

Environmental and Social Management Plan (ESMP)

Bhutan Waste Bank

Greener Way

Environmental and social risks and impacts are strongly linked to subproject location and scope of activities. As much as ESMP is attempted to customize with each specific subproject location and activities. Some subproject activities of this “**Bhutan Waste Bank (BWB)**” project are too minor or miscellaneous to generate impacts on environment and society like the addition of cubical wooden/prefab banking counters at the already established Drop Off Centers (DOCs) or the impacts are similar if not same in the operation phase in all the BWB stations. Even establishment of four (04) new wire mesh Wastes Depository House (WDH) at source will have negligible ES impacts. However, for a clearer understanding of the potential impacts and knowing the site locations independently this ESMP is developed.

1. Subproject Activity Information

Subproject Activity Title:	Establishment of nine (09) Bhutan Waste Bank (BWB) at existing Drop-Off Centers (DOCs), set-up waste bank at Greener Way’s head office (1), and establishment of 4 new Waste Depository Houses.
Estimated Cost:	USD 98,123
Start/Completion Date:	February 15, 2024/January 31, 2025

Site/Location Description

All the site locations identified for the established Bhutan waste banks (BWBs) and the Waste Depository House (WDH) are within the Thimphu Thromde (Municipality). The BWBs are stationed in series with Dangrina BWB in the north to Tshalumaphey and Chubugnag BWBs in the south. The climatic conditions, temperature, altitude, and geographical conditions of all the BWBs and WDHS locations are similar, therefore do not vary much from each other. In one stretching valley, the weather patterns and temperature differences are within small margins. Rainfall patterns and seasons are the same all over the municipal area. Thimphu experiences dry months from December to March with rainfall as low as 20 millimeters (0.79 inch) a month and as high as 220 millimeters (8.7 inches) in the monsoon months of July-September. Annual rainfall recordings on average can be nearly 650 mm (25.6 inches). The altitude ranges from 2340 masl at the lowest point of Tshalumaphey downstream of Thimphu to an average altitude of 2407 at Dangrina at Dechencholing to an average altitude of 2410 at Motithang.

Light snowfalls very rarely are experienced in Thimphu between the months of December to March. Not many records are traceable except for a 2 cm thick snowfall reported on 20 December in 2019. Include the min and max temperatures. Water bodies of source streams and the Thimphu river *Chhu* (water/stream/river) are in close proximity (as close as 30-50 meters) from the BWB stations. Waste disposal as it is therefore easy and normal for people to dispose of it into the water bodies and open space **without a DOC/BWB facility**.

Urban settlements with a mixture of residents, institutions including schools and hospitals, offices, shops, enterprises, auto and machinery workshops, private social service ventures like public vegetable markets, scrap dealers, and tailoring and saloons, spread all over the municipality and around the BWBs. Therefore, BWBs are strategically located in the convenient locations possible for efficient services to the settlements. The BWBs are made accessible with a well connected road network and are friendly for people with disabilities.



Table 01: Locations of Waste Banks and Waste Depository House along with their coordinates

Sl. No	Location	Category of the locations	Coordinates (E, N) and location map	Accessibility and surrounding details
WB 01	Motithang Drop-Off Center	Waste Bank	(89.624667 27.474084) Location WB 01	Located in front of Bhutan Information, Communication and Media Authority (BICMA) Office on the road side coming down from Motithang to Changzamtok. Accessible comparatively by a bigger society comprising residences, offices and institutions.
WB 02	Dangrina Drop-Off Center	Waste Bank	(89.637897 27.532225) Location WB 02	Located in the upper settlements of Dechencholing. Accessible by road. Proximity to Royal Body Guards (RBG) campus and Fuel Reserve Tank.
WB 03	Pamtsho Drop-Off Center	Waste Bank	(89.636703 27.512868) Location WB 03	located downstream Dechencholing and on the left bank of Thimphu River. About 150 meters distance from the river, opposite to Taba satellite town. BWB station is on the right hand side of Taba-Pamtsho-Thimphu main connecting road.
WB 04	Bebena Drop-Off Center	Waste Bank	(89.630362 27.503577) Location WB 04	Located on the road along the right bank of Samstelingchhu or the road to the left end of the satellite town facing north-west to south-east of the settlement at a close proximity to the Babena Sports complex which includes the BOC Football field, Thimphu Aquatic center, Bhutan Badminton federation building and Johnny Strange skate park.
WB 05	Changzamtok Drop-Off Center	Waste Bank	(89.6419775 27.458609) Location WB 05	Located above Army Sawmill and behind the Police fire brigade. Closely located in a clustered residential area. Easy accessible by road.

WB 06	Changbangdu Drop-Off Center	Waste Bank	(89.650095 27.452354) Location WB 06	Located in close proximity to Hotel Glory and Hotel Ga-yuel. Although there is no popular landmark around the Changbangdu BWB, it is densely populated with residential buildings. It can be accessed from three sides; from Changzamtog to Hindu Temple road, from Thimphu-Babesa Express through Changbangdu settlements towards Hindu Temple, and from Hindu Temple on Kuenselphodrang road, down towards Changbangdu or Changzamtog. The BWB therefore is at the tri-junction of road from Kuenselphodrang road, road from Changzamtog and road ip from Expressway.
WB 07	Changjalu Drop-Off Center	Waste Bank	(89.657347 27.451335) Location WB 07	ChangJalu (Olakha) BWB is located on the road from Thimphu-Babesa express way to Lungtenphu Royal Bhutan Army camp, on top of the satellite vegetable market for the locality. The area is densely populated by residences, offices, shops and stores. Hotel Ariya, Hotel White Tara, Hotel Migmar are some landmark structures in the vicinity.C
WB 08	Tshalumaphey Drop-Off Center	Waste Bank	(89.661985 27.440173) Location WB 08	Tshalumaphey (Babesa) BWB is located adjacent to the local Meat market surrounded by densely populated residences, hotels, shops, stores, etc. It is accessible by the road from Semtokha-Express Way above Oalkha Automobile Workshops to Babesa vegetable market to Dr Tobygal School that goes in parallel and in between the Semtokha-Serbithnag old road and Thimphu-Babesa express. Tshalumaphey BWB is in close proximity (about 2 kms) to the Greener Ways MRF at Ngabirongchhu.
WB 09	Chubogang Drop-Off Center	Waste Bank	89.654411 27.432303) Location WB 09	Chubogang BWB is below Chubugang village community on the side of the old Semtokha-Ngabirongchhu-Phuentsholing highway. It is a newly developing area surrounded mostly by residential buildings and fewer shops. The BWB being at a tri-junction of the access road to Chubugang-Serbithang and the old highway, waste dropoff should be regular and frequent.
WB 10	GW MRF Babesa (Mother waste banks)	Waste Bank	(89.643137 27.429007) Location WB 10	Greener Way's main head office (Mother Waste Bank), includes the Material Recovery Facility (MRF). It is situated opposite Bap-Lakhang, directly under the bridge, with the Nibirongchhu stream flowing in close proximity. The surrounding area features a few scattered settlements, along with some automobile workshops and restaurants nearby
WDH 01	RBG Motithang Cantonment 1	Waste Depository House	(89.597291 27.478478) WDH 01	Three (03) wire-mesh WDH establishment sites are identified in three different locations within Royal BodyGuards (RBG) cantonment campus in upper Motithang. RBGs camps are spread in upper Motithang surrounding the Palaces. The area is spread over a large space. Therefore, 3 WDHs stations were proposed at 3 different locations to cover the entire RBG settlement. Accessible to the Motithang Palace area road but accessibility is restricted to the public in the area.
WDH 02	RBG Motithang Cantonment 2	Waste Depository House	(89.605815 27.478072) WDH 02	
WDH 03	RBG Motithang Cantonment 3	Waste Depository House	(89.611416 27.475987) WDH 03	
WDH 04	RBG Samtenling Cantonment 1	Waste Depository House	(89.631564 27.505223) WDH 04	One (01) WDH in the RBG cantonment at Samtenling is on the left bank of Samtenling chhu (stream). Accessibility to the WDH at Samtenling is accessible from old Pamtsho road and the Samtenling Palace road. This WDH is on the opposite (left bank) to Babena BWB. Accessibility however is restricted like in Motithang.

2. Subproject Description and Activities

Construction Phase:

Nine Bhutan waste banks were established within the periphery of the existing drop-off centers with approval from the Thimphu municipality. The drop-off centers already have well-established infrastructure, requiring only minimal additions of a cubicle for BWB operations. The existing structures will be used for the waste storage. Therefore, only Prefabricated cubicles were constructed at the BWB site to be used as banking transaction counters.

- Transaction counter in Pamtsho Drop-Off Center constructed with steel frames, Wood plastic composite walls, aluminum frame windows, and corrugated galvanized iron roofing) counter
- Transaction counter in Babena Drop-Off Center constructed as 3mx3m wooden cubicle with timber frames, ply walls, wooden frame windows, and corrugated galvanized iron roofing)
- Transaction counter in rest of the waste banks were constructed as 2.5mx2.5m wooden cubicle with timber frames, wood plastic composite walls, aluminum frame windows, and corrugated galvanized iron roofing
- Transaction counter set-up at Greener Way's head office involving no construction.

Four Waste depository Houses are currently under construction. The construction of WDHs involves minimal infrastructure—installing angle iron posts, wire-mesh fencing, and a roof made of Pre-Painted Corrugated Sheets. No significant excavation or groundworks are required, and thus, the environmental and social impacts are minimal.

All BWBs and WDHs will be accessible by car, waste collection vans, and on foot, including accessibility for persons with disabilities.

Operation Phase:

1. Waste Bank

Waste Banks are established at 10 different locations—9 within existing drop-off facilities and one at Greener Way's main head office. Each waste bank is staffed by a BWB Manager and a Scale Operator. The BWB Manager oversees transactions related to segregated waste, while the Scale Operator weighs and inspects the incoming waste to ensure it is free from contamination or fraud. These waste banks serve as collection points for segregated waste and provide a platform to incentivize individuals for responsible waste disposal.

2. Waste Depository House

The Waste Depository Houses (WDH) will serve as simple collection and storage facilities for recyclable waste. Unlike the Waste Banks, WDHs will not have designated BWB Managers or Scale Operators. Instead, they are need-based facilities constructed upon the request of stakeholders, such as the Women's Association of the Royal Bodyguard. The local community where the WDH is built will assign a person to oversee its operation. When the WDH reaches capacity, they will contact Greener Way to collect the waste. Greener Way will then weigh, inspect, and incentivize the waste according to a payment system developed by the community.

Given their operational simplicity, we expect more WDHs to be established in the future, particularly in schools, to accommodate their specific waste management needs.

*Both the waste collected/recovered via waste banks and WDH will be at last transported to the Eco-Pole and PET plants for it to be recycled.

3. Table 02: ESMP Matrix: Risk and Impacts, Mitigation, Monitoring - Construction phase

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring		
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility
Inadequate design or lack of consideration for universal accessibility may result in limited access and usability for people with disabilities, leading to exclusion and dissatisfaction among community members.	Waste disposal accessibility even as a DOC was comfortable for all including disabled persons. BWB transaction counter also is made accessible all for comfort and encouragement of BWB services sustainability .	At all project sites during the design and construction phase	BWB Manager/GW	Community complaints records. Reduced accessibility and usability (The aim is to ensure accessibility, comfort, and appeal. However, risks include inadequate infrastructure, inconsistent worker behavior, low incentive, and uncoordinated timing changes, which may inconvenience disabled individuals. As such, people with disabilities will be discouraged to use waste banks. Key mitigation measures include optimizing infrastructure, ensuring worker responsiveness, and adhering to scheduled timings)	Monthly accessibility audits Quarterly community engagement and feedbacks	Env Consultant GW Env Technical Specialist UNOPS

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring		
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility
Possible issues with the long-term durability and environmental sustainability of the BWB, including the wooden cubical structures, which may affect the project's overall lifespan and environmental footprint.	Regular monitoring and maintenance	Quality of infrastructures and facilities ensured by use of seasoned timbers and appropriate weather proofing paints.. Regular monitoring and maintenance to be considered in the Operation and Maintenance (O&M) Plan.	BWB Manager/BWB Project Manager	Monitoring occurrences of damages, decays, weathering, wear & tears	Quarterly monitoring and inspection of all waste banks	Env Consultant GW and Env Technical Specialist UNOPS
Low acceptability by the local community leading to underutilization or resistance hindering the project's overall success.	Regular public consultation/hearing. Attending needs and recording.	Consultation for establishment of DOCs carried out by the Municipality and already established. Awareness on upgradation to BWB services consulted and accepted by public. Revision of waste material rates time to time with market viability.	GW CEO/Thimphu Thromde Chief Env Officer	Records of discussion and decision taken. Public Complaint records.	Quarterly community consultations at project sites and community centers to adjust engagement strategies based on feedback.	Env Consultant GW and Env Technical Specialist UNOPS
Sustainability of the BWB functionality at risk if Incentives paid for recyclable wastes is low, resulting in lower participation rates and reduced effectiveness	Wastes prices to be announced and revised from time to time and notified in the media and displayed on board at the banking counter.	Wastes price must be justified and reasonable for acceptance by the public.	BWB Manager/GW	Quality and Quantity of recyclable wastes coming to BWBs for business. Participation rates in recycling programs.	Monthly tracking of incentive program participation and feedback collection.	Env Consultant GW and Env Technical Specialist UNOPS

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring		
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility
Provided employment opportunities could be perceived as inadequate or not aligned with local expectations, potentially leading to dissatisfaction or mistrust among the community.	Preference must be given to local community residents to work at the BWB, especially to women.	Preferential treatment to local communities especially women must be clearly announced in job vacancy announcements of BWB	BWB Manager/GW	Number of local hires and job satisfaction levels.	Quarterly reports on employment statistics and employee surveys.	Env Consultant GW and Env Technical Specialist UNOPS
Disruption or competition with existing local businesses, potentially leading to reduced business opportunities, which could cause tension within the local recycling business owner	Conduct impact assessments during the planning phase at all project sites. Provide ongoing support to affected businesses throughout the project.	At any given time and whenever proposals received from local communities	BWB Manager/GW	Business impact assessments and local business feedback.	Quarterly assessments and feedback sessions with local businesses.	Env Consultant GW and Env Technical Specialist UNOPS
public nuisances from odors and noise may arise, potentially affecting community health and well-being.	Implement dust control measures and proper waste management practices. Schedule noisy activities during less disruptive times and use noise barriers.	Twice and year or quarterly public awareness and education on regular activities of the BWB or newer plans and potential impacts with safety measure responses must be implemented.	BWB Manager/GW/Env Consultant	Level of information and the knowledge about BWB functionalities and new activities by the local community.	Appreciation/acknowledgement or complaining records.	Env Consultant GW and Env Technical Specialist UNOPS

Anticipated E&S Risks and Impacts	Risk Mitigation and Management Measures	Impact Mitigation		Impact/Mitigation Monitoring		
		Location/Timing/Frequency	Responsibility	Parameter to be monitored	Methodology, including Location and Frequency	Responsibility
Surrounding environment pollution from solid wastes spillovers or leakages of liquids and fluids.	Regular compliance checkup of workplace cleanliness and safety gadgets, air quality, water quality and soil quality.	Daily monitored for solid waste spillovers or illegal drop offs and liquid leakages.	BWB Manager/GW	Noise levels, and community feedback/complaints Rampant littering and leakages visibility	Records of un-attended waste disposals and public complaints. Weekly monitoring of noise levels at site boundaries, with monthly reviews of community feedback reports.	Env Consultant GW and Env Technical Specialist UNOPS
In-house management challenges leading to poor BWB services	Good housekeeping and HRD planning. Regular management monitoring	In-house harmony and cooperation is crucial for the success of the business and the public services.	GW/Env Consultant	Efficient and effective functioning of the BWB stations	Disruption in public services. Un-managed wastes piling at the BWB premises.	Env Consultant GW and Env Technical Specialist UNOPS

4. Capacity Development & Training

Capacity development and training for the BWB workers on Environment and Social safety, especially to the new recruitments, for an effective operation of the BWB and WDH, including the wastes collectors/sellers at the BWB will include;

- 1) Training on understanding/identifying different categories of wastes and risks associated with types of wastes,
- 2) Training on use of PPEs and safeguards, first aid, emergency preparedness, fire drills, etc.,
- 3) Training on recognizing, preventing, and responding to state of emergencies, risks to occupational health safety, social disgruntlement/complains from the community, workplace disharmony, etc.,
- 4) Awareness and understanding of gender based violence and discrimination,
- 5) Training on the importance of wastes segregation at source, value addition to wastes coming to BWBs and the recycled waste products,
- 6) Training on workplace compounding, quality controls, housekeeping, ES protection and monitoring, and very importantly on waste management within the community and at the BWBs, WDH and MRF.

5. Implementation Schedule and Cost Estimates

All 10 waste banks were completed on August 15th and became fully operational as of August 16th, 2024. However, the waste depositories are still under construction.

Total cost of the subproject activity is reflected above in the subproject information section.

Table 03: Environmental & Social Cost for the Waste Bank

Sl. No	Description	Timeline	Cost (USD)
1	<p>Construction Phase for both waste banks and waste depository house:</p> <ol style="list-style-type: none"> 1. Maximized usage of locally available raw materials to minimize carbon footprints. 2. Use of local small-size contractors to uplift local entrepreneurs 3. Avoidance of excavation, drilling, and heavy machinery works. 4. Comply to the Environmental Standards, especially the workplace air quality, ambient air quality, emissions, and noise pollution. 5. Enforce usage of PPEs by workers/supervisors/site visitors 	June, 2024 - September 9, 2024	Mitigation costs are integrated into the awarded contract
2	<p>Operational Phase:</p> <ol style="list-style-type: none"> 1. Proper storage, collection, and transportation of recovered waste from the waste banks to the Eco-pole and PET Plant to ensure elimination of unpleasant litter. 2. BWB Sensitization/Advocacy to maximize the number of Waste Bank users, promote community engagement, and ultimately increase the overall waste recovery rate. 	August, 2024 - January, 2024	Vehicle hire cost: USD 57,000 Publicity: USD 52,000
3	<p>Human Resource: In line with our commitment to empowering women, all BWB managerial and scale operator positions at the nine waste banks adjacent to Drop-Off Centers (DOCs) have been filled by women. At the waste bank located at Greener Way (GW), we have appointed both a woman and a man to these roles. The positions at the DOCs were directly offered to the caretakers, most of whom were previously working without pay. This initiative is part of our broader effort</p>	August, 2024 - January, 2024	USD 23693

	to uplift the socio-economic status of the often overlooked and invisible female workforce within the waste industry. Historically, GW has empowered these women by purchasing sorted waste from them at the DOCs. The project has helped transition them into formal employment. The remaining positions were filled by recruiting women from disadvantaged backgrounds who, despite the societal stigmatization of waste-related work, have shown a strong desire to contribute to the industry.		
4	Environmental Expert Fee: Covers costs for an environmental expert to identify improvement areas and monitor construction activities.	June, 2024 - December, 2025	USD 23,333.73

6. Attachments

The map identifying the BWB station locations is shown below.

Attachment 1: Administrative approval by the Thimphu City Corporation for the establishment of Waste Banks in the existing Drop-Off Center

[BWB_Administrative approval from Thimphu Thromde_Greener Way.pdf](#)

Attachment 2: MoU between the Greener Way and The Women Association of Royal BodyGuard for the establishments of Waste Depository House in Motithang and Samtenling RBg cantonment.

[MoU between Women association of RBG and GW.pdf](#)

Review & Approval

	
<p>Prepared By: Yeshey Penjor Position: Environment Consultant Date: Aug 11, 2024</p>	
<p>Reviewed</p> <div style="text-align: center;">  </div> <p>By:</p> <p>Position: Technical Specialist Environment Bhutan Date: 15th Aug 2024</p>	<p>Approved By:(Signature) Position: Date</p>

Annex 1: Bills of Quantity for the construction waste bank

[BoQ for Waste Bank](#)