondhand equipment

The holder shall ensure that import and use secondhand equipment and machineries are strictly prohibited.

#### IV. Water use and management

The holder shall:

1. ensure that activities does not disrupt the 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.



**V. Waste prevention and management**

The holder shall:

1. manage wastes generated from the activities (activity site, labour camps, offices etc.) with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management; and
2. ensure that import and use of hazardous wastes are strictly prohibited.

**VI. Management of excavated materials and run-off**

The holder shall:

1. dispose off excess excavated materials at the pre-identified approved dumpsite only; and
2. put appropriate measures to avoid erosion and landslides.

**VII. Implementation plan**

The holder shall prepare a detailed implementation plan focusing on the implementation of terms and conditions of this EC and submit to NECS within three (03) months from the date of issue of this EC.

**VIII. 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 environment focal person;

**IX. Renewal and modification**

The holder shall:

1. ensure that renewal of this EC is processed at least three (03) months prior to its expiry along with a copy EC and a report on the implementation of its terms and conditions; and
2. obtain prior approval from NECS for any modification to the existing proposal/application.

**Reservation**

1. The NECS may stop the activity or impose additional terms and conditions, as may be deemed necessary; and
2. 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.**







ཀྲུལ་ཡོངས་མཐའ་ལོའོར་གནས་སྤངས་ལྷན་ཆེན།  
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