

Environmental Monitoring Report

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Bhutan: Water Flagship Program Support Project

Prepared by the Project Management Unit, Water Flagship Program Support Project,
Ministry of Infrastructure and Transport, Royal Government of Bhutan for the Asian
Development Bank (ADB).

CURRENCY EQUIVALENTS

(as of 28 July 2023)

Currency unit	–	Bhutanese Ngultrum (Nu.)
Nu.1.00	=	\$ 0.01216
\$1.00	=	Nu.82.2400

ABBREVIATIONS

ADB	-	Asian Development Bank
BoQ	-	bill of quantity
CEMP	-	Contractor's Environmental Management Plan
DBO	-	design-build-operate
DES	-	Department of Engineer Services
EAA	-	Environmental Assessment Act
EC	-	Environmental Clearance
EMP	-	environmental management plan
GESI	-	gender equity and social inclusion
GRC	-	Grievance Redress Committee
GRM	-	grievance redress mechanism
IEE	-	initial environmental examination
JFPR	-	Japan Fund for Prosperous and Resilient Asia and the Pacific
MOWHS	-	Ministry of Works and Human Settlement
MOAF	-	Ministry of Agriculture and Forestry
MOAL	-	Ministry of Agriculture and Livestock
MOIT	-	Ministry of Infrastructure and Transport
NEC	-	National Environment Commission
NECS	-	National Environment Commission Secretariat
NEPA	-	National Environmental Protection Act
NOC	-	no objection certificate
ODS	-	ozone-depleting substance
O&M	-	operation and maintenance
PMSC	-	Project Management and Supervision Consultant
PMU	-	project management unit
PIU	-	project implementation unit
RGOB	-	Royal Government of Bhutan
RP	-	Resettlement Plan
SCADA	-	Supervisory Control and Data Acquisition
SEMP	-	site-specific environmental management plan
SEMR	-	semi-annual environmental monitoring report
SPS	-	safeguard policy statement
WFP	-	Water Flagship Program
WSC	-	Water Sharing Committee
WSD	-	Water and Sanitation Division
WUA	-	Water Users Association

WEIGHTS AND MEASURES

lps liter per second

Dzongkha Terminologies

Dzongkhag	District
Thromde	Municipality
Tsogpa	Village Headman

NOTE

In this report, "\$" refers to United States dollars.

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I. INTRODUCTION

A. OVERALL PROJECT DESCRIPTION AND OBJECTIVES

1. For the Water Flagship Support Project, the ADB approved a loan for \$14 million from ADB's concessional ordinary capital resources, a grant for \$6 million from ADB's Asian Development Fund (ADF 13), and a grant of \$2 million from Japan Fund for Prosperous and Resilient Asia and the Pacific (JFPR) (to be administered by ADB) on 12 December 2022. The loan and grant agreements were signed on 14 December 2022 and become effective on 14 January 2022. The loan and grant closing are on 30 June 2030. The government will contribute \$1.8 million to the investment cost of the project to finance (i) taxes and duties, (ii) land acquisition and resettlement costs, (iii) incremental administration costs, and (iv) contingencies. The total project cost was estimated at \$23.8 million.

2. Impact and outcome. The project will be aligned with the following impacts: (i) sustainable water access achieved and (ii) food self-sufficiency and nutrition security enhanced.¹ The project will have the following outcome: Resilience of residents and farmers to climate and disaster risks strengthened.

3. Output 1: Climate- and disaster-resilient drinking water supply and irrigation infrastructure developed. The project will develop two gravity-fed integrated drinking water supply and irrigation systems in the Hetsotsamchu area (total design capacity 608 liters per second [lps]), and Zhemgang town and villages (total design capacity 250 lps). The project will also develop a drinking water supply system in Thimphu-Pamtsho area to benefit 1,378 households, which will include a new water treatment plant (1.4 million liters per day capacity), and a new district metering area-based distribution network (at least 16 kilometers) with 300 automatic meter reading household connections to improve access to safe and continuous drinking water supply that meets national standards.

4. Output 2: Climate smart water management systems established. The project will establish user-friendly climate smart water management (digital) systems for each of the three schemes established under output 1, which will integrate (i) climate and hydrological information such as rainfall, temperature, and upstream and intake river flow data with (ii) Supervisory Control and Data Acquisition (SCADA) or smart devices such as flow meters, pressure control, and flow valves connected to the infrastructure. These will enable remote real-time monitoring and operation (including automatic control) for early warning and prompt response to extreme events (floods). The systems will also strengthen the overall capacity of local communities to adapt to long-term climate change through improved information for planning and managing water allocation and utilization.

5. Output 3: Capacity, governance, and awareness of inclusive, resilient, and sustainable water management strengthened. To improve resilience, sustainability, and quality of water service delivery, the project will strengthen the capacity of at least 20 staff (at least 33% women) from the MoIT (formerly Ministry of Works and Human Settlement), Ministry of Agriculture and Livestock (formerly Ministry of Agriculture and Forests), municipal units, Dzongkhags, and Thimphu Thromde, in climate resilient and sustainable water service delivery, and their awareness of PPP.² The project will train local communities (200 people at least 33% women and disadvantaged persons) and/or water users associations (WUAs) in rural areas in sustainable operation and maintenance (O&M), asset management, water governance and allocation, and climate adaptation (in synergy with output 2). Service level sustainability plans, with clear responsibilities and financing mechanisms and revenue improvement for O&M, and water and sanitation safety plans will be developed for the schemes. The project will raise

¹ Royal Government of Bhutan, Gross National Happiness Commission. 2019. [Twelfth Five-Year Plan 2018–2023](#). Thimphu.

² Workshops will be held to explain public private partnership (PPP), with examples of successes and challenges in water and agriculture PPPs from other countries, and map out local private sector capacity to participate in PPP.

community awareness (1,500 people at least 50% women and disadvantaged persons) on water resources conservation, integrated water resource management, water, sanitation, and hygiene (including limiting the spread of infectious diseases such as COVID-19), and climate change, to maximize the health and economic impact of the investments in the water supply. Women and adolescent girls will also benefit from tailored awareness-raising programs on menstrual health.

6. Output 4: Solutions for improved and climate resilient farmers' livelihoods introduced. The project will assist farm-level support activities to strengthen farmers' livelihood resilience to climate change and realize economic benefits from irrigation service improvement through crop diversification, production upscaling, processing, marketing, and extension service. This will include tailored training, extension, and mobilization of at least 300 farmers (50% women, youth, and disadvantaged persons) and implementation of a minimum of 10 pilots per irrigation scheme covering key issues for resilient agriculture such as crop diversification (e.g., the combination of food crops and trees), pest control, marketing, local processing to increase shelf-life, and climate smart agriculture applications.

B. ENVIRONMENTAL CATEGORY AS PER ADB SAFEGUARD POLICY STATEMENT 2009

7. The project is being implemented through the following subprojects

- I. Thimphu- Drinking water supply infrastructure development for selected areas (Pamtsho) in the northern section of Thimphu thromde
- II. Hetsotsamchu Integrated drinking water supply and irrigation scheme
- III. Zhemgang- Drinking water to the town and irrigation water to the adjacent villages (Integrated drinking water supply and irrigation scheme)

8. The ADB's Safeguard Policy Statement (SPS) 2009 classifies environmental projects into four categories based on the nature and scale of their potential impacts. Category A encompasses projects with significant, diverse, irreversible, or unprecedented environmental impacts, necessitating an Environmental Impact Assessment (EIA). Category B applies to projects with site-specific, reversible, and moderate impacts that require an Initial Environmental Examination (IEE). Category C includes projects with negligible or no adverse environmental effects, for which formal environmental assessments are not mandatory. Category FI pertains to projects executed through financial intermediaries, where the environmental evaluation depends on the subprojects funded. For all subprojects under SPS 2009, the environmental category has been identified as "B".

C. ENVIRONMENTAL CATEGORY OF EACH SUBPROJECT AS PER NATIONAL LAWS AND REGULATIONS

9. The Bhutan Regulation for Environmental Clearance of Projects 2016 establishes a framework for assessing and managing environmental impacts to promote sustainable development. It categorizes projects into Listed and Non-Listed, with Listed projects screened and cleared by designated competent authorities, while Non-Listed projects are overseen by the NEC Secretariat. Significant Projects demand detailed evaluations like EIA or IEE, guided by NEC sectoral guidelines. The regulation outlines activities requiring clearance, exempted projects, and responsibilities of competent authorities, including annual reporting and compliance monitoring. Drinking water schemes over 10,000 liters/day require Dzongkhag-level clearance, smaller schemes are exempt but must adhere to guidelines, and irrigation channel construction falls under the Department of Agriculture. This categorization ensures alignment with Bhutan's environmental preservation and development goals.

D. PROJECT IMPLEMENTATION ARRANGEMENTS AND SAFEGUARD TEAM OVERVIEW

10. The PMU has designated relevant Engineers as the focal for each subproject. Table 1 details the project safeguards officers.

TABLE 1: PROJECT SAFEGUARD TEAM

#	Name	Designation/Office	Email Address	Contact Number	Roles & Mobilization date
PROJECT MANAGEMENT UNIT					
1	Mr. Sonam Gyeltshen	Engineer, Irrigation Division, MoAL	sgyeltshen@moal.gov.bt	17912108	Irrigation focal for Zhemgang & Social Safeguards Officer
2	Ms. Ugyen Dema	Engineer, Irrigation Division, MoAL	udema@moal.gov.bt	17353290	Irrigation focal for Hetsotsamchu & Environmental Safeguards Officer
3	Ms. Ugyen Yangchen	AE, WSD, MoIT	uyangchen@moit.gov.bt	77659698	Focal link between PMU and Thimphu PIU
4	Mr. KB Rana	AE, WSD, MoIT	kbrana@moit.gov.bt	17110352	Focal link between PMU and Zhemgang PIU
5	Mr. Karma	Principal Engineer, WSD, MoIT	Karma1@moit.gov.bt	17618505	Focal link between PMU and Wangdue Phodrang PIU
PROJECT IMPLEMENTATION UNIT					
THIMPHU SUBPROJECT					
1	Ms. Rinzin Om,	Dy. Chief Forestry Officer, Thimphu Thromde,	env@tto.gov.bt	+975-02-336310	Environment safeguards focal. Mobilized since the resignation of the previous environmental officer Ms.Kelzang Lhamo Dorji in 2023.
2	Mr. Kezang Dorji	Urban Planner, Thimphu Thromde	kezangd@thimphucity.gov.bt	77812324	Social Safeguards Focal. Mobilized in August 2023.
HESOTSAMCHU SUBPROJECT					
1	Mr Kinga Tshering	Asst. Environment Officer	Somchuksonam558@gmail.com	17491489	Environment safeguards focal
2	Mr.Tashi Dorji	Offtg District Planning Officer	tashid@wangduephodrang.gov.bt	17611891	Social Safeguards Focal
ZHEMGANG SUBPROJECT					
1	Mr. Tandin Dorji	Offtg. District Environment Officer	tandin@zhemgang@gov.bt	17610297	Environment safeguards focal
2	Mr. Yeshey Rinzin	Assistant Engineer	yesheeryiqzaay55@gmail.com	17823434	Social Safeguards Focal

E. OVERALL PROJECT AND SUBPROJECT PROGRESS AND STATUS

11. The PMU and the PIUs have been established. The Project management team comprises of the following officers (in addition to those mentioned under Section #4). With the merger of the Irrigation Division, with the DOID of the MoIT, two staff from the Irrigation Division working on Zhemgang and Hetsotsamchu (in addition to the current irrigation focal) have been added to the PMU, as well as a focal for agriculture from the Ministry of Agriculture and Livestock, considering the agricultural development interventions of the project. The members of the Project Steering Committee include the following:

12. Project Management Unit (Executing agency, WSD, DoID, MoIT)

- I. Project Director: Mr. Karma Dupchuk, Director, DoID
- II. Project Coordinator: Ms. Tshering Chhoden, Offtg. Chief Engineer, WSD
- III. Project Manager: Ms. Chimi Dema, Dy. EE, WSD
- IV. Accountant: Mr. Yad Bdr. Rai, Accountant, Finance Section
- V. Irrigation focal for both projects: Mr. Thinley Gyamtsho, Specialist, Irrigation Division
- VI. Agriculture focal (MOAL): Mr. Tsheltrim, Dy. Chief Agriculture Officer
- VII. GESI Focal person: Mr. Pema Rabgay, PPD, MoIT

13. Project Implementation Unit (Thimphu Thromde)
 - I. Project manager: Mr. Yeshey Wangdi (Chief Engineer, Infrastructure Division)
 - II. Project Coordinator: Mr. Ngawang Tashi, Executive Engineer
 - III. Project engineer: Mr. Pema Tashi, Engineer & Mr. Thukten Thinley, Engineer
 - IV. GESI focal person: Ms. Phub Dem, Legal Officer
14. Project Implementation Unit (Zhemgang)
 - I. Project manager: Mr. Luv Kumar Chettri, Chief Dzongkhag Engineer
 - II. Project engineer: Mr. Yeshey Rinzin, Assistant Engineer
 - III. GESI focal person: Mr. Prem Lal Sharma, Asst. District Agriculture Officer
15. Project Implementation Unit (Wangdue Phodrang)
 - I. Project manager: Mr. Nidup Tshering, Officiating District Engineer
 - II. Project engineer: Mr. Singay Dorji, Asst. Engineer
16. The Project Steering Committee was instituted vide order # MoIT/DoID/WSD/WFP-39/2022-2023/1210 on 15/06/2023.
17. The PMU and PIUs are being supported by the PMSC, which was engaged by the project in February 2024 for a duration of 42 months.

F. DESCRIPTION OF SUBPROJECTS (PACKAGE-WISE) AND STATUS OF IMPLEMENTATION (PRELIMINARY, DETAILED DESIGN, ON-GOING CONSTRUCTION, COMPLETED, AND/OR O&M STAGE)

18. DB-01-Design, build and Operate of Water Treatment Plant for Thimphu Pamtsho with 2-year O&M -The contract was awarded on 8 August 2023 with site possession on 17 August. The work is expected to be complete by 18 April 2025.
19. CW-01-Construction of Distribution Network for Pamtsho, Thimphu- The contract was awarded on 16 August 2023 to Bhutan Engineering Co. Pvt. Ltd (BEC) and work commenced from 18 August. The project is for a duration of 20 months up to 18 April, 2025. The work involves pipelaying for 24.6km (DI-5.4km and HDPE pipes 14.2km). 86.53% of the physical work progress has been achieved during the reporting period.
20. CW-02: Starting on 9th September 2024 and scheduled to conclude by 8th September 2026, this 24-month project undertaken by M/s Construction Development Corporation Limited (CDCL) is currently 0.33% complete. The scope includes a variety of tasks such as survey, contouring, geotechnical studies, and various earthworks and pipe works for the intake and main transmission line. It also encompasses the construction of a raw water main line, rehabilitation of the existing water treatment plant, and the setup of laboratory equipment. Further tasks include building a distribution network for Zhemgang town, constructing two RCC service reservoirs/BPT (50 cubic meters), developing an irrigation distribution system and pipes, installing sprinkler and drip irrigation systems, and implementing SCADA. Additionally, the project covers operation and maintenance, supply of equipment and tools, occupational health and safety measures, and provision of temporary living accommodation.

TABLE 2: STATUS OF ALL SUBPROJECTS/PACKAGES

Package/ Subproject	Subproject / Package components	PIU	Current Status	Bid / contract type
DB-01-Design, build and Operate of Water Treatment Plant	(i) Construction of administrative building (ii) Construction of staff quarters building (iii) Construction of Water Treatment Plant for	Thimphu Thromde	Under implementation	DBO

Package/ Subproject	Subproject / Package components	PIU	Current Status	Bid / contract type
for Thimphu Pamtsho with 2- year O&M				
CW-01- Construction of Distribution Network for Pamtsho, Thimpu	(i) Topographic survey (ii) Purchase of pipes of all diameters recommended as per design. (iii) Excavation works for the pipe trenches continued in the quarter. (iv) Installation of mainline pipes in trenches		Under implementation	Works
CW-02- Construction of Integrated drinking water and irrigation for system for Zhemgang including 2 years O&M	(i) Survey, geo-technical investigation, and miscellaneous items (ii) Irrigation (iii) Drinking water supply system rehabilitated and improved (iv) Irrigation efficiency improved (v) Design, supply and installation of instrumentation, SCADA system (vi) Operation and Maintenance for 2 years (vii) Supply of equipment, tools and spares	Zhemgang Dzongkhag	Construction work begin by late 2024.	Works
DB-02: Construction of integrated drinking water and irrigation system for Hesotsamchu including 3 years O&M	(i) Topographic survey (ii) Purchase of pipes of all diameters recommended as per design. (iii) Excavation works for the pipe trenches continued in the quarter. (iv) Installation of mainline pipes in trenches	Wangdue Phodrang Dzongkhag	Bid preparation for design work is being discussed whether it will be done in house or contracted out in the form of DBO.	DBO not yet finalized
CW-03: Efficiency and resilience improvement for irrigation and drinking water supply (distribution) in Hesotsamchu scheme	(i) Topographic survey (ii) Purchase of pipes of all diameters recommended as per design. (iii) Excavation works for the pipe trenches continued in the quarter. (iv) Installation of distribution pipes in trenches		Bid document preparation	Works – yet to start
G-01-Design, Supply and Install and Operation of Climate Smart Water management system including 3-year O&M	(i) Supervisory Control and Data Acquisition (SCADA) or smart devices such as flow meters, pressure control and flow valves connected to the infrastructure. (ii) Climate and hydrological information such as rainfall, temperature, and upstream and intake river flow data	All three PIUs	Detailed design	Works – yet to start

TABLE 3 STATUS OF ACTIVITIES

Package	Package status: 1. Date of Award 2. Date of mobilization 3. Scheduled completion 4. Duration 5. Contractor	Design progress to date	Construction progress to date	Works conducted during the reporting period
DB-01	1. 7-Aug-2023 2. 17-Aug-2023 3. 17-Feb-2025 4. 18 months 5. M/s EW Construction Pvt. Ltd. & Granus Water and Environmental Solution Pvt. Ltd.(JV)	100%	71.56%	<ul style="list-style-type: none"> • Site mobilization • Topographical survey of WTP location • Geotechnical exploration • Sampling and raw water quality analysis • Preliminary design • Designs and drawings of staff quarter • Construction of stilling chamber and staff quarter
CW-01	1. 8-Aug-2023 2. 4-Sep-2023 3. 18-April-2025 4. 18 months 5. M/s Bhutan Engineering Company Pvt. Ltd.	100%	86.53%	<ul style="list-style-type: none"> • Site mobilization • 100% complete - Surveying and layout of main transmission line from Dechencholing WTP till Samtenling, including location of two reservoir tanks • 91% complete of all type DI pipe trenching and laying • Dismantling works for the pre-sedimentation tank • 100% of all type of trenching & laying HDPE pipes
CW-02	1. 9-Sep-2024 2. 8-Sep-2026 3. 24 months 4. M/s Construction Development Corporation Limited (CDCL)	Partly complete	0.33%	<ul style="list-style-type: none"> • Survey, contouring and as built drawing • Geotechnical studies • Intake & main transmission line earthworks • Intake & main transmission line – pipe works • Construction of Raw Water Main Line and Rehabilitation of existing WTP • Laboratory equipment • Distribution network for Zhemgang town • Construction of 2No. RCC Service Reservoir/BPT (50cum) • Irrigation distribution system (Civil Works) • Irrigation distribution pipes and miscellaneous works • Irrigation sprinkler and Drip irrigation • Design, supply, installation, testing and commissioning of SCADA • Operation and maintenance • Supply of equipment and tools • Occupational Health & Safety • Temporary Living Accomodation

DB-02-Construction of integrated drinking water and Irrigation system for Hesotsamchu including 3 years O&M

21. The Bid Submission date was re-scheduled, and the actual dates related to Procurement activities, including Updated dates have been reflected in Procurement schedule monitoring sheet of the Quarterly Progress Report.

22. Discussions are ongoing between the PMSC design experts and PMU to decide the contract award modality for the Wangdue sub-project. It is being debated whether to award the contract entirely as DBOT or partially. Meanwhile, the integrated water and irrigation system

design for Hesotsamchu is almost complete, thanks to the PMU's in-house design experts. The PMSC design experts caution against awarding the contract as DBOT, including the design component to a contractor, as it has led to inferior designs in the past and may take considerable time to meet client expectations.

Project Management and Supervision Consultants (PMSC)

23. The PMSC was recruited in February 2024 and will provide assistance to the PMU and PIU for project management and implementation as well as compliance monitoring for environmental and social safeguards for 42 months.

II. ENVIRONMENTAL COMPLIANCE MONITORING

A. COMPLIANCE WITH RECOMMENDATIONS FROM PREVIOUS SEMR

25. Status of the safeguard compliance issues flagged in the previous SEMR:
- I. The Grievance Redress Mechanism (GRM) requires contractors to display contact numbers of their respective focal persons. However, it has been noted that for both the DB-01 and CW-01 packages, the focal persons' contact numbers are missing from the signage. Both contractors are required to include these numbers immediately and be monitored by Thromde/PIU. Both the DB-01 and CW-01 contractors have fully complied by adding the contact numbers of their focal persons to their respective signboards.
 - II. There is also no written code of conduct, workers' complaint register, or record of accidents/injuries, necessitating immediate preparation and briefing by both contractors under PIU's supervision. The contractors' have not complied since they have not prepared the code of conduct for labourers.
 - III. It was noticed that the quality of drinking water at the project sites has not been tested for the reporting period of January – June 2024. However, the CW-01 contractor has conducted basic tests for four parameters (BOD, COD, TSS, and pH) at two locations. The DB-01 package has not carried out water quality tests for this period. Upon discussions with the contractors, the reason for not conducting water quality tests is that the water is sourced from the Municipal Water Supply, which is treated and regularly monitored by the municipality. Therefore, no additional tests have been done. Previous water quality tests indicate that the water quality is good and safe for drinking.

B. COMPLIANCE WITH NATIONAL STATUTE AND REGULATIONS

26. The contract document for the project has been carefully designed to align with all national laws and regulations related to construction projects. It includes and integrates various acts, policies, rules, regulations, and guidelines to ensure that the contractor is required to follow these standards by implementing Environmental Management Plans (EMPs).

27. The DB-01 and CW-01 packages (Thimphu subproject) received Environmental Clearances (ECs) from the Department of Environment and Climate Change (DECC), formerly known as the National Environment Commission (NEC), on 6 October 2024.

28. The CW-02 (Zhemgang subproject) package received Environmental Clearance (EC) on 29 January 2024, which is valid for one year, until 28 January 2025. The Project Implementation Unit (PIU) in Zhemgang must process the renewal of the EC before the existing clearance expires.

29. The DB-02 (Wangdue subproject) is still in the design stage, and the Initial Environmental Examination (IEE) has not been finalized for submission to the Department of Environment and Climate Change (DECC) to obtain the Environmental Clearance (EC).

TABLE 4: STATUS OF COMPLIANCE WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

S#	Compliance Requirements	Status by Contract packages – DB-01, CW-01, CW-02 & DB-02	Remarks
GENERAL			
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 2012 (Amendment 2016), The Water Act of Bhutan 2011 and its Regulation 2014 and Revised Regulation on the Substances that Deplete the Ozone layer and Hydrofluorocarbons (HFCs) 2021.	The compliance is being monitored by the PIU Environmental focal, PMSC Site Engineer and Environment Specialist. DB-01, CW-01 & CW-02 – Being Complied. DB-02 – yet to be implemented	-
2	The holder shall ensure that execution of the project is in line with the Initial Environmental	Construction activities are in accordance with IEEs for DB-02.	-

S#	Compliance Requirements	Status by Contract packages – DB-01, CW-01, CW-02 & DB-02	Remarks
	Examination and Environmental Impact Assessment reports submitted for EC.		
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	There have been no reports till date about (DB-01, CW-01 & CW-02) project activities affecting local communities, properties, and any religious, cultural, historic and ecologically important sites.	Distribution line laying
4	The holder shall restore the damage of any public or private properties caused by the development and operation of the project.	No damage is caused to public or private properties due to the project activities.	-
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	No such materials were found.	-
6	The holder shall erect a signboard at the take-off point of the main entrance of the activities stating the name of the project and contact address	Sign boards are installed at strategic locations for DB-01, CW-01 & CW-02.	DB-02 is yet to be implemented
7	Ensure that a copy of the environmental clearance is framed and displayed at the workplace.	A copy of the EC is displayed in the project office.	-
ENVIRONMENTAL STANDARDS			
1	The holder shall comply with the existing Environmental Standards	Environmental Standards are adhered to strictly except for DB-02	
IMPORT AND USE OF OZONE DEPLETING SUBSTANCES (ODS)			
1	The holder shall ensure that import and use of Ozone Depleting Substances and the Hydrofluorocarbons (HFCs) as per the Revised Regulations on the Substances that deplete the Ozone Layer and HFCs 2021.	No such substances were imported by the project.	-
PROTECTION AND MANAGEMENT OF WATER RESOURCES			
1	The holder shall ensure that proposed activity does not disrupt the water flow and pollute the water bodies.	No water bodies are affected by the project activities.	-
WASTE PREVENTION AND MANAGEMENT			
1	The holder shall manage wastes generated from the project (project site, labor camps, offices, etc.) with the application of 4R (Reduce, reuse, recycle, responsibility) principle and other environmentally friendly methods of waste management.	The project practices waste segregation at source. Recyclables such metal scraps, PET bottles, glass bottles are sold to scrap dealer. The non-biodegradable rubbish is disposed to the thromde landfill. Organic wastes are collected by Thromde separately to process into organic manure.	DB-02 is yet to be implemented
2	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 wastes were not generated.	-
3	Ensure that wastes are stored in proper designated sheds prior to disposal/dispatch	No need for waste sheds in Thimphu as waste collections are regularly. For CW-02, waste shed requirement will be assessed and will be constructed if required.	
MANAGEMENT OF EXCAVATED MATERIALS AND RUN-OFF			
1	The holder shall dispose of excess excavated materials at the pre-identified approved dumpsite only	All excavated materials are entirely reused for backfilling, leaving no surplus. This is particularly relevant to the CW-02 and DB-02 packages, which focus on constructing integrated drinking water and irrigation systems requiring larger pipelines. However, the implementation of DB-02 has not yet begun.	During the reporting period, the Zhemgang sub-project CW-02, focused on the integrated drinking water and irrigation scheme, was in the initial stages of construction. No spoil generation was observed during this time; however, it is anticipated in the next reporting period.
2	The holder shall put appropriate measures to avoid erosion and landslides	There is no risk of erosion and landslide due to surface runoff at the subproject site of CW-01 & DB-01. But there is high risk of erosion during the implementation of CW-02 package.	The design of CW-02, particularly for the distribution network, is actively underway,

S#	Compliance Requirements	Status by Contract packages – DB-01, CW-01, CW-02 & DB-02	Remarks
			incorporating measures to address potential erosion and landslides. Upon completion of the design, the IEE and EMP will be revised and updated accordingly.
MONITORING			
1	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.	Day to day monitoring of compliance with EC terms and conditions are ensured through i) Daily monitoring of work sites by contractor's SE Manager and site safeguard supervisors; ii) periodic and random monitoring by PMU/PIU Environmental Manager and PMSC Environmental expert.	-
2	The holder shall maintain proper records on wastes generated and its management, stating types of wastes, quantities and characteristic and submit to NECS annually.	The compliance report for CW-01 and DB-01 was submitted to the Department of Environment and Climate Change (DECC). The report for CW-02 will also be submitted.	-
IMPLEMENTATION PLAN			
1	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	Detailed Implementation Plan for CW-01 & DB-01 was submitted while for CW-02 & DB-02 are yet to be submitted.	CW-02's detailed implementation will be submitted in the upcoming quarter.
RENEWAL AND MODIFICATION			
1	The holder shall 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 as per the format attached and payment of prescribed renewal application fee, failing which the applicant shall be liable for penalty as per the RECOP 2016.	The EC for DB-01 and CW-01 are valid until 5 October 2025, providing ample time for the completion of both packages. The EC for CW-02 is valid until 25 January 2025 and must be renewed before the expiration date.	The EC for CW-02 for another 12 months as required.
2	The holder shall obtain prior approval from NECS for any modification to the existing proposal/application including, but not limited to, increase in production capacity, change in location of the project, change in ownerships, etc.	During the project implementation, there were minor design changes, such as transmission alignment adjustments for CW-01, and the IEE has been updated accordingly. Similarly, the alignment for the distribution lines for CW-02 is likely to change as the design is finalized, and the IEE will be updated.	Distribution network design for CW-02 is expected to be completed by May 2025.
RESERVATIONS			
1	The NECS may stop the activity or impose additional terms and conditions, as may be deemed necessary	No such action was taken by the DECC.	-
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	No modifications to the EC have been issued by DECC.	-
3	The holder may adopt best practices in executing these terms and conditions to avoid adverse environmental impacts.	The project has mechanism and facilities in place to comply with environmental standard and safeguards.	-

C. COMPLIANCE WITH ENVIRONMENTAL LOAN COVENANTS

30. The status of the environmental loan covenants is presented in the following table.

TABLE 5: STATUS OF COMPLIANCE WITH ENVIRONMENTAL LOAN COVENANTS

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance
Schedule 4. Execution of Project: Financial Matters. 3. Conditions for award of Contract	The Borrower shall not award any Works contract that involves environmental impact until the Project Executing Agency has a) obtained the final approval of the IEE for such works from the Borrowers NEC. b) incorporated the relevant provisions from the EMP into the relevant works contract.	Complied for Thimphu subproject Being complied for the other sub-project
Para 4.	The Borrower may award a works contract involving environmental impacts with its respective IEE on preliminary design having been cleared to and cleared by ADB if the contract (a) is of 'design and build' or 'turnkey' b) expressly provides the installation and construction phase (and commencement thereof) is conditional upon (i) a final RP for the works contract detailed design having been submitted to and cleared by ADB, (ii) the Borrower having notified ADB and the contractor in writing that due consultation has been carried out, all required physical and/or economic displacement has been completed, and compensation and other entitlements have been provided to affected people in accordance with the RP.	Complied for Thimphu subproject Being complied for the other sub-project
Safeguards Environment. Para 7.	The Borrower shall ensure, or cause each subnational government 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 Borrower relating to environment, health and safety; (b) the environment safeguards, and (c) all measures and requirements set forth in the IEE, the EMP, and any corrective measures or preventive actions set forth in a Safeguards Monitoring Report.	Being complied
Human and Financial Resources to Implement Safeguard Requirements. Para 11.	The Borrower shall make available necessary budgetary and human resources to fully implement each EMP and RP	Being complied
Safeguards-Related Provisions in Bidding Documents and Works Contracts Para 12.	The Borrower shall ensure, or cause each Subnational Government to ensure, that all bidding documents and contracts for Works contain provisions that require Contractors to: (a) comply with the measures and requirements relevant to the contractor set forth in each IEE, EMP, and RP (to the extent they concern impacts on affected people during construction), and any corrective or preventative actions set forth in a Safeguards Monitoring Report (b) Make available a budget for all such environment and social measures. (c) provide the Borrower and the relevant Subnational Government, with a written notice of any unanticipated environmental, resettlement or indigenous peoples risks or	Being complied for all sub-projects

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance
	<p>impacts that arise during construction, implementation or operation of the Project that were not considered in the relevant IEE, EMP or RP.</p> <p>(d) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction, and fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon completion of construction.</p>	
Safeguards Monitoring and Reporting Para 13.	<p>The Borrower shall do the following, or shall cause each Subnational Government to do the following:</p> <p>(a) Submit semi-annual Safeguards Monitoring Reports to ADB and disclose relevant information from such reports to affected persons promptly upon submission</p> <p>(b) If any unanticipated environmental and/or social risks and impacts arise during the construction, implementation or operation of the Project that were not considered in the relevant IEE, EMP or RP, promptly inform the ADB of the occurrence of such risks and impacts, with detailed description of the event and proposed corrective action plan; and</p> <p>(c) Report any actual or potential breach of compliance with measures and requirements set forth in any EMP or RP promptly after becoming aware of the breach.</p>	Being complied
Prohibited List of Investments Para 14.	<p>The Borrower shall ensure, or cause each Subnational Government to ensure, that no proceeds of the Loan are used to finance any activity included in the list of prohibited investment activities provided in Appendix 5 of the SPS</p>	Being complied
Labor Standards, Health and Safety. Para 15.	<p>The Borrower shall ensure, or cause each Subnational Government to ensure, that that core labor standards, the Borrowers applicable laws and regulations, and any applicable laws and regulations of any Subnational Government, are complied with during Project implementation. The Borrower shall include specific provisions in the bidding documents and contracts financed by ADB under the Project requiring that contractors, among other things: (a) comply with the Borrowers applicable labor laws and regulations, and any applicable laws and regulations, and incorporate applicable workplace occupational safety norms; (b) do not use child labor; (c) do not discriminate workers in respect of employment and occupation; (d) do not use forced labor; (e) allow freedom of association, and effectively recognize the right to collective bargaining; and (f) disseminate information on the risks of sexually transmitted diseases, including HIV/AIDS, to the employees of contractors engaged under the Project and to members of the local communities surrounding the Project area, especially women.</p>	Being complied
Para 16.	<p>The Borrower shall strictly monitor compliance with the requirements set forth in paragraph 15 above and provide ADB with regular reports.</p>	Being complied

1. STATUS OF IEE REPORTS

31. The status of the IEE reports is presented in the following table.

Package	Status of draft IEE	Draft IEE included in bid and contract	Updated / final IEE		
			Requirement	status	Provided to contractor
CW-01 – Construction of Distribution Network for Pamtsho, Thimphu	Prepared, cleared by ADB and disclosed https://www.adb.org/projects/documents/bhu-42173-017-iee-0	Yes	Required if there are any changes during implementation	Due to some changes in the alignment of the main trunk or transmission line. IEE will be updated accordingly.	Yes Updated IEE/EMP will be provided
DB-01-Design, build and Operate of Water Treatment Plant for Thimphu Pamtsho with 2-year O&M		Yes	Required based on detailed design and any further changes during implementation	Designs are in progress, IEE will be updated	Yes
CW-02 – Construction of Integrated drinking water and irrigation for system for Zhemgang including 2 years O & M		Yes	Required based on detailed design and any further changes during implementation	Design is finalized	Selection of the contractor is yet to be finalized

D. COMPLIANCE WITH ADB REVIEW MISSION RECOMMENDATIONS

1. ADB MISSION'S SAFEGUARD COMPLIANCE ISSUES OF THIMPHU SUBPROJECTS:

32. Safeguard Compliance Issues Observed and Recommendations by the ADB Mission during its Visit to the Thimphu Sub-projects from 3-5 November 2024:

1. There is an absence of a labour attendance register by both contractors (CW01 & DB01). Proper attendance records must be maintained by both contractors. All workers should be eligible for at least one day of paid leave per week. The monthly attendance register must be verified by the safeguard specialists.
2. The first aid box is kept only at the contractor's site office with none at the 1.4 MLD intake construction site, located nearly 9 km away. ADB advised the contractor that maintaining a separate, well-equipped first aid box at the construction site is essential.
3. Following the flash flood events on 10 August 2024, which destroyed both the existing 1 MLD intake structure and the 1.4 MLD intake structure under construction, the ADB mission expressed the need for emergency contact tags and blood type information for construction workers to ensure proper care during emergencies.
4. Proper maintenance of an accident/incident register is required at the construction sites for both contractors (CW-01 and DB-01 packages). The incident/accident register needs to be closed monthly, regardless of whether there are incidents, and verified by the safeguard specialists.
5. Provision and proper usage of personal protective equipment (PPE) are necessary. Workers at the intake construction site of the CW-01 package were not provided with

hand gloves despite working with steel rods, and the helmets were not properly used as the straps were hanging loose instead of being strapped below the chin for secure mounting.

6. There is a lack of amenities for workers at the intake construction site (CW-01 package). Workers are exposed to the elements with no shelters in bad weather. Therefore, the ADB mission advised the contractor to construct proper shelters for workers to have a place to sit, rest, and eat lunch without worrying about the weather.
7. Proper storage of construction materials is required for workers' safety. The ADB mission observed the haphazard stacking of construction materials, which could impede workers' movement and cause accidents. Contractors were advised to maintain proper housekeeping by neatly storing and stacking construction materials at the work sites. Additionally, advice on fuel storage to avoid fire accidents was provided, suggesting contractors bring only the required amount of fuel to avoid storage issues.
8. Hazardous working practices observed at DB-01, including unsupported deep excavations and the movement of heavy equipment on overburden.
9. Proper maintenance of construction equipment. The ADB mission observed poorly maintained construction machinery at the CW-01 intake construction site. To prevent any unwanted injuries during the operation of the machinery, the contractor was advised to properly cover the exposed parts of the machinery.
10. The grievance redress mechanism (GRM) needs to be properly recorded. Contractors were advised to compile grievances monthly, which must be verified and closed by the safeguard specialists at the end of each month.

2. SAFEGUARD ISSUES COMPLIANCE IMPLEMENTATION MEETING WITH CONTRACTORS

33. As a follow-up for the safeguard compliance implementation, the environmental and gender/social specialists held a meeting with the contractors of the Thimphu subproject's DB-01 and CW-01 contract packages on 6 November 2024. The contractors were asked to provide schedules for implementing the ADB mission's safeguard issues observations and subsequent recommendations. In return, the contractors requested at least 10 days to implement all nine of the ADB mission's recommendations.

3. SAFEGUARD ISSUES COMPLIANCE IMPLEMENTATION MONITORING

34. Compliance Monitoring of the implementation of the ADB Mission's Safeguard Recommendations on 19 and 26 December 2024:

Compliance Issue 1: Attendance Register

35. There is an absence of a labour attendance register by both contractors (CW01 & DB01). Proper attendance records must be maintained by both contractors. All workers should be eligible for at least one day of paid leave per week. The monthly attendance register must be verified by the safeguard specialists.

Compliance status: Fully Complied

36. DB-01 and CW-01 contractors complied with the ADB mission's recommendations by updating and maintaining proper attendance registers in line with the Labour and Employment Act of Bhutan 2007. Workers are provided one day paid leave as recommended. Key observance by the Gender Expert was the recruitment of one female employee by DB-01 package as OHS officer while there were none under the CW-01 package.

Compliance Issue 3: Emergency Information

39. Following the flash flood events on 10 August 2024, which destroyed both the existing 1 MLD intake structure and the 1.4 MLD intake structure under construction, the ADB mission expressed the need for emergency contact tags and blood type information for construction workers to ensure proper care during emergencies.

Compliance status: Partially Complied

40. The CW-01 contractor partially complied with this recommendation by providing name tags to the intake construction site workers. Upon review by the safeguard specialist, it was found that the name tags included the worker's name, sex, and emergency contact number but lacked blood type information, which is crucial during emergencies. The contractor was advised to enhance the name tags by converting them into badges sewn onto the workers' reflective jackets. This measure ensures that the badge remains with the individual, even during mishaps.

FIGURE 3: EMERGENCY INFORMATION FOR WORKERS IN HAZARDOUS AREAS



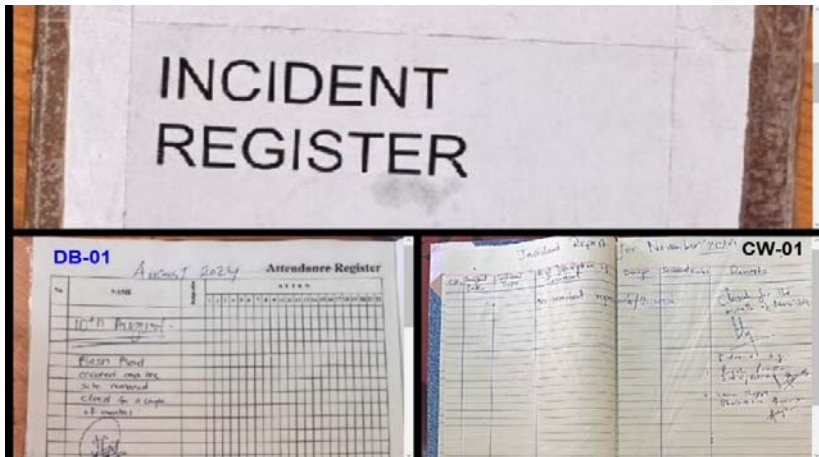
Compliance Issue 4: Incident/Accident Register

41. Proper maintenance of an accident/incident register is required at the construction sites for both contractors (CW-01 and DB-01 packages). The incident/accident register needs account the daily incidences, accidents and even a near misses. This accident register needs to be closed monthly, regardless of whether there are incidents, and verified by the safeguard specialists.

Compliance status: Fully Complied

42. Both contractors of CW-01 and DB-01 have fully complied by maintaining the incident registers. Fortunately, there have been no reports of incidents, accidents, or near misses since the registers have been maintained for both contract packages. The registers were closed monthly and verified by the safeguard specialists.

FIGURE 4: INCIDENT REGISTERS OF DB-01 AND CW-01



Compliance Issue 5: Personal Protective Equipment (PPE)

43. Provision and proper usage of personal protective equipment (PPE) are necessary. Workers at the intake construction site of the CW-01 package were not provided with hand gloves despite working with steel rods, and the helmets were not properly used as the straps were hanging loose instead of being strapped below the chin for secure mounting. ADB mission recommended that the provision of PPE and their proper usage have to strictly adhered to by both the contractors.

Compliance status: Fully Complied

44. All basic PPE equipment, including helmets, reflective jackets, and sturdy hand gloves for those working with abrasive items, were provided to the workers. Safeguard specialists checked that helmets were properly worn with the straps secured for the safety of the workers. It was observed that the laborers were wearing the helmets correctly. Contractors were advised to regularly inspect the proper usage of PPEs.

FIGURE 5: PPE PROVISIONS AND USAGE



Compliance Issue 6: Amenities for workers

45. There is a lack of amenities for workers at the intake construction site (CW-01 package). Workers are exposed to the elements with no shelters in bad weather. Therefore, the ADB mission advised the contractor to construct proper shelters for workers to have a place to sit, rest, and eat lunch without worrying about the weather.

Compliance status: Fully Complied

46. The CW-01 contractor complied by providing a proper rest area at the work site as recommended. The contractor was instructed to maintain these amenities until the completion of the construction works, as the site experiences intense breezes and cold waves during the winter months.

FIGURE 6: RESTING SHED PROVIDED AT THE INTAKE CONSTRUCTION SITE OF CW-01 PACKAGE



Compliance Issue 7: Storage of Construction Materials

47. Proper storage of construction materials is required for workers' safety. The ADB mission observed the haphazard stacking of construction materials, which could impede workers' movement and cause accidents. Contractors were advised to maintain proper housekeeping by neatly storing and stacking construction materials at the work sites. Additionally, advice on fuel storage to avoid fire accidents was provided, suggesting contractors bring only the required amount of fuel to avoid storage issues.

Compliance status: Fully Complied

48. Both the DB-01 and CW-01 contractors complied with this safeguard requirement. The construction materials were properly stacked and neatly stored within the construction areas. Contractors were asked to maintain proper storage and site cleanliness to prevent injuries and accidents.

FIGURE 7: CONSTRUCTION MATERIAL STORAGE CONDITIONS OF DB-01 AND CW-01 CONSTRUCTION SITES



Compliance Issue 8: Unsafe Working Practices at DB-01

49. Ensure proper support for deep excavations exceeding 1 meter and adhere to standard, safe construction practices.

Compliance status: Fully Complied

50. Following the recommendations, the contractor secured the unsafe site, allowing wall construction to proceed diligently and be completed without any safety concerns.

FIGURE 8: UNSAFE BREAST WALL HAS BEEN CORDONED OFF AND COMPLETED WITHOUT ANY SAFETY ISSUES



Compliance Issue 9: Non-clearance of debris at CW-01

51. Clear the debris from the site and dispose it in identified site or reuse in construction purposes.

Compliance status: Fully Complied

As recommended, the contractor has cleared all the debris from the chamber construction sites. Therefore, it has complied with the safeguard recommendation.

Compliance Issue 10: Unsafe hill track and stream crossing

52. The CW-01 pre-sedimentation tank work site is accessible via a hill track from the monastery road. While workers use this path to carry heavy loads and equipment manually, the lack of proper access makes it unsafe.

Compliance status: Fully Complied

53. Access along the existing track was improved without cutting trees or disturbing the landscape. Debris was cleared using an excavator, and handrails were installed at the stream crossing to enhance safety.

FIGURE 9: STREAM CROSSING TO CW-01 INTAKE SITE BEFORE AND NOW



Compliance Issue 10: Maintenance of Construction Equipment and Machinery

54. Proper maintenance of construction equipment. The ADB mission observed poorly maintained construction machinery at the CW-01 intake construction site. To prevent any unwanted injuries during the operation of the machinery, the contractor was advised to properly cover the exposed parts of the machinery.

Compliance status: Fully Complied

55. As recommended, the contractor has completed the required maintenance and covered the exposed parts of the cement, sand, and aggregate mixture machine. Therefore, it has complied with the safeguard recommendation.

FIGURE 10: CONDITION OF CONSTRUCTION EQUIPMENT DURING ADB MISSION VISIT AND COMPLIANCE MONITORING



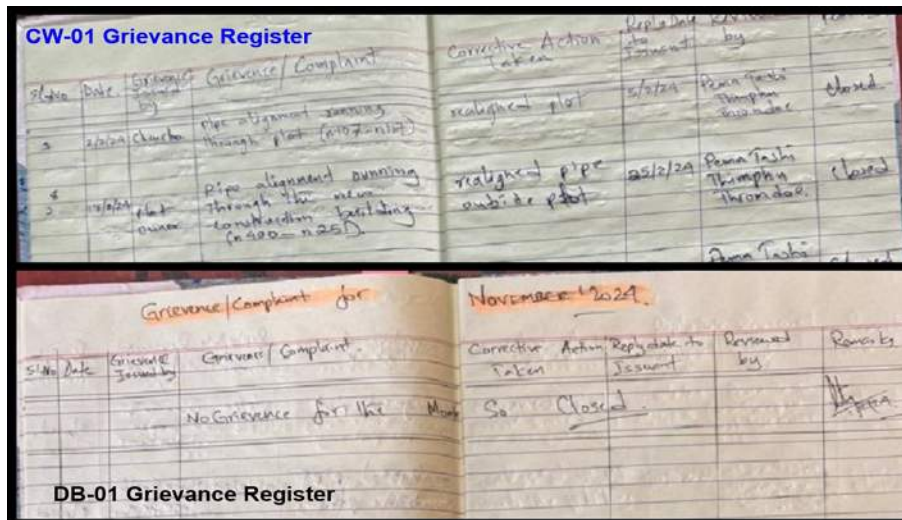
Compliance Issue 11: Grievance Redress Mechanism (GRM)

56. The grievance redress mechanism (GRM) needs to be properly recorded. Contractors were advised to compile grievances monthly, which must be verified and closed by the safeguard specialists at the end of each month.

Compliance status: Fully Complied

57. As recommended, the contractors have maintained the grievance register. Therefore, they have complied with the safeguard recommendation.

FIGURE 11: GRIEVANCE REDRESS REGISTERS OF DB-01 AND CW-01 PACKAGES



E. COMPLIANCE WITH ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

58. Monthly site-specific EMPs are prepared and monitored by the respective contractors at the site for Packages I, II, III & IV. The compliance status of Package I, II, III and IV are provided in Table 5. Note that Package IV is still under design stage and yet to be tendered.

TABLE 6: COMPLIANCE STATUS OF THE EMP IMPLEMENTATION FOR PACKAGE I, II, III & IV.

Sl. No.	Activity	Mitigation Measures	Compliance (Yes/No/Partial) *			
			DB-01	CW-01	CW-02	DB-02
1	Land Acquisition	<ul style="list-style-type: none"> Undertake assessment for involuntary resettlement per ADB SPS requirements. Prepare resettlement plan, if required. 	NA	Yes	-	-
2	Extreme weather events	<ul style="list-style-type: none"> Integrate in the subproject design appropriate climate change adaptation measures, such as, but not limited to, use of structural arrangements, construction methods, and/or materials designed to withstand future climate-related changes such as flooding due to extended monsoon seasons and increased level of precipitation, droughts, and increased global temperature, among others. Integrate in the subproject design a user-friendly climate smart water management (digital) system envisaged under Output 3 of the project. 	Yes	Yes	Yes	-
3	Source sustainability and seasonal water availability	<ul style="list-style-type: none"> Identification of other sources that could augment raw water supply in case flow from the main intake source becomes insufficient. Assessment for competing water use in the future to determine the appropriate allocation of water in case of shortage 	Yes	Yes	Yes	-
4	Biological Corridor and Government Reserve Forests	<ul style="list-style-type: none"> Ensure to include in the bidding and contract documents for works at the intakes and transmission mains the necessary requirements and construction methodologies that will avoid or at least minimize change the natural conditions in the area, such as the following: Avoid establishing storage sites or workers' camps within the biological corridor or government reserve forest; Depth of excavation, if any, for the raw water transmission mains shall be not too deep and shall only be sufficient enough to protect the pipes. This will minimize production of spoils and shorten the construction period; Develop a spoil management plan (SMP) to ensure proper disposal of excess excavated materials, which include disposal to pre-identified disposal site. The SMP shall be submitted to and approved by the PIU; Identify appropriate disposal site for other construction debris/wastes to avoid indiscriminate dumping of these into the streams or rivers; Provide training to workers on awareness with the laws and penalties governing illegal felling of trees; For any felling of trees covered under the subproject, compensate through replantation or afforestation which involves providing budget Restore all heavily modified areas within the biological corridor and government reserve forests after construction works, particularly in steep sections, to ensure no induced landslides occur in the future. This may be done through bioengineering or methods that will stabilize the affected areas. 	NA	NA	Yes	-

Sl. No.	Activity	Mitigation Measures	Compliance (Yes/No/Partial) *			
			DB-01	CW-01	CW-02	DB-02
5	Biodiversity	<ul style="list-style-type: none"> • Ensure to include in the bidding and contract documents for works at the intakes and transmission mains the necessary requirements and construction methodologies that will avoid or at least minimize impact to biodiversity in the area, such as the following: • Construct intake structures and raw water pipelines during lean season to avoid any delay in works and shorten construction period; • Lay the pipes strictly in accordance with plan to minimize extended disturbance in the area. Depth of excavation shall only be sufficient enough to protect the pipes. This will reduce the time of excavation works; • Use of excavation method that will not require huge heavy equipment that need to be deployed in the area. Use handheld excavators and smaller machines where possible; • Avoid of use of explosives, where possible. In areas where blasting is necessary, use “controlled blasting” method; • Limit construction activities at day time; and • Provide training to workers on awareness with the laws and penalties governing poaching/hunting of wildlife. 	Yes	Yes	Yes	-
6	Water resource allocation	<ul style="list-style-type: none"> • Ensure to include in the design of the offtakes and transmission mains infrastructures the appropriate mechanism (mechanical) for controlling water diversion for irrigation. • Based on the sustainability analysis conducted under the subproject, strictly maintain the required allocations for drinking water, downstream flows, and irrigation water diversions. 	Yes	Yes	Yes	-
7	Consents clearances, and permits	<ul style="list-style-type: none"> • Prior to any construction activity, the following consents, clearances and permits that might have expired should be renewed to avoid any delays in the implementation: • Consent from Community Forestry group • Consent from Dzongkhag administration, Consent from other stakeholders • Public clearance • Consent from Gewog/Thromde • Forestry Clearance • Environmental Clearance 	Yes	Yes	Yes	-
8	Construction work camps, stockpile, storage and disposal areas	<ul style="list-style-type: none"> • Ensure to include in the bidding and contract documents the condition that Contractor will be required to implement the following measures during pre- construction phase: • Prepare a detailed layout plan for the development of construction camps, including workers' accommodation sites, if any will be established under the subproject, showing the relative locations of all temporary structures and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use of construction equipment or machines, and power supply generators, if any), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps. This will need to be approved by the PIU; • Locate the construction camps, if any will be 	Yes	Yes	Yes	-

Sl. No.	Activity	Mitigation Measures	Compliance (Yes/No/Partial) *			
			DB-01	CW-01	CW-02	DB-02
		<p>established under the subproject, at areas which are acceptable from environmental, cultural or social point of view;</p> <ul style="list-style-type: none"> • Maximize the employment of people from the project area and immediate vicinities, so that the need for workers' accommodation is avoided or minimized; • Construction camps, storage areas, and disposal areas should not be located in biological corridor, government reserve forests, and productive agricultural lands. Locations should also be at least 20m from water bodies, natural drainage channels, and groundwater recharge areas, etc.; • Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters; • Locate the garbage pit/waste disposal site approved by the government and at considerable distance from the nearest residence, so that the people are not disturbed with the odour likely to be produced; • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form; • Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed. Restore the site to at least its original condition; and • Include in the SMP specific procedure to ensure excess excavated materials are properly handled, transported and disposed. Ensure that disposal sites for spoils are identified beforehand and approved by the local government, and secured from unauthorized entry of people, including children. 				
9	Project disclosure and community awareness	<ul style="list-style-type: none"> • Disclose project information/brief on MOIT website, along with GRM mechanism and contact numbers. • Continue stakeholder engagement and consultations to present any updates or developments about the subproject. • Make project brief available at the site office and/or PIU office. 	Yes	Yes	Yes	-
10	Establishment of Contractor's site Facilities	<ul style="list-style-type: none"> • Build any site office, storage facilities and/or workers' camps as close as possible to the newly constructed road so as to minimize vegetation clearance; • Avoid or minimize cutting of trees when setting up these facilities. Any tree cut will be compensated with replanting of trees through an afforestation program at the area replacement ratio of 2:1 (i.e. required afforestation area is twice the tree cutting affected area). Budget for the afforestation program as indicated in the EMP cost table in this IEE will be provided to the DOFPS. Budget for the replanting program will be provided to the DOFPS; • No facilities will be built within the Biological Corridor. Since these facilities are expected to be shifted along the alignment as work progresses, the same will be built temporarily for easy 	Yes	Yes	Yes	-

Sl. No.	Activity	Mitigation Measures	Compliance (Yes/No/Partial) *			
			DB-01	CW-01	CW-02	DB-02
		<ul style="list-style-type: none"> dismantling and relocation; Provide temporary pit latrines and kitchen wastes disposal pits within these facilities for proper solid waste management and prevent the indiscriminate discharge of wastes to the surroundings; Provide diversion drains, catch drains and silt-traps around camps to avoid siltation of nearby water bodies, if any; 				
11	Physical Resources finds– Cultural chance	<ul style="list-style-type: none"> For any chance finds during excavation activities, the Contractor shall strictly implement the following protocol: Stop work immediately to allow further investigation; Coordinate with PIU and/or PMU and local Department of Culture; and Through PIU and/or PMU, request authorized person from the local Department of Culture to observe when excavation resumes for the identification of the potential chance finds, and comply with further instructions 	Yes	Yes	Yes	-
12	Transport of construction materials	<ul style="list-style-type: none"> All construction material will be stacked temporarily by the roadsides leaving adequate space for the vehicles to ply safely at work sites. Dusty areas will be sprinkled with water especially on dry windy days. Vehicles transporting sand, soil and aggregates will be covered with tarpaulin to reduce the release of dust along transport routes. To minimize air emissions, ensure regular maintenance of equipment to prevent smoke belching and compliance with the RSTA emission test. All stockpiles that will be left idle for a long time will be covered. 	Yes	Yes	Yes	-
13	Biodiversity	<ul style="list-style-type: none"> The Contractor shall strictly adhere to all the mitigation measures proposed for the design phase of the subproject as included in the bidding and contract documents. By reiteration, and consistent with the measures proposed for the design phase, the Contractor shall implement the following measures for construction activities within the biological corridor and government reserve forest areas: Construct intake structures and raw water pipelines during lean season to avoid any delay in works and shorten construction period; Limit construction activities at day time; Avoid establishing storage sites or workers' camps within the biological corridor or government reserve forest; Lay the pipes strictly in accordance with plan to minimize extended disturbance in the area. Depth of excavation, if any, shall only be sufficient enough to protect the pipes. This will reduce production of spoils and shorten the time of excavation works; Use of excavation method that will not require huge heavy equipment to be deployed in the area. Use handheld excavators and smaller machines where possible; Avoid of use of explosives, where possible. In areas where blasting is necessary, use "silent 	Yes	Yes	Yes	-

Sl. No.	Activity	Mitigation Measures	Compliance (Yes/No/Partial) *			
			DB-01	CW-01	CW-02	DB-02
		<ul style="list-style-type: none"> blasting" method; Identify disposal site for construction debris to avoid indiscriminate dumping of wastes into the streams or rivers; For any felling of trees covered under the subproject, compensate through replantation or afforestation which involves providing budget to DoFPS; Ensure that no harvesting or poaching of wildlife flora and fauna resources in the area occur. Provide training to workers on awareness with the laws and penalties governing poaching/hunting of wildlife and illegal felling of trees; and Restore all heavily modified areas after construction works, particularly in steep sections, to ensure no induced landslides occur in the future. This may be done through bioengineering or methods that will stabilize the affected areas. 				
14	Soil Erosion and Sedimentation	<ul style="list-style-type: none"> Minimize exposed areas at work sites. Ensure to undertake proper compacting of backfilled areas. Use structural erosion prevention and sediment control practices such as temporary sedimentation canals around the exposed areas. This will prevent sediments from moving offsite, and reduce the erosive forces of runoff waters. Consistent with the SMP, immediately remove all excess spoils from sites and dispose the same in designated disposal site 	Yes	Yes	Yes	-
15	Surface water quality	<ul style="list-style-type: none"> Provide silt traps or temporary sedimentation canals along alignments that are adjacent to receiving bodies of water. Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer. Minimize transport and disposal of excess spoils. Where possible, use excess spoils for beneficial purposes such as in any other construction activities, or to raise the level of low-lying areas near the subproject sites. Avoid scheduling of excavation work during the monsoon season. Earthworks should be undertaken during dry season. Confine construction area including the material storage (sand and aggregate) so that runoff from upland or elevated areas will not enter the site. Ensure that drains are not blocked with excavated soil. Stockyards at least 20 meters away from watercourses. Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and banded 110% by volume. For effluents from work sites, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs. A sewage management plan has to be prepared by the Contractor and agreed with PIU. 	Yes	Yes	Yes	-

Sl. No.	Activity	Mitigation Measures	Compliance (Yes/No/Partial) *			
			DB-01	CW-01	CW-02	DB-02
		<ul style="list-style-type: none"> Monitor water quality according to the environmental management plan. 				
16	Air quality	<ul style="list-style-type: none"> Take every precaution to reduce the levels of dust at construction sites, and not exceeding the pre-project ambient air quality standards. Barricade the construction area particularly in relation to distribution network improvement within the settlements. Initiate site clearance and excavation work only after barricading of the site is done. Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated and government-approved disposal area. Conduct work sequentially – excavation, pipe laying, backfilling; conduct pipe testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done. Remove the excavated soil of first section to the disposal site; as the work progresses, sequentially, by the time second section is excavated, the first section will be ready for back filling. Backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, pedestrian movement and wind will generate dust from backfilled section. Restoration should be undertaken immediately. Provide all heavy equipment and machinery with air pollution control devices that are functioning properly. Vehicles travelling to and from the construction site must adhere to speed limits so as to avoid excessive dust that may go airborne. Reduce dust by spraying stockpiled soil, excavated materials, and spoils. Cover with tarpaulin the dump body of trucks or vehicles when transporting soil and sand. Cover stockpiled construction materials with tarpaulin or plastic sheets. Trenching and transport vehicles shall move only in designated areas and roads. Water spraying of access roads, camp sites and work sites to reduce dust emissions. Machines and vehicles must be regularly examined and to ensure efficient functioning, and use them within their design limits and specifications. All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements of the government. Compliance with this requirement will be included in Contractor's reports to PIU and PMU. Monitor air quality according to the environmental management plan. 	Yes	Yes	Partial	-
17	Noise and Vibration	<ul style="list-style-type: none"> Follow all construction methods developed for the subproject during the design phase, including use of "silent blasting" technique when blasting is necessary for rocky alignments in the biological corridor or forest reserve areas. Plan activities in consultation with PIU so that 	Yes	Yes	Partial	-

Sl. No.	Activity	Mitigation Measures	Compliance (Yes/No/Partial) *			
			DB-01	CW-01	CW-02	DB-02
		<p>activities with the greatest potential to generate noise are conducted during day time in the biological corridor and forest areas, and along alignments near residential areas and/or noise-sensitive institutions such as hospitals. Night time works may also be considered in alignments adjacent schools and places of worship.</p> <ul style="list-style-type: none"> Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptors. Identify any structures such as houses or buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach. Consult local communities in advance of the work to identify and address key issues, and avoid working during sensitive occasions, such as religious and cultural festivals. 				
18	Community health and safety	<ul style="list-style-type: none"> Follow a code of conduct for workers, which should include restricting workers in designated areas, no open defecation, no littering, no firewood collection, no setting of fire except when needed but in designated places, no trespassing, no unauthorized overstaying at construction sites, and no obligation to undertake potentially dangerous work without the use of proper personal protective equipment, among others. Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities. Follow the established community and occupational health and safety protocol on emerging infectious diseases such as COVID-19.. Maintain a complaint logbook in workers' camp and take action promptly of complaints. Schedule transport and hauling activities by avoiding busy areas of the town. Clean wheels and undercarriage of haul trucks prior to leaving construction site. Educate drivers and comply with speed limit between 20-25 km/h near settlements or sensitive institutional establishments, and avoid use of horn unless necessary to prevent accidents. Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement. No night time construction activities including material/waste haulage near or within residential areas. Construction activities in these areas must be prohibited from 9pm to 7am. Temporary access such as planks with handrails will be provided at excavation areas, particularly in locations where access to residential, commercial and institutional establishments is 	Yes	Yes	Yes	-

Sl. No.	Activity	Mitigation Measures	Compliance (Yes/No/Partial) *			
			DB-01	CW-01	CW-02	DB-02
19	Occupational health and safety	<p>affected.</p> <ul style="list-style-type: none"> All relevant provisions of the Labour and Employment Act of Bhutan 2007, Regulation on Occupational Health, Safety and Welfare 2012, and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases. Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities. Implement an occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID-19) as approved by the PIU or PMU. See Appendix 13 for a sample guidance note in responding to COVID-19. Provide at every workplace, a readily available first aid unit, including an adequate supply of sterilized dressing material and appliances. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital or clinic. Make available emergency medical equipment and nursing staff at all times. Provide regular health check-ups, sanitation and hygiene, health care, and control of diseases for the workforce. Provide at cost all labor and materials, and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site. Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards. Make available first aid kits, ambulance facilities or standby emergency vehicle, and fire extinguishers in camp sites. Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries. Provide insurance to the workers. Health and safety training for all site personnel is very important and must be mandatory. 	Yes	Yes	Yes	-

1. CONTRACTORS' DETAILS

59. For Thimphu, the contracts were awarded to the technically responsive lowest evaluated bidder in July.

TABLE 7: CONTRACTORS NODAL AND SAFEGUARD STAFF

Package Name	Contractor	Nodal Person	Email Address	Contact Number
DB-01-Design, build and Operate of Water Treatment Plant for	M/s E.W & Grannus Water & Environmental	Tashi Nyibum	nyibumt@gmail.com	17641452

Thimphu Pamtsho with 2-year O&M	Solutions Pvt. Ltd JV			
	Safeguards person	Ms Yeshi Bumkyid		17258686
CW-01-Construction of Distribution Network for Pamtsho, Thimphu	M/s Bhutan Engineering Co. Pvt. Ltd	Lotay	lotay.sksktj@gmail.com	17120422
	Safeguards person	Nado Rinchen		17612042
CW-02 – Construction of Integrated drinking water and irrigation for system for Zhemgang including 2 years O&M	M/s Construction Development Corporation Limited (CDCL)	Karsang Norbu	-	17602493
	Safeguards person	Pemchung	-	17867958

2. PREPARATION OF SITE-SPECIFIC ENVIRONMENTAL MANAGEMENT PLANS (SEMPs), IMPLEMENTATION AND MONITORING

60. Monitoring of the contract activities is delegated to the PIU safeguard officers as well as by the contractors EHS officers.

61. The contractors have prepared the site specific EMPs and these have been approved by the PIU. Compliance with the EMP has been reported by DB-01 but details on how or what measures have been undertaken are not reported for all activities. For CW-01, the reporting of ESS compliance is lacking (refer Appendix 7a and 7b).

TABLE 8: STATUS OF EHS STAFF, SEMP PREPARATION AND MONITORING

S. No	Package	Contractor's EHS Supervisor	SEMP submitted by contractor	SEMP approved by PIU/PMSC	SEMP includes health and safety plan	EMP implement's report submitted by contractor	EMP monitoring on site Conducted by PIU /PMC/PMU Safeguard Staff
1	DB-01-Design, build and Operate of Water Treatment Plant for Thimphu Pamtsho with 2-year O&M	Appointed - Ms. Yeshi Bumkyid 17258686	Yes	Yes	Yes	Being complied	Yes (regular site visits are conducted by the PIU/PMSC)
2	CW-01 – Construction of Distribution Network for Pamtsho, Thimphu	Appointed - Mr. Nado Rinchen 1712042	Yes	Yes	Yes	Being complied	Yes (regular site visits are conducted by the PIU/PMSC)
3	CW-02 – Construction of Distribution Network for Pamtsho, Thimphu	Appointed - Mr. Pemchung 17867958	Yes	Yes	Yes	Being complied	Yes (regular site visits are conducted by the PIU/PMSC)

III. MONITORING OF ENVIRONMENTAL QUALITY

62. Monitoring the ambient air quality, noise levels, and water quality is vital to assess the impact of project implementation on these parameters. Regular monitoring is necessary to ensure that the emission levels are within the permissible limits of the National Environment Standards 2020, and mitigation measures may be required to limit them.

63. For DB-01 and CW-01, no independent baseline monitoring for ambient air, noise, and water quality has been established. Instead, air and noise data from the National Environmental Commission station in Thimphu has been used as baseline data. Except for water quality monitoring, ambient air and noise monitoring within the project areas of DB-01 and CW-01 was conducted only in November 2024. The contractors explained that they were unable to find an agency within Bhutan to perform such monitoring. It was only after the safeguard specialist introduced them to a local agency that the contractors conducted the tests.

64. Similarly, for CW-02, Zhemgang subproject, no baseline data for air, noise, and water quality has been established since the IEE study was conducted during the active phase of the COVID-19 pandemic between 2021-2022. According to the IEE, the contractor is required to conduct baseline monitoring for ambient air, noise, and water quality prior to the start of construction work. Consequently, the contractor has been asked to conduct and establish the baseline data within the first quarter of 2025 for future monitoring.

65. DB-02, the Wangdue subproject, is still in the design and tendering stage. However, the contractor is required to establish baseline monitoring data prior to the commencement of construction work.

A. AIR QUALITY

Package I – DB-01

66. DB-01 package conducted the air and noise quality monitoring at the construction site, existing 1 MILD water treatment plant (WTP) area. The mean values of the 24-h average values of the air quality parameters are given in Table 5.

TABLE 9: AMBIENT AIR QUALITY MONITORING DURING PROJECT IMPLEMENTATION PERIOD (8-9 NOV 2024).

Pollutant	Results	Unit	NEC Standard ($\mu\text{g}/\text{m}^3$)	IFC Standard ($\mu\text{g}/\text{m}^3$)	Notes
TSPM	39.71	($\mu\text{g}/\text{m}^3$)	200	15	WHO 2021 guideline: 15 $\mu\text{g}/\text{m}^3$ (24h); IFC often aligns with this.
PM_{2.5} (Fine Particles)	7.10	($\mu\text{g}/\text{m}^3$)	60	15	WHO 2021 guideline: 15 $\mu\text{g}/\text{m}^3$ (24h); IFC often aligns with this.
PM₁₀ (Coarse Particles)	13.42	($\mu\text{g}/\text{m}^3$)	100	45	WHO 2021 guideline: 45 $\mu\text{g}/\text{m}^3$ (24h).
Nitrogen Dioxide (NO₂)	19.8	($\mu\text{g}/\text{m}^3$)	80	200	WHO 2021 guideline: 200 $\mu\text{g}/\text{m}^3$ (1h); 25 $\mu\text{g}/\text{m}^3$ (annual).
Sulfur Dioxide (SO₂)	BDL	($\mu\text{g}/\text{m}^3$)	80	40	WHO 2021 guideline: 40 $\mu\text{g}/\text{m}^3$ (24h).
Carbon Monoxide (CO)	BDL	($\mu\text{g}/\text{m}^3$)	2000	30,000	WHO 2021 guideline: 30 mg/m^3 (1h); IFC uses same.

BDL – Below Detectable Limit

67. The test results from the 8-9 November 2024 monitoring period indicate:

68. **TSPM (Total Suspended Particulate Matter): 39.713 $\mu\text{g}/\text{m}^3$** This level is significantly below the National Environmental Commission (NEC) standard of 200 $\mu\text{g}/\text{m}^3$, indicating low levels of suspended particulate matter in the air.

69. **PM10 (Particulate Matter ≤ 10 µm): 13.42 µg/m³** This is well below both the NEC (100 µg/m³) and International Finance Corporation (IFC) standards (150 µg/m³). Low PM10 levels suggest good air quality with minimal respiratory irritants.

70. **PM2.5 (Particulate Matter ≤ 2.5 µm): 7.10 µg/m³** This result is far below the NEC standard of 60 µg/m³ and the IFC standard of 75 µg/m³. Low PM2.5 levels indicate minimal fine particulate matter, which is crucial for health as these particles can penetrate deep into the lungs.

71. **NO2 (Nitrogen Dioxide): 19.8 µg/m³** This level is well within the NEC standard of 80 µg/m³ and significantly below the IFC standard of 125 µg/m³. It suggests that NO2 pollution is within safe limits.

72. **SO2 (Sulfur Dioxide): Below Detection Limit (BDL)** Since SO2 levels are below the detection limit, it indicates extremely low or negligible concentrations, well below both the NEC (80 µg/m³) and IFC (200 µg/m³) standards.

73. **CO (Carbon Monoxide): Below Detection Limit (BDL)** Similar to SO2, CO levels are below the detection limit, suggesting very low or negligible concentrations, far below both NEC (2000 µg/m³) and IFC (160 µg/m³) standards.

74. Overall, the air quality during the 8-9 November 2024 monitoring period was excellent, with all recorded pollutant levels well within both national and international standards. This implies a clean environment with minimal health risks associated with air pollution.

Package II – CW-01

75. CW-01 package conducted the air and noise quality monitoring at the construction site office at Pamtsho. The mean values of the 24-h average values of the air quality parameters are given in Table 6.

TABLE 10: AMBIENT AIR QUALITY MONITORING DURING PROJECT IMPLEMENTATION PERIOD (2-3 NOV 2024).

Pollutant	Results	Unit	NEC Standard (µg/m³)	IFC Standard (µg/m³)	Notes
TSPM	13.08	(µg/m³)	200	15	WHO 2021 guideline: 15 µg/m³ (24h); IFC often aligns with this.
PM_{2.5} (Fine Particles)	5.08	(µg/m³)	60	15	WHO 2021 guideline: 15 µg/m³ (24h); IFC often aligns with this.
PM₁₀ (Coarse Particles)	9.06	(µg/m³)	100	45	WHO 2021 guideline: 45 µg/m³ (24h).
Nitrogen Dioxide (NO₂)	71.20	(µg/m³)	80	200	WHO 2021 guideline: 200 µg/m³ (1h); 25 µg/m³ (annual).
Sulfur Dioxide (SO₂)	BDL	(µg/m³)	80	40	WHO 2021 guideline: 40 µg/m³ (24h).
Carbon Monoxide (CO)	BDL	(µg/m³)	2000	30,000	WHO 2021 guideline: 30 mg/m³ (1h); IFC uses same.

BDL – Below Detectable Limit

76. The test results indicate:

77. **TSPM (Total Suspended Particulate Matter): 13.089 µg/m³** This level is well below the National Environmental Commission (NEC) standard of 200 µg/m³, indicating very low levels of suspended particles in the air.

78. **PM10 (Particulate Matter ≤ 10 µm): 9.065 µg/m³** This is also below both NEC (100 µg/m³) and International Finance Corporation (IFC) standards (150 µg/m³). Low PM10 levels suggest good air quality with minimal respiratory irritants.

79. **PM2.5 (Particulate Matter ≤ 2.5 µm): 5.08 µg/m³** The result is below the NEC standard of 60 µg/m³ and the IFC standard of 75 µg/m³. Low PM2.5 levels indicate minimal fine particulate matter, which is crucial for health as these particles can penetrate deep into the lungs.

80. **NO₂ (Nitrogen Dioxide): 71.20 µg/m³** This level is below the NEC standard of 80 µg/m³ and significantly lower than the IFC standard of 125 µg/m³. It suggests that NO₂ pollution is within safe limits.

81. **SO₂ (Sulfur Dioxide): Below Detection Limit (BDL)** Since SO₂ levels are below the detection limit, it indicates extremely low or negligible concentrations, well below both the NEC (80 µg/m³) and IFC (200 µg/m³) standards.

82. **CO (Carbon Monoxide): Below Detection Limit (BDL)** Similar to SO₂, CO levels are below the detection limit, suggesting very low or negligible concentrations, far below both NEC (2000 µg/m³) and IFC (160 µg/m³) standards.

83. Overall, the air quality in the monitored in the project area is excellent, with all recorded pollutants well below both national and international standards. This implies a clean environment with minimal health risks associated with air pollution.

Package III – CW-02

84. No air quality baseline is established till date.

Package IV – DB-02

85. The DB-02, also known as Package IV, is currently in the design stage and has yet to be tendered.

B. NOISE MONITORING

Package I – DB-01

86. Noise quality monitoring for DB-01 is carried out at the same location as the air quality monitoring, which is the construction site at the 1MLD WTP plant site.

TABLE 11: NOISE LEVEL MONITORING DURING PROJECT IMPLEMENTATION PERIOD (8-9 NOV 2024)

Monitoring Season	Parameter	UNIT	Result (Avg)	Max. permissible limit NECS)	Max. permissible limit (WHO)	Test ref. method
Baseline	Sound Pressure Level (SPL)	Db	NA	65 (Day) 55 (Night)	85 (8-hour exposure)	SLM continuous recording
8-9 Nov 2024	Sound Pressure Level (SPL)	Db	45.75 (Day) 32.54 (Night)	65 (Day) 55 (Night)	85 (8-hour exposure)	SLM continuous recording

87. **Daytime Sound Pressure Levels:** The recorded average SPL during the day (45.75 dB) is well below the NEC permissible limit of 65 dB and significantly below the WHO permissible limit of 85 dB for an 8-hour exposure. This indicates a relatively quiet environment during the day.

88. **Nighttime Sound Pressure Levels:** The recorded average SPL during the night (32.54 dB) is also well below the NEC permissible limit of 55 dB and the WHO permissible limit of 85 dB for an 8-hour exposure. This suggests a very quiet environment during the night.

89. The monitoring data from 2-3 November 2024 indicates that both daytime and nighttime sound pressure levels are within the permissible limits set by the NEC and WHO, implying a low noise environment.

Package II – CW-01

90. Noise quality monitoring for CW-01 is carried out at the same location as the air quality monitoring, which is the construction site office at Pamtsho.

TABLE 12: NOISE LEVEL MONITORING DURING PROJECT IMPLEMENTATION PERIOD (2-3 NOV 2024)

Monitoring Season	Parameter	UNIT	Result (Avg)	Max. permissible limit NECS)		Max. permissible limit (WHO)	Test ref. method
Baseline	Sound Pressure Level (SPL)	Db	NA	65 (Day)	55 (Night)	85 (8-hour exposure)	SLM continuous recording
2-3 Nov 2024	Sound Pressure Level (SPL)	Db	45.75 (Day) 32.54 (Night)	65 (Day)	55 (Night)	85 (8-hour exposure)	SLM continuous recording

91. **Daytime Sound Pressure Levels:** The recorded average SPL during the day (45.75 dB) is well below the NEC permissible limit of 65 dB and significantly below the WHO permissible limit of 85 dB for an 8-hour exposure. This indicates a relatively quiet environment during the day.

92. **Nighttime Sound Pressure Levels:** The recorded average SPL during the night (32.54 dB) is also well below the NEC permissible limit of 55 dB and the WHO permissible limit of 85 dB for an 8-hour exposure. This suggests a very quiet environment during the night.

93. The monitoring data from 2-3 November 2024 indicates that both daytime and nighttime sound pressure levels are within the permissible limits set by the NEC and WHO, implying a low noise environment.

Package III – CW-02

94. No water quality baseline is established till date.

Package IV – DB-02

95. The DB-02, also known as Package IV, is currently in the design stage and has yet to be tendered.

96.

C. WATER QUALITY

Package I – DB-01

97. DB-01 has conducted comprehensive water quality testing through a laboratory belonging to the Royal Centre for Disease Control (RCDC) under the Department of Public Health. All parameters are within acceptable limits except for the E. coli content, which is 12 CFU/100ml (Table 11). According to the World Health Organization, a zero count of E. coli per 100 ml of water is considered safe for drinking, a count of 1–10 CFU/100 ml is regarded as low risk, and 11–100 CFU/100 ml is medium risk. Therefore, to make the water safe for drinking, treatment is required to eliminate the E. coli bacteria.

98. Cadmium exceeds permissible limits in both BDWQS and WHO guidelines, posing a significant health risk. Cadmium contamination can originate from natural sources, such as the weathering of cadmium-rich rocks, volcanic activity, or leaching from soils into water systems, even in pristine environments like mountain streams. While such areas are often considered unaffected by pollution, natural processes can still introduce cadmium into the water. This underscores the importance of regular water quality monitoring and, if detected, conducting geological surveys or water testing to confirm its source and ensure safety.

99. Since industrial discharges and agricultural waste are absent, cadmium removal from water sources can be achieved using techniques such as reverse osmosis, ion exchange, and

adsorption. However, it is essential to conduct further analysis to accurately assess cadmium levels in the water source before proceeding with costly remediation efforts.

TABLE 13: WATER QUALITY TEST RESULT OF DECHENCHOLING WATER (DB-01 SITE), 21 NOVEMBER 2023

Parameter	Unit	Value	BDWQS 2016	WHO Standard
Alkalinity	mg/l	5.2	20-200	Not explicitly stated
Aluminium	mg/l	0	0.0-0.9	0.0-0.2
Barium	mg/l	0.0020	0.0-1.3	1.3
Boron	mg/l	0	0.0-2.4	2.4
Cadmium	mg/l	0.008	0.0-0.003	0.003
Calcium	mg/l	0.987	<75	Not explicitly stated
Calcium (Hardness as CaCO ₃)	mg/l	7.4	0-75	Not explicitly stated
Conductivity	µS/cm	16.37	0-1000	Not explicitly stated
E. coli	CFU/100ml	12	0	0
Fluoride	mg/l	0.11	0.0-1.5	1.5
Nitrates	mg/l	0.9	0-50	50
pH	-	7.2	6.5-8.5	6.5-8.5
Sulphate	mg/l	0	0-250	250
Turbidity	NTU	0.45	0-5	5
Chromium	mg/l	0	0.0-0.05	0.05
Cobalt	mg/l	0	0.000-0.005	Not explicitly stated
Copper	mg/l	0	0-2	2
Lead	mg/l	0.0030	0.0-0.01	0.01
Magnesium	mg/l	0.305	Not explicitly stated	Not explicitly stated
Manganese	mg/l	0.0005	0-0.4	0.4
Potassium	mg/l	0.457	Not explicitly stated	Not explicitly stated
Sodium	mg/l	0.985	<20	Not explicitly stated
Zinc	mg/l	0	0-3	3

Source: RCDC, Department of Public Health, MOH, 2023

Package II – CW-01

100. The drinking water quality was assessed at two distinct locations: the BEC project campsite in Pamtsho and the Upper Pamtsho area. Tests focused on four specific parameters: COD (Chemical Oxygen Demand), BOD (Biological Oxygen Demand), TSS (Total Suspended Solids), and pH. These tests were carried out by the WWTP lab located in Babesa, Thimphu.

101. The table shows water quality data for COD (Chemical Oxygen Demand), BOD (Biochemical Oxygen Demand), TSS (Total Suspended Solids), and pH at two sites during March and June 2024. Both sites show improved water quality over time, with decreases in COD, BOD, and TSS levels, indicating reduced organic pollution, biodegradable material, and suspended particles. The pH remains stable within the acceptable range of 6.5–8.5, suitable for aquatic life and human use. These improvements suggest effective water management practices or natural seasonal variations positively impacting water quality.

TABLE 14: WATER QUALITY TEST RESULT OF CW-01 PROJECT SITES, MARCH & JUNE 2024

Parameter	Unit Measurement	March 2024		June 2024	
		Site 1	Site 2	Site 1	Site 2
COD	mg/l	9.6	7.3	7.8	7
BOD	mg/l	4	2.6	3.1	2.3
TSS	mg/l	2.1	1	1.3	1
pH	-	6.9	7	7.2	7.1

Package III – CW-02

102. No water quality baseline is established till date.

Package IV – DB-02

103. The DB-02, also known as Package IV, is currently in the design stage and has yet to be tendered.

IV. HEALTH AND SAFETY MONITORING

A. OVERALL OHS MONITORING

104. The contractor’s Environmental, Health, and Safety (EHS) officer conducts daily site inspections to ensure compliance with Occupational Health and Safety (OHS) standards. Their duties include resolving safety concerns, enforcing the Environmental Management Plan (EMP), and maintaining hygienic office and camp facilities—ensuring no litter or stagnant water is present.

105. Workers are stationed in secure camps, strategically placed away from flood or landslide risks. Regular safety briefings cover PPE use, emergency evacuation, disease prevention, and fire safety. First aid kits are stocked and inspected daily at all locations.

106. While no system is entirely risk-free, the project team has implemented robust measures to safeguard worker health and safety, meeting the project’s requirements effectively.

B. LABOUR EMPLOYMENT

107. The sub-projects DB-01 and CWW-01 employ both national and expatriate workers who have been recruited and employed in compliance with the Labour Act and regulations of the country. The DB-01 sub-project has one female employee working as an environmental and health safety officer.

108. For the CW-02 Zhemgang sub-project, the contractor employs the entire team with a national workforce, including laborers. The sub-project also employs two female workers: one as an office assistant and the other as a technician. The details of the workforce employed in the sub-projects are provided in Table 11.

109. Expatriate workers undergo mandatory medical check-ups and screening before work permits are issued to ensure they do not bring or transfer communicable or other health-threatening diseases to others in the country. While national workers are not required to undergo medical screening, their overall health is evaluated before recruitment based on job requirements.

110. Despite encouraging female participation in the project, their employment rate in construction sites remains low except for a few women in site offices and testing laboratories. The project strictly prohibits child labour, discrimination in recruitment, employment and wages, and ensures clean and safe drinking water supply and electricity in worker camps. All possible measures are taken in compliance with existing laws and regulations.

TABLE 15: WORKFORCE EMPLOYED FOR DB-01, CW-01 AND CW-02 CONTRACT PACKAGES

Contract Package	Nationality	Employee		Remarks
		Male	Female	
DB-01	National ³	6	1	
	Expatriate ⁴	8	-	
CW-01	National	12	-	
	Expatriate	30	-	
CW-02	National	36	2	
	Expatriate	-	-	
DB-02	National	NA	NA	
	Expatriate	NA	NA	

³ National – Bhutanese national

⁴ Expatriate – Majority of expats are from India

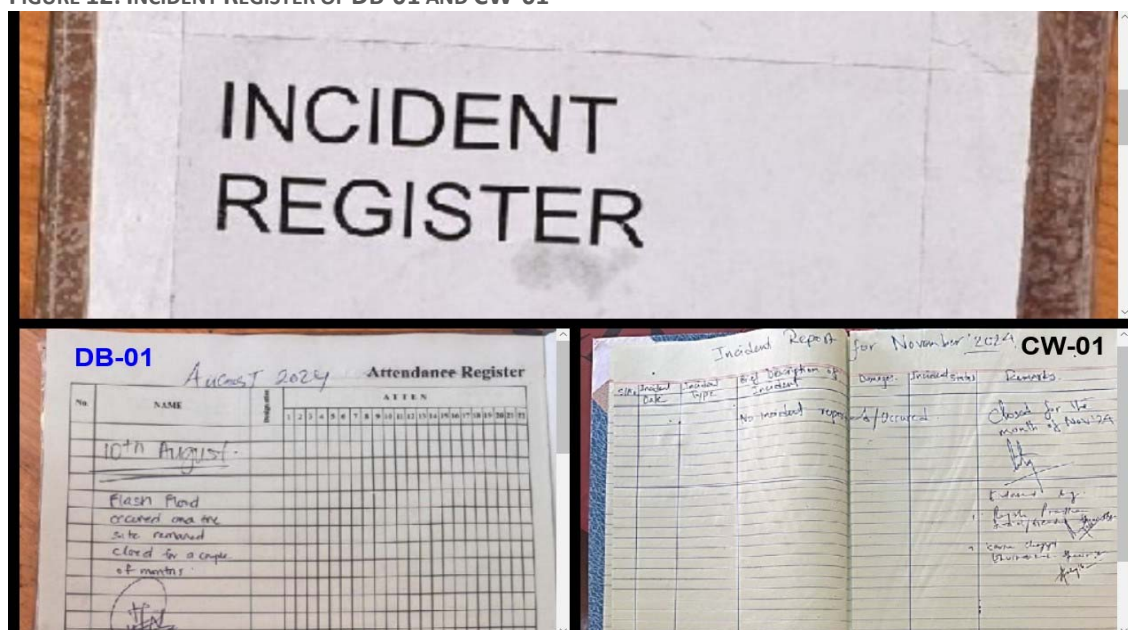
C. INCIDENTS OF HEALTH AND SAFETY ISSUES

111. Each subproject has its own Environmental Health and Safety (EHS) officer who is responsible for overseeing health and safety issues at the project site. The EHS officer addresses any incidents that occur and manages them according to the Environmental Management Plan (EMP). If an incident requires further attention, the EHS officer reports it to the contractor's project management for additional actions and follow-ups.

112. During an ADB Mission held from November 3-5, 2024, the mission instructed the contractors of the DB-01 and CW-01 subprojects to maintain a proper incident register that records daily incidents, accidents, and even near misses. This incident register must be closed on a monthly basis, regardless of whether there are incidents, and verified by safeguard experts. During recent visits to the CW-02 site in Zhemgang from 15-24 November 2024, environmental and social experts conveyed the ADB mission's concerns and requested the maintenance and adherence to a similar incident register.

113. Fortunately, the project has not encountered any incidents related to health and safety issues within the reporting period.

FIGURE 12: INCIDENT REGISTER OF DB-01 AND CW-01



D. TRAFFIC MANAGEMENT PLAN

114. In the Thimphu subprojects—specifically the DB-01 and CW-01 packages—traffic management has not posed significant challenges, rendering the need for a traffic management plan less critical.

115. However, the CW-02 project in Zhemgang is a different story. This subproject involves laying substantial stretches of irrigation pipelines along the Zhemgang-Tingtibi and Zhemgang-Wangdigang road stretches. The plan is to install these pipelines below the surface, along the existing side drains, which will inevitably lead to traffic issues. Hence creating a traffic management plan is essential when laying water pipelines along the road for a few important reasons:

116. 1. Safety

117. *Public Safety.* Ensures that pedestrians and drivers are protected from potential hazards associated with construction activities.

118. *Worker Safety*: Safeguards construction workers by clearly delineating work zones, reducing the risk of accidents or injuries.
119. 2. Minimize Disruptions
120. *Traffic Flow*: A well-implemented plan helps maintain smooth traffic flow, avoiding unnecessary congestion.
121. *Access to Properties*: Ensures that residents and businesses can still access their properties with minimal inconvenience.
122. 3. Efficiency
123. *Project Completion*: Streamlines the construction process, reducing delays caused by unanticipated traffic issues.
124. *Resource Allocation*: Allows for better management of resources such as construction vehicles and personnel.
125. 4. Regulatory Compliance
126. *Legal Requirements*: Adheres to Bhutan Construction and Transport Authority (BCTA) regulations, preventing potential legal issues or fines.
127. *Emergency Services*: Ensures that emergency vehicles can still access necessary routes quickly and safely.
128. 5. Communication
129. *Public Awareness*: Keeps the public informed about construction schedules and potential detours, reducing frustration and confusion.
130. *Stakeholder Coordination*: Facilitates coordination among various stakeholders, including municipal authorities, Department of Surface Transport, BCTA, and the public.
131. Consequently, the Contractor (CDCL) for the Zhemgang subproject is required to prepare and implement a traffic management plan during the construction along the roadways. By planning ahead and putting a comprehensive traffic management plan into action, safety, efficiency, and overall public satisfaction during the pipeline installation process can be greatly improved.

V. GRIEVANCE REDRESS MECHANISM

132. The project necessitates the implementation of a Grievance Redress Mechanism (GRM) to address and resolve any grievances that may arise during subproject execution. This mechanism provides a structured avenue for affected individuals to submit their complaints and ensures that these issues are resolved promptly and effectively throughout the subproject's implementation.

133. In the event of any public grievances regarding the subproject, such grievances are required to be resolved through the procedure as discussed in this section.

134. To resolve any grievance during the subproject implementation a formal committee, Grievance Redress Committee (GRC), comprising a team of relevant officials have been formed at different levels. For the project, the GRM structure follows a three-tiered system, namely: Level 1, Level 2 and Level 3, to redress any grievance. If the grievance is unresolved then the matter is forwarded to the court.

135. The GRM structure, mechanism and procedures to redress grievances or complaints are disclosed through MOIT website, both in English and Dzongkha. The GRM structure is also be displayed on Notice Boards in the PMU and PIU Offices and the people in the project area made aware of the rights and procedures while filing the grievances.

A. SUMMARY OF GRIEVANCE REDRESSAL

Package I – DB-01 (Thimphu subproject)

136. To date, no grievances have been registered, as the subproject does not encroach upon or fall within privately-owned land.

Package II – CW-01(Thimphu subproject)

137. For the CW-01 package, which involves the laying of main transmission line and the distribution networks within Pamtsho and Jungshina townships, the contractor has received four grievances in 2024. After that no further grievances have been received. All grievances were addressed through the Thromde office in consultation with the affected parties.

TABLE 16: GRIEVANCES LOGGED BY CW-01-CONSTRUCTION OF DISTRIBUTION NETWORK FOR PAMTSHO, THIMPHU

Date of Grievance	From/ Aggrieved person	Grievance	Action taken	Date of informing the aggrieved person	Status
02/02/2024	Plot owner	Pipe alignment running through plot (n107 – n117)	Realigned pipe outside plot	05/02/2024	Closed
18/02/2024	Plot owner	Pipe alignment running through the new construction building (n400-n251)	Pipe realigned outside plot	25/02/2024	Closed
18/03/2024	Plot owner	Pipe alignment running through the private plot (n324-n295)	Realigned pipe outside the plot	19/03/2024	Closed
21/05/2024	Plot owner	Excavation work for the pipeline Infront of building may lead to water leakage into the basement of the building.	Immediate backfilling and concreting the excavated area to prevent the water seepage and leakage.	21/05/2024	Closed

Package III – CW-02 (Zhemgang subproject)

138. No grievances have been registered to date. However, the PIU and the contractor anticipate that public grievances may arise once the project implementation is fully underway.

Package IV – DB-02 (Wangdue subproject)

139. The DB-02, also known as Package IV, is currently in the design stage and has yet to be tendered.

FIGURE 13: GRM REGISTER OF CW-01

Sl. No.	Date	Grievance Issued by	Grievance / Complaint	Corrective Action Taken	Reply Date to Issuer	Reviewed by	Remarks
2	2/12/24	Church	Pipe alignment running through plot (n107-n117)	realigned plot	5/2/24	Pema Tashi Thimphu Throndae	Closed
4	19/2/24	Plot owner	Pipe alignment running through the new construction building (n400-n25)	realigned pipe outside plot	25/2/24	Pema Tashi Thimphu Throndae	Closed
9	20/5/24	Plot owner	Pipe alignment running through the private plot. (n329-n295)	realigned pipe outside the plot	19/3/24	Pema Tashi Thimphu Throndae	Closed
10	21/5/24	Pema Tashi	Excavation instead of his building. Water sewage in the basement due to excavation.	To be backfilled and deconcreted immediately because there was water sewage in the basement of the building.	21/5/24	Pema Tashi Thimphu Throndae	Concrete completed

VI. AWARENESS AND TRAININGS ON SAFEGUARDS

A. HIV/AIDS AWARENESS CAMPAIGN FOR THE WORKERS OF DB-01 AND CW-01

140. A combined HIV/AIDS awareness campaign was organized by the contractors through the Health Information and Service Centre (HISC) for laborers working on the DB-01 and CW-01 subprojects in Thimphu. This initiative aimed to educate workers on HIV/AIDS prevention, raise awareness about its impact, and promote healthy practices at the workplace. The session included interactive discussions, the distribution of informational materials, and the provision of counselling resources. Laborers actively participated, demonstrating engagement and interest in the topic, contributing to the campaign's success.



B. ENVIRONMENT INCLUDING EMP, SOCIAL AND GENDER SAFEGUARD TRAINING FOR CONTRACTOR'S TEAM

141. Contractors working on projects funded by the Asian Development Bank (ADB) are required to undergo training on ADB's environmental safeguard policies. This training ensures that contractors understand and comply with the environmental standards and regulations set by ADB to minimize the environmental impact of their projects. The contractors for the DB-01 and CW-01 packages received training prior to commencing construction works. Similarly, the contractor's team for the CW-02 Zhemgang subproject was trained and informed about ADB safeguard policies in November 2024.

142. The training covered topics such as:

- **Environmental and Social Safeguards Principles:** Understanding the core principles and requirements of ADB's environmental safeguard policies.
- **Project Cycle and Environmental Safeguards Requirements:** Integrating environmental safeguards throughout the project cycle.
- **Environmental Impact and Mitigation Measures:** Identifying potential environmental impacts and developing measures to mitigate them.
- **Preparation of Site-Specific Environmental Management Plans (EMP) and Implementation training:** Creating plans to manage and monitor environmental impacts during project implementation.

- **Monitoring and Reporting:** Establishing systems for ongoing monitoring and reporting of environmental performance.

143. By completing this training, contractors are better equipped to implement environmentally responsible practices and ensure that their projects comply with ADB's stringent environmental safeguard standards

FIGURE 14: SAFEGUARD TRAINING AND AWARENESS SESSION AT CDCL PROJECT OFFICE, ZHEMGANG



VII. PUBLIC & STAKEHOLDERS CONSULTATIONS

144. The stakeholder meeting for the CW-02 Zhemgang Subproject took place at the Project Implementation Unit (PIU) office on 18 November 2024. Chaired by the Chief Engineer, it included participants such as the Zhemgang Municipal Office, the Dzongkhag Agriculture Officer, the PMSC Resident Engineer, the Safeguards team, and representatives from Trong Gewog.

145. Key points from the meeting:

- **Drinking Water Access:** The Mangmi and Gewog Agriculture Extension Officer raised the need to extend drinking water to all command areas, including Zhemgang municipal and Dangkhar village.
- **Project Awareness:** The lack of understanding about the project among Trong Gewog administration and end users was a concern. Even the Gewog head (Gup) was noted to be unclear about the scope of the project.

146. The safeguard team suggested organizing a formal public consultation meeting to improve awareness. However, due to an upcoming local ceremony, it was decided that consultations would be postponed to the next visit, with one-on-one discussions conducted in the interim.

FIGURE 15: THE SAFEGUARDS TEAM ENGAGED WITH THE MANGMI AND AGRICULTURE EXTENSION OFFICER OF TRONG GEWOG TO ADDRESS PROJECT CONCERNS AND HELD ONE-ON-ONE CONSULTATIONS WITH SHOPKEEPERS IN ZHEMGANG THROMDE TO ENHANCE COMMUNITY AWARENESS



VIII. CONCLUSIONS AND RECOMMENDATIONS

147. Construction activities for DB-01, CW-01, and CW-02 are currently underway. DB-01 is 71.56% complete, and CW-01 is 86.53% complete, while CW-02 commenced construction in late 2024. Both the DB-01 and CW-01 projects were on track to meet their respective deadlines, but were delayed by the flash flood of the Dechencholing stream in August 2024.

148. Loan covenants and national regulations are being adhered to. Nevertheless, compliance with the ESMP is only partial as ambient air quality monitoring was conducted for both the Thimphu subproject packages (DB-01 and CW-01) in November 2024, while water quality tests were not carried out during this period. Additionally, the CW-02 Zhemgang subproject, currently in the initial construction phases, is mandated to conduct air, noise, and water quality testing as per recommendations to establish the baseline data.


149. With regard to safeguard compliance recommendations from the previous SEMR, the issue of displaying the contact numbers of focal persons, which were initially missing from the signage for both the DB-01 and CW-01 packages, has been resolved by including the focal persons' contact numbers on their signboards. However, there is still a lack of a written code of conduct for the workers, which needs to be addressed in the upcoming reporting period. For baseline environmental quality monitoring, the CW-01 contractor conducted basic water quality tests at two locations, while the DB-01 package did not perform any tests during the same period. All required tests, including water quality tests, must be carried out in the upcoming reporting period to ensure better compliance.

150. To enhance compliance, contractors for DB-01 and CW-01 are required to carry out water quality tests at their respective project sites with immediate effect. Although, Thimphu subprojects is in the advance stages of implementations, it is required to comply with labour standards by preparing the workers' code of conduct. For Zhemgang subproject, it is important to renew the EC to avoid complications, establish baseline data, update IEE based on updated irrigation line and prepare traffic management plan. For details refer Table 13.

TABLE 17: SAFEGUARD ISSUES THAT NEED TO BE COMPLIED WITH IN THE UPCOMING REPORTING PERIOD

No	Issues and Action Required	Responsible Agency	Timeline
DB-01 & CW-01 (Thimphu Subprojects)			
1	Drinking water quality tests has not been done for this reporting period. It has to be done in the upcoming reporting period for both DB-01 and CW-01.	DB-01 & CW-01	January 2025
2	Workers' code of conduct was not prepared as recommended in the last SEMR. Code of conduct for workers shall be prepared with immediate effect.	DB-01 & CW-01	January 2025
CW-02 – Zhemgang Subproject			
1	Zhemgang subproject's Environmental Clearance (EC) will be expired by 28 January 2025. PIU/PMU has to reapply for the renewal of EC with immediate effect.	PIU/PMU	With immediate effect
1	Baseline data on ambient air, noise and water quality has to be established at least 3 locations: Sedimentation tank location Zhemgang town Dangkhar village	CDCL	With immediate January 2025
2	Once the distribution line for the irrigation and drinking water alignment from the main line finalized. The PIU and the Contractor supported by the PMSC site engineer will determine the number of tree felling required. PIU has to apply for the fresh Forest Clearance. Accordingly, the IEE will be updated and submitted to the ADB.	CDCL/PIU	February 2025
3	The substantial portion of the construction of the distribution line for integrated irrigation and drinking water will take place along the Zhemgang-Tingtibi and Zhemgang-Wangdigang roads, leading to potential traffic issues. Therefore, the contractor is required to prepare and implement a traffic management plan during the construction along these roadways. By planning ahead and putting a comprehensive traffic management plan into action, safety, efficiency, and overall public satisfaction during the pipeline installation process can be significantly improved.	CDCL	February 2025

APPENDIX 1 A – ENVIRONMENTAL CLEARANCE OF DB-01 & CW-01


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Department of Environment and Climate Change
Ministry of Energy and Natural Resources
Royal Government of Bhutan
Thimphu

BHUTAN
Believe

DECC/EACD/Tphu-Thromde/4223/2023/1171 October 06, 2023

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 **Thimphu Thromde** for construction of **Water Treatment Plant at Dechencholing and laying of distribution network at Jungzhina and Pamtho LAP** under Thimphu Thromde with the following terms and conditions:

I. General
The holder shall:

1. Comply with provisions of the National Environment Protection Act 2007, Environmental Assessment (EA) Act 2000 and Regulation for Environmental Clearance of Projects (RECOP) 2016, Waste Prevention & Management Act of Bhutan 2009 and its Regulation 2012 (Amendment 2016), The Water Act of Bhutan 2011 and its Regulation 2014 and Revised Regulation on the Substances that Deplete the Ozone Layer and HFCs 2021;
2. Ensure that the activity is in line with the Initial Environmental Examination (IEE) report and project document submitted for EC;
3. Ensure that local communities, properties and any religious, cultural, historic, and ecologically important sites are not adversely affected by the activity;
4. Restore the damage of any public or private properties caused by the activity;
5. Inform the Department of Environment and Climate Change (DECC) 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;
6. Erect a signboard at the take-off point of the main entry of the activity stating the name of the activity and contact address;
7. Ensure that a copy of the environmental clearance is framed and displayed at the workplace.

II. Environmental standards
The holder shall comply with the Environmental Standards 2020.


III. Import and use of Ozone Depleting Substances (ODS)
The holder shall import and use ODS and the Hydrofluorocarbons (HFCs) as per the Revised Regulation on the Substances that Deplete the Ozone Layer and HFCs 2021.

IV. Protection and management of water resources
The holder shall:

1. Ensure that the activity does not disrupt the water flow and pollute the water bodies; and
2. Ensure that a 30 meter or 100 feet buffer is maintained from the water resources.

V. Waste prevention and management
The holder shall:

P.O Box No. 141, Telephone (975) 323384/324323/326993



1. Manage waste generated from the activity with the application of 4R (Reduce, Reuse, Recycle, Responsibility) principle and other environmentally friendly methods of waste management;
2. Ensure that import and use of hazardous wastes are strictly prohibited; and
3. Ensure that wastes are properly stored prior to disposal/dispatch.

VI. Management of excavated materials and raw materials

The holder shall:

1. Dispose of excess excavated materials generated during the activity only at the pre-identified approved dumpsite; and
2. Put appropriate measures to avoid erosion and landslides.

VII. Others

The holder shall ensure that adequate measures are taken to reduce the noise generated from the activity.

VIII. Implementation plan

The holder shall prepare a detailed implementation plan focusing on the implementation of the terms and conditions of this EC and submit to DECC within three (3) months from the date of issue of this EC as per the reporting format attached herewith.

IX. Monitoring and reporting

The holder shall:

1. 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; and
2. Maintain proper records on wastes generated and its management – stating types (industrial and general wastes), quantities, and characteristics and submit to DECC annually.

X. Renewal and modification

The holder shall:

1. Ensure that application for the renewal of EC is submitted at least three (03) months prior to its expiry along with a copy of EC, a report on the implementation of its terms and conditions as per the format attached and payment of prescribed renewal application fee, failing which the applicant shall be liable for penalty as per the RECOP 2016;
2. Obtain prior approval from DECC for any modification to the existing proposal/application including, but not limited to, increase in production capacity, change in location of the project, change in ownerships, etc.

Reservation

1. The DECC may stop the activity or impose additional terms and conditions, as may be deemed necessary; and
2. The EC shall be subjected 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.

P.O Box No. 141, Telephone (975) 323384/324323/326993



Failure to comply with any of the above terms and conditions shall constitute an offense and the proponent shall be liable in accordance with the Environmental Assessment Act 200 and/or existing environmental laws.

Validity:

This EC is valid from October 06, 2023, until October 05, 2025, only for the construction of the following:

- a) Pre-sedimentation tank (60 m³) at the existing intake tank at Dechenphu;
- b) Compact-type Water Treatment Plant (1.4 MLD)
- c) Reservoir tanks (230 m³ & 100 m³)
- d) 3.531 Km of Treated Water Transmission Mains from Dechencholing to Pamtsho; and
- e) 18 Km of Distribution Network in Pamtsho and Jungzhina LAP.

This EC is issued solely pursuant to the EA Act, 2000 and its Regulations and in no way intends to overrule or alter the provisions of any laws or rules in force. The Holder of this EC shall be responsible to adhere to the requirement under other laws and the issuing authority assumes no liability resulting from non-compliance or omission of any laws or rules.


(Tashi Pem)
DIRECTOR GENERAL

To,
Executive Secretary
Thromde Administration
Thimphu Thromde

Copy to:

1. Guard-file (EACD/Tphu-Thromde/4223) DECC, MoENR for record.



P.O Box No. 141, Telephone (975) 323384/324323/326993

APPENDIX 1 B – ENVIRONMENTAL CLEARANCE OF CW-02



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DEPARTMENT OF AGRICULTURE
Ministry of Agriculture and Livestock
Royal Government of Bhutan
Tashichhodzong, Thimphu: Bhutan



DoA/PD/PSP-04/ 364

29 January 2024

Subject: Environmental Clearance for Sershong Irrigation Channel, Trong Gewog, Zhemgang.

Exercising the powers granted under Article 33.1 of the EA Act, the Department of Agriculture (DoA), Ministry of Agriculture & Livestock hereby renews Environmental Clearance (EC) for the construction/renovation of **Sershong Irrigation Channel, Trong Gewog, Zhemgang Dzongkhag** with the following terms and conditions:

1. The channel construction must be in line with the National Irrigation Policy;
2. The original alignment should be followed and no deviations must be made without prior DoA approval;
3. The gross abstraction of water from the source should not exceed 105 litres per second;
4. Wherever the soil structure is weak the channel must be lined with cement or HDPE pipe to prevent soil erosion and that the channel bed-slope must not exceed 1:100;
5. To avoid landslides and instability the channel alignment must conform to the technical survey report;
6. Structures like Drop/cascade, retaining walls and aqueducts must be constructed as per the plan/design specifications;
7. Waste materials (timber, soil, stones etc.) must be disposed off in designated areas and as per the Forest & Nature Conservation Act, 1995;
8. Occupational Health and Safety measures must be strictly maintained at all times and
9. Any disputes arising due to the construction of the channel shall be the responsibility of the project proponent.

Non-compliance of any of the above conditions shall constitute an offence under the EA Act 2000. This shall result in annulment of the EC without any liability on the part of the DoA. This EC is valid for a period of 12 months from the date of issue. In case of non-completion of the activity within the given period, the EC must be renewed one month prior to the date of its expiry.




This renewal is issued based on initial EC DoA-/Eng-19/2020-2021/619 dated 15 Feb 2021 and subsequent late renewal penalty paid vide RC492489568971 dated 22/01/24 and compliance report of 24/01/24 from Zhemgang dzongkhag.

Yonten Gyamtsho





Director.

Department of Agriculture PABX: 322228, 331316; Fax No. 323562; Director: 322805; Chief Agriculture Officer: 321291; Chief Engineer: 329122; Chief Horticulture Officer: 336946; Horticulture Division PABX: 323183,323184 Fax No: 325837

APPENDIX 2A: FORESTRY CLEARANCE: CW-01- DISTRIBUTION NETWORK FOR PAMTSHO

	<p>ཐིམ་ཕུ་ཁྲོམ་གྲོང་ཁྲུང་། Thimphu Thromde 220 Gongdzin Lam SE, Norzin Thimphu -11001: Bhutan</p>	
TT/Env/UF/2023-24/ ༠༧༥༤		17 th August, 2023
Infrastructure Division, Thimphu Thromde		
<u>Subject: Issuance of Forest Clearance</u>		
Sir,		
<p>This has reference to your application dated 31st July, 2023 regarding the laying of water supply pipelines in government land from Dechencholing to Pamtshe, Environment Division of Thimphu Thromde inspected the site and found 10nos. of pole-sized blue pine trees and 10nos. of pole-sized oak trees are required to be felled. However, the applicant is requested to avoid the felling of trees if possible. There is no adverse effect in issuing the forest clearance however, the applicant should strictly adhere to the terms and conditions mentioned in this clearance and form (Annexure III).</p>		
<p>In this regard, Environment Division would like to request Thimphu Forest Division to mark 20nos. of trees (detailed attached) from the proposed site and the trees may be allotted to NRDC.</p>		
<p>In any case, if the applicant fails to comply with any of the terms and conditions mentioned in this clearance and the form it shall constitute an offence under the Forest and Nature Conservation Rules and any other relevant laws. Penalties for such offenses shall include suspension and or revocation of forest clearance in any part or whole.</p>		
<p>The clearance granted shall be valid for a period of one year from the date of issue of this notification.</p>		
<p>Please find attached the details of the inspection report.</p>		
Thanking you,		
Yours sincerely,		
		
Dy. Chief Forestry Officer, Environment Division, TT		
Cc:		
<ul style="list-style-type: none">• Dasho Thrompon, TT for kind information• Executive Secretary, TT for kind information• Chief Forest Officer, Thimphu Forest Division, DoFPS for kind information.• Regional Manager, Wang Region, NRDC to execute the felling immediately• Office copy.		
PABX Phone: +975-2-336310/330001 Toll free-1009		
www.thimphucity.bt		

APPENDIX 2B: FORESTRY CLEARANCE: DB-01- WTP

	<p>ཐིམ་ཕུ་གྲོང་ཁྱེད། Thimphu Thromde 220 Gongdzin Lam SE, Norzin Thimphu -11001: Bhutan</p>	
TT Env/UF/2023-2024: 0241		25 th August 2023
The Chief Forest Officer, Thimphu Forest Division, Thimphu.		
Subject: Marking Order		
Dear Sir,		
As per the application dated 25 th August 2023 by the Infrastructure Division regarding the felling of trees for the extension of the water treatment plant at Dechencholing in government land bearing Thram No. 675 and Plot no. KAW- 558, the Environment Division of TT has inspected the site and found that there are 33nos. of blue pine trees are required to be felled.		
In this regard, Thimphu Thromde would like to recommend your office to mark 33nos. of trees (detailed attached) from the proposed site and the trees may be handed over to the NRDC.		
Please find enclosed the inspection report.		
Thanking you.		
Yours sincerely,		
		
Dy. Chief Forestry Officer Environment Division, TT		
Cc:	<ul style="list-style-type: none">• Executive Secretary, TT for kind information• Regional Manager, Wang Region, NRDC for executing the felling.• Applicant to plant equal number of trees in unaffected area.• Office copy.	<p>THIS/EM/15/04/2023/172 Dated: 25/8/2023</p> <p><u>BO, Dechencholing</u> Please conduct field verification and submit report on the following. - species, no & volume - GPS coordinates.</p> <p> 25/8/23</p>
PABX Phone: +975-2-336310/330001 Toll free-1009 www.thimphucity.bt		

APPENDIX 3A: PARTICIPANT LIST FOR THE CW-01 & DB-01
CONTRACTOR ORIENTATION ON ESS

ENVIRONMENT & SOCIAL SAFEGUARDS TRAINING ORIENTATION FOR WFSP-PIU & CONTRACTORS 01/09/2023		
1) Lotay Tsheten	BECPL	Lotay.becpl@gmail.com.
2) Budha Mani	EWCPPL	budhamani2011@yahoo.com.
3) Pema Tashi	T.T	ptashi@thimphuacity.gov.bt
4) Mongal Yang Subba	BE CPL	wongalyang@gmail.com
5) Yeshe Bumkyid	EWCPPL	Bumkyid@gmail.com
6) Tasni Nyikum.	EWCPPL	nyikumt@gmail.com
7) Saroj K. Nepal	ADB consultant (Social)	gonefela@gmail.com
8) Deki P. Yonden	ADB Consultant, PCS.	-
9) Jigme Sonam	PCS. PCS.	-
10) Thukten Thinley	T.T.	thuktenthinley77@gmail.com
11) Ngawang Tashi	TT	ritashi@thimphuacity.gov.bt
12) Pema Thokcho	TT	pthokcho@thimphuacity.gov.bt

APPENDIX 3B: PARTICIPANT LIST FOR THE CW-02 CONTRACTOR ORIENTATION ON ESS

☀ ☁ ☔

Su Mo Tu We Th Fr Sa Date: / /

Sl.#	Name	Sex	Designation	Contact#	Signature
1.	Tashi Tobgay	Male	W/ OHS Officer	17547546	[Signature]
2.	Kinzang Thondup	M	Biologist	17291192	[Signature]
3	Namgay Khuzu	m	Supervisor	17767027	[Signature]
4	Bikash Bhattachai	M	Jr/supervisor	170117679	[Signature]
5	Nar Bor Bhattachai	M	Plumber	17473473	[Signature]
6	Dorji	M	Supervisor	17664484	[Signature]
7.	Tenzin Natsu	m	Physician	13702903	[Signature]
8.	Arun	m	Technician	77254743	[Signature]
10	KARSHAN NARDO	m	PM	17602493	[Signature]
11.	Kamal Thapa	M	CSE (PMSC)	17409074	[Signature]
12.	Rajish Pradhan	M	Health Officer	17603661	[Signature]
13.	Nagay Tamjore	M	Social Safeguards	17618624	[Signature]
14.	Karma Chogyel	M	Env. Safeguards	1765489	[Signature]
15.	Tshering Jangden	F	Office assistance	17595219	[Signature]

APPENDIX 4A: CEMP COMPLIANCE OF DB-01

No	Activities	Potential Negative Impacts	Proposed mitigation measures	Responsible Agency		Remarks	
				Implementation	Monitoring	Client	Contractor
1	Labor Camp Location and Operation:						
a	Labor camp location	Improper location of the camps	Camps to be constructed at designated/approved location	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Camps constructed in approved location given by the client
b	Latrines	Conflict with nearby vicinity for water resources contamination, surrounding sanitation and unhygienic living condition.	Proper latrine to be provided with adequate water supply, surrounding to be maintained clean with proper drainage facilities.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Provided with adequate water
c	Drinking water Supply	Health problems and spread of diseases	Safe drinking water to be provided with 25mm water line for 24 hours supply at about 1 km away from the construction site	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
d	Waste Disposal	Improper disposal of domestic waste, spread of diseases, unhygienic living condition and water pollution of nearby stream & river	Use of proper waste disposal site of earthen pit and collect the waste every weekend to memilakha disposal site.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
e	Health Awareness	Get affected with water borne diseases, spread of other disease like STD/HIV/AIDS	First AID and medical supply to be kept at site, Labors to be briefed about the spread of diseases, identified the location of nearby hospital.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
f	Awareness on the Law of the Country	Illegal hunting, illegal fishing and collection of timber from the forest.	Staff and the labors to be educated on the law of the country and collection of timber from the forest. The staffs and labors to be provided with cooking firewood/electricity after getting the permit from authorized department.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
2							
a	Disruption of road traffic by excavation operations	Cause injuries and accident	Provision of advance information to the public on the timing and duration of construction operations that will affect traffic flow, and use of suitable temporary signaling system	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
3.							
a	Excessive cutting	Instabilities of local landscape, production of excess spoil, slope	Minimize the cutting to required height and the operator to be briefed properly before start of cutting. Proposed	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde	Complied

		failure and soil erosion	retaining wall to retain the fill areas.				
b	Spoil materials	Air pollution, Road blockage, water pollution and soil erosion.	All excess excavated material to be disposed at identified dumping yard and provide protection wall wherever necessary.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde, Thimphu Thromde,	Complied
c	Safety	Injury and accident.	Safety gadgets like helmet, gloves and safety boots to be used during work. Sign boards, information boards and barricade tape to be erected at work side.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
4.							
a	Construction Waste Disposal	Scarring of Landscape, Damage of vegetation, water pollution, disruption of natural flow, blockage of road and disturbance to aquatic ecology.	Proper disposal of waste at identified location, should not be disposed in streams and rivers.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
5. Materials:							
a	Storage	Huge stock piling can slump down and cause land slip and damage existing vegetation and infrastructure.	Stock piling area to be not erosion prone, away from residential area, construction materials to be covered by tarpaulin to protect from rain and wind.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
b	Handling	Caused injury and accident	Provision of proper construction gloves, goggles, face mask, safety boots as required. Supervisor to be engaged with labors.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
6. Water:							
a	Water management	Soil erosion, land slid and flooding of area.	Proper drainage to be constructed.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
b	cross drain and diversion	Flooding of downstream area, increase sediments in the stream and rivers	Provision of appropriate drainage and proper restoration of original course of water after construction.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
7. Vehicle and Machinery:							
a	Pollution	Air pollution, noise pollution, dust pollution and water pollution.	Regular maintenance of vehicle. Used oil/grease to be disposed off properly and proper mask to the workers.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied
b	Safety	Injury and accident.	Provision of safety gear such as gloves, boots, helmets, face mask, ear plugs to the construction workers. Ensuring that vehicle and equipment operators are properly licensed and trained.	M/s E W Construction Pvt. Ltd.	Thimphu Thromde,	Thimphu Thromde,	Complied

APPENDIX 4B: CEMP COMPLIANCE OF CW-01

SI no	Activities	Mitigation	Location of implement	Remarks
1	Orientation for contractor's workers on EMP	PIU and Contractor will conduct awareness program and Contractor will strictly follow the EMP	Camp Area	1) Briefed every time new workers join the site. 2) every Monday morning workers are briefed,
2	Site Clearance	Felling of Trees	Construction site	Not applicable
		Clearing of Forest	Construction site	Not applicable
3	Earth work	1) We will do excavation as per specification and maintain slope as required	Construction site	Complied and excavated manually
		2) Embankment filling will be done as specification with required proper slope		Complied
		3) In the area of Deep Excavation and trench Excavation Caution tape will be used around the excavated area.	Construction site	Caution tape provided
4	Material exploitation and management of quarry	1) All construction materials, particularly stone and aggregate are to be source from BSAF or Singye Quarry (Approve by DGM)	Approved Quarry	
		2) Sand will be procured from NRDCL (Authorised supplier)	Wangdi Quarry	sand from Wangdiphodrang after approval from NRDCL
		3) All vehicle used for transportation will be covered by tarpaulin	Quarry to Site	Covered
5	Waste	1) We will dispose Construction waste and surplus earth at identified disposed site.	Construction site	Complied
		2) Waste Generated from labour and staff camp will be collected and hand over to Thomde waste collecting truck	Construction site	Waste Dropped when the Thomdoe vehicle comes and others are taken to waste drop-in centre, Jungshina
6	Dust Pollution	We will sprinkle water if necessary	Construction site	Tanker kept at site ready
7	Air Pollution	All vehicle and machine have fitness and emission test certificate	Construction site	all emission test are done
8	Noise pollution	We will avoid noise pollution like unnecessary horn.	Construction site	instructed drivers and complied
9	Stock piling of Materials	Stockpiling will be done in Appropriate locations where, there will be no soil erosion or damaged to vegetation	Construction site	complied and stored on stable ground
10	Construction camp and canteen facilities	1) Construction camp will be construct at designated area provided by Thomde or rented private place	Camp area	complied
		2) Adequate drinking water, and other basic require item will be provided	Camp area	provided
		3) Proper pit latrine is constructed for hygiene propose, Waste will dispose to city waste collector	Camp area	complied
		4) instruct the labour regarding illegal work like fishing and hunting	Camp area	briefed every Monday and every time new labour arrive at site
		5) After completion of project, Camp area will be clean and bring back to original state	Camp area	
12	Safety measure	Will provide adequate safety gear, Such as Ear plugs, masks, gumboots, gloves and safety helmets etc.....to the workers. Provide full PPE kit to workers	Construction site	provided
13	Injury/Illness	Render first Aid, Call emergency if needed, notify OHAS officer	Construction site	provided
14	Disease outbreak	Render first aid, contact emergence, cordon off the area.	Construction site	
15	Machinery Accident	Render first Aid, Call police, emergency if needed, notify OHAS officer	Construction site	complied

16	Fire prevention and protection	Awareness program by OHAS officer, no burning of fire in open area, forest area. Highly flammable material to be disposed properly	Construction site	briefed every Monday and every time new labour arrive at site about the fire prevention and Do's and don'ts.
17	Public health and safety	Construction site near settlement will be provide safety tape and sign board whenever necessary.	Construction site	provided at necessary area
18	Operations of Vehicles, Machinery and equipment'	Regular maintenance of Vehicle & Machinery	-	complied
		Emission test to be carried out	-	Complied

APPENDIX 4C: CEMP COMPLIANCE OF CW-02

SNo	Activities	Impacts	Mitigation Measures	Remarks
Construction Phase				
1	Establishment of Contractor's site Facilities	Construction of site facilities could involve clearing of vegetation, require electrical and water supply and sanitation facilities. Improper management will result to environmental pollution and damage, and diseases.	<p>Build any site office, storage facilities and/or workers' camps as close as possible to the newly constructed road so as to minimize vegetation clearance.</p> <ul style="list-style-type: none"> •Avoid or minimize cutting of trees when setting up these facilities. Any tree cut will be compensated with replanting of trees through an afforestation program at the area replacement ratio of 2:1 (i.e. required afforestation area is twice the tree cutting affected area). Budget for the afforestation program as indicated in the EMP cost table in this IEE will be provided to the DOFPS. Budget for the replanting program will be provided to the DOFPS. •No facilities will be built within the Biological Corridor. Since these facilities are expected to be shifted along the alignment as work progresses, the same will be built temporarily for easy dismantling and relocation. •Provide temporary pit latrines and kitchen wastes disposal pits within these facilities for proper solid waste management and prevent the indiscriminate discharge of waste to the surroundings. •Provide diversion drains, catch drains and silt-traps around camps to avoid siltation of nearby water bodies, if any. •Ensure a very strict compliance of the pandemic COVID-19 safety protocols of the country at all times. See Appendix 13; and •Restore all facility sites and modified areas after completion of the work. The PIU will issue a work completion certificate only when all the restoration works are carried out satisfactorily by the Contractor. 	All the mitigation measures stipulated in the EMP to be implemented diligently during the construction phase of the project.
2	Physical Cultural Resources – Chance find	Excavation activities may impact underground and undiscovered cultural artifacts.	<p>For any chance finds during excavation activities, the Contractor shall strictly implement the following protocol: Stop work immediately to allow further investigation.</p> <ul style="list-style-type: none"> - Coordinate with PIU and/or PMU and local Department of Culture; and - Through PIU and/or PMU, request authorized person from the local Department of Culture to observe when excavation resumes for the identification of the potential chance finds, and comply with further instructions. 	
3	Transport of construction materials	Material transport and storage will generate noise, vehicle emission and dust that could disturb the subproject immediate receptors	<p>All construction material will be stacked temporarily by the roadsides leaving adequate space for the vehicles to ply safely at work sites.</p> <p>Dusty areas will be sprinkled with water especially on dry windy days.</p> <p>Vehicles transporting sand, soil and aggregates will be covered with tarpaulin to reduce the release of dust along transport routes.</p>	

SNo	Activities	Impacts	Mitigation Measures	Remarks
			<p>To minimize air emissions, ensure regular maintenance of equipment to prevent smoke belching and compliance with the RSTA emission test.</p> <p>All stockpiles that will be left idle for a long time will be covered.</p>	
4	Biodiversity	All construction activities at the four intake sources and along the raw water transmission alignment will potentially change the natural landscape of the biological corridor and government reserve forests and disturb flora and fauna resources thriving therein.	<p>Shall implement the following measures for construction activities within the biological corridor and government reserve forest areas:</p> <p>Construct intake structures and raw water pipelines during lean season to avoid any delay in works and shorten construction period.</p> <p>Limit construction activities during the daytime.</p> <p>Avoid establishing storage sites or workers' camps within the biological corridor or government reserve forest.</p> <p>Lay the pipes strictly in accordance with the plan to minimize extended disturbance in the area. Depth of excavation, if any, shall only be sufficient enough to protect the pipes. This will reduce production of spoils and shorten the time of excavation works.</p> <p>Use of excavation method that will not require huge heavy equipment to be deployed in the area. Use handheld excavators and smaller machines where possible.</p> <p>Avoid the use of explosives, where possible. In areas where blasting is necessary, use "silent blasting" method.</p> <p>Identify disposal site for construction debris to avoid indiscriminate dumping of wastes into the streams or rivers.</p> <p>For any felling of trees covered under the subproject, compensate through replantation or afforestation which involves providing budget to DoFPS;</p> <p>Ensure that no harvesting or poaching of wildlife flora and fauna resources in the area occurs. Provide training to workers on awareness with the laws and penalties governing poaching/hunting of wildlife and illegal felling of trees; and</p> <p>Restore all heavily modified areas after construction works, particularly in steep sections, to ensure no induced landslides occur in the future. This may be done through bioengineering or methods that will stabilize the affected areas.</p>	
5	Soil Erosion and Sedimentation	Exposed soil at construction sites can be washed away by runoff and could clog the receiving bodies of water and drainage system in the areas.	<p>Minimize exposed areas at work sites.</p> <p>Ensure proper compacting of backfilled areas.</p> <p>Use structural erosion prevention and sediment control practices such as temporary sedimentation canals around the exposed areas. This will prevent sediments from moving offsite and reduce the erosive forces of runoff waters.</p> <p>Consistent with the SMP, immediately remove all excess spoils from sites and dispose the same in designated disposal site.</p>	

SNo	Activities	Impacts	Mitigation Measures	Remarks
6	Surface water quality	Runoff from stockpiled materials and chemicals from fuels and lubricants during construction works can contaminate surface water quality in these bodies of water.	<p>Provide silt traps or temporary sedimentation canals along alignments that are adjacent to receiving bodies of water. Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer.</p> <p>Minimize transport and disposal of excess spoils. Where possible, use excess spoils for beneficial purposes such as in any other construction activities, or to raise the level of low-lying areas near the subproject sites.</p> <p>Avoid scheduling of excavation work during the monsoon season. Earthworks should be undertaken during the dry season.</p> <p>Confine construction area including the material storage (sand and aggregate) so that runoff from upland or elevated areas will not enter the site.</p> <p>Ensure that drains are not blocked with excavated soil.</p> <p>Stockyards at least 20 meters away from watercourses.</p> <p>Fuel and other petroleum products are stored at storage areas away from water drainage and protected by impermeable lining and bound 110% by volume.</p> <p>For effluents from work sites, camps, and offices, provide treatment arrangement such as retention ponds and septic tank should be incorporated in the facility designs. A sewage management plan has to be prepared by the Contractor and agreed with PIU.</p> <p>Monitor water quality according to the environmental management plan.</p>	
7	Air quality	Emissions from construction vehicles, equipment, machineries used for excavation and construction, and the excavation activities will produce pollutants (dust, smaller particulate matters, etc.) that could impact the air quality.	<ul style="list-style-type: none"> • Take every precaution to reduce the levels of dust at construction sites, and not exceeding the pre- project ambient air quality standards. • Barricade the construction area particularly in relation to distribution network improvement within the Zhemgang town center. Initiate site clearance and excavation work only after barricading of the site is done. • Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated and government- approved disposal area. • Conduct work sequentially – excavation, pipe laying, backfilling; conduct pipe testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done. • Remove the excavated soil of first section to the disposal site; as the work progresses, sequentially, by the time second section is excavated, the first section will be ready for back filling. The backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, 	

SNo	Activities	Impacts	Mitigation Measures	Remarks
			<p>pedestrian movement and wind will generate dust from the backfilled section. Restoration should be undertaken immediately.</p> <ul style="list-style-type: none"> • Provide all heavy equipment and machinery with air pollution control devices that function properly. • Vehicles travelling to and from the construction site must adhere to speed limits so as to avoid excessive dust that may go airborne. • Reduce dust by spraying stockpiled soil, excavated materials, and spoils. • Cover with tarpaulin the dump body of trucks or vehicles when transporting soil and sand. • Cover stockpiled construction materials with tarpaulin or plastic sheets. • Trenching and transport vehicles shall move only in designated areas and roads. • Water spraying of access roads, camp sites and work sites to reduce dust emissions. • Machines and vehicles must be regularly examined and maintained to functioning and use them within their design limits and specifications. <p>All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements of the government. Compliance with this requirement will be included in Contractor's reports to PIU and PMU.</p> <p>Monitor air quality according to the environmental management plan.</p>	
8	Noise and Vibration	Noise and vibration impacts are expected from construction activities that could affect sensitive fauna resources in the biological corridor and forest areas, and the general population in the Zhemgang town proper. Vibration generated from excavation works for the distribution network will also have impact on nearby structures such as houses and/or buildings in the Zhemgang town proper.	<p>Follow all construction methods developed for the subproject during the design phase, including use of "silent blasting" technique when blasting is necessary for rocky alignments in the biological corridor or forest reserve areas.</p> <p>Plan activities in consultation with PIU so that activities with the greatest potential to generate noise are conducted during daytime in the biological corridor and forest areas, and along alignments near residential areas and/or noise-sensitive institutions such as hospitals. Nighttime works may also be considered in alignments adjacent schools and places of worship.</p> <p>Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptors.</p> <p>Identify any structures such as houses or buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity.</p> <p>Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach.</p>	

SNo	Activities	Impacts	Mitigation Measures	Remarks
			Consult local communities in advance of the work to identify and address key issues, and avoid working during sensitive occasions, such as religious and cultural festivals.	
9	Community health and safety	Some work sites can be easily accessed by the community people. There may be an increased traffic congestion and risk of accidents where delays and diversions are imposed or altered without adequate warnings and precautions. In case of the COVID-19, there is a serious threat of spreading the virus in the communities surrounding the subproject sites due to interaction of subproject staff and workers with the locals.	<p>Follow a code of conduct for workers, which should include restricting workers in designated areas, no open defecation, no littering, no firewood collection, no setting of fire except when needed but in designated places, no trespassing, no unauthorized overstaying at construction sites, and no obligation to undertake potentially dangerous work without the use of proper personal protective equipment, among others.</p> <p>Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on construction and decommissioning activities.</p> <p>Follow the established community and occupational health and safety protocol on emerging infectious diseases such as COVID-19. See Appendix 13 for a sample guidance note in responding to COVID-19. Maintain a complaint logbook in workers' camp and take action promptly of complaints.</p> <p>Schedule transport and hauling activities by avoiding busy areas of the town.</p> <p>Clean wheels and undercarriage of haul trucks prior to leaving construction site.</p> <p>Educate drivers and comply with speed limits between 20-25 km/h near settlements or sensitive institutional establishments and avoid use of horns unless necessary to prevent accidents.</p> <p>Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement.</p> <p>Provide prior information to local people about work.</p> <p>No nighttime construction activities including material/waste haulage near or within residential areas. Construction activities in these areas must be prohibited from 9pm to 7am.</p> <p>Noise barriers must be installed in housing areas to reduce the noise level.</p> <p>Temporary access such as planks with handrails will be provided at excavation areas, particularly in locations where access to residential, commercial and institutional establishments is affected.</p>	
10	Occupational health and safety	Health risks and safety problems for workers is likely due to various construction activities such as storage, handling and	All relevant provisions of the Labour and Employment Act of Bhutan 2007, Regulation on Occupational Health, Safety and Welfare 2012, and relevant WHO guidelines will be adhered to concerning the provision of adequate measures to	

SNo	Activities	Impacts	Mitigation Measures	Remarks
		<p>transport of hazardous construction material, excavation, and other construction related activities. Workers may also be exposed to high level of pollution from dust, exhaust of vehicles and machinery and noise.</p> <p>Further, if workers do not keep to regulated working hours, the risk of accidents will be higher due to fatigue. COVID-19 is also a major issue at construction and camp sites that is detrimental to the workers.</p>	<p>avoid contracting and/or spreading diseases.</p> <p>Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities.</p> <p>Implement an occupational health and safety protocol on emerging -19) as approved by the PIU or PMU. See Appendix 13 for a sample guidance note in responding to COVID-19.</p> <p>Provide at every workplace, a readily available first aid unit, including an adequate supply of sterilized dressing material and appliances. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital or clinic.</p> <p>Make available emergency medical equipment and nursing staff at all times.</p> <p>Provide regular health check-ups, sanitation and hygiene, health care, and control of diseases for the workforce.</p> <p>Provide at cost all labor and materials, and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site.</p> <p>Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards.</p> <p>Make available first aid kits, ambulance facilities or standby emergency vehicles, and fire extinguishers in camp sites.</p> <p>Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries.</p> <p>Provide insurance to the workers. Health and safety training for all site personnel is very important and must be mandatory.</p>	
	<p>Closure of construction sites</p>	<p>Wastes generated during construction works and remain unmanaged after the construction period could impact the environment. If not removed from the sites after completion of the works, these wastes will cause nuisances to community, aesthetics issues, and potential sources of contaminants for surface runoffs.</p>	<p>After work completion, remove the construction waste from the sites. The entire site must be free of any construction waste.</p> <p>Implement the required surface restoration through bioengineering works.</p> <p>All surplus excavated soil shall be disposed in designated disposal sites identified and approved during the design/pre-construction phase.</p>	

APPENDIX 5A: CW-01 AMBIENT & NOISE QUALITY TEST RESULT



BHUTAN ECOLAB SERVICES, PEKARZHING, P/LING.

INSPIRING ENVIRONMENTAL SERVICES...

TEST REPORT						
Name & Address of the Customer:		M/s Bhutan Engineering Company Pvt Ltd, Thimphu, Bhutan		Report No.	BES/599	
Type of Analysis:		Ambient air quality analysis		Date of Result Dispatch	4/11/2024	
Sampling Location:		Project Area		Sample No.:	BES/24/599	
Date of Sampling:		02/11/24 to 3/11/24		Sample Description:	Ambient air	
Sampler		Bhutan Ecolab Team				
S.L.No.	POLLUTANTS	UOM	ANALYSIS (Result)	MAX.PL (NECS)	MAX.PL (WHO)	TEST REF. METHOD
1	Conc. Of TSPM	µg/m ³	13.089	500(24 hr mean)	150 (24 hr mean)	IS: 5182: Part 4: 1999
2	Conc. Of PM-10	µg/m ³	9.065	200(24 hr mean)	50 (24 hr mean)	IS: 5182: Part 23: 2011
	Conc. of PM-2.5	µg/m ³	5.08	60(24 hr mean)		
5	Conc. Of NO ₂	µg/m ³	71.20	120(24 hr mean)	200 (1 hr mean)	IS: 5182: Part 6: 2011
6	Conc. Of SO ₂	µg/m ³	BDL	120 (24 hr mean)	20 (24 hr mean)	IS: 5182: Part 2: 2011
7	Conc. Of CO	ppm	BDL	5000 (8 hr mean)	30 (1 hr mean)	
8	Temperature	°C	18.72			
9	Air Pressure	mbar	772.155			
10	RH	%	63.52			
<i>Note: Maximum permissible limit as per Environmental Discharge Standard, 2020 (ambient air), NECS, RGoB & WHO</i>						
<i>*BDL: Below detectable limit; MAX.PL: Maximum Permissible Limit; UOM: Unit of Measurement;</i>						
<i>*BDL:-Below Detectable limit; *LPM: - liters per minute; *Max.PL:- Maximum Permissible Limit</i>						

*Weather condition at the time of sampling: Sunny

GEO-COORDINATES OF SAMPLING LOCATIONS: 27.50916, 89.63726

Elevation: 2331 m.a.s.l

EQUIPEMENT OF USED SPECIFICATION:

- 1) Equipment Name: AQM-09 real time sampler
- 2) Model No.: AQM-09
- 3) Make: Oceanus

Prepared by:

For Bhutan Ecolab Services;

[Authorized Signatory]



CONTACT NO. +975-17449115/77734954; EMAIL : tenzin85veshi@gmail.com



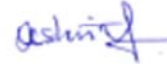
TEST REPORT						
Name & Address of the Customer:		M/s Bhutan Engineering Company Pvt Ltd, Thimphu, Bhutan.		Report No.		BESLM/494
Type of Analysis:		Ambient Noise level		Date of Result Dispatched:		4/11/2024
Sampling Location:		Project Area		Sample No.:		SLM/525
Date of Sampling:		2/11/24 to 3/11/24		Sample Description:		Ambient Noise
Sampler		Bhutan Ecolab Team				
ANALYSIS						
SL.NO	PARAMETER	UOM		MAX.PL (NECS)	MAX.PL (WHO)	TEST REF. METHOD
1	Sound Pressure Level (SPL)	Db	45-75	75 (Day)	85 (8-hour exposure)	SLM continuous recording
			32-54	65 (Night)		
* UOM: Unit of Measurement; Max.PL: Maximum Permissible Limit; WHO: World Health Organization						
Note: Noise level Limits, National Environment Commission Secretariat (NECS), 2020 & WHO standards.						

GEO-COORDINATES OF SAMPLING LOCATIONS: 27.50916, 89.63726

Report Prepared by:



For M/s Bhutan Ecolab Services (BES):




APPENDIX 5B: DB-01 AMBIENT & NOISE QUALITY TEST RESULT



BHUTAN ECOLAB SERVICES, PEKARZHING, P/LING.

INSPIRING ENVIRONMENTAL SERVICES...

TEST REPORT						
Name & Address of the Customer:		M/s East West Construction Pvt Ltd, Thimphu, Bhutan		Report No.		BES/603
Type of Analysis:		Ambient air quality analysis		Date of Result Dispatch		12/11/2024
Sampling Location:		Project Area		Sample No.:		BES/24/603
Date of Sampling:		08/11/24 to 09/11/24		Sample Description:		Ambient air
Sampler		Bhutan Ecolab Team				
Sl.No.	POLLUTANTS	UOM	ANALYSIS (Result)	MAX.PL (NECS)	MAX.PL (WHO)	TEST REF. METHOD
1	Conc. Of TSPM	µg/m³	39.713	500(24 hr mean)	150 (24 hr mean)	IS: 5182: Part 4: 1999
2	Conc. Of PM-10	µg/m³	13.42	200(24 hr mean)	50 (24 hr mean)	IS :5182: Part 23: 2011
	Conc. of PM-2.5	µg/m³	7.10	60(24 hr mean)		
5	Conc. Of NO ₂	µg/m³	19.86	120(24 hr mean)	200 (1 hr mean)	IS: 5182: Part 6: 2011
6	Conc. Of SO ₂	µg/m³	BDL	120 (24 hr mean)	20 (24 hr mean)	IS: 5182: Part 2: 2011
7	Conc. Of CO	ppm	BDL	5000 (8 hr mean)	30 (1 hr mean)	
8	Temperature	°C	17.32			
9	Air Pressure	mbar	770.654			
10	RH	%	66.07			
<i>Note: Maximum permissible limit as per Environmental Discharge Standard, 2020 (ambient air), NECS, RGoB & WHO</i>						
<i>*BDL: Below detectable limit; MAX.PL: Maximum Permissible Limit; UOM: Unit of Measurement;</i>						
<i>*BDL:-Below Detectable limit; *LPM: - liters per minute; *Max.PL:- Maximum Permissible Limit</i>						

*Weather condition at the time of sampling: Sunny

GEO-COORDINATES OF SAMPLING LOCATIONS: 27.5373777, 89.6339075

Elevation: 2567 m.a.s.l

EQUIPEMENT OF USED SPECIFICATION:

- 1) Equipment Name: AQM-09 real time sampler
- 2) Model No.: AQM-09
- 3) Make: Oceanus

Prepared by: *(Signature)*

For Bhutan Ecolab Services;

(Signature)
 [Authorized Signatory]

CONTACT NO. +975-17449115/77734954; EMAIL : tenzin85yeshi@gmail.com

TEST REPORT						
Name & Address of the Customer:		M/s East West Construction Pvt Ltd, Thimphu, Bhutan.	Report No.		BESLM/499	
Type of Analysis:		Ambient Noise level	Date of Result Dispatched:		12/11/2024	
Sampling Location:		Project Area	Sample No.:		SLM/530	
Date of Sampling:		08/11/24 to 09/11/24	Sample Description:		Ambient Noise	
Sampler		Bhutan Ecolab Team				
ANALYSIS						
SL NO	PARAMETER	UOM		MAX.PL (NECS)	MAX.PL (WHO)	TEST REF. METHOD
1	Sound Pressure Level (SPL)	Db	48.21	75 (Day)	85 (8-hour exposure)	SLM continuous recording
			34-75	65 (Night)		
* UOM: Unit of Measurement; Max.PL: Maximum Permissible Limit; WHO: World Health Organization						
Note: Noise level Limits, National Environment Commission Secretariat (NECS), 2020 & WHO standards.						

GEO-COORDINATES OF SAMPLING LOCATIONS: 27.5373777, 89.6339075

Report Prepared by:



For M/s Bhutan Ecolab Services (BES):




APPENDIX 5B: PHOTOGRAPHS OF THE PROJECT



FIGURE 16: SITE OFFICE AND LABOUR CAMP OF CW-01

FIGURE 17: SAFETY RAILING OVER THE STREAM CROSSING TOWARDS CW-01 INTAKE SITE & CLEANED DISTRIBUTION CHAMBER AREA



FIGURE 18: EMP TRAINING PARTICIPANTS OF CW-02 AND HIV/AIDS AWARENESS TRAINING SESSION FOR DB-01 AND CW-01 WORKERS

