

South Asia Co-operative Environment Programme (SACEP) Plastic free Rivers and Seas for South Asia (P171269)

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN OF PLASTIC RECYCLING FACILITY AT SIMARA

GRANTEE :BIOCOMP NEPAL PVT. LTD - NEPAL

Environmental and Social Management Plan (ESMP)

The purpose of the Environmental Social Management Plan (EMP) is to minimize the potential environmental impacts caused by the RIVER+ project. The ESMP is required for formulation, implementation and monitoring of environmental protection measures during project development & operation. The ESMP reflects the commitment of the proponent to safeguard the environment as well as the surrounding population and project staff. Similarly, the ESMP has been prepared for Biocomp's plastic recycling facility (plastic board industry) to set out environmental management requirements and to develop procedures to ensure that all mitigation measures and monitoring requirements specified in this document will be carried out in subsequent stages of project development and operation. The impacted terms of reference of the study suggests that the ESMP should comprises of implementation of the mitigation measures, environmental monitoring plan, framework for the environmental auditing and the arrangement for the implementation and monitoring of ESMP.

1. Subproject Information

Project Title	RIVER+ (Reduce and Intercept, Value add through the Establishment of a Recycling plant for low-grade plastics and used beverage cartons in Nepal)
Subproject Title:	Construction of the plastic recycling facility (plastic board industry)
Estimated Cost:	USD 713,151
Start Date:	July 15, 2024
Completion Date	November 30, 2024

2. Site/Location Description

For the plastic recycling facility (board production industry) Biocomp signed a 30-year lease for an 8000 M² plot at the Special Economic Zone (SEZ) in Simara. The lease is signed with the Special Economic Zone Authority (SEZA), Government of Nepal. Through the SEZ Act 2073, the Government of Nepal introduced the Special Economic Zone Authority (SEZA) for investment promotion, administrative management, and delivery of services for the industries in SEZ. Biocomp's facility is located in plot no. 65 of Block A, SEZ Simara, Ward no. 4, Jeetpur-Simara Sub-Metropolitan City, Bara district, Madesh Province. The project site is 3 km away in aerial distance from the Simara Airport. The location of the project is presented in the following figures below.

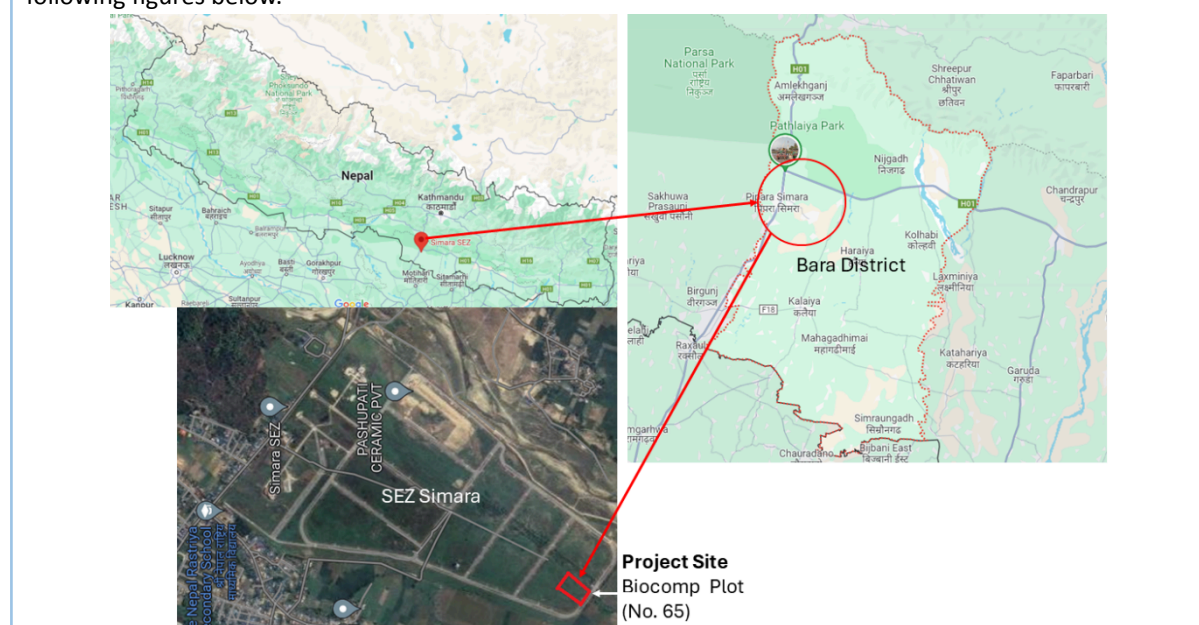


Figure: Location Map

Site Location: 27.146222, 84.988017 (<https://maps.app.goo.gl/Z4EJeDTMXyZCPwMw7>)

The land use of the project site comprises non-agricultural land which is barren with grass area and does not have any trees. The land picture is mentioned below.

The project site is about 119 Km via Fastrack and 256 Km via Mugling towards the east-west of Kathmandu. There are access roads for the proposed project site namely Tribhuvan Highway. A topographic map and Google image of the project showing its accessibility is provided in the figure below:

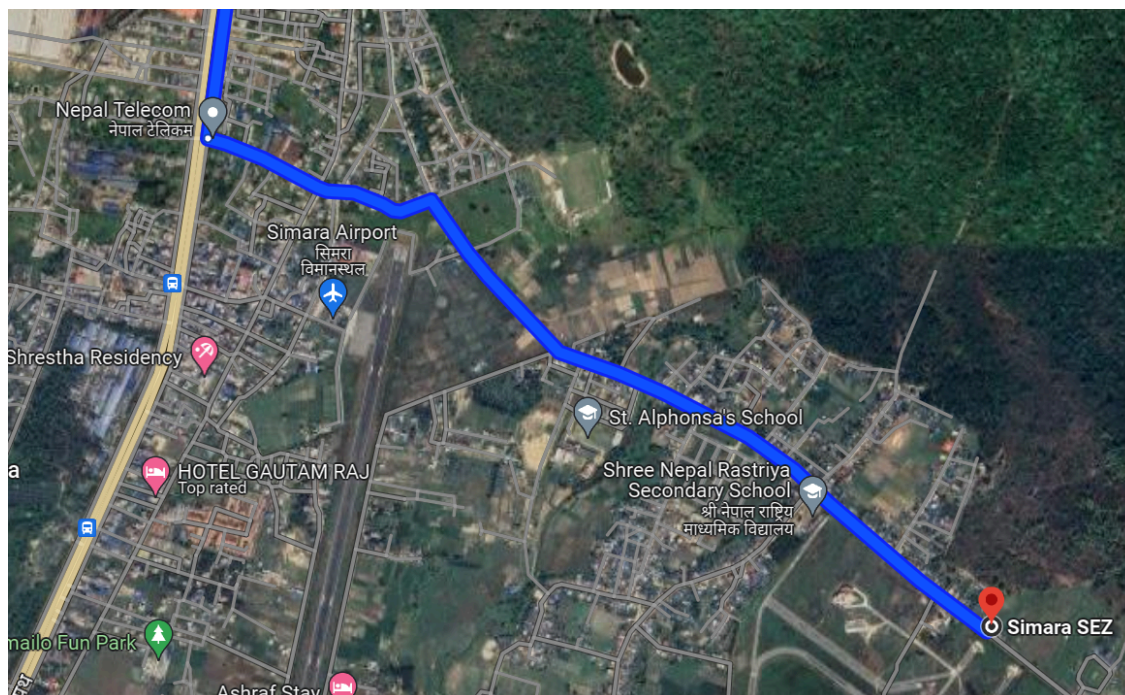


Fig: Road access from Kathmandu to Simara

The plot is plain and is surrounded by other industries around it. The whole SEZ Simara area is covered by the boundary wall and monitored by the SEZ administrative staff and guards full time so that the area is safe & secured. The land lease contract for 30 years is directly done with the government and has an easy compliance process about environmental and building permits, and facilities such as access to black-topped roads, water, sewer lines, and wastewater/effluent treatment plant (ETP) are available.

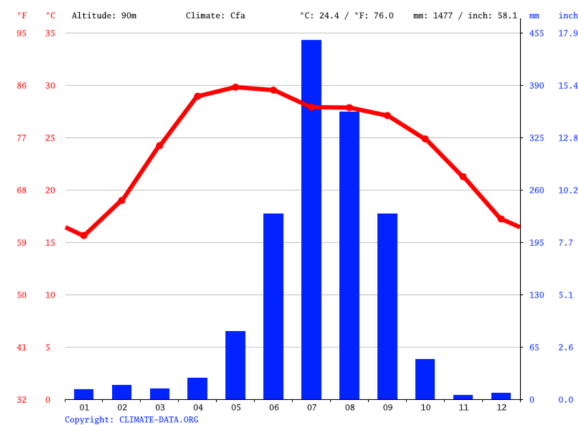


Fig: Annual Temperature/Rainfall of Simara

Fig: Biocomp's Plot

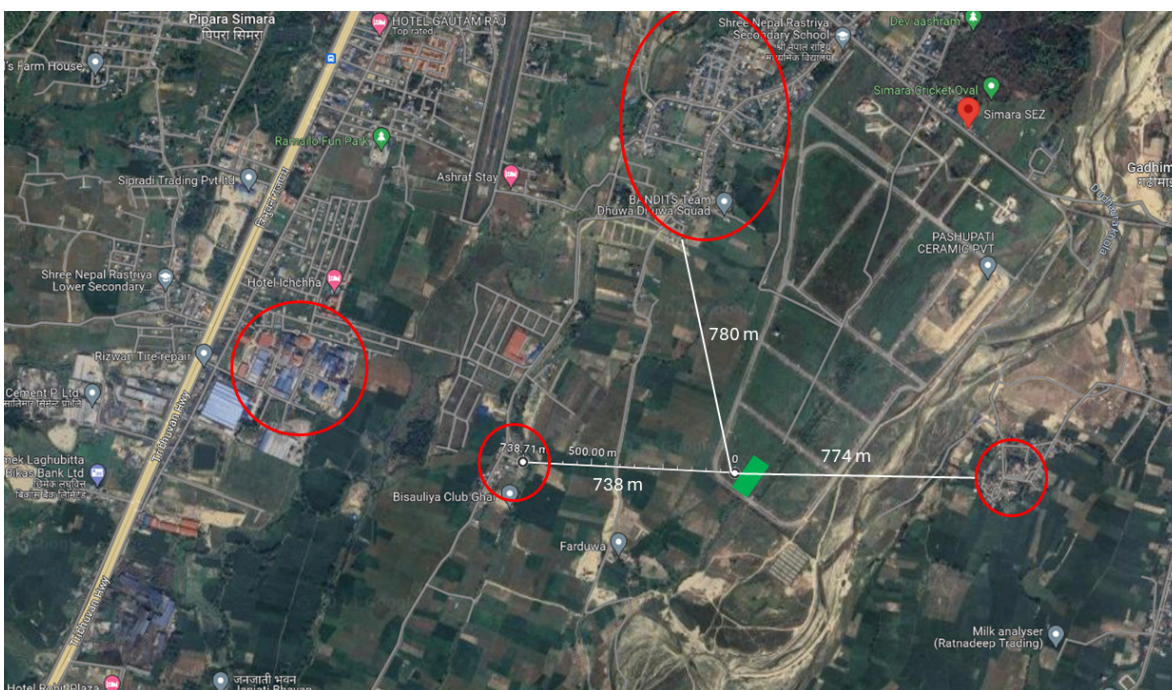


Fig: Nearby residential area from Biocomp's plot (Red circle shows the nearby residential area)

The plot is surrounded by other industries located inside the boundary of SEZ Simara. There is no nearby residential area of the project site. The nearest aerial distance of the residential area is 734 meters from the

project site. On the south side, Biocomp's plot borders the SEZ expansion area hence no new residencies will be constructed in the future.

3. Subproject Description and Activities

● Construction Phase

Biocomp is set to build a plastic recycling facility at the Special Economic Zone (SEZ) in Simara on an 8000 sq. mt. plot area, with a 16,000 sq. ft. main production hall constructed using a metal truss structure in compliance with the national building code and about 4000 Sq. ft. other buildings. A consultant has been hired to design the facility's Master plan and to create an Invitation for Bids (IFB) for its construction, which has been shared with bidders. Two tenders have been conducted, one for the construction of the factory hall and other blocks and one for the machinery. The manufacturer of the machinery as well as the construction companies have been selected according to Biocomp's procurement policy.

S.N	Building Block/ Details	Area (sq ft)
A	Factory Production Area (Sq foot)	17277
1	Pre-Processing Unit: Intake / Unloading/ Materials Sorting & Storage Area/ Shredding/Cleaning/Drying Unit along with silo storage	7133
2	Production Unit: Material Loading, Spraying, Hot & Cold press, Boiler Room	5000
3	Cutting Area	1200
4	Finished Goods Packaging, Storage & Dispatch Area	3106
5	QA/QC & Maintenance Room	332
6	Account/Production Manager and Counter Room	506
B	Cafeteria and Sanitary Block	2050
1	Café, Kitchen	744
2	Male, Female Locker Room, Male & Female Toilet, Staff Toilet	1306
	Total Area (A+B) (In sq feet)	19783
C	Boundary Wall (Running Feet)	1180
D	Side Drain/Gutter/Guardhouse	
E	Vehicle Parking/Material Open Storage/Driveway (Using concrete flooring)	9000

● Operation & Production Phase

The facility includes areas for raw material storage, cleaning, and shredding, board manufacturing with hot and cold presses, board cutting, and final product storage. The production process is similar to that of the plywood industry but with significant machinery modifications. The production process begins with sorting, cleaning, drying, and shredding the raw materials. The shredded materials are then spread out on metal plates, which are loaded into the hot press using loading elevators and movable holding cages. During the hot-pressing cycle, high temperature and pressure cause part of the plastics to soften, functioning as a resin to form the materials into strong, high-quality plastic boards. A subsequent cold pressing cycle ensures the boards maintain their shape as they cool down. The boards are then trimmed and bundled. The facility will be powered by NEA grid electricity.

For the sustainable production of composite boards from low-grade plastic, Biocomp is going to collect and source materials from aggregators, municipal contractors, and industries located inside and outside the Kathmandu Valley. Trained IWWs collect and segregate low-grade plastic waste and sell it to aggregators with whom Biocomp procures the materials. These aggregators sort, bale, and store the materials. After November 2024 when the factory gets started, Biocomp will directly load the material from aggregators in the big truck and it to the plastic recycling facility.

Project Area	● 87,237 sq feet
Built up area	● 19,119 sq feet

Offsite investments that may be required (e.g., access roads, water supply, etc.)	<ul style="list-style-type: none"> • 400 KVA transformer inside the facility • Side gutter and Waste water drain and drinking water connection from the facility premises to the production area of the facility
Energy Requirement/day	<ul style="list-style-type: none"> • 2400 unit (KWatthour)
Per Day Water Requirements	<ul style="list-style-type: none"> • 3000 Liter
Water Storage Capacity	<ul style="list-style-type: none"> • 10000 Liter
Solid Waste per Day	<ul style="list-style-type: none"> • Approx 100 Kg/day
Waste Water per Day	<ul style="list-style-type: none"> • 2500 Liter
Open Space	<ul style="list-style-type: none"> • Approx 78%
Construction/ Production Planning	<ul style="list-style-type: none"> • Factory Construction from August to November 2024 • Testing Period November 2024-January 2025 • From February 2025 – December 2025 [Commercial Production for the first year will be below 5 ton/day and less than 1400 tons/year]

The list of the sub-project activities of the plastic recycling facility are:

S. N	Activities
1	Construction Phase
1.1	Preparation of BoQs, IFB, and release for procurement, vendor assessment, and contract with contractors
1.2	Site Clearance, Breaking Ground, and Foundation Works and Installing all the machines/components related to ESMP
1.3	Factory Hall Construction
1.4	Landscaping and construction including side drain, gutter, pavement driveways and Parking Area
1.5	Procuring, Installation, Commissioning, and testing of machinery
2	Operations Phase
2.1	Development of Standard operating procedure, code of conduct, and maintenance procedure
2.2	Hiring Factory staff and training them on the use of machinery, occupational health and safety including the use of PPE, and HER safety training.
2.3	Collection from IWWs and Waste Aggregators, Loading and Transportation to Facility
2.4	Unloading, Sorting & pre-processing Raw Materials
2.5	Pressing & Cutting of Boards
2.6	Storage, packaging, marketing, and sales of boards

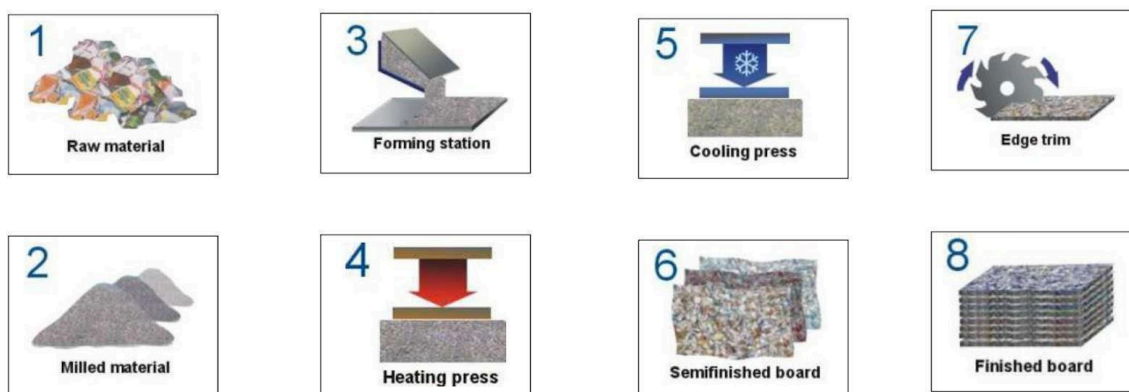


Fig: Composite board production process

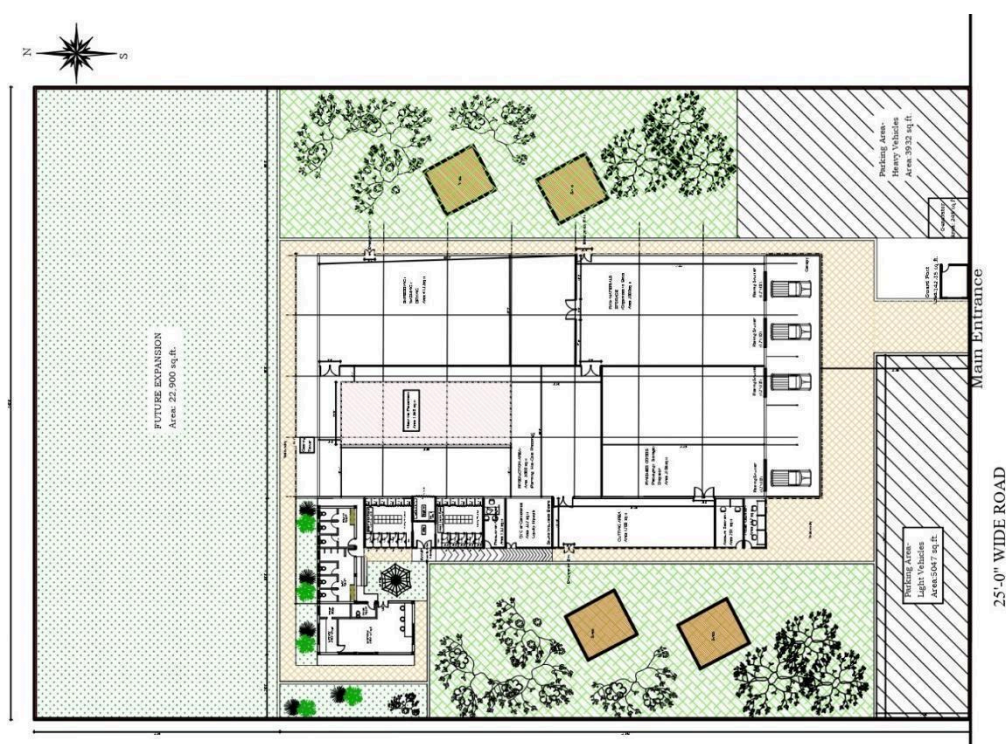


Fig: Master Plan of Plastic Recycling Facility [[For detailed drawing follow this link](#)]

4. ESMP Matrix: Risk and Impacts, Mitigation, Monitoring

4.1 Potential Risk Assessment from Baseline Survey of Plastic Recycling Facility based on World Bank ESM Framework

The area where the project will be implemented, its adjacent land plots, and adjacent built-up structures are defined as the Direct Impact Area (DIA) whereas from 500 m radius from the center of the construction site is categorized as an Indirect Impact Area (IIA), which is the general method of area delineation in similar studies. The project is perceived to have a significant level of influence areas as defined below.

Direct Impact Area (DIA)	Project implementation site where the construction will be carried out
Indirect Impact Area (IIA)	Adjacent sites of the Special Economic Zone of ward 4 of Jeetpur-Simara Sub Metropolitan City within a radius of 500 m

Residential and Community In Direct and Indirect Impact Areas	Both Direct and Indirect Impact Areas lie within a Special Economic Zone with multiple industrial plots
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4.1.1 Site Inspection:

Multiple field visits were conducted in May- July 2024 for field survey, consultation by a multidisciplinary team of Biocomp Nepal, for collecting information on physical, biological and socio-economic and cultural environment of project site. The team has generated data regarding the physical, biological and socio-economic environment of direct and indirect zone of influence (Zoi) with the methodological approaches as given below.

Items	Description
Land details	<ul style="list-style-type: none"> Land lease is contracted for 30 years with the government SEZ area covered by the boundary wall and full-time monitored by the SEZ administrative staff and guards Access to the black-topped road, electricity line, drinking water, underground water, sewer lines, wastewater gutter, and wastewater/effluent treatment plant (ETP)
Geographical Context	<ul style="list-style-type: none"> Physiographically, the project is located in the northern extent of the Indo-Gangetic belt. Geographically, it is located in the Terai region of the country. The project is about 96m above sea level away from the residential area The location is near major city and industrial hubs like Birgunj Metropolitan City (Birgunj Industrial Area), Simara Airport, and in the North Hetauda.
Climate, Temporal/ Weather Context	<ul style="list-style-type: none"> Specific climatic data of the project influence area (municipality) is not available. However, the 15-year data from 2009 and 2024 recorded by the nearest station at Simara Airport showed that the minimum temperature is 8°C whereas the maximum temperature is 40°C. Similarly, the average temperate temperature was observed to be about 19°C. The annual average rainfall analyzed from 8 years of station data (2009- 2024) is 2,160.55 mm. Climatically, the project area falls on a tropical climate. The data has been taken from https://www.worldweatheronline.com
Hydrology	<ul style="list-style-type: none"> The GPS coordinates of this district is 27°84' N latitude and 84°98' E longitude. The natural resources of the district also include rivers and streams like Bakaiya, Jamuniya, Pasaha, Dudhaura, and Bangari. The principal streams lining the project and surrounding areas are Dudhaura Khola and Balganga Khola. Both originate in the southern slopes of Siwaliks south of Hetauda and flow north to south. Owing to the excessive erosion in the Siwaliks, the streams flood plain is wide and charged with high sediment loads. In the north adjacent to Siwalik hills the sediment is coarse comprising of boulders cobbles and pebbles of Siwalik sand stones. Further south, in the area, the sediment is fine comprising of pebbles at the river bed and fine sand and silt in the active alluvial flood plain. As the stream emerges to the project site starts meandering and the riverbed is braided. [Details taken from EIA report of SEZ Simara] Stream hydrology is highly dependent upon seasonal rainfall. River flow is high and consistent in the monsoon months (June through October). In the dry season, there is very little flow in these streams often going dry in the months of April through May. Flash flood is a characteristic of the streams in the event of rainfall particularly in the monsoon season. As the nearest river is 400 m away from the plot and the plot is situated at a higher level than the river there won't be any issues of floods at the project site. Excessive rainfall is mitigated by the drainage system of the SEZ Simara industrial site. [Details taken from EIA report of SEZ Simara]

Geology, Ecology and Soil Context	<ul style="list-style-type: none"> The project area is located in the geologically stable land which is composed of alluvial fan deposits. The subsurface geology contains of gravels and sand deposits at about 15m below the ground. The area comprises non-agricultural land which is barren with bushes and grass and does not have any trees or vegetation planted for several years
Air Quality, Water Quality and Noise Levels	<ul style="list-style-type: none"> The project area lies about 2 km east of the Tribhuvan Highway where the industrial establishments of various types are located in a ribbon fashion. The project area itself is open land dominantly left barren with few ongoing construction works of new industries. The highest and the lowest concentrations of PM10 were found during November 2018 (62.95 µg/m³) and August 2018 (7.6 µg/m³) respectively from the available data of Simara Air Quality Monitoring station. The highest and the lowest concentrations of PM2.5 were found in November 2018 and August 2018 respectively. The mean value for those months were found to be 67.79 and 9.31 µg/m³ respectively. The mean values for PM10 for August and November 2018 were found to be 75.49 and 12.62 µg/m³ respectively. [Report attached in Annex]. Considering the distance from the existing industrial zone, and limited industrial activities within the project area, the ambient air quality of the project site is envisaged to be within the National Ambient Air Quality Standard (NAAQS). The influence of the industrial zone along the Tribhuvan Highway on the air quality of the project zone is assumed to be relatively low. [Details taken from EIA report of SEZ Simara] The noise level around the project area seems to be within the permissible level as it is located away from the dense and populated area as well as away from highway which is 40 to 60 dB as per the data from the EIA report of SEZ Simara attached in annex. The underground water quality was done during the EIA of SEZ Simara by SEZA at the project location and as per the report the underground water quality is within the Nepal Drinking Water Quality Standard as in the Attachment. Also, the underground quality was also monitored during the EIA of Surya Nepal's Apartment block at Ward no. 2, Jeetpur-Simara Sub-Metropolitan City. The report of SEZ Simara EIA with pH, total Chloride, Ammonia, Nitrite, Nitrate, Magnesium, and Iron test has been attached below. [Water Quality Test Report, EIA Report SEZ Simara]
Social/Cultural Context	<ul style="list-style-type: none"> The plot is surrounded by other industries located inside the boundary of SEZ Simara There is no nearby residential area of the project site The nearest aerial distance of the residential area is 734 meters from the project site The project area is devoid of any cultural and religious sites of local or historical importance. However, the Jitpur-Simara Sub-metropolitan city has a few: Gadimai Temple, Musarnimai Temple, Kali Temple & Krishna Temple.
Sewerage and Stormwater drainage	<ul style="list-style-type: none"> Facilities of concrete drainage systems along with wastewater treatment unit are provided for drainage of sewerage and stormwater inside SEZ Simara in the project influence area

4.1.2 Impact Assessment of Site

Impact Assessment	1	2	3	4	5	6	7	8	9	10	11
Phase	Environmental & Social	Labor & Working Conditions	Resource Efficiency & Pollution Prevention	Community Health & Safety	Land acquisition with involuntary resettlement	Biodiversity Conservation & Sustainable Management of Living Natural Resources	Indigenous Peoples/ Historically Underserved Traditional Local Communities	Cultural Heritage	Financial Intermediaries	Stakeholder Engagement and Information Disclosure	Earthquake, Landslide, Flood, Liquefaction

Impact Assessment	1	2	3	4	5	6	7	8	9	10	11
Construction Phase											
Site Clearance, Breaking Ground and Foundation	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	Yes
Factory Hall Construction	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes
Landscaping including Roads and Parking Area Construction	Yes	Yes	Yes	No	No	Yes	No	No	No	Yes	Yes
Installation and Commissioning of Machinery	No	Yes	No	No	No	No	No	No	No	Yes	No
Operations Phase											
Unloading & Sorting of Raw Materials	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Pre-processing	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Pressing of Boards	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Cutting	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Storage and Loading	Yes	Yes	Maybe	No	No	No	No	No	No	No	No
Collection from IWWs and Waste Aggregators	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	No

4.2 Beneficial Impact of Plastic Recycling Facility (Board production industry)

Construction Phase

- **Employment Opportunity:** During the construction period the project requires about 20 human resource for four months that include skilled labor. Likewise, the project has a policy to provide maximum local employment opportunities depending upon their skills and training specific to construction works. The priority beneficiaries will be the interested locals of nearby settlements from the project vicinity area. Hence, the project intends to generate work for different skilled and unskilled manpower during the construction phase, which seems to attract the locals for employment and thus the employment opportunities will be high. The envisaged impact is high, local, and short-term.

Operation Phase

- **Employment Opportunities for Locals:** For the operation of the facility, multiple staff are required. This will provide opportunities for some human resources (about 50+). The project generates opportunities for helpers, segregators, machine operators, technicians, accountants, engineers, managers, etc. in the long run. Furthermore, the time-to-time maintenance of the facility creates short-term jobs for the technicians. The envisaged impact is high, local, and long-term.
- **Boost in Local Economy :** The Project operation will increase the demand for local goods, markets, food and other basic requirements at the project site. Through direct procurement of goods and services from Biocomp as well as through an increased value of economic transactions in and around the vicinity by Biocomp Staff. This will lead to urbanization of the area and will improve the socio – economic status of the local people. The envisaged impact is high, local, and long-term.
- **Positive Environmental Impacts (Recovery of Low-Grade Plastic from Environment):** Improperly managed plastic waste ends up in landfills and pollutes rivers, seas, and oceans, and breaks down into microplastic. Additionally, the open burning and improper incineration of plastic release large amounts of carbon dioxide and other pollutants into the atmosphere. Plywood and wooden furniture are also major causes of

deforestation and significant contributors to carbon emissions. Biocomp solves these environmental issues by establishing the plastic recycling facility. By recycling and manufacturing the composite boards, Biocomp plans to eliminate around 9000 tons of plastics each year from the third year which helps to reduce around 27,000 tons of CO2 each year.

- **Beneficial Impact with Circular Collection Value Chain directly from IWWs:** For the sustainable production of composite boards from low-grade plastic, Biocomp is going to collect and source materials from Informal waste worker, aggregators, municipal contractors, and industries. As part of the RIVER+ project, Biocomp with its project partner People in Need (PIN) and CLEANUP NEPAL has been working to empower 500 Informal Waste Workers (IWWs) for safe collection of low-grade plastic. By working directly with IWWs, Biocomp gains direct access to sorted plastic from households, businesses, organizations, transfer stations, and aggregation centers. The IWWs sell the collected and sorted materials to aggregators and Biocomp buyback the recyclables from the aggregators establishing a circular value chain. Biocomp and its partner People in Need will provide HER safety training on the Use of PPE, Safe Collection of Waste, and Information on Fair Market Price, Occupational Health, and well-being to 45 women informal waste workers (IWWs). PPE kits like shoes, gloves, masks, and caps will be provided to 500 IWWs including health insurance coverage. Additionally, gender sensitization training covering topics such as gender equality, GBV, sexual violence, and child protection including safe plastic collection training will be provided to 500 IWWs.

Project Phase	Impacts	Nature of Impacts				Significance
		Type	Magnitude	Extent	Duration	
Construction Phase	Employment opportunities for locals	Direct	High	Local	Short-Term	Significant
Operation Phase	Boost in the local economy	Direct	High	Local	Long-Term	Significant
	Employment opportunities for locals	Direct	High	Local	Long-Term	Significant
	Positive Environmental Impact (Recovery of Low-grade plastic)	Direct	High	National	Long-Term	Significant
	Circular Collection Value Chain directly from IWWs	Direct	High	National	Long-Term	Significant

4.3 Mitigation Measures

4.3.1 Summary of Mitigation Measures

Biocomp has prepared this Environmental and Social Management Plan to map, assess, and develop a mitigation plan for environmental and social risks and impacts during the construction and operation of the facility for safe working conditions and minimal environmental impact.

For safeguarding civil structure and wind, the production hall of the project will be constructed as an earthquake-resistant building with the optimum use of local resources to define a safe and economical structure. As per the seismic zoning category, the Simara region falls under category IV (DoMG) and has been designed as per the national standards to make the structure more stable. Structural analysis and design conform to the requirements of seismic zone IV. The foundation is being designed as per the required structural loads and soil-bearing capacity. All design parameters comply with the National Building Code of Nepal. For fire safety Biocomp installs fire exists, plans evacuation routes, installs evacuation plan sign boards and symbols throughout the facility, installs fire extinguishers, regularly trains factory staff on their use, and conducts fire drills for emergency evacuation. For better indoor and outdoor air quality, Biocomp plans to install turbo ventilators and dust collectors for shredding and cutting machinery. A forced air suction chimney is going to be installed above the hot press to capture effluent gas and will pass through activated carbon filter to filter the air, improving both indoor and outdoor air quality. To reduce indoor noise, Biocomp is going to construct the

sound insulating wall in the board-cutting area. Turbo ventilators are installed throughout the building to reduce the ambient temperature. For wastewater management, Biocomp is going to install a wastewater pre-processing system with filters, the discharged pre-processed wastewater will be disposed of in the wastewater/effluent treatment plant of SEZ Simara. The construction debris along with rejected waste from production is going to be disposed by SEZ Simara in Birgunj Metropolitan City's sanitary landfill site. For the management of the fecal sludge and gray water generated from toilet and washroom, Biocomp is going to construct a soak pit and septic tank inside the facility. For occupational health and safety aspects of waste and factory workers, Biocomp and its partner People in Need are preparing to provide HER safety training to factory workers including PPE kits like shoes, gloves, masks, and caps for the factory workers and health insurance coverage. Additionally, gender sensitization training covering topics such as gender equality, GBV, sexual violence, and child protection will be provided to factory staff. Biocomp and its partner People in Need will provide HER safety training on the Use of PPE, Safe Collection of Waste and Information on Fair Market Price, Occupational Health and well-being to 45 women informal waste workers (IWWs). PPE kits like shoes, gloves, masks, and caps will be provided to 500 IWWs including health insurance coverage. Additionally, gender sensitization training covering topics such as gender equality, GBV, sexual violence, and child protection including safe plastic collection training will be provided to 500 IWWs too.

4.3.2 Adverse Impact and Mitigation Measure

Anticipated E&S Risk and Impacts	Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Impact Mitigation		Impact/Mitigation Monitoring		Responsibility
			Location Timing/Frequency	Responsibility	Parameters to be monitored	Methodology, including Location and Frequency	
Construction Phase							
<p>Workers staying on the construction site may create social issues due to the way they communicate, dress, behave.</p> <p>Potential for contracting communicable diseases</p> <p>Sexual exploitation and abuse (SEA) and sexual harassment (SH)</p> <p>Grievances could arise between the construction workers</p>	<p>The construction site is located in a separate area far from the community residential area so there will be low risk of social issues with residents because they are too far away. Further, there will be an induction session to the laborer's and staff working for the construction of occupational health and safety, policies, codes of conduct and protocols. Health conditions will be closely monitored, and prevention mechanisms will be in place to avoid spread of communicable diseases (PPE, hand wash facilities with soap, clean drinking water, etc). The required number of proper sanitary facilities will be installed separately for male and female workers and regularly cleaned. Safety briefing will be given regularly.</p> <p>Appropriate complaint or grievance redress mechanisms will be implemented by providing the workers with a phone number of the client, a complaint box, both will be made visible on the site with a sign showing what type of complaints can be lodged. This will be publicly available for everyone to report gender-based violence, sexual exploitation and abuse, and sexual Harassment (SEA/SH). Construction supervisor, PPE, and first aid kits will reduce adverse impact. Night lights, boundary walls and gates will be installed. Adequate and well-ventilated camps/premises, clean eating areas, and separate sleeping/resting areas for male and female workers will be set up. Construction workers with health issues will be referred to the medical center.</p>	<p>Part of the construction cost</p>	<p>SEZ Simara, During the construction period</p> <p>Daily</p>	<p>Construction supervisor, Biocomp Nepal</p>	<p>Health and safety plan, awareness program material, number of PPEs available and used, Grievance Log, suggestions Box, Assignment of construction supervisor</p>	<p>Attendance of workers, Self-health history declaration and medical report if required.</p> <p>Prior to starting assigned tasks and biweekly by the Safeguard Officer, PIN, and monthly by the UNOPS country team</p>	<p>Safeguard Officer, PIN</p> <p>Environmental expert, UNOPS country team</p>
<p>Excess soil residual spoils including debris, topsoil removal, Soil erosion, and sedimentation of nearby drains. Loss of trees, vegetation cover, and vegetative soil</p>	<p>All debris and residual spoil material shall be segregated as much as possible and disposed of only at locations approved by the construction supervisor. The debris and spoil shall be disposed of in such a manner that; (i) waterways and drainage paths are not blocked; (ii) the disposed material should not be washed away by runoff. There is no important vegetation in the construction site and suitable vegetation could be replaced during the landscaping of the construction site. Biocomp will plant the trees/grass after the construction</p>	<p>305.00</p>	<p>SEZ Simara, During the construction period</p> <p>The planting of trees is going to be done during & after the construction (Completed by December 2024)</p>	<p>Construction Supervisor, Biocomp Nepal</p>	<p>Number of trees and bushes removed and planted</p>	<p>Counting no of trees/sq.meter of grass planted, Physical visit and records of every 3 months.</p> <p>Before clearing the site and one month after completion of the facility</p>	<p>Civil Engineer, Biocomp Nepal</p> <p>Environmental expert, UNOPS country team</p>
<p>Landslide</p>	<p>There is no issue with landslides in SEZ Simara and there are no issues/reports of floods in the SEZ as the land topography is at a higher level than the nearby river. In addition this is a flat land.</p>	<p>0.00</p>	<p>SEZ Simara,</p> <p>N/A</p>	<p>Not required</p>	<p>Sign of landslides</p>	<p>Maintain monthly checklist for landslide indications</p>	<p>Civil Engineer, Biocomp Nepal</p> <p>Environmental expert, UNOPS country team</p>

Anticipated E&S Risk and Impacts	Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Impact Mitigation		Impact/Mitigation Monitoring		Responsibility
			Location Timing/Frequency	Responsibility	Parameters to be monitored	Methodology, including Location and Frequency	
Stormwater and Drainage issues due to rain	The design of the building has taken into account the anticipated sea level and rainfall pattern fluctuation. The factory plot of Special Economic Zone Simara is around the same level as the road and roadside drain, thus filling with sand is only required at the planned roads and parking areas. The production hall and other blocks are to be raised by 2 feet from the ground level to avoid potential flooding issues	4615.00	SEZ Simara, During the construction period To be done before the concreting of the sub-structure (Between August-September 2024)	Construction Supervisor, Biocomp Nepal	Label/elevation of surface flooring and gutter/drain connection	Check for water stagnation/water pot formation through visual inspection Monitored weekly by Civil Engineer and monthly by the UNOPS country team	Civil Engineer, Biocomp Nepal Environmental expert, UNOPS country team
Building may collapse due to earthquake	The earthquake vulnerability scenario of 2021, Bara District has been analyzed from the Seismic hazard map of Nepal published by the National Earthquake Monitoring and Research Center. As per the seismic zoning category, the Simara region falls under category IV (DoMG), and the contractor is going to design and build the structure to handle the seismic load in compliance with the Nepal National Building Code NBC: 105:2020, Seismic Design of Building in Nepal	Part of factory design & construction (superstructure)	SEZ Simara, The design is to be done before the start of construction. The quality control of materials and construction procedures is to be maintained throughout the construction period (Between August-November 2024)	Construction Supervisor, Biocomp Nepal	Design and BoQ of structure and construction process on the construction site	Types of building materials used as per design/BoQ or not and whether construction methods are followed as per design/National building code or not Monitored weekly by Civil Engineer and monthly by the UNOPS country team	Civil Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team
Workers might be exposed to dust due to groundbreaking, drilling, and other construction activities. Fine dust particles may be generated during the finishing activities which may fly with the wind and become a nuisance to the workers and the neighboring community	The contractor periodically sprays water to reduce dust levels during dry weather conditions. An <u>emission monitoring device</u> to be procured & installed to measure the dust level. Constructing boundary walls to prevent dust from being released into the nearby settlements. The contractor will provide all the construction workers with safety gear (safety shoes, gloves, masks, caps and earmuffs if needed). The contractor also trains their workers on health and safety aspects and one of the supervisors in the use of first aid kits. The first-aid box is to be installed by the contractor.	3230.00	SEZ Simara, Regularly when required until the construction is not over (To be done until November 2024)	Construction Supervisor, Biocomp Nepal	Quantity/Level of Dust Pollution, no. of workers not wearing the mask	An environmental monitoring device will be installed that measures the dust levels and Data will be stored in the device, site visits and interviews with workers to find if workers following safety protocols are not Monitored weekly by Civil Engineer and monthly by the UNOPS country team	Civil Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team
Workers might be exposed to noise pollution & vibrations	For the noise control, less Noisy Equipment will be used. Noise will be maintained within the acceptable limits of construction, there are no residents close by who can experience noise issues during the construction of the factory. The contractor will provide all the construction workers with safety gear (safety shoes, gloves, masks, caps and earmuffs) to get protected from noise.	3230.00	SEZ Simar Training is to be done before the start of construction activities and PPEs to be worn throughout the construction period	Construction Supervisor, Biocomp Nepal	No. of waste workers not wearing safety gear, number of injury/accident cases	Regular monitoring, reviewing the site progress reports direct observations in site and workers surveys Monitored weekly by Civil Engineer and monthly by the UNOPS country team	Civil Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team
Workers might be exposed to health hazards & accidents	The contractor also trains their workers on health and safety aspects and the use of first aid kits. First-aid box to be installed by the contractor before the start of construction. The contractor provides all the construction workers with safety gear (safety shoes, gloves, masks, caps, and earmuffs).	Cost is already mentioned above	SEZ Simara, During the construction period Training is to be done before the start of construction activities and PPEs to be worn	Construction Supervisor, Biocomp Nepal	No. of waste workers not wearing safety gear, no. of injury/accident cases and it's report	Regular monitoring, reviewing the site progress reports direct observations in site and workers surveys Monitored weekly by the Mechanical Engineer and monthly by the UNOPS country team	Mechanical Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team

Anticipated E&S Risk and Impacts	Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Impact Mitigation		Impact/Mitigation Monitoring		Responsibility
			Location Timing/Frequency	Responsibility	Parameters to be monitored	Methodology, including Location and Frequency	
			through the construction period				
Adequacy of sanitary facility and Health and safety requirements	Adequate sanitary facilities including safe drinking water, clean washing facility, and toilet facilities will be provided to construction workers	Part of the construction cost	SEZ Simara, During the construction period Regularly when required until the construction is not over (To be done until November 2024)	Construction Supervisor, Biocomp Nepal	Toilet, drinking water, washing station	Monitor the quality of WASH and drinking water system through site visit Monitored weekly by Civil Engineer and monthly by the UNOPS country team	Civil Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team
Water pollution due to wastewater generated from construction site	During construction, a very low volume of wastewater will only be discharged in the regular sewer system of SEZ Simara.	Part of factory design & construction	SEZ Simara To be done during the construction period (Between August-November 2024)	Construction Supervisor, Biocomp Nepal	Whether water has been discharged into the drainage system of SEZ or not	Inspection/site report & visual inspection of drainage and ETP Monitored weekly by Plastic Expert and monthly by UNOPS country team	Plastic Expert, Biocomp PLEASE Country Manager
Water and soil contamination due to the generation of construction waste debris, excess concrete slurry, and mixed spoils. Generation plumbing items and electrical accessories which may contain Flame retardant chemicals.	If the waste contains any recyclable or up cyclable material that waste will be diverted to the Material recovery centers instead of dumping into the landfill. The generated waste on the construction site is to be Reused/recycled if where possible, the remaining construction debris is regularly collected in a safe place and frequently dumped by SEZ Simara on Birgunj Metropolitan City's Sanitary landfill site	184.00	SEZ Simara To be done during the construction period (Between August-November 2024)	Construction Supervisor, Biocomp Nepal	Waste and concrete slurry produced during the construction	Weighing report of reject waste and inspection of disposal process & final disposal location Weekly observation during the construction period by Plastic Expert, Biocomp and Monthly by UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team
Oil and hazardous material release, chemical contamination and Water & soil quality degradation due to it	Calculate required oil or hazardous material, chemical contamination and forecast the requirement to avoid any accidents. In the event of any accident, the area will be isolated and stored in a secured place and bioremediation will be provided. Hazardous materials and chemicals will be stored in a locked storage. Maintain records of any accidents, measures for cleanup and accident handling, and provide training and PPEs for staff to handle emergency and contamination	Part of the construction cost	SEZ Simara During construction period To regularly supervise the site	Construction Supervisor, Biocomp Nepal	The number of incidents with hazardous materials recorded	Visual inspection, and instant report of incidents in the construction coordination whatsapp group. Weekly observation during the construction period by Plastic Expert, Biocomp, and Monthly by UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team
Fire Hazards during construction activities	The contractor is going to train the construction workers in prevention methods on fire and fire safety protocols. Fire extinguishers are kept on the construction site so that if there are any fire issues, they can be resolved immediately. Biocomp will also do the insurance of the construction site. First Aid Kits will be installed, and Emergency exit doors will be marked. Emergency medical places will be marked where immediate first aid to workers will be provided	192.00 & other cost is already mentioned above	SEZ Simara Fire extinguisher and Training are to be done before the start of construction activities on August 2 nd week 2024	Construction Supervisor, Biocomp Nepal	No. of fire extinguishers installed and training on fire safety	Need to check whether fire extinguishers are installed or not and training provided or not through training report Weekly observation during the construction period by Plastic Expert, Biocomp, and Monthly by UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team

Anticipated E&S Risk and Impacts	Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Impact Mitigation		Impact/Mitigation Monitoring		Responsibility
			Location Timing/Frequency	Responsibility	Parameters to be monitored	Methodology, including Location and Frequency	
Water clogging, Stormwater, and Drainage issues	The factory plot of Special Economic Zone Simara is almost at the same level as the road and road-side drain level, thus filling with sand is only required at the planned roads and parking areas. The factory building will be increased by 2 feet from the road level to avoid any potential issues with flooding. The side gutter is going to be made with proper elevation so that water passes smoothly to the drainage system of the Special Economic Zone Simara	3076.00 & other costs is already mentioned above	SEZ Simara To be done before the concreting of the sub-structure (Between August-September 2024)	Construction Supervisor, Biocomp Nepal	Label/elevation of landscape	Visual inspection of the landscape Monthly inspection during the construction phase	Civil Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team
Workers might be exposed to possible health hazards, pollution & accidents during the commissioning of the factory	The facility workforce will be trained to use the machine and provided with high-quality safety gear (boots, shoes, gloves, mask, PPE dress e.t.c) and will be trained in health and safety aspects along with CRFM training. First aid boxes will also be installed to provide immediate aid. Factory worker's insurance & regular health checks will be done.	24944.00	SEZ Simara During the machine commissioning (November 2024)	Construction Supervisor, Biocomp Nepal	Whether workers are wearing safety gear or not and no of accident/injury cases	No. of waste workers not wearing safety gear, no. of injury/accident cases and its report Monitored during the commissioning phase	Mechanical Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team
Operations Phase							
Hygienic Risks associated with the health, safety, and hygiene of the workers during operations. Potential for the spread of communicable diseases	Provision of health insurance, OHAS training, Providing required PPE, Preparation of Guidelines on safety, and Daily safety briefing to the workers, Conducting frequent medical checkups for employees, Training on Safeguard, Accident reporting mechanism and Daily safety briefing, Training and easy and ready access on First aid materials, safe drinking water. Providing separate and washing facilities to male and female workers. Display instruction boards, clean space for the dining	Included in the construction cost. PPE/HER safety training budget is 24944.00	SEZ Simara Throughout Operation period Regularly when required until the construction is not over (To be done until November 2024)	Factory Supervisor, Biocomp Nepal	Toilet, drinking water, washing station, no. of people trained	Monitor the quality of WASH and drinking water system through site visit, training reports Monitored weekly by the Safeguards Officer, PIN and monthly UNOPS country team	Safeguards Officer, PIN and Biocomp Nepal Environmental Expert, UNOPS Country team
Social Issues (Individual/ community) due to Sexual exploitation and abuse (SEA) and sexual harassment (SH), social issues related to labor influx	A worker grievance redress methodology, incorporating focal points for both genders and an effective referral mechanism, will be adopted Awareness of communicable diseases, awareness of gender-based violence will be provided and priority will be given to recruiting workers from the local community Provision of anonymous reporting and complaining system along with protection measures for individuals who report Provide training on recognizing, preventing, and responding to SEA and SH, Establishment of a code of conduct	PPE/HER safety training budget as mentioned above	SEZ Simara Throughout Operation period Daily	Factory Supervisor, PIN	Health and safety plan, awareness program material, number of PPEs available and used, Grievance Log, suggestions Box, No. of people trained in SEA/SH Assignment of factory supervisor, requirement policy	Attendance of workers, Self-health history declaration and medical report if required, Training reports and photos, training manuals, requirement ToR/Process reports Prior to starting assigned tasks and biweekly by the Safeguard Officer, PIN, and monthly by the UNOPS country team	Safeguard Officer, PIN Environmental expert, UNOPS country team
Gender discrimination in job opportunity and wage	Preparation of Non discriminating guidelines for recruitment process and operations affecting all levels of workers HR policy for equal wages to male and female workers/employee A complain Box/issue box will be installed to know if there are any discrimination happening with staff	Included in Operations cost	SEZ Simara Throughout Operation period Weekly	Mechanical Engineer, Biocomp Nepal	Requirement staff data, Requirement Process, HR policy, regeneration sheet, Gender ratio	Detail report of salary sheet, employee data sheet, interview with employee, HR policy and hiring process documents Prior to and during the hiring process	General Manager, Biocomp Environmental expert, UNOPS country team
Public and nearby people complain due to bad smell and air pollution	None expected, as the factory is not close to a residential area and intake materials are recyclables and not waste	0.00 (E23)	SEZ Simara Throughout Operation period	N/A	N/A	N/A	N/A

Anticipated E&S Risk and Impacts	Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Impact Mitigation		Impact/Mitigation Monitoring		Responsibility
			Location Timing/Frequency	Responsibility	Parameters to be monitored	Methodology, including Location and Frequency	
			N/A				
Employees exposed to physical injuries during operations activities such as lifting weights and using cutting, shredding machinery	Provision of OHAS training, machinery training, Providing required PPE, Preparation of Guidelines on safety, and Daily safety briefing to the workers, Training on Safeguard & SOP, accident reporting mechanism, Health and accident insurance of workers will be done, signboards of dos and don't for workers will be placed. Machinery with proper guards and emergency switches will be installed. Health/accident insurance of construction workers will be done including their regular health checkups.	PPE/HER safety training budget as mentioned above	SEZ Simara & Aggregators of KTM Throughout Operation period OHSA training to be conducted on monthly basis, functioning of emergency switch to be check monthly	Factory supervisor, Biocomp Nepal	No. of OHSA trained workers, no. of accident cases and no. of sign boards placed, emergency switch in machinery	Reports of trained workers, reports of PPEs distribution, Visual inspection of emergency switches Monitored weekly by the Mechanical Engineer and monthly by the UNOPS country team	Mechanical Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team
Waste pickers will be exposed to hazardous waste & chemicals during waste collection and sorting	The consortium trains the waste pickers in safe collection, occupational health and safety, and what to do in case of injury, the consortium will also provide health insurance during the project period and provide PPEs to 500 IWWs. The consortium will build a WASH facility in 2 aggregators and provide HER safety training to 45 women IWWs	121018.00	Kathmandu and Lalitpur Metropolitan Throughout Operation period 2-day plastic/OHS Training and 2 day GEDSI training and distribution of PPEs to IWWs to be done between August to October 2024	Project Coordinator, PIN	IWWs training, PPEs received by them, and their quality and reject waste produced during the production	Report on no. of IWWs received training, PPEs, and their learnings report with site inspection. On a monthly basis from August to October 2024	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team
Employees exposed to hazardous waste during operations (B18)	Provision of OHAS training, Providing required PPE, Preparation of Guidelines on safety, and Daily safety briefing to the workers Due diligence on sources and avoid high-risk waste suppliers such as hospitals, battery, and chemical manufacturers. Training of aggregators and IWWs on safe collection and types of materials to be sorted and supplied to us	PPE, plastic training budget as mentioned above	SEZ Simara & Aggregators of KTM Throughout Operation period Training on plastics to IWWs and Distribution of PPEs between August to October 2024 and distribution of kits to IWWs	Factory supervisor, Biocomp Nepal	Whether workers are wearing safety gear or not and no of accident/injury cases	No. of waste workers not wearing safety gear, no. of injury/accident cases and its report Monitored weekly by the Plastic Expert and monthly by the UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team
Foul smell and harmful gas generation affecting workers' health and the environment	Regularly spray disinfectant in the storage area and use tarpaulin in truck. Forced ventilator (chimney) will be installed above the hot press machine to suck the effluent gas, and an activated carbon filter will be procured to pass the effluent gas and filter them. Machines will be maintained in optimal condition to minimize emissions. Monitoring of indoor air quality on a regular basis. Provision of OHAS training, Providing required PPE, Preparation of Guidelines on safety, and Daily safety briefing to the workers.	10232.00 and PPE, plastic training budget as mentioned above	SEZ Simara - Throughout Operation period A forced ventilator (chimney) is to be installed during the machinery installation period in November 2025. Indoor air quality monitoring on a regular basis throughout the operation period	Factory supervisor, Biocomp Nepal	Chimney/ Activated carbon filter installation, Exhaust air quality during the machine operation to check the effectiveness of the filter, Maintenance Schedule of the filtration system	Presence of foul smell BoQ/Visual inspection of the installation of Chimney/filter and Data/Report of exhaust air quality and maintenance plan/report of filter One-time monitoring of indoor air quality through the report	Mechanical Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team

Anticipated E&S Risk and Impacts	Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Impact Mitigation		Impact/Mitigation Monitoring		Responsibility
			Location Timing/Frequency	Responsibility	Parameters to be monitored	Methodology, including Location and Frequency	
Employees exposed to dust and noise pollution	Installation of an air ventilation system, 4 units of 20 ft shutters & multiple windows and doors including 15+ turbo ventilators at the roof. Dust monitoring done. Dust will be generated while shredding/cutting plastic and boards which will be captured with a dust suction device. In BoQ low noise producing machines will be required during the bidding process. The cutting area will be constructed with thick walls to reduce noise level and workers will be provided with ear plug. the noise level at the facility boundary will not cross more than 75 dB(A) [Industrial zone noise level standard of Nepal, 2012]. Provision of proper PPEs at the facility. A dust and noise monitoring device will be installed to monitor indoor PM level and noise and necessary action like halting the process will be taken if the dust/PM crosses the limit.	8345.00 & other costs as mentioned above	SEZ Simara, Throughout Operation period PPE sets for workers to be provided during the operation phase when they start their job in November 2024 and to be worn on a daily basis during working hours. The dust suction device is to be installed during the machinery installation period in November 2024	Factory supervisor, Biocomp Nepal	No. of workers not wearing safety gear, indoor air quality data,	No. of waste workers not wearing safety gear, no. of injury/accident, cases and its report Monitored weekly by the Mechanical Engineer and monthly by the UNOPS country team	Mechanical Engineer, Biocomp Nepal Environmental Expert, UNOPS Country team
Leakage of plastic and other waste	All the floor areas will be concreted to prevent direct contamination of the soil. Will regularly collect plastics inside the facility falling on the ground during the unloading of the trucks. Areas will be cleaned regularly with an industrial vacuum cleaner and wastewater from the facility will be passed through the wastewater pre-processing unit and then discharged SEZ's ETP	769.00 & other costs included in cell E15	SEZ Simara Cleaning of the facility is to be done daily, during the operation phase from November 2024	Factory supervisor, Biocomp Nepal	Cleanliness level/plastic particles on the floor	Monitor the cleanliness level of the area through visual inspection Monitored weekly by the Mechanical Engineer and monthly by the UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team
Contamination of soil and water bodies, groundwater due to dumping of generated refused waste and hazardous waste from the production area	Conduct awareness training for the IWWs and aggregators regarding the supply of clean waste materials to our facility. Proper dumping of reject waste by SEZ Simara in the Birgunj Metropolitan's sanitary landfill site (Expected 30 tons of reject waste/year). If chemical or hazardous waste is found in the batch of raw materials, it will be stored separately and returned to the aggregator. The other hazardous waste will be stored separately and dumped separately in Birgunj sanitary landfill site. A small and separate track is made to pass and collect all the oil and grease in the production area. In the wastewater pre-processing system, an oil & grease separator tank will separate such chemical waste.	29553.00 & other costs already mentioned above	Kathmandu and Lalitpur Metropolitan-Throughout Operation period 2-day training to be conducted for IWWs on plastic between August-October 2024	Factory supervisor, Biocomp Nepal	IWWs training, PPEs received by them, and their quality and reject waste produced during the production	Report on no. of IWWs received training, PPEs, and their learnings along with site inspection. Weighing report of reject waste and inspection of disposal process & final disposal location. Monitored weekly by the Plastic Expert and monthly by UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team
Contamination of land and water bodies due to generation of Microplastic during operation phase	The floor will be cleaned on a regular basis with an industrial vacuum cleaner and all the facility's wastewater will be routed into the wastewater pre-processing unit. Biocomp will install a wastewater pre-processing unit to filter plastic particles and pre-process effluent/ wastewater using a wastewater settlement tank, aeration process, and passing through activated charcoal & sand filtration and membrane filter. The output water will then be discharged into the Special Economic Zone Simara wastewater treatment plant (ETP). The sludge generated from ETP will be safely disposed of in	11673.00 & other costs already mentioned above	SEZ Simara-Throughout Operation period The wastewater pre-processing system is to be installed in November 2024. Cleaning of the facility is to be done on daily basis and	Factory supervisor, Biocomp Nepal	Need to check the wastewater leakage from facility, functionality of the wastewater pre-processing unit and end discharge of pre-processed water at SEZ's ETP	Discharge water quality report (BOD/TSP/E-coli/pH) and Visual inspection of Wastewater leakage from facility to ground, functionality of SEZ ETP Monitored weekly by the Plastic Expert and monthly by the UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team

Anticipated E&S Risk and Impacts	Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Impact Mitigation		Impact/Mitigation Monitoring		Responsibility
			Location Timing/Frequency	Responsibility	Parameters to be monitored	Methodology, including Location and Frequency	
	Birgunj sanitary landfill site via SEZ Simara. The rejected waste generated from the factory and sludge will be disposed of safely in Birgunj sanitary landfill site through the facilitation of SEZ Simara.		maintenance of the wastewater preprocessing system is to be on quarterly basis from November 2024				
Contamination of land and water bodies due to generation of wastewater during cleaning of the preprocessing	The floor will be cleaned on a regular basis with an industrial vacuum cleaner and all the facility's wastewater will be routed into the wastewater pre-processing unit. Biocomp will install a wastewater pre-processing unit to filter plastic particles and pre-process effluent/ wastewater using a wastewater settlement tank, aeration process, and passing through activated charcoal & sand filtration and membrane filter. The output water will then be discharged into the Special Economic Zone Simara wastewater treatment plant (ETP). Biocomp will construct a soak pit and septic tank inside the facility to manage the fecal sludge and gray water generated from the toilet and washroom.	Cost already mentioned above	SEZ Simara-Throughout Operation period The wastewater pre-processing system is to be installed in November 2024. Cleaning of the facility and use of the wastewater pre-processing system are to be done daily and maintenance of the wastewater preprocessing system is to be on a quarterly basis from November 2024	Factory supervisor, Biocomp Nepal	Need to check the wastewater leakage from the facility. functionality of the wastewater pre-processing unit and end discharge of pre-processed water at SEZ's ETP	Discharge water quality report (BOD/TSP/E-coli/pH) and Visual inspection of Wastewater leakage from facility to ground, functionality of SEZ ETP Monitored weekly by the Plastic Expert and monthly by UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team
Plastic spills during transportation causing water bodies and soil contamination	Cover truck with tarpaulin (big plastic)	Cost already mentioned above	SEZ Simara Tarpaulin to be used in every truck for covering during the production phase (From November 2024)	Factory supervisor, Biocomp Nepal	Whether the driver is covering the truck with tarpaulin or not while material transportation	Report of no. of times the driver doesn't cover the truck with tarpaulin upon arrival at the factory Monitored weekly by the Plastic Expert and monthly by the UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team
Fire Hazards and impacts due to it	Biocomp will install four units of 25-liter trolley-mounted ABC powder-type fire extinguishers and five units of 4-liter gas-type fire extinguishers on the wall or kept on the floor at an approachable distance. Smoke detectors /fire alarms will be installed at multiple places. An emergency evacuation plan will be developed and labeled properly in different places in the factory hall. Workers are going to be trained in fire safety and the use of fire extinguishers and fire drills every month. Biocomp will also do the insurance of the factory.	3654.00	SEZ Simara-Throughout Operation period Fire extinguishers, smoke detectors, and evacuation plan labeling are to be done before the start of the operation phase (November 2024). Fire drills and fire safety protocols training are to be conducted on a monthly basis Throughout Operation period	Factory supervisor, Biocomp Nepal	No. of fire extinguishers installed and training on fire safety	Need to check whether fire extinguishers are installed or not and training provided or not through training report Monitored weekly by the Plastic Expert and monthly by the UNOPS country team	Plastic Expert, Biocomp Nepal Environmental Expert, UNOPS Country team

Anticipated E&S Risk and Impacts	Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Impact Mitigation		Impact/Mitigation Monitoring		Responsibility
			Location Timing/Frequency	Responsibility	Parameters to be monitored	Methodology, including Location and Frequency	
Electrical Short Circuit and possible fire and other hazards due to it	Biocomp will install high-quality, thick insulant cables in all electrical connections. Electrical circuit boards, 2-way switches, fuses, and other components to reduce the risk of short circuits, including emergency buttons to cut power to machinery will be installed. Earthing will be done on machinery and electrical components. All these details are to be included in BoQ provided to the contractor. The safety shoe soles will be procured which is bad conductor of electricity to avoid electric shocks to workers Do insurance for the factory and factory staff	Included in the Factory construction (Electrical budget)	SEZ Simara-throughout Operation period To be done during the MEP installation phase between October-November 2024	Factory supervisor, Biocomp Nepal	Need to check whether earthing is done or not, high-quality electric cable is used or not, circuit switches and boards are used or not	BoQ/Contract of MEP with the contractor and Visual inspection of the quality of electrical components during the installation phase Once during installation	Mechanical Engineer, Biocomp Nepal Technical Expert, UNOPS Country team
Emission of GHGs from vehicles during transportation	The positive impact of the project will be enhanced to substitute impacts from GHGs. Will organize meetings virtually whenever possible.	0.00	Head Office-BCN & Country Office-PIN/CUNP During the project implementation period (Feb 2024-Feb 2025)	Factory supervisor, Biocomp Nepal	The overall impact of the project	N/A	N/A

4.4 Details of Key Impact Management & Mitigation Measures

4.4.1 Air Pollution Mitigation Measures and Management:

Biocomp has prioritized air pollution management in this ESMP to obtain safe indoor and outdoor air quality during the construction and operation phases. During the construction stage, dust might be generated during site clearance, material transportation, ground-breaking, and foundation & concreting work. Thus, in the BoQ, Biocomp has specifically listed that the contractor should regularly spray water to reduce dust at the site in dry humid conditions. For monitoring the dust particles (PM 10) during construction, dust monitoring device will also be placed and regularly monitored by Biocomp's construction supervisor.

For proper ventilation and improved air quality and ambient temperature inside the production hall, Biocomp will install 15 turbo ventilators throughout the roof at standard distances, which is already included in the BoQ for the construction.

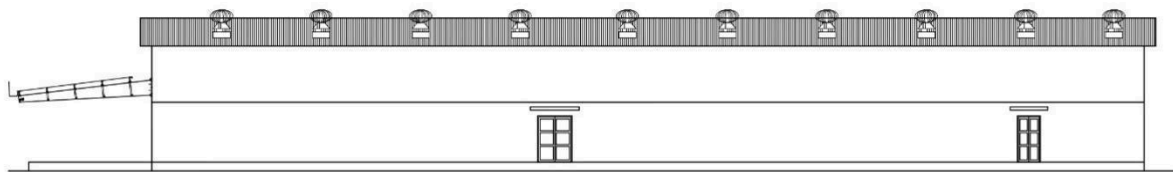


Figure: Ventilation system of plastic recycling facility [turbo ventilators at the roof]

Additionally, Biocomp will procure and install a forced air suction chimney above the hot press and other machinery to capture emitted air. The captured air will then be discharged outside the roof after passing through and being filtered by an activated carbon filter placed on the floor or roof of the production hall. To reduce PM and dust particles in the shredding and board-cutting area, Biocomp is going to install cyclone dust collectors along with the shredder and board-cutting machines. For monitoring the indoor air quality during factory production, dust (PM 10) and CO₂/CO measuring devices will be installed and regularly monitored by Biocomp's facility supervisor.



Fig: Reference image of air suction chimney and activated carbon filter

4.4.2 Solid Waste Management generated during Production and Operation:

Solid waste will be generated during the construction and operation of the facility, and Biocomp plans to manage this waste safely and responsibly in compliance with the Solid Waste Management Act 2068 of the Nepal Government. Currently, under the terms and conditions of SEZA, industries located inside SEZ Simara hand over their generated solid waste to SEZ Simara for disposal at the Birgunj Metropolitan's sanitary landfill.

- During the construction period, construction debris such as concrete, sand, waste bricks, and other materials will be disposed of at Birgunj's sanitary landfill site through SEZ Simara
- During the operation of the facility, reject waste constituting around 2% of the production (estimated 30 tons/year), will be handed over to SEZ Simara for disposal at Birgunj's sanitary landfill site
- Additionally, the residue collected in the settling tank of the wastewater pre-processing system will be regularly scraped out and safely handed over to SEZ Simara for disposal at Birgunj's sanitary landfill site



Fig: Sanitary Landfill Site of Birgunj Municipality

The ISWM facility/sanitary landfill site of Birgunj Municipality is located at Bishrampur which lies at the border of the Jeetpur-Simara Sub-Metropolitan City. This dedicated plot is purchased and owned by the Birgunj Metropolitan City and developed with ADB funds. After all the valuable waste is recovered and the organic portion is composted, the remaining valueless items are dumped in landfill cells. A soil cover is done to be kept to prevent birds, animals, and winds from scattering the materials. This also traps the bad odors from releasing preventing a smelly environment with methane and other gases production. The life of the landfill site is estimated to be 20 years.

The leachate produced from the dumping cell is collected in the pond passing through the side drains which needs to be treated as this has a high polluting capacity (high BOD/COD) and a strong smell. A simple

technology for treating this leachate is through the oxidation/stabilization pond system. This sanitary landfill site has four ponds in order: Anaerobic (Oxygenless) / Facultative (Oxygen at top and no oxygen at bottom) / Aerobic (Oxygen containing) / Maturation (Kills pathogens). These ponds do the treatment of the leachate with the help of bacteria and algae. After this, the cleared water is discharged to the Singhiya River nearby. The maturation pond also acts as an aerobic pond and a separate aerobic pond is not present. The three ponds do the treatment of the leachate with the help of bacteria and algae. After this, the cleared water is discharged to the Singhiya River nearby. [Source: [Integrated Solid Waste Management Site – Birgunj](#)]

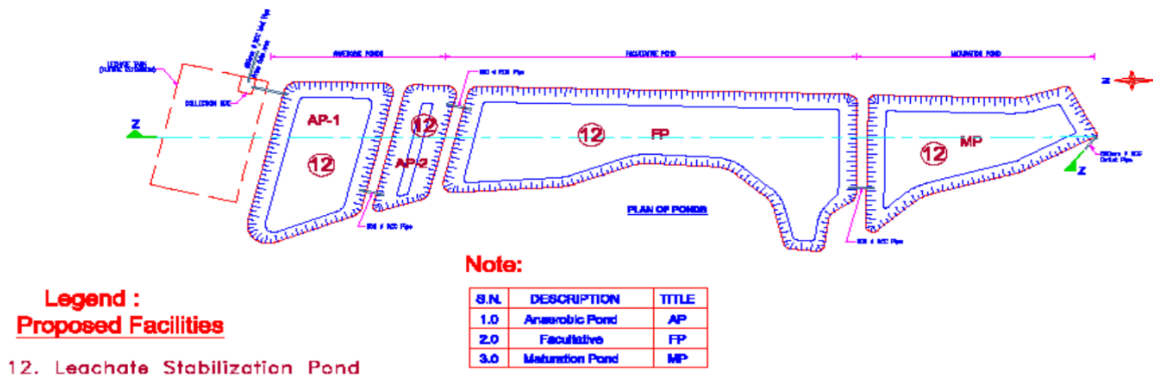


Fig: Leachate treatment unit plan of Sanitary Landfill site of Birgunj



Fig: Leachate Collection Drain and Treatment Unit of Birgunj Municipality

4.4.3 Water, Waste Water & Microplastic Management Plan:

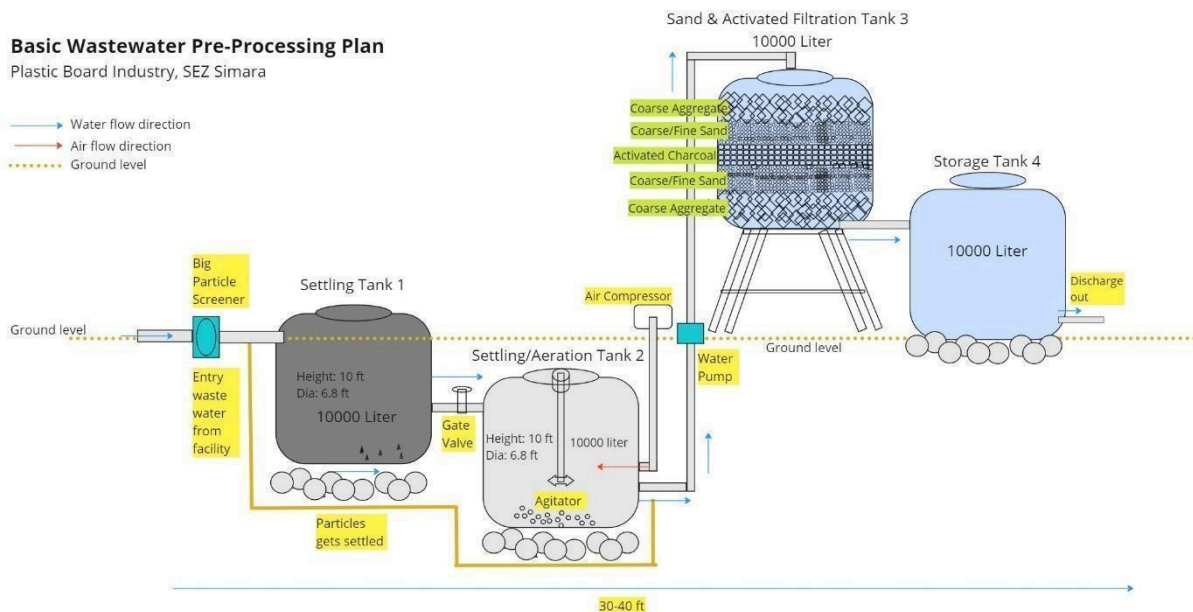
SEZ Simara will supply the water regularly to meet the daily water demand (around 2500 liter/day) for the plastic recycling facility. SEZ Simara has built a deep tube well at the central western boundary area of the Block "A" along with Water treatment and storage system. For management of the fecal sludge and gray water generated from toilet and washroom, Biocomp will construct a soak pit and septic tank inside the facility.

The wastewater generated during production-related activities like washing the plastic or cleaning floors will be transferred to the wastewater pre-processing system and the pre-processed water gets discharged to the wastewater treatment plant or ETP of SEZ Simara.

Biocomp will develop a wastewater pre-processing system consisting of connected tanks. The tanks systems are placed underground, in and above the ground and connected by pipes and gate valves to each other. The process begins with passing the wastewater from the screening mesh to Settling Tank 1, where wastewater particles get settled at the bottom of the tank. The top layer of settled water then flows into Settling/Aeration Tank 2 via gate value leaving the settled sediments/particles in the Settling Tank 1. In Settling/Aeration Tank 2, aeration will be done by an agitator which rotates the wastewater and an air compressor pumps the oxygen. The aeration tanks helps to reduce the overall BoD of the wastewater. After the Aeration, the wastewater is left to settle and pumped into Sand Filtration Tank 3 via a water pump leaving the settled sediments/particles in the Settling/Aeration Tank 2. In Sand & Activated Charcoal Filtration Tank 3, layers of coarse aggregate, coarse sand, fine sand, activated charcoal and membrane filter are added, and when the wastewater is passed through the layers of sand, aggregate, activated charcoal & membrane filter the water gets filtrated and stored

in Storage Tank 4. Activated charcoal removes free chlorine, chloramine, chlorine dioxide, phenols, organic solvents, and pesticides. The output water from Tank 4 will be discharged at SEZ's ETP.

Until the roadside gutter/drain becomes functional the wastewater is carried by the tanker and discharged at the ETP of SEZ Simara. The sediment and microplastic residue stored in the tanks will be regularly scraped out of the tank and handed over to SEZ Simara for disposal in Birgunj's sanitary landfill site. As a safety measure, the design envisages that the industrial units that generate toxic chemicals need to pre-treat the wastewater to the municipal sewage standard prior to its discharge to the wastewater system. In this way, the system helps to decrease BOD/COD concentration in discharged water & decrease dust/sediment particles and microplastic. The pre-processed discharged water will meet the standards of wastewater discharge as per the Ministry of Forest and Environment.



Steps and Process Details:

- **Step 1: Large Size Particles Screening**

The process begins with passing the wastewater produced inside the facility through the screening mesh made up of steel mesh which helps to screen and trap the large particles of plastic and other materials. The size of the hole of the steel mesh will be around 5 mm x 5 mm. The trapped particles in the steel mesh will be regularly cleaned.

- **Step 2: Settling of Wastewater**

Wastewater passes from the steel mesh and enters into Settling Tank 1 of 10000-liter capacity. In the settling tank, particles are left to settle for at least 4 hours before they get passed into the Aeration tank. This helps to settle the dust and soil particles of wastewater to settled inside the bottom of the tank. The settling and aeration tanks are connected by pipes, and the water flows sequentially through Aeration Tank 2 via a gate valve.

- **Step 3: Aeration of wastewater**

The aeration tank with a capacity of 10000 liters has an agitator to continuously rotate the water and air compressor to supply surplus oxygen in the tank. The wastewater flows from Settling Tank 1 to Settling/Aeration Tank 2 passing from gate valve where it undergoes aeration. Aeration is essential in the treatment of industrial wastewater due to its role in enhancing biological treatment processes, where it provides the necessary oxygen for aerobic microorganisms to decompose organic pollutants, thereby reducing biochemical oxygen demand (BOD) and chemical oxygen demand (COD). Additionally, aeration helps control odors by preventing the formation of anaerobic conditions that produce foul-smelling gases like hydrogen sulfide (H₂S). It also aids in detoxifying harmful substances produced by industrial processes through microbial

activity, ensuring the effluent released into the environment is less harmful. Furthermore, aeration prevents stagnation, keeping wastewater in motion and enhancing the overall efficiency of the treatment process.

- **Step 4: Sand & Activated Charcoal Filtration**

The wastewater will be pumped from Aeration Tank 2 to Sand & Activated Charcoal Filtration Tank 3 and undergo water filtration. A sand filtration tank 3 with a 10,000-liter capacity, comprising layers of coarse aggregate, coarse sand, fine sand, activated charcoal, coarse sand, coarse aggregate and membrane filter offers significant benefits in treating generated wastewater. The layered structure enhances the physical & chemical filtration process by trapping suspended solids and particulate matter at various stages, with coarse aggregate and sand layers capturing larger particles while fine sand filters out finer particles. This multi-layered filtration effectively reduces turbidity and prevents clogging, ensuring efficient water flow and prolonged filter life. Additionally, the varying granularity promotes biological activity, as microorganisms colonize the sand layers, aiding in the biodegradation of organic pollutants.

Activated charcoal helps to remove free chlorine, chloramine, chlorine dioxide, phenols, organic solvents, and pesticides. This combination of physical and biological treatment processes in a sand & activated carbon filtration tank along with a membrane filter improves the overall quality of the treated water, filtering plastic particles making it suitable for safe discharge into the environment as per National standard (DoDW/DoE).

Step 5: Water Storage and Discharge

The output of Sand & Activated Charcoal Filtration Tank 3 will be stored in Storage Tank 4. The treated water will be discharged at SEZ's ETP. Until the side gutter/drain of SEZ Simara gets functional Biocomp will directly discharge the pre-processed wastewater at the ETP plant carrying it through the tanker. The sediment and microplastic residue stored in the tanks will be regularly scraped out of the tank and handed over to SEZ Simara for safe disposal in Birgunj's sanitary landfill site. The pre-processed discharge water will meet the standards of wastewater discharge as per the Ministry of Forest and Environment which is tabled below.

2 **Tolerance Limits Chart for Industrial Effluents to be Discharged into Public Sewers** [[Standard, Ministry of Population and Environment](#)]

Characteristics	Tolerance Limit
Total Suspended solids	30-200 mg/L
Particle size of total suspended particles	Shall pass 850-micron Sieve.
pH	6 to 9.0
Temperature	Shall not exceed 40 degrees C in any section of the stream within 15 meters downstream from the effluent outlet.
Biochemical oxygen demand (BOD) for 5 days at 20 degrees C	30-100 mg/L
Chemical Oxygen demand (COD)	Monitor and report (Standard, Ministry of Drinking Water)
E-coli	1000 CFU/100 mL (Standard, Ministry of Drinking Water)

4.4.4 Wastewater Treatment Plant of SEZ Simara

The wastewater treatment plant of SEZ Simara is located in the southwestern corner of the SEZ area near the plastic recycling facility plot. All the water and drainage from the gutter and wastewater system is collected in a sump well from where it is diverted to the wastewater treatment plant. About 1.39% of the total land is provisioned for wastewater treatment plant. The wastewater treatment plant has been designed to meet the tolerance limits for the wastewater to be discharged into inland surface water from a combined wastewater treatment plant as given under the Generic Standard - Part III by the Ministry of Forest & Environment (MoSTE).

The wastewater generated is primarily treated in Anaerobic Baffled Reactors (ABR) and secondarily treated in Horizontal Flow Constructed Wetlands (HFCW). The sludge generated in the primary treatment would be further treated in Constructed Wetlands Sludge Drying Beds (CWSDB). The treatment plant comprises eight

numbers of ABR each of 10X3.65X2m dimensions. Each ABR has been designed to treat one-eighth of the average wastewater volume of 64m³. The ABR has three baffles. Horizontal Flow Constructed Wetlands (HFCW) consists of 24 HFCW each with a surface area of 250m to treat the total wastewater volume. It is said that the treatment plant will be effective in meeting the treatment requirements as proposed in the generic standard - Part III of the Ministry of Forest and Environment. The wastewater treatment plant is closely monitored & maintained by SEZ Simara officers. [These above details are referred from the EIA report of SEZ Simara.](#)



Fig: SEZ Simara wastewater treatment plant

4.4.5 General Occupational Health and Safety (OHS) Measures

The contractor will prepare and implement the occupational health and safety (OHS) package of the project during construction and Biocomp will implement it during the occupational health and safety package for operations. The staff will be informed about the OHS requirement during training and refresher training on occupational health and safety and the required measures will be displayed and available to all persons working on/visiting the site. These measures are required to eliminate or minimize risks to the workers who could be exposed to OH and S hazards associated with continuous exposure.

1. OHS during Construction

To ensure the safety of the occupational workers, Biocomp through the contractor will implement the following measures:

- Construction staff and workers will be provided with basic safety training and safety measures to be taken in the construction sites at least once a week before the start of day construction activity
- Signs to show potential risks will be placed at appropriate locations at the construction site and factory

- The construction staff and workers will be provided with personnel safety gear such as helmets, boots with tough toes, gloves, air masks, ear plugs, and others as required depending upon the work nature at least every six months.
- The construction supervisor will ensure that all the workforce is using the personnel protective gear at all times at the construction sites and those not using the gear will be prohibited in the construction sites
- First aid kits for minor cuts and injuries will be placed at all times in each of the active construction sites and in the project office.
- Handy fire-fighting gears will be placed at each of the construction sites for immediate use in case of fire.

2. OHS during Production and Raw Material Collection

To ensure the safety of the occupational workers, Biocomp will implement the following measures:

- Factory staff and workers will be provided with basic safety training and safety measures to be taken in the factory operations at least once a month
- Signs to show potential risks and emergency evacuation plan will be placed at appropriate locations at the facility
- The factory staff and workers will be provided with personnel safety gear such as safety helmets, safety shoes with steel toes, gloves, air masks, ear plugs, and others as required depending upon the work nature at least every six months including
- The factory supervisor will ensure that all the workforce is using the personnel protective gear at all times at the factory operations and those not using the gear will be strictly asked to use PPEs
- First aid kits for minor cuts and injuries will be placed at all times in the supervisor's office
- Handy fire-fighting gears will be placed at various places of facility for immediate use in case of fire.
- GEDSI and HER safety training, Training on the safe collection of PPEs including PPEs set and health insurance coverage will be provided to factory staff and 500 IWWs

4.4.6 Measures to Address Labor, Occupational Health and Safety/Safeguard Issues for Women Workforce during Facility Operation:

At the Plastic Recycling Facility, we are dedicated to ensuring the health, safety, and well-being of our women workforce through a robust strategy. This includes regular health and safety training tailored to their specific needs, comprehensive health checkups, and insurance coverage for maternity and reproductive health. RIVER+ provide essential support such as menstrual health education and accommodations for pregnant workers. RIVER+ & Biocomp's commitment extends to maintaining a safe working environment with regular risk assessments and ergonomic improvements. Accessible grievance mechanisms and compliance with relevant laws are integral to our approach which help us to address any emerging issues and enhance workplace conditions effectively.

1. Health and Safety Training

The project will conduct routine training sessions tailored specifically to the needs of women workers, focusing on occupational health and safety. These sessions will cover best practices and safety protocols relevant to their roles. The staff will be trained on emergency preparedness, including evacuation procedures and first aid. This ensures that all workers are well-prepared to handle emergencies effectively.

2. Health and Well-being

The project will offer comprehensive health insurance that includes coverage for maternity, reproductive health and accidental insurance coverage. This ensures that workers have access to essential healthcare services.

3. Gender-Specific Facilities and Support

Project will roll out Her Safety Training package among the workers in the recycling facility covering essential capacity-building content such as Sexual and Gender-based Violence (SGBV), Sexual and Reproductive Health Rights (SRHR), Safe Migration, Government Social Protection Program, safe collection and emotional well-being that enhance their knowledge on GBV issues, available services to increase service seeking behavior, strengthen accessibility to government social protection, increase knowledge on self-care and emotional wellbeing exercises, and so on. The project also provides access to sanitary

facilities and menstrual products in plastic recycling and WASH facilities. Arrangements for pregnant workers, such as modified duties, adequate rest periods, and maternity leave will be made. This helps ensure a supportive environment for those who are pregnant.

4. Safe Working Environment

The project will ensure to conduct regular risk assessments to identify and mitigate potential hazards, with a particular focus on those affecting women. This helps to create a safer working environment.

5. Grievance Mechanisms

The project shall ensure that women workers have easy access to grievance mechanisms for reporting safety concerns and incidents of discrimination or harassment. This promotes a transparent and responsive approach to addressing issues. The reporting mechanism shall be anonymous to protect workers from potential retaliation and ensure that they feel safe coming forward with their concerns.

6. Legal Compliance

The project shall ensure that the facility complies with national labor laws and international standards related to women's rights and workplace safety. This ensures that all legal requirements are met.

7. Monitoring and Continuous Improvement

Feedback loops to continuously improve workplace conditions will be established to gather and act on feedback from workers to address emerging issues and enhance overall safety and well-being.

4.4.7 Comprehensive Grievance Redress Mechanism for the Plastic Recycling Facility

1. Strong Implementation of Policies

A standardized [HR Policy & CoC](#) of Biocomp will be enforced, outlining clear expectations and consequences for breaches. This CoC will guide the behavior and interactions of all staff within the facility. A Zero Tolerance Policy will be developed for gender violence, SEA, and SH will be strictly implemented.

2. Staff Training and Awareness

All facility staff will undergo mandatory training on recognizing, preventing, and responding to SEA and SH. Comprehensive induction sessions will cover the Code of Conduct (CoC), Zero Tolerance Policy, and [Community Feedback and Response Mechanism \(CFRM\)](#) channels, ensuring that every staff member is well-informed from the start. Regular refresher sessions will be held to maintain continuous awareness and a strong commitment to upholding the highest standards of conduct. Additionally, the facility will display posters detailing the CoC, Zero Tolerance Policy, and CFRM mechanism prominently to reinforce these important messages.

3. Establishment of Clear Reporting Lines

Facility staff will have multiple accessible channels to share complaints and feedback, enhancing accountability and engagement. These channels will include suggestion boxes, a dedicated number and email. The project will ensure that these reporting lines are confidential, and staff will be encouraged to use them without fear of retaliation. Regular communication will be maintained to remind staff about these channels and to reinforce the importance of reporting any concerns. Additionally, there will be designated staff members trained to handle complaints sensitively and effectively, ensuring a prompt and thorough response to any issues raised.

4. Investigation and Delivering Firm Outcomes

During the project period, all cases and allegations, including SEAH, will be handled with the utmost care, following Biocomp's Investigation Guidelines and Handling (Referral) Safeguarding Cases Tool. A confidential case register will be maintained to record all cases, and comprehensive investigation reports will be prepared using the standard Biocomp template.

Violations of the CoC will result in disciplinary actions, which may include warnings, suspension, or termination of employment. If necessary, legal proceedings will be initiated. Relevant third parties, such as donors, will be informed about the steps taken to address the confirmed wrongdoing, ensuring transparency and accountability throughout the process.

5. Support for Victims/Survivors

During the project period, we are committed to providing comprehensive support to the survivors of gender violence, SEA, and SH. This includes:

- **Immediate Assistance:** Survivors will receive immediate assistance, including medical care, psychological support, and safe shelter if needed.

- **Psychological Support and Counseling:** Access to professional psychological support and counseling services will be provided. This includes external consultants offering counseling.
- **Legal Assistance:** Legal support will be provided to help survivors navigate the legal process if they choose to pursue legal action.
- **Ongoing Case Management:** Each case will be managed with the utmost confidentiality and care, following a survivor-centered approach. Dedicated staff members will ensure that survivors receive continuous support throughout the investigation and resolution process.

4.4.8 SEA/SH and GBV Risks and Mitigation Measure:

Risk	Likelihood	Impact	Mitigation Measure
Informal Waste Worker (IWWs) are subject to harassment and other forms of protection-related concerns: IWWs face various kinds of discrimination based on their work relating to waste, abusive language, disrespectful behavior, etc.	Medium	Medium	IWWs will receive training on protection and will have access to protection referral services. Service mapping for all the project areas and socialization of the information. Coordinate with the mapped-out services to strengthen the referral mechanism to respond to any potential GBV cases. Coordinate with the available safe house, Psycho-social service provider, local protection authorities, and local level government.
Employees working in plastic recycling facilities, especially women employees receive unequal payment compared to male employee	Low	Medium	Biocomp will ensure for fair and equal payment based on competencies and experience regardless of gender identity. The consortium has an HR policy where female candidates are always preferred over male candidates and the consortium ensures equal pay for men and women. The project HR manual will include equal pay policies. The manual will be based on the Biocomp HR Manual .
Lack of gender balance in all functions and levels: Lacking gender balance in all levels and a certain gender group overshadows the rest of the gender dynamic imposing unequal gender representation. Also lacking consideration from gender lenses creates a situation where the dynamic is in favor of the 'majority' group which can result in abuse of power, not consideration of colleagues' skills and competencies, degrading or humiliating situations, deteriorating work environment, resignations, and high turnover (lack of women staff retention), lack of representation, equal opportunities and voice, lack of involvement of some gender groups in PCM, lack of understanding of gendered elements at the project level - reinforcing gender imbalance and inequality	Medium	Medium	Consider GEDSI lenses and ensure gender balance as much as possible. The consortium has an HR policy where female candidates are always preferred over male candidates and the consortium ensures equal pay for men and women. Given the limited talent pool in Nepal for men as well as women caused by poor education systems and a brain drain due to migration the consortium cannot guarantee that a suitable female candidate is available for all the required positions. (Policies – HR Policies)
IWWs especially women, girls, migrant women, person with a disability are more prone to protection risk as physical violence, mental and psychological problems due to their vulnerable situation and social exclusion	Medium	High	IWWs especially vulnerable groups will be prioritized following the marginalization framework. Service mapping will be in place and information on available services will be shared with the IWWs. Coordinate with the mapped-out services provider to strengthen the referral mechanism to respond to any potential GBV cases.
IWWs especially women, girls, migrant women, person with a disability at risk of sexual exploitation, abuse and harassment	Medium	High	IWWs will be trained on protection and will have access to protection referral services. They will be aware on available services. Coordinate with the mapped-out services to strengthen the referral mechanism to respond to any potential GBV cases.

Risk	Likelihood	Impact	Mitigation Measure
Lack of inclusive and effective reporting mechanism in place due to which employees especially women, persons with disability, and other marginalized groups find the reporting process unsafe hence not reporting concerns.	Medium	High	Ensure inclusive and accessible reporting channels and necessary policies in place including safeguarding, CoC, HR, and Whistleblowing Policies. Conducting orientation on relevant policies to confidentially raise any concerns.
Lack of gender friendly latrines at waste segregation site (e.g. Aggregators) and waste recycling facilities imposing further risk of harassment, GBV and SEA	Medium	Medium	Ensure gender-friendly latrines at plastic recycling facility. The consortium will ensure the proper sanitation facility in two aggregator centers and advocate for gender-friendly latrines at waste segregation site. Ensure access to safe restrooms and clean water for washing and drinking. Designate women-only toilets that maintain hygienic standards.
SEA/SH and GBV risk	Low	High	The Consortium will conduct GEDSI training and develop mechanisms to ensure a safe and sexual harassment-free work environment for women. The consortium ensures inclusive and accessible reporting channels and necessary policies to take action for the abuser
Not having a designated point person sensitized on privacy issues, accessible communication on resources on seeking help on GBV whether it happens at workplace or home. GBV risk such as power imbalance between men and women, particularly waste pickers, and high vulnerability among the lowest economic rung of beneficiaries.	Low	High	A designated safeguarding and accountability lead will ensure that the project has a well-conceptualized risk assessment and mitigation plan. Safeguarding and Protection measures such as complaint response mechanism (CRM) and others approaches will be in place. One of the measures of Safeguarding and Accountability is also to ensure that the project beneficiaries are aware about these mechanisms and have access to them.
Lack of Gender training to sensitize on gender challenges and opportunities for women	Low	High	Gender Training for actors and partners will be provided by using the in-house resource person and will be integrated in the project induction and review meetings. The training curricula of "Her Safety" training will be developed through a joint effort of PIN's GEDSI and Protection Lead, and Program Managers of gender programming. This training will be developed to meet the needs of the employees and will cover: Code of Conduct, GRM, sexual and gender-based violence, sexual and reproductive health access to GBV services, financial management training, emotional wellbeing, information on how to access government social protection services, use of personal protective equipment (PPE), and occupational health and well-being.
Failing to collect gender-disaggregated data considering gender-differing needs and adaption	Medium	High	The PIN MEAL guidelines mandates the team gather and analyze the data by age-gender-diversity disaggregation. There is a PIN GEDSI Mainstreaming Checklist for MEAL to ensure GEDSI Mainstreaming in the MEAL activities including gender-balanced and diverse teams. The project team adheres to the General Data Protection Regulation GDPR when it comes to data protection. So, the collection of gender-disaggregated data was prioritized to monitor progress in all the activities related to the projects

5. Capacity Development & Training

RIVER+ emphasizes a robust Capacity Development & Training program aimed at equipping factory staff and related stakeholders with the necessary skills and knowledge to effectively manage plastic waste. The primary focus areas include gender sensitization & occupational health and safety

GEDSI & Safeguard Sensitization Training: To address gender and social inclusion, 20 GEDSI (Gender Equality, Disability, and Social Inclusion) sensitization training sessions will be conducted. These will cover topics such as gender equality, inclusion training, and protection services, aiming to sensitize 500 IWWs on harmful gender norms and social issues like gender-based violence (GBV). Additionally, GEDSI & safeguard sensitization training will be provided to the staff & factory workers of project partners (Biocomp, PIN, and Cleanup) to ensure a holistic understanding of these issues across all project stakeholders.

Training on Plastic Collection & Sorting: 500 IWWs and a few aggregators and factory workers will be provided with in-depth plastic training which includes types of plastic, kinds of low-value plastic, plastic pollution and its effects, safe segregation, and sorting methods, quality check of materials required for producing composite boards, packaging and bailing technique of plastic e.t.c

Occupational Health and Safety Training: Referred to sections 4.5.6 and 4.5.7

"Her Safety" Training: RIVER+ will implement 3 "Her Safety" training focused on creating a safe working environment for women employees in aggregator businesses. These trainings will include modules on the use of PPEs, safe collection of waste, information on fair market prices, and occupational health and well-being. The training will target factory workers and 45 women IWWs working with the two aggregators selected by RIVER+ to establish WASH facilities.

Machine Commissioning, Machinery Operation & Maintenance Training: Technical staff of the facility will be trained in machinery operation & maintenance through comprehensive training provided by machine suppliers based on the SOP.

6. Implementation Schedule and Cost Estimates

The table provides the implementation timeline & estimated cost for the mitigation measures and capacity development activities described above.

Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Source of Fund	Timeline 2024							2025	
			Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Construction Phase											
Organize induction session to the laborer's and staff working for the construction of occupational health and safety, policies, codes of conduct and protocols. Organize daily meetings and provide feedback on compliance and awareness programs on communicable diseases and implement prevention mechanisms. The required number of proper sanitary facilities will be installed. Adequate and well-ventilated camps/premises, clean eating areas, and separate sleeping/resting areas for male and female workers will be set up. Do the insurance of the construction site and worker	3230.00	Included in the Design and Construction of Factory									
All debris and residual spoil material shall be segregated as much as possible and disposed of only at locations approved by the construction supervisor. The debris and spoil shall be disposed of in such a manner that; (i) waterways and drainage paths are not blocked, (ii) the disposed material should not be washed away by runoff.	84.00	Included in the ESMP budget									
Suitable greeneries could be replaced during the landscaping of the construction site. Plant the trees/grass after the construction	305.00	Included in the ESMP budget									
The design of the building has taken into account the anticipated sea level and rainfall pattern fluctuation. The factory plot of Special Economic Zone Simara is around the same level as the road and roadside drain, thus filling with sand is only required at the planned roads and parking areas. The production hall and other blocks are to be raised by 2 feet from the ground level to avoid potential flooding issues	4615.00	Included in the Design and Construction of the Factory									
As per the seismic zoning category, the Simara region falls under category IV (DoMG), and the contractor is going to design and build the structure to handle the seismic load in compliance with the Nepal National Building Code NBC: 105:2020, Seismic Design of Building in Nepal	N/A	Included in the Design and Construction of the Factory									
The contractor periodically sprays water to reduce dust levels during dry weather conditions.	769.00	Included in Design and Construction of Factory									
An <u>emission monitoring device</u> is to be procured & installed to measure the dust level.	2461.00	Included in the ESMP budget									
For the noise control, less Noisy Equipment will be used. Noise will be maintained within the acceptable limits of construction, there are no residents close by who can experience noise issues during the construction of the factory.	N/A	Included in the Machinery budget									
Adequate sanitary facilities including safe drinking water, clean washing facility, and toilet facilities will be provided to construction workers	Part of the construction cost	Included in the Design and Construction of the Factory									
Calculate required oil or hazardous material and forecast the requirement to avoid any accidents. In the event of any accident, the area will be isolated and stored in a secured place and bioremediation will be provided. It is also possible to store it in a temporary container. Maintain records of any accidents, measures for cleanup, and accident handling	N/A	Included in the Design and Construction of the Factory									
The contractor is going to train the construction workers in prevention methods on fire and fire safety protocols. Few fire extinguishers are kept on the construction site so that if there are any fire issues, they can be resolved immediately. First Aid Kits will be installed, and Emergency exit doors will be marked. Emergency medical places will be marked where immediate first aid to workers will be provided	192.00	Included in the Machinery budget									
The factory plot of Special Economic Zone Simara is almost at the same level as the road and road-side drain level, thus filling with sand is only required at the planned roads and parking areas. The factory building will be increased by 2 feet from the ground level to avoid any potential issues with flooding. The side gutter is going to be made with proper elevation so that water passes smoothly to the drainage system of the Special Economic Zone Simara	3076.00	Included in the Design and Construction of the Factory									
The facility workforce will be trained to use the machine and provided with high-quality safety gear (boots, shoes, gloves, mask, PPE dress e.t.c) and will be trained in health and safety aspects along with CRFM training. First aid boxes will also be installed to provide immediate aid. Factory worker's insurance & regular health checks will be done.	24944.00	Included Operations/ Production budget									
Operations Phase											

Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Source of Fund	Timeline 2024								2025	
			Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
Provision of health insurance, OHAS training, Providing required PPE, Preparation of Guidelines on safety, and Daily safety briefing to the workers, conducting frequent medical checkups for employees, Training on Safeguard, Make accident reporting mechanism. Training on First aid and necessary First aid materials are readily available to ensure prompt response to any medical needs. Display Instruction boards, clean space for the dining	Cost mentioned in the above row	Included Operations/ Production budget										
Awareness of communicable diseases, and awareness of gender-based violence will be provided and priority will be given to recruiting workers from the local community. Provision of anonymous reporting and complaining system along with protection measures for individuals who report. Provide training on recognizing, Preventing, and responding to SEA and SH, Establishment of a code of conduct	Cost mentioned in the above row	Included in the Capacity development/ training cost										
Preparation of Non discriminating guidelines for recruitment process and operations affecting all levels of workers. HR policy for equal wages to male and female workers/employee. A complain Box/issue box will be installed to know if there are any discrimination happening with staff	Included in the Operations cost	Included in the Operations cost										
Workers may face health and safety risks associated with material handling, lifting heavy loads so Use of a manual forklift for loading the materials	769.00	Included in the Machinery budget										
The consortium trains the waste pickers in safe collection, occupational health and safety, and what to do in case of injury, the consortium will also provide health insurance during the project period and provide PPEs to 500 IWWs. The consortium will build a WASH facility in 2 aggregators and provide HER safety training to 45 women IWWs	121018.00	Included in the Capacity development/ training budget										
Regularly spray disinfectant in the storage area and use tarpaulin in truck.	269.00	Included in ESMP budget										
A forced ventilator (chimney) will be installed above the hot press machine to suck the effluent gas, Machines will be maintained in optimal condition to minimize emissions.	5230.00	Included in the Machinery budget										
An activated carbon filter will be procured to pass the effluent gas and filter them.	4733.00	Included in ESMP budget										
Installation of an air ventilation system, 4 units of 20 ft shutters & multiple windows and doors including 15+ turbo ventilators at the roof.	6807.00	Included in the Design and Construction of the Factory										
Dust will be generated while shredding/cutting plastic and boards which will be captured with a dust suction device. In BoQ a low noise-producing machine will be required during the bidding process.	1538.00	Included in the Machinery budget										
The cutting area will be constructed with thick walls to reduce noise level	Included in Design and construction cost	Included in Design and construction cost										
Will regularly collect plastics inside the facility falling on the ground during the unloading of the trucks. Areas will be cleaned regularly with an industrial vacuum cleaner	769.00	Included in ESMP budget										
Conduct awareness training for the IWWs and aggregators regarding the supply of clean waste materials to our facility.	29553.00	Included in IWWs capacitating budget										
Proper dumping of reject waste by SEZ Simara in the Birgunj Metropolitan's sanitary landfill site (Expected 30 tons of reject waste/year)	100.00	Included in ESMP budget										
Biocomp will install a wastewater pre-processing unit to filter plastic particles and pre-process effluent/ wastewater using a wastewater settlement tank, aeration process, and passing through activated charcoal & sand filtration and membrane filter. The output water will then be discharged into the drainage system of the Special Economic Zone Simara connected to their wastewater treatment plant (ETP). Special Economic Zone Simara doesn't have a functional side gutter connected to ETP yet. Until SEZ Simara makes a functional side gutter connected to ETP, the pre-processed water will be pumped from the storage tank of the facility and discharged directly at the ETP chamber of SEZ Simara	11673.00	Included in ESMP budget										
Biocomp will install four units of 25-liter trolley-mounted ABC powder-type fire extinguishers and five units of 4-liter gas-type fire extinguishers on the wall or kept on the floor at an approachable distance. Smoke detectors /fire alarms will be installed at multiple places. An emergency evacuation plan will be developed and labeled properly in different places in the factory hall.	1654.00	Included in ESMP budget										
Insurance of factory staff and factory	2000.00	Included in design and construction budget										

Risk Mitigation and Management Measures	Cost for Mitigation and Monitoring measures (USD)	Source of Fund	Timeline 2024							2025	
			Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Biocomp will install high-quality, thick insulant cables in all electrical connections. Electrical circuit boards, 2-way switches, fuses, and other components to reduce the risk of short circuits, including emergency buttons to cut power to machinery will be installed. Earthing will be done on machinery and electrical components.	Included in the Factory construction (Electrical budget)	Included in electricals budgets									
The positive impact of the project will be enhanced to substitute impacts from GHGs. Will organize meetings virtually whenever possible.	N/A	N/A									
Sub-total ESMP budget	22240										
Subtotal Design and Construction of Factory/Electricals Budget (ESMP/Mitigation Components)	18497										
Subtotal Machinery budget (ESMP/ Mitigation Components)	7537										
Subtotal Operations/ Production budget (ESMP/ Mitigation Components)	28944										
Training and Capacity Building Budget	121018										
Total Mitigation Budget (USD)	198236										

7. Attachments

- [1. IFB And Master Plan of Plastic Recycling Factory](#)
- [2. EIA Report SEZ Simara](#)
- [3. Ground Water Quality Report](#)
- [4. Grant Service Agreement Biocomp](#)
- [5. Board Decision for Self-Declaration](#)
- [6. Self-Declaration Biocomp July 2024](#)
- [7. Self Declaration Biocomp August 2024](#)
- [8. Permit to Work in SEZA](#)
- [9. Contract Agreement with SEZA](#)
- [10. Industrial Registration Certificate](#)
- [11. Industry Shift Letter](#)
- [12. SEZ Statement on IEE Requirement \(Nepali\)](#)
- [13. SEZ Statement on IEE Requirement \(Translated\)](#)
- [14. SEA.SH GBV Risk Assessment](#)
- [15. Biocomp Protection from Sexual Exploitation and Abuse Policy](#)
- [16. HR Policy and Code of Conduct-Biocomp](#)
- [17. Marginalization Framework](#)
- [18. Industrial Enterprise Act 2076](#)
- [19. Environmental Protection Regulations 2077](#)
- [20. Solid Waste Management Act 2068](#)

[21. Effluent Wastewater Discharge Standards-MOPE](#)

[22. Effluent Wastewater Discharge Standards-MODW](#)

8. Review & Approval

Prepared & Compiled By: Jacob Maarten Nijhof



Position: RIVER+ Project Manager & MD/CEO Biocomp Nepal Pvt. Ltd.

Date: August 28, 2024



Reviewed By: Rajendra KHANAL(Signature)

Position: ...Project Manager- Nepal

Date ...10 Sep, 2024.....

Approved By:



Approved By

Kapila Mahesh Rajapaksha,

Position: Environment and Social Development Specialist. SACEP

Date: 13th September 2024