

# Environmental Impact Assessment (EIA)



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## Declaration

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We, the undersigned at Earth Squad, hereby declare that this Environmental Impact Assessment (EIA) report for the proposed Aspire Washing Ltd. has been prepared by us with due professional diligence and care.

The information, data and analyses presented in this report, including the proposed environmental management and mitigation plans, are accurate and true to the best of our knowledge, belief and professional judgment. This assessment has been conducted in accordance with the prevailing environmental regulations and established best practices.

This Environmental Impact Assessment (EIA) study was carried out under the direct supervision and guidance of Md. Asiqur Rahman, PhD Research Fellow (RU), M.S in Environment Science, BAU, Mymensingh & Chief Executive Officer of Earth Squad. The report was primarily authored by Rahul Acharjee with the dedicated and coordinated contributions of the organization's multidisciplinary professional team.

We extend our sincere gratitude to the Board of Directors and management of Aspire Washing Ltd. for their cooperation and for providing the necessary data and information required for the completion of this report. We hereby acknowledge all individuals and organizations who contributed to this study.

This declaration affirms our professional responsibility for the contents of this report.

For and on behalf of Earth Squad,

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# Abbreviation

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## Abbreviation

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|        |                                             |
|--------|---------------------------------------------|
| BBS    | Bangladesh Bureau of Statistics             |
| BMD    | Bangladesh Meteorological Department        |
| BWDB   | Bangladesh Water Development Board          |
| DC     | Deputy Commissioner                         |
| DG     | Director General                            |
| DOE    | Department of Environment                   |
| ECR'23 | Environment Conservation Rules 2023         |
| EIA    | Environmental Impact Assessment             |
| EMP    | Environmental Management Plan               |
| EQS    | Environmental Quality Standard              |
| GIS    | Geographic Information System               |
| GOB    | Government of Bangladesh                    |
| GPS    | Global Positioning System                   |
| IEC    | Important Environmental Component           |
| IEE    | Initial Environmental Examination           |
| LGED   | Local Government Engineering Department     |
| MoEF   | Ministry of Environment and Forests         |
| NEMAP  | National Environment Management Action Plan |
| NGO    | Non-Government Organization                 |
| NWMP   | National Water Management Plan              |
| PAP    | Project Affected Person                     |
| PCP    | Project Concept Paper                       |
| PDB    | Power Development Board                     |
| AWL    | Aspire Washing Ltd.                         |
| SRDI   | Soil Resource Development Institute         |
| TOR    | Terms of Reference                          |
| GECL   | Global Environmental Consultant Ltd.        |
| ESBD   | Earth Squad (BD)                            |

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# *Glossary*

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## Glossary

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**Adverse impact:** An impact that is considered undesirable.

**Ambient air:** Surrounding air.

**Aquatic:** Growing or living in or near water.

**Bangla:** Bengali language.

**Baseline (or existing) conditions:** The baseline essentially comprises the factual understanding and interpretation of existing environmental, social and health conditions of where the business activity is proposed. Understanding the baseline shall also include those trends present within it, and especially how changes could occur regardless of the presence of the project, i.e. the „No-development Option“.

**Bazar:** Market.

**Beel:** A back swamp or depression. Can be either perennial or seasonal.

**Beneficial impacts:** Impacts, which are considered to be desirable and useful.

**Biological diversity:** The variety of life forms, the different plants, animals and microorganisms, genes they contain and the ecosystems they form. It is usually considered at three levels: genetic diversity, species diversity and ecological diversity.

**Ecosystem:** A dynamic complex of plant, animal, fungal and microorganism communities and associated non-living environment interacting as an ecological unit.

**Emission:** The total amount of solid, liquid or gaseous pollutant emitted into the atmosphere from a given source within a given time, as indicated, for e.g., in grams per cubic meter of gas or by a relative measure, upon discharge from the source.

**Endangered species:** Species in danger of extinction and whose survival is unlikely if the existing conditions continue to operate. Included among those are species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to suffer from immediate danger of extinction.

**Environmental effects:** The measurable changes, in the natural system of productivity and environmental quality, resulting from a development activity.

**Environmental impact assessment (EIA) / Environmental assessment:** The systematic, reproducible and interdisciplinary identification, prediction and evaluation, mitigation and management of impacts from a proposed development and its reasonable alternatives, sometimes known as environmental assessment.

**Environmental Impact:** An estimate or judgment of the significance and value of environmental effects for natural, socio-economic and human receptors.

**Environment Management Plan (EMP):** A Plan to undertake an array of follow-up activities which provide for the sound environmental management of a project/ intervention so that adverse environmental impacts are minimized and mitigated; beneficial environmental effects are maximized; and sustainable development is ensured.

**Environmental Management:** Managing the productive use of natural resources without reducing their productivity and quality.

**Erosion:** Process in which wind and water removes materials from their original place; for instance, soil washed away from an agricultural field.

**Evaluation:** The process of looking back at what has been really done or accomplished.

**Fauna:** A collective term denoting the animals occurring in a particular region or period.

**Field Reconnaissance:** A field activity that confirms the information gathered through secondary sources. This field study is essentially a rapid appraisal.

**Flora:** All of the plants found in a given area.

**Habitat:** The natural home or environment for a plant or animal.

**Household:** A household is identified as a dwelling unit where one or more persons live and eat together with common cooking arrangement. Persons living in the same dwelling unit having separate cooking arrangements constitute separate household.

**Important Environmental Component (IEC):** These are environmental components of biophysical or socio-economic importance to one or more interested parties. The use of important environmental components helps to focus the environmental assessment.

**Initial Environmental Assessment / Evaluation:** Preliminary analysis undertaken to ascertain whether there are sufficient likely significant adverse impacts to warrant a „full“ EIA. In some countries, use of initial assessment forms a meaning of “screening” proposed projects.

**Khal:** Small Channel, canal.

**Land use:** Types include agriculture, horticulture, settlement, pisciculture and industries.

**Mauza:** A Bangla word for the smallest government administrative area corresponding to village revenue unit.

**Mitigation:** An action, which may prevent or minimize adverse impacts and enhance beneficial impacts.

**Negative Impact:** Negative change from the existing situation due to the project.

**Public involvement / Public consultation:** A range of techniques that can be used to inform, consult or interact with stakeholders“ affected / to be affected by a proposal.

**Reversible impact:** An environmental impact that recovers either through natural process or with human assistance (e.g. cutting off fish migration by an embankment might be reversible at a later stage if a proper regulator is built).

**Stakeholders:** Those who may be potentially affected by a proposal, e.g. Local people, the proponent, government agencies, NGOs, donors and others, all parties who may be affected by the project or to take an interest in it.

**Taka:** Unit of Bangladeshi currency.

**Terrestrial:** Living on land.

**Thana:** Sub-district level of government administration, comprising several unions under district.

**Union:** Smallest unit of local self-government comprising several villages.

**Upazila:** Sub-district name. Upazila introduced in 1982.

**Zila:** Bengali word of district.

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## *Disclaimer*

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## Disclaimer

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This Environmental Impact Assessment (EIA) report for the Aspire Washing Ltd. is intended to provide a comprehensive overview of environmental practices and their potential impacts. It is important to acknowledge certain considerations:

The information within this report is sourced from various references, including field surveys, research, and industry standards. While we have diligently verified the accuracy of this data, it is subject to change and may evolve over time. Some sections of this report contain assumptions, projections, and forward-looking statements based on available data and best practices. Actual outcomes may differ due to evolving technologies, market conditions, and unforeseen circumstances. Environmental regulations and policies are subject to revisions and updates by relevant authorities. This report is based on the regulations in effect at the time of its preparation. Future regulatory modifications may impact the recommendations and findings provided herein. The environmental impact assessment is conducted with general industry standards in mind. However, site-specific conditions and local factors can influence the outcomes and mitigation measures required. Site-specific studies may be necessary for a comprehensive assessment.

This disclaimer underscores the dynamic nature of the information in this report. It is a foundational document to guide our environmental initiatives, with the understanding that ongoing evaluation, adaptation, and compliance with evolving regulations are integral to our approach.

Aspire Washing Ltd. remains fully committed to transparent reporting and accountable environmental management practices. We will continue to collaborate with regulatory authorities, stakeholders, and the community to minimize environmental impacts and promote sustainability in our operations.

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# *Executive Summary*

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## EXECUTIVE SUMMARY

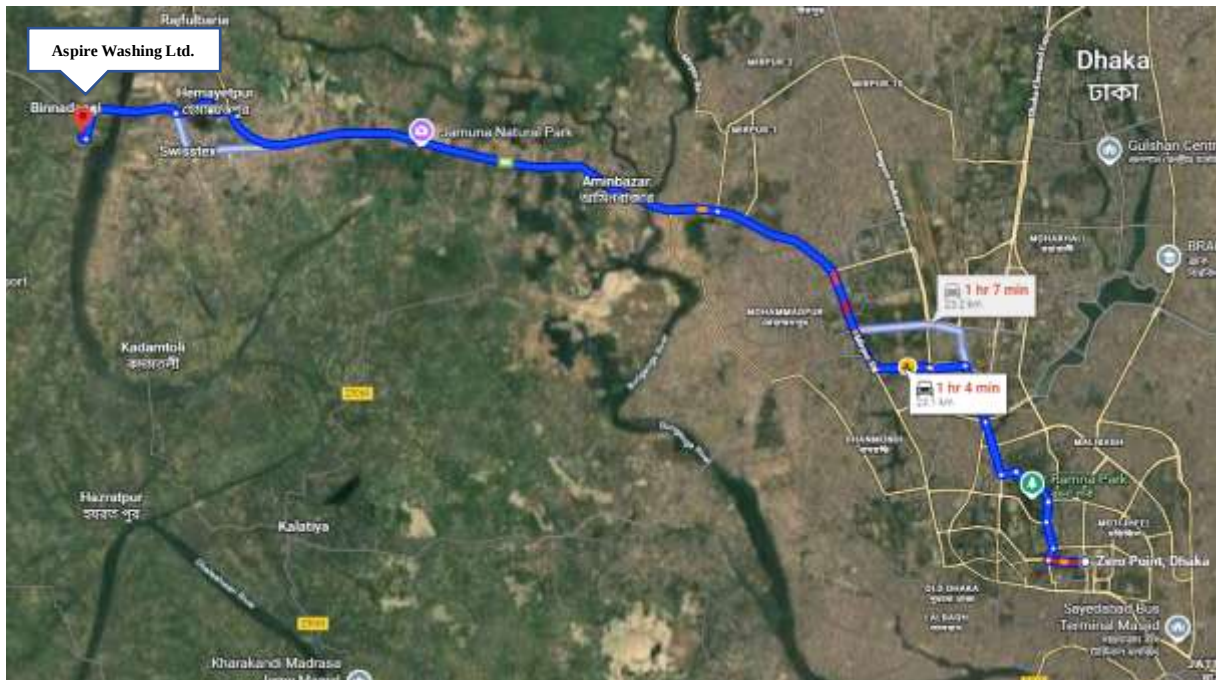
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This document constitutes, the Environmental Impact Assessment (EIA) of **Aspire Washing Ltd.** and has been developed by **Earth Squad (BD)** in close collaboration with the factory management. The EIA presents background information about the project. A number of national legislations which the project should abide by have been presented. Existing environmental examination is conducted by the consultants. The project activities are closely examined to find relationship and dependency in between the activities and environmental components. This information is used to predict impacts of the project activities on its' surrounding environment. Later on, evolution of this impact is done by examining existing environmental components. A number of mitigation measures were suggested in order to reduce adverse impacts. Finally, a management plan with monitoring requirement has been developed. Moreover, to address concerns and promote transparency, the factory management arranged a local stakeholder meeting and public consultation, actively involving the community in the decision-making process regarding environmental impacts.

**Aspire Washing Ltd.** has been established at Sudkhira, Jamirta, Singair, Manikganj, Bangladesh, for the production of denim washing with an annual production capacity of 1,87,20,000 units. The factory is well equipped with the latest machinery to produce good quality products. The total land area is 10,925 sqm. The project occupies approximately 7,314 sqm.

### A. Location & Access to The Project:

**Aspire Washing Ltd.** is located at Sudkhira, Jamirta, Singair, Manikganj. The company intends to set up its manufacturing plant over 7,314 square meter of land, within a total area of 10,925 square meter. The site is located at the geographical coordinates of Longitude: 90° 14' 18.7224" E and Latitude: 23° 47' 41.6976" N. The project site is about 23.2 km away from Dhaka Zero Point, 4 km away from Hemayetpur Bus Stand and about 32.1 km far from Hazrat Shahjalal International Airport.



**Figure 1: Location of Aspire Washing Ltd.**

### B. Project Component

The total area is 10,925 square meter and the area occupied by the project is about 7,314 square meter (approximately). Aspire Washing Ltd. till date consists of the following five major units which are-

- a) Administrative Office – 414 sqm.
- b) Production Facility – 4564 sqm.
- c) STP & ETP– 1045 sqm.
- d) Generator – 490 sqm.
- e) Others – 2744 sqm. (approx.)

### **C. Objectives of EIA Study**

The overall objective of this EIA report is to identify major environmental impacts resulting from the implementation of the project and to recommend mitigation measures to avoid or reduce adverse environmental impacts and to enhance positive impacts. The EIA is prepared as per requirements of DoE in order to issue Environmental Clearance Certificate in favor of the project. This report also follows the terms and condition of Site Clearance Certificate, which is issued previously.

### **D. EIA Study Methodology**

The EIA is conducted by following steps-

- To assess the existing environmental conditions of the project site and its adjacent areas in order to establish a baseline framework against which potential environmental impacts due to the implementation of the project would be compared.
- To identify and assess environmental impacts resulting from the project during its development or construction phase.
- To identify, pre-determine and assess environmental impacts resulting from the project during its operational phase.
- To develop a well-balanced environmental management plan with recommendations for mitigating adverse impacts and enhancing positive impacts and outlining environmental monitoring requirements both during construction and operational phase of the project.
- To identify issues that may require further studies.

### **E. Existing Environmental Condition**

Existing environmental survey is conducted to identify existing environmental condition. Water, air and noise quality monitoring is conducted at project site, details of which are available in chapter-4.0. According to the existing condition, the operation of the Aspire Washing Ltd will not impose any adverse impact to the surrounding environment.

### **F. Potential Positive impacts**

Positive impacts of the project are creation of jobs; support of local businesses; infrastructure development; and revenue to Local Council.

### G. Potential negative environmental impacts and mitigation measures:

Major environmental component that may be affected by the project activity is water, acoustic environment, air etc. Some of the major environmental impacts and proposed mitigation measure is shown below:

| Affected Environmental Component / Concern | Anticipated Impact            | Proposed/Implemented mitigation/ Enhancement Measures                                                                                                                                                                           |
|--------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Water Environment</b>                   | Water pollution               | <ul style="list-style-type: none"> <li>❖ Take care of ETP and Plumbing system of the project.</li> <li>❖ Ensure proper sanitation facilities.</li> <li>❖ Increase awareness and training.</li> </ul>                            |
| <b>Acoustic Environment</b>                | Noise pollution               | <ul style="list-style-type: none"> <li>❖ Noise shielding by barriers or buildings.</li> <li>❖ Green belt development.</li> <li>❖ Strict use of PPEs inside noisy areas.</li> <li>❖ Regular noise quality monitoring.</li> </ul> |
| <b>Air Quality</b>                         | Air Pollution                 | <ul style="list-style-type: none"> <li>❖ Proper management of solid waste.</li> <li>❖ Effective control of vehicular traffic.</li> <li>❖ Burning good quality fuel.</li> </ul>                                                  |
| <b>Solid Waste Generation</b>              | Air, Water and Soil Pollution | <ul style="list-style-type: none"> <li>❖ Proper solid waste management system.</li> <li>❖ Sufficient number of waste handling bins.</li> <li>❖ Awareness and training.</li> </ul>                                               |
| <b>Traffic congestion</b>                  |                               | <ul style="list-style-type: none"> <li>❖ Sufficient parking facility should be provided.</li> <li>❖ Everybody should abide by traffic rules.</li> </ul>                                                                         |

### H. Public Consultation:

Aspire Washing Ltd. arranged a public meeting on **14<sup>th</sup> March, 2026** at project site. The meeting was attended by more than **25 persons** which includes local people, local community leaders, businessmen and other interested persons from different corners. Officials of Department of Environment, Manikganj Zila office were also present in this meeting.

Local stakeholders expressed their concerns regarding potential environmental impacts associated with the operations of the denim washing. They recommended adopting a 3R (Reduce, Reuse, Recycle) and ZLD (Zero Liquid Discharge) plan for the production process. In response, the factory assured them that initially, 70% of water would be reused, with the remaining 30% treated through the Effluent Treatment Plant (ETP) before discharge into the neighboring river. There is a future plan to achieve

100% water reuse and zero discharge. The factory commits to incorporating the 3R and ZLD plan in the Environmental Impact Assessment (EIA) report. Additionally, the local community expressed optimism about potential job opportunities, highlighting no previous disturbances related to the factory's operations.

#### **I. Environmental Management Plan**

A comprehensive monitoring plan has also been suggested in the report. The present study found the adverse environmental impacts are totally manageable.

Hence considering commitment from project authority to take any actions necessary to conserve environmental conditions at **Aspire Washing Ltd.** at surrounding environment, the Environmental Clearance Certificate can be issued.

---

# *Chapter 1*

## *Introduction*

---

## 1. INTRODUCTION

### 1.1 Project Background

In the context of Bangladesh's rapidly expanding textile and apparel sector, the establishment of **Aspire Washing Ltd.** holds significant industrial importance. With the growing global demand for high-quality denim garments and advanced washing effects, the need for modern and efficient denim washing facilities has increased substantially. In response, Aspire Washing Ltd. plans to establish a modern, export-oriented denim-washing factory equipped with advanced machinery and technologies to process various denim products such as jeans and twill garments. The project aims to support the country's export-oriented garment industry by ensuring high-quality washing services while maintaining compliance with international production and environmental standards.

#### **Industry Overview:**

Bangladesh has emerged as one of the world's leading producers and exporters of ready-made garments (RMG), with denim products representing a significant portion of the sector's export portfolio. The rapid growth of the textile and apparel industry has led to increasing demand for modern garment processing facilities, including specialized denim washing units. Denim washing is a critical stage in garment manufacturing, responsible for achieving desired fabric textures, colors, and finishing effects required by international buyers.

To remain competitive in the global market, the industry is gradually transitioning toward technologically advanced washing facilities that can produce consistent quality while meeting stringent environmental and compliance standards. In this context, Aspire Washing Ltd. proposes to establish a modern, export-oriented denim-washing factory equipped with advanced machinery and process technologies. The facility will support the growing demand for diversified denim products and provide high-quality washing services aligned with international production and compliance requirements.

#### **Economic Contributions:**

The establishment of Aspire Washing Ltd. is expected to make significant contributions to the national and local economy. As a 100% export-oriented facility, the project will enhance Bangladesh's export capacity by supporting the production of high-value denim garments for international markets. By improving processing efficiency and quality control, the project will strengthen the country's position in the competitive global denim supply chain.

The project will also generate direct and indirect employment opportunities for skilled and semi-skilled workers, including technicians, machine operators, quality control staff, and administrative personnel. In addition to employment generation, the factory will contribute to government revenue through taxes, duties, and service-related economic activities. The project is also expected to stimulate supporting industries such as transportation, packaging, chemical supply, and maintenance services, thereby creating broader economic benefits.

**Investment and Infrastructure:**

The proposed denim-washing factory represents a substantial industrial investment in modern manufacturing infrastructure. The project will include the installation of advanced denim washing machines, drying systems, finishing equipment, and supporting utilities designed to ensure efficient and high-quality garment processing. All essential machinery, chemicals, spare parts, and operational components required for denim washing operations will be imported and installed following international industrial standards.

The facility will also include critical environmental and operational infrastructure such as an Effluent Treatment Plant (ETP), water supply systems, power distribution units, chemical storage facilities, and waste management systems. Proper planning and engineering design will ensure that the infrastructure supports safe operations, efficient resource utilization, and compliance with national environmental regulations. This investment will contribute to modernizing Bangladesh's textile processing capabilities and improving industrial productivity.

**Corporate Social Responsibility:**

Aspire Washing Ltd. recognizes the importance of responsible industrial operations and is committed to implementing effective Corporate Social Responsibility (CSR) practices. The company aims to maintain a safe and healthy working environment for its employees by complying with occupational health and safety standards, providing appropriate training and ensuring proper use of protective equipment.

In addition, the company will prioritize environmental responsibility by implementing pollution control systems, including an efficient Effluent Treatment Plant (ETP) to treat wastewater before discharge. Resource efficiency measures such as water conservation, proper chemical management, and energy-efficient technologies will be incorporated into the operational framework.

Aspire Washing Ltd. also intends to contribute positively to the surrounding community by creating employment opportunities and supporting local economic activities. These CSR initiatives will help strengthen relationships with stakeholders while ensuring sustainable and responsible industrial development.

**Market Dynamics:**

The global apparel market is experiencing continuous growth in demand for denim products, driven by evolving fashion trends and consumer preferences. International brands increasingly require garments with advanced washing effects, consistent finishes, and innovative designs. As a result, the demand for specialized denim washing facilities capable of producing a wide variety of washing styles and finishes has increased significantly.

Bangladesh's denim sector has expanded rapidly to meet this demand, but many existing washing units face challenges related to technological limitations and compliance requirements. Buyers now emphasize sustainability, quality consistency, and efficient production processes. These market dynamics have created opportunities for new facilities equipped with modern technologies and environmentally compliant systems.

The proposed project by Aspire Washing Ltd. aims to address these market requirements by providing advanced washing capabilities, maintaining strict quality standards, and supporting the production needs of export-oriented garment manufacturers.

**Environmental Considerations:**

Denim washing operations involve processes that can potentially impact the environment, including water consumption, wastewater generation, chemical usage, air emissions, noise, and solid waste production. Therefore, careful environmental planning and management are essential to ensure sustainable industrial operations.

As part of the project development process, an Environmental Impact Assessment (EIA) will be conducted to identify and evaluate potential environmental impacts associated with the proposed factory. Appropriate mitigation measures will be recommended to minimize adverse effects and ensure compliance with national environmental regulations.

The project will incorporate environmentally responsible practices such as the installation of a properly designed Effluent Treatment Plant (ETP), efficient water management systems, controlled chemical handling procedures, and proper waste disposal mechanisms. Continuous environmental monitoring and management plans will also be implemented to maintain environmental quality and ensure the sustainable operation of the facility.

## **1.2 Need for Environmental Impact Assessment (EIA)**

The establishment and operation of a modern denim washing facility such as Aspire Washing Ltd. represent a significant industrial activity that may have potential environmental and social implications. Denim washing processes typically involve considerable consumption of water, chemicals, and energy, along with the generation of wastewater, emissions, and solid waste. Therefore, conducting an Environmental Impact Assessment (EIA) is essential to identify, evaluate, and mitigate possible environmental impacts associated with the project. The following factors highlight the importance of carrying out a comprehensive EIA for the proposed denim washing facility:

### **a) Environmental Preservation:**

The project area and its surrounding environment may be affected by industrial activities such as wastewater discharge, noise, and air emissions. An EIA helps assess these potential impacts and ensures appropriate mitigation measures are implemented to protect the surrounding ecosystem and environmental quality.

### **b) Resource Utilization:**

Denim washing operations require significant amounts of water, energy, and chemical inputs. The EIA process evaluates resource consumption patterns and recommends efficient technologies and management practices to minimize wastage and promote sustainable resource use.

### **c) Water Quality Management:**

The washing process generates wastewater containing dyes, chemicals, detergents, and suspended solids. Through the EIA, appropriate wastewater treatment strategies—such as the installation of an efficient Effluent Treatment Plant (ETP)—can be designed to ensure compliance with environmental standards.

### **d) Waste Management:**

Industrial washing processes generate solid wastes such as sludge from wastewater treatment and packaging materials from chemicals. The EIA identifies proper waste handling, recycling, and disposal methods to minimize environmental impacts.

**e) Community Impact:**

The operation of the proposed facility may influence the surrounding community through employment opportunities, industrial activities, and local economic development. An EIA helps assess these socio-economic effects and promotes responsible engagement with local stakeholders.

**f) Legal and Regulatory Compliance:**

Conducting an EIA ensures that the project complies with relevant environmental laws and regulations of Bangladesh, including applicable environmental conservation rules and guidelines issued by regulatory authorities.

**g) Public Consultation and Stakeholder Engagement:**

Public participation and input are vital in the decision-making process for projects of this nature. An EIA provides a platform for meaningful stakeholder engagement, offering transparency and incorporating community feedback into the project's development and operations.

**h) Risk Mitigation:**

An EIA facilitates the identification of potential environmental risks related to industrial washing operations and recommends mitigation and monitoring measures to ensure safe and sustainable project operation.

In summary, the need for an Environmental Impact Assessment is imperative to ensure responsible and sustainable industrial development.

### **1.3 Ideal EIA System**

In the context of conducting an Environmental Impact Assessment (EIA) for Aspire Washing Ltd., it is essential to establish an ideal EIA system that supports responsible environmental management and sustainable industrial practices. As the proposed project involves denim-washing operations that utilize water, chemicals, and energy while generating wastewater and other wastes, a well-structured EIA system is necessary to ensure environmentally sound project implementation. The foundation of this ideal EIA system includes the following key components:

**a) Comprehensive Scope:**

The EIA system should cover all potential environmental impacts associated with the denim washing operations, including wastewater generation, chemical handling, water consumption, energy use, air emissions, noise, and solid waste management.

**b) Holistic Approach:**

The assessment should consider not only the direct environmental impacts of washing operations but also indirect impacts related to supporting activities such as chemical storage, transportation, and utility usage.

**c) Stakeholder Engagement:**

An effective EIA system should involve consultation with relevant stakeholders, including local communities, regulatory authorities, and other concerned parties, ensuring transparency and incorporation of stakeholder concerns in project planning.

**d) Baseline Data:**

Reliable baseline environmental data should be collected prior to project implementation to establish the existing environmental conditions of the project area. This data will provide the reference point for evaluating potential project impacts.

**e) Impact Prediction and Analysis:**

The EIA system should apply appropriate analytical methods to predict potential environmental impacts resulting from the proposed washing operations and evaluate alternative management options.

**f) Mitigation and Monitoring:**

The system must include effective mitigation measures to minimize adverse impacts, such as installing and properly operating an Effluent Treatment Plant (ETP) for wastewater treatment, along with regular environmental monitoring to ensure compliance with environmental standards.

**g) Adaptive Management & Top management Commitment:**

An ideal EIA framework should incorporate adaptive management principles, allowing continuous improvement based on monitoring results and operational feedback. Strong commitment from the top management of Aspire Washing Ltd. is essential to ensure the effective implementation of environmental policies and sustainable practices.

**h) Regular Auditing:**

Periodic environmental audits and assessments should be conducted to evaluate the effectiveness of environmental management measures and ensure adherence to established environmental standards.

**i) Compliance with Regulations:**

The EIA system should ensure full compliance with the applicable environmental laws, rules, and guidelines of Bangladesh, particularly those related to industrial wastewater management and environmental protection.

## **1.4 Objectives of EIA Study**

Proper location, process and waste abatement and control are very important for each development activities and environment. To ensure this Environmental Impact Assessment (EIA) is a very effective tool, which delineates what needs to be done to make a development activity suitably located and operated in an environment friendly way.

The overall objective of this EIA report is to identify major environmental impacts resulting from the implementation of the project and to recommend mitigation measures to avoid or reduce adverse environmental impacts and to enhance positive impacts. Briefly the specific objectives of this EIA are:

- To assess the existing environmental conditions of the project site and its adjacent areas in order to establish a baseline framework against which potential environmental impacts due to the implementation of the project would be compared.
- To identify and assess environmental affect resulting from the project during its development or construction phase.
- To identify, pre-determine and assess environmental impacts resulting from the project during its operational phase.
- To develop a well-balanced environmental management plan with recommendations for mitigating adverse impacts and enhancing positive impacts and outlining environmental monitoring requirements both during construction and operational phase of the project.
- To assess existing facility design, review the process & operation and recommend further improvement.
- To identify issues that may require further studies.

## **1.5 EIA Study Methodology**

Based on the above Scope of Work, the following steps are followed during the EIA process:

- Undertaking a rapid field survey toward collection of Social and Environmental information and data pertaining to the project area.
- Collection and review of primary data by document review, baseline monitoring, public consultation and field visits.
- Collection of Secondary data from different government and non-government organizations.
- Understanding the technical and environmental aspects of the project facilities;

- Identification of potential environmental impacts (along with residual impacts and cumulative impacts, if any) and evaluation of socio-economic consequences of such impacts.

Multiple data collection techniques were adopted to collect primary, as well as secondary information required the preparation of overall management plan. Detailed information about the project was gathered from the key individuals involved in the project. Several field visits were carried out by the EIA Team to obtain firsthand information on the surrounding environment of the project site. During this field visit, formal and informal discussions were carried out with people in and around the project site. Climatic data of the project area was collected from the Bangladesh Meteorological Department.

On the basis of collected relevant data, identification of possible impacts has been done using Checklists method. This was followed by evaluation of likely impacts along with the impact's origin and extent. The possible mitigation/enhancing measures for negative and beneficial impacts have been suggested to develop an Environmental Impact Assessment (EIA).

### 1.5.1 The EIA Process Comprises Six Key Steps

#### Screening

Screening is the initial step of the Environmental Impact Assessment process. It determines whether a proposed project requires a detailed EIA study or not. A well-structured screening system helps identify projects that could cause significant environmental effects, thereby saving time and resources by excluding activities with minimal or negligible impacts. For *Aspire Washing Ltd.*, the screening outcome categorizes the project as **Red Category** under *Schedule 1 of ECR 2023*, requiring a full EIA before obtaining Environmental Clearance from the Department of Environment.

#### Scoping

Once the need for an EIA is confirmed, the next stage is scoping. Scoping is often referred to as the foundation of the entire EIA process and should ideally be undertaken during the project-planning phase. Its main purpose is to determine the key environmental and social issues that need detailed assessment and to set clear boundaries for the study area. This stage also includes preparing the **Terms of Reference (ToR)** for the assessment in consultation with the DoE and stakeholders. Properly executed scoping ensures that the study remains focused, relevant, and free from unnecessary detail.

#### Impact Assessment

This stage involves identifying, predicting, and evaluating potential impacts arising from project activities by comparing the project characteristics with the established baseline conditions. The assessment is based on the cause-and-effect relationship between project actions and environmental responses. Analytical tools and models are used where applicable, though with caution, as data

limitations in developing contexts may influence model accuracy. The ultimate aim is to estimate the significance, extent, and duration of each potential impact.

### Public Consultation

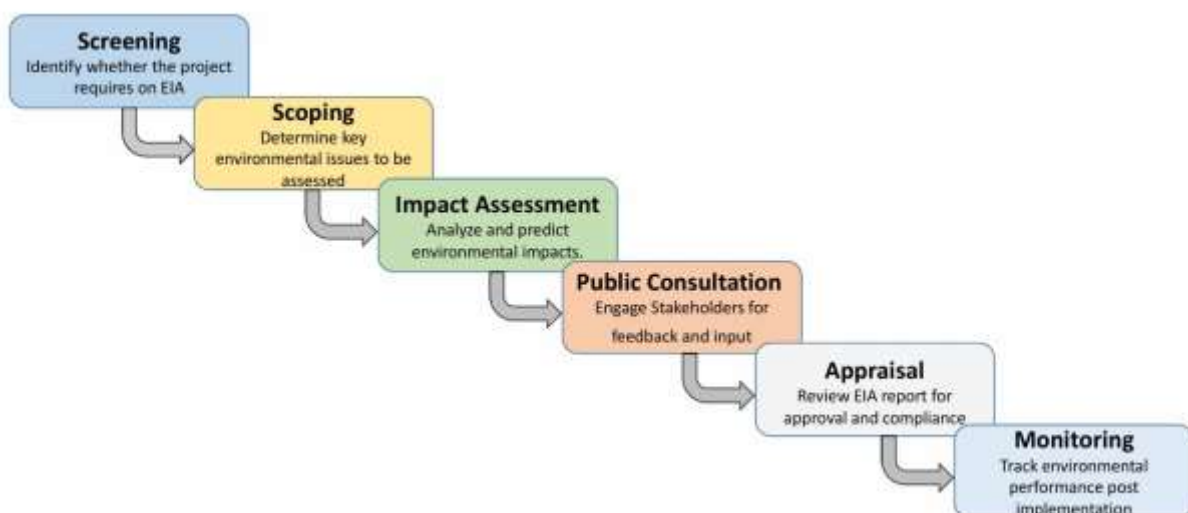
Public consultation is a vital component of the Environmental Impact Assessment (EIA) process as required by the Department of Environment (DoE). It ensures that the views, concerns, and suggestions of local communities, workers, and other stakeholders are taken into account during project planning. Through meetings, discussions, and information sharing, the project proponent can identify potential environmental and social issues early and address them effectively. This participatory process enhances transparency, builds community trust, and increases the project's social acceptability.

### Appraisal

The appraisal process ensures that the EIA includes accurate data, realistic impact predictions, and appropriate mitigation measures. Based on this assessment, the DoE decides whether to grant Environmental Clearance and may impose specific conditions to ensure environmental protection and sustainable project operation.

### Monitoring

Monitoring is the final and continuous stage of the EIA process that tracks the implementation of mitigation and management measures during construction and operation. It involves regular measurement of environmental parameters such as air, water, noise, and waste management to ensure compliance with DoE standards and the Environmental Management Plan (EMP). The findings are reported periodically to the DoE, enabling corrective actions and continuous improvement to maintain long-term environmental sustainability of the project.



**Figure 1.1: Flowchart of EIA Steps**

## 1.6 EIA Approach

This EIA report identifies environmental impacts/issues rises from the operation of the project facility and prepares an outline for mitigation measures of potential negatives impacts and enhancement of positive environmental impacts. Accordingly, the scope of the EIA report includes the following:

- Project Description
- Conducting Existing environmental study within the study area,
- Collection and generation of primary and secondary data
- Assessment of Environmental and socio-economic and residual impacts that may arise due to project operation and any future construction
- Study the environmental management practices
- Preparation of an outline of Environmental Management Plan

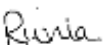
This report consists of **11** chapters. The chapters are-

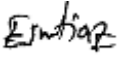
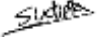
- Chapter 1 (Introduction)
- Chapter 2 (Policy & Legal Consideration)
- Chapter 3 (Project Description)
- Chapter 4 (Description of Existing Environmental and Social Baseline)
- Chapter 5 (Identification & Mitigation of Potential Impacts)
- Chapter 6 (Environmental Management Plan)
- Chapter 7 (Emergency Response & Disaster Management Plan)
- Chapter 8 (Analysis of Alternatives)
- Chapter 9 (Public Consultations)
- Chapter 10 (Conclusions)
- Chapter 11 (References)

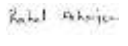
## 1.7 EIA Team

**Earth Squad** has prepared this report with its highly efficient team of consultants. The report is prepared under the guidance, expertise and supervision of -

| SL No | Name                          | Qualification                                                                                                                                                                                                                                                                                                                           | Position                     | Field of Specialization                                                                                                                                                                                                                                   | Years of Experience | Signature                                                                             |
|-------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------|
| 1.    | <b>Md. Asiqur Rahman</b>      | <ul style="list-style-type: none"> <li>M.S in Environment Science, BAU, Mymensingh</li> <li>PhD Research Fellow (RU)</li> <li>Lead Auditor ISO 14001:2015 (EMS) from Intertek</li> <li>Training on Environmental Modelling &amp; ESIA from IWM</li> <li>6 Research articles published in national and international journals</li> </ul> | Team Leader                  | <ul style="list-style-type: none"> <li>Environmental Specialist (EMP, EIA, ESIA)</li> <li>Expert on Environmental Monitoring Location, Frequency &amp; Specific Parameters.</li> <li>Expert on (ETP, CETP, STP, MLD &amp; ZLD, WTP &amp; ATP).</li> </ul> | 21                  |    |
| 2.    | <b>Zahirul Islam Jwell</b>    | <ul style="list-style-type: none"> <li>B.Sc in Textile Engineering (BUTEX)</li> </ul>                                                                                                                                                                                                                                                   | Textile Engineer             | <ul style="list-style-type: none"> <li>Wet Processing (Denim &amp; Knit Dyeing Washing)</li> <li>Garments Manufacturing</li> <li>Fabric Engineering</li> </ul>                                                                                            | 26                  |  |
| 3.    | <b>Md. Munir Hossain, PhD</b> | <ul style="list-style-type: none"> <li>B.Sc (Hons), M.Sc University of Dhaka</li> <li>PhD Fellow, IBSc (RU)</li> </ul>                                                                                                                                                                                                                  | Team Member & Biologist      | <ul style="list-style-type: none"> <li>Environmental baseline survey (Flora &amp; Fauna) Specialist</li> </ul>                                                                                                                                            | 24                  |  |
| 4.    | <b>Sukumar Dhali</b>          | <ul style="list-style-type: none"> <li>MS in Environmental Science</li> <li>PGDPM</li> </ul>                                                                                                                                                                                                                                            | Team member and Consultant   | <ul style="list-style-type: none"> <li>Environmental baseline survey</li> <li>Specialized in STP, ATP, ETP and WTP.</li> <li>Specialized in IEE, EIA &amp; EMP.</li> </ul>                                                                                | 24                  |  |
| 5.    | <b>Rajib UI Haque</b>         | <ul style="list-style-type: none"> <li>Post Graduate Diploma, on Environmental Management &amp;</li> </ul>                                                                                                                                                                                                                              | Wastewater Treatment Process | <ul style="list-style-type: none"> <li>Process Design of Biological Wastewater Treatment,</li> </ul>                                                                                                                                                      | 16                  |  |

| SL No | Name                         | Qualification                                                                                                                                                                                                                                                                | Position                            | Field of Specialization                                                                                                                                                          | Years of Experience | Signature                                                                             |
|-------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------|
|       |                              | Wastewater Treatment, Institute for Sanitary Engineering, Water Quality and Solid Waste Management (ISWA), University of Stuttgart, Germany<br>▪ MSc. in Environmental Science, NSU                                                                                          | Design Expert                       | Membrane Separation, MLD & ZLD<br>▪ Water Pollution Impact Assessment for Aquatic Life<br>▪ Wastewater Treatment Plant Audit<br>▪ ZDHC Approved Trainer on Wastewater Management |                     |                                                                                       |
| 6.    | <b>Kazi Mohiuddin Jilany</b> | ▪ Master of Science & Business Administration (MSBA) in Management, Shanghai University, China<br>▪ MBA, BBA in Marketing, University of Dhaka                                                                                                                               | Economist                           | ▪ Specialized in Data Analysis<br>▪ EIA & ESIA specialist<br>▪ Expert on Business Analysis, Procurement and International Correspondence.                                        | 15                  |   |
| 7.    | <b>Md. Solaiman</b>          | ▪ M.Sc. in Environment and Disaster Management, Jagannath University, Dhaka<br>▪ Commonwealth Executive Master in Business Administration, Bangladesh Open University in collaboration with Commonwealth of Learning, Canada.<br>▪ B.Sc. Honors (4 years) in Chemistry, SUST | Environmental Monitoring Specialist | ▪ Expert on Water Quality and Noise Quality Assessment, Sampling, Analysis & Reporting                                                                                           | 18                  |  |
| 8.    | <b>Runia Sharmin</b>         | ▪ MSS, BSS in Social Science, Rajshahi University                                                                                                                                                                                                                            | Sociologist                         | Expert on Social Baseline Survey                                                                                                                                                 | 17                  |  |

| SL No | Name                              | Qualification                                                                                                               | Position                   | Field of Specialization                                                            | Years of Experience | Signature                                                                             |
|-------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------|
| 9.    | <b>Md. Sojib Hossen</b>           | ▪ B.Sc. in mechanical engineering, City University                                                                          | Sr. Environmental Engineer | Expert on Mechanical Design                                                        | 05                  |    |
| 10.   | <b>Eimtiazbne Easin</b>           | ▪ BSc. in Civil Engineering, Ahsanullah University of Science & Technology (AUST), (Major: Environmental Engineering)       | Civil Engineer             | ▪ Baseline Survey, Drawing, EIA expert                                             | 04                  |    |
| 11.   | <b>Md. Fakhruz Zahir Majumder</b> | ▪ BSc. in Civil Engineering, Chittagong University of Engineering and Technology (CUET) (Major: Water Resource Engineering) | Environmental Engineer     | ▪ Environmental Survey & Data Collection, STP, ETP, EIA & EMP                      | 03                  |   |
| 12.   | <b>Sudipta Sarker</b>             | ▪ BSc. in Civil Engineering, Ahsanullah University of Science & Technology (AUST), (Major: Transportational Environment)    | Environmental Engineer     | ▪ Environmental Data Compilation, STP, ETP, EIA & EMP                              | 02                  |  |
| 13.   | <b>Engr. Atano Roy</b>            | ▪ BSc. in Civil Engineering, Ahsanullah University of Science & Technology (AUST), (Major: Structural Engineering)          | Civil Engineer             | ▪ AutoCAD 2D, Autodesk Revit 3D, animation & Design<br>▪ STP, ETP, ESIA, EIA & EMP | 02                  |  |

| SL No | Name                  | Qualification                                                                                                                                   | Position                   | Field of Specialization                                                                                                           | Years of Experience | Signature                                                                           |
|-------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------|
| 14.   | <b>Rahul Acharjee</b> | <ul style="list-style-type: none"> <li>B.Sc. in Civil Engineering, AUST;</li> <li>M.Sc. in Environmental Science and Management, BUP</li> </ul> | Environmental Engineer     | <ul style="list-style-type: none"> <li>AutoCAD (2D), Environmental Survey and Data Collection, STP, ETP, EIA &amp; EMP</li> </ul> | 1.0                 |  |
| 15.   | <b>Ucchas Muhury</b>  | <ul style="list-style-type: none"> <li>B.Tech Mechanical Engineering, NIT, Warangal. India</li> </ul>                                           | Jr. Environmental Engineer | <ul style="list-style-type: none"> <li>IT/OT, Systems Administration, IIoT, Cloud, Industrial Automation</li> </ul>               | 1.0                 |  |

### 1.8 Limitations

Services performed by the consultant are conducted in a manner consistent with that level of care and skill generally exercised by members of the engineering and consulting profession. The report may not exhaustively cover an investigation of all possible circumstances that may exist. However, an effort is made to discover all meaningful areas under the stipulated time available.

In evaluating subject site, consultant relies in good faith on information provided by client's management or employees. The consultant assume that the information provided is factual, accurate and accepts no responsibility for any deficiency, misstatement or inaccuracies contained in this report as a result of omission or misrepresentation of any person interviewed or contacted. However, the consultant notifies the contradictions and errors in the data, where it seems appropriate.

It should be recognized that the information given in the report is time specific and with the passage of time, the relevancy of data and analysis may suffer. Specific circumstances and condition of site can change due to which conclusion and opinions may also change.

### 1.9 Acknowledgement

The EIA report has been prepared basically with the support from authority and also from **Aspire Washing Ltd.** various government agencies including Department of Environment (DOE), Bangladesh Meteorological Department (BMD), Soil Resource Development Institute (SRDI), Bangladesh Bureau of Statistics (BBS), Bangladesh Water Development Board (BWDB), Department of Environment (DoE) and Department of Agriculture Extension (DAE), Disaster Management Bureau (DMB), Bangladesh etc.

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## *Chapter 2*

# *Policy & Legal Consideration*

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## **2. POLICY AND LEGAL CONSIDERATIONS**

### **2.1 Introduction**

Development projects are governed by some legal and institutional requirements. Therefore, considerations of relevant legal provisions, policies, strategies and institutional issues are very important for any project proponent or developer before they execute a program or plan, and obviously at the operational stages of projects no one can deny these rules, which set the boundary limits for each project. The proponent must be well aware of these requirements and comply with the provisions as applicable and necessary. The following sections review the relevant national legislation and policies along with some international laws.

### **2.2 Environmental Policy**

Environment Conservation Act, 1995 (ECA '95) is currently one of the main legislative documents relating to environmental protection in Bangladesh. Under this act, no industrial unit or project shall be established or adopted without obtaining environmental clearance, in the manner prescribed by the rules, from Director General. Compliance with the provision of this Act is the responsibility of Department of Environment (DoE). A set of the relevant rules to implement the ECA'95 had been promulgated in August 1997. The rules mainly consist of:

- ✓ Categorized list (green, orange and red) of the projects.
- ✓ Application format to take environmental clearance.
- ✓ Ambient standards in relation to water pollution, air pollution and noise, as well as permitted discharge/emission levels of water and air pollutants and noise by industries.

In accordance with section 20 of The Bangladesh Environment Conservation of Act No. 1 of 1995, the Government in March, 2023 passed the Bangladesh Environment Conservation Rules, 2023. This Article discussed various important provision of the Regulation:

- ✓ Categorized list (green, yellow, orange and red) of the projects.
- ✓ Application format to take site clearance and environmental clearance.
- ✓ Ambient standards in relation to water pollution, air pollution and noise, as well as permitted discharge/emission levels of water and air pollutants and noise by industries.

- ✓ Procedure for issuance of Environmental Clearance and Location Clearance Certificate.
- ✓ Services, fees, and mode of payment Services, fees, and mode of payment.

In the light of categorization made under the above ECR, '23, **Aspire Washing Ltd.** falls under “Red” categories. (Schedule-1, Page No. 3057, ECR, '23)

|     |                                                                   |
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|-----|-------------------------------------------------------------------|

According to ECR, '23, industries fall under the Green and Yellow categories are not required to undertake an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) study. Orange projects are required to undertake an IEE, while Red category projects must undertake an IEE and an EIA or EMP.

Being committed to environmental protection BTSM from the beginning has taken positive actions to meet ECA, '95, ECR, '23, and other environment protection rules and regulations.

## 2.3 Provisions Under Environmental Legislation

### 2.3.1 National Water Management Plan (NWMP), 2001 (approved in 2004)

The National Water Resources Council approved on March 31, 2004 a 25-year National Water Management Plan. The plan provides a framework within which all concerned with the development, management and use of water resources water services in Bangladesh can plan and implement their own activities in a coordinated and integrated manner. The planned activity programs have been presented in the eight sub-sectoral clusters: i) Institutional Development, ii) Enabling Environment, iii) Main River, iv) Towns and Rural Areas, v) Major Cities; vi) Disaster Management; vii) Agriculture and Water Management, and viii) Environment and Aquatic Resources. Each cluster comprises of a number of individual programs. WARPO was assigned to monitor the NWMP.

### 2.3.2 Natural Water Bodies Protection Act 2000

- According to this Act, the character of water bodies, i.e. rivers, canals, tanks, or floodplains identified as water bodies, in the master plans or the master plans formulated under the laws establishing municipalities in division and district towns shall not be changed without approval of the concerned ministry.
- Anyone disobeying this act will be subjected to a maximum of 5 years of imprisonment or a maximum 50,000-taka penalty or both.

### **2.3.3 National Water Policy (1999)**

The National Water Policy of 1999 was passed to ensure efficient and equitable management of water resources, proper harnessing and development of surface and ground water, availability of water to all concerned and institutional capacity building for water resource management. It has also addressed issues like river basin management, water rights and allocation, public and private investment, water supply and sanitation and water need for agriculture, industry, fisheries, wildlife, navigation, recreation, environment, preservation of wetlands, etc.

### **2.3.4 National Agricultural Policy, 1999**

The overall objective of the National Agriculture Policy is to make the nation self-sufficient in food through increasing production of all crops including cereals and ensure a dependable food security system for all. One of the specific objectives of National Agricultural Policy is to take necessary steps to ensure environmental protection as well as environment-friendly sustainable agriculture. Through increased use of organic manure and strengthening of the integrated pest management program. The policy also suggests creating awareness so that the chemical fertilizers and pesticides used for increased crop production do not turn out to be responsible for environmental pollution. Water logging and salinity are identified as one of the serious problems in some parts of the country including the coastal areas for agricultural activities and environmental damage. The policy recommends for crop rotation and salt tolerant crop varieties.

## **2.4 Other Sectoral Policies/Legislation of Relevance**

Any industry in the country is also required to comply with the industrial and export/import policy of the country. The industry is also required to comply with the Factories and Establishment Act and to undertake the license from concerned licensing authority.

In addition to the above National rules and regulations BTSM in its operational phase must comply with other national acts, policies and rules, some of those are as follows:

### **2.4.1 Forest Policy (1994)**

The National Forest Policy of 1994 is the amended and revised version of the National Forest Policy of 1977 in the light of the National Forestry Master Plan. The major target of the policy is to conserve the existing forest areas and bring about 20% of the country's land area under the forestation Program and increase the reserve forest land by 10% by the year 2015 through coordinated efforts of GO-NGOs and active participation of the people.

Amendments of the existing laws (acts, rules and regulations) relating to the forestry sector and creation of new laws for sectoral activities have been recognized as important conditions for achieving the policy goals and objectives. The Forestry Policy also recognizes the importance of fulfilling the, responsibilities and commitments under International Conventions, Treaties and Protocols (ICTPs).

#### **2.4.2 National Fisheries Policy, 1999**

The National Fisheries Policy, 1999 was formulated following review and intent of the East-Bengal Protection and Conservation of Fish Act 1950, which was updated by the Protection and Conservation of Fish (Amendment) Ordinance 1982 and further refined by the Protection and Conservation of Fish (Amendment) Act 1995. These Acts and ordinance provide provisions for the protection and conservation of fish in fresh water and brackish water bodies.

The Fisheries Policy highlights the need to conserve fish breeding grounds and habitats. It intends to promote fisheries development and conservation in all water bodies. The project should consider these policies to protect the habitats, migration and connectivity of fish and fisheries resources around the project area. Measures to reduce any potential negative impacts on local fish populations will be incorporated into all stages of the Project.

#### **2.4.3 National Land Use Policy, 2001**

The National Land Use Policy was enacted in 2001, aims at managing land use effectively to support trends in accelerated urbanization, industrialization and diversification of development activities. The policy urges that increasing the land area of the country may be not possible through artificial land reclamation process, which is cost-effective only in the long run. Major content of this policies is following:

- Stopping the high conversion rate of agricultural land to non-agricultural purposes;
- Utilizing agro-ecological zones to determine maximum land-use efficiency;
- Adopting measures to discourage the conversion of agricultural land for urban or development purposes;
- Improving the environmental sustainability of land-use practice

#### **2.4.4 The Embankment and Drainage Act, 1952**

The East Bangle Act No. 1, 1953 was amended in 1953 which has been adapted by the People Republic of Bangladesh, by the Bangladesh Order (adaptation of Existing Laws), 1972 (President's Order No. 48 of 1972). The Act consolidates the laws relating to embankments and drainage providing provision for

the construction, maintenance, management, removal and control of embankments and water courses for the better drainage of lands and for their protection from floods, erosion or other damage by water.

The specific Sections and Articles relevant to the project are mentioned below:

- **Section 4 (1)** of the Act states that the embankment, water-course, and tow-path, earth, pathways, gates, berms and hedges of the embankments shall vest in the Government of the Authority (BWDB).
- **Section 56 (1)** states that, person will be subject to penalty (500 taka or imprisonment... if he erects, or causes of willfully permits to be erected, any new embankment, or any existing embankment, or obstructs or diverts, or causes or willfully permits to be obstructed or diverted, any water course).
- **Section 15** allows for the engineer (engineer in charge of Divisional level BWDB) for constructing new embankment or enlarging, lengthening or repairing existing embankments.
- The other sections of the Act give powers and access to the Government or Authority or Engineers to commence necessary project activities, for land acquisition (through the DC), and site clearing activities including removal of trees or houses (if necessary).

#### **2.4.5 Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009**

The GOB also prepared the BCCSAP in 2008 and revised in 2009. This is a comprehensive strategy to address Climate Change (CC) challenges in Bangladesh. BCCSAP built on and expanded the NAPA. It is built around the following six themes:

- **Food security, social protection and health** to ensure that the poorest and most vulnerable in society, including women and children, are protected from CC and that all programs focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.
- **Comprehensive disaster management** to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.
- **Infrastructure** to ensure that existing assets (e.g., coastal and river embankments) are well maintained and fit for purpose and that urgently needed infrastructure (cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.
- **Research and Knowledge management** to predict that the likely scale and timing of CC impacts on different sectors of economy and socio-economic groups; to underpin future

investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on climate change.

- **Mitigation and low carbon development** to evolve low carbon development options and implement these as the country's economy grows over the coming decades.
- Capacity building and Institutional strengthening to enhance the capacity govt. ministries, civil society and private sector to meet the challenge of CC.

#### 2.4.6 Sound Pollution Control Rules, 2006

**Table 2.1: Bangladesh Standards for Noise**

| SL. No. | Area Category                                                                               | Standard Values<br>(all values in dB) |       |
|---------|---------------------------------------------------------------------------------------------|---------------------------------------|-------|
|         |                                                                                             | Day                                   | Night |
| 1.      | Silent Area                                                                                 | 50                                    | 40    |
| 2.      | Residential area                                                                            | 55                                    | 45    |
| 3.      | Mixed area (basically residential and together used for commercial and industrial purposes) | 60                                    | 50    |
| 4.      | Commercial                                                                                  | 70                                    | 60    |
| 5.      | Industrial                                                                                  | 75                                    | 70    |

**Source:** Noise Control Rules, MOEF, 2006

**Note 1)** The time from 6 a.m. to 9 p.m. is counted as daytime.

**2)** The time from 9 p.m. to 6 a.m. is counted as nighttime

### 2.5 Compliance with DoE's EIA Guideline

#### 2.5.1 The Environmental Conservation Act, 1995

The Bangladesh Environmental Conservation Act of 1995, an umbrella legislation enacted to provide for conservation of the environment, improvement of environmental standards and control and mitigation of environmental pollution. The DOE was created under the Act. The provisions of the Act authorize the Director General (DG) of Department of Environment to undertake any activity he deems fit and necessary to conserve and enhance the quality of environment and to control, prevent and mitigate pollution. The main provisions of the Act have been listed in table 2.2

**Table2.2: Various Provisions of the Bangladesh Environmental Conservation Act, 1995**

| Sections     | Provisions                                                                                                                                                                                                                                                                       |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section 3    | A Department of Environment, headed by a Director General (DG), should be established by the government for carrying out the purposes of this Act.                                                                                                                               |
| Section 4    | The powers and functions of the DG will include taking necessary measures for conservation and protection of environment and issuing directions to concerned persons, to be carried out within a specified time limit, including that of closure after sending a written notice. |
| Section 4(A) | The DG or any other authorized person may seek assistance from law-enforcing agencies in case of non-compliance with directions of closure. In such cases, the electricity, gas, telephone and water services for the non-compliant party can be discontinued.                   |
| Section 5    | The government can declare an area ecologically critical, and issue a notice specifying the activities or processes that cannot be initiated or continued in it.                                                                                                                 |
| Section 6    | This section specifies the restrictions regarding (a) vehicles emitting smoke injurious to environment and (b) manufacture, sale etc. of articles injurious to environment.                                                                                                      |
| Section 7    | The DG may seek compensation and/or corrective measures from the concerned person whose act/emission has caused direct/indirect injury to the ecosystem, failing which a civil suit and/or criminal case can be filed in a competent court.                                      |
| Section 8    | This section allows a person affected or likely to be affected by environmental pollution or degradation to apply to the DG for remedy.                                                                                                                                          |
| Section 9    | The person responsible and the person in charge of the place of occurrence of accidental pollution shall take measures to control or mitigate it, expenses for which are payable to the DG.                                                                                      |
| Section 10   | Any person generally or specially authorized by the DG shall have the right to enter any building.                                                                                                                                                                               |
| Section 11   | A person authorized by the DG may, in the manner prescribed by rules, collect from any factory, premises or other place any sample of air, water, soil or other substance for analysis.                                                                                          |
| Section 12   | An Environmental Clearance Certificate must be obtained from the DG for the establishment and undertaking of an industrial project.                                                                                                                                              |

| Sections   | Provisions                                                                                                                                                                                         |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section 13 | The government may formulate and publish environmental guidelines for conservation and improvement of environment and control and mitigation of pollution.                                         |
| Section 14 | This section allows a person aggrieved by a notice, order or direction issued under this Act to appeal to the appellate authority constituted by the government, within 30 days from its issuance. |
| Section 15 | This section specifies the penalty to be paid for various offences.                                                                                                                                |
| Section 16 | When a company violates any provision of this Act or fails to perform its duties in accordance with a notice issued under this Act or the Rules, it will amount to a violation.                    |
| Section 17 | This section introduces the grounds for taking cognizance of an offence and claim for compensation by a court.                                                                                     |
| Section 18 | An action taken by the government or the DG, which caused or is likely to cause injury to any person, cannot be legally contested, if taken in good faith.                                         |
| Section 19 | The government may delegate its powers to the DG, who may delegate his to any other officer of the department.                                                                                     |
| Section 20 | The government is vested with the power to make various rules for carrying out the purposes of this Act.                                                                                           |

**Source:** *The Bangladesh Environmental Conservation Act, 1995*

### 2.5.2 The Environmental Conservation Rules (ECR), 2023

The Environment Conservation Rules, 2023 are the first set of rules promulgated under the Environment Conservation Act, 2023. ECR, '23 provide additional guidance for specific components of the Act. The rules mainly consist of:

- Categorization of industries, development projects and other activities on the basis of pollution activities of the existing or proposed industries/development projects/activities (Section-1);
- The national Environmental Quality Standards (EQS) for surface water, groundwater, drinking water, industrial effluents (Section-2);
- Procedure for obtaining environmental clearance;

- Requirement for undertaking IEE and EIA as well as formulating EMP according to categories of industries/development projects/activities;
- Procedure for damage-claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to normal civic life;
- Guideline for preparing Environmental Impact Assessment (EIA) report (Section-11).

The Rules incorporate "inclusion lists" of projects requiring varying degrees of environmental investigation.

**Green:** Industries/development projects/activities are considered relatively pollution-free and therefore do not require an environmental clearance certificate from the DoE and no environmental study.

**Yellow:** Industries/development projects/activities fall in Yellow category are those which are causing medium pollution on the environment and human health. These projects/activities required to submit general information, an IEE report, application to DoE for obtaining environmental site clearance and environmental clearance.

**Orange:** Industries/development projects/activities fall in Orange category are moderately polluted required to submit general information, a process flow diagram and schematic diagrams of waste treatment facilities, an IEE and EMP along with their application to DOE for obtaining environmental site clearance and environmental clearance.

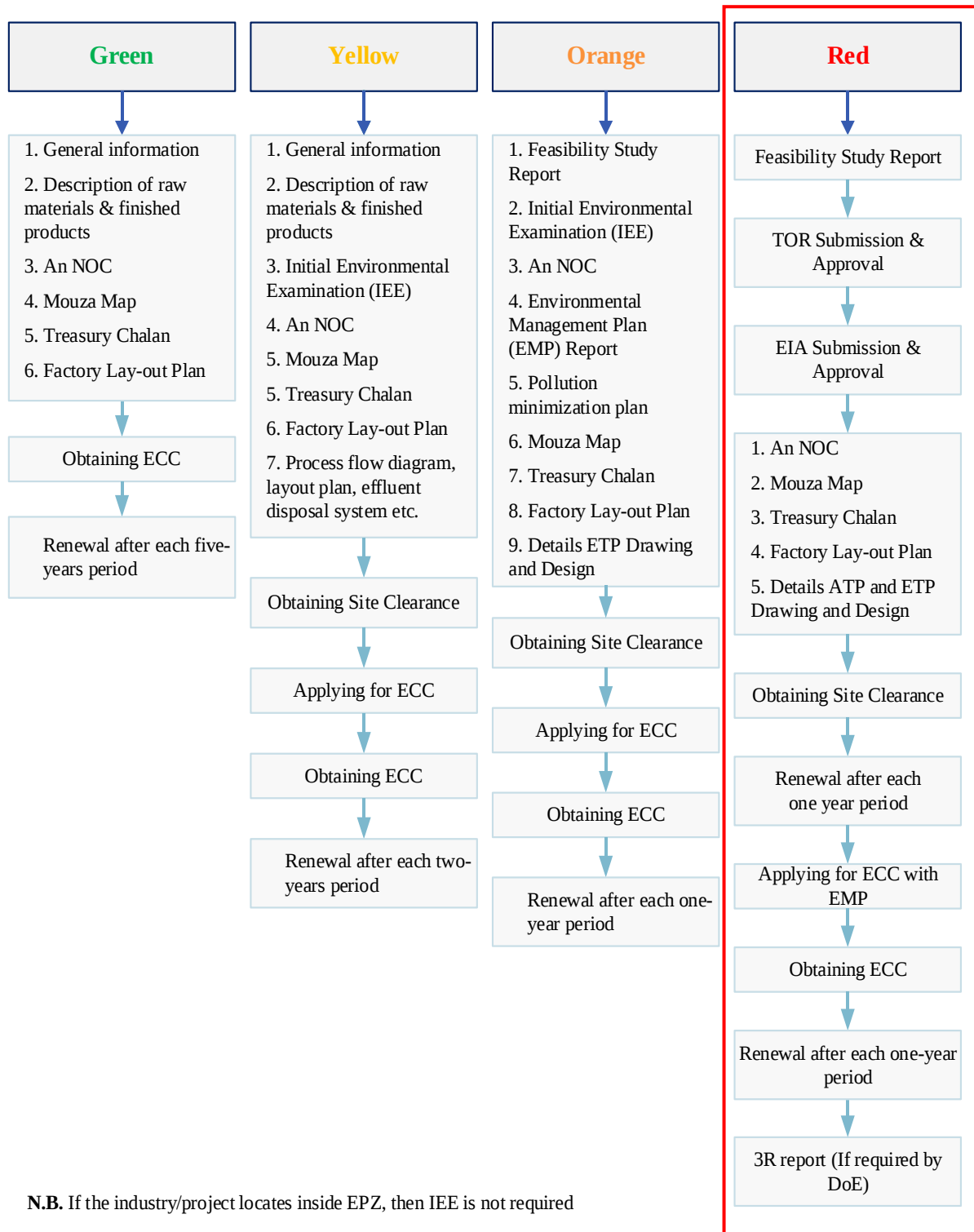
**Red:** Industries/development projects/activities which fall in RED category are those which may cause significant adverse environmental impacts and are therefore required to submit an EIA report. It should be noted that they might obtain an environmental site clearance on the basis of an IEE report, and subsequently submit an EIA report for obtaining environmental clearance along with other necessary papers.

## **2.6 Compliance with Legal Requirements**

Including ECA, 1995 and the ECR, 2023, depending on applicability, the entrepreneur has to adhere to and may require taking approvals of other previous and existing policies, ordinances, acts and rules.

## 2.6.1 Obtaining Environmental Clearance

### APPLICATION TO DOE FOR ENVIRONMENT CLEARANCE CERTIFICATE



**N.B.** If the industry/project locates inside EPZ, then IEE is not required

**Figure: 2.1 Process of Obtaining Environmental Clearance Certificates**

### 2.6.2 Environmental Quality Standards

Bangladesh is one of the least developed countries with a low resource base, a burgeoning population with a very low land-man ratio, often threatened by both natural & anthropogenic stresses. Like all other nations of the world, Bangladesh also acted to the global call for the protection and conservation of natural environment & ecology. Industrial development significantly contributes towards economic growth of a country. It brings along with it a host of environmental problem too. It is increasingly being recognized in Bangladesh as in other part of the world that for development to be meaningful & sustainable over a longer period environmental concern must be integrated into all development policies. The Ministry of Environment and Forest is the nodal ministry that supervises the implementation of environmental and forestry programs in Bangladesh. The Department of Environment (DoE) carries out policy analysis, planning and evaluation, program coordination, and monitoring and evaluation of the environmental programs. The Forest Department in the ministry deals with the forestry programs.

In Bangladesh, the environmental aspects of any project are mainly governed by: The Environmental Conservation Act, 1995, the Environmental Conservation Rules, 1997 and the Forest Act, 1927 (if forestland has been converted).

The requirement for undertaking environmental studies has been specified under the ECA, 1995 and the ECR, 1997. Section 12 of ECA, 1995 stipulates, "No industrial unit or project shall be established or undertaken without obtaining environmental clearance from the Director General, Department of Environment (DG, DoE) in the manner prescribed by the rules".

#### Air Quality

**Table 2.3: Ambient Air Quality Standards**

| Air Pollutant                        | Unit                    | Standards | Average Time |
|--------------------------------------|-------------------------|-----------|--------------|
| Carbon Monoxide (CO)                 | mg/m <sup>3</sup>       | 5         | 8 hrs.       |
|                                      |                         | 20        | 1 hr.        |
| Lead (Pb)                            | micro gm/m <sup>3</sup> | 0.25      | Annual       |
|                                      |                         | 0.5       | 24 hrs.      |
| Nitrogen di oxide (NO <sub>2</sub> ) | micro gm/m <sup>3</sup> | 40        | Annual       |
|                                      |                         | 80        | 24 hrs.      |
|                                      | micro gm/m <sup>3</sup> | 50        | Annual       |

| Air Pollutant                                             | Unit                    | Standards | Average Time |
|-----------------------------------------------------------|-------------------------|-----------|--------------|
| Particulate Maters <sub>10</sub><br>(PM <sub>10</sub> )   |                         | 150       | 24 hrs.      |
| Particulate Maters <sub>2.5</sub><br>(PM <sub>2.5</sub> ) | micro gm/m <sup>3</sup> | 35        | Annual       |
|                                                           |                         | 65        | 24 hrs.      |
| Ozone (O <sub>3</sub> )                                   | micro gm/m <sup>3</sup> | 180       | 1 hr.        |
|                                                           |                         | 100       | 8 hrs.       |
| Sulphur di oxide (SO <sub>2</sub> )                       | micro gm/m <sup>3</sup> | 250       | 1 hr.        |
|                                                           |                         | 80        | 24 hrs.      |
| Ammonia (NH <sub>3</sub> )                                | micro gm/m <sup>3</sup> | 100       | Annual       |
|                                                           |                         | 400       | 24 hrs.      |

**Source:** Air Emission Control Rules, MOEF, 2022

**Note:**

- 1) In this schedule, air quality means ambient air quality.
- 2) Average value shall not exceed more than once a year.
- 3) The target will be achieved when the annual average is within the prescribed standard.

## Water Quality

**Table 2.4: Standards for Inland Surface Water**

| SL. No. | Best Practice based classification                          | pH      | DO mg/L    | BOD mg/L  | NO <sub>3</sub> -N mg/L | NH <sub>4</sub> -N mg/L | PO <sub>4</sub> -P mg/L | Total Cr mg/L | Pb mg/L | Hg mg/L | Total Coliform CFU/L | TDS mg/L | TDS mg/L |
|---------|-------------------------------------------------------------|---------|------------|-----------|-------------------------|-------------------------|-------------------------|---------------|---------|---------|----------------------|----------|----------|
| 1       | Source of drinking water for supply only after disinfecting | 6.5-8.5 | 6 or above | 2 or less | 7.0                     | 0.1                     | 0.1                     | 0.02          | 0.03    | 0.001   | 100 or less          | 1000     | 10       |
| 2       | Water usable for recreational activity                      | 6.5-8.5 | 5 or above | 3 or less | 7.0                     | 0.3                     | 0.5                     | 0.2           | 0.05    | 0.001   | 50 or less           | 1000     | 10       |

| SL. No. | Best Practice based classification                                | pH      | DO mg/L    | BOD mg/L   | NO <sub>3</sub> -N mg/L | NH <sub>4</sub> -N mg/L | PO <sub>4</sub> -P mg/L | Total Cr mg/L | Pb mg/L | Hg mg/L | Total Coliform CFU/L | TDS mg/L | TDS mg/L |
|---------|-------------------------------------------------------------------|---------|------------|------------|-------------------------|-------------------------|-------------------------|---------------|---------|---------|----------------------|----------|----------|
| 3       | Source of drinking water for supply after conventional treatment: | 6-9     | 5 or above | 5 or less  | 7.0                     | 0.3                     | 0.5                     | 0.02          | 0.03    | 0.001   | 5000 or less         | 1000     | 25       |
| 4       | Water usable by fisheries                                         | 6-9     | 5 or above | 6 or less  | 7.0                     | 0.3                     | 0.5                     | 0.05          | 0.1     | 0.004   | 5000 or less         | 1000     | 50       |
| 5       | Water usable by various process and cooling industries            | 6.5-8.5 | 1 or above | 12         | -                       | 2.7                     | -                       | 0.1           | 0.1     | 0.05    | -                    | 1000     | 100      |
| 6       | Water usable for irrigation                                       | 6.5-8.5 | -          | 12 or less | 5.0                     | 1.5                     | 2.0                     | 0.1           | 0.1     | 0.002   | 50,000 or less       | 1000     | 100      |

**Source:** Environmental Conservation Rules, 2023

**Notes:**

- Electrical conductivity for irrigation water – 2250 µmhos/cm (at a temperature of 25°C);  
Sodium less than 26%; Boron less than 0.2%

**Table 2.5: Standards for Drinking Water**

| Sl. No. | Parameters                               | Unit      | Standards |
|---------|------------------------------------------|-----------|-----------|
| 1.      | Fecal Coliform                           | CFU/100ml | 0         |
| 2.      | Total Coliform                           | "         | 0         |
| 3.      | Free Residual Chlorine                   | mg/L      | 0.20      |
| 4.      | Nitrate (NO <sub>3</sub> <sup>-</sup> )  | "         | 45        |
| 5.      | Arsenic (As)                             | "         | 0.05      |
| 6.      | Turbidity                                | NTU       | 5         |
| 7.      | Aluminum (Al)                            | "         | 0.20      |
| 8.      | Ammonia (NH <sub>3</sub> )               | "         | 1.50      |
| 9.      | Barium (Ba)                              | "         | 0.70      |
| 10.     | Benzene (C <sub>6</sub> H <sub>6</sub> ) | "         | 0.01      |
| 11.     | Boron (B)                                | "         | 1.0       |
| 12.     | Cadmium (Cd)                             | "         | 0.003     |
| 13.     | Calcium (Ca)                             | "         | 75        |
| 14.     | Chloride (Cl)                            | "         | 250*      |
| 15.     | Carbon tetrachloride                     | "         | 0.005     |
| 16.     | 1,1 Dichloroethane                       | "         | 0.03      |
| 17.     | 1,2 Dichloroethane                       | "         | 0.03      |
| 18.     | Tetrachloroethane                        | "         | 0.04      |
| 19.     | Trichloroethane                          | "         | 0.02      |
| 20.     | Pentachlorophenol                        | "         | 0.009     |
| 21.     | 2,4,6 Trichlorophenol                    | "         | 0.20      |
| 22.     | Chloroform                               | "         | 0.09      |
| 23.     | Total Chromium                           | "         | 0.05      |
| 24.     | Color                                    | Hazen     | 15        |
| 25.     | Copper (Cu)                              | mg/L      | 1.5       |
| 26.     | Cyanide (CN)                             | "         | 0.05      |
| 27.     | Fluoride                                 | "         | 1.0       |
| 28.     | Hardness as CaCO <sub>3</sub>            | "         | 500       |
| 29.     | Ferrous (Fe)                             | "         | 0.3-1.0   |
| 30.     | Total Kjeldahl Nitrogen                  | "         | 1.0       |
| 31.     | Lead (Pb)                                | "         | 0.01      |
| 32.     | Magnesium (Mg)                           | "         | 30-35     |
| 33.     | Manganese (Mn)                           | "         | 0.4       |
| 34.     | Mercury (Hg)                             | "         | 0.001     |

| Sl. No. | Parameters                                   | Unit      | Standards |
|---------|----------------------------------------------|-----------|-----------|
| 35.     | Nickel (Ni)                                  | "         | 0.05      |
| 36.     | Nitrite (NO <sub>2</sub> <sup>-</sup> )      | "         | 1.0       |
| 37.     | Odor                                         | -         | Odorless  |
| 38.     | Oil & Grease                                 | mg/L      | 0.01      |
| 39.     | pH                                           | -         | 6.5-8.5   |
| 40.     | Phenols                                      | mg/L      | 0.002     |
| 41.     | Potassium (K)                                | "         | 12        |
| 42.     | Radioactive materials (gross alpha activity) | Bq/L      | 0.1       |
| 43.     | Radioactive materials (gross beta activity)  | "         | 1.0       |
| 44.     | Selenium (Se)                                | mg/L      | 0.01      |
| 45.     | Silver (Ag)                                  | "         | 0.02      |
| 46.     | Sodium (Na)                                  | "         | 200       |
| 47.     | Suspended Solid (SS)                         | "         | 10        |
| 48.     | Sulphide as H <sub>2</sub> S                 | "         | 0.05      |
| 49.     | Sulphate (SO <sub>4</sub> <sup>2-</sup> )    | "         | 250       |
| 50.     | Total Dissolve Solids (TDS)                  | "         | 1000      |
| 51.     | Temperature                                  | 0C        | 20-30     |
| 52.     | Tin (Sn)                                     | mg/L      | 2.0       |
| 53.     | Zinc (Zn)                                    | "         | 5.0       |
| 54.     | Aldrin/Dieldrin                              | Micro-g/L | 0.03      |
| 55.     | Anionic detergents                           | mg/L      | 0.2       |

**Source:** Environmental Conservation Rules, 2023

**Note:** \*1000 mg/L for Coastal Area

**Table 2.6: Standards for Sewage Discharge**

| SL No. | Parameters            | Unit               | Standards |
|--------|-----------------------|--------------------|-----------|
| 1      | BOD <sub>5</sub>      | mg/l               | 30        |
| 2      | Nitrate               | "                  | 50        |
| 3      | Phosphate             | "                  | 15        |
| 4      | Suspended solids (SS) | "                  | 100       |
| 5      | Temperature           | Degrees centigrade | 30        |
| 6      | Total Coliform        | CFU/100 ml         | 1000      |
| 7      | pH                    | mg/L               | 6-9       |
| 8      | COD                   | "                  | 125       |

| SL No. | Parameters   | Unit | Standards |
|--------|--------------|------|-----------|
| 9      | Oil & Grease | „    | 10        |

*Source: Schedule 3, Environmental Conservation Rules, 2023*

**Notes:**

- This limit shall be applicable to discharges into surface and inland waters bodies.
- Sewage shall be chlorinated before final discharge. Residual Chlorine cannot be more than 0.2 mg/L.

**Noise**

**Table 2.7: Standards for Sound**

| SL No. | Area Category                                                                               | Standard Values<br>(all values in dB) |       |
|--------|---------------------------------------------------------------------------------------------|---------------------------------------|-------|
|        |                                                                                             | Day                                   | Night |
| 1.     | Silent Area                                                                                 | 50                                    | 40    |
| 2.     | Residential area                                                                            | 55                                    | 45    |
| 3.     | Mixed area (basically residential and together used for commercial and industrial purposes) | 60                                    | 50    |
| 4.     | Commercial                                                                                  | 70                                    | 60    |
| 5.     | Industrial                                                                                  | 75                                    | 70    |

*Source: Noise Control Rules, MOEF, 2006*

**Note:**

- 1) The time from 6 a.m. to 9 p.m. is counted as daytime.
- 2) The time from 9 p.m. to 6 a.m. is counted as nighttime.

### 2.6.3 The National Conservation Strategy

National Conservation Strategy (GoB/IUCN, 1992) was drafted in late 1991 and submitted to the Government in early 1992. For sustainable development in industrial sector, the report offered various recommendations; some of those are as follows:

- Industries based on nonrenewable resources should be made to adopt technology which conserves raw materials, and existing industries should be given incentives to install technical fixes to reduce wastage rate

- All industries, especially those based on imported raw materials, should be subjected to EIA and adoption of pollution prevention/control technologies should be enforced.
- No hazardous or toxic materials/wastes should be imported for use as raw material.
- Import of appropriate and environmentally sound technology should be ensured.
- Complete dependence on imported technology & machinery for industrial development should gradually be reduced so that industrial development is sustainable with local skills and resources.

#### **2.6.4 The National Environmental Management Plan (NEMAP), 1995**

The National Environmental Management Plan (NEMAP) was developed as the framework of programs and interventions aimed at implementing NEP. Under this Plan, various program outlines were drawn up and activities incorporated. The main aims of the Plan were:

- Better management of scarce resources;
- Checking the rate of environmental degradation;
- Improving the natural and manmade environment;
- Conserving habitats and biodiversity;
- Promoting sustainable development; and
- Improving quality indicators of human life.

#### **2.6.5 National Environmental Policy (NEP), 1992**

In 1992 the National Environmental Policy (NEP) was drawn up with the aim of providing protection and sustainable management of the environment. The objectives of the Policy include:

- Maintaining ecological balance and overall development through protection and improvement of the environment;
- Identifying and regulating polluting and environmentally degrading activities;
- Ensuring environmentally sound development;
- Ensuring sustainable and environmentally sound use of all-natural resources;
- Active association with all international environmental initiatives.

#### **2.6.6 The Environment Court Act, 2010**

In 2010, a new law known as the Bangladesh Environment Court Act, 2010 was enacted, replacing the 2000 Act. The objective of the current Act is to establish Environment Courts in each district, presided

over by a Joint District Judge. This Judge handles both regular cases and those falling under the jurisdiction of an Environment Court. Notably, the Act doesn't require the creation of entirely separate Environment Courts. Consequently, aside from the former three Courts and an Appellate Court, no additional Environment Courts have been set up. Similar to the prior Act, the 2010 Act also allows for the establishment of Special Magistrate Courts in each District, managed by first-class Magistrates or Metropolitan Magistrates. These courts handle cases with penalties of less than five years' imprisonment or fines up to five lakh BDT. Furthermore, the Act involves Executive Magistrates who operate under the Mobile Court Act, 2009. They can promptly address certain offenses and pass judgments based on the offender's admission of guilt. Environmental laws commonly incorporate provisions for the operation of Mobile Courts.

## **2.7 International Legal Obligations**

### **2.7.1 The Convention on Biological Diversity (CBD), 1992**

The Convention on Biological Diversity (CBD) is an international treaty that was adopted in 1992. The CBD has three main goals:

- Conservation of biological diversity
- Sustainable use of its components
- Fair and equitable sharing of benefits arising from genetic resources

The CBD applies to all types of biological diversity, including land-based ecosystems. Land development projects can have a significant impact on biological diversity, both positive and negative. The CBD provides a number of tools and mechanisms to help countries manage the impacts of land development projects on biological diversity. These tools include:

**National Biodiversity Strategies and Action Plans (NBSAPs):** NBSAPs are national plans that set out the goals and objectives for the conservation and sustainable use of biological diversity in a particular country.

**The Prior Informed Consent (PIC) procedure:** The PIC procedure requires countries to obtain the consent of the country providing genetic resources before using those resources in a land development project.

**The Access and Benefit-sharing (ABS) regime:** The ABS regime provides a framework for countries to share the benefits arising from the use of genetic resources. The CBD is an important tool for protecting biological diversity and ensuring that land development projects are carried out in a sustainable manner.

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## *Chapter 3*

# *Project Description*

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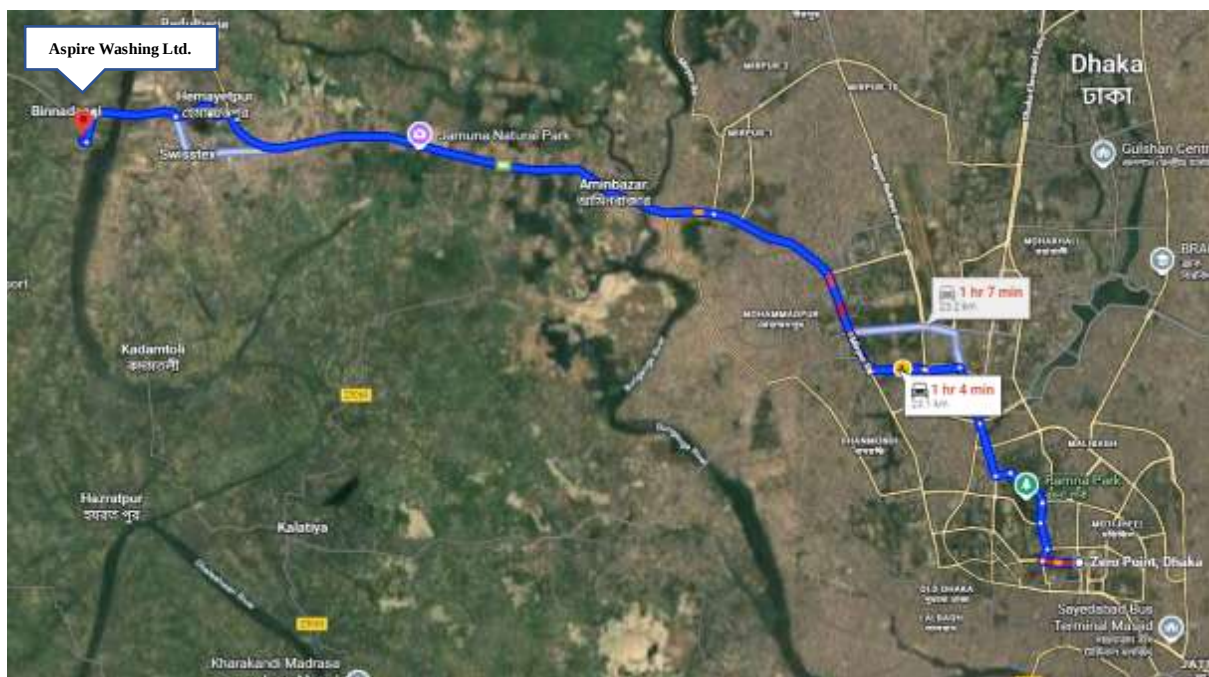
### 3. PROJECT DESCRIPTION

#### 3.1 Project Definition

**Aspire Washing Ltd.** proposes to establish a denim-washing factory at Sudkhira, Jamirta, Singair, Manikganj. The project aims to provide various denim-washing services for garments intended for both domestic and export markets. Equipped with modern washing machinery and supported by appropriate wastewater treatment, the factory is designed to ensure environmental compliance and promote sustainable industrial operations.

#### 3.2 Location & Access to The Project

**Aspire Washing Ltd.** is located at Sudkhira, Jamirta, Singair, Manikganj. The company intends to set up its manufacturing plant over 7,314 square meter of land, within a total area of 10,925 square meter. The site is located at the geographical coordinates of Longitude: 90° 14' 18.7224" E and Latitude: 23° 47' 41.6976" N. The project site is about 23.2 km away from Dhaka Zero Point, 4 km away from Hemayetpur Bus Stand and about 32.1 km far from Hazrat Shahjalal International Airport.



**Figure 3.1: Location map of Aspire Washing Ltd.**

#### 3.3 Project Location and Surroundings of the project

The project site of Aspire Washing Ltd. is situated in a mixed land-use area characterized by agricultural land, rural settlements, industrial establishments, and nearby surface water bodies. To the north of

the project site, the surrounding area mainly consists of agricultural fields, scattered vegetation, ponds, and a few rural homesteads connected by local roads. The eastern side of the site is located close to the Dhaleshwari River, which is an important surface water body in the region. Between the project boundary and the river, there are cultivated lands and open green areas, including a recreational space known as River Bank Park. On the southern side, the area is influenced by industrial development and transportation infrastructure, where the nearby Manikganj Power Generations Ltd. power plant is located, along with a paved road providing access to the surrounding industrial facilities and local communities. The western side of the project area comprises a combination of agricultural land, small rural settlements, and light industrial establishments, including Shamim Group of Tech & Textiles.



**Figure 3.2 Project Location and Surroundings of Aspire Washing Ltd.**

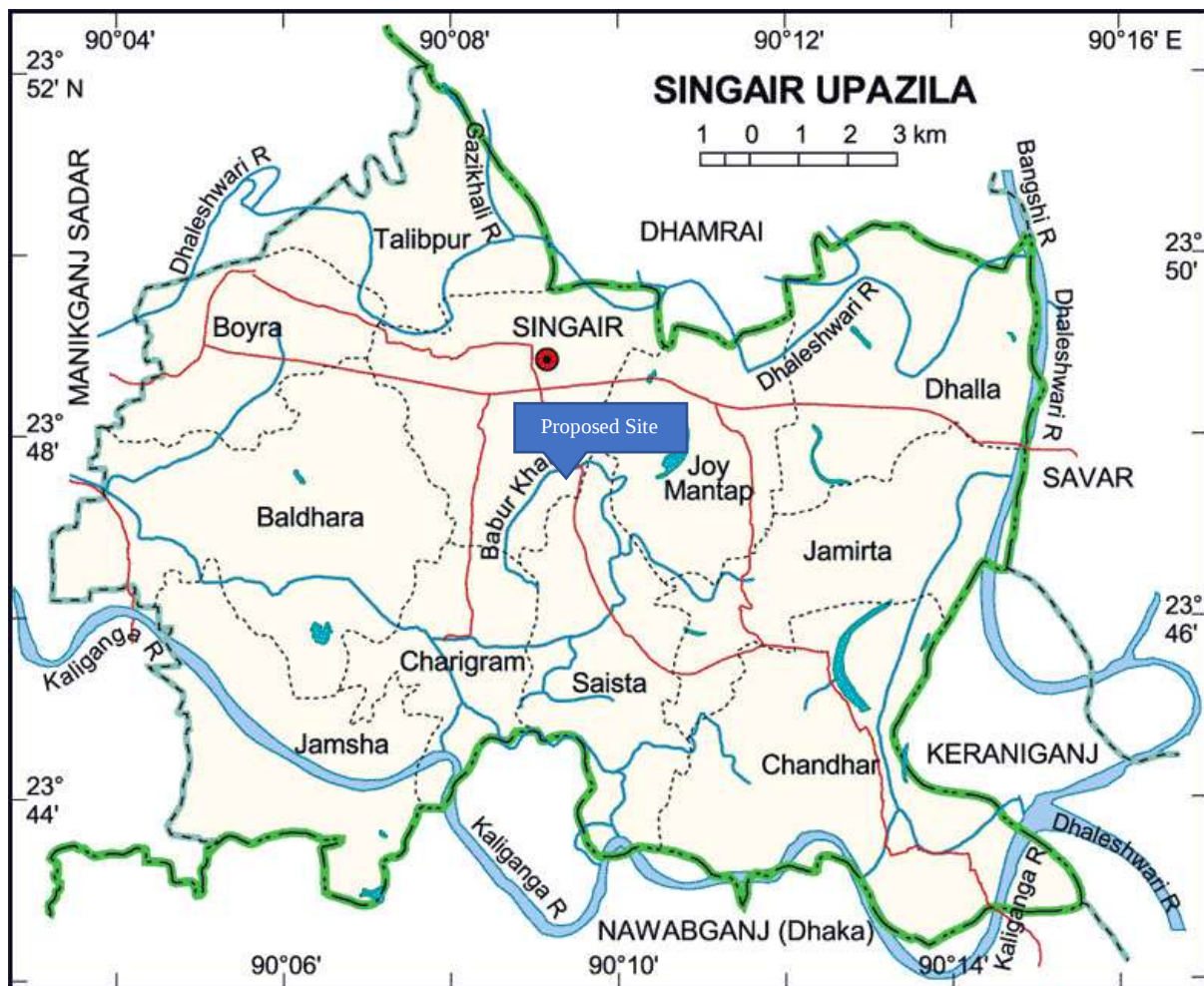
### **3.4 Basic Information of Project**

The EIA Report of Aspire Washing Ltd. presented here primarily focuses on impacts resulting from the operation of project facilities on the surrounding environment. Basic information of the project is shown in table 3.1.

**Table 3.1: Basic Information of Aspire Washing Ltd.**

|                                                          |                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name of the project</b>                               | <b>Aspire Washing Ltd.</b>                                                                                                                                                                                                                                                                                                                                                         |
| <b>Project proponent</b>                                 | Kamrul Huq                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Project location</b>                                  | Village: Binnadangi, Mouza: Sudkhira, Union: Jamirta, Upazila: Singair, District: Manikganj, Bangladesh                                                                                                                                                                                                                                                                            |
| <b>Office address</b>                                    | 103, Sudkhira, Jamirta, Singair, Manikganj-1822                                                                                                                                                                                                                                                                                                                                    |
| <b>Types of Industry</b>                                 | 100 % export oriented denim washing production factory                                                                                                                                                                                                                                                                                                                             |
| <b>Project Value</b>                                     | 132,76,60,000 Taka                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Production Capacity</b>                               | 200 Metric Tons annually                                                                                                                                                                                                                                                                                                                                                           |
| <b>Final product</b>                                     | Denim Washing Product                                                                                                                                                                                                                                                                                                                                                              |
| <b>a. No. of Employees:</b>                              | 610 Persons                                                                                                                                                                                                                                                                                                                                                                        |
| <b>b. Employees Engaged in Environmental Management:</b> | 5 Persons                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Duty Hours</b>                                        | 24 hours per day                                                                                                                                                                                                                                                                                                                                                                   |
| <b>a. Total area of land</b>                             | 10, 925 square meters                                                                                                                                                                                                                                                                                                                                                              |
| <b>b. Area covered by the facility</b>                   | 7,314 square meters                                                                                                                                                                                                                                                                                                                                                                |
| <b>Raw Materials and Their Source</b>                    | Enzymes, detergents, pumice stones, sodium hypochlorite, calcium hypochlorite, potassium permanganate, hydrogen peroxide, acetic acid, sodium metabisulphite, sodium thiosulphate (hypo), direct dyes, sulphur dyes, pigments, fixing agents, softeners, anti-back staining agents, sequestering agents, wetting agents and boosters etc.<br><br>Source: Local and Foreign Market. |
| <b>a) Daily Water Consumption</b>                        | 2300 m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                |
| <b>b) Source</b>                                         | Own Deep tube well                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Electricity Requirements</b>                          | 2,000 kWh per day                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Fuel Requirement (Diesel)</b>                         | 700 L/day                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Generator Capacity</b>                                | 800 kVA (2 units)                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Boiler Capacity</b>                                   | 4000 kg (1 unit) and 3000 kg (1 unit)                                                                                                                                                                                                                                                                                                                                              |
| <b>Liquid Waste Generation</b>                           | 75 m <sup>3</sup> /hr or 1,800 m <sup>3</sup> /day                                                                                                                                                                                                                                                                                                                                 |

|                                                               |                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ETP Capacity</b>                                           | 90 m <sup>3</sup> /hr. (2160 m <sup>3</sup> /day)                                                                                                                                                                                                                        |
| <b>Mode of wastewater treatment</b>                           | Biological (Conventional ASP) Treatment Process                                                                                                                                                                                                                          |
| <b>Units of the wastewater treatment</b>                      | Solid Separation Tank, Collection Tank, Equalization Tank, Neutralization Tank, Biological Oxidation Tank, Secondary Clarifier Tank, Mixing Channel, Post Aeration Tank, Sludge Thickening Tank, Sludge Thickening Tank, Multi-Grade Filter, Selector Tank, Recycle Tank |
| <b>Drainage Arrangement Between the Project &amp; The ETP</b> | After treatment through the ETP, the effluent will be discharged into the nearby Dhaleshwari River                                                                                                                                                                       |
| <b>Ownership of the drain:</b>                                | Own.                                                                                                                                                                                                                                                                     |
| <b>Solid Waste Management:</b>                                | Recycle                                                                                                                                                                                                                                                                  |



**Figure 3.3: Location map of Aspire Washing Ltd. (Singair Upazila)**

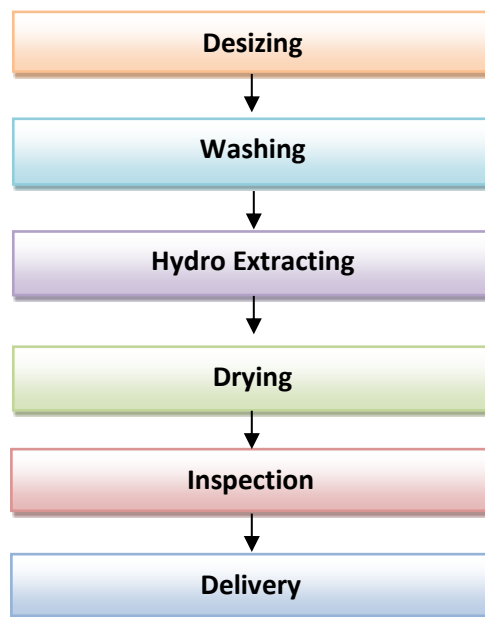
### 3.5 Project components

Aspire Washing Ltd. till date consists of the following five major units which are-

- Administration/Office – 414 square meters
- Factory / Production Area – 4,564 square meters
- Raw Material Storage – 498 square meters
- Treatment Plant (Water) – 1,045 square meters
- Generator Area – 490 square meters
- Others – 2,791 square meters (approx.)

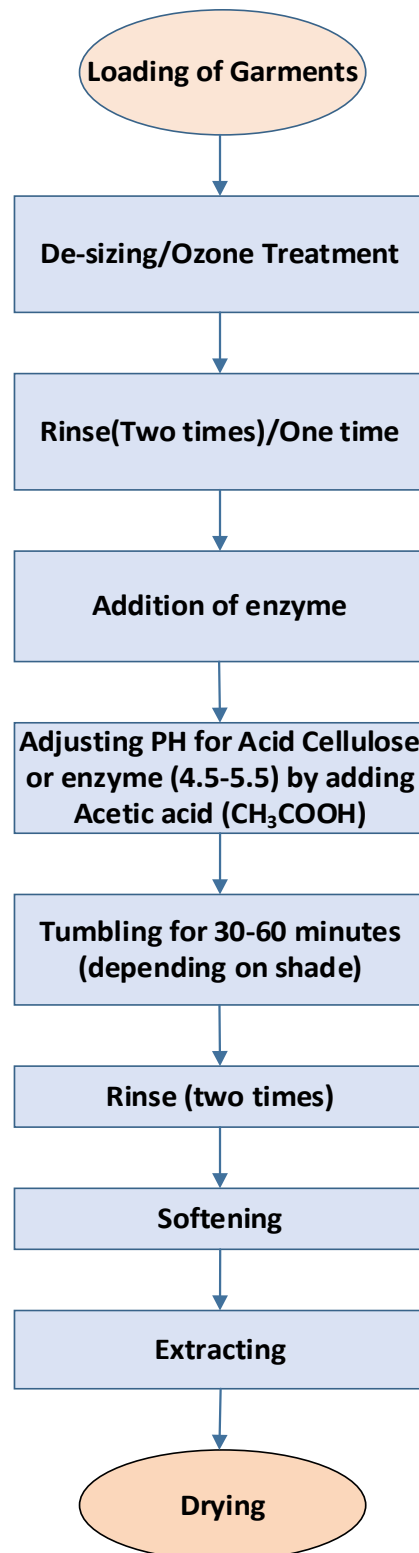
### 3.6 Production Process:

The garment washing process of Aspire Washing Ltd. is relatively simple and the technology involved is well established in Bangladesh. Garments will be received from clients and loaded into industrial washing machines. The machines perform the washing operations using appropriate chemicals, enzymes, and water according to the required washing type. After completion of washing, the garments are subjected to hydro extraction to remove excess water and subsequently dried in industrial dryers. Finally, the garments are inspected for quality control before being delivered back to the clients.



**Figure 3.4: Production Process Flow Diagram of Aspire Washing Ltd.**

### 3.6.1 Enzyme Washing Process:



**Figure 3.5: Enzyme Washing Process Flow Diagram of Aspire Washing Ltd.**

The garments washing process described represents a standard enzyme-based washing sequence, widely used in denim and knit processing to achieve the desired shade, softness, and surface finish. Each stage is carefully controlled to ensure effective treatment while preserving fabric quality.

The process starts with the loading of garments into a rotary washing machine. Proper loading is essential to maintain uniform mechanical action; overloading can reduce washing efficiency, while underloading may cause excessive abrasion and uneven results.

The next stage is de-sizing or ozone treatment. De-sizing removes sizing agents such as starch, PVA, or CMC that were applied during weaving. This is typically achieved using enzymes or chemicals. In some cases, ozone treatment is used as an environmentally friendly alternative to partially fade the fabric color and reduce water and chemical consumption. This step prepares the fabric surface for further processing.

After this, the garments are subjected to rinsing (one or two times) to eliminate loosened size materials, residual chemicals, and impurities. Proper rinsing is important to ensure that the subsequent enzyme treatment is not hindered by unwanted substances.

The process then proceeds with the addition of enzyme, usually cellulase for cotton-based fabrics. The enzyme acts on the fiber surface, breaking down protruding cellulose fibers. This results in improved smoothness, reduced fuzz, and enhanced appearance of the fabric.

To ensure effective enzyme activity, pH adjustment is carried out using acetic acid ( $\text{CH}_3\text{COOH}$ ). The pH is maintained within the range of 4.5–5.5, which is optimal for acid cellulase enzymes. Maintaining this pH level is crucial, as enzyme performance is highly sensitive to pH conditions.

At the same time, the temperature is controlled according to the enzyme requirement, generally between 45°C and 60°C. Proper temperature ensures maximum enzyme efficiency without causing denaturation.

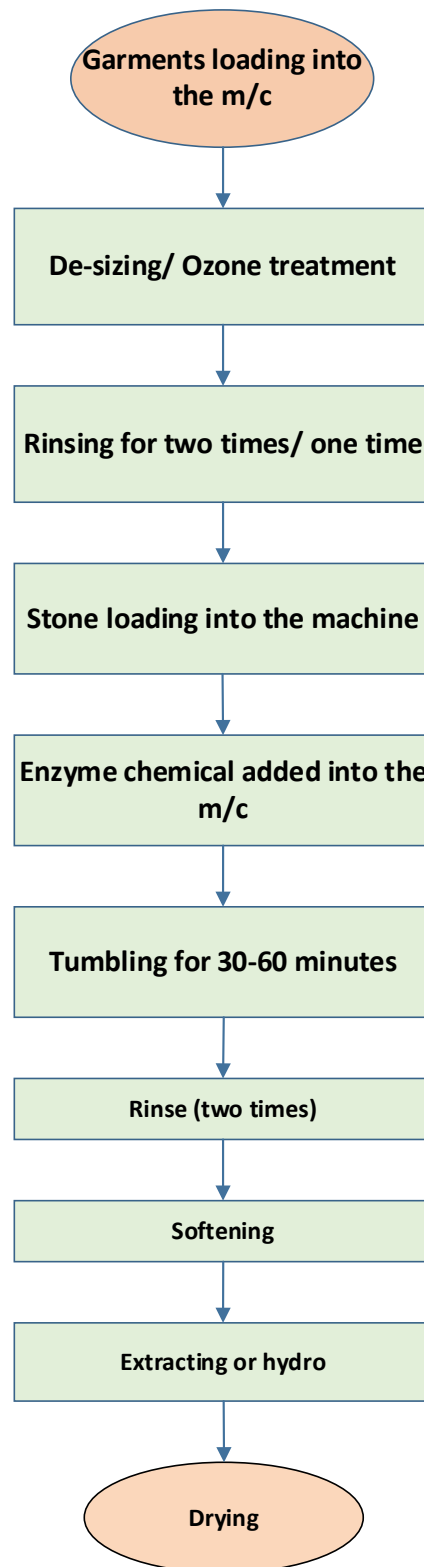
The garments are then subjected to tumbling for 30–60 minutes, depending on the desired shade. Mechanical agitation during tumbling enhances enzyme action and helps achieve uniform fading and surface polishing.

Following this, the garments undergo rinsing (two times) to remove residual enzymes, degraded fibers, and released dye particles, effectively stopping the enzymatic reaction.

Next is the softening process, where softening agents are applied to improve the fabric's hand feel, smoothness, and comfort.

Finally, extraction removes excess water, and drying completes the process by bringing the garments to the required moisture level, ensuring the final appearance and quality.

### 3.6.2 Stone Enzyme Washing Process



**Figure 3.6: Stone Enzyme Washing Process Flow Diagram of Aspire Washing Ltd.**

The stone enzyme washing process is a combined mechanical and biochemical treatment widely used in garment washing, particularly for denim, to achieve a faded appearance, improved softness, and a worn-out look. This process integrates the abrasive action of stones with the controlled hydrolysis of enzymes to produce a unique surface effect. The process begins with loading the garments into the washing machine, typically a rotary drum type. Proper loading is essential to ensure uniform contact between garments, stones, and chemicals. Incorrect loading can result in uneven washing or excessive fabric damage.

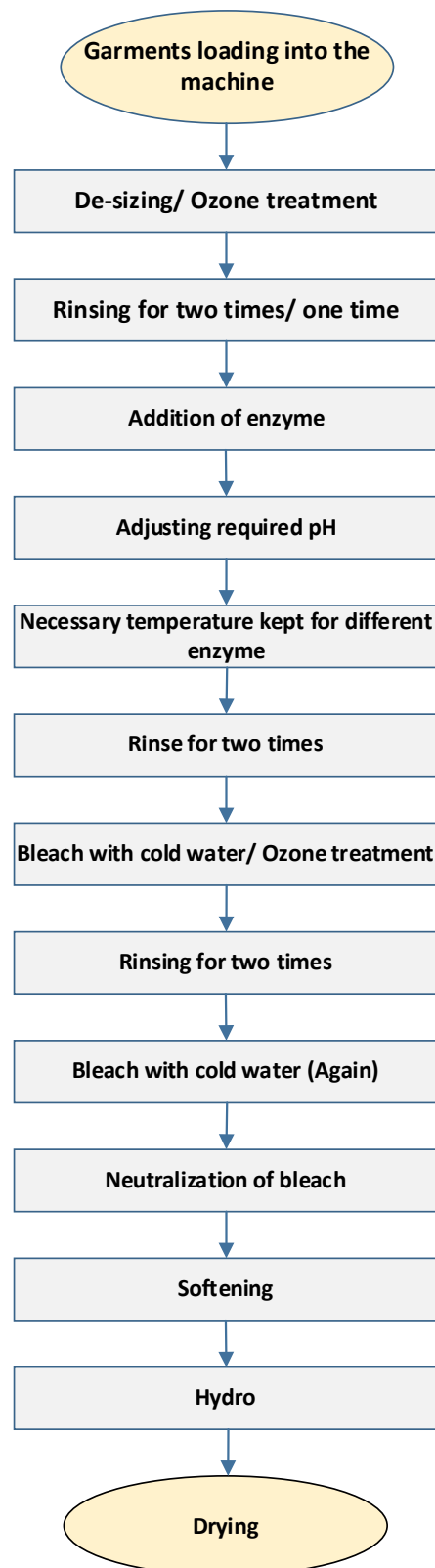
Next is the de-sizing or ozone treatment stage. De-sizing removes sizing agents such as starch or synthetic polymers applied during weaving. This is crucial because these مواد can hinder the washing effect. Alternatively, ozone treatment may be used to initiate partial fading of dyes in an environmentally friendly way, reducing the need for excessive chemicals. After this, the garments undergo rinsing (one or two times) to remove residual size materials and impurities. This ensures a clean surface for effective interaction with stones and enzymes in the next stages. The process then continues with stone loading into the machine. Usually, pumice stones are used, which create mechanical abrasion during tumbling. This abrasion helps remove indigo dye from the fabric surface, producing a faded and worn look. The quantity and size of stones significantly influence the final appearance.

Following stone addition, enzyme chemicals (typically cellulase) are introduced into the machine. These enzymes act on the cotton fibers, breaking down protruding microfibrils and enhancing the worn effect initiated by the stones. The combination of stones and enzymes results in better efficiency and reduced processing time compared to using stones alone. The garments are then subjected to tumbling for 30–60 minutes. During this period, both mechanical (stone abrasion) and biochemical (enzyme action) processes occur simultaneously. This step is critical for achieving the desired shade, texture, and softness. Careful control is necessary to avoid excessive fabric damage or strength loss.

After tumbling, the garments are rinsed (two times) to remove detached dye particles, residual enzymes, and stone dust. This step also helps to stop the enzymatic reaction. Next, the garments undergo softening, where softening agents are applied to improve hand feel, reduce harshness caused by abrasion, and enhance overall comfort. The process then includes extraction or hydro-extraction, where excess water is removed using centrifugal force, reducing moisture content before drying.

Finally, drying is carried out in a tumble dryer. This step ensures proper moisture removal and stabilizes the final appearance, giving the garments their desired aesthetic and finish.

### 3.6.3 Enzyme Bleach Washing Process



**Figure 3.7: Enzyme Bleach Washing Process Flow Diagram of Aspire Washing Ltd.**

The described process represents an advanced stone enzyme washing sequence combined with bleaching, commonly applied in denim and garment finishing to achieve a faded shade, improved softness, and enhanced aesthetic appearance. Each stage is designed to control both mechanical and chemical effects on the fabric. The process begins with loading the garments into the washing machine, usually a rotary drum type. Proper loading ensures uniform movement and interaction of garments during treatment. Overloading or underloading can lead to uneven washing results.

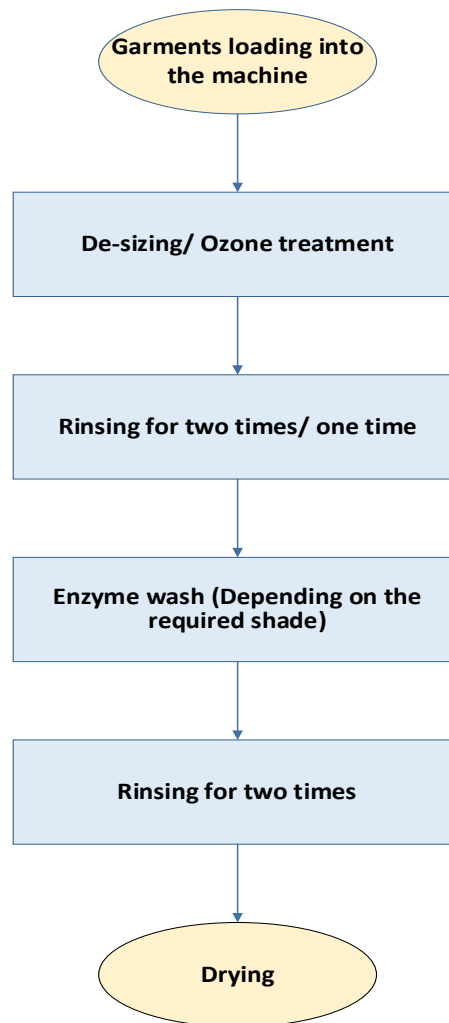
The next step is de-sizing or ozone treatment. De-sizing removes sizing agents such as starch or synthetic chemicals applied during weaving, which otherwise hinder washing efficiency. Alternatively, ozone treatment may be used for initial color fading in an eco-friendly manner with reduced water and chemical usage. After this, the garments undergo rinsing (one or two times) to eliminate loosened impurities and residual chemicals, preparing the fabric for enzyme treatment. The process continues with the addition of enzyme, typically cellulase, which acts on the cotton fibers by breaking down surface fibrils. This improves smoothness, reduces fuzz, and enhances the worn-out appearance.

To ensure optimal enzyme activity, pH adjustment is carried out using suitable acids (commonly acetic acid), maintaining an ideal pH range depending on the enzyme type. Simultaneously, the required temperature is maintained, generally between 45°C and 60°C, to maximize enzyme efficiency without causing denaturation. The garments are then subjected to tumbling for 40–50 minutes, where mechanical action and enzymatic reactions occur simultaneously. This step is crucial for achieving the desired shade and texture. After treatment, the garments are rinsed twice to remove residual enzymes and detached particles. The process then proceeds to bleaching with cold water or ozone treatment, which further lightens the fabric shade. This is followed by rinsing to remove excess bleaching agents.

A second bleaching step with cold water may be applied to achieve the required level of whiteness or fading. After bleaching, neutralization is essential to deactivate residual oxidizing agents, preventing fabric damage and ensuring stability. Next, softening is carried out using softening agents to improve the hand feel and comfort of the garments.

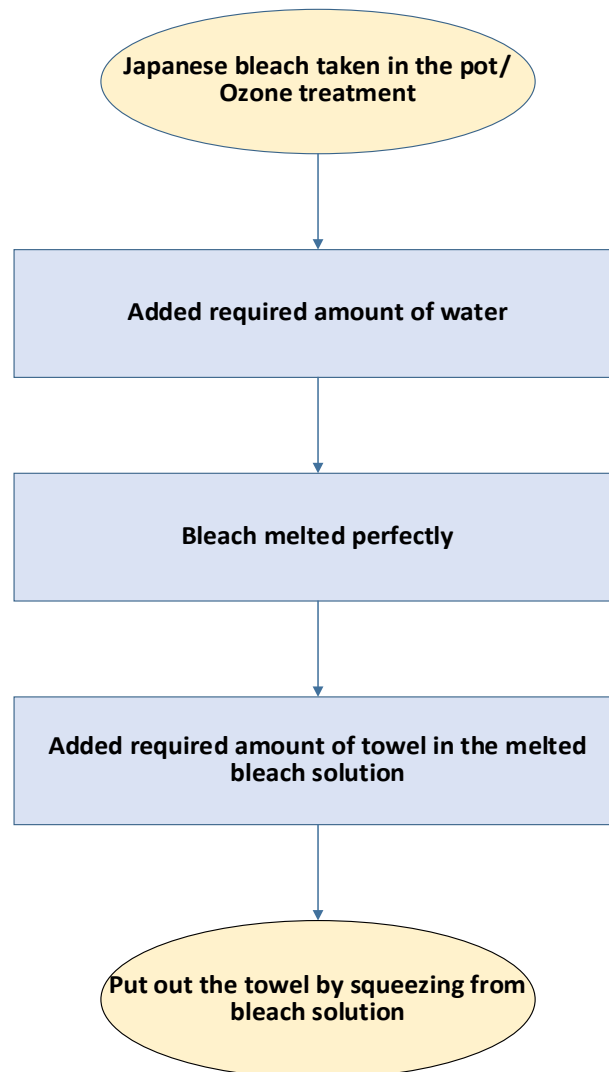
Finally, hydro-extraction removes excess water, and drying completes the process, stabilizing the fabric and achieving the final desired appearance and quality.

### 3.6.4 Towel Bleach Washing Process



**Figure 3.8: Towel Bleach Washing Process Flow Diagram of Aspire Washing Ltd. (First Step)**

The process begins with loading the garments into the machine, followed by de-sizing or ozone treatment to remove impurities and prepare the fabric. The garments are then rinsed (one or two times) to eliminate residual chemicals. Then an enzyme wash is carried out depending on the required shade, which helps achieve the desired appearance and softness. This is followed by rinsing (two times) to remove remaining enzymes and loosened particles. Finally, the process is completed by drying, ensuring the garments reach the desired finish and quality.

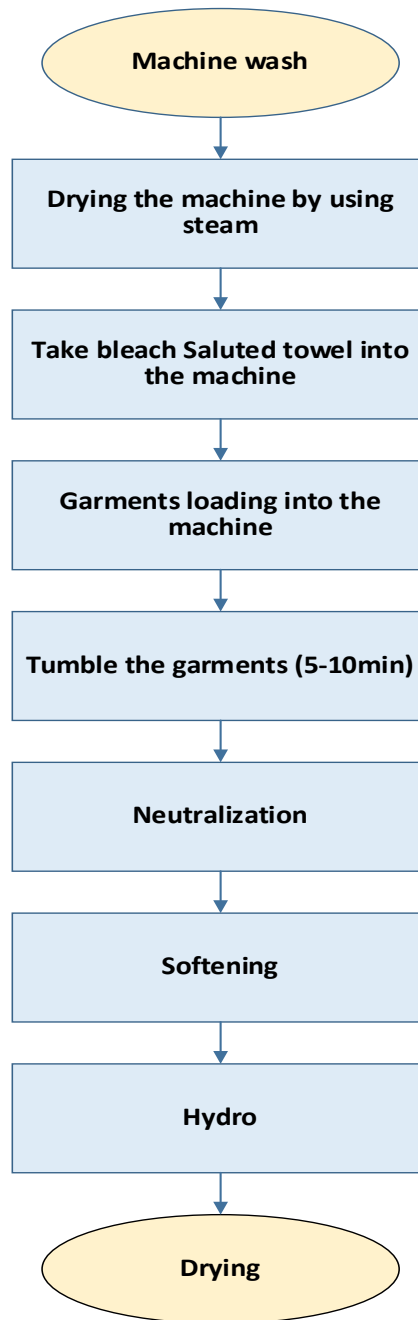


**Figure 3.9: Towel Bleach Washing Process Flow Diagram of Aspire Washing Ltd.  
(Second Step)**

The process begins with taking Japanese bleach in a pot or applying ozone treatment, depending on the required effect. Then, the required amount of water is added to dilute the bleach to an appropriate concentration. Proper dilution is important to ensure controlled bleaching and to avoid excessive damage to the fabric. The solution is then mixed thoroughly until the bleach is completely dissolved, forming a uniform and consistent mixture. Next, the required number of clean towels are added into the bleach solution. These towels act as carriers, so they must be fully soaked and evenly saturated to ensure proper absorption of the bleaching agent.

After soaking, the towels are removed from the solution and squeezed carefully to eliminate excess liquid. This step helps maintain the right amount of bleach in the towels and prevents over-application, which could result in uneven fading or fabric weakening. Finally, the prepared towels are ready for use.

in the washing process, where they help achieve controlled bleaching, uniform fading, and the desired visual effect on the garments.

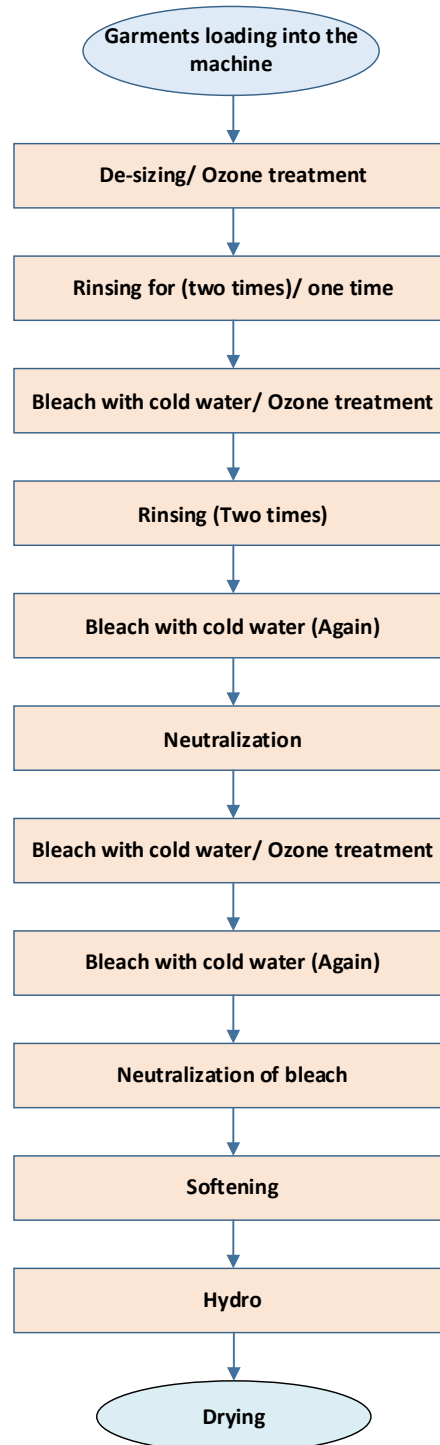


**Figure 3.10: Towel Bleach Washing Process Flow Diagram of Aspire Washing Ltd. (Final Step)**

The towel bleach washing process is performed in several stages. In the first stage, garments undergo de-sizing, rinsing, and enzyme washing depending on the desired shade. After rinsing, the garments are hydro-extracted. In the second stage, bleaching solution is prepared separately by dissolving

bleaching chemicals in water. Towels are dipped into the bleaching solution and squeezed. In the final stage, the bleach-treated towels are added into the washing machine together with the garments, and the materials are tumbled for a short period to achieve the desired effect. The process is completed through neutralization, softening, hydro extraction, and drying.

### 3.6.5 Bleaching Wash Process



**Figure 3.9: Bleaching Wash Process Flow Diagram of Aspire Washing Ltd.**

The process begins with loading garments into the machine, followed by de-sizing or ozone treatment to remove impurities. The garments are then rinsed (one or two times) before undergoing bleaching with cold water or ozone treatment to achieve initial fading. After this, rinsing (two times) is carried out to remove residual chemicals.

A second bleaching with cold water is then applied to reach the desired shade, followed by neutralization to stop the bleaching action and protect the fabric. ঐকপক softening is done to improve the hand feel and comfort of the garments. Finally, hydro-extraction removes excess water, and drying completes the process, ensuring the final appearance and quality.

### **3.7 Machinery and Utility**

#### **3.7.1 Generator Facility**

The proposed project of Aspire Washing Ltd. will install two diesel-operated standby generators, each having a capacity of 800 kVA, to ensure uninterrupted power supply during electricity outages from the national grid. Under normal operating conditions, electricity will be supplied from the national grid system; however, the generators will be used as backup power sources when grid power is unavailable.

The generators will be installed in a designated generator room equipped with proper ventilation and necessary safety arrangements. Adequate noise control measures will be implemented to minimize sound levels during generator operation. The generators will use diesel as fuel, and regular maintenance will be carried out to ensure efficient combustion and reduced air emissions. Exhaust gases from the generators will be discharged through properly designed stacks to ensure safe dispersion into the atmosphere.

#### **3.7.2 Biomass Boiler Facility**

The project will install two biomass boilers with capacities of 4,000 kg/hour and 3,000 kg/hour to generate steam required for the washing and drying processes of the factory. The boilers will supply the necessary thermal energy for various washing operations within the facility.

Biomass fuel such as agricultural residues or similar renewable fuel sources will be used for steam generation. The boilers will be installed with appropriate chimney stacks to ensure proper dispersion of flue gases. Necessary safety and operational measures will be maintained to ensure efficient and safe operation of the boilers. Regular monitoring and maintenance will also be conducted to maintain

emission levels within acceptable environmental standards as required by the Department of Environment Bangladesh.

### 3.7.3 Imported Machineries:

#### *Imported Machineries*

**Table 3.2: List of Imported Machineries**

| SL. No. | Name, Brand, Model & Capacity                                                                                                            | Qty (Pcs/Set) |
|---------|------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 1       | Front Loading Washing Machine 520KG, Yilmak, Turkey                                                                                      | 13            |
| 2       | Front loading Washing & Dyeing Machine 520kg, Yilmak, Turkey                                                                             | 5             |
| 3       | Front Loading Washing Machine 420KG, Yilmak, Turkey                                                                                      | 1             |
| 4       | Front Loading Washing Machine 220KG, Yilmak, Turkey                                                                                      | 2             |
| 5       | Belly Washing Machine 800 LBS, Tonxin, China                                                                                             | 8             |
| 6       | Belly Washing & Dyeing Machine 800 LBS, Tonxin, China                                                                                    | 4             |
| 7       | Belly Washing Machine 650 LBS, Tonxin, China                                                                                             | 1             |
| 8       | Belly Washing Machine 350 LBS, Tonxin, China                                                                                             | 1             |
| 9       | Front Loading Washing Machine 520KG, Turkey                                                                                              | 2             |
| 10      | Belly Acid Washing Machine 1200 LBS, Tonxin, China                                                                                       | 6             |
| 11      | Belly Acid Washing Machine 550 LBS, Tonxin, China                                                                                        | 1             |
| 12      | Dryer Machine, Dry Bolume 300kg, Tonxin, China                                                                                           | 19            |
| 13      | Dryer Machine, Dry Bolume 250kg, Tonxin, China                                                                                           | 2             |
| 14      | Hydro Extractor Machine, Dry bolume 250kg, Tonxin, China                                                                                 | 7             |
| 15      | Brand New Sustainable Industrial Convyer Type Oven Machine, Brand: Yonghao, Model: JI-12000, Production Capacity: 10000 Pcs (Max), China | 1             |
| 16      | Ozone Generator (1Generator with 2 Dram)Jeanologia, Spain                                                                                | 2             |
| 17      | Front Loading Washing Machines, 250kg, Yilmak, Turkey                                                                                    | 1             |
| 18      | Front Loading Washing Machines, 100kg, Yilmak, Turkey                                                                                    | 1             |
| 19      | Front Loading Washing Machines, 65kg, Yilmak, Turkey                                                                                     | 1             |
| 20      | Front Loading Washing Machines, 36kg, Yilmak, Turkey                                                                                     | 1             |
| 21      | Belly Washing & Dyeing Machine, 100LBs, Tonxin, China                                                                                    | 1             |
| 22      | Belly Washing & Dyeing Machine, 70LBs, Tonxin, China                                                                                     | 2             |
| 23      | Belly Washing & Dyeing Machine, 50LBs, Tonxin, China                                                                                     | 2             |

| SL. No. | Name, Brand, Model & Capacity                                         | Qty (Pcs/Set) |
|---------|-----------------------------------------------------------------------|---------------|
| 24      | Belly Washing & Dyeing Machine, 30LBs, Tonxin, China                  | 2             |
| 25      | Belly Washing & Dyeing Machine, 20LBs, Tonxin, China                  | 1             |
| 26      | INDUSTRIAL TUMBLER DRYER, 45kg, Tonxin, China                         | 2             |
| 27      | INDUSTRIAL TUMBLER DRYER, 36kg, Tonxin, China                         | 2             |
| 28      | HYDRO EXTRACTOR, 30kg, Tonxin, China                                  | 2             |
| 29      | Crock meter/Rubbing Fastness Tester, Type GT-D05, Gester,China        | 1             |
| 30      | Color Fastness Tester, Model GT-D07, Gester,China                     | 1             |
| 31      | Digital PH/Temp Meter, Model HI, HANNA                                | 1             |
| 32      | Digital Elmendor Tearing Tester(128N), China                          | 1             |
| 33      | Color Matching Cabinet, Type GT-D08(6), Gester,China                  | 1             |
| 34      | Model GT-C75, Gester,China                                            | 1             |
| 35      | Balance Scale Model M-ACS030G/C, China                                | 1             |
| 36      | Colour Faetness & Perspiration Drying Type Model Gt-D10, Gester,China | 1             |
| 37      | Moisture meter TEM-1, AquaBoy,Germany                                 | 1             |
| 38      | Digital Balance Model GT-C75-1, Gester,China                          | 1             |
| 39      | Oven Type, UK                                                         | 1             |
| 40      | Digital Shaker Type SHO-1D, Digital Shaker Type SHO-1D, China         | 1             |
| 41      | Light box 6 color, China                                              | 1             |
| 42      | SPRAYING CABINET MACHINE WITH PLATFORM, 6 Legs, China                 | 2             |
| 43      | Scraping machine, China                                               | 22            |
| 44      | Whisker machine, China                                                | 16            |
| 45      | DENIM DESTROYER MACHINE, China                                        | 12            |
| 46      | 3D Crinkle Machine, (Double Head Individual), China                   | 6             |
| 47      | TAGING MACHINE, China                                                 | 20            |
| 48      | Laser Machine 600/700 Watt (Jeanologia), Spain                        | 4             |
| 49      | HOT & COOL AIR BLASTER, China                                         | 2             |
| 50      | Jeans Pant Reversing Machine, China                                   | 2             |
| 51      | 4Ton Multi Fuel Boiler (Biomass Boiler), Korea                        | 2             |
| 52      | 55 KW compressor with 2KW dryer, Belgium                              | 2             |
| 53      | 45 KW compressor with 2KW dryer, Belgium                              | 1             |

| SL. No. | Name, Brand, Model & Capacity                                                                 | Qty (Pcs/Set) |
|---------|-----------------------------------------------------------------------------------------------|---------------|
| 54      | 800 KVA Diesel Generator (UK)                                                                 | 2             |
| 55      | BBT with accessories (approximate) (Price Depend on BBT Ampere) (Turkey) Depend on as per BOQ | 1             |
| 56      | Fire Detection System Foreign part (Japan)                                                    | 1             |
| 57      | Auto Fire Protection System, Foreign part (Japan)                                             | 1             |
|         | <b>Total:</b>                                                                                 | <b>202</b>    |

### **Local Machineries**

**Table 3.3: List of Local Machineries**

| SL. No. | Name, Brand, Model & Capacity                | Qty (Pcs/Set) |
|---------|----------------------------------------------|---------------|
| 1       | Digital weight machine                       | 2             |
| 2       | Curine Oven (Electric Heater) 3000pcs        | 1             |
| 3       | 4 Ton Multi Fuel Boiler (Bio-mass Boiler)    | 2             |
| 4       | 55 KW compressor with 2KW dryer              | 2             |
| 5       | 45 KW compressor with 2KW dryer              | 1             |
| 6       | 800 KVA Diesel Generator                     | 2             |
| 7       | Auto Fire Protection System, Local part (BD) | 1             |
| 8       | Fan With Air Cooling System                  | 1             |
| 9       | WTP                                          | 1             |
| 10      | Solar System                                 | 1             |
| 11      | 1600 KVA Sub-station-                        | 1             |
| 12      | Local Machineries & Equipment                | 1             |
| 13      | Laser Machine Local Part                     | 1             |
|         | <b>Total:</b>                                | <b>17</b>     |

### 3.8 Raw Materials List

Following items are the raw materials of the project.

**Table 3.4: Industrial raw materials**

| Sl. No. | Item                                               |
|---------|----------------------------------------------------|
| 1       | Acetic Acid                                        |
| 2       | Acrylic Emulsion (3D) Resin RFB                    |
| 3       | Anti- Back staining Agent                          |
| 4       | Antiozon softener                                  |
| 5       | Binder (3D- Improver)                              |
| 6       | Booster                                            |
| 7       | Calcium Hypochlorite 65%                           |
| 8       | Cationic Pill Softener                             |
| 9       | Deep Cherry                                        |
| 10      | Desi zing Agent                                    |
| 11      | Direct Black (N.F)                                 |
| 12      | Direct Black (VSF)                                 |
| 13      | Direct Blue GL                                     |
| 14      | Direct Brown GTL                                   |
| 15      | Direct Red                                         |
| 16      | Direct Turquoise Blue                              |
| 17      | Direct Yellow 2RL                                  |
| 18      | Dychufix Black B                                   |
| 19      | Dychufix Black GR                                  |
| 20      | Dychufix Red 3R-XF                                 |
| 21      | Fixing Agent                                       |
| 22      | Fluorescent Brightener                             |
| 23      | Hydrogen Peroxide (H <sub>2</sub> O <sub>2</sub> ) |
| 24      | Emeril PCLE                                        |
| 25      | Labeling Agent                                     |
| 26      | Liquid Enzyme                                      |
| 27      | Micro Emulsion                                     |
| 28      | Neutral Bio Polish                                 |

| Sl. No. | Item                          |
|---------|-------------------------------|
| 29      | Neutral Enzyme                |
| 30      | Nova corn Dark Blue SGL       |
| 31      | Nova corn Deep Night SR       |
| 32      | Nov- Yellow S-3R              |
| 33      | Optical Brightener            |
| 34      | Paste softener                |
| 35      | Phosphoric Acid               |
| 36      | Pigment Yellow CL-2R          |
| 37      | Pigment Black CLS             |
| 38      | Pigment Red CL-5B             |
| 39      | Pocket Clear                  |
| 40      | Potassium Permanganates       |
| 41      | PP Activator                  |
| 42      | Prevent Crease Mark           |
| 43      | Refining Agent                |
| 44      | Sequestering agent (RSK)      |
| 45      | Sodium Carbonate Light (Soda) |
| 46      | Sodium Chloride (Salt)        |
| 47      | Sodium Chloride (G.Salt)      |
| 48      | Sodium Hydroxide (Caustic)    |
| 49      | Sodium Meta Bi Sulphate       |
| 50      | Sodium Thiosulphate (HYPO)    |
| 51      | Stable Bleaching Powder (KCI) |
| 52      | Punic Stone                   |

### 3.9 Project Category

In the light of categorization made under the above ECR, '23, **Aspire Washing Ltd.** falls under **“Red”** categories. (Schedule-1, Page No. 3057, ECR, '23)

১৮। বস্ত্র/পোশাক ওয়াশিং ইউনিট (দৈনিক উৎপাদন ক্ষমতা ১৫ টনের উর্ধ্বে)।

According to ECR, '23, industries fall under the Green and Yellow categories are not required to undertake an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) study. Orange projects are required to undertake an IEE, while Red category projects must undertake an IEE and an EIA and or EMP

According to ECR, '23, industries fall under the Green category do not required to undertake an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) study. Yellow and Orange projects are required to undertake an IEE, while Red category projects must undertake an IEE, EIA and EMP.

Being committed to environmental protection AWL from the beginning has taken positive actions to meet ECA, '95, ECR, '23, and other environment protection rules and regulations.

### **3.10 Employment Opportunities**

**Aspire Washing Ltd.** serves as a hub of economic activity, not only contributing to the production of essential packaging materials but also creating a multitude of employment opportunities for both skilled and unskilled workers. With approximately 610 skilled and unskilled positions in Aspire Washing Ltd. these opportunities play a pivotal role in boosting the local and regional job market.

Skilled positions in this company encompass a range of roles, including machine operators, maintenance technicians, quality control experts, and logistics professionals. These individuals are integral to the efficient and high-quality operation of the facility. Skilled workers often receive specialized training, and their expertise ensures the smooth functioning of the machinery, maintenance of production standards, and the adherence to safety protocols.

On the other hand, unskilled positions offer entry-level opportunities, making it possible for individuals with varying levels of experience to secure stable employment. These roles include general laborers, warehouse staff, and administrative support personnel. Unskilled workers receive on-the-job training, providing them with valuable skills and experience that can open doors to further career advancement within the company. The combined workforce, comprising both skilled and unskilled employees, fosters a dynamic and collaborative environment. It not only drives the production process but also supports the local community by injecting income and stability. In many cases **Aspire Washing Ltd.** also engage in community outreach, education, and vocational training programs to enhance the skills and employability of their workforce.

### 3.11 Biological Effluent Treatment Plant (ETP)- Capacity: 90 m<sup>3</sup>/hr.

#### 3.11.1 Project profile:

The proposed facility of **Aspire Washing Ltd.** will generate wastewater mainly from denim washing operations. This wastewater may contain residual chemicals, detergents, dyes, enzymes, and suspended solids. To manage and treat this wastewater effectively, the project will install an Effluent Treatment Plant (ETP) with adequate treatment capacity. The ETP will treat the generated wastewater through a biological treatment process.

The treated effluent from the ETP will meet the discharge standards set by the Department of Environment Bangladesh before being discharged into the nearby Dhaleshwari River. Proper operation and regular monitoring of ETP will be maintained to ensure effective treatment performance and compliance with environmental regulations. This treatment system will significantly reduce the environmental impact of the industrial activities of the project.

#### 3.11.2 General Information

|                       |   |                                                   |
|-----------------------|---|---------------------------------------------------|
| <b>Name of Client</b> | : | <b>Aspire Washing Ltd.</b>                        |
| Location              | : | Sudkhira, Jamirta, Singair, Manikganj             |
| Type of Effluent      | : | Denim Wash Process Effluent                       |
| ETP Capacity          | : | 90 m <sup>3</sup> /Hr (2160 m <sup>3</sup> /day.) |
| Treatment Hours       | : | 24 Hrs/Day                                        |
| Treatment Concept     | : | Biological (Conventional ASP) Treatment Process.  |

#### 3.11.3 ETP Information:

There is constructed for a 90.0 m<sup>3</sup>/hr. ETP. Details, Drawing and Design Calculation is attached in **Annex-D & Annex-E**

#### 3.11.4 Water Mass Balance & ETP Capacity Calculation:

**Water Requirement:** The daily requirement of water has been estimated at about 2300.0 m<sup>3</sup>, which will be available from deep tube well sources. Mass balance of the project are given below-

**Table 3.5: Wastewater Generation and ETP Capacity Calculation of Aspire Washing Ltd.**

| Denim Washing ETP Capacity Calculation (Proposed)                               |                                                    |           |          |                                                                                                                                                                      |
|---------------------------------------------------------------------------------|----------------------------------------------------|-----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SL                                                                              | Particulars                                        | Quantity  | Unit     | Remarks                                                                                                                                                              |
| 1                                                                               | Production Capacity & type of production           | 60,000    | Pcs/day  | Garments Wash, Enzyme Wash, Stone Enzyme Wash, Enzyme & Stone Wash with DP, Enzyme & Bleach Wash With DP, Enzyme Towel & Acid Wash with dry process, Garments Dyeing |
| 2                                                                               | Weight                                             | 30,000    | kg/day   | Average weight 500 gm per piece                                                                                                                                      |
| 3                                                                               | Water Consumption                                  | 60        | Ltr/kg   | The global standard for washing 1 kilogram of denim fabrics is 70 liters                                                                                             |
| 4                                                                               | Wastewater Generation                              | 18,00,000 | Ltr/day  | 1800 m <sup>3</sup> /day                                                                                                                                             |
| 5                                                                               | ETP Capacity (Effluent Flow+ 15% Factor of Safety) | 20,70,000 | Ltr/day. | 2070 m <sup>3</sup> /day                                                                                                                                             |
| 6                                                                               | Effluent Flow                                      | 86,250    | Ltr/hr.  | 86.25 m <sup>3</sup> /hr. (2070 m <sup>3</sup> /day)                                                                                                                 |
| <b>So, Proposed ETP Capacity: 90 m<sup>3</sup>/hr. (2160 m<sup>3</sup>/day)</b> |                                                    |           |          |                                                                                                                                                                      |

- Source**

The raw effluent shall be discharge to the proposed effluent treatment plant from the process units.

- Quantity**

The quantity of effluent to be treated shall be of the order of 2160 m<sup>3</sup>/day.

### 3.11.5 Waste Water Inlet & Outlet Design Parameter

| SL NO. | Name of Parameter | Inlet Parameter (ppm)<br>(Maximum) | Outlet<br>Parameter (ppm)<br>(ECR'23, Department of<br>Environment, DoE) |
|--------|-------------------|------------------------------------|--------------------------------------------------------------------------|
| 1.     | pH                | 8-11                               | 6.0-9.0                                                                  |
| 2.     | TSS               | 200-600                            | 100                                                                      |
| 3.     | BOD               | 450                                | <30                                                                      |
| 4.     | COD               | 1000                               | <200                                                                     |
| 5.     | DO                | 00                                 | ---                                                                      |
| 6.     | TDS               | <1000                              | <2100                                                                    |
| 7.     | Total Nitrogen    | <40                                | ---                                                                      |
| 8.     | Total Phosphate   | <5                                 | ---                                                                      |
| 9.     | Color             | 15;9;6 (600-800)                   | ≤ 150 Pt-Co                                                              |

\* Source: Inlet parameters are taken from similar projects.

### 3.11.6 ETP Process Flow Diagram:

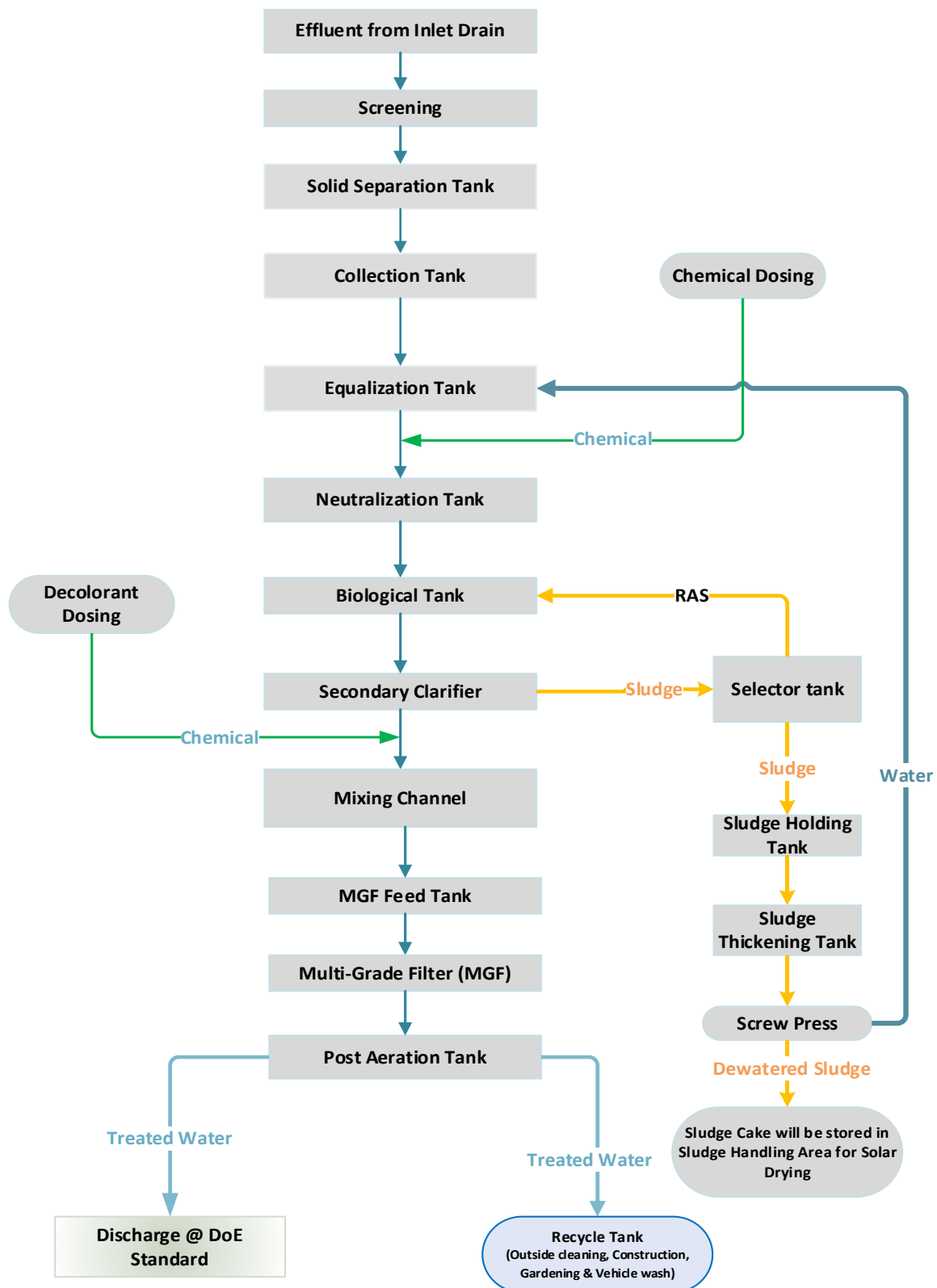


Figure 3.10: ETP Process Flow Diagram

### 3.11.7 Operational Processes

#### **A. Automatic Screening:**

Automatic screening removes large solids, rags, and debris from Inlet. It increases the efficiency of treatment plant.

#### **B. Solid Separation Tank:**

This tank will collect the effluent from the drain coming from process unit and Sand trap will settle grits from the effluent and will be collected periodically. This Tank will collect and store the effluent up to a certain time. Anaerobic reaction May take place in this tank If air is not supplied in this tank.

#### **C. Collection Tank:**

This tank was constructed to avoid turbulence at the solid separation tank. It will collect the effluent from the solid separation tank and send the effluent water to Solid separation tank.

#### **D. Equalization Tank:**

The effluent will be taken into equalization reactor where the homogeneous mixing will be done by the by Blower. This homogeneous mixing will help to neutralize the pH effortlessly in next tank. And increase the efficiency of biological system.

Air can be applied in the Equalization Tank based on the requirements. If we want to Reduce BOD, COD load before aeration tank then we can add oxygen in the Equalization tank. In this case, aerobic bacteria will grow if pH level is neutral.

#### **E. Neutralization Tank:**

Homogeneously mixed Wastewater will be pumped to this section for neutralization of pH by adding acid/alkali.

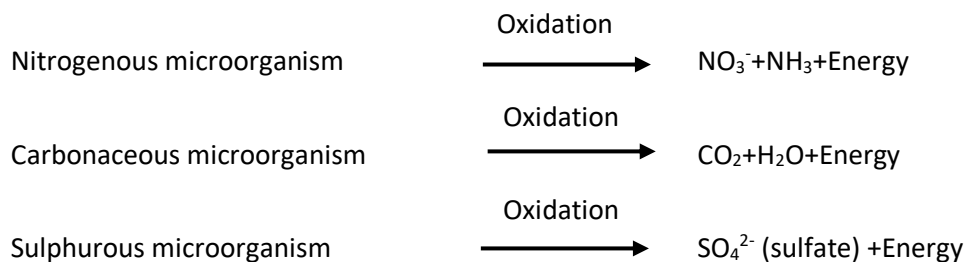
- For acidic wastes (low pH): NaOH (Sodium hydroxide),  $\text{Na}_2\text{CO}_3$  (Sodium carbonate),  $\text{CaCO}_3$  (Calcium carbonate) or  $\text{Ca}(\text{OH})_2$ .
- For alkali wastes (high pH):  $\text{H}_2\text{SO}_4$ , HCl (Hydrochloric acid).

## F. Biological Tank:

In biological tank, organic pollutants will be removed aerobically. Oxygen is provided in this tank and bacteria for treating and stabilizing the wastewater use it. Oxygen is needed by the bacteria for biodegradation of organic matters. The supplied oxygen is utilized by bacteria (microorganism) in the wastewater to break down the organic matter containing carbon form carbon dioxide and water. Without the presence of sufficient oxygen, bacteria are not able to biodegrade the incoming organic matter.

There are mainly three types of microorganism.

1. Nitrogenous microorganism
2. Carbonaceous microorganism
3. Sulphurous microorganism



NH<sub>3</sub> Create odors in aeration tank and it is removed by Nitrification and Denitrification.

Nitrification and Denitrification in water treatment:

Nitrification and Denitrification is a process of removing excess nitrogen form of ammonia from the water to maintain the standard concentration of nitrogen in environment.

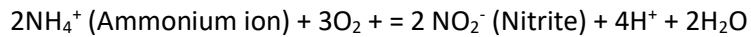
### Nitrification:

Nitrification is the biological oxidation of ammonia to nitrite followed by the oxidation of the nitrite to nitrate occurring through separate organisms or direct ammonia oxidation to nitrate by heterotrophic /Nitrosomonas and Nitrobacter bacteria. It is very Oxygen consuming process, 4.6 lb oxygen required to produce 1 lb  $\text{NO}_3^-$ . Nitrosomonas has an optimal pH between approximately 7.0 and 8.0, and the optimum pH range for heterotrophic / Nitrobacter is approximately 7.5 to 8.0.

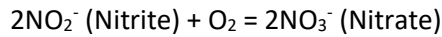
### In the presence of Air:

Nitrification is an aerobic process. So, oxygen is required to convert the ammonia to nitrite. Now;

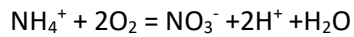
Nitroso-Bacteria:



Nitro-Bacteria:



Total Oxidation Reaction:



#### **G. Secondary Clarifier:**

A clarifier tank allows suspended particles to settle out of water or wastewater as it flows slowly through the tank, thereby providing some degree of purification. A layer of accumulated solids, called sludge, forms at the bottom of the tank and is periodically removed.

#### **H. Mixing Channel**

Effluent will come from the secondary clarifier and will go through the mixing channel to remove its color.

#### **I. Recycle Tank**

A recycle tank in an ETP stores treated wastewater for reuse instead of discharge. It ensures a steady supply of reclaimed water for processes like cooling or washing, reduces freshwater use, and supports sustainability goals such as 3R and ZLD.

#### **J. MGF Feed Tank:**

This is a Feed tank use to hold the water. Water will pump to the Filter Vessel (MGF) from this tank. Denitrification will happen in this tank if any Nitrite retain.

#### **K. Multi Grade Filter Vessel (MGF):**

Multi Grade Filter is a latest concept in the water treatment technology. a Multi Grade Filter consists of vertical or horizontal pressure sand filters that contain multiple layers of course and fine sand (pebbles and gravels) in a fixed proportion. It is a kind of a deep filter bed with adequate pore dimensions for retaining both large and small-suspended solids and un-dissolved impurities like dust particles. It can reduce high turbidity and TSS (< 5ppm) from water.

#### **L. Post Aeration Tank:**

The Treated Water Tank is used to disinfection & increase the DO in the water before discharging the water and it increase the quality of the water. The air causes the dissolved gases to release from the water before discharge.

#### **M. Sludge Thickening Tank:**

Excess sludge from the Clarifier tank will be taken to the sludge tank, will be thickened further in the sludge tank and the thickened sludge will be pumped the filter press for the dewatering of sludge to make it in the form of cake. Secondary sludge will be feed to biological tank as return activated sludge (RAS) to maintain required MLSS & MLVSS level in the aeration tank. Extra sludge will be moved to filter press for further sludge treatment.

#### **N. Screw Press:**

An industrial Screw press is a tool used in separation processes, specifically to separate solids and liquids. Liquids are sent to the equalization tank.

- **ETP Layout, Section, ETP Flow & Hydraulic Flow, Design Calculation, Structural Design & Others are attached in Annex-E**

#### **3.11.8 ETP Final Discharge Details**

The treated water from ETP will be collected through factory owned surface drain and will be discharged into the nearby Dhaleshwari river.

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## *Chapter 4*

### *Description of Existing Environmental & Social Baseline*

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## **4. DESCRIPTION OF EXISTING ENVIRONMENTAL AND SOCIAL BASELINE**

### **4.1 General Consideration**

Baseline data on environment is important to understand physical, biological, cultural, economic and social environmental characteristics of the project study area. This information forms the basis to analyze the probable impacts of the project activities. Mainly the following are the objectives or outcome of examining and defining the existing environment:

- To identify environmental and socioeconomic components that may be affected due to project activities;
- To recognize potential environmental impacts on them;
- To provide a base line against which environmental conditions in the future project may be measured;

For this EIA study, the emphasis is given on the environmental features like water, air and noise quality of study area. Considerations are given to both the environment and ancillary area that seems to be affected.

### **4.2 Study Area**

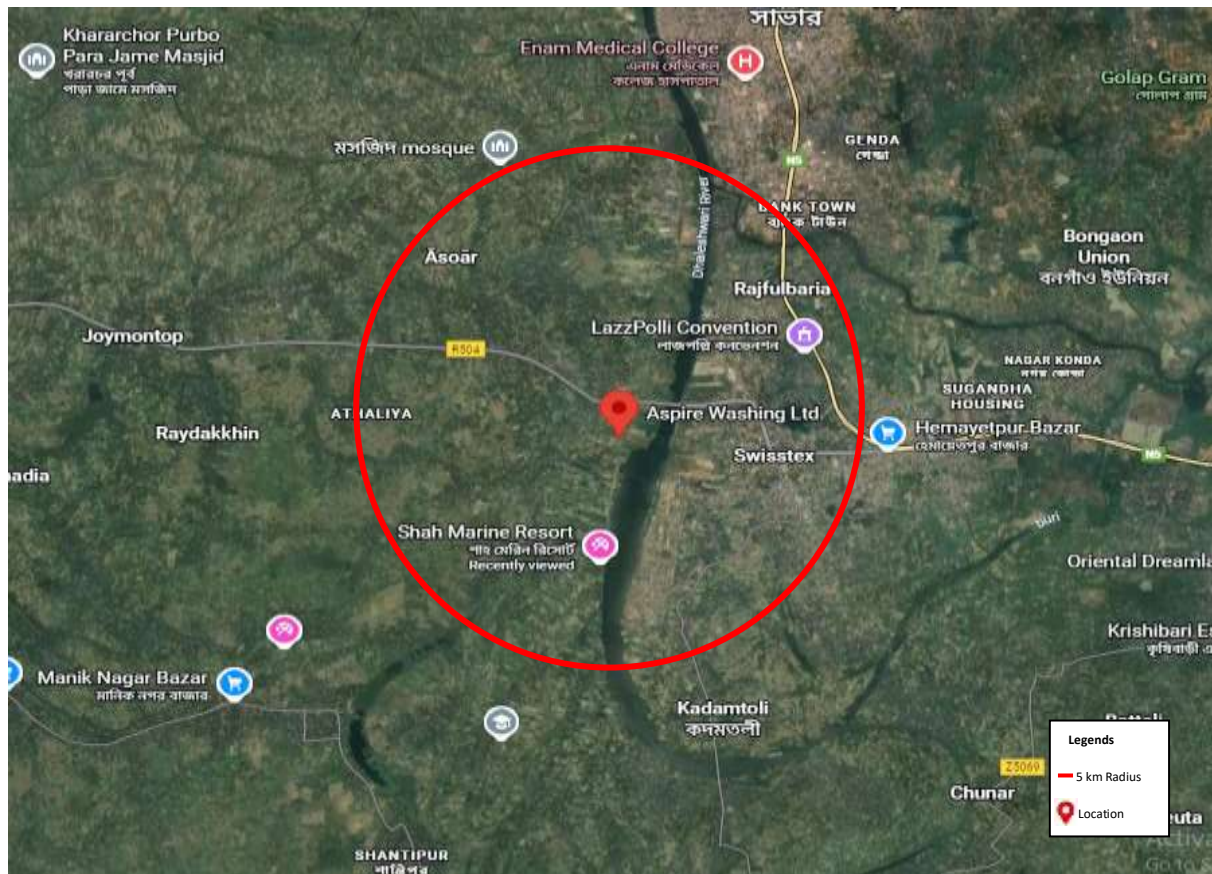
Aspire Washing Ltd. is located at Sudkhira, Jamirta, Singair, Manikganj. The company intends to set up its manufacturing plant over 7,314 square meter of land, within a total area of 10,925 square meter. The site is located at the geographical coordinates of Longitude: 90° 14' 18.7224" E and Latitude: 23° 47' 41.6976" N. The project site is about 23.2 km away from Dhaka Zero Point, 4 km away from Hemayetpur Bus Stand and about 32.1 km far from Hazrat Shahjalal International Airport. The surrounding area is characterized by a mix of semi-urban and rural land uses, including agricultural fields, residential settlements, and small-scale industrial units.

### 4.3 Physio-Chemical Environment

#### 4.3.1 Land

##### *i. Existing and Surrounding Land Uses*

The area enjoys all the infrastructure facilities like water, electricity, NG, telecommunication etc. Manikganj District is a district in central Bangladesh, part of the Dhaka Division.



**Figure 4.1: Surrounding of Aspire Washing Ltd. (5 KM Radius)**

Manikganj District is a district in central Bangladesh, which is a part of the Dhaka Division. Manikganj District is located to the west of Dhaka and serves as an important agricultural and riverine district of the country. The district lies along the banks of major rivers such as the Padma River and Jamuna River, contributing significantly to its fertile land and economic activities.

The total area of Manikganj District is approximately 1,383.66 square kilometers (534.23 square miles). The district is bounded by Tangail District on the north, Dhaka District and Faridpur District on the south, Dhaka District and Munshiganj District on the east, and Rajbari District on the west.

Manikganj District consists of 7 upazilas, several union parishads, mouzas, municipalities, and numerous villages.

Manikganj Zila consists of 7 upazilas:

- Manikganj Sadar Upazila
- Singair Upazila
- Satura Upazila
- Harirampur Upazila
- Ghior Upazila
- Daulatpur Upazila
- Shivalaya Upazila

Overall, Manikganj plays a vital role in agriculture, fisheries, and river-based trade within the central region of Bangladesh.

**Aspire Washing Ltd.** is situated in **Singair Upazila** of **Manikganj District**.

Some of the notable features of the surroundings are:

- No nationally protected monument or officially declared archaeological site was identified during the field investigation within or around the project area;
- No designated ecological conservation zone, protected scientific interest area, or environmentally critical habitat was observed in the immediate vicinity of the project site based on site reconnaissance and available secondary information;
- No established scenic, tourism, or formal recreational facilities were identified in the surrounding area. The project location is characterized by a predominantly mixed land-use pattern, including agricultural land, scattered settlements, and small-scale commercial and industrial activities.

Hence, based on field observation and available secondary information, the project site and its immediate surroundings are considered the primary zone of influence for the assessment of potential environmental impacts.

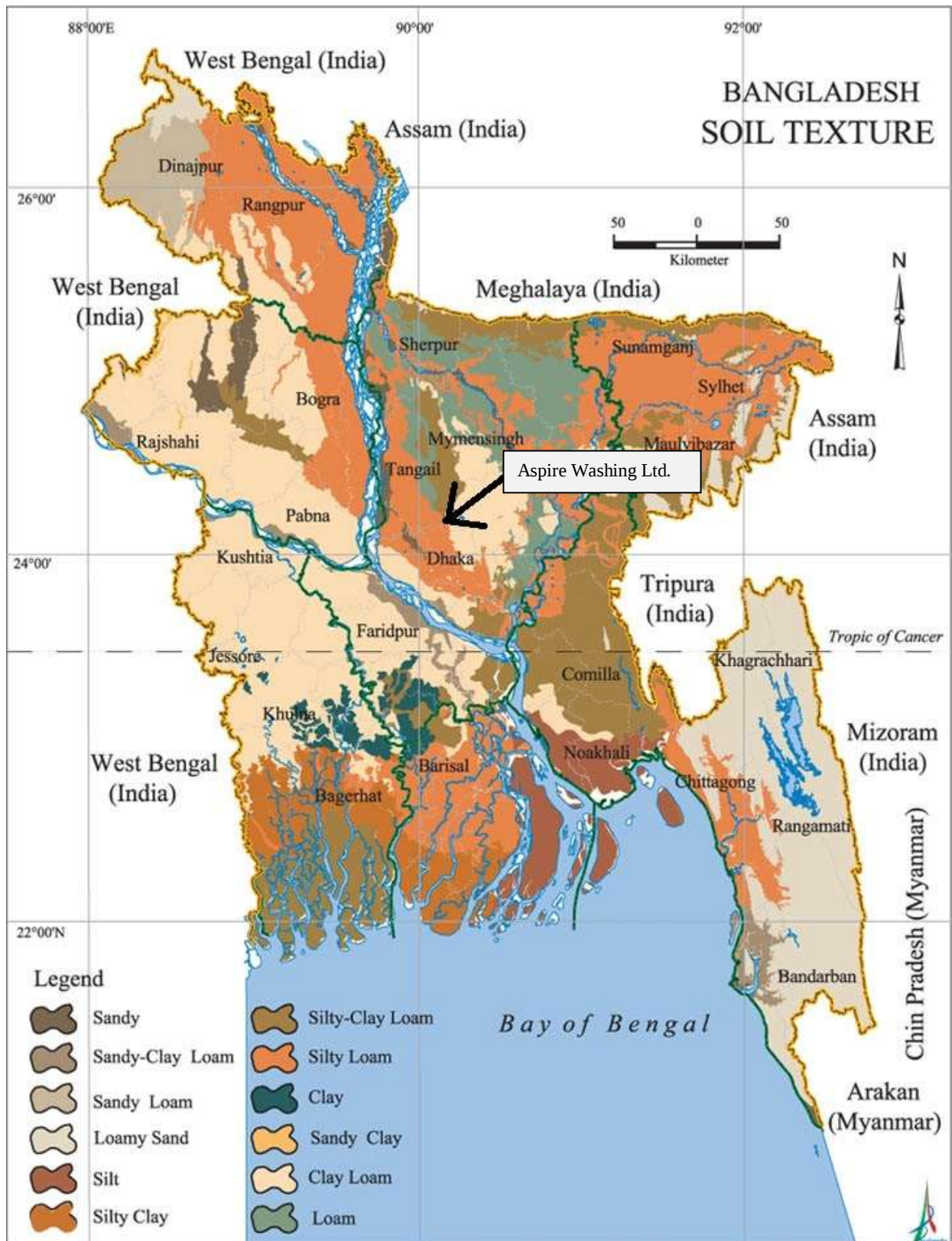
## ***ii. Land Form and Soil Classification***

The current project area has been marked in in the Physiography map, General Soil Map of Bangladesh in Figure 4.2 and 4.3. The general Physiography of Bangladesh is shown in Figure 4.2. and the project site has been marked on it. Most of the area of Bangladesh is a vast, low-lying alluvial plain, sloping gently to the south and southeast. The project as well as Manikganj Zila has a unique topography. According to Physiographic Map of Bangladesh the proposed project area in Non-calcareous Alluvium Floodplain. In Non-calcareous Alluvium Floodplain raw sandy and salty alluvial deposits, usually stratified either from the surface or below the cultivated topsoil in the active floodplain areas (young char lands) or massive in the older flood plain areas. Brahmaputra and Teesta alluvia are rich in mica and biotite; alluvia of other rivers are less micaceous. These are neutral to alkaline in reaction and are saline in the coastal tidal areas.

**Table 4.1: Land Type of Manikganj Zila**

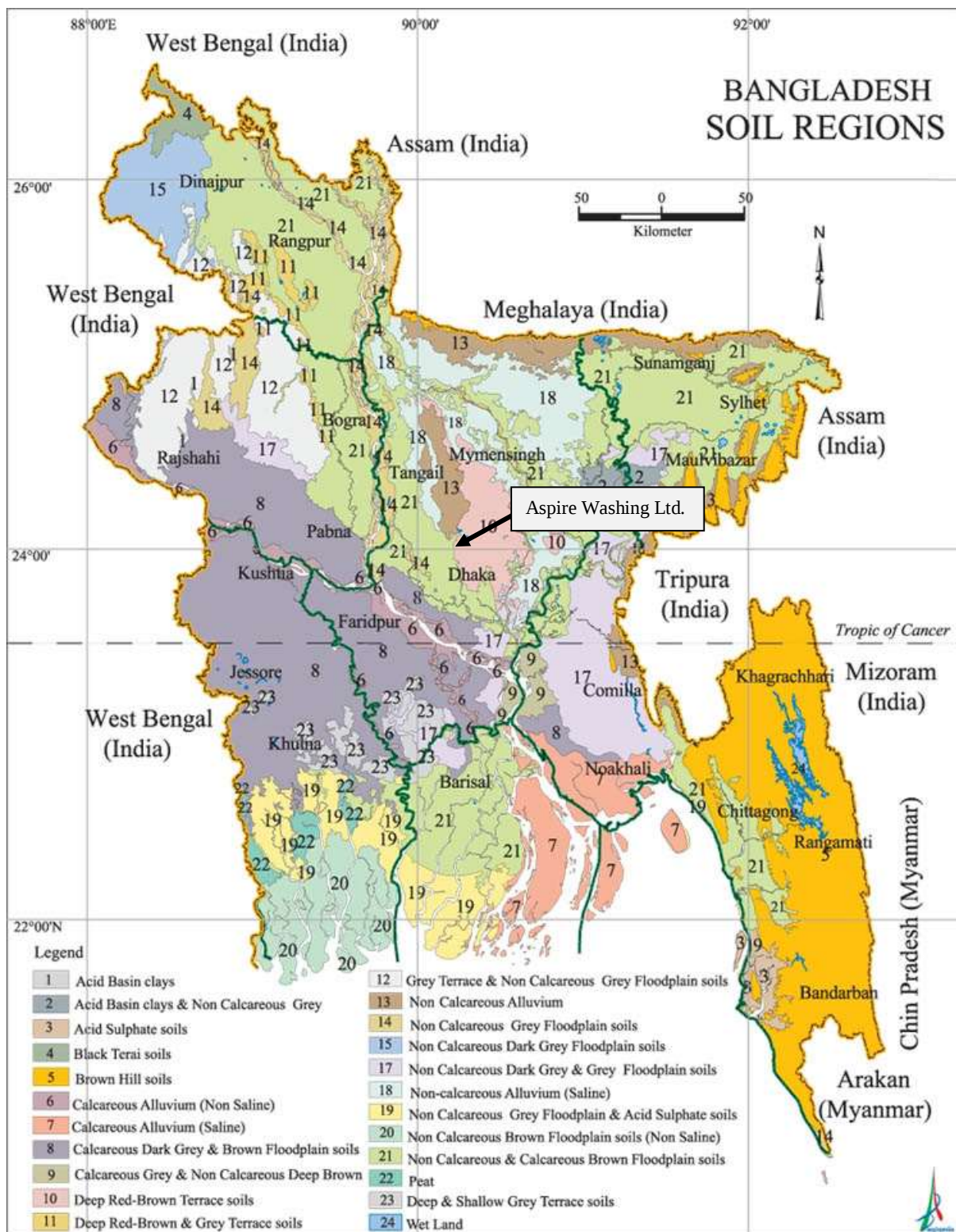
| <b>Land Category Area<br/>(Sq. Km.)</b> | <b>Area<br/>(in ha)</b> |
|-----------------------------------------|-------------------------|
| High land                               | 11,865                  |
| Medium high land                        | 26,742                  |
| Medium low land                         | 41,938                  |
| Low land                                | 32,614                  |
| Very low land                           | 7,541                   |
| Miscellaneous land                      | 17,700                  |
| <b>Total area</b>                       | <b>138,400</b>          |

*Source: Bangladesh Statistical Year Book, 2022*



**Figure 4.2: Project Area Marked on Physiographic Map of Bangladesh**

Source: Banglapedia



**Figure 4.3: General Soil Map of Bangladesh**

Source: BARC, 2005

### ***iii. Soil Sample Based on Land type***

Two upazilas, namely, Singair and Saturaia of Manikganj district were selected for study. Soil samples from 114 sites across the area were collected on the basis of land type, i.e. high land (HL), medium high land (MHL), medium low land (MLL), low land (LL) and very low land (VLL), as defined by (SRDI Staff (1985-1991).

| <b>Upazila</b> | <b>Land Type</b> | <b>Soil Series (Representative)</b> | <b>Texture</b>  | <b>pH</b> | <b>Organic Matter (%)</b> | <b>TEB (meq/100g)</b> |
|----------------|------------------|-------------------------------------|-----------------|-----------|---------------------------|-----------------------|
| Singair        | HL               | Tejgaon                             | Silty clay loam | 5.80      | 0.95                      | 6.50                  |
| Singair        | HL               | Belabo                              | Silt loam       | 5.40      | 1.05                      | 6.80                  |
| Singair        | MHL              | Kalma                               | Silty clay loam | 5.60      | 1.20                      | 7.50                  |
| Singair        | MHL              | Melandah                            | Silt loam       | 5.50      | 1.30                      | 8.20                  |
| Singair        | MLL              | Dhamrai                             | Clay loam       | 5.70      | 1.45                      | 9.10                  |
| Singair        | MLL              | Khilgaon                            | Silty clay      | 5.65      | 1.50                      | 8.80                  |
| Singair        | LL               | Singair                             | Clay            | 5.30      | 1.55                      | 10.50                 |
| Singair        | LL               | Karail                              | Clay            | 5.25      | 1.65                      | 9.80                  |
| Singair        | VLL              | Karail                              | Clay            | 5.10      | 1.75                      | 10.20                 |
| Saturaia       | HL               | Tejgaon                             | Silty clay loam | 5.85      | 1.00                      | 6.90                  |
| Saturaia       | MHL              | Kalma                               | Clay loam       | 5.75      | 1.25                      | 7.80                  |
| Saturaia       | MLL              | Dhamrai                             | Silty clay      | 5.90      | 1.60                      | 9.50                  |
| Saturaia       | LL               | Karail                              | Clay            | 5.40      | 1.70                      | 10.80                 |

Source: Soil Resource Development Institute, 1985-1991



**Figure 4.3: Location of Environmental Monitoring Samplings of Aspire Washing Ltd.**

### 4.3.2 Water Sources

#### *i. Surface Water Quality*

##### **a) Sampling Location**

Aspire Washing Ltd. is located in a high-impact industrial zone near the Dhaleshwari River. As per the Terms of Reference (ToR), surface water quality sampling was intended at eight (8) locations, including upstream and downstream points (within 100 meters) of the discharge location, as well as additional surface drains. However, during the field survey, only two (2) feasible locations were identified where surface water bodies were present. No other accessible or functional surface water bodies or drainage channels were found within the study area at the time of sampling. Accordingly, to assess potential environmental impacts, surface water quality monitoring was conducted at four strategic locations, including two points in the adjacent canal and two along the main river. The sampling follows an upstream–downstream (US–DS) approach to evaluate water quality. The canal upstream point (23°47'35.97" N, 90°14'14.50" E) represents baseline conditions, while the canal downstream point (23°47'36.01" N, 90°14'13.26" E) reflects local impacts. Similarly, river upstream (23°47'37.91" N, 90°14'30.20" E) indicates natural river quality, and river downstream (23°47'36.08" N, 90°14'29.64" E) assesses cumulative effects after mixing with canal discharge.

Samples from these locations are analyzed in a certified laboratory for key parameters, including pH, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD). As the assessment focuses on flowing water

bodies rather than stagnant sources, it provides a more rigorous evaluation of pollutant transport and environmental impact.



**Figure 4.4: GPS Location of The Surface Water Sampling Point**

## b) Method of Analysis

**Table-4.2: Method of Analysis of Surface Water Quality Parameters of River and Canal**

| SL. No. | Short Form       | Methodology        |
|---------|------------------|--------------------|
| 1.      | pH               | pH Meter           |
| 2.      | TDS              | TDS Meter          |
| 3.      | TSS              | Gravimetric        |
| 4.      | DO               | Azide Modification |
| 5.      | BOD <sub>5</sub> | DO Meter           |
| 6.      | COD              | COD Refluction     |

### c) Results of Surface Water Quality Analysis

**Table 4.3: Analysis Result of Surface Water Quality Parameters of River and Canal**

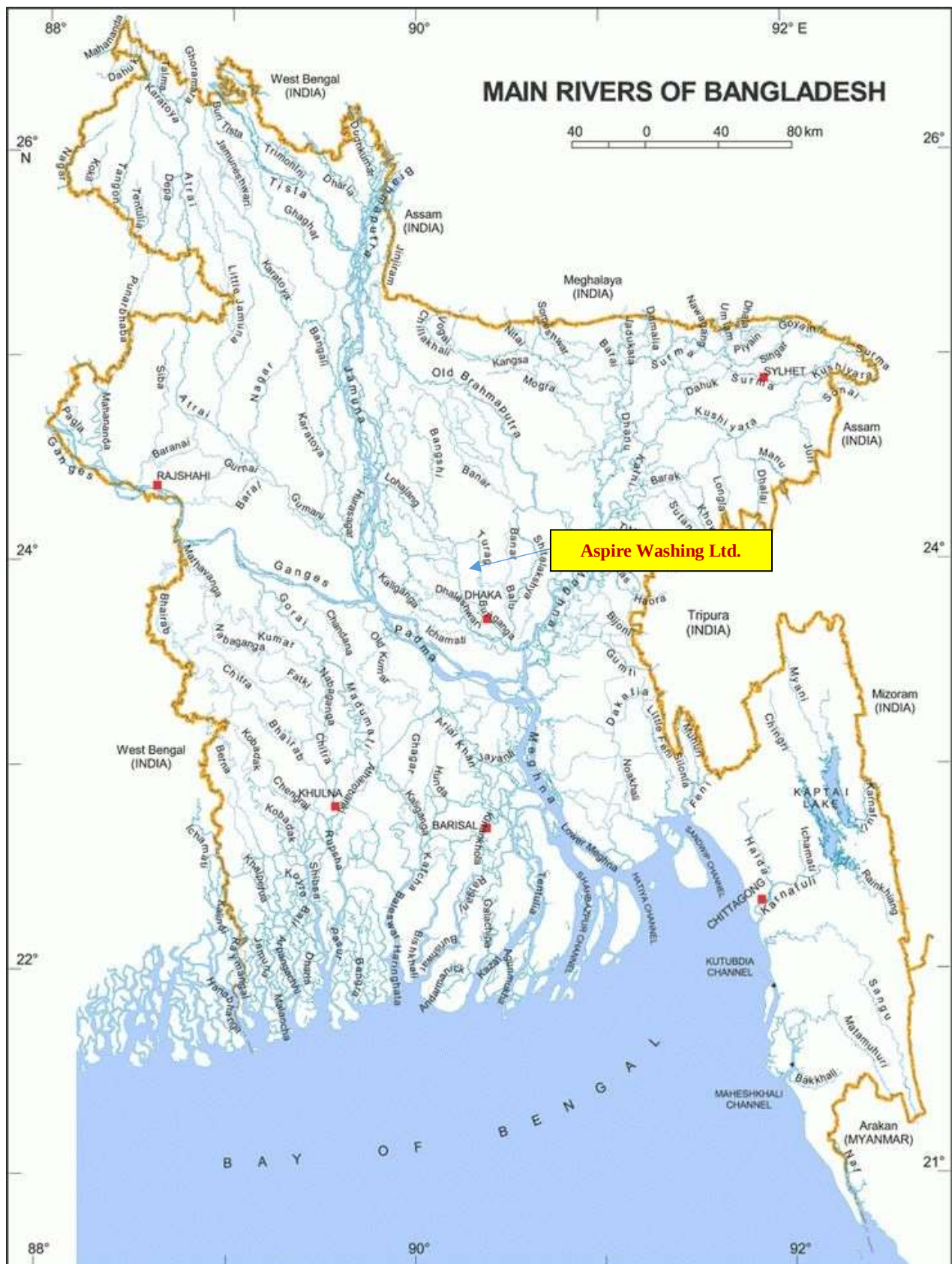
| SN | Parameter     | Unit  | Concentration Present |      |       |      | DoE (Bangladesh) Standard for Inland surface water ECR-2023-(SRO no. 32-law/2023), Schedule-4 |
|----|---------------|-------|-----------------------|------|-------|------|-----------------------------------------------------------------------------------------------|
|    |               |       | Dhaleshwari River     |      | Canal |      |                                                                                               |
|    |               |       | SW-1                  | SW-2 | SW-3  | SW-4 |                                                                                               |
| 1. | pH            | -     | 6.87                  | 6.85 | 6.34  | 6.36 | 6-9                                                                                           |
| 2. | TDS           | mg/l  | 345                   | 346  | 679   | 678  | 2100 mg/l<br>(ECR-97)                                                                         |
| 3. | SS            | mg/l  | 3.4                   | 3.3  | 6.3   | 6.4  | 100 mg/l                                                                                      |
| 4. | DO            | mg/l  | 3.84                  | 3.86 | 2.18  | 2.19 | 4.5-8.5 mg/l<br>(ECR-97)                                                                      |
| 5. | BOD5 at 20 °C | mg /l | 27                    | 25.2 | 32    | 33   | 30 mg/l                                                                                       |
| 6. | COD           | mg/l  | 51                    | 52   | 57    | 62   | 200 mg/l                                                                                      |

**Source:** GECL Laboratory Analysis Report (water collected on 14.03.2026 and analysis reporting date 06.04.2026)

### d) Comments:

Appropriate analytical methods were used to determine the physicochemical parameters of surface water, including pH, DO, BOD<sub>5</sub>, TDS, SS, and COD. Surface water samples from Aspire Washing Ltd. were collected from the nearby Dhaleshwari River and a canal. The measured physicochemical parameters, including pH, SS, and COD, were found to be below the standard limits set by the Environment Conservation Rules (ECR) 2023 of the Department of Environment (DoE), Government of Bangladesh, for surface water quality. The BOD<sub>5</sub> value at 20°C exceeded the ECR 2023 standard at two locations, while at the other two locations it was within the permissible limit.

- **GECL Laboratory Report on Surface Water has been attached in Annex-H**



**Figure 4.5: River Map of Bangladesh**

*Source: The Prime Minister's Office Library, (13 July, 2021)*

## ***ii. Ground Water Quality***

### **a) Sampling Location**

As no specific number of groundwater sampling locations is specified in the ToR, therefore, a sample was collected from a single representative source commonly used within the project area. The project area has been marked on the Ground water zoning map shown in Figure 4.6. The GPS Location of the sampling point is 23° 47' 41.6976" N, 90° 14' 18.7224" E.

As other parts of the country, this area also receives sufficient amount of rainfall and there is a good availability of ground water that is being used by pumps for drinking and domestic purposes. Aspire Washing Ltd. (AWL) uses supplied water from its own of submersible pump & is striving to reduce the water consumption. Moreover, the surrounding condition favors the recharge of underground water aquifer as a result water table in this area would not lower significantly & there is no specific complaint in this area about non-availability of ground water.

To determine quality of ground water, water sample was collected from the existing ground water source at factory. As per the project authorities, potable water for drinking purposes is supplied by another factory under the same management. The ground water quality analysis report has been tabulated in Table.



**Figure 4.6: GPS Location of The Ground Water Sampling Point**

## b) Method of Analysis

**Table 4.4: Method of Analysis of Ground Water Quality Parameters of Aspire Washing Ltd.**

| SL. No. | Short Form     | Methodology                                        |
|---------|----------------|----------------------------------------------------|
| 1.      | pH             | pH Meter                                           |
| 2.      | TDS            | Electrode                                          |
| 3.      | Iron           | 1, 10 Phenanthroline UV-visible spectrophotometers |
| 4.      | Alkalinity     | Burette Method 8221                                |
| 5.      | Hardness       | Complexo-metric titration by EDTA                  |
| 6.      | Chloride (Cl-) | Silver nitrate- Mohr Method                        |
| 7.      | Arsenic (As)   | Silver DDTC UV- Visible                            |

## c) Results of Ground Water Quality Analysis

**Table 4.5: Analysis Result of Ground Water Quality Parameters of Aspire Washing Ltd.**

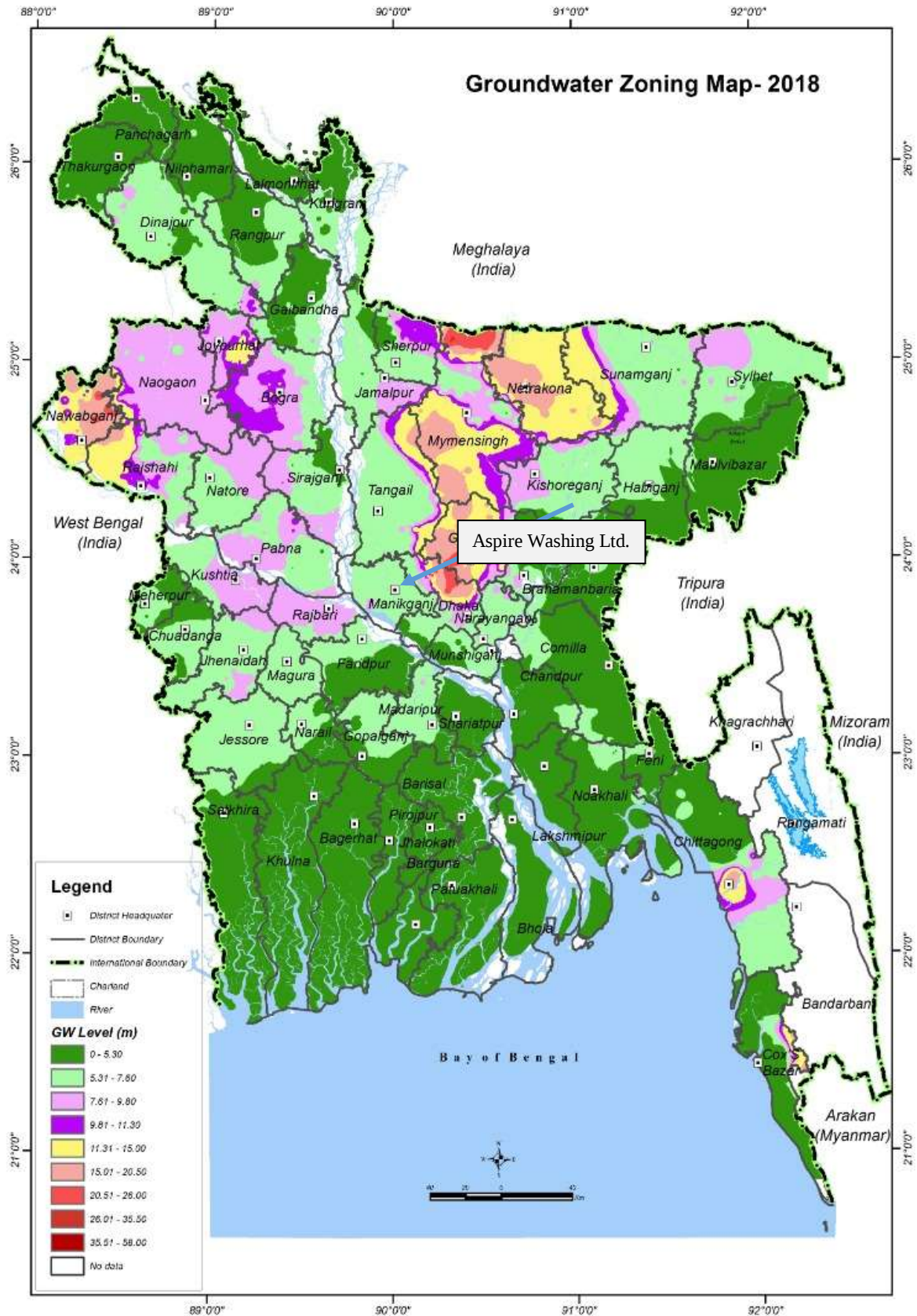
| SL. No. | Parameter                   | Concentration Present. | Bangladesh Drinking Water Standards as per (ECR), 2023 (SRO No. 32-Law/2023), Schedule II, sub-rule (kha) |
|---------|-----------------------------|------------------------|-----------------------------------------------------------------------------------------------------------|
|         |                             | Project Ground Water   |                                                                                                           |
| 01      | pH                          | 7.39                   | 6.5-8.5                                                                                                   |
| 02      | Total Dissolved Solid (TDS) | 113 mg/l               | 1000 mg/l                                                                                                 |
| 03      | Iron                        | 0.02 mg/l              | 0.3-1.0 mg/l                                                                                              |
| 04      | Alkalinity                  | 35 mg/l                | -                                                                                                         |
| 05      | Hardness                    | 45 mg/l                | 500 mg/l                                                                                                  |
| 06      | Chloride (Cl-)              | 51 mg/l                | 250 mg/l                                                                                                  |
| 07      | Arsenic (As)                | <0.001                 | 0.05 mg/l                                                                                                 |

**Source:** GECL Laboratory Analysis Report (water collected on 14.03.2026 and analysis reporting date 06.04.2026)

**d) Comments:**

The laboratory analyses have been used for the determination of above-mentioned parameters (Iron, Arsenic, Chloride, TDS, Hardness and Alkalinity) and buffered calibrated pH meter has been used for determining its value. The ground water quality of the Aspire Washing Ltd was good and the values of parameters were within the limit of water quality standard (DOE/EPA). The groundwater quality parameters were within the acceptable limits of Drinking water guidelines as per ECR-2023, DoE, Bangladesh. Therefore, the water is considered safe for drinking and domestic use.

- **GECL Laboratory Report on Ground Water has been attached in Annex-H**



**Figure 4.7: Groundwater zoning map of Bangladesh**

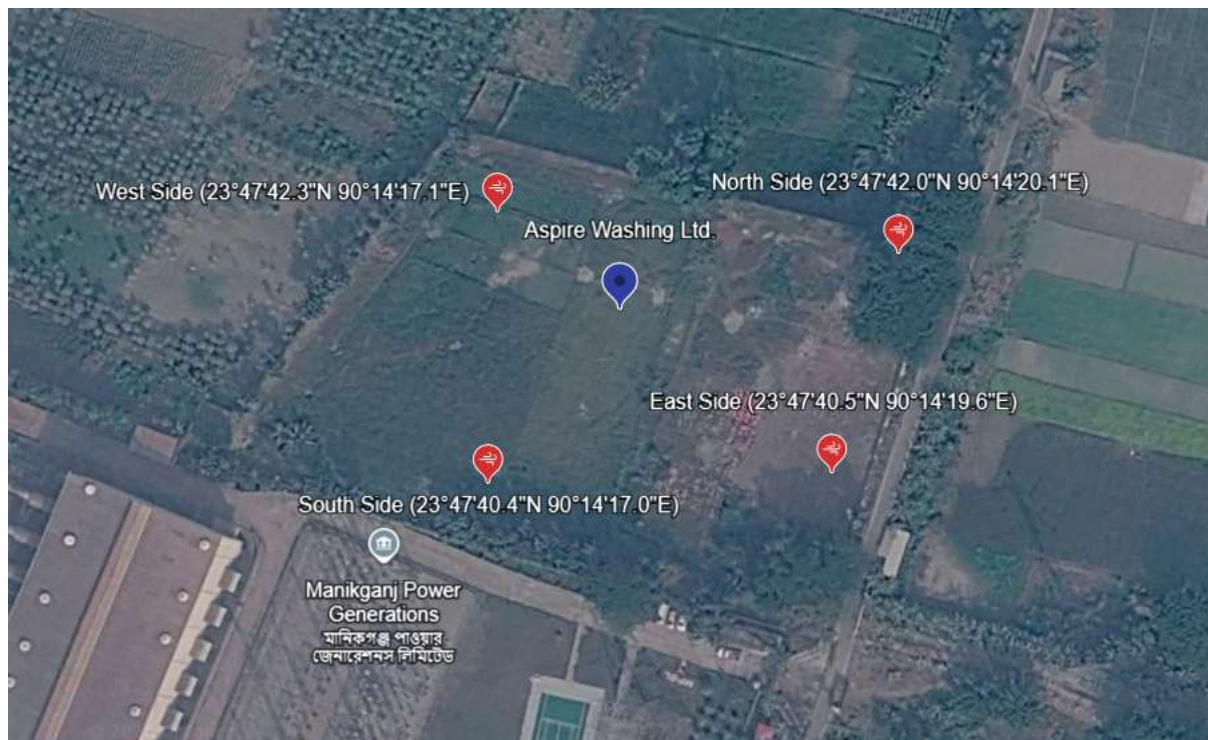
**Source:** Bangladesh Agricultural Development Corporation (BADC)

### 4.3.3 Ambient Air Quality

Air quality depends on substances, which are present in atmosphere. Air is called polluted when these substances are present in such concentrations that they produce undesirable effects on human beings, animal and as well, as plant life. These substances include gases (SO<sub>x</sub>, NO<sub>x</sub>, CO<sub>2</sub>, etc.), Suspended Particulate Matter (smoke, dust, fumes, etc.), and many others. Concentration of different pollutants above allowable level can have adverse impacts on plant, animal and human life.

#### a) Sampling Location

During site visit, it is observed that the apparent ambient air quality of the area is good. Ambient air quality samples were collected from selected locations within the project boundary to assess the existing environmental condition. The spatial extent of the sampling area has been defined using geospatial coordinates for proper representation. The northern boundary is located at 23°47'42.0" N and 90°14'20.1" E, while the southern boundary lies at 23°47'40.4" N and 90°14'17.0" E. The eastern boundary is marked at 23°47'40.5" N and 90°14'19.6" E, and the western boundary at 23°47'42.3" N and 90°14'17.1" E. It was observed that the overall air quality in the surrounding environment is fairly good. No significant visible emissions, such as smoke or dust, were detected, and no pungent or offensive odors were noticed at the time of inspection, indicating stable atmospheric conditions in the vicinity of the project site. For the purpose of air quality analysis, the sampling location was carefully selected to ensure representativeness of the area.



**Figure 4.8: GPS Location of The Ambient Air Quality Sampling Point**

## b) Results of Ambient Air Quality Analysis

**Table 4.6: Ambient Air Quality of the industry**

| Sample Location                                      | GPS Coordinate               | Concentration of different ambient air parameters |                                         |                                        |                                        |                                         |                                         |                                          |                                                              |
|------------------------------------------------------|------------------------------|---------------------------------------------------|-----------------------------------------|----------------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------|------------------------------------------|--------------------------------------------------------------|
|                                                      |                              | SPM                                               | PM <sub>10</sub>                        | PM <sub>2.5</sub>                      | NO <sub>x</sub>                        | SO <sub>2</sub>                         | O <sub>3</sub>                          | VOC                                      | CO                                                           |
| West Side Boundary Area                              | 23°47'42.3"N<br>90°14'17.1"E | 226                                               | 108                                     | 51                                     | 22                                     | 14                                      | 13                                      | 0.01                                     | 267                                                          |
| North Side Boundary Area                             | 23°47'42.0"N<br>90°14'20.1"E | 212                                               | 102                                     | 54                                     | 24                                     | 16                                      | 14                                      | 0.01                                     | 271                                                          |
| East Side Boundary Area                              | 23°47'40.5"N<br>90°14'19.6"E | 224                                               | 107                                     | 49                                     | 19                                     | 13                                      | 12                                      | 0.01                                     | 229                                                          |
| South Side Boundary Area                             | 23°47'40.4"N<br>90°14'17.0"E | 219                                               | 104                                     | 46                                     | 25                                     | 17                                      | 15                                      | 0.01                                     | 272                                                          |
| Units                                                |                              | µg/m <sup>3</sup>                                 |                                         |                                        |                                        |                                         |                                         |                                          |                                                              |
| Test Duration (Hours)                                |                              | 8                                                 |                                         |                                        |                                        |                                         |                                         |                                          |                                                              |
| Method of Analysis                                   |                              | Gravimetric                                       |                                         |                                        | NEDA-Visible at 540nm                  | TCM-Visible at 560 nm                   | KI UV method At 352 nm                  | ASS                                      | Iodine penta-oxide Method                                    |
| Bangladesh Ambient Air Quality Standards (APCR) 2022 |                              | NYS                                               | 150 µg/m <sup>3</sup> (24-hour average) | 65 µg/m <sup>3</sup> (24-hour average) | 80 µg/m <sup>3</sup> (24-hour average) | 80 µg/m <sup>3</sup> (24-hour average)  | 100 µg/m <sup>3</sup> (8 hours average) | 0.50 µg/m <sup>3</sup> (24-hour average) | 5 mg/m <sup>3</sup> 5000 µg/m <sup>3</sup> (8 hours average) |
| National Ambient Air Quality Standards (NAAQS) 2009  |                              | NYS                                               | 100 µg/m <sup>3</sup> (24-hour average) | 60 µg/m <sup>3</sup> (annual average)  | 80 µg/m <sup>3</sup> (24-hour average) | 80 µg/m <sup>3</sup> (24-hour average)  | 100 µg/m <sup>3</sup> (8 hours average) | 1.0 µg/m <sup>3</sup> (24-hour average)  | 2 mg/m <sup>3</sup> 2000 µg/m <sup>3</sup> (8 hours average) |
| IFC/World Bank Standard-2007 (IT-1)                  |                              | NYS                                               | 150 µg/m <sup>3</sup> (24-hour average) | 75 µg/m <sup>3</sup> (24-hour average) | 200 µg/m <sup>3</sup> (1 hour Average) | 125 µg/m <sup>3</sup> (24 hour average) | 160 µg/m <sup>3</sup> (8 hour Average)  | NYS                                      | NYS                                                          |
| World Health Organization (WHO) 2021 (IT-1)          |                              | NYS                                               | 150 µg/m <sup>3</sup>                   | 75 µg/m <sup>3</sup>                   | 120 µg/m <sup>3</sup>                  | 125 µg/m <sup>3</sup>                   | 160 µg/m <sup>3</sup>                   | NYS                                      | 7 mg/m <sup>3</sup>                                          |

| Sample Location | GPS Coordinate | Concentration of different ambient air parameters |                                       |                                        |                                      |                                      |                                    |      |                                                |
|-----------------|----------------|---------------------------------------------------|---------------------------------------|----------------------------------------|--------------------------------------|--------------------------------------|------------------------------------|------|------------------------------------------------|
|                 |                | SPM                                               | PM <sub>10</sub><br>(24-hour average) | PM <sub>2.5</sub><br>(24-hour average) | NO <sub>x</sub><br>(24 hour average) | SO <sub>2</sub><br>(24 hour average) | O <sub>3</sub><br>(8 hour Average) | VOC  | CO<br>7000 µg/m <sup>3</sup> (8 hours average) |
|                 |                |                                                   |                                       |                                        |                                      |                                      |                                    |      |                                                |
| Remarks         |                | Good                                              | Good                                  | Good                                   | Good                                 | Good                                 | Good                               | Good | Excellent                                      |

**Source:** GECL Laboratory Analysis Report (sampling date 14.03.2026 and analysis reporting date 06.04.2026)

Note: -

- i. PM<sub>10</sub> - Respirable Dust Content.
- ii. PM<sub>2.5</sub> - Fine Particulate Matter
- iii. SPM - Suspended Particulate Matter
- iv. SO<sub>2</sub> - Sulphur dioxide.
- v. NO<sub>x</sub> - Oxides of Nitrogen.
- vi. O<sub>3</sub> - Ozone
- vii. Pb – Lead
- viii. CO- Carbon Monoxide
- ix. VOC- Volatile Organic Compounds
- x. NYS – Not Yet Set

#### c) Details of Equipment Used

This ambient air quality monitoring was usually accomplished by Respirable Dust Sampler (Model- Ecotech India AAS-2I7AL) and Gaseous Sampler (Model- Ecotech India AAS 109) Equipment calibrated by NABL Accredited Lab. Global Environmental Consultants Ltd. is now accredited by the Bangladesh Accreditation Board (BAB) and 9001:2015 certified from FrenchCert UK Ltd., GECL is now certified organization in Bangladesh for the field of environmental inspection and monitoring.

#### d) Comments

As part of environmental monitoring, a high-volume air sampler with gaseous impingers was used at Sudkhira, Jamirta, Singair, Manikganj, Bangladesh, for the quantitative analysis of ambient air quality

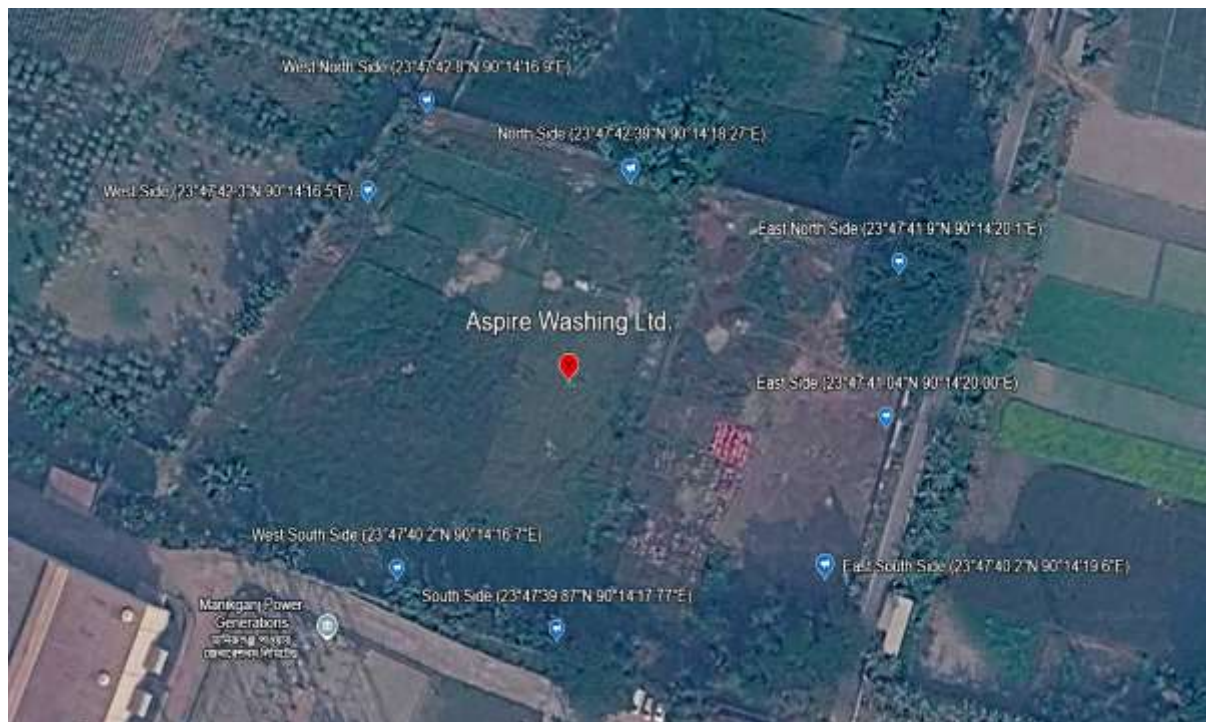
parameters. Key air quality parameters, including PM<sub>2.5</sub>, PM<sub>10</sub>, SPM, SO<sub>2</sub>, NO<sub>x</sub>, O<sub>3</sub>, Pb, and CO, were determined based on an 8-hour time-weighted average (TWA) sampling. The concentrations of these parameters, as shown in the table above, were found to be within the standard limits set by the Ambient Air Quality Standards (Bangladesh Gazette, SRO No. 255-Law/2022, Schedule-1) under the Bangladesh Air Pollution Control Rules 2022, as well as the AQI Standards of India (CPCB), IFC/WB, and WHO guidelines. Anthropogenic activities and the presence of other industries in the locality may contribute to the pollutant levels observed at Aspire Washing Ltd. During the sampling period, the monsoon wind direction was from the southeast to the northwest.

- **GECL Laboratory Report on Ambient Air Quality has been attached in Annex-H**

#### 4.3.4 Ambient Noise Level

##### a) Sampling Location

In order to determine the existing sound level at the project site, ambient noise level data at running condition of the project were collected from different locations of the inside the project premises by Sound Level Meter. This include- East, West, North & South side of the factory, near the last Wall boundary area. The result of the sound level survey has been tabulated in Table 4.5.



**Figure 4.9 GPS Location of The Ambient Noise Level Sampling Point**

## b) Results of Ambient Noise Quality Analysis

**Table 4.7: Ambient Noise Quality Analysis**

| SN                                                                                     | Sample Location | GPS Coordinate              | Site Condition   | Concentration present (LAeq) dBA |            |
|----------------------------------------------------------------------------------------|-----------------|-----------------------------|------------------|----------------------------------|------------|
|                                                                                        |                 |                             |                  | Day time                         |            |
| 01                                                                                     | West-South Side | 23°47'40.2"N 90°14'16.7"E   | Proposed Project | 57.3                             |            |
| 02                                                                                     | West North Side | 23°47'42.8"N 90°14'16.9"E   |                  | 54.4                             |            |
| 03                                                                                     | East South Side | 23°47'40.2"N 90°14'19.6"E   |                  | 59.2                             |            |
| 04                                                                                     | East North Side | 23°47'41.9"N 90°14'20.1"E   |                  | 53.5                             |            |
| 05                                                                                     | West Side       | 23°47'42.3"N 90°14'16.5"E   |                  | 56.1                             |            |
| 06                                                                                     | East Side       | 23°47'41.04"N 90°14'20.00"E |                  | 52.3                             |            |
| 07                                                                                     | North Side      | 23°47'42.39"N 90°14'18.27"E |                  | 53.4                             |            |
| 08                                                                                     | South Side      | 23°47'39.87"N 90°14'17.77"E |                  | 58.1                             |            |
| Bangladesh Noise Pollution (Regulation and Control) Rules 2006 (“SRO no 212-law/2006”) |                 |                             |                  | Day Time                         | Night Time |
| Industrial area                                                                        |                 |                             |                  | 75                               | 70         |
| Commercial Area                                                                        |                 |                             |                  | 70                               | 60         |
| Mixed Area                                                                             |                 |                             |                  | 60                               | 50         |
| Residential Area                                                                       |                 |                             |                  | 55                               | 45         |
| Silent Area                                                                            |                 |                             |                  | 50                               | 40         |
| World Bank/IFC Standard                                                                |                 |                             |                  | Day Time                         | Night Time |
| Industrial                                                                             |                 |                             |                  | 70                               | 70         |
| Residential; Intuitional; Educational                                                  |                 |                             |                  | 55                               | 45         |

**Source:** GECL Laboratory Analysis Report (sampling date 14.03.2026 and analysis reporting date 06.04.2026)

### c) Details of Used Equipment's

Ambient Noise level assessment measured instantly on the site by noise level meter (Model- AS824F, Brand- Smart Sensor). All units are in (LA<sub>Aq</sub>) dBA.

### d) Comments

The standards for ambient noise level in the industrial area are 75 and 70 decibels, according to DoE. Day and night, respectively. However, for IFC standard, the ambient noise level in the industrial area is 70 decibels during the day and night. According to the Environment Conservation Rule (ECR), "SRO No. 212-law/2006, the level of noise will have to keep within the above-mentioned standard limit. The levels of sound varied from 59.2 dBA to 52.3 dBA in the factory area at day. The levels of noise were satisfactory and were below the lower level of the DoE/IFC standard limit.

- **GECL Laboratory Report on Ambient Noise Level has been attached in Annex-H**

## 4.3.5 Baseline Meteorological Conditions

### a) Data Source and Methodology

Meteorological data for the project area (Manikganj) were not available from a dedicated local monitoring station. Therefore, the baseline condition has been established using:

- I. Secondary data from nearest regional meteorological records
- II. Long-term climatic averages for March
- III. Interpolation based on seasonal weather patterns (pre-monsoon period)

### b) Meteorological Conditions

| Parameter         | Observed Value                  | Remarks                      |
|-------------------|---------------------------------|------------------------------|
| Temperature       | 22–35 °C                        | Typical pre-monsoon range    |
| Relative Humidity | 40–45%                          | Moderate to low humidity     |
| Wind Speed        | 9–15 km/h (gust up to ~25 km/h) | Light to moderate            |
| Wind Direction    | South to South West (S–SW)      | Seasonal prevailing wind     |
| Rainfall          | 0 mm                            | No significant precipitation |

### c) Climatic Interpretation

The meteorological condition of the study day reflects typical pre-monsoon characteristics of central Bangladesh:

- High temperature with dry atmospheric condition
- Moderate wind flow facilitating pollutant dispersion
- Absence of rainfall indicating no wet deposition during the period

#### 4.3.6 Climatic Condition

The climate of Manikganj of which the project is a part, is average tropical monsoon with alternating dry/wet seasons. It has three main seasons:

- Summer/pre-monsoon - March and April
- Rainy season/monsoon - May to October
- Winter - November to February

**Winter:** November to February: The winter or dry season is the coolest and driest period. However, according to Bangladesh Meteorological Department (BMD) the highest temperature recorded during winter in Manikganj is 32° C and a minimum of 12.7° C. Rainfall is very rare during this period. Winds are predominantly blowing from the Northwest but with a high frequency of calm wind situations.

**Pre-Monsoon:** March and April: In the summer pre-monsoon season and the early months of the wet seasons, the highest temperatures are reached. The monthly average temperature can rise up to 36° C. During this period, air becomes more humid, rainfall increases, and heavy rains with thunderstorm occur.

**Monsoon:** May to October: In the wet season more than 85% of the total annual rainfall occurs. Monthly average temperatures remain high with a maximum of 32.3° C. The period of periodic heavy thunderstorms lasts until June. June to mid-September to early November is the transitional period with decreasing rainfall, often thunder. The project area has been marked in the climate map of Bangladesh in Figure 4.10.

## **A. Survey Timing, Season, Rationale and Limitations**

### **1. Survey Timing and Season**

Baseline environmental monitoring and field surveys were conducted during March 2026, representing the pre-monsoon (non-monsoon) season in Bangladesh. This period is characterized by relatively dry weather conditions with limited rainfall and stable environmental parameters.

### **2. Rationale for Season Selection**

The pre-monsoon (non-monsoon) season was selected for baseline data collection for the following reasons:

- To avoid dilution effects caused by heavy rainfall during the monsoon season
- To obtain representative and stable environmental quality data
- To capture worst-case or conservative conditions for certain parameters (e.g., air quality, dust, pollutant concentration)
- To ensure consistency with standard EIA practices and regulatory expectations

### **3. Survey Coverage**

The baseline survey included monitoring of key environmental components such as:

- Ambient air quality
- Surface and groundwater quality
- Noise levels
- Socio-economic conditions

### **4. Limitations of the Study**

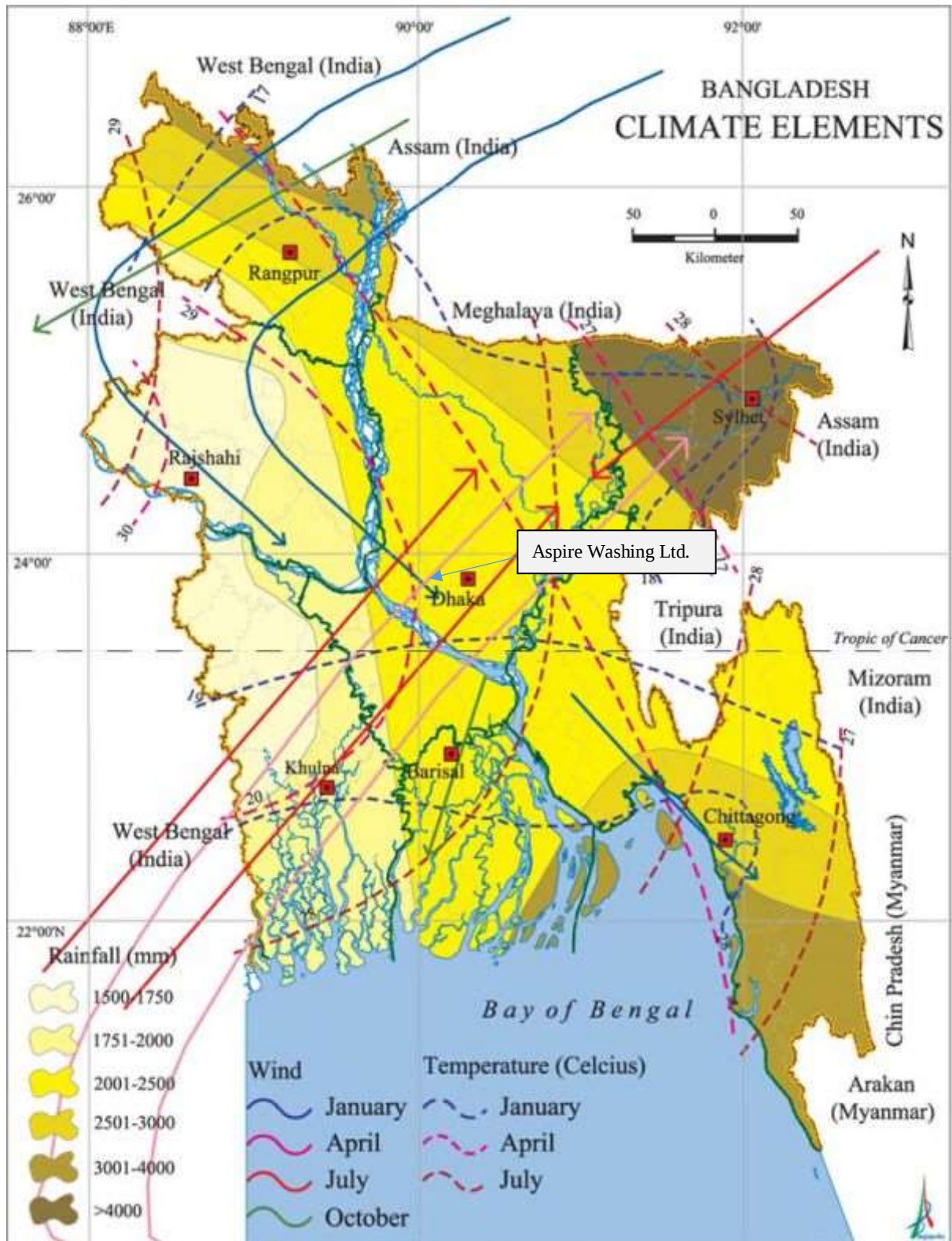
While the baseline study provides a reliable representation of environmental conditions, certain limitations are acknowledged:

- Data represents a single season (pre-monsoon) and may not capture seasonal variations, particularly during the monsoon period
- Short-term monitoring may not reflect long-term environmental trends
- Accessibility constraints or site-specific limitations may affect sampling in some locations

### **5. Mitigation of Limitations**

To address the above limitations:

- Conservative assumptions have been applied where necessary
- Secondary data and literature references have been reviewed to support findings
- Environmental monitoring will continue during project operation as part of the Environmental Management Plan (EMP)



**Figure 4.10: Climate Map of Bangladesh**

Source: Banglapedia

#### **4.3.7 Workplace Light, Humidity and Temperature**

In the context of **Aspire Washing Ltd.**, the environmental factors of workplace light, humidity, and temperature play pivotal roles in ensuring a conducive and safe working environment.

##### ***i. Workplace Light***

A well-illuminated workplace is arranged for ensuring the safety and productivity of workers in **Aspire Washing Ltd.** Insufficient lighting can lead to accidents, decrease in work efficiency, and negatively impact the overall well-being of employees. As part of the EIA, an assessment of the adequacy of lighting conditions was conducted, considering both natural and artificial light sources. Implementation of energy-efficient lighting systems and the incorporation of natural light wherever feasible is considered for sustainability.

##### ***ii. Humidity Control***

Humidity control is an important environmental and operational factor in denim washing facilities, as it directly influences process efficiency, worker comfort, and product quality. The presence of high moisture levels from washing, drying, and chemical application processes can increase indoor humidity, potentially leading to corrosion of equipment, microbial growth, and reduced drying efficiency. Conversely, excessively low humidity may contribute to dust generation and static-related issues in finishing sections. Therefore, proper ventilation systems exhaust fans, and, where necessary, dehumidification measures are maintained to regulate indoor humidity within acceptable limits. The EIA assessment evaluates existing humidity control practices to ensure a balanced indoor environment that supports consistent production quality, protects machinery, and maintains occupational health and safety standards.

##### ***iii. Temperature Regulation***

Temperature regulation is a critical aspect of operational efficiency in a denim-washing factory, as various processes such as washing, dyeing, drying, and finishing are temperature-dependent. Excessively high temperatures, particularly in washing and drying sections, can affect process consistency, reduce equipment efficiency, and create uncomfortable working conditions. On the other hand, inadequate temperature control may affect chemical reactions and overall product quality. To address these challenges, the facility maintains proper temperature control through effective ventilation systems, heat management practices, and the use of energy-efficient equipment such as dryers and boilers. The EIA assessment evaluates the existing temperature regulation measures to ensure optimal process performance, worker comfort, and compliance with occupational health and safety standards.

#### 4.3.8 Rainfall

Information about rainfall data was collected from BBS, BMD, Bangladesh Agricultural Research Council's database and Annual rainfall averages 2004 mm in Manikganj. More than 70-85% of the total annual rainfall occurs in monsoon. The project area has been marked in the average rainfall map of Bangladesh in Figure 4.10. From the map it is evident that the mean rainfall varies from 2000 mm to 2500 mm.

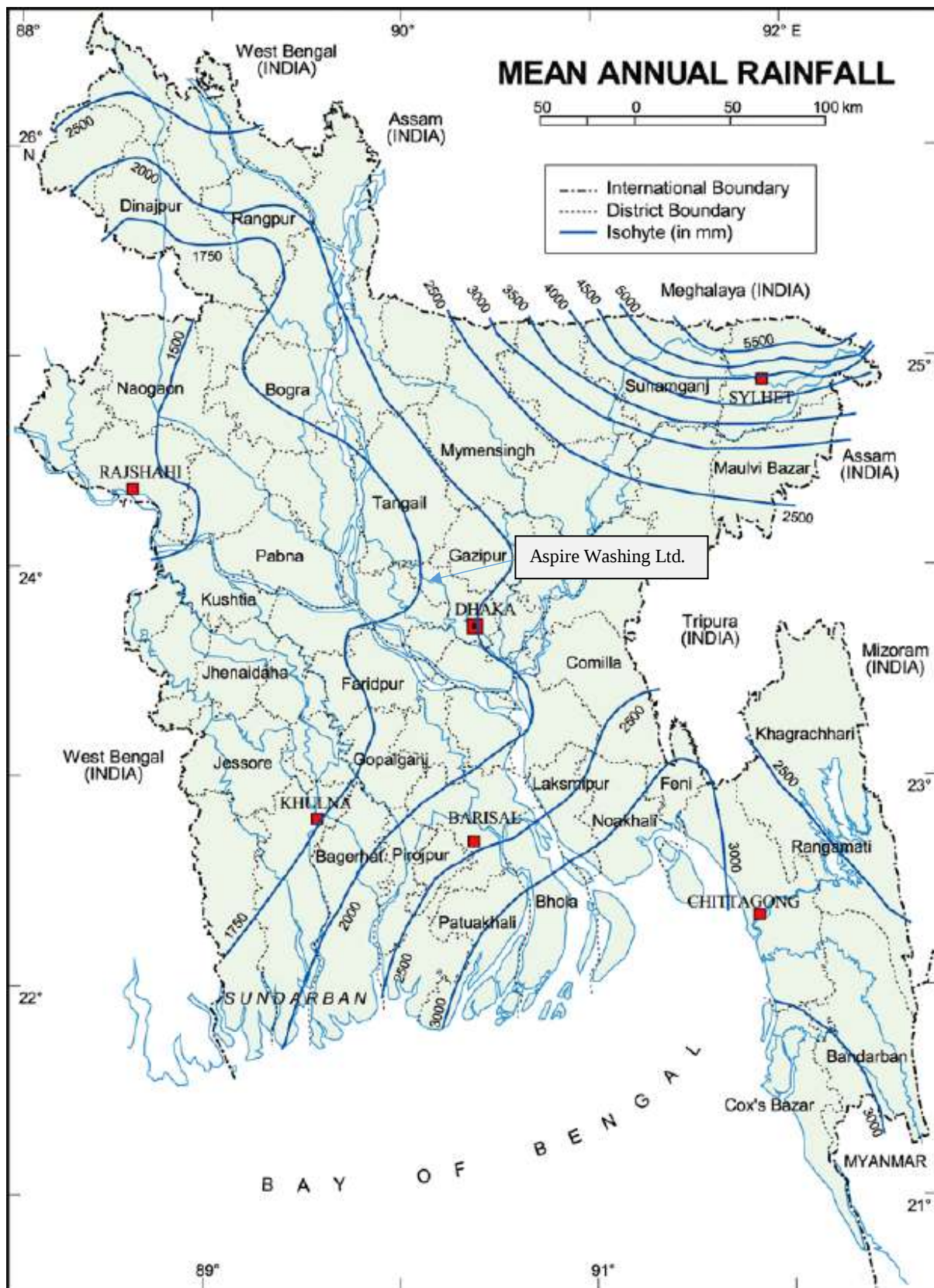
**Table 4.8: Monthly Average Rainfall in the project area (2009- 2024)**

| Year        | Rainfall in mm |     |     |     |     |     |     |     |     |     |     |     |
|-------------|----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|             | Jan            | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| <b>2024</b> | 3              | 12  | 45  | 180 | 420 | 580 | 520 | 480 | 300 | 150 | 20  | 2   |
| <b>2023</b> | 2              | 10  | 50  | 200 | 450 | 610 | 540 | 500 | 320 | 170 | 25  | 3   |
| <b>2022</b> | 1.5            | 8   | 40  | 170 | 400 | 590 | 510 | 470 | 310 | 160 | 22  | 1.5 |
| <b>2021</b> | 2              | 9   | 35  | 160 | 380 | 560 | 500 | 460 | 290 | 140 | 18  | 2   |
| <b>2020</b> | 2              | 11  | 38  | 150 | 370 | 540 | 480 | 450 | 280 | 130 | 20  | 2.5 |
| <b>2019</b> | 3              | 15  | 55  | 210 | 460 | 620 | 550 | 510 | 330 | 180 | 30  | 3   |
| <b>2018</b> | 4              | 6   | 30  | 120 | 300 | 450 | 380 | 360 | 250 | 120 | 15  | 2   |
| <b>2017</b> | 2              | 7   | 60  | 190 | 350 | 500 | 420 | 400 | 270 | 140 | 10  | 3   |
| <b>2016</b> | 3              | 10  | 42  | 175 | 390 | 520 | 460 | 430 | 280 | 135 | 18  | 2   |
| <b>2015</b> | 5              | 8   | 28  | 160 | 340 | 480 | 410 | 390 | 260 | 110 | 12  | 2   |
| <b>2014</b> | 2              | 9   | 25  | 140 | 360 | 510 | 440 | 420 | 270 | 130 | 15  | 1   |
| <b>2013</b> | 3              | 5   | 35  | 180 | 480 | 600 | 530 | 500 | 310 | 160 | 10  | 2   |
| <b>2012</b> | 4              | 7   | 30  | 200 | 420 | 580 | 520 | 490 | 300 | 150 | 20  | 3   |
| <b>2011</b> | 2              | 6   | 45  | 150 | 390 | 500 | 450 | 420 | 260 | 120 | 8   | 2   |
| <b>2010</b> | 1              | 5   | 20  | 130 | 350 | 490 | 430 | 410 | 250 | 110 | 12  | 1   |
| <b>2009</b> | 2              | 6   | 40  | 140 | 370 | 480 | 420 | 400 | 260 | 120 | 15  | 2   |

**Table 4.9: Monthly Average Rainfall in the project area (1981 - 2010)**

| Parameters                                 | Jan | Feb  | Mar  | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov  | Dec  |
|--------------------------------------------|-----|------|------|-------|-------|-------|-------|-------|-------|-------|------|------|
| <b>Avg. Rainfall (mm)</b>                  | 6.0 | 18.0 | 55.0 | 130.0 | 270.0 | 360.0 | 410.0 | 320.0 | 345.0 | 175.0 | 28.0 | 10.0 |
| <b>Days of Rain (per month)</b>            | 1   | 2    | 4    | 7     | 11    | 16    | 21    | 15    | 18    | 8     | 2    | 1    |
| <b>Days of Rain &gt; 10 mm (per month)</b> | 0   | 1    | 2    | 4     | 7     | 10    | 11    | 9     | 8     | 4     | 1    | 0    |

**Source:** ICWFM 2011 (*International Conference on Water & Flood Management, 2011*)



Source: Brammer, 1996

**Figure 4.11: Average Rainfall Map of Bangladesh**

*Source: The Prime Minister's Office eLibrary, (13 July, 2021)*

#### 4.3.9 Disasters

In 2005, the Manikganj District experienced severe impacts from one of the most devastating monsoon-induced flood events in Bangladesh. Triggered by prolonged and intense rainfall during the monsoon season, the resultant flooding led to widespread inundation of low-lying areas across the district. The event caused significant disruption to normal life, including temporary displacement of local residents, damage to rural housing structures, agricultural land loss, and impairment of local infrastructure such as roads and communication networks. As Manikganj is located within the floodplain zone influenced by nearby river systems, the overflow of water bodies further intensified the extent of flooding in several areas.

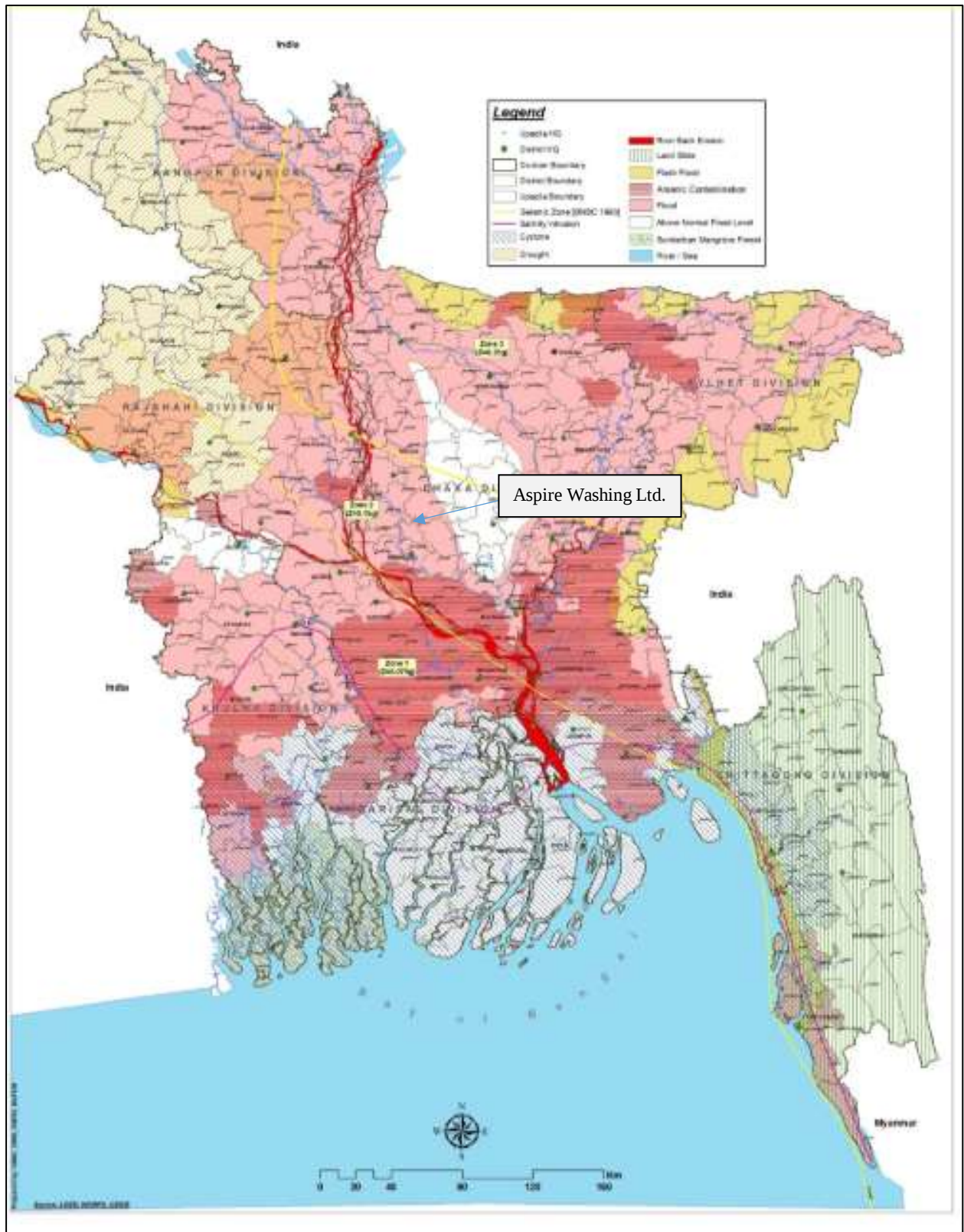
The disaster highlighted the vulnerability of the region to extreme hydrological events and underscored the importance of improved flood management and drainage planning in future development initiatives. In the aftermath, government authorities undertook emergency response measures and supported organizations to provide relief, including food supply, temporary shelter, and basic medical assistance to affected communities. The recovery phase emphasized community resilience and gradual rehabilitation of livelihoods, particularly in agriculture-dependent areas. This historical flooding event remains an important reference for environmental impact assessment and climate resilience planning in the region.

The Manikganj District faces various natural disasters that pose significant challenges to the region. The primary nature of disasters in Manikganj includes:

**Flooding:** Manikganj is highly prone to riverine and monsoon flooding due to its low-lying floodplain topography and proximity to major river systems. Seasonal floods often lead to temporary inundation of agricultural land, damage to rural infrastructure, and disruption of transportation and livelihood activities.

**River Erosion:** Riverbank erosion is another major hazard in the district, gradually affecting settlements and agricultural land along river courses, leading to land loss and displacement in vulnerable areas.

**Waterlogging and Heavy Rainfall Impacts:** Intense monsoon rainfall occasionally results in localized waterlogging, particularly in poorly drained areas, affecting mobility and agricultural productivity.



**Figure 4.12: Natural Hazard Map of Bangladesh**

Source: Bangladesh Bureau of Statistics (BBS)

#### 4.3.10 Ambient Air Temperature

The temperature of the region shows a clear relationship with the seasonal rainfall pattern, where cooler periods generally coincide with lower rainfall. In the case of the Manikganj District, climatic conditions are largely similar to those of the greater Dhaka region due to its geographic proximity. Analysis of regional temperature trends indicates that the highest average temperature is typically observed during the pre-monsoon and early monsoon months (April to June), while the lowest average temperatures occur during the winter season (December to January). Overall, the rainfall pattern in the project area is expected to closely follow the monsoonal characteristics of central Bangladesh, with the majority of rainfall concentrated between May and September, and comparatively dry conditions prevailing during the winter months.

**Table 4.10: Monthly Ambient Temperature nearby the Industry Area in 2009**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 17.6           | 28.8          | 9.6           |
| Feb   | 18.2           | 30.8          | 12.6          |
| Mar   | 23.2           | 36.7          | 15.0          |
| Apr   | 26.7           | 35.9          | 18.1          |
| May   | 29.3           | 37.5          | 22.3          |
| Jun   | 28.5           | 35.9          | 22.0          |
| Jul   | 30.5           | 34.8          | 23.4          |
| Aug   | 29.3           | 35.9          | 24.2          |
| Sep   | 28.3           | 34.9          | 23.5          |
| Oct   | 26.8           | 35.6          | 19.6          |
| Nov   | 22.1           | 31.8          | 16.8          |
| Dec   | 16.4           | 28.2          | 10.3          |

**Table 4.11: Monthly Ambient Temperature nearby the Industry Area in 2010**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 16.7           | 29.0          | 10.5          |
| Feb   | 18.0           | 30.6          | 10.8          |
| Mar   | 24.3           | 34.6          | 16.5          |
| Apr   | 27.0           | 36.9          | 19.6          |
| May   | 27.9           | 36.7          | 20.3          |
| Jun   | 28.4           | 35.4          | 22.5          |
| Jul   | 28.8           | 34.0          | 24.6          |
| Aug   | 28.6           | 36.0          | 23.6          |
| Sep   | 28.7           | 34.8          | 24.4          |

|     |      |      |      |
|-----|------|------|------|
| Oct | 26.3 | 34.8 | 18.0 |
| Nov | 22.1 | 32.3 | 16.3 |
| Dec | 19.1 | 29.0 | 13.0 |

**Table - 4.12: Monthly Ambient Temperature nearby the Industry Area in 2011**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 17.0           | 28.1          | 11.1          |
| Feb   | 20.4           | 33.9          | 12.2          |
| Mar   | 23.9           | 36.0          | 15.8          |
| Apr   | 27.2           | 39.6          | 20.4          |
| May   | 27.6           | 37.8          | 21.6          |
| Jun   | 29.8           | 36.5          | 22.6          |
| Jul   | 29.6           | 35.7          | 24.4          |
| Aug   | 28.9           | 34.3          | 24.3          |
| Sep   | 29.3           | 35.3          | 24.5          |
| Oct   | 26.5           | 35.8          | 20.6          |
| Nov   | 22.2           | 33.9          | 15.2          |
| Dec   | 17.3           | 29.0          | 11.4          |

**Table - 4.13: Monthly Ambient Temperature nearby the Industry Area in 2012**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 14.5           | 29.0          | 9.6           |
| Feb   | 19.8           | 34.2          | 12.0          |
| Mar   | 25.6           | 37.3          | 18.4          |
| Apr   | 28.3           | 37.9          | 20.8          |
| May   | 28.8           | 36.9          | 21.3          |
| Jun   | 28.8           | 35.8          | 23.2          |
| Jul   | 29.6           | 35.1          | 25.3          |
| Aug   | 29.5           | 35.1          | 25.0          |
| Sep   | 28.8           | 34.0          | 24.8          |
| Oct   | 26.9           | 35.7          | 21.5          |
| Nov   | 23.1           | 33.2          | 16.6          |
| Dec   | 17.8           | 29.7          | 11.0          |

**Table - 4.14: Monthly Ambient Temperature nearby the Industry Area in 2013**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 14.2           | 27.8          | 8.2           |
| Feb   | 19.8           | 31.0          | 13.0          |
| Mar   | 24.0           | 34.5          | 16.0          |
| Apr   | 26.4           | 35.8          | 20.2          |
| May   | 27.6           | 35.3          | 21.3          |
| Jun   | 29.1           | 36.0          | 23.2          |
| Jul   | 29.2           | 35.4          | 23.9          |
| Aug   | 29.0           | 35            | 24.5          |
| Sep   | 29.0           | 36.2          | 23.7          |
| Oct   | 27.4           | 34.5          | 22.0          |
| Nov   | 21.9           | 32.4          | 17.2          |
| Dec   | 16.8           | 30.0          | 11.0          |

**Table - 4.15: Monthly Ambient Temperature nearby the Industry Area in 2014**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 17             | 25            | 11            |
| Feb   | 19             | 27            | 13            |
| Mar   | 23             | 32            | 16            |
| Apr   | 28             | 37            | 22            |
| May   | 28             | 34            | 4             |
| Jun   | 28             | 33            | 25            |
| Jul   | 28             | 32            | 25            |
| Aug   | 27             | 31            | 25            |
| Sep   | 27             | 31            | 24            |
| Oct   | 24             | 30            | 20            |
| Nov   | 20             | 28            | 16            |
| Dec   | 18             | 26            | 12            |

**Table - 4.16: Monthly Ambient Temperature nearby the Industry Area in 2015**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 19             | 26            | 13            |
| Feb   | 21             | 29            | 14            |
| Mar   | 25             | 33            | 18            |
| Apr   | 27             | 32            | 23            |

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| May   | 29             | 34            | 25            |
| Jun   | 28             | 32            | 26            |
| Jul   | 27             | 31            | 25            |
| Aug   | 28             | 32            | 25            |
| Sep   | 28             | 32            | 25            |
| Oct   | 26             | 31            | 22            |
| Nov   | 22             | 29            | 17            |
| Dec   | 19             | 25            | 14            |

**Table - 4.17: Monthly Ambient Temperature nearby the Industry Area in 2016**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 18             | 25            | 12            |
| Feb   | 23             | 31            | 16            |
| Mar   | 27             | 34            | 20            |
| Apr   | 28             | 34            | 24            |
| May   | 28             | 33            | 25            |
| Jun   | 28             | 32            | 25            |
| Jul   | 28             | 32            | 25            |
| Aug   | 28             | 32            | 25            |
| Sep   | 28             | 32            | 25            |
| Oct   | 26             | 31            | 23            |
| Nov   | 22             | 28            | 18            |
| Dec   | 20             | 27            | 15            |

**Table - 4.18: Monthly Ambient Temperature nearby the Industry Area in 2017**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 18             | 27            | 12            |
| Feb   | 21             | 30            | 14            |
| Mar   | 23             | 31            | 18            |
| Apr   | 26             | 31            | 23            |
| May   | 28             | 34            | 25            |
| Jun   | 28             | 32            | 25            |
| Jul   | 28             | 32            | 25            |
| Aug   | 28             | 32            | 25            |

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Sep   | 28             | 32            | 25            |
| Oct   | 28             | 31            | 23            |
| Nov   | 23             | 29            | 18            |
| Dec   | 20             | 26            | 16            |

**Table - 4.19: Monthly Ambient Temperature nearby the Industry Area in 2018**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 18             | 25            | 12            |
| Feb   | 22             | 30            | 16            |
| Mar   | 26             | 34            | 20            |
| Apr   | 28             | 34            | 23            |
| May   | 28             | 33            | 24            |
| Jun   | 29             | 33            | 26            |
| Jul   | 28             | 33            | 25            |
| Aug   | 29             | 33            | 26            |
| Sep   | 28             | 33            | 25            |
| Oct   | 28             | 32            | 22            |
| Nov   | 26             | 31            | 18            |
| Dec   | 23             | 27            | 16            |

**Table 4.20: Monthly Ambient Temperature nearby the Industry Area in 2019**

| Month | Mean temp (°C) | Max temp (°C) | Min temp (°C) |
|-------|----------------|---------------|---------------|
| Jan   | 24             | 25            | 18            |
| Feb   | 26             | 30            | 17            |
| Mar   | 24             | 34            | 20            |
| Apr   | 30             | 37            | 24            |
| May   | 32             | 37            | 26            |
| Jun   | 31             | 34            | 26            |
| Jul   | 29             | 31            | 25            |
| Aug   | 30             | 33            | 25            |
| Sep   | 28             | 31            | 24            |
| Oct   | 28             | 31            | 23.1          |
| Nov   | 24             | 30            | 20            |
| Dec   | 22.3           | 27            | 15            |

Source: Bangladesh Meteorological Department (BMD)

#### 4.3.11 Relative Humidity

As would be expected, relative humidity during the wet season is significantly higher than those occurring at other period of the year. This is well depicted by the data as shown in the Table - 4.21 for relative humidity of Manikganj during the period 2017 – 2022.

**Table 4.21: Average Monthly Relative Humidity of the Project Area in last 5 years**

| Humidity in % | Monthly Mean Humidity |     |     |     |     |     |     |     |     |     |     |     |        |
|---------------|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------|
| Year          | Jan                   | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
| 2017          | 67                    | 62  | 53  | 53  | 78  | 85  | 87  | 91  | 89  | 84  | 80  | 75  | 75     |
| 2018          | 66                    | 52  | 48  | 70  | 75  | 83  | 88  | 85  | 84  | 80  | 75  | 71  | 73     |
| 2019          | 62                    | 56  | 63  | 78  | 76  | 86  | 86  | 84  | 85  | 83  | 73  | 76  | 75     |
| 2020          | 60                    | 56  | 63  | 78  | 76  | 86  | 86  | 84  | 85  | 83  | 73  | 76  | 75     |
| 2021          | 64                    | 55  | 53  | 64  | 77  | 81  | 84  | 83  | 81  | 75  | 71  | 68  | 71     |
| 2022          | 57                    | 55  | 51  | 61  | 74  | 81  | 88  | 86  | 86  | 85  | 80  | 69  | 72     |

Source: Bangladesh Meteorological Department (BMD)

#### 4.3.12 Wind

Monthly Prevailing Wind Speed and Direction in Knots of Dhaka for the period of 2009- 2014 (till June) are presented in **Table - 4.22**.

**Table 4.22: Monthly Prevailing Wind Speed and Direction in Knots of Dhaka**

| Year | Month | Wind speed(knots) | Wind direction |
|------|-------|-------------------|----------------|
| 2009 | Jan   | 2.9               | North-West     |
|      | Feb   | 3.1               | North-West     |
|      | Mar   | 4.2               | North-West     |
|      | Apr   | 3.8               | South          |
|      | May   | 3.5               | South          |
|      | Jun   | 3.1               | South          |
|      | Jul   | 3.1               | South          |
|      | Aug   | 3.1               | South          |
|      | Sep   | 3.2               | South          |
|      | Oct   | 4.1               | North-East     |
|      | Nov   | 5.5               | North-East     |
|      | Dec   | 2.9               | North-West     |

| Year        | Month | Wind speed(knots) | Wind direction |
|-------------|-------|-------------------|----------------|
| <b>2010</b> | Jan   | 3.6               | North          |
|             | Feb   | 3.2               | North          |
|             | Mar   | 3.8               | South          |
|             | Apr   | 3.4               | South          |
|             | May   | 3.4               | South          |
|             | Jun   | 3.3               | South          |
|             | Jul   | 3.4               | South          |
|             | Aug   | 2.8               | South          |
|             | Sep   | 2.8               | South          |
|             | Oct   | 9.6               | North-East     |
|             | Nov   | 2.5               | North-East     |
|             | Dec   | 3.3               | West           |
| <b>2011</b> | Jan   | 3.3               | West           |
|             | Feb   | 4.1               | West           |
|             | Mar   | 4.0               | West           |
|             | Apr   | 4.1               | South          |
|             | May   | 3.8               | South          |
|             | Jun   | 3.1               | South          |
|             | Jul   | 4.3               | South-East     |
|             | Aug   | 2.8               | South          |
|             | Sep   | 4.2               | South-East     |
|             | Oct   | 2.3               | East           |
|             | Nov   | 2.8               | North          |
|             | Dec   | 2.4               | North-West     |
| <b>2012</b> | Jan   | 2.9               | North-West     |
|             | Feb   | 3.3               | West           |
|             | Mar   | 3.8               | South          |
|             | Apr   | 4.1               | South          |
|             | May   | 3.7               | South          |
|             | Jun   | 3.0               | South          |
|             | Jul   | 2.4               | South          |
|             | Aug   | 2.2               | South          |
|             | Sep   | 2.6               | South-East     |

| Year        | Month | Wind speed(knots) | Wind direction |
|-------------|-------|-------------------|----------------|
|             | Oct   | 2.0               | North-East     |
|             | Nov   | 2.9               | North          |
|             | Dec   | 2.4               | North          |
| <b>2013</b> | Jan   | 2.2               | West           |
|             | Feb   | 2.4               | West           |
|             | Mar   | 3.8               | South          |
|             | Apr   | 2.4               | South          |
|             | May   | 3.0               | South          |
|             | Jun   | 2.7               | South-East     |
|             | Jul   | 2.4               | South-East     |
|             | Aug   | 2.4               | South-East     |
|             | Sep   | 2.6               | South-East     |
|             | Oct   | 2.0               | North-West     |
|             | Nov   | 2.3               | West           |
|             | Dec   | 2.1               | North-West     |
| <b>2014</b> | Jan   | 2.4               | West           |
|             | Feb   | 3.0               | West           |
|             | Mar   | 2.5               | South          |
|             | Apr   | 2.6               | South          |
|             | May   | 2.5               | South          |
|             | Jun   | 3.0               | South          |
|             | Jul   | -                 | -              |
|             | Aug   | -                 | -              |
|             | Sep   | -                 | -              |
|             | Oct   | -                 | -              |
|             | Nov   | -                 | -              |
|             | Dec   | -                 | -              |

#### 4.3.13 Seismicity

Bangladesh is possibly one of the country's most vulnerable to potential earthquake threat and damage. Earthquake vulnerability of any place largely depends on its geology and topography, population density, building density and quality, and finally the coping strategy of its people and it shows clear spatial variations. Geographically Bangladesh is located close to the boundary of two

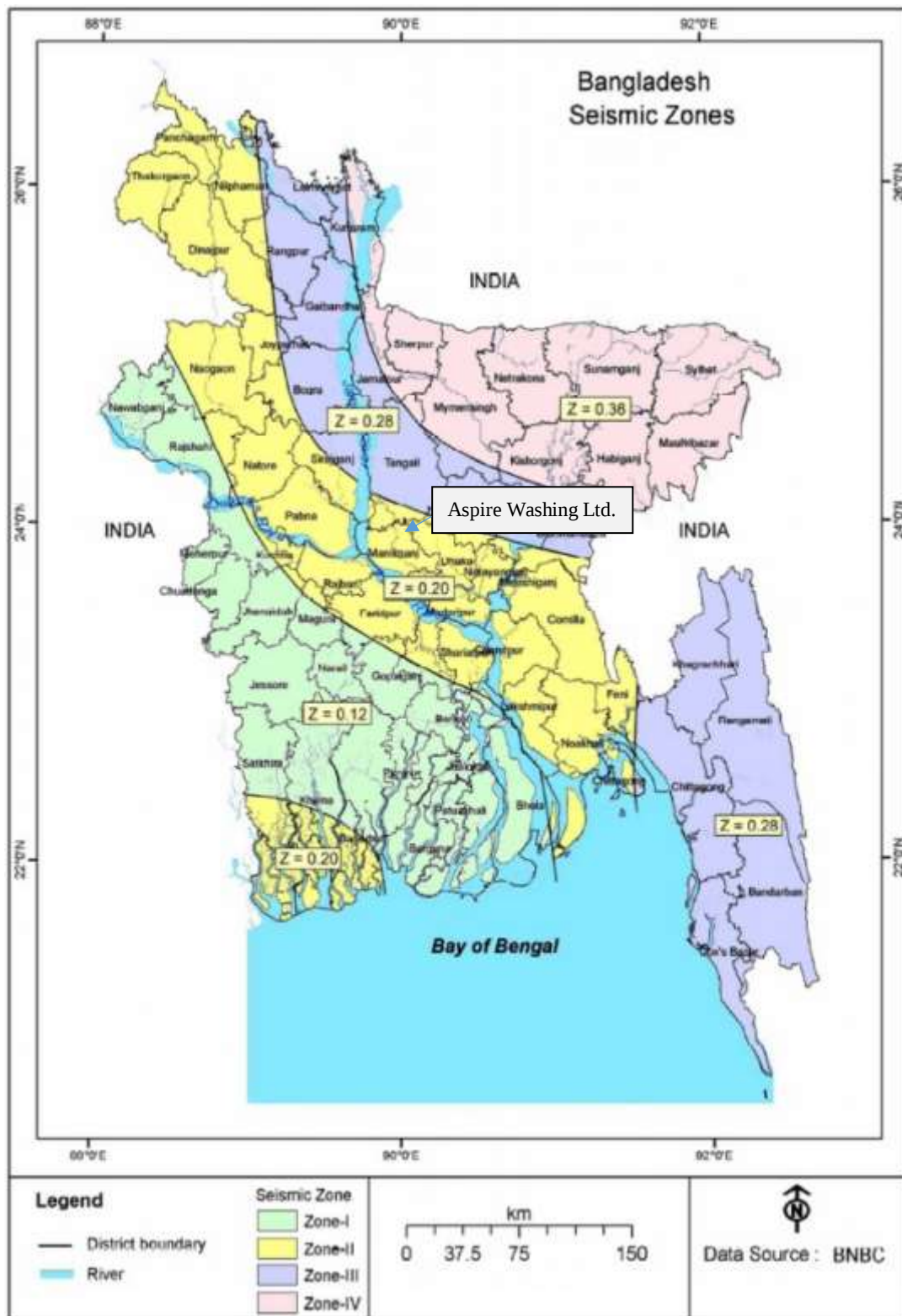
active plates: the Indian plate in the west and the Eurasian plate in the east and north. As a result, the country is always under a potential threat of earthquake of any magnitude at any time, which might cause catastrophic devastation in less than a minute. Bangladesh has been divided into three seismic zones.

**Table 4.23: Zone wise earth quake information in Bangladesh**

| Earthquake Zone | Area Name                                                                                                                           | Seismic Zone Coefficients | Seismic Intensity |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|
| Zone-I          | Southwestern part including Barisal, Khulna, Jessore, Rajshahi                                                                      | 0.12                      | Low               |
| Zone-II         | Lower Central and Northwestern part including Noakhali, Dhaka, Pabna, Dinajpur, as well as Southwestern corner including Sundarbans | 0.20                      | Moderate          |
| Zone-III        | Upper Central and Northwestern part including Brahmanbaria, Sirajganj, Rangpur                                                      | 0.28                      | Severe            |
| Zone-IV         | Northeastern part including Sylhet, Mymensingh, Kurigram                                                                            | 0.36                      | Very Severe       |

*Source: Table 6.2.14- Description of Seismic Zones, BNBC, 2020, Gazetted*

Manikganj with its surroundings is situated in the seismic Zone 2 and Zone 3, which has a basic seismic coefficient,  $Z=0.20$  &  $0.28$  (BNBC, 2020). The project area has been marked in the seismic map of Bangladesh in Figure 4.13 which resides in Zone 2.



**Figure 4.13: Earthquake Zonal map of Bangladesh**

Source: Figure 6.2.24- Seismic Zoning map of Bangladesh, BNBC, 2020

**Table 4.24: Major earthquake affect in Dhaka Division and its neighboring area**

| Year | Location     | Magnitude (Richter scale) | Intensity at Dhaka (MM) | Description                                                                                                                                               |
|------|--------------|---------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1548 | Assam        | -                         | -                       | Opened numerous ground fissures and caused liquefaction in Assam, Sylhet, Tripura and in the Meghna floodplains.                                          |
| 1642 | Assam        | -                         | -                       | might have shaken Dhaka with moderate intensity                                                                                                           |
| 1762 | Chittagong   | 8.5+                      | -                       | At Dhaka the rivers and jhils were agitated, and raised high above their usual levels, leaving, when they receded, their banks were strewn with dead fish |
| 1775 | Dhaka        | -                         | -                       | no loss of life                                                                                                                                           |
| 1787 | Sirajganj    |                           | X                       | no loss of life                                                                                                                                           |
| 1812 | Dhaka        | -                         | VIII                    | The earthquakes jolted Dhaka violently and damaged a number of houses and several buildings at Tejgaon                                                    |
| 1822 | Kishoreganj  | 7.1                       | VI                      | The tremor was followed by three minor aftershocks                                                                                                        |
| 1842 | Rajshahi     | 7.3                       | V                       | The maximum damage was reported from Pabna                                                                                                                |
| 1845 | Sirajganj    | 7.1                       | VI                      | No damaged at Dhaka was reported from these earthquakes                                                                                                   |
| 1846 | Mymensingh   | 6.2                       | VI                      | many structures, including the mosque, the church and many government buildings were damaged                                                              |
| 1865 | Chittagong   | -                         | VII                     | Several aftershocks were felt                                                                                                                             |
| 1885 | Bengal       | 7                         | -                       | destruction to buildings is greatest and loss of life occurred                                                                                            |
| 1897 | Great Indian | 8.7                       | VIII+                   | At least 1,626 people were killed                                                                                                                         |
| 1918 | Srimangal    | 7.6                       | VII                     | The earthquake caused considerable damage to buildings in Dhaka.                                                                                          |
| 1923 | Meghalaya    | 7.1                       | VI                      | Damage occurred in Mymensingh and to a lesser extent at Agartala, Guwahati and Kolkata                                                                    |

| Year | Location     | Magnitude<br>(Richter<br>scale) | Intensity<br>at Dhaka<br>(MM) | Description                                                                                                                                                                                                                                                                             |
|------|--------------|---------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1930 | Dubri        | 6                               | V+                            |                                                                                                                                                                                                                                                                                         |
| 1934 | Bihar-Nepal  | 8.4                             | VI                            | At least 8,519 people were killed in Nepal                                                                                                                                                                                                                                              |
| 1935 | Pabna        | 5.9                             | VI                            |                                                                                                                                                                                                                                                                                         |
| 1943 | Assam        | 7.2                             | VI                            |                                                                                                                                                                                                                                                                                         |
| 1950 | Assam        | 8.4                             | IV                            | Water bodies in Dhaka remained in a state of agitation for an hour due to the effect of long period seismic waves from this distant earthquake.                                                                                                                                         |
| 1954 | Monipur-Myan |                                 |                               |                                                                                                                                                                                                                                                                                         |
| 2001 | Dhaka        | 4.5                             | VI                            | Strong tremors were felt in Dhaka city                                                                                                                                                                                                                                                  |
| 2003 | Borkol       | 5.7                             | IV                            | This quake killed three people, injured 25 people and damaged about 500 buildings in Chittagong                                                                                                                                                                                         |
| 2004 | Sumatra      | 9.3                             | -                             | It was one of the deadliest natural disasters in recorded history, having generated devastating tsunamis that struck<br><br>Along the coasts of most landmasses bordering the Indian Ocean, killed about 2,30,000 people in fourteen countries including 2 people in coastal Bangladesh |
| 2008 | Manikganj    | 3.8                             | -                             | created considerable panic among the city dwellers                                                                                                                                                                                                                                      |
| 2008 | Mymensingh   | 5.1                             | V                             | Apart from Mymensingh where the earthquake caused panic, tremors from this earthquake were felt in many parts of the Dhaka                                                                                                                                                              |
| 2008 | Chandpur     | 4.5                             | V                             | It caused tremendous panic among the city dweller                                                                                                                                                                                                                                       |
| 2009 | Bhutan       | 6.1                             | V                             | People at upper floors of high-rise buildings were panicked; some came out of their houses and offices in fear. Small and light objects fell down.                                                                                                                                      |

| Year | Location      | Magnitude<br>(Richter<br>scale) | Intensity<br>at Dhaka<br>(MM) | Description                                                                                                                        |
|------|---------------|---------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| 2009 | Bay of Bengal | 7.5                             | V                             | The quake was strongly felt in most parts of Bangladesh including Dhaka. Residents of upper floors in high rise buildings woke up. |

#### **4.4 Biological Environment**

##### **4.4.1 Introduction**

Forests, pasture lands, rivers, surface water and other water bodies, etc. are the most important natural ecosystems. They are the foundation on which conservation of biological diversity depends. Biological diversity, which refers to genetic variation as well as to the diversity of human populations and ecosystems, is a resource that belongs not only to regions and to nations but also to all of humankind. Although it is a renewable resource, it can be irreversibly destroyed. Future uses of this resource (medicine, plant breeding. etc.) cannot be foreseen at present, although they will certainly be extensive in scope, and they even are crucial to the survival of humankind. It is extremely rare to encounter completely natural areas nowadays.

On the other hand, both extensive and local use of natural flora and fauna can be regarded as normal occurrences in natural ecosystems. Although the transition from hunting and gathering to settle agriculture in established agro-ecological zones is complete almost everywhere, traditional forms of resource use continue to play an important role in the lives of rural populations. Current pressure due to increase production and extend the area of land under cultivation is leading to more intensive use of remaining predominantly natural areas. This results in environmental stress and rapid loss of biological diversity, as well as permanent conversion of land to agricultural use. Opening up natural areas in order to exploit their resources with modern technology frequently leads to additional forms of resource use. For example, forests opened up to commercial forestry are more exposed to uncontrolled over exploitation, as well as being subjected to ecological stress by migrants who practice agriculture.

There had been extensive field survey in the project area during the study to assess and also quantify to a certain extent the flora and fauna richness. These concentrated among others, on the wildlife (reptiles, amphibians, mammals and birds), separately on fishes and a floral species ( , shrubs, and timber/fuel wood trees and fruit trees). Findings of the survey have been presented in Table 4.25 to Table 4.26, respectively in the following pages. The area is quite rich in flora and fauna. However,

many of those are quite common for different other areas in Bangladesh. The already existing industries in the study area not just brought, some of the utility services, but have also provided with a different look of infrastructure setting in the area. This is still not something, which can be called aesthetically unacceptable or directly detrimental to the floral growth of the area. However, the industrial activities along with their discharges may prove quite detrimental to both flora and fauna in the area eventually, provided no appropriate corrective measures are taken.

#### 4.4.2 Common Flora and Fauna

##### i. Terrestrial Habitat

##### a) Terrestrial Flora

Flora can grow naturally or artificially in terrestrial and aquatic environment, if the natural conditions are favorable. Common natural vegetation (terrestrial and aquatic) grows naturally in plenty in the rainy season. Most of the flora, particularly the trees, are planted in the study site for economic purposes by the local inhabitants and are fairly common, and distributed in scattered way, and have similarity in comparison to other plain districts of Bangladesh. The study site has vast low land where aquatic flora grows in plenty in the rainy season. Some important plant species were observed in the surveyed areas like medicinal plant e.g. Chatim - *Alstonia scholaris*, part of which is generally used as a traditional medicine. The existing terrestrial floral diversity makes a complex ecosystem in which some wildlife has direct relationship through their ecological niche.

**Table 4.25: Terrestrial Floral Species in the Study Area**

| Scientific Name                              | English Name     | Local Name        |
|----------------------------------------------|------------------|-------------------|
| <b>Tree:</b>                                 |                  |                   |
| <i>Artocarpus heterophylla Samanea saman</i> | Jackfruit        | Kathal Gach       |
|                                              | Rain tree/Rendi  | Rendi             |
| <i>Mangifera indica</i>                      | Mango            | Aam Gach          |
| <i>Swietenia mahagoni</i>                    | Mehagini         | Mehogoni          |
| <i>Ficus religiosa</i>                       | Banyan tree      | Bot gach          |
| <i>Tectona grandis</i>                       | Teak/Segun       | Segun Gach        |
| <i>Zizyphus mauritiana</i>                   | Indian plum      | Boroi Gach        |
| <i>Annona reticulata</i>                     | B. heart/Sharifa | Sharifa Gach      |
| <i>Cocos nucifera</i>                        | Coconut          | Narikel Gach      |
| <i>Eucalyptus citriodora</i>                 | Eucalyptus       | Eucalyptus Gach   |
| <i>Delonix regia</i>                         | Krishnachura     | Krishnachura Gach |
| <i>Musa sapientum</i>                        | Banana           | Kola Gach         |
| <i>Averrhoa carambola</i>                    | Kamranga         | Kamranga Gach     |

| Scientific Name                | English Name          | Local Name   |
|--------------------------------|-----------------------|--------------|
| <i>Anthocephalus chinensis</i> | Kadam                 | Kadam Gach   |
| <i>Tamarindus indica</i>       | Tamarind              | Tetul Gach   |
| <i>Bambusa sp.</i>             | Bamboo                | Bash Gach    |
| <i>Phoenix Sylvestris</i>      | Date palm /Khejur     | Khejur Gach  |
| <i>Borassus fiabelli</i>       | Tal/Palm              | Tal Gach     |
| <b><u>Herb and Shrub:</u></b>  |                       |              |
| <i>Leucus aspera</i>           | Danda Kalash          | Danda-kolosh |
| <i>Mikania scandens</i>        | Assamlata             | Libuji Iota  |
| <i>Clerodendrum viscosum</i>   | Bhant                 | Vati (Bhat)  |
| <i>Heliotropium indicum</i>    | Hatisur               | Hatishura    |
| <i>Ipomoea fistulosa</i>       | Dholkalmi             | Kaing-jukai  |
| <i>Blumea lacera</i>           | Sheyalmutra           | Hial mutra   |
| <i>Coccinia indica</i>         | Telakucha             | Telakachu    |
| <i>Ricinus communis</i>        | Reri/Venna            | Reri         |
| <i>Cynodon dactylon</i>        | Bermuda grass         | Durbaghash   |
| <i>Saccharum officinarum</i>   | Sugarcane             | Akh          |
| <i>Phragmites sp.</i>          | Common Reed           | Khagra       |
| <i>Mimosa invisa</i>           | Giant sensitive plant | Thankuni     |
| <i>Mimosa pudica</i>           | Sensitive plant       | Lazzaboti    |
| <i>Polygonum hydropiper</i>    | water pepper          | Bishkatali   |
| <i>Amaranthus spinosus</i>     | Spiny pigweed         | Kantanotey   |

## b) Terrestrial Fauna

Faunal species require both terrestrial and aquatic environment. Terrestrial environment dependent faunas are referred to as terrestrial fauna, and aquatic environment dependent fauna are referred to as aquatic fauna. The study site has both terrestrial and aquatic environment that supports various species of terrestrial and aquatic fauna. Most of the terrestrial faunal species found here are fairly common (see Fig. 4.44) in comparison to other plain districts of Bangladesh. Faunal species that are adapted in altered semi urban habitat are commonly seen in the study sites.

**Table 4.26: Terrestrial Faunal Species in the Study Area**

| Scientific Name                  | English Name         | Local Name        |
|----------------------------------|----------------------|-------------------|
| <b><u>Birds</u></b>              |                      |                   |
| <i>O. sutorius</i>               | C. Tailorbird        | Holde pakhi       |
| <i>Copsychus saularis</i>        | O. Magpie Robin      | Doyel pakhi       |
| <i>D. vagabunda,</i>             | Rufous Tree Pie      | Harichacha        |
| <i>Columba livi</i>              | Rock Pigeon          | Jalali Kobutor    |
| Common Myna                      | Acridotheres tristis | Shalik Pakhi      |
| <i>Haliastur indus</i>           | Brahminy Kite        | Shankho Chil      |
| <i>Rhipidura albicollis</i>      | Wthroated Fantail    | Mukto Bihango     |
| <i>D. macrocercus</i>            | Black Drongo         | Kalo Finge        |
| <i>C. macrorhynchus</i>          | Jungle Crow          | Dar kak           |
| <i>Corvus splendens</i>          | House Crow           | Kak               |
| <i>Cypriurus parvus</i>          | Asian Palm Swift     | Kokil             |
| <i>Anthus rufulus</i>            | Paddy field Pipit    | Choroi            |
| <i>C. micropterus,</i>           | Indian Cuckoo        | Kokil             |
| <i>Pycnonotus cafer</i>          | Red-vented Bulbul    | Bulbul pakhi      |
| <i>S. chinensis,</i>             | Spotted Dove         | Ghu-ghu           |
| <i>Passer domesticus</i>         | House Sparrow        | Chorui            |
| <i>Sturnus contra</i>            | Pied Starling        | Gobor shalik      |
| <i>Halcyon smyrnensis,</i>       | W. T. Kingfisher     | Masranga          |
| <i>Oriolus xanthornus,</i>       | B. H Oriole          | Isti kutum pakhi  |
| <i>Lanius schach</i>             | B. H. Shrike         | Kalo Matha Koshai |
| <b><u>Reptiles</u></b>           |                      |                   |
| <i>Hemidactylus flaviviridis</i> | House Lizard         | Tiktiki           |
| <i>V. bengalensis</i>            | Monitor Lizard       | Gui-shap          |
| <i>Calotes versicolor</i>        | Garden Lizard        | Rakto-chusa       |
| <i>Lycodon aulicus</i>           | Wolf Snake           | Ghorchiti shap    |
| <i>Coluber mucosus</i>           | Rat Snake            | Danrash shap      |
| <i>Ahaetulla nasutus</i>         | Vine Snake           | Laudoga shap      |
| <b><u>Amphibians</u></b>         |                      |                   |
| <i>Bufo melanostictus</i>        | Common Toad          | Bang              |
| <i>L. limnocharis</i>            | Cricket Frog         | Bang              |
| <i>P. maculates</i>              | M. Tree Frog         | Gecho bang        |
| <i>H. tigerinus</i>              | Bull Frog            | Bang              |

## ii. Wetland Habitat

### a) Aquatic Flora

Due to the vast amount of low land, the study site has various types of aquatic flora (tree, herb and shrub), most of which are distributed in and around the water bodies (pond, canal, river, ditch etc.). In rainy season, the aquatic flora gets favorable condition that helps them to grow in plenty, Aquatic flora plays an important role for biodiversity conservation. Aquatic flora grows in rivers, ponds, canals, ditches and low-lying cultivated fields as submerge, free-floating and rooted floating states.

**Table 4.27: Aquatic Floral Species in the Study Area**

| Scientific Name                         | English Name       | Local Name        |
|-----------------------------------------|--------------------|-------------------|
| <b><u>Tree:</u></b>                     |                    |                   |
| <i>Crataeva nurvala</i>                 | Varuna             | Barun/Banny       |
| <i>Ludwigia adscendense</i>             | Water primrose     | Keshordam         |
| <b><u>Herb and Shrub:</u></b>           |                    |                   |
| <i>Trewia nudiflora</i>                 | Indian cornel      | Pitali            |
| <i>Pongamia pinnata</i>                 | Karanj             | Koroj             |
| <i>Ipomoea aquatica</i>                 | Water spinach      | Kalmi             |
| <i>Ceratophyllum demersum</i>           | Hornwort           | Jhanjhi           |
| <i>Nymphaea nouchali</i>                | Water Lily         | Sada Shapla       |
| <i>Hygroryza aristate</i>               | Jungle rice        | Phutki/Janglidhan |
| <i>Vallisneria spiralis</i>             | Tape grass         | Patajhanghi       |
| <i>Utricularia aurea</i>                | Golden bladderwort | Jhangi            |
| <i>Echinocloa colonum</i>               | Floating Grass     | Pana              |
| <i>Trapabi spinosa</i>                  | Spinous trapabi    | Paniphal          |
| <i>Spirogyra sp.</i>                    | Spiral Algae       | Hazala            |
| <i>Aponogeton natans</i>                | Water hawthorn     | Ghenchu           |
| <i>Hydrilla verticillata Eichhornia</i> | Hydrilla           | Janjhi/Kurcli     |
| <i>crassipes</i>                        | Water Hyacinth     | Kachuripana       |
| <i>Salvinia cuculata</i>                | Floating fern      | Indurkanipana     |
| <i>Pistia strateotes</i>                | Water lettuce      | Topa pana         |
| <i>Lemna perpusilla</i>                 | Tiny duckweed      | Khudipana         |

### b) Aquatic Fauna

The study site has vast low land that act as a seasonal wetland during monsoon and support varieties of aquatic fauna. Some aquatic fauna used these vast lands as their temporary habitat, while others as permanent habitat. In the rainy season, the native fish species breed here in plenty.

**Table 4.28: Aquatic Faunal Species in the Study Area**

| Scientific Name                 | English Name         | Local Name            |
|---------------------------------|----------------------|-----------------------|
| <b><u>Amphibian:</u></b>        |                      |                       |
| <i>Euphlyctis cyanophlyctis</i> | Skipper frog         | Kola bang             |
| <b><u>Reptile:</u></b>          |                      |                       |
| <i>Mabuya carinata</i>          | Common Skink         | Anjon                 |
| <i>Kachuga tecta</i>            | Indian Roofed Turtle | Deshi Kori Kaitta     |
| <i>Xenochrophis piscator</i>    | Checkered Keelback   | Dhora Shap            |
| <i>Enhydryis enhydryis</i>      | C. S. Water Snake    | Kamalabati            |
| <i>Atretium schistosum</i>      | Olive Keelback       | Metey sap             |
| <b><u>Bird:</u></b>             |                      |                       |
| <i>Egretta alba</i>             | Great Egret          | Sada Bok              |
| <i>Egretta gazetta</i>          | Small Egret          | Chhoto Bok            |
| <i>Egretta intermedia</i>       | Intermediate Egret   | Korche Bok            |
| <i>Amauornis phoenicurus</i>    | W-breasted Waterhen  | Dahuk                 |
| <i>Metopidius indicus</i>       | B. Winged Jacana     | Bene bou              |
| <i>Ardeola grayii</i>           | Indian Pond heron    | Kani bok              |
| <i>Phalacrocorax niger</i>      | Little Cormorant     | Pankouri              |
| <i>Gallinago henura</i>         | Snipe                | Kadakhocha            |
| <i>Alcado athis</i>             | Common Kingfisher    | Masranga<br>Machranga |
| <b><u>Mammal:</u></b>           |                      |                       |
| No mammal                       |                      |                       |
| <b><u>Fish:</u></b>             |                      |                       |
| <i>Macrognathus aculeatus</i>   | One-stripe Spinyeel  | Chikri                |
| <i>Puntiuschol</i>              | Swamp Barb           | Chala punti           |
| <i>Puntius conchoni</i>         | Rosy Barb            | Kanchan Puti          |
| <i>A. microlepis,</i>           | Indian Carplet       | Mola                  |
| <i>Clarius batrachus,</i>       | Walking Catfish      | Magur                 |
| <i>Heteropneustes fossilis</i>  | Stinging Catfish     | Singi mach            |
| <i>Labeo rohita</i>             | Rohu                 | Rui                   |
| <i>Catla catla</i>              | Catla                | Katol                 |
| <i>Cirrhinus mrigala</i>        | Mrigal               | Mrigel                |
| <i>Aorichthys aor</i>           | L-whiskered Catfish  | Ayer                  |
| <i>Wallago attu</i>             | Freshwater Shark     | Boal mach             |
| <i>Pisodonophis boro</i>        | Paddy Eel            | Shol mach             |
| <i>Notopterus notopterus</i>    | Gery Fetherback      | Along                 |

| Scientific Name                         | English Name      | Local Name     |
|-----------------------------------------|-------------------|----------------|
| <i>Notopterus chitala</i>               | Humped Fetherback | Chitol Mach    |
| <i>Channa orientalis</i> ,              | Asiatic Snakehead | Cheng          |
| <i>Channa punctatus</i>                 | Spotted Snakehead | Taki Mach      |
| <i>Channa striatus</i>                  | Striped Snakehead | Shol Mach      |
| <i>Channamarulius</i>                   | Giant Snakehead   | Gojar Mach     |
| <i>Glossogobius giuris Brachygobius</i> | Tank Goby         | Bele Mach      |
| <i>nunas</i>                            | Bumblebee Goby    | Bumblebee Goby |
| <i>Anabas testudineus</i>               | Climbing Perch    | Koi Mach       |
| <i>Mystus cavasius</i>                  | Gangetic Mystus   | Tengra         |
| <i>Mystus tengara</i>                   | Tengra Mystus     | Tengra         |
| <i>Nandus nandus</i>                    | Mottled Nandus    | Meni Mach      |
| <i>Monopterus cuchia</i>                | Gangetic Mudeel   | Kuicha Mach    |
| <i>Polydactylus indicus.</i>            | Indian Threadfish | Lakkha         |



Rain Tree (*Samanea saman*)



Krishnachura (*Delonix regia*)



Banana tree (*Musa paradisiaca*)



Water Hyacinth (*Eichhornia crassipes*)

#### 4.4.3 Endangered and Threatened Species

Manikganj, being a sub urban district in Bangladesh, is not a typical habitat for a diverse range of wildlife. The urbanization and industrialization of the area have likely had moderate presence of natural habitats for many species. The project area is also not a habitat of any known endangered and threatened species.

While Manikganj may not be a prominent area for wildlife conservation, efforts should be made to assess and address the impact of urbanization and industrial activities on any remaining natural habitats and species. Local conservation initiatives, habitat restoration projects, and community awareness programs can contribute to mitigating threats to wildlife in the region.

### 4.5 Socio Economic Profile of The Project Area

#### 4.5.1 Socio Economic Condition

Manikganj has experienced significant economic growth driven by industrial development, including garment factories and manufacturing units. The city's infrastructure has improved, providing better road networks, educational institutions, and healthcare facilities. The economy of this area is supported by both industrial and agricultural sectors. However, challenges such as income disparities and limited access to quality education and healthcare persist. Efforts are being made to address these challenges and improve social equity in the city.

#### **4.5.2 Area, Population & Social Structure:**

##### ***Income and Poverty***

- I. **Income Levels:** Manikganj, being an industrial and commercial hub, has a diverse range of income levels. The city's economy is driven by industrial activities, including garment factories and manufacturing units, which provide employment opportunities for both skilled and unskilled workers. Income levels vary depending on occupation, skill level, and industry.
- II. **Poverty:** While Manikganj has witnessed economic growth, poverty remains a concern in some areas. Poverty rates in Manikganj are influenced by factors such as access to education, healthcare, and employment opportunities. Efforts are being made to address poverty through various development programs and initiatives.

##### ***Gender and Women***

- III. **Gender Dynamics:** Gender dynamics in Manikganj reflect the broader societal context of Bangladesh. Although progress has been made in promoting gender equality and empowering women, gender disparities persist. Women often face challenges in accessing education, employment, and decision-making positions. Efforts are being made to enhance gender inclusivity and ensure equal opportunities for women in various sectors.

##### ***Access to Basic Services:***

The availability of essential services like clean water, sanitation facilities, and electricity is crucial in assessing the quality of life in Manikganj.

- ❖ **Healthcare:** Indicators related to healthcare, such as access to healthcare facilities, availability of medical professionals, and disease prevalence, help evaluate the well-being and health outcomes of the population.
- ❖ **Economic Opportunities:** Indicators related to income levels, employment rates, and poverty rates provide insights into the economic stability and opportunities available to the residents of Manikganj.
- ❖ **Housing and Infrastructure:** Assessing the quality and availability of housing, transportation infrastructure, and access to basic amenities helps gauge the living conditions and infrastructure development in Manikganj.

### ***Conflicts of Interest:***

**Local Authorities and Government Officials:** Potential conflicts of interest involving local government officials, landowners, or influential individuals. Need to ensure the project follows a transparent and legal process to obtain permits, licenses, and approvals.

**Landowners and Developers:** If there are multiple parties involved in the project, need to ensure the interests of each party are aligned and clearly defined. Potential conflicts could arise regarding profit distribution, decision-making, and responsibilities.

**Community and Environmental Groups:** Community and environmental groups might have interest that conflict with the development plans. Engage with these stakeholders early in the planning process to address concerns, mitigate negative impacts, and foster positive relationships can solve this dispute.

### ***Law and Order Situation***

**Local Regulations:** Local laws and regulations that pertain to land development in Manikganj. Different zoning laws, building codes, and environmental regulations will apply to the land development project.

**Permits and Approvals:** Must obtain all the necessary permits and approvals from local government agencies before starting any construction. Failure to comply can result in legal actions and delays.

**Security and Safety:** Assessment of the overall security situation in the area. Consultation with local law enforcement to understand any security challenges or concerns that might affect the implementation.

**Labor Relations:** Labor disputes can escalate and impact project progress. Need to follow labor laws, provide fair wages, and maintain good working conditions.

**Dispute Resolution:** A clear plan in place for resolving any disputes that might arise during the course of the project, whether they involve contractors, partners, or community members.

**Political Stability:** Sudden political changes or unrest could impact the regulatory environment and overall project conditions.

It's crucial to work closely with legal experts, local consultants, and other professionals who have experience in the specific area. Must conduct thorough due diligence, engage in transparent communication, and ensure that the project adheres to ethical practices and legal requirements.

### ***Common Property Resources***

The Manikganj area in Bangladesh, like many other regions, has its share of common property resources (CPRs) that play a vital role in supporting the livelihoods and well-being of local communities. Here is an overview of the common property resource scenario in the Manikganj area:

**Common Grazing Lands:** In rural Manikganj, common grazing lands are crucial for livestock owners. These areas provide a space for cattle and other livestock to graze, supporting the agrarian economy of the region. Local farmers, especially those with limited land for grazing, rely on these shared pastures for their animals.

**Community Forests:** Manikganj has pockets of community-managed forests and woodlands. These forests serve as a source of timber, firewood, and non-timber forest products for local communities. Additionally, they contribute to biodiversity conservation and help combat deforestation.

**Fisheries:** The Manikganj area has access to various water bodies, including ponds, canals, and rivers. These water resources support fishing communities who depend on common fisheries for their livelihoods. Fish from these waters provide a crucial source of protein and income for local residents.

**Irrigation Systems:** Traditional irrigation systems, such as small-scale canal networks and shared tube wells, are used for agricultural purposes. Farmers in Manikganj often cooperate to manage water resources collectively, ensuring efficient and equitable distribution for crop cultivation.

**Common Water Sources:** Access to clean drinking water is vital for the residents of Manikganj. Shared tube wells and communal water sources provide access to potable water, particularly in rural areas where centralized water supply systems may be limited.

**Common Pastures:** In addition to grazing lands, shared agricultural fields are sometimes used by multiple farmers for seasonal crop cultivation. This practice allows landless or small-scale farmers to cultivate crops collectively, contributing to food security.

**Community Gathering Spaces:** Manikganj also has shared spaces used for community gatherings, cultural events, and social activities. But the project area has no common recreational place for gathering. Thus, the project aims to create a common zone for every resident in the proposed project. These common areas will foster social cohesion and preserve local traditions and customs.

Management of these common property resources will often involve the establishment of community-based rules and norms. Local institutions, such as village committees or user groups, play a crucial role in governing access, use, and conservation of these resources. The balance between individual and collective interests is vital to ensuring sustainable resource management in the project area.

Sustainable management of CPRs in Manikganj and other regions is essential to support both the local economy and environmental conservation. Community engagement and collaboration with government authorities can help address challenges related to resource degradation and overuse, ensuring the long-term viability of these valuable shared resources.

#### **4.5.3 Literacy and Education Institutes:**

Educational indicators such as literacy rates, school enrollment, and access to quality education reflect the educational opportunities and achievements in Manikganj. Manikganj District has an average literacy rate of 49.6% (7+years), and the national average of 32.4% literate. There aren't a lot of educational institute near the project site. Some educational institute which are within 1.0 km radius of the project are- AHB International School & College, Parvez Technical Institute, Bhulta School and College etc.

#### **4.5.4 Religious Institutions**

Manikganj, a vibrant city in Bangladesh, is home to a rich tapestry of religious diversity and cultural heritage. In this urban landscape, religious institutions hold a special place in the hearts of the community. The city is adorned with a multitude of mosques, temples, churches, and other places of worship, where people from various faiths come together to practice their beliefs and find solace. These religious institutions in Manikganj not only serve as places of prayer and reflection but also play a vital role in promoting communal harmony and social cohesion. They are hubs of charitable activities, organizing events, and fostering a sense of unity among the city's residents.

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## *Chapter 5*

### *Identification & Mitigation of Potential Impacts*

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## 5. IDENTIFICATION & MITIGATION OF POTENTIAL IMPACTS

### 5.1 General Consideration

In the case of most industrial or development projects, potential negative impacts are far more numerous than beneficial impacts. A number of project activities during operation of existing facilities of **Aspire Washing Ltd.** or construction at the project site have been identified in chapter 3 of this report. This chapter identifies potential positive and negative impacts that may be generated from those project activities, which is the first step of forming this EIA report. Though regional and national economic benefits associated with the implementation of any development project are considered to fall outside the scope of an EIA, they are also considered here. It is fully recognized that the long-term benefits will ultimately contribute to an improvement in the quality of life in the project area.

### 5.2 Impacts Identification & Mitigation Measures

Identification of potential impacts due to the plant location and operation has been done using Checklist. Checklists are comprehensive lists of environmental effects and impacts indicator designed to stimulate the analysis to think broadly about possible consequences of contemplated actions (*Munn, 1979*). In order to prepare the checklist and further to analyze to associated Environmental impacts due to the project multi-disciplinary team from the consultant's side visited the existing project site, closely identified activities of the project and significant environmental components that may be affected by the project. The project officials were interview during each visit to assess their level of understanding of the interrelation of the project activities and significant environmental impacts. The visitors in the project site were also interviewed randomly to assess their level of understanding about the general responsibilities to conserve the overall environment of this recreational spot. These were done mainly to identify the major environmental components of the project and at the same time stimulate thinking environmental conservation of all the groups associated with the project. This process identifies the water quality of the project and its surroundings as the most significant environmental components. Overall project environment, erosion, sewage and storm water management, solid waste management, sound and air quality management, maintenance practices and overall environmental management systems are the major environmental issues identified from the consultant's side.

However, as the project is an existing project, so the environmental management of the operation phases of the existing facilities has been given emphasis in order to develop the EIA. An outline of management issues in case of any future construction & development have also been included in the management plan, so that Aspire Washing Ltd. authority can take proactive approaches for minimizing environmental and socio-economic impacts to the lowest possible extent. Table -5.1 represents the checklists developed for Aspire Washing Ltd. In this checklist, major activities, which create the Significant Environmental Impacts (SEIs), are shown. The terms none, minor, moderate major, short termed and long termed are used in checklists to classify the magnitude and duration of probable SEI.

### **5.2.1 Environmental Aspects Process Model:**

#### **a) Identification of Environmental Aspects:**

Organizations identify and list the various activities, products, or services that interact with the environment. These are known as environmental aspects.

#### **b) Evaluation of Environmental Impacts:**

For each identified aspect, organizations assess the potential environmental impacts. These impacts can include effects on air, water, soil, biodiversity, energy consumption, etc.

#### **c) Significance Determination:**

The significance of each impact is determined based on criteria such as regulatory requirements, potential harm, frequency, and reversibility.

#### **d) Legal and Other Requirements:**

Organizations identify applicable legal requirements and other obligations related to significant environmental aspects.

#### **e) Objectives and Targets:**

Environmental objectives and targets are established to address the significant aspects and comply with legal requirements. These objectives are specific, measurable, achievable, relevant, and time-bound (SMART).

#### **f) Operational Controls:**

Procedures and controls are implemented to ensure that operations are conducted in line with environmental objectives and legal requirements.

#### **g) Monitoring and Measurement:**

Monitoring processes are established to track environmental performance and ensure compliance. This may involve regular inspections, sampling, and data analysis.

#### **h) Review and Continuous Improvement:**

Periodic reviews are conducted to assess the effectiveness of the EMS. Findings are used to make improvements, update objectives, and enhance environmental performance continually.

**Table 5.1 Checklist for identification of probable Environmental Impact of Aspire Washing Ltd. (Project Location).**

| Project Phase           | Action Affecting Environmental Resources and Values |                                                           | SEIs without Mitigation Measures |       |          |       | Impact Type |            |            |              | Duration   |           |
|-------------------------|-----------------------------------------------------|-----------------------------------------------------------|----------------------------------|-------|----------|-------|-------------|------------|------------|--------------|------------|-----------|
|                         |                                                     |                                                           | None                             | Minor | Moderate | Major | Adverse     | Beneficial | Reversible | Irreversible | Short Term | Long Term |
| <b>Factory Location</b> | a                                                   | Loss of and displacement from homestead land              | ✓                                |       |          |       |             |            |            |              |            |           |
|                         | b                                                   | Overland Drainage and Impact on surface water             |                                  | ✓     |          |       | ✓           |            |            | ✓            |            | ✓         |
|                         | c                                                   | Change in Landscape                                       |                                  | ✓     |          |       | ✓           |            |            | ✓            |            | ✓         |
|                         | d                                                   | Loss of and displacement from agricultural land and house | ✓                                |       |          |       |             |            |            |              |            |           |
|                         | e                                                   | Disruption of Earth Surface                               |                                  | ✓     |          |       | ✓           |            |            | ✓            |            | ✓         |
|                         | f                                                   | Inadequacy of Buffer Zone                                 |                                  | ✓     |          |       | ✓           |            | ✓          |              |            | ✓         |

**Table 5.2 Checklist for identification of probable Environmental Impact of Aspire Washing Ltd. (Project Location).**

| Project Phase | Action Affecting Environmental Resources and Values |                                      | SEIs without Mitigation Measures |       |          |       | Impact Type |            |            |              | Duration   |           |
|---------------|-----------------------------------------------------|--------------------------------------|----------------------------------|-------|----------|-------|-------------|------------|------------|--------------|------------|-----------|
|               |                                                     |                                      | None                             | Minor | Moderate | Major | Adverse     | Beneficial | Reversible | Irreversible | Short Term | Long Term |
| Construction  |                                                     | Air pollution                        |                                  | ✓     |          |       | ✓           |            |            | ✓            | ✓          |           |
|               |                                                     | Noise Pollution and vibration affect |                                  | ✓     |          |       | ✓           |            |            | ✓            | ✓          |           |
|               |                                                     | Spreading diseases                   |                                  | ✓     |          |       | ✓           |            |            | ✓            |            | ✓         |
|               |                                                     | Accidents                            |                                  | ✓     |          |       | ✓           |            |            | ✓            |            | ✓         |

**Table 5.3 Checklist for identification of probable Environmental Impact of Aspire Washing Ltd. (Operation of the Factory).**

| Project Phase     | Action Affecting Environmental Resources and Values |                 | Effect on Environment and Economy                 | SEIs without Mitigation Measures |       |          |       | Impact Type |            |            |              | Duration   |           |
|-------------------|-----------------------------------------------------|-----------------|---------------------------------------------------|----------------------------------|-------|----------|-------|-------------|------------|------------|--------------|------------|-----------|
|                   |                                                     |                 |                                                   | None                             | Minor | Moderate | Major | Adverse     | Beneficial | Reversible | Irreversible | Short Term | Long Term |
| Factory Operation | Operation of Aspire Washing Ltd.                    |                 |                                                   |                                  |       |          |       |             |            |            |              |            |           |
|                   | a                                                   | Noise Pollution | Noise Generated from Electro mechanical machinery |                                  |       | ✓        |       | ✓           |            | ✓          |              |            | ✓         |

| Project Phase | Action Affecting Environmental Resources and Values |                                                                             | Effect on Environment and Economy                                            | SEIs without Mitigation Measures |       |          |       | Impact Type |            |            |              | Duration   |           |
|---------------|-----------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------|-------|----------|-------|-------------|------------|------------|--------------|------------|-----------|
|               |                                                     |                                                                             |                                                                              | None                             | Minor | Moderate | Major | Adverse     | Beneficial | Reversible | Irreversible | Short Term | Long Term |
|               | b                                                   | Water Pollution                                                             | Untreated liquid wastewater and sewage discharge can pollute the environment |                                  |       |          | ✓     | ✓           |            |            | ✓            |            | ✓         |
|               | c                                                   | Air pollution from generator                                                |                                                                              |                                  | ✓     |          |       | ✓           |            |            | ✓            | ✓          |           |
|               | d                                                   | Solid Wastes from daily activities as well as from routine maintenance work |                                                                              |                                  |       | ✓        |       | ✓           |            |            | ✓            |            | ✓         |
|               | e                                                   | Accidental and Natural Hazard                                               |                                                                              |                                  |       | ✓        |       | ✓           |            |            | ✓            |            | ✓         |
|               | f                                                   | Employment- Recruitment of new staffs and operators                         |                                                                              |                                  |       |          | ✓     |             | ✓          |            |              |            | ✓         |

The Impacts, which are likely to be occurred in the different phases of the project, are identified in the checklist. Evaluation of these impacts will be done in the following sections mentioning their origin and characteristics, actual site condition, implemented mitigation measures along with the possible enhancement of mitigation/enhancing measures. At the end of each sub section, status of residual impact will also be mentioned.

### **5.3 Evaluation of Predicated Adverse Impacts and Mitigation**

Unjustified and unplanned operation of any project can potentially affect quality of life, air, noise, water, land, flora, fauna and human by increase in water, noise and air pollution, increase in hazardous waste generation, pollution from spillage/surface runoff, disturbance to flora and fauna, by loss of trees resulting from increased access, increase in land values, threatening agriculture, etc.

### **5.4 Impact due to Operation of the Existing Project**

Environmental issues during the operational phase of the existing Aspire Washing Ltd. project has been identified and the major environmental issues that need to be evaluated are:

- ❖ Impacts on Topography (Moderate)
- ❖ Water use and wastewater discharge (Significant)
- ❖ Solid waste generation (Significant)
- ❖ Noise generation (Moderate)
- ❖ Natural and Accidental Hazard (Uncertain); etc.

### **5.5 Impacts on Topography**

#### **5.5.1 Land Acquisition**

##### ***i. Impact Origin***

The project had been established on an area of 10925 sqm of land. Land acquisition may affect the environment and peoples by the following ways:

- Loss of Homestead land
- Loss of Agricultural Land
- Cultural, historical and Aesthetic Loss
- Loss of sensible places
- Corruption and partiality during acquisition and Reacquisition process, etc.

## ***ii. Mitigation Measures***

The project will not require any relocation of homestead and land acquisition will be done by paying proper compensation of land to the land owners. The entire land must be a fallow, vacant, low and a small portion of the land or no land must be agricultural land in the project site. There will be no homestead land. There will be no cultural, historical and aesthetic interest in the project land and no loss of sensible place. Therefore, if the above-mentioned measures are taken then the impacts will be negligible.

### **5.5.2 Loss and Displacement from Agricultural Land**

#### ***i. Impact Origin***

A small portion of the proposed land is agricultural land and one crop (Aman season) is cultivated in a year on that land since the land was not so fertile. The other portions are flat, low and vacant forest land. So, there will be very small loss of agricultural land hence agricultural product in the country.

#### ***ii. Mitigation Measures***

For economic development, Bangladesh has no option other than going for industrialization. To do so, some portion land would have to be converted into industrial land. But attention should be given so that conversion of such land use should take place in comparatively less fertile area. The present land for project is not so fertile and hence ultimate loss in economic value due to loss in agricultural products will be overcome by positive of the project in near future. Moreover, the land has been purchased by compensating the proper land value, so it is expected that by this time, the displaced land owners must find themselves adopted in new income generation activities.

### **5.5.3 Disruption of Earth Surface**

#### ***i. Impact Origin***

As mentioned earlier that a part of land filling would be required to develop the site to provide protection against flood. This land filling will be from its original level, which will not disrupt the natural surface of earth and obstruct the natural drainage system of the area.

#### ***ii. Mitigation Measure***

According to the plan, Aspire Washing Ltd. will not create any water logging and drainage problem as the authority collects the soil to develop the area by carried sand from different places. Cross drainage, works should be constructed to bypass the surface water and other discharges.

### ***iii. Residual Impact***

If the mitigation measures indicated above are, fully implemented, residual impact will be very insignificant.

## **5.5.4 Change in Landscape**

### ***i. Impact Origin***

A landscape is a subjective concept that cannot be precisely quantified. However, in general, any project when not designed considering the local landscape, then it creates visual intrusion to the people. The project may change the local landscape to some extent.

### ***ii. Mitigation Measure***

Any part of the project should be designed considering key criteria of landscape like coherence, readability, hierarchy and stability. It is understood that project will have a modern architectural view, which does not provide any significant visual intrusion. One simple way by which the altered green area can be turned into its original visual quality is the plantation of trees around the project area.

### ***iii. Residual Impact***

Provided that the mitigation measures indicated above are fully implemented, residual impact will be very insignificant.

## **5.6 Impact on Climate**

### ***i. Impact Origin:***

The primary source of climate impact from the Aspire Washing Ltd. project is the emission of greenhouse gases, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). These emissions result from:

- Burning of fossil fuels (diesel) in the power generator.
- Transportation of raw materials and finished products.
- Energy consumption in the production processes.

### ***ii. Mitigation Measure:***

- Transition to renewable energy sources, such as solar or wind power.

- Implement sustainable forestry practices, support responsible sourcing, and promote afforestation projects.
- Implement water-recycling systems and adopt cleaner production technologies.
- Invest in energy-efficient technologies, conduct energy audits, and promote conservation practices.
- Optimize logistics, adopt eco-friendly transport modes, and consider regional sourcing.
- Explore eco-friendly pulping methods, substitute hazardous chemicals, and implement closed-loop systems.

**iii. Residual Impacts:**

- Minimal residual impacts, reduced carbon footprint.
- Reduced impact on biodiversity and ecosystems.
- Reduced water stress and pollution in local ecosystems.
- Lower energy consumption and associated greenhouse gas emissions.
- Minimized landfill contribution and resource conservation.
- Reduced carbon footprint in the supply chain.
- Minimized chemical-related environmental harm.

## **5.7 Impact on Water Use & Wastewater Discharge on Environment**

**i. Impact Origin**

Aspire Washing Ltd. consumes 2300 m<sup>3</sup> of water per hour. A portion is used for operation, another portion is used for utility section and rest of the amount is used for domestic purpose in the plant.

Total amount of liquid effluent from Aspire Washing Ltd. is around 75.0 m<sup>3</sup>/hour and a 90.0 m<sup>3</sup>/hr. ETP is constructed for industrial wastewater treatment.

Untreated dye wastes have adverse effects on agricultural land in the following ways:

- The suspended and colloidal matter may clog the pores of the soil by forming an impervious mat;
- The high alkalinity may be harmful to crops and high salinity of the wastes will impair their growth;

- The soil loses its water holding capacity and as a cumulative effect, the soil will lose its productivity.

On the other hand, untreated effluent if discharged into streams causes rapid depletion of the dissolved oxygen of the receiving streams. The condition is aggravated due to the settlement of Suspended Solids (SS) and subsequent decomposition of the deposited sludge in an anaerobic condition.

#### ***ii. Mitigating Measure***

Water quality issues associated with any industry are always significant. As there are always liquid and solid wastes generated from the industry especially from denim washing industry. The wastewater is being treated by the ETP. The water from the process unit must be passed through ETP directly. The cooling water will be used in a close loop system having no discharge. Some make up water would be added to the system often. The domestic liquid waste will be disposed through a septic tank with a soak pit. The project has planned drainage system to discharge the surface runoff. The surface drainage network would be connected with an interceptor prior to discharge through natural water. The interceptor will trap all oily matter present in the water. It is well known that the disposal of liquid waste is the major problem associated with the denim washing production machines.

#### ***iii. Residual Impact***

It is clear from above study that anodizing wastewater needs proper treatment before discharging into the environment and accordingly, the project proponent has been adopted necessary treatment options suitable to their needs meeting the national standards and at the same time, which is cost effective, easy to maintenance and operation. Adaptation of measures set out above may not provide total mitigation. Therefore, in this case, to maintain national standard, Aspire Washing Ltd. will discharge some residual pollutants, which can affect the environment in the long run. Therefore, this situation can be overcome by determining the exact level of treatment and proper monitoring, which is required to maintain the normal water quality of the receiving body.

### **5.8 Impact Due to Solid Waste Generation**

#### ***i. Impact Origin***

The operation of the industry itself would not generate any solid waste. Solid waste normally sludge is generated from the Effluent Treatment Plant. Moreover, other solid waste generated by the people

working at the factory is paper, cartoons, bags, boxes, office wastes, pallets, empty drums etc. Along with negligible quantity of domestic waste. There will have waste Air filters and waste rugs be generated occasionally which need to be properly disposed.

#### ***ii. Mitigation Measures***

Sludge produced from the ETP should be dumped off to specific landfill otherwise; it will cause danger to our health directly. All solid waste without will be segregated properly. Some solid waste has tremendous secondary demand and sold to the secondary dealers. Other solid wastes will be disposed to the safe places carefully. The air filters and waste rugs should be collected in a safe place and should be disposed to the land fill.

#### ***iii. Residual Impact***

Provided that the mitigation measure indicated above is fully implemented, residual impact to be very insignificant.

### **5.9 Impact on Air Quality**

#### ***i. Impact Origin***

Emission from the power generator stack may affect the ambient air quality. Unburned gases from the power generator operation may affect the air quality. The situation aggravates when gas contains high percentage of impurities like sulfur, hydrocarbon, etc. The high temperature of flue gases also impacts the air quality in terms of thermal pollution. The combustion of fossil fuels for power Generation inevitably results in emission of gaseous pollutants to the atmosphere. Each of these pollutants is examined below to ensure the Bangladesh emission limit, where appropriate, the required emission control techniques would be incorporated into the mitigation measures. The emissions of SO<sub>2</sub> are dependent on the sulfur content of the gas. As the Bangladeshi indigenous natural gas is almost free from Sulphur and particles so there would be no emission of Sulphur-dioxide from the power generator. Electricity will be produced using lean burn mixture of air and gas in the cylinder i.e. more air will be present in the cylinder than required for complete combustion. So, the cumulative NO<sub>x</sub> content would be a big concern to the ambient air quality to the surrounding atmosphere if proper mitigation measures would not be taken. Carbon monoxide is generated when incomplete combustion takes place. The emission of carbon dioxide depends on the fuel burn and the carbon content in the fuel.

### ***ii. Existing mitigation measures of Aspire Washing Ltd.***

It has been discussed earlier that the power generator of Aspire Washing Ltd. has been constructed with a modern design and sophisticated machinery setting. The emission from the power generator has been kept minimum with optimum designed cycle efficiency in order to maximize the KW output. Dispersion modeling was conducted before installation of the power generator for preliminary environmental impact assessment at Manikganj. In that study, the NO<sub>2</sub> emissions through stack were modeled to obtain maximum possible downward concentration. Moreover, for the well dispersion of the hot air from the generator, the Aspire Washing Ltd. authority constructed several stack more than 1.5 m high from the ground level. The stack is connected with a silencer to prevent the noise from the engine. The stack heights have been designed to facilitate undisturbed and free dispersion of the emitted air pollutants. Exhaust gas sample extraction facilities was installed for emission monitoring on each stack.

### ***iii. Residual Impact***

It is clear from above study that the project proponent adopted necessary options suitable to their needs meeting the national standards. Adoption of measures set out above is not expected to provide total mitigation, because no machine works at 100% efficiency. After adopting proper mitigation measures to maintain national/international standards, The Aspire Washing Ltd. will emit very little amount of residual pollutants, which does not affect the environment. So, this situation can be sustained by determining the exact level of treatment and maintaining it by following the management plan properly, which is required to maintain the normal ambient air quality of the area.

## **5.10 Impacts on Acoustic Environment**

### ***i. Impacts and Origin***

The term 'noise' may be defined as an unwanted sound at a wrong time and a wrong place. Noise is considered to be one of the dimensions of pollution, which leads to degradation of the environment and also creates psychological and physical effects on human health. The discomfort caused by noise is difficult to assess; it includes auditory fatigue and temporary lessening of hearing ability. Perception of noise is often relative to the background sound level, so that new roads in quiet areas or noisy trucks at night are often perceived as worse than higher levels of noise in a busy area during working day. Noise levels depend on the two parameters- sound pressures and sound intensity. They are measured in different units giving varying degree scale of magnitude. The common scientific unit is the 'decibel' (dB). Measurement of noise level in dB is carried out with an instrument called sound

level meter. During operation of Aspire Washing Ltd. noise is likely to be generated from the following activities:

- Gas generator.
- Truck/ other vehicles & machineries at the plant area

#### Potential environmental impacts of noise

Noise pollution can potentially affect immediate neighbors, Employees and workers. The impacts are

- ✓ Continuous exposure of neighbors, employees and workers to noise nuisance may result in noise induced hearing lose;
- ✓ Noise nuisance may reduce concentration of workers.
- ✓ High noise level will force employees to shout loud when communicating to one another;
- ✓ Exposure of employees to high noise level (above 85 dB) continuous for 8 hours per day may result in noise induced hearing lose;
- ✓ Exposure of ear to peak sound level instantaneously may result to deafness.

#### **ii. Existing Situation Aspire Washing Ltd.**

In order to assess the present sound quality monitoring was conducted at Aspire Washing Ltd., which shows except main gate at industry sound level exceeds the allowable level of 60 dBA for mixed area. In order to reduce noise level, the steps that are already taken in Aspire Washing Ltd. is the generator room is enclosed and the Engineers and operators use earplug during working hour inside generator room.

#### **iii. Mitigation Measures**

Following mitigation measures is suggested to reduce impacts of noise

- Noise shielding by barriers or buildings (Barriers can be themed or designed in a way that guests or visitor are not aware of their purpose and presence)
- Action against vibration i.e. shock absorber, damper/isolator should be taken. Machine that could be creates vibration are installed at ground floor of the factory with appropriate vibration management system.
- Regular noise quality monitoring at the site
- Strict use of PPEs inside noisy areas
- Take approval of concerned authorizes before organizing any concert.

#### **iv. Residual Impact**

Provided that the mitigation measure indicated above is fully implemented, residual impact to be very insignificant.

### **5.11 Impact Due to Lubricating Oil**

#### ***i. Impact Origin***

The industry uses lubricating oil in the operation of machineries and equipment as well as engine cooling system from where insignificant amount of used lubricating oil is generated.

#### ***ii. Mitigation Measures***

The oil storage of the project (fresh and used) should be done on hard standing floor and roofing with a secondary containment facility of 110% bigger than the allowable maximum storage capacity. As there is no chance of mixing and disposal of oil onto land or water, so there is no mitigating measure to be suggested.

#### ***iii. Residual Impact***

Provided that the mitigation measure indicated above is fully implemented, residual impact to be very insignificant.

### **5.12 Impact on Health and Safety, Natural & Accidental Incidents**

#### **A. Health and Safety**

#### ***i. Impact Origin***

The project will employ around more than 600 people during its operational period. The workers of the total employees who work inside the industry will face occupational health hazards due to different operational processes. Safe and good occupational health status of the employees and workers is important for only the persons working in the plant, but also for the better plant operation and maintenance.

#### ***ii. Mitigation Measures***

Protective clothing, earplug, helmets, shoes and accessories should be provided to the workers. Adverse impact on worker's safety would be minimized by implementing an occupational health program. Regular medical checkup would be done to ensure the soundness of health of employees

and workers. Pollution control measures would duly adopt if necessary, including noise and air pollution.

**iii. Existing steps of Aspire Washing Ltd.**

Aspire Washing Ltd. authority provides mask, helmets, safety shoes, hand gloves, dust mask, safety goggles as well as necessary personal protective equipment (PPE) to ensure the health safety of the workers. For drinking water, the authority provided water filter in every section of the project.

**iv. Residual Impact**

Provided that the mitigation measure indicated above is fully implemented, residual impact to be very insignificant.

**v. Natural & Accidental incidents**

**a. Impact Origin**

Under controlled situation, accident is not expected. However, occasionally it occurs during construction works. Accident may occur during earth cutting, casting, construction works and installation of heavy machinery. The protection of head, eye, ear, and hand, foot of the workers, laborers and project personnel could be affected if proper and adequate arrangement is not ensured.

**b. Mitigation Measures**

The workers should wear PPE (Personal Protective Equipment), safety goggles, and other necessities.

**5.13 Socio-economic Impacts**

The Aspire Washing Ltd. is contributing to make up the increasing demand of the job opportunity to the local people. On the other hand, during the operation activities of **Aspire Washing Ltd.**, jobs and income opportunities have been created and as such per capita income has been enhanced in this area. For operation, a number of long-term skilled and unskilled personnel is required, which has created employment opportunities for the local inhabitants also. However, migration will be increased due to creating new job opportunities in the project area. People in the neighborhood are getting benefits from the employment, which generated increased business activities in this area. There is no religious, cultural or historic place near the site, so the noise and air pollution during

construction of the project does not create any potential impact. People of the surrounding area are benefited by the development of local small businesses due to the increase of migration in the area.

#### **5.14 Overland Drainage and Impact on Surface Water**

The potential impacts on local hydrology are principally those of altered patterns as a result of on-site construction and earthwork activities. The project may affect natural drainage, surface and ground water quality if not managed the construction works properly. There could be Siltation of water system or drainage from uncovered piles of soil

##### **5.14.1 Proposed Mitigation Measures**

- Surface drainage shall be controlled to divert surface runoff away from the construction area;
- Laying barrier net
- Undertaking construction work during dry seasons:
- Completed areas should be restored/re-vegetated as soon as practicable;
- Temporary silt-trap or digging of pond toward siltation prevention
- Stockpiling of spoil soil at a safe distance from the drainage system
- Utilizing spoil soil in land-fill
- Strict supervision should be maintained to avoid blockage of natural creeks during the construction period, and
- Containment of sanitary waste should be adequately disposed of to avoid surface and ground water contamination.
- Making provision for temporary disposal of wastes inside construction yard and disposal of solid wastes in an appropriate manner.
- Adequate provision has to be retained for the treatment and disposal of cuttings, drilling fluids and other chemicals and lube oil wastes generated during drilling, testing and commissioning stage.

#### **5.15 Increase in Vehicular Traffic in The Area**

Increase in vehicular traffic in the area is likely to be experienced during construction phase of the project. During the construction phase, increase in vehicular traffic in the area is likely to be because of Trucks ferrying construction material to site, Trucks ferrying waste material from site and Ferrying in of construction tools and equipment.

### **5.15.1 Potential Negative Environmental Impacts Likely to Result from Increased Vehicular Traffic in the Area**

- Possible traffic congestion of local roads and lanes;
- Possible of occasional experience of delays on the said local roads;
- Increased number of vehicles on local roads will result in increased wear and tear of local roads thus reducing lifespan of affected roads;
- Cost of maintaining local roads will increase;
- Pedestrians and cyclists using local roads will have to exercise more care with increase of vehicular traffic on the said roads; and
- There will be an increase of exhaust emission from vehicles, which will pollute local atmospheric air.

### **5.15.2 Proposed Mitigation Measures to Mitigate Increase in Vehicular Traffic in the Area**

The following measures can be put in place to mitigate possible negative impacts likely to result from increase in vehicular traffic in the area:

Management to provide for adequate internal parking, for all vehicles coming to the project premises;

Management to pave the dilapidated service road with tarmac or more durable material;

- All users of said roads to always observe traffic rules this will give pedestrians and cyclist their space and safety while using the road; and
- Marking of the roads to be clearly done.

## **5.16 Impacts During Construction**

### **5.16.1 Disruption of Earth Surface-Site Preparation and Clearing and Earthworks**

#### ***i. Impact Origin***

Each development project more or less requires site preparation. The preparation works generally done during construction stages includes-

- Biomass Removal
- Biomass Disposal
- Property removal
- Construction of access road

- Cut and fill operation
- Soil Export and Import
- Drainage works etc.

The impacts generally arise from the above activities are as follows-

- Noise
- Fugitive dust
- Runoff and flooding
- Soil erosion: Land erosion along the uncovered space due to soil removal and excavation.
- Water Pollution through runoff and sedimentation
- Social concerns
- Infrastructure disruption
- Safety Concerns

However, the project site is of the nature that it will cause negligible impacts in the preconstruction stages. The site will require some land filling. The proposed site for extended facility has no homestead land so impact from property removal activities is negligible.

#### ***ii. Mitigation Measures***

Cutting and filling operation should be kept minimum. The proponent should ensure construction of proper drainage facility. Regular water sprinkle should be used to minimize fugitive dust emission. Safe working procedures should be ensured by the contractor. Undertaking construction work during dry seasons. The heavy equipment should be operated at day time.

### **5.16.2 Impacts on Air Environment**

#### ***i. Impact Origin***

The air quality in the project area may slightly deteriorate for the time being during construction. The major construction activities from which air emission mostly dust emission may occur are;

- Poorly paved service lane;
- Ground excavation;
- Delivery of building materials to site;
- Handling and mixing of cement
- Potential environmental impacts from dust

#### ***ii. Poorly Paved Service***

The access road to the project should be perfectly paved. Dust nuisance from unpaved or partly paved road is of concern because:

- There will be increased traffic driving in and out of the project site to deliver construction material;
- If soil moisture content becomes very low; it could create increasing quantity of loose particulate matter on road surface;
- There could be no or little vegetation cover to act as dust trap.

### ***iii. Delivery of Building Materials to Site***

Construction materials such as building blocks, cement, sand, steel bars, stone/brick chips will be bulky and thus will require to be delivered on site by a fleet of trucks driving in and out of the construction site. During this exercise dust is likely to be generated from the following-

- Handling of cement which is dusty by nature of the way it is;
- Handling of sand, stone/brick chips may contain loose dust particles;
- Site clearing of area of holding ballast, building blocks and sand will expose the site to wind action;

### ***iv. Handling and Mixing of Cement***

The powdery nature of cement will be a potential source of dust especially during handling and mixing it with other materials such as sand and gravel. Cement dust will likely be of concern during: -

- Opening-up of cement bags and emptying the cement in order to mix with other construction material;
- During loading and offloading of cement.

### ***v. Potential environmental impacts from dust***

Dust produced will potentially negatively affect the following:

- Employees generally construction workers;
- Immediate neighbors and general public; and

## **1. Effects of Dust to Employees**

Cement dust can affect plant employers in the following way

- Eye irritation;
- Skin irritation;
- Impairment of normal sweating of the skin as it blocks pores on the skin;

- Chocking of the throat;
- Respiratory difficulties;
- Difficulty in breathing;
- Potential course of chest complication and ailment.

## **2. Dust Impacts to Immediate Neighbors and General Public**

- Reduced visibility; emission of high particulate matter to the environment will reduce local visibility;
- Continuous exposure of people to dust will likely affect one's eye sight that can potentially result in an outbreak of eye infection;
- Chest related ailment; continuous exposure of people to dust will likely result in chest complications and respiratory disorders.

### **vi. Mitigation measures**

Following mitigation measures are proposed to minimize the air pollution during the construction stage:

- The Project Proponent should ensure the complete paving of the service road
- Regular sprinkling of water to be done on open surface and dust grounds until paving is done;
- Transport of materials in tarpaulin- covered trucks
- The sand and other such dispersible material will be stored at site for minimum working period.
- Removal of soil/mud from trucks and other appliances prior to leaving the project area.
- Storage of top-soil in a safe space and creation of top-soil on filled land utilizing this preserved soil
- Selective cutting of trees in the site should be carried out. Only trees which on exact proposed position of the building should be cleared any other vegetation outside proposed building position should be maintained;
- Plantation of trees in the construction yard as quickly as possible. Any open area should be planted with appropriate vegetation (trees, flowers and grasses);
- Project management and contractor to enforce strict use of personal protective clothing;

The emissions are temporary and not expected to contribute significantly to the ambient air quality and will be within prescribed limits for industrial regions by National Ambient Air Quality Standards.

**vii. Residual Impact**

Provided that the mitigation measure indicated above is fully implemented, residual impact to be very insignificant.

**5.17 Gains to The Economy**

**5.17.1 During Operation Phase**

**i. Impact Origin**

The most significant positive impact of the project is that the industry is playing role to the denim washing manufacturing sector of Bangladesh. The other important positive impact of the project is the employment of personnel for the operation of the industry. The project envisages employing 393 experienced and dedicated workforces. Apart from the positive impacts other beneficial impacts include benefit to local economy due to employment, community development, etc.

**ii. Benefit Enhancement Measure**

Although labor recruitment is a matter of company who has the right to determine whom he shall and shall not employ, but still the project proponent should take initiative to employ local people wherever possible and to give preference to employment of the jobless people.

**5.17.2 During Construction**

**i. Impact Origin**

During construction period, the plant will create job opportunities of a large number of skilled, semi-skilled and unskilled labors. However, the impact will be a relatively short duration, being restricted locally to the construction period. In addition to this, all construction sites attract small traders, who supply food and other consumable to the work force. Although the numbers of people who benefited in this way are relatively small, the impacts on individuals can be disproportionately high compare to the other local people.

## ***ii. Benefit Enhancement Measure***

Although labor recruitment is a matter of construction contractor who has the right to determine whom he shall not employ, but still the project proponent shall encourage him to hire local people wherever possible and to give preference to employment of the landless people.

### **5.17.3 Job Opportunities**

A production company serves as a hub of economic activity, not only contributing to the production of essential packaging materials but also creating a multitude of employment opportunities for both skilled and unskilled workers. With skilled and unskilled positions in Aspire Washing Ltd, these opportunities play a pivotal role in boosting the local and regional job market. Skilled positions in a denim washing company encompass a range of roles, including machine operators, maintenance technicians, quality control experts, and logistics professionals. These individuals are integral to the efficient and high-quality operation of the facility. Skilled workers often receive specialized training, and their expertise ensures the smooth functioning of the machinery, maintenance of production standards, and the adherence to safety protocols.

On the other hand, unskilled positions offer entry-level opportunities, making it possible for individuals with varying levels of experience to secure stable employment. These roles include general laborers, warehouse staff, and administrative support personnel. Unskilled workers receive on-the-job training, providing them with valuable skills and experience that can open doors to further career advancement within the company.

The combined workforce, comprising both skilled and unskilled employees, fosters a dynamic and collaborative environment. It not only drives the production process but also supports the local community by injecting income and stability. In many cases, Aspire Washing Ltd. also engage in community outreach, education, and vocational training programs to enhance the skills and employability of their workforce.

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## *Chapter 6*

### *Environment Management Plan*

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## **6. ENVIRONMENTAL MANAGEMENT PLAN**

### **6.1 General Consideration**

In the context of a project, Environmental Management Plan (EMP) is concerned with the implementation of the measures necessary to minimize or offset adverse impacts and to enhance beneficial impacts. All the measures are said to be successful when they comply with the Environmental Quality Standard (EQS) of Bangladesh. Thus, the objectives of EMP for current and proposed project would be-

- Propose Mitigation measures to reduce or eliminate negative impacts
- Enhancement measures to maximize positive impacts
- Define Monitoring requirement and Monitoring indicators
- Propose budgeting and allocation of funds for environmental management system

In preparation of the EMP, Environmental components, sub-components and major activities of the project were identified. Probable impacts of the activities on the environment and their magnitude and duration were also identified.

During the life span of the project, Aspire Washing Ltd. will need to integrate to its existing environmental management plan (EMP) with the one proposed in this section so as to harmonize and mitigate all significant impacts from the existing facilities and any future development works. To achieve this Aspire Washing Ltd. will need to put in place and document policies that will govern their operations to this end. This will also ensure that management will be committed to avail necessary finances to be used in implementation of management options the EMP. To achieve objectives of this EMP it will consist of the following sections:

- Overview of the project;
- Environmental Impacts and Mitigation;
- Management Policies;
- Institutional Arrangements;
- Management Plans; and Implementation Program

### **6.2 Project Overview**

Aspire Washing Ltd. located at Sudkhira, Jamirta, Singair, Manikganj is an existing facility, which is committed to environmental protection now requires environmental clearance certificate for the production unit under this EMP.

As per the existing rule each project must get ECC from DoE. To meet these two main regulatory requirements and for better management of the overall environment this EMP is conducted. As a pre-requisite of the overall EMP study baseline environmental examination was conducted by the consultants and important environmental components that may be affected by the existing project activities were identified. The study identified Water, Air and Acoustic environment as the major components of the project site.

### **6.3 Environmental Impacts and Mitigation**

After identification of the major environmental components, activities that could impact this component was identified, finally predict and evaluations of environmental impacts have been done in chapter 5. Mitigation measures that is required to minimize these impacts to allowable extent and enhancement of the positive impacts have also been identified the following Table 6.1 presents a summary of impacts and mitigation measures.

**Table 6.1: Major environmental impacts mitigation/ enhancement measures**

| Project Phase     | Project Activity                                                      | Affected Environmental Component                  | Anticipated Impact                                                                                                                                               | Proposed/Implemented mitigation/ Enhancement Measures                                                                                                                                                                                  |
|-------------------|-----------------------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pre- Construction | Site selection & layout, Design of facilities, Raw material sourcing. | Land use pattern, topography, drainage            | Minor change in local land use, possible obstruction to natural drainage if not designed properly                                                                | <ul style="list-style-type: none"> <li>Select land inside approved industrial area</li> <li>Maintain natural drainage alignment</li> <li>Obtain DoE site clearance before physical works.</li> </ul>                                   |
|                   |                                                                       | Physical environment (space use, air circulation) | Loss of topsoil, removal of existing vegetation and habitat                                                                                                      | <ul style="list-style-type: none"> <li>Strip and store topsoil separately for reuse in landscaping, restrict clearing to project footprint</li> </ul>                                                                                  |
|                   |                                                                       | Sanitation, water supply, waste generation        | Improper design may lead to inadequate space for ETP & STP                                                                                                       | <ul style="list-style-type: none"> <li>Incorporate ETP (90 m<sup>3</sup>/h), STP, waste storage and fire lane in design, ensure adequate ventilation and separation between process and storage units.</li> </ul>                      |
|                   |                                                                       | Soil, surface runoff, vegetation                  | Improper sanitation may pollute surface or groundwater                                                                                                           | <ul style="list-style-type: none"> <li>Provide portable toilets with septic tank</li> <li>Establish waste bins, ensure potable water supply, and connect to temporary soak pit.</li> </ul>                                             |
| Operational Phase | Regular Operation of the utility machineries and generator            | Water Environment                                 | Deterioration of the surface water quality from<br>a) Discharge of effluent for irrigation purpose<br>b) Discharge of solid and liquid wastes to open water body | <ul style="list-style-type: none"> <li>Strict monitoring the quality of effluent discharged through ETP</li> <li>Regularly monitor surface water quality</li> <li>Minimize impervious surfaces and increase tree plantation</li> </ul> |

| Project Phase     | Project Activity                 | Affected Environmental Component | Anticipated Impact                                                                                                                                                                                                                         | Proposed/Implemented mitigation/ Enhancement Measures                                                                                                                                                                                                                                                                                          |
|-------------------|----------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                   |                                  |                                  | c) Unplanned discharge of sewage<br>d) Oil spillage from diesel generator<br>e) Natural causes like excessive runoff from rain                                                                                                             | <ul style="list-style-type: none"> <li>• A planned site for solid waste discharge</li> <li>• Monitor drainage situation especially during wet season</li> <li>• Prevent oil spillage from diesel generator</li> <li>• Ensure proper sanitation facilities</li> <li>• Increase awareness and training</li> </ul>                                |
|                   |                                  | Acoustic Environment             | Noise pollution due to-<br>a) Routine operation of utility machineries, evaporator and generator<br>b) Workers screaming on duty<br>c) Operation of ETP & STP,<br>d) Vehicular movement,                                                   | <ul style="list-style-type: none"> <li>• Noise shielding by barriers or buildings</li> <li>• Green belt development beside the noisy machineries</li> <li>• Strict use of PPEs inside noisy areas</li> <li>• Regular noise quality monitoring</li> <li>• Proper management of vehicular traffic and swift work practice at entrance</li> </ul> |
|                   |                                  | Air Quality                      | <ul style="list-style-type: none"> <li>▪ Air Pollution (negligible) from</li> <li>a) Gas and Diesel generator exhaust</li> <li>b) Solid waste</li> <li>c) Increased traffic movement</li> </ul>                                            | <ul style="list-style-type: none"> <li>• Burning good quality fuel</li> <li>• Proper management of solid waste</li> <li>• Effective control of vehicular traffic</li> </ul>                                                                                                                                                                    |
| Operational Phase | Regular Operation of the utility | Due to Solid Waste Generation    | <ul style="list-style-type: none"> <li>▪ Air, Water and Soil Pollution by –</li> <li>a) Odor emanating from degradable waste</li> <li>b) Discharge of solids to open space</li> <li>c) Poorly disposed waste may block drainage</li> </ul> | <ul style="list-style-type: none"> <li>• Proper solid waste management system</li> <li>• Sufficient number of waste handling bins</li> <li>• Awareness and training</li> </ul>                                                                                                                                                                 |

| Project Phase | Project Activity          | Affected Environmental Component                               | Anticipated Impact                     | Proposed/Implemented mitigation/ Enhancement Measures                                                                                                                                                                                                                                                                                                               |
|---------------|---------------------------|----------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | machineries and generator | Health and Safety                                              | Health hazard of employees and workers | <ul style="list-style-type: none"> <li>• Implementation of proper pollution control measures</li> <li>• Appointment of Medical officer</li> <li>• Provision of medical centers and regular health check up</li> <li>• Operators training regarding safe operation and maintenance works</li> <li>• Proper management of surface and ground water quality</li> </ul> |
|               |                           | Natural and Accidental Hazard                                  |                                        | <ul style="list-style-type: none"> <li>• Proper structural design of infrastructures</li> <li>• Develop Emergency response and disaster management plan</li> <li>• Develop and maintain safety related resource manuals</li> <li>• Provision of sufficient First Aid facilities</li> <li>• Effective firefighting systems</li> </ul>                                |
|               |                           | Traffic congestion due to increased vehicular traffic movement |                                        | <ul style="list-style-type: none"> <li>• Sufficient parking facility should be provided</li> <li>• Proper marking on road and proper signaling facility</li> <li>• Everybody should abide by traffic rules</li> </ul>                                                                                                                                               |

| Project Phase           | Project Activity                                                                                                                                                                                                                                                                                                                                 | Affected Environmental Component                                                                                                                                                                                   | Anticipated Impact | Proposed/Implemented mitigation/ Enhancement Measures                                                                                                                                                                                                                                                                                                         |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | <b>Anticipated positive impacts of the proposed Project are:</b> <ul style="list-style-type: none"> <li>✓ Creation of jobs;</li> <li>✓ Beautification of locality;</li> <li>✓ Support of local businesses;</li> <li>✓ Infrastructure development;</li> <li>✓ Revenue to Local Municipal Council; and</li> <li>✓ Gains to the economy.</li> </ul> |                                                                                                                                                                                                                    |                    | <ul style="list-style-type: none"> <li>• Local people should be given preference in case of recruiting new staffs</li> <li>• The authority should regularly pay all local taxes</li> <li>• Should sponsor local development and beautification works</li> <li>• Should take part in social activities</li> <li>• Conduct social awareness training</li> </ul> |
| Any future construction | Regulatory Constrains                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>▪ Lack of planning</li> </ul>                                                                                                                                               |                    | <ul style="list-style-type: none"> <li>• Should conduct proper environmental study</li> <li>• Land use planning should comply with national standard</li> </ul>                                                                                                                                                                                               |
|                         | Land Selection                                                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>▪ Encroachment into irrigation area</li> <li>▪ Encroachment into forest area, etc.</li> </ul>                                                                               |                    | <ul style="list-style-type: none"> <li>• Avoid irrigation area and forest area</li> </ul>                                                                                                                                                                                                                                                                     |
|                         | Site preparation and Clearing and Earthworks                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>✓ Noise</li> <li>✓ Fugitive dust</li> <li>✓ Runoff and flooding</li> <li>✓ Water Pollution through runoff and sedimentation</li> <li>✓ Infrastructure disruption</li> </ul> |                    | <ul style="list-style-type: none"> <li>• Minimize cutting and filling</li> <li>• Ensure proper drainage facility</li> <li>• Ensure Safe working procedures</li> <li>• Regular water sprinkle to bare surfaces</li> </ul>                                                                                                                                      |
|                         |                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>▪ Change in Landscape</li> </ul>                                                                                                                                            |                    | <ul style="list-style-type: none"> <li>• Ensure modern architectural design</li> </ul>                                                                                                                                                                                                                                                                        |
|                         |                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>▪ Impacts on Air Environment</li> </ul>                                                                                                                                     |                    | <ul style="list-style-type: none"> <li>• Ensure complete the paving of the service road</li> </ul>                                                                                                                                                                                                                                                            |

| Project Phase | Project Activity                                | Affected Environmental Component | Anticipated Impact | Proposed/Implemented mitigation/ Enhancement Measures                                                                                                                                                                                        |
|---------------|-------------------------------------------------|----------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                                                 |                                  |                    | <ul style="list-style-type: none"> <li>Sand and other such dispersible material should be stored at site for minimum working period.</li> <li>Material transportation truck should be covered</li> </ul>                                     |
|               | ▪ Impacts on Acoustic Environment               |                                  |                    | <ul style="list-style-type: none"> <li>Noisy construction works to be limited to daytime hours</li> <li>Immediate neighbors to be notified in writing</li> <li>Ensure strict enforcement on user of ear protectors at noisy areas</li> </ul> |
|               | ▪ Sanitation Hazard & drinking water            |                                  |                    | <ul style="list-style-type: none"> <li>Proper sanitation system should be provided</li> <li>Ensuring sufficient numbers of toilets</li> <li>Ensure safe potable water supply to the workers</li> </ul>                                       |
|               | ▪ Accidents or Occupational Health Hazard       |                                  |                    | <ul style="list-style-type: none"> <li>Ensure safe working procedure</li> <li>Strict use of PPEs</li> </ul>                                                                                                                                  |
|               | ▪ Overland Drainage and Impact on surface water |                                  |                    | <ul style="list-style-type: none"> <li>Surface drainage shall be controlled to divert surface runoff away from the construction area</li> <li>Strict supervision should be maintained to avoid blockage of natural creeks</li> </ul>         |

| Project Phase | Project Activity | Affected Environmental Component | Anticipated Impact | Proposed/Implemented mitigation/ Enhancement Measures                                                                                                                     |
|---------------|------------------|----------------------------------|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                  |                                  |                    | <ul style="list-style-type: none"> <li>Containment of ETP and sanitary waste should be adequately disposed off to avoid surface and ground water contamination</li> </ul> |

## **6.4 Management Policies**

Aspire Washing Ltd. should review and enhance its current different policies that will guide operations of company activities. The policies are vital in that:

- They will enable management to develop and maintain sound relations with company employees and the neighboring community;
- They will enable management put in place measures and structures that will care for the safety, health and welfare of all company employees and workers;
- They will ensure that management will plan for, and put in place, monitoring programs that will ensure emissions do not exceed the required maximum limits, and wastewater and solid wastes generated by the project are properly managed; and
- They will ensure that management assumes its corporate responsibility for its activities with regard to conservation of the environment as well as for the well-being of the neighboring community.

The following policies will need to be enhanced: -

- 1) Environmental Management Policy;
- 2) Occupational Health and Safety Policy;
- 3) Local Community Policy; and
- 4) Employment Policy.

### **6.4.1 Environmental Management Policy**

Aspire Washing Ltd. may already have developed an environmental policy for its existing facilities. This environmental policy is to be reviewed and enriched. This will help Aspire Washing Ltd. to carry out its activities with the highest regard to the natural environment and sustainable utilization of environmental resources therein. The policy should therefore cover the following, among other issues:

- Ensure that all company activities and operations must be within legal requirements of all relevant national legislation;
- That there will be continuous environmental improvement and performance through monitoring of company activities;
- Ensure that utilization of natural resources is optimal with measures in place to ensure resource availability for future generation;

- Awareness creation to the surrounding community regarding sustainable utilization of natural resources, protection of sensitive ecosystems and bio-diversity maintenance for communal livelihood; and
- Balancing between natural resource use, environmental conservation and economic development.

According to the developed environmental policy environmental stewardship should be both a management obligation and the responsibility of every employee. To achieve this everyone should:

- Maintain and continuously improve the Environment, Health and Safety Management System (EHSMS) across the organization.
- Ensure that all employees and workers receive appropriate training to full their individual EHSMS and environmental responsibilities.
- Establish annual environmental objectives and targets and implement programs to achieve them.
- As a minimum comply with relevant legal and other requirements
- Ensure that Aspire Washing Ltd. have the resources and skills necessary to achieve our environmental commitments.
- Incorporate environmental performance in the annual appraisal of employees and contractors and recognize accordingly
- Formally monitor, audit, review and report annually on our environmental performance and EHSMS requirements against defined objectives.

#### **6.4.2 Occupational Health and Safety Policy**

Aspire Washing Ltd. may already have developed an Occupational Health and Safety Policy. This policy should be reviewed and revised. This will enable the company put in place appropriate measures that will ensure that the health, safety and welfare of all employees; together with the health requirements of the local community in which the company is conducting business. The policy should highlight on the following, among others:

- Safety measures for all machines and equipment to be used;
- Appropriate safety and rescue equipment to be availed in all work places;
- Emergency procedures and actions;
- Risk minimization of accidental damage to employees, community and environment;
- Machine maintenance and machine operator proficiency; and
- Training in safety

There should believe within employees that

- No business objective will take priority over health and safety.
- All injuries and incidents are preventable.
- No task is so important or urgent that it cannot be done safely.
- Without diminishing management's obligations, the responsibility and accountability for health and safety rests with every individual.

Best practice in health and safety management should be encouraged. To achieve these objectives everybody should:

- Maintain and continuously improve the Environment, Health and Safety Management System (EHSMS) across the organization.
- Provide a balanced focus on the management of health and wellbeing, personnel and process safety.
- Proactively pursue the identification of all hazards and eliminate or, if not possible, manage the risk to as low as reasonably practicable
- Consult with and promote active participation of employees in the management of their own and others' health, wellbeing and safety.
- Provide resources to achieve a systematic approach to health, personnel safety and process safety management to ensure continuous performance improvement.
- Identify performance measures, set improvement targets, measure and report performance at all levels.
- As a minimum comply with relevant legal and other requirements
- Develop a culture where all employees and contractors are constantly aware of safety hazards around them and act accordingly at and away from work.
- Include health and safety performance in the appraisal of employees and workers and recognize accordingly.
- Steward the health and safety performance of Joint Venture activities operated by others.

#### **A. Exposure to Specific Occupational Health and Safety Hazards**

Workers in the proposed denim washing facility may be exposed to various occupational health and safety hazards during construction and operational phases. These hazards primarily arise from chemical handling, machinery operation, wastewater treatment processes, and physical working conditions.

**Table 6.2: Identification of Key Hazards and Exposure**

| <b>Hazard Type</b>  | <b>Source of Exposure</b>                          | <b>Potential Impact</b>                         |
|---------------------|----------------------------------------------------|-------------------------------------------------|
| Chemical Exposure   | Handling of acids, alkalis, dyes, bleaching agents | Skin irritation, respiratory issues, eye damage |
| Noise               | Washing machines, dryers, generators               | Hearing impairment, stress                      |
| Heat Stress         | Boiler operations, drying sections                 | Fatigue, dehydration                            |
| Biological Exposure | ETP (biological treatment units, sludge handling)  | Infections, skin diseases                       |
| Physical Hazards    | Moving machinery, wet floors                       | Injuries, slips and falls                       |
| Confined Space      | Tanks, ETP units                                   | Oxygen deficiency, toxic gas exposure           |

**i. Workers are exposed through:**

- Inhalation of fumes, vapors, and dust
- Direct skin contact with chemicals and contaminated materials
- Noise exposure from continuous machine operation
- Accidental ingestion due to poor hygiene practices

**ii. Mitigation and Control Measures**

- Provision and mandatory use of appropriate PPE (gloves, masks, goggles, ear protection)
- Installation of proper ventilation systems in chemical and ETP areas
- Regular maintenance and guarding of machinery
- Implementation of confined space entry procedures
- Noise control measures and periodic monitoring
- Worker training on safe handling of chemicals and equipment
- Availability of first aid and emergency response facilities

**iii. Monitoring and Health Surveillance**

- Periodic medical check-ups for exposed workers
- Monitoring of workplace air quality and noise levels
- Record-keeping of exposure incidents and health conditions

With proper implementation of control measures, the occupational exposure risks can be effectively minimized, ensuring a safe and healthy working environment.

## **B. Occupational Health and Safety (OHS) Plan and Budget Allocation**

To ensure the occupational health and safety of all workers during construction and operational phases, a comprehensive OHS management plan will be implemented. The plan will comply with national regulations and international best practices.

### **1. Safety Measures and Implementation Plan**

- All workers will be provided with appropriate Personal Protective Equipment (PPE) such as helmets, gloves, safety shoes, goggles, and masks.
- Regular safety training and awareness programs will be conducted for workers and staff.
- Emergency response procedures (fire safety, chemical handling, first aid) will be established and communicated.
- Adequate ventilation, lighting, and noise control systems will be ensured within the facility.
- First aid kits and medical support facilities will be available on-site.
- Proper signage and hazard identification systems will be maintained throughout the plant.
- Routine inspection and maintenance of machinery and equipment will be carried out to prevent accidents.

### **2. Monitoring and Responsibility**

- A dedicated Safety Officer will be appointed to monitor compliance with OHS standards.
- Regular audits and inspections will be conducted to ensure safety compliance.
- Incident reporting and corrective action mechanisms will be implemented.

### **3. Commitment**

The project authority is committed to maintaining a safe and healthy working environment by ensuring continuous improvement in occupational health and safety performance.

## **C. Annual Report on Workers' Health Status (OHS Focus):**

An annual health status report will be prepared based on medical examinations, workplace monitoring, and incident records. The report will cover workers' health conditions, occupational diseases, accident statistics, exposure risks, and effectiveness of safety measures. Necessary corrective actions and improvement plans will be incorporated to ensure continuous enhancement of occupational health and safety performance.

### **6.4.3 Local Community Policy**

The Local Community Policy to be developed by Aspire Washing Ltd. should ensure that the company develops and maintains sound relations with its employees and the local community on mutual respect and active partnership. The policy should highlight on ways the company should: -

- Work with the local community and relevant government departments and agencies to achieve sustainable community development;
- Ways of enhancing information flow from management to the community and employees, and vice versa;
- Community capacity building; and
- Active engagement of the local community in the project.

Aspire Washing Ltd. has in place an employment policy. This policy will require updating to reflect the social economic realities that the company is operating in view of future development should take into consideration the varying employment needs of the community. The policy should endeavor to protect the local community from unfair competition when it comes to recruitment of workers for the project. The policy should cover the following, among other issues: -

- Local community considerations in employment;
- Training needs for employees;
- Employment of people with specialized skills;
- Casual Workers;
- Compensation, allowances and benefits; and
- Terms of payment and scales

### **1. Livelihoods**

The proposed project is expected to have both positive and negative impacts on local livelihoods. Positive impacts include employment generation for local skilled and unskilled workers during construction and operational phases, as well as indirect economic opportunities for local service

providers and small businesses. Potential negative impacts, such as temporary disturbance during construction activities, will be minimized through proper planning and scheduling.

## **2. Community Health and Safety**

The project may pose potential risks to surrounding communities due to construction activities, increased traffic movement, noise, and possible accidental chemical exposure. To mitigate these risks, appropriate safety measures such as controlled site access, traffic management plans, dust suppression, and emergency response preparedness will be implemented. No untreated effluent or hazardous discharge will be released into the surrounding environment.

## **3. Vulnerable Groups**

Special attention will be given to vulnerable groups including low-income households, elderly people, and children living near the project area. The project will ensure that no disproportionate adverse impacts occur on these groups. Community consultation and grievance mechanisms will be established to address concerns in a timely manner.

## **4. Gender Issues**

The project will promote gender equality by encouraging the participation of women in suitable employment opportunities. A safe and inclusive working environment will be ensured, free from harassment and discrimination. Separate sanitation facilities, safety provisions, and equal opportunity policies will be implemented to support female workers.

## **5. Mitigation and Enhancement Measures**

- Priority employment for local communities
- Occupational health and safety measures for workers and nearby residents
- Traffic and dust control during construction
- Community engagement and awareness programs
- Establishment of grievance redress mechanism (GRM)
- Gender-sensitive workplace policies

### **6.4.4 Employment Policy**

#### **A. Equal Opportunity Employment:**

Aspire Washing Ltd. is committed to providing equal employment opportunities to all individuals regardless of race, gender, religion, disability, age, or other protected status.

**B. Professional Development:**

Invest in the professional development of employees by providing ongoing training programs and opportunities for skill enhancement. Encourage continuous learning to ensure employees stay abreast of industry advancements.

**C. Employee Welfare and Benefits:**

Provide competitive compensation packages, including fair wages, benefits, and incentives, to attract and retain a skilled and motivated workforce.

**D. Non-Discrimination and Harassment:**

Strictly prohibit discrimination, harassment, or any form of unfair treatment within the workplace. Establish clear reporting mechanisms and investigate all complaints promptly and impartially.

**E. Social Responsibility:**

Encourage employee involvement in community service and social responsibility initiatives. Foster a sense of community engagement and pride among employees.

**F. Ethical Conduct:**

Promote a workplace culture that values honesty, integrity, and ethical conduct.

**G. Employee Engagement:**

Foster open communication channels and encourage employee feedback to enhance workplace satisfaction and productivity. Promote a collaborative and inclusive work environment.

**H. Grievance Resolution:**

Establish a fair and transparent grievance resolution process to address any concerns or disputes promptly and impartially.

This Employment Policy reflects the factory's commitment to creating a positive, inclusive, and environmentally responsible workplace. It aligns with the principles of sustainable development and social responsibility, contributing to the overall success and well-being of the workforce.

#### **6.4.5 Institutional Arrangements**

Aspire Washing Ltd. should develop a management cell namely environmental management cell in order to manage all environmental related activities on the site. This cell will be headed by Environmental Health and Safety Manager along with supporting staff. With the existing manpower

Aspire Washing Ltd. could easily form environmental management cell. Each individual will have his responsibility and together the cell will perform the following functions:

- Continued monitoring & assessment of Environmental parameters & regulations.
- To work for continuous & regular improvement in environmental performance.
- To ensure systematic and routine monitoring to reduce generation of pollutants inside the industry core area.
- To develop & maintain green belt
- To keep close liaison with environmental regulating authorities
- To conduct monthly, quarterly and yearly monitoring and submit statements
- To manage post project-monitoring plan as per approved EMP.
- To follow proper documentation and monitoring practices and procedures, which will facilitate the company to go for IS 14001 or equivalent

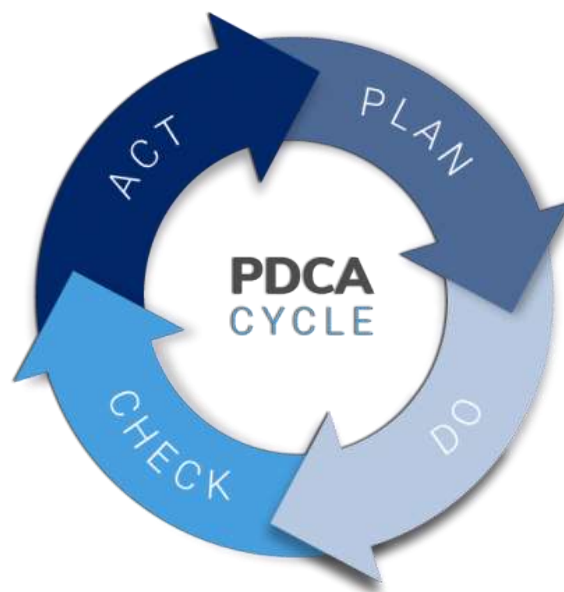
The EMP in this case of Aspire Washing Ltd. follows the "**Plan, Do, Check, and Act**" model (EPA, 2005) for ongoing improvement:

**Plan** - Planning, including identifying environmental impacts and establishing environmental goals.

**Do** - Implementing, including employee training and establishing operational controls.

**Check** - Checking, including auditing, monitoring and taking corrective action.

**Act** - Reviewing, including progress reviews and taking action to make needed changes.



**Figure 6.1: PDCA Cycle for Environmental Management for Aspire Washing Ltd.**

## **6.5 Health, Safety and Emergency Management Plan**

### **6.5.1 Objective:**

Ensuring the health and safety of all personnel involved in the Aspire Washing Ltd. (AWL) denim washing factory is of principal importance. AWL is committed to implementing comprehensive Occupational Health and Safety (OHS) measures to safeguard the well-being of its workforce and stakeholders throughout the project's execution.

### **6.5.2 Enforcement:**

To address potential hazards and maintain a safe work environment, the following OHS measures will be rigorously enforced:

- **Site Safety Management:** AWL will establish a dedicated safety management team responsible for supervising and enforcing safety protocols. Regular safety audits, inspections, and risk assessments will be conducted to identify and mitigate potential hazards.
- **Personal Protective Equipment (PPE):** All personnel, including workers, engineers, and visitors, will be required to wear appropriate PPE, such as helmets, gloves, safety shoes, and high-visibility vests, to reduce the risk of injury.
- **Construction Training:** Prior to commencing work, all workers will undergo comprehensive training on construction safety protocols and emergency procedures. This will enhance their awareness of potential risks and promote a safety-conscious work culture.
- **Fall Protection:** Given the nature of construction activities, fall protection measures will be strictly enforced for elevated work areas. Guardrails, safety harnesses, and proper scaffolding will be provided to prevent falls and ensure the safety of workers working at heights.
- **Machinery and Equipment Safety:** All construction equipment and machinery will undergo regular maintenance and inspections to ensure they are in optimal working condition. Operators will be trained to operate equipment safely and efficiently.
- **Emergency Response:** Well-defined emergency response plans will be in place, with clearly marked evacuation routes and assembly points. First aid kits, fire extinguishers, and other necessary emergency equipment will be strategically located across the site.

- **Health and Hygiene:** Adequate sanitation facilities, clean drinking water, and hygiene stations will be provided on-site to maintain the health and well-being of workers.
- **Site Security:** The establishment of a secure perimeter through the development of a boundary wall will not only protect the project site but also control access, enhancing safety by preventing unauthorized entry.
- **Ongoing Safety Monitoring:** The project's safety performance will be continuously monitored, with regular safety meetings and feedback mechanisms in place to encourage worker participation in identifying and resolving safety concerns.

## **6.6 Management Plans**

To address the potential impacts of wastewater discharge, solid waste, noise and air pollution, following management plan will be in force:

- Water and Wastewater Management (WWMP),
- Noise Management Plan (NMP)
- Offensive Odor Management Plan
- Hazardous Waste Management Plan
- Solid Waste Management Plan (SWMP)
- Sewage waste Management Plan

### **6.6.1 Water and Wastewater Management (WWMP)**

#### **Objective**

The objective of the WWMP is to ensure that operations in project at all stages do not result in releasing significant amount of waste water to the environment. The WWMP will take into critical account all possible sources of water usage and discharge that can result in generation of wastewater to pollute surrounding water environment. This is to be achieved by continuous monitoring of surface water quality on site, implementation of recommendations and mitigation measures made in this report in respect to water pollution and ensuring that the conditions subjected to license approval with respect to pollution control are adhered to.

#### **Enforcement**

The WWMP guiding principle will be installation of proper Effluent Treatment Plant (ETP) and sewage treatment facilities followed by good housekeeping practices, and safety and environmental performance, supported by regular feedback from the employees through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions, all regulatory authority will be enjoined in actions taken. This will include giving them access to the facility to assess working conditions as far as air quality is concerned and give government directives as may be required by law.

**Table 6.3: Water and Wastewater Management Plan (WWMP)**

| Issue/<br>concern                                                      | Potential<br>negative<br>environmental<br>impacts                                                                                                                                                                                                                                                                                                                                                              | Proposed<br>mitigation<br>measures                                                                                                                                                                                                                                                                                                                                                                                                                             | Environmental<br>Monitoring                                                                                                                                                                                                                               | Responsible<br>actors                                                                                                                                                                                                                           | Time<br>frame                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ground<br>water,<br>Surface<br>water<br>and ETP<br>effluent<br>Quality | <p>Deterioration of the Surface water quality from –</p> <p>a) Uncontrolled Usage ground water</p> <p>b) Discharge of partially treated wastewater through ETP</p> <p>b) Discharge of solid and liquid wastes to nearby surface water body</p> <p>c) Oil spillage from diesel generators</p> <p>d) Natural causes like excessive runoff due to heavy rain</p> <p>e) Health hazard of employees and workers</p> | <ul style="list-style-type: none"> <li>Proper and efficient use of ground water</li> <li>ETP effluent should be discharged through proper monitoring</li> <li>Protect surface water from unauthorized solid and liquid waste discharge</li> <li>Minimize impervious surfaces and increase tree plantation</li> <li>Prevent oil spillage from diesel generator</li> <li>Ensure proper sanitation facilities</li> <li>Increase awareness and training</li> </ul> | <ul style="list-style-type: none"> <li>Regularly monitor of ETP effluent quality at outlet</li> <li>Monitor regularly surface water quality</li> <li>Monitor drainage situation especially during wet season</li> <li>Proper management of ETP</li> </ul> | <ul style="list-style-type: none"> <li>- Aspire Washing Ltd. Authority &amp; workers</li> <li>-Occupational Safety and Health Officer</li> <li>-District Environmental Officer;</li> <li>-Neighbors; and</li> <li>-The common public</li> </ul> | <p>-Ground water, Surface water and ETP outlet water quality should be checked regularly And quarterly to submit DoE</p> <p>-Regular monitoring /Auditing of SWMS</p> <p>- ETP effluent quality (DO, BOD, COD, pH, TSS, TDS and SS etc.) should be checked daily</p> |

## **6.6.2 Noise Management Plan (NMP)**

### **a) Objective**

The objective of the Noise Management Plan (NMP) is to ensure that operational activities at Aspire Washing Ltd. and any future construction and operations do not generate and result in noise pollution to the employees and local community. The NMP is to be achieved by continuous monitoring of noise levels on site, implementation of recommendations and mitigation measures made in this report in respect to noise pollution and ensuring the conditions subjected to license approval with respect to noise management are adhered to.

### **b) Sources of noise**

Likely sources of noise at Aspire Washing Ltd. include Routine operation of heavy machineries specially evaporators, power generators and other utility and process sections, increased vehicular activities, visitors screaming etc.

### **c) Noise minimization**

Noise at Aspire Washing Ltd. can be minimized by assessing the noise risks, protecting employees against noise; proper maintaining and equipment use; training and sensitizing of workers; health surveillance; and work reviews. Assessing of noise risks involves identification of noise hazards at the work place and developing the appropriate action plans. Employee protection involves elimination or controlling noise risks to acceptable legal limits by use of good practice, appropriate engineering controls and employee protection. Equipment use and maintenance involves appropriate use of all noise control equipment and appropriate use of hearing protection. Training and sensitization of workers involves employee accessing information and training on noise risks, control measures and hearing protection. Health surveillance involves hearing checks for exposed workers and using result to improve on protection of the workers.

### **d) Enforcement**

The NMP guiding principle will be carrying out all site activities in a coordinated and acceptable way continuous and sustained improvement in the construction and implementation of the process operations, safety and environmental performance, supported by regular feedback from the community through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions, all the local and national regulatory authorities will be enjoined in

actions taken. This will include giving them access to the facility to assess working conditions as far as noise is concerned and give government directives as provided for in the law.

**Table 6.4 Noise Mitigation Action Plan (NMP)**

| Issue/<br>concern  | Potential negative<br>environmental<br>impacts                                                                                                                                                                                                                                                                 | Proposed<br>mitigation<br>measures                                                                                                                                                                                                                                                                                                                                                                                                               | Environmental<br>Monitoring                                                        | Responsible<br>actors                                                                                                                                                                                                                                                               | Time<br>frame                                                                                                                                      |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Noise<br>pollution | <ul style="list-style-type: none"> <li>Noise induced hearing loss.</li> <li>Reduced productivity and efficiency at work place.</li> <li>Fatigue, headache, Nervousness, irritability and high pretension resulting in accidents at workplace.</li> <li>Stress to workers thus reduced concentration</li> </ul> | <ul style="list-style-type: none"> <li>Noise shielding by barriers or buildings</li> <li>Green belt development beside the machineries and generators</li> <li>Strict use of PPEs inside noisy areas</li> <li>Noisy construction works to be limited to daytime hours</li> <li>Proper management of vehicular traffic and swift work practice at entrance</li> <li>Ensure strict enforcement on user of ear protectors at noisy areas</li> </ul> | <ul style="list-style-type: none"> <li>Regular noise quality monitoring</li> </ul> | <ul style="list-style-type: none"> <li>- Aspire Washing Ltd. top Management</li> <li>- Aspire Washing Ltd. workers</li> <li>-Occupational Safety and Health Officer</li> <li>-District Environmental Officer;</li> <li>-Neighbors and</li> <li>-The general local public</li> </ul> | <p>Noise surveys should be carried out once in preferable every 12 months;</p> <p>Medical severance Should be carried out every twelve months.</p> |

### **6.6.3 Offensive Odor Management**

#### **1. Source of Odor**

Potential sources of offensive odor from the proposed denim washing facility include:

- Effluent Treatment Plant (ETP), particularly biological treatment units and sludge handling areas
- Storage and handling of chemicals
- Accumulated sludge and solid waste
- Drainage channels and wastewater collection systems

#### **2. Potential Impact**

Uncontrolled emission of offensive odor may create nuisance conditions for workers and surrounding communities. It may also affect workplace comfort and overall environmental quality if not properly managed.

#### **3. Mitigation Measures**

To control and minimize odor emissions, the following measures will be implemented:

- Proper design and operation of the ETP to prevent anaerobic conditions
- Regular removal and safe disposal of sludge from the treatment system
- Covered storage of sludge and solid waste in designated areas
- Maintenance of good housekeeping practices throughout the facility
- Use of deodorizing agents or bio-culture where necessary
- Proper ventilation in wastewater treatment and chemical handling areas
- Regular cleaning of drains and collection systems to prevent stagnation

#### **4. Monitoring and Control**

- Routine inspection of ETP and waste handling areas will be conducted
- Any odor complaints will be recorded and addressed immediately
- Operational parameters of biological treatment units will be monitored to ensure effective performance

With proper operation and maintenance of the Effluent Treatment Plant and implementation of good housekeeping practices, the generation of offensive odor will be minimized and kept within acceptable limits.

#### **6.6.4 Hazardous Waste Management**

##### **1. Identification of Hazardous Waste**

The proposed denim washing facility will generate several types of hazardous waste during its operational phase due to the use of chemicals and effluent treatment processes. The major hazardous wastes include:

- ETP sludge containing dyes, heavy metals, and chemical residues
- Used oil and lubricants from machinery and generators
- Empty chemical containers (acids, caustic soda, bleaching agents, dyes)
- Chemical residues and spill-contaminated materials
- Contaminated personal protective equipment (PPE) and cleaning materials

##### **2. Storage and Handling**

- Hazardous waste will be stored in a designated, covered, and impervious storage area to prevent soil and water contamination.
- All containers will be properly labeled and segregated according to waste type.
- Secondary containment systems will be provided to prevent leakage or accidental spillage.
- Handling of hazardous waste will be carried out only by trained personnel using appropriate PPE.

##### **3. Transportation and Disposal**

- Hazardous waste will be transported and disposed of through Department of Environment (DoE)-approved vendors/recyclers in compliance with national regulations.
- Used oil will be sent to authorized recycling facilities.
- ETP sludge will be disposed of at approved landfill sites or through authorized treatment facilities.
- Proper documentation and records of waste generation, storage, and disposal will be maintained.

##### **4. Safety and Environmental Protection Measures**

- Spill prevention and control measures (spill kits, absorbents, sand) will be available on-site.
- An emergency response plan will be implemented to manage chemical spills and accidental exposure.
- Regular inspection of storage areas and containers will be conducted.

- Workers will receive training on hazardous waste handling and emergency procedures.

## 5. Monitoring and Compliance

- Periodic monitoring of hazardous waste generation and management practices will be conducted.
- Compliance with Department of Environment (DoE) regulations will be strictly ensured.
- A proper documentation and reporting system will be maintained for audit and regulatory purposes.

The project authority is committed to ensuring environmentally sound management of hazardous waste to minimize risks to human health and the environment.

### 6.6.5 Emission Control and Management Plan (ECMP)

#### *i. Objective:*

The primary objective of this Emission Control and Management Plan for the **Aspire Washing Ltd.** is to establish comprehensive measures that mitigate environmental impact and ensure the responsible operation of the facility. The plan aims to:

- Achieve Regulatory Compliance
- Optimize Manufacturing Processes
- Promote Sustainable Energy Use
- Enhance Waste Management
- Prioritize Afforestation and Greenery
- Cultivate Employee Awareness
- Engage with the Community
- Ensure Emergency Preparedness
- Commit to Continuous Improvement

#### *ii. Emission Control and Management Plan for Aspire Washing Ltd.*

##### **Emission Inventory and Monitoring:**

1. Conduct a comprehensive emission inventory, identifying key pollutants.
2. Implement continuous emission monitoring systems to track pollutants in real-time.

3. Regularly assess and analyze emission data to ensure compliance with regulatory standards.

**Process Optimization:**

1. Employ advanced technologies for efficient denim washing manufacturing processes.
2. Implement closed-loop systems to minimize emissions during production.
3. Regularly audit and optimize manufacturing processes for reduced environmental impact.

**Green Energy Integration:**

1. Transition to renewable energy sources such as solar or biomass to reduce reliance on fossil fuels.
2. Implement energy-efficient technologies and practices to minimize overall energy consumption.

**Waste Management:**

1. Develop a robust waste management plan to address solid and liquid waste generated during production.
2. Invest in recycling and reuse initiatives for waste reduction.
3. Ensure proper disposal of hazardous materials in accordance with regulations.

**Afforestation and Greenery:**

1. Establish green belts and vegetation around the factory premises to absorb emissions.
2. Promote afforestation projects to offset carbon emissions and enhance local air quality.

**Regulatory Compliance:**

1. Stay informed about and comply with local and international environmental regulations.
2. Engage with regulatory authorities to ensure adherence to emission standards.

**Emergency Response Plan:**

1. Develop a robust emergency response plan for potential emission-related incidents.
2. Conduct regular drills to ensure the preparedness of the factory personnel.

#### **6.6.6 Solid Waste Management Plan (SWMP)**

##### **a) Objective**

The objective of the Solid Waste Management Plan (SWMP) is to ensure that solid waste is properly collected, transported and disposed off, that may be generated from operational activities at Aspire Washing Ltd. and any future construction and operation activity. The SWMP is to be achieved by developing solid waste inventory, implementation of recommendations and mitigation measures made in this report in respect to solid waste generation and ensuring the conditions subjected to license approval with respect to noise management are adhered to.

##### **b) Sources of Solid waste**

Main sources of solid waste at Aspire Washing Ltd. is the ETP sludge and the likely sources include routine operation of utility machineries, indiscriminate disposal and throwing of solid waste by workers

##### **c) Management Plan**

The management plan includes effective implementation of mitigation measures as discussed in chapter 5 and as summarized in Table 6.2.

#### **6.6.7 Sewage Waste Management Plan**

##### **a) Objective**

The objective of the Sewage Waste Management Plan is to ensure proper collection, treatment, and disposal of sewage waste generated from the Aspire Washing Ltd. (AWL) facility, preventing environmental pollution and health hazards and to comply with all relevant environmental regulations and standards regarding sewage discharge.

##### **b) Sources of Solid waste**

The primary source of sewage waste at AWL is the domestic wastewater generated by the approximately more than 600 employees present on-site. This includes waste water from toilets and urinals.

##### **c) Management Plan**

Aspire Washing Ltd. (AWL) will implement a dedicated and well-maintained sewerage system that will collect sewage from all sources within the premises, designed to prevent leakage and infiltration for efficient transport to the treatment plant. To ensure effective management of sewage waste, the

facility will adopt an on-site septic tank system designed in accordance with the guidelines of the Department of Public Health Engineering (DPHE) and Bangladesh National Building Code (BNBC). The septic tanks will receive sewage through a properly graded underground pipeline network to facilitate gravity flow. The tanks will be designed with adequate retention time to allow for primary sedimentation and anaerobic digestion, reducing organic load and pathogens before discharge. The treated effluent from the septic tanks will be directed to a properly designed soak pit or leach field for infiltration into the subsoil, ensuring no surface water contamination. The septic tanks will be constructed with reinforced concrete, equipped with inlet and outlet chambers, baffles, and inspection covers for maintenance access. Routine maintenance will include desludging at intervals of 1–2 years, depending on usage, to prevent blockages and maintain treatment efficiency. Sludge will be safely removed and disposed of in compliance with municipal waste management protocols, ensuring no risk to human health or the environment. All sewage management facilities will be located away from water sources to avoid contamination risks. Periodic inspections will be conducted to ensure structural integrity, functional efficiency, and compliance with environmental standards, thereby maintaining hygienic conditions within the plant premises.

#### **6.6.8 Sludge Management Plan**

The sludge for the settling tank will go to a sludge thickening tank and finally it will go to the filter press for dewatering. After dewatering the sludge cake will be preserved for six months at the site to stabilize. After stabilization with sludge will be handed over to a licensed recycling company.

### **6.7 Environmental Monitoring Program**

#### **6.7.1 Environmental Monitoring**

Environmental monitoring is an essential tool in relation to environmental management as it provides the basic information for rational management decisions. The prime objectives of monitoring are-

- To check on whether mitigation and benefit enhancement measures are actually being adopted and are providing effective in practice
- To provide a means whereby impacts which were subject to uncertainty at the time of preparation of EMP, or which were unforeseen, can be identified and steps to be taken to adopt appropriate control measures.
- To provide information on the actual nature and extent of key impacts and the effectiveness of the mitigation measures which, through a feedback mechanism, can be taken into account in the planning and execution of similar projects in future.

There are two basic forms of monitoring:

- Visual observation or checking, coupled with inquiries
- Physical measurement of selected parameters

In the case projects in general, monitoring is done by physical measurement of some selected parameters like air, water, noise etc. It should be mentioned here that the monitoring program should be such so that it can ensure compliance with national environmental standards. The importance of this monitoring program is also for ensuring that the project does not create adverse environmental changes in the area and providing a database of operations and maintenance, which can be utilized if unwarranted complaints are made. Aspire Washing Ltd. will require that regular monitoring of possible change in environmental parameters to be undertaken during the operational life of the project.



Air Quality Sampling Point 1 (NS-23°47'42.0"N 90°14'20.1"E)



Ambient Noise Level Sampling 1 (ESS-23°47'40.2"N 90°14'19.6"E)



Surface Water Sampling Point 1 (23°47'36.08" N, 90°14'29.64" E)



Ground Water Sampling Point (23° 47' 41.6976" N, 90° 14' 18.7224" E)



Surface Water Sampling Point 2 (23°47'35.97" N, 90°14'14.50" E)



Air Quality Sampling Point 2 (ES- 23°47'40.5"N 90°14'19.6"E)



Ambient Noise Level Sampling 1 (ES- 23°47'41.04"N  
90°14'20.00"E)



Ambient Noise Level Sampling 1 (WS- 23°47'42.3"N  
90°14'16.5"E)

### 6.7.2 Monitoring Indicators

Keeping in mind the pollution factors, there will be a need to put in place elaborate and sound environmental management system and mechanisms of monitoring on a continuous basis. Undertaking monitoring and auditing of key environmental parameters and putting in place of all approved recommendation of the environmental management plan and conditions of the license will achieve this.

### 6.7.3 Monitoring Parameters

Environmental monitoring requires a set of indicators that could be conveniently measured, assessed and evaluated periodically to establish trends of impacts. The indicators may be independent or may be functionally related. The monitoring program, in view of the possible impacts as assessed earlier, should consider the indicators for the impact assessment related to following issues is presented in Table 6.7 in the following page. Monitoring will involve measuring, observing, recording and evaluation of physical, socio-economic and ecological variables within the project area and the neighborhood.

This may include the following:

- Liquid Effluent disposal monitoring.
- Surface water quality monitoring,
- Ground water quality monitoring;
- Solid waste disposal monitoring;
- Air quality monitoring;

- Noise level monitoring and
- Dust levels monitoring;

It is important for the facility management to set up regular monitoring programmers to assess parameters of the environment as stipulated in ECR 2023. This monitoring program will help to identify changes in the environmental situations giving opportunities for adopting appropriate control measures. A comprehensive checklist must be developed for operational usage. The basic activities for a sound-monitoring program me should at least include:

- Collection and analysis of relevant environmental data of the project area;
- Preparation of proper effluent monitoring program; and
- Proper Risk Assessment programs

This would be under the responsibility of the Environment Management cell.

#### **6.7.4 Grievance Redress Mechanism (GRM)**

To ensure effective communication and prompt resolution of community and worker concerns, *Aspire Washing Ltd.* will establish a **Grievance Redress Mechanism (GRM)** as part of its Environmental Management System (EMS).

This mechanism provides a formal process for receiving, evaluating, and addressing environmental, health, and social concerns related to the project's construction and operation phases.

##### **6.7.4.1 Objectives of the GRM**

- To provide a transparent, accessible, and fair process for affected individuals or groups to raise environmental or social issues.
- To resolve grievances quickly and effectively to prevent escalation or conflicts.
- To ensure accountability and build trust with nearby communities, employees, and regulatory agencies.

##### **6.7.4.2 Scope of the GRM**

The GRM will address complaints related to:

- Air, noise, or water pollution
- Waste disposal and traffic disturbance
- Occupational health and safety concerns
- Employment, community relations, and contractor behavior
- Any other environmental or social issue linked to project activities

#### 6.7.4.3 GRM Structure and Process

The mechanism will operate through a **three-tier system**:

**Table 6.4: GRM Structure**

| Level          | Responsible Authority                                 | Description of Action                                                                                    | Resolution Timeframe     |
|----------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------|
| <b>Level 1</b> | <b>Site EHS Officer</b>                               | Receive oral or written complaints; record in grievance register; attempt resolution through discussion. | Within 3 working days    |
| <b>Level 2</b> | <b>Grievance Redress Committee (GRC)</b>              | Review unresolved cases; include representatives from management, local community, and EHS team.         | Within 7–10 working days |
| <b>Level 3</b> | <b>Senior Management / DoE / Local Administration</b> | If unresolved internally, refer to higher authority or DoE for mediation and compliance action.          | Within 30 days           |

A **Grievance Register** will be maintained on-site to record all complaints, including date, complainant's details (if available), description of issue, action taken and resolution status. Anonymous grievances will also be accepted.

#### **Disclosure and Communication**

Information about the GRM process will be displayed on the factory notice board and at the main gate in **both English and Bangla**, ensuring accessibility for workers and local residents. Local community members may also submit written complaints through the site office, local union parishad, or company email or helpline.

#### **Monitoring and Reporting**

The EHS Manager will summarize grievance cases in the **bi-annual Environmental Monitoring Report** submitted to the Department of Environment (DoE).

All grievances, resolutions and corrective actions will be reviewed during internal audits to ensure continuous improvement.

## **6.8 Materials, Supplies and Equipment (In house monitoring Capability) Monitoring Budget**

To be an environmentally acceptable unit, the present plant should have its own environment monitoring unit/cell with trained manpower with necessary equipment and other logistics along with required budget. Hence, Aspire Washing Ltd. Environmental Management Cell team will undertake the activity of monitoring the water quality, ambient air quality, noise level etc. either departmentally or by appointing external agencies wherever necessary. Regular monitoring of environmental parameters will be carried out to find out any deterioration in environmental quality and also to take corrective steps, if required, through respective internal departments.

The Environmental Management Cell will also collect data about health of workers, green belt development etc.

The materials, supplies, equipment and personnel requirements are largely guided by technical aspects of monitoring and such requirements thus, largely control the budget of the monitoring program too. Aspire Washing Ltd. should have capability of conducting all kinds of monitoring which could be made successful by arranging all kinds of equipment, laboratory, laboratory instruments, chemicals and engaging technically efficient personals. In case of lack of in-house monitoring facility, the company may engage any government approved private organization or apply to DoE to conduct monitoring.

However, for conducting the monitoring program by third party a proposed budget has been tabulated in Table-6.5. Laboratory analysis fees considered as per monitoring fees of Private laboratories.

**Table 6.5: Environmental Management and Monitoring Budget**

| Particulars                                             | Item                              | Yearly Cost (BDT)   |
|---------------------------------------------------------|-----------------------------------|---------------------|
| <b>Effluent Treatment Plant (ETP)</b>                   | Water Test                        | 2,00,000            |
|                                                         | Operation & Maintenance           | 3,00,000 – 6,00,000 |
| <b>Sewage Treatment Plant (STP)</b>                     | Operation & Testing               | 1,00,000 – 2,00,000 |
| <b>Occupational Health &amp; Safety</b>                 | Monitoring & Audits               | 50,000              |
|                                                         | Safety Training                   | 50,000              |
|                                                         | PPE Supply                        | 1,00,000 – 2,00,000 |
|                                                         | Fire Safety Equipment Maintenance | 50,000              |
|                                                         | Medical Facilities & First Aid    | 50,000              |
| <b>Environmental Monitoring</b>                         | Air Quality Analysis              | 30,000 – 50,000     |
|                                                         | Noise Level Assessment            | 10,000 (LS)         |
|                                                         | Drinking Water Quality            | 10,000 (LS)         |
|                                                         | Surface Water Quality             | 10,000 (LS)         |
| <b>Compliance &amp; Reporting</b>                       | Environmental Audit / Consultancy | 1,00,000 – 2,00,000 |
| <b>Approximate Total: 8,00,000 – 12,00,000 BDT/year</b> |                                   |                     |

**Table 6.6: Summary of Proposed Environmental Monitoring Schedule**

| Parameter/Environmental Component                 | Monitoring Tasks                                                                                                                                                                                                                                                     | Duration/Frequency                      |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Air Quality                                       | Parameters: SPM, PM <sub>10</sub> , PM <sub>2.5</sub> , NO <sub>2</sub> , SO <sub>2</sub> , O <sub>3</sub> , CO, VOC                                                                                                                                                 | Once in a year                          |
| Noise Level Measurement                           | Noise Level-Around Factory site (8 locations)                                                                                                                                                                                                                        | Once in a year                          |
| Surface Water Quality                             | Parameters: pH, TDS, SS, DO, BOD <sub>5</sub> , COD                                                                                                                                                                                                                  | Once in a year                          |
| Ground Water Quality                              | Parameters: pH, TDS, Iron, Alkalinity, Hardness, Chloride (Cl-), Arsenic (As)                                                                                                                                                                                        | Once in a year                          |
| ETP (Water Quality)                               | Parameters: pH, BOD, COD, SS, Color, Oil & Grease, Temperature                                                                                                                                                                                                       | Twice in a year                         |
| STP (Water Quality)                               | Parameters: pH, BOD, COD, SS, Oil & Grease, Nitrate, Phosphate, Total Coliform, Temperature                                                                                                                                                                          | Twice in a year                         |
| Dust and Stack emissions                          | Dust (Water Spraying) and Stacks Emission Parameters Specified by DoE                                                                                                                                                                                                | During Construction and Twice in a year |
| Solid Waste Management                            | Garbage and Sludge Collection, cleaning and maintenance                                                                                                                                                                                                              | Daily                                   |
| Landscape Management & environmental conservation | Maintain landscaped areas as environmental indicators and promote tree planting within the project site and nearby community areas.                                                                                                                                  | Monthly                                 |
| Emergency response Equipment                      | <ul style="list-style-type: none"> <li>- Extinguishers in position</li> <li>- Water hydrants</li> <li>- Fireman switch testing</li> <li>- Servicing Fire Extinguishers</li> <li>- Review records of accidents recorded on and around the entire facility.</li> </ul> | Monthly                                 |
| Social Impact                                     | Review complaints related to dust and noise, record local employment-related grievances, and document procurement of tree seedlings from local youth groups within the project area.                                                                                 | Twice in a year<br>When it occurs       |

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## *Chapter 7*

### *Emergency Response & Disaster Management Plan*

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## 7. EMERGENCY RESPONSE AND DISASTER MANAGEMENT PLAN

The initial response to an incident is a critical step in the overall emergency response. Like all other Industries and installations, manufacturing plant must have adequate measures against accidents or incidents to meet the emergency. The purpose of having an Emergency Response Plan (ERP) is to:

- Assist personnel in determining the appropriate response to emergencies.
- Provide personnel with established procedures and guidelines.
- Notify the appropriate Company Emergency Response Team personnel and regulatory/ Govt. agencies.
- Manage public and media relations.
- Notify the next-to-kin of accident victims.
- Promote inter-departmental Communications to ensure a “Companywide” Coordinated emergency response.
- Minimize the effects that disruptive events can have on company operations by reducing recovery times and costs.
- Respond to immediate requirements to safeguard the subtending environment and community.

Generally, the initial response is guided by three priorities Ranked in importance these priorities are:

1. People
2. Property
3. Environment

Emergency Response Procedures will identify who does what and when in the event of an emergency. Responsibility for who is in charge and their coordination of emergency actions shall be identified.

Nature of Emergency & Hazardous Situations may be of any or all of the following categories:

### **I. Emergency**

- ❖ Fire
- ❖ Explosion
- ❖ Medical emergency

### **II. Natural Disasters**

- ❖ Flood
- ❖ Earthquake/ cyclone

- ❖ Storm/ typhoon/ tornados and
- ❖ Cloud burst lightning.

#### **External Factors**

- ❖ Food poisoning/water poisoning
- ❖ Sabotage and
- ❖ War.

### **7.1 Six Steps in Emergency Response**

#### **Step-1**

- a) Determine the potential hazards associated with the incident, substance or circumstances and take appropriate action to identify the type and qualities of dangerous goods involved and any known associated hazards.
- b) Determine potential hazards stemming from local conditions such as inclement weather, water bodies etc. and ensure that the initial response team is aware of these conditions.

#### **Step-2**

Determine the source/ cause of the event resulting to the emergency and prevent further losses.

#### **Step-3**

Conduct an assessment of the incident site for any further information on hazards or remedies.

#### **Step-4**

Initiate redress procedures.

#### **Step-5**

Report the incidence its nature cause impact applied redress procedures and any further assistance required etc. to the appropriate company, government and/or land owner.

#### **Step-6**

Take appropriate steps with respect to hazards to wildlife, other resources and addressing public and media concerns and issues, as applicable. Response priorities are to protect human lives, property and the environment.

## **7.2 Emergency Procedures in Case of Fire**

- A.** In all cases, immediately raise the alarm by operating local fire alarm buttons.
- B.** Assess the situation to determine if the fire can be extinguished easily. If so attempt to fight the fire using available equipment.
- C.** If the fire is large or has the potential to become large:
  - 1. If possible, isolate the air supply and/or the fuel supply to the fire. This may include shutting down vent fans, closing ventilators and closing fuel supply valves.
  - 2. Stop any operating equipment. Shut down engines adjacent to the fire. Bear in mind that shutting down the plant completely will cause a black out and may make fire-fighting difficult.
  - 3. Attack the fire using the appropriate equipment. Be aware of potential electrical shock hazards when using water to fight a fire.
- D.** In all cases, the shift supervisor shall initiate a call to the local fire department and notify others according to the fire emergency notification and response lists in attachment.
- E.** If the fire is too large or cannot be readily extinguished by actions of one person, a firefighting team should be assembled under the direction of the person designated to be in charge. Based on the individual circumstances the approach will be some appropriate combination and sequence of the following:
  - a. Contain the fire. Use hoses or the means to restrict the fire to as small an area as is practically possible. If necessary, use boundary cooling.
  - b. Isolate the fuel supply by closing all supply valves to the equipment or area.
  - c. Isolate or minimize the air supply to the fire by closing vents and dampers and shutting down vent's fans.
  - d. Attack the fire using appropriate means.
- F.** After a fire-
  - 1. Post a fire watch for at least 30 minutes after any fire. In the case of larger fires, a longer fire watch may be necessary.

2. The operations supervisor or maintenance supervisor shall prepare an incident report.  
The project manager shall distribute copies of the incident report for any fire at the plant to the owner and to the General Manager operation, with a copy retained on file.
3. The project manager shall hold a debriefing to review the action taken during the fire and to emphasize “lessons learned”. Any recommendations for changes in this procedure or in the plant fire-fighting plan, as deemed appropriate, should be made to the safety committee.

#### **Records**

- A. All records are to be maintained for three years.
- B. Superseded copies of the procedure are to be retained on file for three years.

### **7.3 Fire Extinguishment and Confinement**

- A. The preservation of life and safety of personnel shall take precedence overall other considerations when determining the actions to be taken in case of fire.
- B. The key to successful firefighting is to take action quickly to suppress, extinguish, or control the fire before it can become established or spread further.
- C. A fire requires three elements in order to start and to be sustained |
  - i. Heat
  - ii. Oxygen (Air)
  - iii. Fuel.

These elements form the triangle of fire. If any one of these elements is removed the fire will be extinguished.

- D. All firefighting efforts should be based on the triangle of fire and should aim at eliminating one or more of the three essential elements.

### **7.4 Portable Extinguisher Instructions & Basic Operation**

- A. **Sound the Alarm:** Activate the fire alarm to alert others in the vicinity.
- B. **Evacuation:** If the fire is beyond control, evacuate immediately. Close doors behind you to contain the fire.
- C. **Fire Extinguisher Operation:** Pull the pin at the top of the extinguisher, breaking the seal.
- D. **Aim at the Base:** Aim the nozzle at the base of the fire, not the flames.

- E. Squeeze the Handle:** Squeeze the handle to discharge the extinguishing agent.
- F. Sweep Side to Side:** Sweep the nozzle from side to side, covering the fire with the extinguishing agent.
- G. Class A Fires (Paper and Wood):** Ensure a steady sweep to cover burning materials thoroughly. Continue until the fire is completely extinguished.
- H. Class B Fires (Flammable Liquids):** Aim at the base of the flames. Sweep side to side to cover the entire surface of the liquid.
- I. Class C Fires (Electrical):** De-energize electrical equipment if possible. Aim at the base of the fire and sweep.
- J. Do Not Use on Class D (Metal) Fires:** Do not use a portable extinguisher on fires involving metals.
- K. After Use:** Report the use of the extinguisher to the designated personnel. Ensure the extinguisher is recharged or replaced promptly.

Remember, safety is a priority. Only use a portable fire extinguisher if it is safe to do so, and if the fire is small and contained. If in doubt, evacuate and seek professional assistance.

## 7.5 Types of Fire

### 7.5.1 Class A Fires (Ordinary Combustibles)

**Description:** Involves materials such as enzymes, pumice stones, bleaching agents, common in a denim washing industry.

**Potential Sources:** Chemical suppliers, local industrial chemical markets.

**Fire Extinguishing Agents:** Water, foam, or dry chemical extinguishers.

### 7.5.2 Class B Fires (Flammable Liquids)

**Description:** Involves flammable liquids like solvents, adhesives, or chemical solutions.

**Potential Sources:** Ink storage areas, solvent-based coatings, chemical processing units.

**Fire Extinguishing Agents:** Foam, dry chemical, or carbon dioxide extinguishers.

### 7.5.3 Class C Fires (Electrical Fires):

**Description:** Involves electrical equipment or wiring.

**Potential Sources:** Electrical panels, machinery, wiring installations.

**Fire Extinguishing Agents:** Carbon dioxide or dry chemical extinguishers (non-conductive agents).

#### **7.5.4 Class D Fires (Metal Fires)**

**Description:** Involves combustible metals, which may not be common but should be considered.

**Potential Sources:** Metal dust or shavings, machinery involving combustible metals.

**Fire Extinguishing Agents:** Specialized dry powder extinguishers designed for metal fires.

#### **7.5.5 Class K Fires (Kitchen Fires):**

**Description:** Involves cooking oils or fats in kitchens or cafeterias within the facility.

**Potential Sources:** Cooking areas, fryers, kitchen appliances.

**Fire Extinguishing Agents:** Wet chemical extinguishers designed for kitchen fires.

Understanding the fire classifications is crucial for selecting the appropriate fire extinguishing agents and implementing effective fire safety measures. Regular training, proper fire extinguisher placement, and awareness of potential fire sources are key components of fire safety in such industrial settings.

### **7.6 Fire Safety Risk Assessment**

#### **7.6.1 Hazard Identification:**

Potential Ignition Sources:

- a. Denim washing machinery.
- b. Electrical panels and wiring.
- c. Flammable liquids used in ink or coating processes.

Combustible Materials:

- a. Cotton rolls and stockpiles.
- b. Chemical storage areas.
- c. Wooden pallets and packaging materials.

Equipment Vulnerability:

- a. Aging or malfunctioning machinery.
- b. Inadequate maintenance of electrical systems.
- c. Presence of hot work activities.

#### **7.6.2 Fire Prevention Measures:**

Machinery Inspection:

- a. Regular inspection and maintenance of production equipment.

- b. Implementing preventive measures to reduce friction and heat generation.

**Electrical System Safety:**

- a. Scheduled inspections of electrical panels and wiring.
- b. Implementation of electrical safety protocols.
- c. Training employees on safe use of electrical equipment.

**Chemical Storage Safety:**

- a. Proper storage and labeling of flammable chemicals.
- b. Adequate ventilation in chemical storage areas.
- c. Training employees on safe handling of chemicals.

**7.6.3 Emergency Response Preparedness:**

**Fire Drills:**

- a. Regular fire drills involving employees.
- b. Evacuation routes and assembly points clearly marked.

**Fire Extinguisher Placement:**

- a. Adequate placement of fire extinguishers near potential fire sources.
- b. Ensuring employees are trained in the proper use of extinguishers.

**Emergency Exit Access:**

- a. Clear and unobstructed emergency exits.
- b. Adequate signage directing employees to exits.

**7.6.4 Fire Detection and Suppression:**

**Smoke and Fire Detection Systems:**

- a. Installation of smoke detectors in key areas.
- b. Automatic fire suppression systems in critical zones.

**Sprinkler Systems:**

- a. Adequate coverage of sprinkler systems in storage and processing areas.
- b. Regular testing and maintenance of sprinkler systems.

**7.6.5 Training and Awareness:**

**Employee Training:**

- a. Regular training on fire safety procedures.
- b. Awareness programs on identifying and reporting fire hazards.

Communication Protocols:

- a. Establishing clear communication protocols during emergencies.
- b. Emergency contact information readily available to all employees.

#### **7.6.6 Evacuation Plans:**

Evacuation Routes:

- a. Clearly marked evacuation routes throughout the facility.
- b. Regular drills to ensure employees are familiar with evacuation procedures.

Emergency Assembly Points:

- a. Designated assembly points for employees to gather after evacuation.
- b. Procedures for accounting for all personnel during emergencies.

#### **7.6.7 Review and Update:**

Periodic Assessments:

- a. Regularly review and update the fire safety risk assessment.
- b. Consider changes in machinery, processes, or facility layout.

Incident Investigation:

- a. Investigate any fire incidents promptly.
- b. Implement corrective actions to prevent recurrence.

This fire safety risk assessment aims to identify, prevent, and mitigate potential fire hazards in **Aspire Washing Ltd.**, promoting a safe working environment for all personnel.

### **7.7 Managing Fire Safety**

- A.** The plant and its personnel must be prepared to respond to a fire at all times regardless of operating status

- a. The project manager shall ensure that all fire-fighting equipment is maintained in a constant state of readiness and is available to personnel.
- b. It is the responsibility of the project manager and every supervisor to ensure that the employees under their supervision know how exit the plant in a fire emergency. An

ordinary evacuation depends on both adequate warning and employee awareness of the proper procedures. State of readiness by conducting weekly fire drills.

- c. The project manager shall establish an emergency organization consisting of a selected number of employees, organized and trained, to deal effectively with fires, explosions, and similar occurrences.
  - d. The project manager shall ensure that procedures and check lists are maintained and kept current for after-hours notification of key personnel when the facility is operating at less than normal complement or shutdown
  - e. Proposed change in facility layout, materials, operation and construction shall be reviewed by unit safety and fire prevent personnel as early in the planning stage as possible to establish necessary fire prevention and control measures.
- B.** The plant fire marshal shall inspect the plant daily to ensure that all fire-fighting equipment is in place and available for use, as well as to identify any potential fire hazards.
- a. Emergency exits and routes leading to them shall be clearly identified by signs.
  - b. Current standard on construction, dimensions, lighting and number of exits required by safety codes shall apply in designating exits.
- C.** A program of fire-fight training shall be established by the fire marshal under the direction of the project manager. This program shall ensure that all personnel are familiar with:
- a. The fire-fighting equipment at the plant
  - b. Fire- fighting techniques
  - c. The fire emergency preparedness plan.
  - d. The plant fire-fighting plan shall be posted at various strategic locations throughout the plant, including in the control room. This plan shall include a floor plan drawn to indicate the emergency exits, the procedure for sounding an alarm and evacuation instructions.
  - e. If possible, the safety committee shall arrange for key emergency instruction and telephone numbers from plan to be highlight in the plant's internal directory.
- D.** A set of master keys providing access to all doors will be maintained in a special fire locker within the control room
- E.** Interface with local fire department

- i. Management through the fire marshal, shall establish an interface with local fire department and shall establish an action plan for action plan for use in case the local fire department is called to respond to emergency.
  - ii. The action plan shall:
    - a. Establish a protocol for responding to an emergency call from the plant.
    - b. Define the types of firefighting equipment to be used at the plant.
    - c. Ensure that the fire department has access to the facility.
    - d. Determine who will be in overall command of fire-fighting efforts.
    - e. Clearly establish actions to be taken by the fire department in response to different types of fire and different types of fire and different sections for example, oil storage tank fires, electricity fires and lubricant store fire etc.
  - iii. The fire marshal shall ask the fire department to become familiar with the plant and to participate in firefighting training conducted at the plant.
  - iv. The project manager shall also ensure that the fire department can connect directly to the plant fire-fighting system without on the spot modifications.
- F. Special fire-fighting procedures are to be posted at fixed firefighting operating stations such as the control room CO2 flooding station, the separator room and so on.**
- G. Training**
1. Fire awareness training shall be given to all project personnel as a part of new employee orientation.
  2. Fire- fighting training and qualification examinations will be given to all site operating staff and to maintenance staff. Selected personnel will be required to attend advanced fire-fighting course.
  3. Specialized training shall be provided to persons with responsibilities for maintenance of fire- fighting equipment, related systems and supplies.
  4. The fire marshal must attend advance fire-fighting course and demonstrate a complete understanding of the plant procedures and fire- fighting system.
  5. The fire marshal shall coordinate with the local fire department and shall arrange for joint fire- fighting training at the plant site.
- H. Fire Drills**

1. Each location shall establish an evacuation procedure to be followed in fire drills and emergencies.
2. Each location shall have an alarm system or other suitable means to alert the occupants to the need for evacuation.
3. The project manager shall conduct weekly fire drills to:
  - a. Demonstrate the operational readiness or fire-fighting equipment

(1) During each drill, the fire pump and at least one fire house should be operated for a minimum of ten minutes.

(2) The fire house used in weekly drill should be rotated.

#### **Personnel Response to a fire alarm (Drill or emergency)**

- b. Take whatever immediate steps are necessary and feasible to minimize any hazard in leaving the working area unattended.
- c. Do not use elevators for evacuation purposes.
- d. Do not reenter facilities until the “All clear” signal sounds or clear verbal instructions to reenter are given by responsible authority.

#### **Supervisor Response to a fire alarm (Drill or emergency)**

- a. Direct the evacuation of your area and account for personnel.
- b. Advise the responding authority of the situation and warn of potentially hazardous conditions.

### **7.8 Reporting Incidents and Accidents**

All accidents and near-miss incidents shall be investigated to determine what caused the problem and what action is required to prevent a recurrence. Employees required to perform investigations shall be trained in accident investigation techniques. The incident/accident investigation should be a fact-finding exercise rather than faultfinding. The investigations will focus on collection of evidence to find out the “root cause” of the incident. The recommendations of the investigation report are implemented in phases.

## **7.9 Approaches to Emergency Response**

For this project, emergency response systems should be in place to deal with ride accidents, natural calamities fires burn and injuries. There are to be trained emergency response teams, specific contingency plans and incidence specific equipment packages in place to cope with these types' emergency. In case of an emergency incident occurred, immediate action must be taken to mitigate the impacts.

In order to minimize the possibility of injury to the responders and others it is important that emergency responders follow a specific sequence of actions.

## **7.10 Disaster Management Plan**

In normal operation of the project, when all environmental protection equipment works according to design specification, then there would be no environmental problems for the present project. Disaster (to certain degree) may occur if the environmental protection equipment fails to work at normal condition. This situation may arise for any of the following causes-

- When project runs at abnormal situation e.g. if the engines give unwanted noise than normal level.
- If liquid waste over flows and pollutes the surroundings

Therefore, appropriate management plan should have to be taken by the project proponent to prevent any unwanted disaster in the project. In this regard there should be a provision to stop the affected/whole facility immediately during any process failure as discussed above.

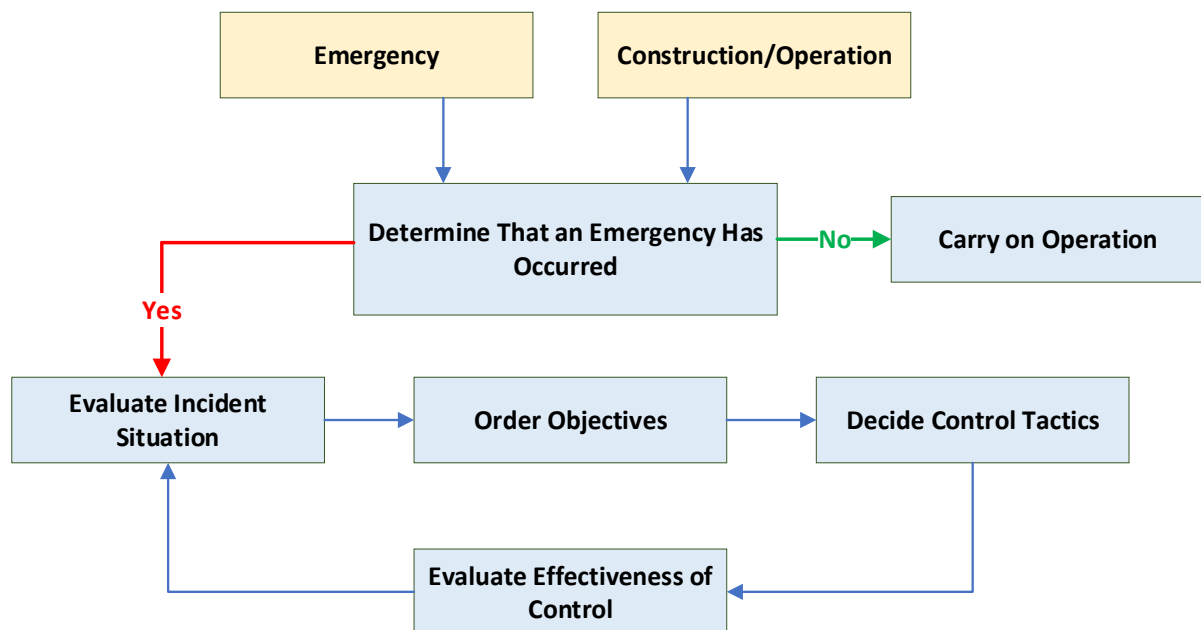
The disaster management plan should consist of preventive measures including, among others, the following.

- Formulation and strict implementation of safety codes and measures;
- Preventive maintenance;
- Aware the workers about electric shock
- Declaring the project area, a "no smoking zone"
- Mock drills by the firefighting cells/ groups
- Provision and inspection of firefighting equipment and fire hydrant system in all the sections;

- Proper training of the employees about the importance of codes;
- Training the employees and the residents of the surrounding about the actions to be taken during an accident, disaster etc.

It is imperative to develop entire facility environment policy and display necessary documentation for ease in accessing information. Some of these documents include:

- Emergency contacts;
- Emergency response procedures for fires



**Figure 7.1: Illustrates an Example System Approach to Construction & Operations.**

The facilities operations and monitoring are carried out under the management and help from both the employees and relevant government lead agencies. In order to take care of any hazards the following control should be adopted:

- All safety precautions and provisions covering the general cleanliness of the entire facility down to, ventilation, lighting, sanitary, waste collection, first aid box provision, adequate fire extinguishers and site security by fencing.

### 7.11 Environment, Health and Safety (EHS)

Health and safety aspects of the entire facility shall be given the highest priority throughout the project lifecycle. The management of Aspire Washing Ltd. will establish a comprehensive Environment, Health and Safety (EHS) Management System to ensure the protection of workers, property and the surrounding environment in compliance with the Environmental Conservation Rules (ECR) 2023.

All workers, supervisors and visitors shall use personal protective equipment (PPE) such as helmets, gloves, goggles, safety shoes, ear protection and acid resistant aprons during their presence in process or chemical handling areas.

Routine inspections will be carried out to ensure PPE availability, proper use and replacement when necessary.

An Environment, Health and Safety (EHS) Register will be maintained as a self-auditing and performance monitoring tool for the entire facility. The register will help track compliance status, incident trends and continuous improvement measures.

The EHS Register will include but not be limited to the following records:

**Fire Safety:** Fire extinguisher servicing and inspection records, fire hydrant and alarm system test logs, emergency drill reports.

**Training & Awareness:** EHS meeting schedules, safety induction and refresher training records and toolbox meeting minutes.

**Electrical & Mechanical Safety:** Periodic inspection of electrical installations, earthing systems and mechanical guarding.

**Generator & Machinery Maintenance:** Routine inspection and maintenance records of generator sets, compressors and lifting equipment.

**Child Labor:** Strictly prohibits the employment of child labor in any form. Only workers aged 18 years or above are allowed to work within the facility, as per the Bangladesh Labor Act (Amended 2018) and ILO conventions.

**Hazardous Materials Management:** Inventory of fuels, lubricants, paints and cleaning agents, Material Safety Data Sheets (MSDS) maintained on site.

**Waste Management:** Records of solid, liquid and hazardous waste disposal through DoE approved facilities, manifests of lead and acid residues.

**Emergency Preparedness:** Emergency response procedures, designated response team list, contact details of local fire service, hospital and DoE office.

Periodic EHS performance audits will be conducted by internal management and third-party professionals to assess compliance and identify improvement areas. Audit findings shall be reported to top management and corrective measures implemented promptly.

The overall goal of this system is to create a safe, pollution free and compliant working environment while protecting the surrounding natural resources, community health and the company's long term sustainability.

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## *Chapter 8*

### *Analysis of Alternatives*

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## **8. ANALYSIS OF ALTERNATIVES**

### **A. The 'No Build' Scenario**

From a purely physical environmental point of view, the 'do-nothing' is preferable to any project implementation, since it would avoid creation of any of the adverse impacts associated with the project. However, the potential socio-economic benefits to the nation would be foregone and industrial growth would be hampered.

It is concluded that the 'No build' alternative is unacceptable, and the potential socio-economic benefits of implementation of such project far outweigh the adverse impacts, all of which can be controlled and minimized to an allowable level.

### **B. Site Alternatives**

As mentioned earlier that the project site is finalized for the project. The plant aesthetic looks are modern and environment compatible, the site is environmentally acceptable, the plant is built and the IEE carried out earlier concluded about the suitability of the plant location. The project site is most suitable for industrial buildings. It is connectable to all parts of Dhaka city and all areas of Bangladesh. Therefore, the project site is suitable for **Aspire Washing Ltd**. So, there is no logical need to look into alternative sites. Hence this has not been done in the present EIA.

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## *Chapter 9*

### *Public Consultations*

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## 9. PUBLIC CONSULTATIONS

### 9.3 Introduction

The public consultation for the construction project in Sudkhira, Jamirta, Singair, Manikganj conducted by **Aspire Washing Ltd.** authority, aimed to gather opinions and concerns regarding the project's environmental and socio-economic impacts. Through open and transparent engagement activities, including meetings and interviews, community members and stakeholders had the opportunity to express their views on topics such as environmental concerns, socio-economic effects, and proposed mitigation measures. The consultation process played a vital role in ensuring community involvement and shaping the Environmental Impact Assessment (EIA) report for the project.

### 9.4 Objectives of Public Consultation and Disclosure Meeting

The objectives of public consultation for the proposed project are given below:

- ✓ **Engagement and Inclusion:** To actively involve the local community, stakeholders, and relevant authorities in the decision-making process and gather their opinions, concerns, and feedback regarding the project.
  - ✓ **Information Sharing:** To provide accurate and comprehensive information about the project's purpose, scope, location, potential impacts, and proposed mitigation measures to ensure transparency and understanding among participants.
  - ✓ **Addressing Concerns:** To create a platform for participants to express their concerns, raise questions, and share their perspectives regarding potential environmental, socio-economic, and community impacts associated with the project.
  - ✓ **Gathering Feedback and Suggestions:** To solicit constructive feedback and suggestions from participants on ways to minimize negative impacts, enhance positive impacts, and ensure sustainable development practices throughout the project lifecycle.
  - ✓ **Promoting Collaboration:** To foster collaboration and partnership among project developers, community members, stakeholders, and relevant authorities in order to achieve a shared understanding and vision for the project.
- Influence Decision-Making:** To ensure that the input gathered from the public consultation process influences the decision-making process, project design, and the finalization of the Environmental Impact Assessment (EIA) report.
- Building Trust:** To establish trust and credibility between the project developers and the

local community by actively listening to concerns, responding to questions, and incorporating meaningful feedback into the project's planning, implementation, and monitoring.

### **9.5 Approach and Methodology of Public Consultation and Disclosure Meeting**

The approach and methodology of the public consultation and disclosure meeting for the construction project in Sudkhira, Jamirta, Singair, Manikganj, should aim to ensure effective communication, meaningful engagement, and transparency. Here is a suggested approach and methodology for the public consultation:

#### ***i. Preparing for the Consultation:***

**Identify key stakeholders:** Identify and engage with relevant stakeholders, including community members, local authorities, NGOs, and experts, who may have an interest in or be affected by the project.

**Define objectives and scope:** Clearly define the objectives, topics for discussion, and the scope of the consultation process to provide a clear direction for the meeting.

**Develop an engagement plan:** Create a comprehensive plan outlining the activities, timeline, and resources required for the consultation process.

**Information preparation:** Compile relevant project information, including project plans, environmental impact assessments, and proposed mitigation measures, to be shared with participants.

#### ***ii. Communication and Outreach:***

**Publicize the meeting:** Utilize various communication channels, such as local media, community notice boards, and social media, to publicize the consultation meeting and invite participation from the community.

**Multilingual support:** Provide translation services or materials in local languages if necessary, to ensure inclusivity and accessibility for all participants.

**Engage local leaders and influencers:** Collaborate with local leaders, community representatives, and influencers to help disseminate information and encourage participation.

### ***iii. Consultation Meeting:***

**Facilitate open discussion:** Create a conducive environment for open dialogue and ensure equal participation of all attendees. Facilitators should encourage participants to express their views, ask questions, and share concerns.

**Present project information:** Begin the meeting with a presentation on the project's overview, purpose, potential impacts, and proposed mitigation measures. Provide visual aids and clear explanations to enhance understanding.

**Q&A and interactive sessions:** Allocate sufficient time for participants to ask questions, seek clarifications, and provide feedback. Foster interactive discussions to encourage diverse perspectives and insights.

**Workgroup activities:** Organize workgroup activities or breakout sessions to allow for focused discussions on specific topics or concerns, ensuring active engagement and collaboration.

### ***iv. Disclosure of Information:***

**Transparent information sharing:** Provide participants with relevant project documents, reports, and studies, ensuring transparency in disclosing project-related information.

**Written submissions:** Encourage participants to provide written submissions or feedback forms to capture their concerns, suggestions, and recommendations in a structured manner.

**Follow-up communication:** Commit to sharing a summary of the meeting proceedings, including key discussions, concerns raised, and proposed actions, to keep participants informed and maintain transparency.

### ***v. Evaluation and Incorporation:***

**Evaluate feedback:** Analyze the feedback and input received during the consultation process to identify common themes, concerns, and suggestions.

**Incorporate feedback:** Use the feedback to refine the project plans, revise mitigation measures, and address community concerns to the extent feasible.

**Communication of outcomes:** Communicate the outcomes of the consultation process, including how participant input influenced decision-making and any changes made based on the feedback received.

## **9.6 Public Consultation Meeting (PCMs)**

Public consultation was initiated with an explicit objective to ensure peoples participation right from the planning stage of the project. More specially, this was aimed at improving the study taking into

account opinions from the people of the impacted area. While undertaking household survey through semi-structured questionnaire, knowledgeable persons, community leaders and local chairman & members were identified and contacted.

The company arranged a public meeting at **14th March, 2026** at project site. The meeting was attended by more about **25 persons** which includes local people, local community leaders and other interested persons from different corners.

### **9.7 Public Disclosure Meeting (PDMs)**

In general, the local people's response to the project **Aspire Washing Ltd. (AWL)** is positive. Most of the people who live close the project site has no objection towards the project being set up at the selected site. Most the people as interviewed are not aware of pollution hazard and also do not feel that **Aspire Washing Ltd. (AWL)** would be source of any hazard to them.

As understood from gathered information, the same approach of not involving the local public during the project planning as prevailing in the country was adopted in case of Aspire Washing Ltd. (AWL). This is a top-down approach of asking the opinion of the people who themselves or whose environment and socio-economies might have been affected due to the project. There should have been a bottom-up approach taken while designing the project with opportunity and arrangements for public participation.

The people of the area seem to be happy for the project since they would not face jobless situation further after operation of the project. Presently public participation is limited to engaging some local people in various construction and other related activities during the implementation of the plant. Also, some people will participate indirectly in various economic activities and support systems associated with **Aspire Washing Ltd. (AWL)**. **The outcome of the PCM's is as follows:**

- ❖ According to the opinion of the local residents, if the project is implemented, the quality of life of the locals will be improved. Notably, there is no expressed concern among locals regarding any disruption to their daily activities. Furthermore, the local community has conveyed a positive outlook regarding potential employment opportunities, emphasizing the absence of any previous disturbances related to the factory's operations.

- ❖ Local stakeholders expressed their concerns regarding potential environmental impacts associated with the operations of Aspire Washing Ltd. They recommended adopting a 3R (Reduce, Reuse, Recycle) and ZLD (Zero Liquid Discharge) plan for the production process.
  - ❖ An ETP has already been constructed for liquid waste management of the project. Before completing the work of the industry, **Aspire Washing Ltd.** authority has completed the installation of ETP.
  - ❖ The Consulting Firm, **Earth Squad (BD)** commits to incorporating the 3R and ZLD plan in the Environmental Impact Assessment (EIA) report, in collaboration with the **Aspire Washing Ltd.** authority.
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- **Meeting Minutes of Public Consultation attached in Annex-I**

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## *Chapter 10*

### *Conclusion*

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## 10. CONCLUSION

### 10.1 Conclusion

- a) The **Aspire Washing Ltd.** is one of the leading denim washing factories in Bangladesh. An EIA has been prepared for the proposed project according to the requirement of the department of Environment (DoE) for environmental clearance as it is made mandatory in ECR'23, for any proposed infrastructure/land development project. The EIA has been prepared through identification of potential impacts, assessing them, Public Consultation and recommending possible mitigation and enhancing measures for negative and positive impacts respectively.
- b) Multiple data collection technique has been used in conducting the EIA study which included document review, observation, and interview with key informants, focus group discussions, public consultation and interaction with the DoE personnel. The EIA is prepared through identifying the potential impacts, assessing them and recommending possible mitigating and enhancing measures for adverse and positive impacts respectively.
- c) On the basis of the impact assessment, it is observed that the project development can cause change in land water flow, Air pollution, Solid waste generation & soil erosion. Also, the project is located in flood prone area. Suitable mitigation measures have been provided for manage the situation. The project will use more water; will generate wastewater and solid wastes etc. Suitable arrangements and mitigations measures have been taken for water supply and also to treat and dispose the solid waste and wastewater.
- d) The adverse impacts are occupational health hazard, liquid discharge from toilet usage and solid waste from different sources. On the other hand, the project will have positive impacts in terms of employment during its construction & operation phase. All the impacts in the construction phase are long term and reversible in nature. Outline of an EMP has been developed to mitigate/enhance the impacts expected to be occurred at different stages of the project.
- e) The Environmental Impact Assessment (EIA) has not identified any comprehensive, broad, diverse or irreversible adverse environmental impacts caused by the project. Since, there are no environmental issues of sensitive nature which might cause serious adverse effects due to proposed project, so the location of **Aspire Washing Ltd.** is quite acceptable for the project on environmental point of view. However, no development can be expected without any adverse impact on environment. The positive impacts on the national as well as individual level would only be meaningful and sustainable if the adverse impacts are minimized through strict maintenance and control measures as mentioned in this report. All these measures would need vigilant care and subsequent monitoring, and the project authority should take

these into effective consideration. It is also expected that DoE will do surveillance and monitoring of the project performance, particularly that of ETP. DoE should also continue its encouragement for projects like by Aspire Washing Ltd. for initiatives to take care of industrial wastewater aiming for a better environment.

It is, therefore, concluded that **(i)** the project will have few low to moderate adverse environmental impacts, **(ii)** these adverse impacts will be small **(iii)** they can be easily mitigated **(iv)** the project has a net positive environmental impact.

The industry will operate under strict environmental control, including an Effluent Treatment Plant (ETP) designed to maintain effluent discharge within permissible limits. A dedicated Environment, Health and Safety (EHS) Unit will monitor compliance and maintain a register covering waste management, fire safety, and emergency preparedness.

Public consultations have been conducted and stakeholder feedback has been integrated into the project design, particularly regarding water reuse, noise reduction and employment opportunities.

Considering the mitigation measures, monitoring programs and management commitments presented in this EIA, the proposed project is **environmentally acceptable** and **recommended for Environmental Clearance**, subject to full compliance with DoE regulations and conditions.

## 10.2 Recommendations

The following recommendations aim to address and mitigate potential environmental impacts associated with the proposed denim washing production project. These measures are designed to foster responsible and sustainable project development while safeguarding the surrounding environment:

- Maintain and upgrade water control equipment as per industry best practices.
- Establish a comprehensive waste management plan that includes recycling and responsible disposal of manufacturing waste.
- Periodically audit waste management practices to ensure compliance with environmental regulations.
- Implement water recycling and reuse systems to minimize water consumption.
- Establish sedimentation basins and wetland areas for treating stormwater runoff to protect local water bodies.
- Incorporate energy-efficient technologies and explore the use of renewable energy sources to reduce the carbon footprint.

- Share monitoring data and reports with regulatory authorities and the public to ensure transparency.
- Adhere to all relevant **environmental laws, regulations and permits**. Regularly report project-related activities, environmental performance, and compliance to the appropriate regulatory bodies.

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## *Chapter 11*

## *References*

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## **Annex A: Good House Keeping Plan for Aspire Washing Ltd. (AWL)**

## **Annex A: Good House Keeping Plan for Aspire Washing Ltd.**

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### **1. Purpose**

This plan provides guidelines for the good housekeeping practice of the **Aspire Washing Ltd.**, which promotes the corporate image, also provides a safe working environment and reduces the risk of accident. Good housekeeping is committed by the company as its primary objective and is essential for good business. Besides promoting orderliness and cleanliness, good housekeeping helps to eliminate accidents and fire hazards, save space, time and effort in material handling and improves employee moral by developing pride in a neat and orderly working environment.

### **Responsibilities**

- Project in charge : Overall Responsible
- Safety Officer : Implementation
- Visitors : Compliance
- Employees : Compliance

### **Good Housekeeping Practices**

- The oils, grease and dirt, dust-deposited in the floor and working areas during operating periods of the construction must be cleaned. The floor should be swept regularly to keep the working place clean, healthy and safe so that spillage of LPG or any lubricating oil, grease or dust from the floor cannot cause pollution and accidental slip.
- Regular checking of safety devices, functioning of gas detectors and perfectness of the fire extinguishers and fire hoses. Sprinklers etc. should be assured so that proper utility of these items can be assured.
- Ear protectors, helmets and aprons should be provided to the working and visiting persons and their use should assured.
- Many industrial injuries are caused by falls, falling objects and the mishandling of equipment, materials, buildings vehicles and properties not in clean condition and good order.
- All employees, regardless of position are required to contribute to cleaning the project site. All personnel will clean up as work progresses and will ensure that work, equipment and tools are cleaned when a job is completed.

- Operation staff, regardless of position, shall clean while on shift. Operators shall carry a clean rag with them at all times and will use it to clean as they carry out their duties.
- No job is completed until tools are cleaned and put away, scrap and wasted bags, materials are disposed off and the equipment put in its proper location and in good orderly condition.
- Do not scatter tools and materials around the work area.
- Clean up machine oil and lubricant spill sites immediately to prevent spilling or fire hazards.
- Dispose of in proper way waste, trash, used rags, used insulation etc. as often as necessary to maintain a safe working environment. Dispose of them only in approved steel, fireproof containers design for trash.
- Do not throw waste materials outside or river or dump them at the site or outside near the plant other than in approved and designed landfills. Managing authority of the industry is responsible for designating landfills.
- Immediately remove all protruding metal straps etc. from boxes, packing cases and crates. Removes nails, staples etc. from boards or flatten them; stack the boards with the flattened nail or staple ends facing down.
- Store tools, materials and equipment in an orderly manner in tool houses, welding shops or other acceptable locations when not in use. Use shadow boards and tool boards to identify tool locations and to simplify inventory counts.
- Cross tie or otherwise secured, stacked material to prevent it from falling.
- Keep aisles and walking areas in warehouses or other materials storage areas clear of material and equipment.
- Exercise care when painting to ensure that instrumentation, electrical equipment and other sensitive equipment is not painted over.
- Neutralize or remove rust before painting.
- Immediately correct or note on a plant attention report, any product leaks or seepage cannot be corrected immediately, place a drip tray under it and identify the tray for regular cleaning until repairs can be made.
- Maintain all equipment and structures in good overall condition.
- Do not store materials, tools etc. in a way that obstructs access to fire extinguishers, fire hoses or other safety equipment.

- Check parking areas routinely for oil contamination. Vehicles that leak oil will not be allowed to park on site.
- Do not allow lube oil filters or fuel oil filters to drip or leak onto walkways, open ground or paved areas. Store them in leak proof and fireproof containers until disposed of approved vendor.
- Maintain bathroom and showers in a clean and neat condition at all times.
- Provision of showering and cloth changing areas with lockers is ensured, and all associated wastewater is directed to the ETP inlet for proper treatment.
- Notices and signs are to be properly located and affixed to surface. No taped messages or hard – written notes and instructions using pencil and colored markers will be allowed on equipment or control panels.

### **Training**

The designated safety officer shall ensure the all employees are fully aware of the procedures for good housekeeping plan and understand the requirement for a clean and safe workplace.

## **2. Fire Emergency and Safety Preparedness Plan**

### **2.1 Purpose**

The action plan is for use in the event of a fire incident, if any at the proposed project. The primary objectives of plan are to save lives, prevent injuries and eliminate or minimize damage to property.

### **2.2 Definitions**

Safety plan for Project Operation: A diagram of proposed plant is indicating the location of and safety and fire protection equipment will be prepared. This plan is to be displayed in the entrance to the site.

### **2.3 Responsibilities**

- |    |                   |                                                 |
|----|-------------------|-------------------------------------------------|
| A. | Project in Charge | : Overall responsibility                        |
| B. | Fire Marshal      | : Responsible for implementation and monitoring |
| C. | Employees         | : Compliance with project manager's Directions. |

## **Annex B: Details of Natural Disaster Management**

## Details of Natural Disaster Management

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### 1. Purpose

This plan is for use if the project is threatened with a cyclone, flood or earthquake. The primary objectives are to save lives, avoid injury to personnel and eliminate or minimize damage to property.

### 2. Scope

This emergency preparedness plan can be divided into the followings:

- General plan & principles for natural disaster emergencies
- Cyclone/hurricane and tropical storm preparedness plan
- Flooding Preparedness plan
- Earthquake Preparedness plan

### 3. Definitions

Flood- Any situation that may result in the proposed Jetty adjacent area being inundated with torrential water to a depth that may potentially endanger personnel or equipment. Flooding may occur from severe rainfall, storm surge from windstorms, tidal actions, or from earthquake.

Cyclone/Hurricane-A tropical storm as defined by the United States National weather service with sustainable winds of 75 knots or more.

The following four levels of preparation for tropical storms are used in the procedure

- Level 1 Storm Watch: A cyclone/ tropical storm is reported to be with the region and may be within 48 hours of reaching landfall within the vicinity of the project.
- Level-2 storm Watch: A cyclone or tropical storm is reported to be within the region and may be within 24 hours of reaching landfall within the vicinity of the project
- Level-3 storm watch: A cyclone or tropical storm is reported to be within the region and may be within 12 hours of reaching landfall within the vicinity of the project.
- Level-4 Storm watch: A cyclone or tropical storm is reported to be within the region and may be within 08 hours of reaching landfall within the vicinity of the project

Season of Cyclone: The time of the year when general climatic conditions allow tropical storm and cyclone to develop.

Safety plan: A good number of safety and fire protection equipment have been placed in key place in the project. The locations of the safety and fire protection are to be displayed in the control room and in various prominent locations close to the entrance to the proposed project.

#### **4. Responsibilities**

1. Project in charge- Overall responsibility
2. Safety Officer- Responsible for monitoring weather conditions and reporting adverse condition or potentially dangerous conditions to the project in charge.
3. Employees- Compliance with project in charge direction.

#### **5. General Principles**

- A. The preservation of lives and the safety of personnel shall take precedence overall other considerations when determining the actions to be taken in the case of threatened storm, flood or earthquake damage.
- B. If it is deemed necessary to shut down Jetty operations and evacuate the project, every precaution possible must be taken to ensure that equipment is shut down in the proper manner and secured in such a way that wind storm, flood wave action, or earthquake will have minimal impact.

Project management is responsible for restoring services to normal as quickly as is practically and safely possible following evacuation and shut down.

#### **6. Cyclone and tropical storm Preparedness Plan**

##### **Monitoring**

- The safety Officer shall be responsible for monitoring weather conditions for potential problems.
- The safety officer shall monitor local radio channels and when possible, CNN (cable News Network) or similar wide area broadcast/ cable Information service.
- If local broadcast channels or cable services are not available the safety officer shall establish contract with the national weather service and shall arrange to receive periodic weather reports mainly during the critical periods.
- The safety officer shall keep the project in charge advised of any potential weather-related threats to the project. At the least, all conditions that may result in a level 1 storm watch must be reported to the project manager.
- If a tropical storm or cyclone reach level-2, it should be tracked on an hour basis on a suitable map.
- As the storm approaches, the plant will be put in to a storm alert condition and appropriate actions taken.

## 7. Cyclone Action Plan

- The project in charge shall establish and maintain cyclone action plan. This plan shall ensure that the proposed jetty is ready to cope with a cyclone in case of Level-1 warning.
- The action plan shall identify a cyclone crew
- The Cyclone crew should consist of the minimum number of persons required to safely operate the jetty in case of an emergency.
- The cyclone crew must include at least one senior manager.
- The cyclone crew will be responsible for operating the jetty during Level-1 through level-4 conditions unless the project manager will determine that the plant is to be evacuated completely.
- The securing crew should consist of the minimum number of persons required to secure the project site in the event of an impending cyclone or severe storm.
- The securing crew will be responsible for preparing the plant for a potential cyclone but will evacuate the plant in the case of Level 3 storm.
- The project manager will-
  - Develop a cyclone check-list, which will be used as a guide for actions needed to prepare for a cyclone.
  - Develop a securing crew check list will be used to secure the plant.
- Level 1 storm watch- the project manager will take following actions:
  - Nominate the cyclone crew
  - Nominate the secure crew
  - Check fuel and lube oil inventory level (if necessary, diesel fuel tanks will be topped off)
  - Notify plant staff that a level 1 watch is in effect and call a meeting with all plant supervisors to review the cyclone procedures
  - Inventory cyclone supplies and replenish them as necessary.
- Level 2 storm watch the project in charge shall take the following actions:
  - Notify plant staff that a level-2 watch is in effect and call a meeting with all plant supervisors to review the cyclone procedure and assign tasks
  - Instruct the securing crew to initiate the actions defined in the plan.
  - Ensure that the securing crew has completed all tasks
  - Relieve any members of cyclone crew so that they may have sufficient time to sleep and to prepare at home for impending cyclone
  - Stop all maintenance projects not essential for normal operation

- Level 3 storm watch, the project in charge will take following actions:
  - Determine whether to evacuate all personnel from the plant
  - Except securing crew and others will be deemed necessary to prevent thief tor looting.
  - Carry out evacuation if the decision will do so.
  - Verify that all precautions will have been taken.
  - Notify owners and others field officer of plant status
  - Notify power utility of plant status
- Level 4 Storm
  - In the event of a level 4 storm watch, the project in charge shall track the storm and based on its reported intensity and course, determine whether to continue to operate the project site.
  - If a shutdown and evacuation of cyclone crew is deemed necessary, the plant in charge shall
  - Notify the power utility of impending shutdown
  - Notify the owners and field officers of impending shutdown
  - Shutdown and evacuate the plant
  - Shutdown of plant will be conducted according to a predetermined plan designed to minimize the potential for damage to the plant and to enable rapid startup after the storm.

## **8. Flooding Preparedness Plan**

- Severe flooding may result from rushing out of water and heavy rainfall or from storm driven water
- Flooding poses the following potential hazards
- Drowning, in severe cases, personnel may be washed away in strong currents and may drown or be severely injured.
- Pollution, rising water may cause drains and sumps to overflow, polluting environment.
- Equipment Damage, Machinery and other equipment may be damaged by rising or flowing water.
- Electrocutation hazard. Rising water may short electrical circuits and cause electric shock hazards.
- Subsidence. Water –logged ground may subside. Underground tanks, especially if empty, may be forced to rise. Piping may become distorted rupture.

- Landslide. Water –logged ground may shift or result in land or mud slides. Earth beam may collapse.
- Snakes and other potentially dangerous animals may seek higher ground.
- In the event of rising water or continued heavy rains, the project manager should ensure that
- Store and equipment are moved from the site to safe storage or are elevated sufficiently to ensure that they will not be flooded.
- Vehicles are moved to higher ground or evacuated
- Tank Bern drains are opened to prevent overfilling and possible collapse of the Bern

## **9. After a Flood**

- In general, follow the procedure for after a storm or cyclone, plus the following points Ensure that pollution, if any, is contained and is removed in accordance with set procedures.
- Check for subsidence and possible distortion of equipment frames and foundations
- Pump out areas that have not drained naturally.
- Check the site for possible infer-station by snakes or other animals.

## **10. Earthquake Preparedness Plan**

- Earthquakes seldom give warning. It is therefore essential that personnel be aware of and prepared for the potential hazards at all times.
- The primary hazards from an earthquake are:
- Injury from falling debris or entrapment by falling and collapsing buildings
- Fire, Explosion and pollution hazards from ruptured pipes and tanks.
- Misalignment or shifting of equipment.
- Possible tidal surges and flooding caused by offshore quakes.

## **11. In the event of an earthquake, the project manager shall:**

- Evacuate personnel from within the project and other buildings.
- Muster all personnel to ensure that everyone is accounted for;
- If necessary, shutdown the operation and isolate systems to minimize the risk of fire, explosion, or pollution.
- If necessary, take action to minimize the risk of flooding or tidal surges, inclusive of evacuating the plant.
- If necessary, to evacuate the project site, follow the procedure in mentioned in the plan.

## **12. After an earthquake**

- Be prepared for aftershocks. Hard hats should be used to all personnel.
- Make a complete damaged assessment including photographing any damage for insurance purposes.

- Inspect all equipment foundations for distortion or cracking
- Inspect pipelines for distortion or rupture. Isolate system as necessary.
- Do not start operation or equipment until certain that it is safe to do so.

### **13. Records**

- A report is to be completed and maintained on file following any storm occurrence above Level-2. The report is to be retained on file for three years.
- This emergency preparedness plan must be maintained on site retain superseded plans for three year.

## **Annex-C: Master Layout**

## **Annex-D: Effluent Treatment Plant (ETP) Details**

- A. GENERAL INFORMATION, DESIGN PARAMETERS, WASTEWATER GENERATION, AND OPERATIONAL PROCESS DESCRIPTION**
- B. PROCESS FLOW DIAGRAM**
- C. DESIGN CALCULATION**
- D. ELECTRO-MECHANICAL BOQ**
- E. POWER AND CHEMICAL CALCULATION**



**A. GENERAL INFORMATION, DESIGN PARAMETERS,  
WASTE WATER GENERATION, ETP COMPONENTS  
AND HRT AND OPERATIONAL PROCESS  
DESCRIPTION  
Of  
ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

**EFFLUENT TREATMENT PLANT (ETP)  
CAPACITY: 90.0 M<sup>3</sup>/HR.**

**DETAIL DESCRIPTION OF BIOLOGICAL TREATMENT OF  
EFFLUENT TREATMENT PLANT (ETP) CAPACITY: 2160 M<sup>3</sup>/DAY**

**1. GENERAL INFORMATION**

|                             |   |                                                   |
|-----------------------------|---|---------------------------------------------------|
| <b>Name of Client</b>       | : | <b>ASPIRE WASHING LTD. (AWL)</b>                  |
| <b>Location</b>             | : | Sudkhira, Jamirta, Singair, Manikganj             |
| <b>Type of Effluent</b>     | : | Denim Wash Process Effluent                       |
| <b>Quantity of Effluent</b> | : | 90 m <sup>3</sup> /Hr (2160 m <sup>3</sup> /day.) |
| <b>Treatment Hours</b>      | : | 24 Hrs/Day                                        |
| <b>Treatment Concept</b>    | : | Biological (Conventional ASP) Treatment Process.  |

**2. MOST CONSIDERABLE DESIGN PARAMETERS**

| SL NO. | Name of Parameter | Inlet Parameter (ppm)<br>(Maximum) | Outlet<br>Parameter (ppm)<br>(ECR'23, Department of<br>Environment, DoE) |
|--------|-------------------|------------------------------------|--------------------------------------------------------------------------|
| 10.    | pH                | 8-11                               | 6.0-9.0                                                                  |
| 11.    | TSS               | 200-600                            | 100                                                                      |
| 12.    | BOD               | 450                                | <30                                                                      |
| 13.    | COD               | 1000                               | <200                                                                     |
| 14.    | DO                | 00                                 | ---                                                                      |
| 15.    | TDS               | <1000                              | <2100                                                                    |
| 16.    | Total Nitrogen    | <40                                | ---                                                                      |
| 17.    | Total Phosphate   | <5                                 | ---                                                                      |
| 18.    | Color             | 15;9;6 (600-800)                   | ≤ 150 Pt-Co                                                              |

\* Source: Inlet parameters are taken from similar projects.

### 3. WASTEWATER GENERATION & ETP CAPACITY

**Water Requirement:** The daily requirement of water has been estimated at about 2300.0 m<sup>3</sup>, which will be available from deep tube well sources. Mass balance of the project are given below-

| Denim Washing ETP Capacity Calculation (Proposed)                            |                                                    |           |          |                                                                                                                                                                      |
|------------------------------------------------------------------------------|----------------------------------------------------|-----------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SL                                                                           | Particulars                                        | Quantity  | Unit     | Remarks                                                                                                                                                              |
| 1                                                                            | Production Capacity & type of production           | 60,000    | Pcs/day  | Garments Wash, Enzyme Wash, Stone Enzyme Wash, Enzyme & Stone Wash with DP, Enzyme & Bleach Wash With DP, Enzyme Towel & Acid Wash with dry process, Garments Dyeing |
| 2                                                                            | Weight                                             | 30,000    | kg/day   | Average weight 500 gm per piece                                                                                                                                      |
| 3                                                                            | Water Consumption                                  | 60        | Ltr/kg   | The global standard for washing 1 kilogram of denim fabrics is 70 liters                                                                                             |
| 4                                                                            | Wastewater Generation                              | 18,00,000 | Ltr/day  | 1800 m <sup>3</sup> /day                                                                                                                                             |
| 5                                                                            | ETP Capacity (Effluent Flow+ 15% Factor of Safety) | 20,70,000 | Ltr/day. | 2070 m <sup>3</sup> /day                                                                                                                                             |
| 6                                                                            | Effluent Flow                                      | 86,250    | Ltr/hr.  | 86.25 m <sup>3</sup> /hr. (2070 m <sup>3</sup> /day)                                                                                                                 |
| So, Proposed ETP Capacity: 90 m <sup>3</sup> /hr. (2160 m <sup>3</sup> /day) |                                                    |           |          |                                                                                                                                                                      |

- Source**

The raw effluent shall be discharge to the proposed effluent treatment plant from the process units.

- Quantity**

The quantity of effluent to be treated shall be of the order of 2160 m<sup>3</sup>/day.

#### **4. OPERATIONAL PROCESS**

##### ***i. Automatic Screening:***

Automatic screening removes large solids, rags, and debris from Inlet. It increases the efficiency of treatment plant.

##### ***ii. Solid Separation Tank:***

This tank will collect the effluent from the drain coming from process unit and Sand trap will settle grits from the effluent and will be collected periodically. This Tank will collect and store the effluent up to a certain time. Anaerobic reaction May take place in this tank If air is not supplied in this tank.

##### ***iii. Collection Tank:***

This tank was constructed to avoid turbulence at the solid separation tank. It will collect the effluent from the solid separation tank and send the effluent water to Solid separation tank.

##### ***iv. Equalization Tank:***

The effluent will be taken into equalization reactor where the homogeneous mixing will be done by the by Blower. This homogeneous mixing will help to neutralize the pH effortlessly in next tank. And increase the efficiency of biological system.

Air can be applied in the Equalization Tank based on the requirements. If we want to Reduce BOD, COD load before aeration tank then we can add oxygen in the Equalization tank. In this case, aerobic bacteria will grow if pH level is neutral.

##### ***v. Neutralization Tank:***

Homogeneously mixed Wastewater will be pumped to this section for neutralization of pH by adding acid/alkali.

- For acidic wastes (low pH): NaOH (Sodium hydroxide),  $\text{Na}_2\text{CO}_3$  (Sodium carbonate),  $\text{CaCO}_3$  (Calcium carbonate) or  $\text{Ca}(\text{OH})_2$ .
- For alkali wastes (high pH):  $\text{H}_2\text{SO}_4$ , HCl (Hydrochloric acid).

**vi. Biological Tank:**

In biological tank, organic pollutants will be removed aerobically. Oxygen is provided in this tank and bacteria for treating and stabilizing the wastewater use it. Oxygen is needed by the bacteria for biodegradation of organic matters. The supplied oxygen is utilized by bacteria (microorganism) in the wastewater to break down the organic matter containing carbon form carbon dioxide and water. Without the presence of sufficient oxygen, bacteria are not able to biodegrade the incoming organic matter.

There are mainly three types of microorganism.

4. Nitrogenous microorganism
5. Carbonaceous microorganism
6. Sulphurous microorganism

|                            |                |                                                    |
|----------------------------|----------------|----------------------------------------------------|
| Nitrogenous microorganism  | Oxidation<br>→ | $\text{NO}_3^- + \text{NH}_3 + \text{Energy}$      |
| Carbonaceous microorganism | Oxidation<br>→ | $\text{CO}_2 + \text{H}_2\text{O} + \text{Energy}$ |
| Sulphurous microorganism   | Oxidation<br>→ | $\text{SO}_4^{2-}$ (sulfate) + Energy              |

NH<sub>3</sub> Create odors in aeration tank and it is removed by Nitrification and Denitrification.

Nitrification and Denitrification in water treatment:

Nitrification and Denitrification is a process of removing excess nitrogen form of ammonia from the water to maintain the standard concentration of nitrogen in environment.

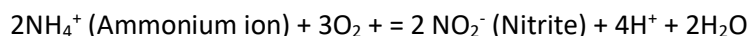
**Nitrification:**

Nitrification is the biological oxidation of ammonia to nitrite followed by the oxidation of the nitrite to nitrate occurring through separate organisms or direct ammonia oxidation to nitrate by heterotrophic / Nitrosomonas and Nitrobacter bacteria. It is very Oxygen consuming process, 4.6 lb oxygen required to produce 1 lb  $\text{NO}_3^-$ . Nitrosomonas has an optimal pH between approximately 7.0 and 8.0, and the optimum pH range for heterotrophic / Nitrobacter is approximately 7.5 to 8.0.

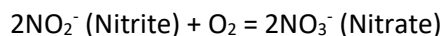
**In the presence of Air:**

Nitrification is an aerobic process. So, oxygen is required to convert the ammonia to nitrite. Now;

Nitroso-Bacteria:



Nitro-Bacteria:



Total Oxidation Reaction:



#### **vii. Secondary Clarifier:**

A clarifier tank allows suspended particles to settle out of water or wastewater as it flows slowly through the tank, thereby providing some degree of purification. A layer of accumulated solids, called sludge, forms at the bottom of the tank and is periodically removed.

#### **viii. Mixing Channel**

Effluent will come from the secondary clarifier and will go through the mixing channel to remove its color.

#### **ix. Recycle Tank**

A recycle tank in an ETP stores treated wastewater for reuse instead of discharge. It ensures a steady supply of reclaimed water for processes like cooling or washing, reduces freshwater use, and supports sustainability goals such as 3R and ZLD.

#### **x. MGF Feed Tank:**

This is a Feed tank use to hold the water. Water will pump to the Filter Vessel (MGF) from this tank. Denitrification will happen in this tank if any Nitrite retain.

#### **xi. Multi Grade Filter Vessel (MGF):**

Multi Grade Filter is a latest concept in the water treatment technology. a Multi Grade Filter consists of vertical or horizontal pressure sand filters that contain multiple layers of course and fine sand (pebbles and gravels) in a fixed proportion. It is a kind of a deep filter bed with adequate pore

dimensions for retaining both large and small-suspended solids and un-dissolved impurities like dust particles. It can reduce high turbidity and TSS (< 5ppm) from water.

***xii. Post Aeration Tank:***

The Treated Water Tank is used to disinfection & increase the DO in the water before discharging the water and it increase the quality of the water. The air causes the dissolved gases to release from the water before discharge.

***xiii. Sludge Thickening Tank:***

Excess sludge from the Clarifier tank will be taken to the sludge tank, will be thickened further in the sludge tank and the thickened sludge will be pumped the filter press for the dewatering of sludge to make it in the form of cake. Secondary sludge will be feed to biological tank as return activated sludge (RAS) to maintain required MLSS & MLVSS level in the aeration tank. Extra sludge will be moved to filter press for further sludge treatment.

***xiv. Screw Press:***

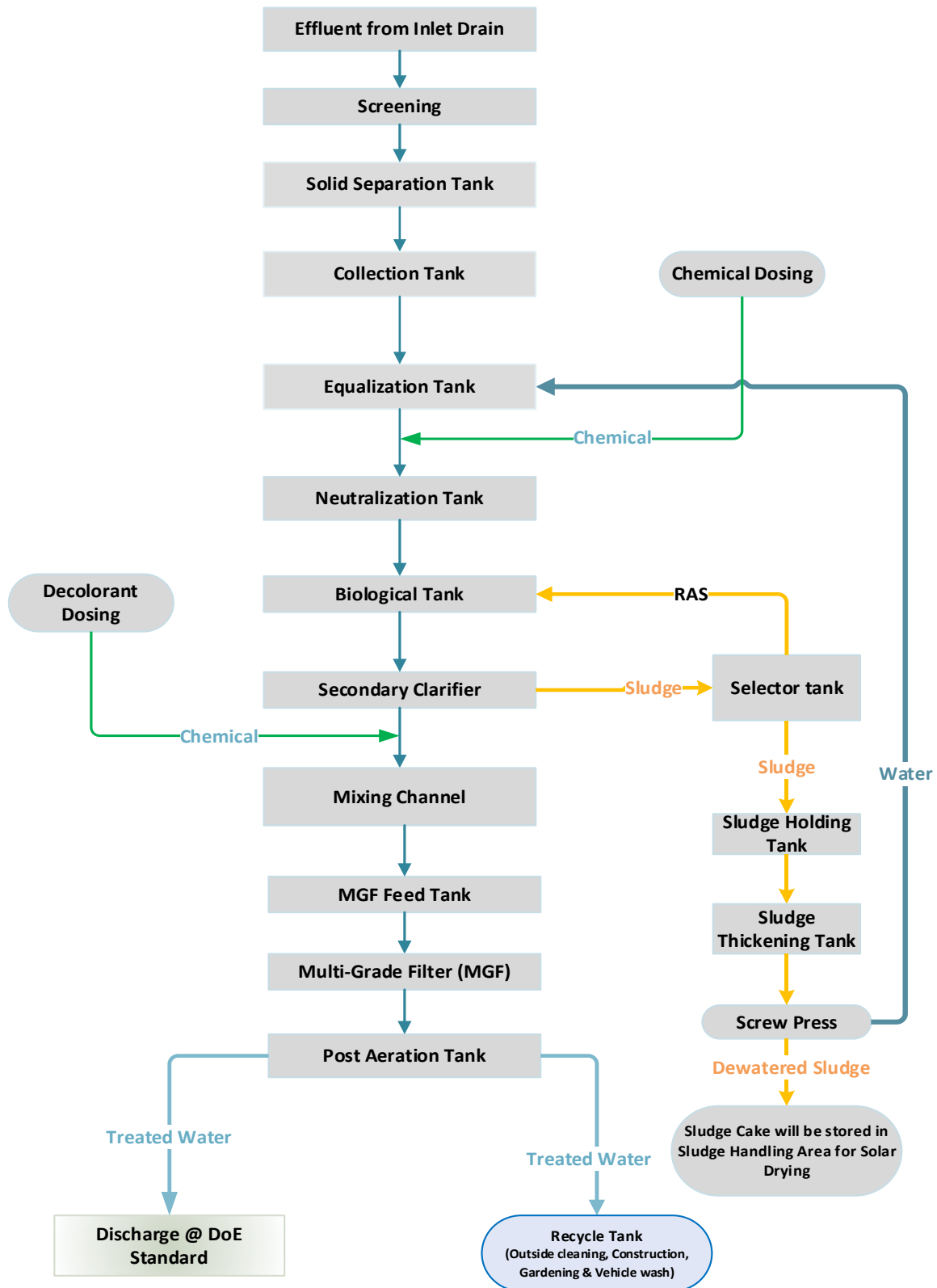
An industrial Screw press is a tool used in separation processes, specifically to separate solids and liquids. Liquids are sent to the equalization tank.

## **B.PROCESS FLOW DIAGRAM Of ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

**EFFLUENT TREATMENT PLANT (ETP)**  
**CAPACITY: 90.0 M<sup>3</sup>/HR.**

## ETP PROCESS FLOW DIAGRAM (CAPACITY: 90.0 M<sup>3</sup>/HR)



## **C.DESIGN CALCULATION Of ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

### **EFFLUENT TREATMENT PLANT (ETP)**

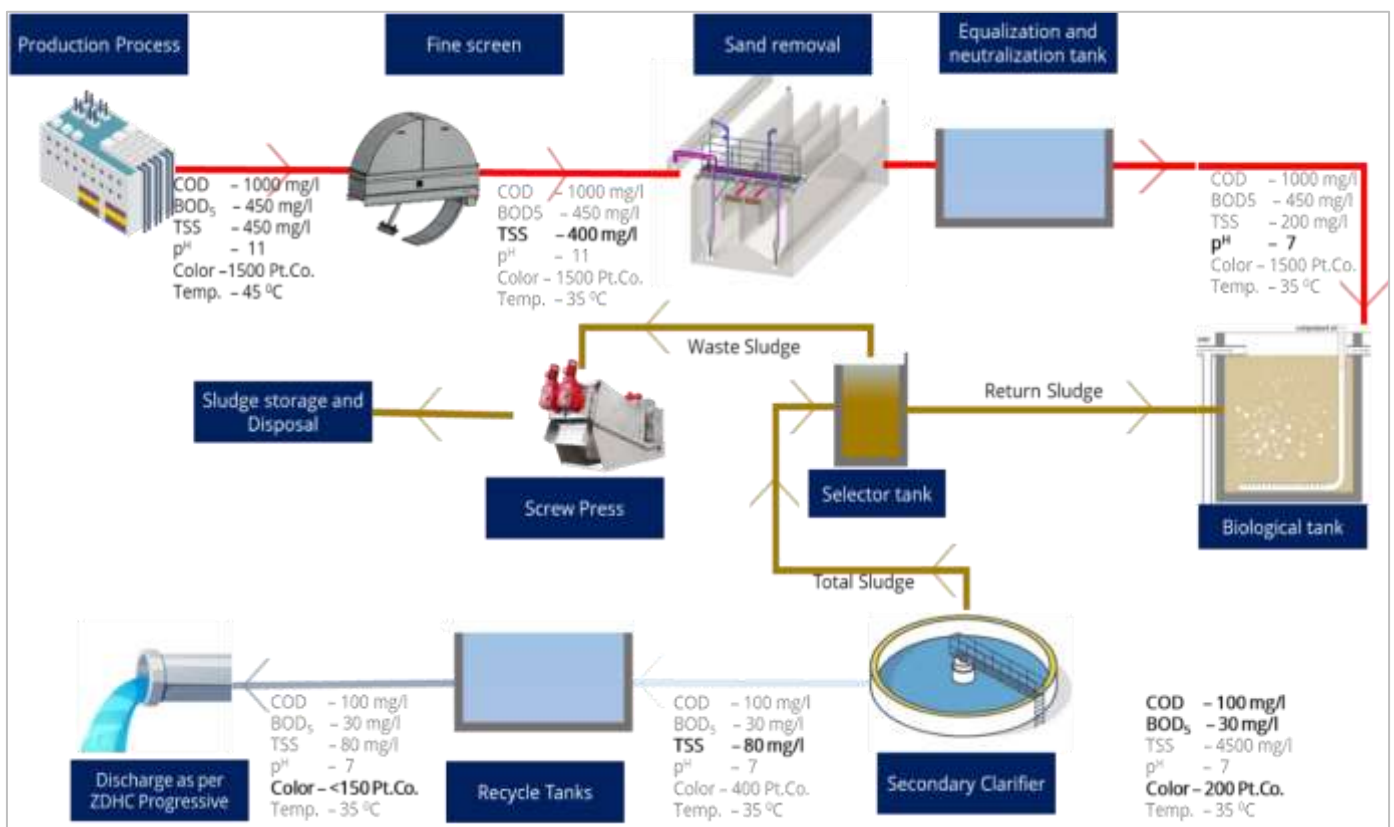
**CAPACITY: 90.0 M<sup>3</sup>/HR.**

**DESIGN CALCULATION OF EFFLUENT TREATMENT PLANT (ETP)**
**CAPACITY: 90.0 M<sup>3</sup>/HR.**

| SL No.                                     | Parameters                                       | Symbols     | Value | Unit                | Remarks           |
|--------------------------------------------|--------------------------------------------------|-------------|-------|---------------------|-------------------|
| <b>Incoming Wastewater Characteristics</b> |                                                  |             |       |                     |                   |
| 1.                                         | Flow rate hourly                                 | $Q_0$       | 90    | m <sup>3</sup> /hr  | Design value      |
| 2.                                         | Flow rate daily                                  | $Q_0$       | 2160  | m <sup>3</sup> /day | Design value      |
| 3.                                         | Average Inlet COD concentration                  | $S_{0-COD}$ | 1000  | mg/l                | Design value      |
| 4.                                         | Inlet BOD <sub>5</sub> concentration             | $S_{0-BOD}$ | 450   | mg/l                | Design value      |
| 5.                                         | Outlet COD concentration                         | $S_1$       | 150   |                     | Design value      |
| 6.                                         | TDS                                              | $TDS$       | <1000 | mg/l                | Design value      |
| 7.                                         | Temperature                                      | $T$         | 35    | °C                  |                   |
| 8.                                         | p <sup>H</sup>                                   | $p^H$       | 6 –9  | —                   | Measured          |
| 9.                                         | Daily COD load                                   | $L_{COD}$   | 2160  | kg/day              | Calculated        |
| <b>Equalization Tank</b>                   |                                                  |             |       |                     |                   |
| 10.                                        | HRT of equalization tank                         | $HRT_{pry}$ | 8     | hr                  | Legal requirement |
| 11.                                        | Volume of equalization tank                      | $V_{eq}$    | 720   | m <sup>3</sup>      | Calculated        |
| 12.                                        | Air requirement for mixing                       | $Air_{eq}$  | 432   | m <sup>3</sup> /hr  | Calculated        |
| 13.                                        | Actual Volume of Equalization Tank               | $V_{ac}$    | 860   | m <sup>3</sup>      | Actual            |
| 14.                                        | Actual HRT of equalization tank                  | $HRT_{pry}$ | 9.5   | hr                  | Actual HRT        |
| <b>Oxidation Tank</b>                      |                                                  |             |       |                     |                   |
| 15.                                        | COD in WWTP Outlet                               | $S_1$       | 150   | mg/l                | Measured          |
| 16.                                        | COD treated in biological treatment system daily | $S_r$       | 1836  | kg/day              | Calculated        |
| 17.                                        | F/M ratio is                                     | $f/m$       | 0.15  | Kg COD/kg MLSS·d    | Empirical         |
| 18.                                        | Ideal (by weight) MLSS needed in biological tank | $P_X$       | 12240 | kg                  | Calculated        |
| 19.                                        | Concentration of MLSS in the biological tank     | $X_0$       | 4500  | mg/l                | Empirical         |
| 20.                                        | Tank volume for biological oxidation             | $V_{ar}$    | 2720  | m <sup>3</sup>      | Calculated        |
| 21.                                        | Actual volume for biological oxidation           | $V_{ar}$    | 3270  | m <sup>3</sup>      | Actual            |
| 22.                                        | HRT of oxidation tank                            | $HRT_{bio}$ | 30    | hours               | Calculated        |
| 23.                                        | Actual HRT of oxidation tank                     | $HRT_{bio}$ | 36.3  | hours               | Actual            |
| 24.                                        | MLSS and MLVSS ratio                             | $ss/vss$    | 70    | %                   | Empirical         |

| SL No.                                              | Parameters                                        | Symbols        | Value | Unit                      | Remarks    |
|-----------------------------------------------------|---------------------------------------------------|----------------|-------|---------------------------|------------|
| 25.                                                 | Total MLVSS in the aeration tank                  | $P_{VSS}$      | 8568  | kg                        | Calculated |
| <b>Calculation for Air Requirement</b>              |                                                   |                |       |                           |            |
| 26.                                                 | Oxygen required for per kg COD removal            | $O_{2-ox}$     | 1.42  | kg O <sub>2</sub> /kg COD | Empirical  |
| 27.                                                 | Oxygen transfer needed                            | $O_{2-t}$      | 260   | kg O <sub>2</sub> per day | Calculated |
| 28.                                                 | Considering SOTE 40%, the oxygen requirement      | $SOTE$         | 5793  | kg/day                    | Calculated |
| 29.                                                 | Ratio of SOTE from clean to effluent water is 90% | $\alpha$       | 90    | %                         | Empirical  |
| 30.                                                 | Diffuser fouling                                  | $F$            | 90    | %                         | Empirical  |
| 31.                                                 | Air requirement                                   | $O_{2-r}$      | 7153  | kg/day                    | Calculated |
| 32.                                                 | Oxygen in the air (21%)                           | $O_{2-air}$    | 21    | %                         | Empirical  |
| 33.                                                 | Air requirement                                   | $Air_r$        | 34060 | kg per day                | Calculated |
| 34.                                                 | Specific gravity of air at 30 <sup>0</sup> C is   | $SG_{air}$     | 1.17  | kg/m <sup>3</sup>         | constant   |
| 35.                                                 | Daily air requirement in m <sup>3</sup>           | $Air_{r-day}$  | 29236 | kg/m <sup>3</sup>         | Calculated |
| 36.                                                 | Air requirement in m3                             | $Air_{r-hour}$ | 1218  | m <sup>3</sup> per hour   | Calculated |
| <b>Excess Sludge, Sludge Recirculation and MCRT</b> |                                                   |                |       |                           |            |
| 37.                                                 | Biomass yield coefficient                         | $Y$            | 0.40  | mg VSS/mg COD             | Empirical  |
| 38.                                                 | Endogenous respiration coefficient                | $b$            | 0.05  | g VSS/g VSS.day           | Empirical  |
| 39.                                                 | Daily biomass yield                               | $P_{x-d}$      | 734   | kg/day                    | Calculated |
| 40.                                                 | Biodegradable fraction of MLSS                    | $f_b$          | 0.70  | g VSS/g SS                | Empirical  |
| 41.                                                 | Biomass removed with Endogenous respiration       | $P_{x-r}$      | 300   | kg/day                    | Calculated |
| 42.                                                 | Net biomass yield                                 | $P_X$          | 435   | kg/day                    | Calculated |
| 43.                                                 | TSS concentration in treated water                | $T_e$          | 25    | mg/l                      |            |
| 44.                                                 | Daily TSS loss with treated water                 | $T_{tl}$       | 54    | kg                        |            |
| 45.                                                 | Concentration of MLSS in return sludge            | $X_w$          | 8000  | mg/l                      | Empirical  |
| 46.                                                 | Daily excess sludge removal                       | $Q_w$          | 48    | m <sup>3</sup> /day       | Calculated |
| 47.                                                 | MCRT (Mean Cell residence time)                   | $\theta_c$     | 28    | days                      | Calculated |
| 48.                                                 | Return sludge ratio (maximum)                     | $Q_0/Q_r$      | 1.50  |                           | Empirical  |
| 49.                                                 | RAS recirculation rate                            | $Q_r$          | 3240  | m <sup>3</sup> /day       | Calculated |
| 50.                                                 | Recommended SVI                                   | $SVI$          | 90    | ml/g                      | Empirical  |
| 51.                                                 | Required SV 30                                    | $SV_{30}$      | 405   | ml/l                      | Calculated |

| SL No.                     | Parameters                          | Symbols   | Value | Unit                               | Remarks      |
|----------------------------|-------------------------------------|-----------|-------|------------------------------------|--------------|
| <b>Secondary Clarifier</b> |                                     |           |       |                                    |              |
| 52.                        | Daily Flow to Secondary Clarifier   | $Q_o$     | 2160  | m <sup>3</sup>                     | Calculated   |
| 53.                        | Surface overflow rate               | $SOR$     | 0.8   | m <sup>3</sup> /m <sup>2</sup> ·hr | Empirical    |
| 54.                        | Clarifier surface area              | $A_s$     | 113.9 | m <sup>2</sup>                     | Calculated   |
| 55.                        | SLR (Solid Loading Rate)            | $SLR_s$   | 5.76  | kg/m <sup>2</sup> ·hr              | Calculated   |
| 56.                        | Length of the weir                  | $W_{LS}$  | 42    | m                                  | Calculated   |
| 57.                        | WOR (weir overflow rate)            | $WOR_s$   | 2     | m <sup>3</sup> /line m·hr          | Calculated   |
| 58.                        | Side water depth of clarifier       | $H_{sc}$  | 4.5   | m                                  | Design value |
| 59.                        | Volume of clarifier                 | $V_{sc}$  | 512   | m <sup>3</sup>                     | Calculated   |
| 60.                        | Retention time of primary clarifier | $RT_{sc}$ | 5.7   | hr                                 | Calculated   |
| <b>Sand filter</b>         |                                     |           |       |                                    |              |
| 61.                        | Filtration rate                     | $R_f$     | 15    | m <sup>3</sup> /m <sup>2</sup> /hr | Empirical    |
| 62.                        | Needed surface area                 | $A_f$     | 6     | m <sup>2</sup>                     | Calculated   |



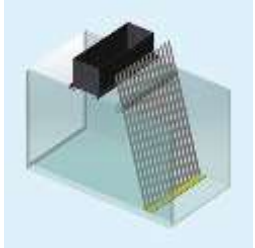
## **D. ELECTRO-MECHANICAL BOQ Of ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

**EFFLUENT TREATMENT PLANT (ETP)**

**CAPACITY: 90.0 M<sup>3</sup>/HR.**

**ELECTRO-MECHANICAL EQUIPMENT BOQ FOR 90.0 M<sup>3</sup>/HR. ETP**

| SL                              | Item Description                                                                                                                                                                                                                                                                                                       | QTY   | Brand | Country of Origin | Photos                                                                                |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------------------|---------------------------------------------------------------------------------------|
| <b>A. INLET SCREENING:</b>      |                                                                                                                                                                                                                                                                                                                        |       |       |                   |                                                                                       |
| 01.                             | <u>Bar Screen:</u><br>Bar screen to separate all medium & large solids inside effluent. SS constructed Hollow bar Rotary screen to protect entrance large solids into ETP to be installed at .reception tank<br>MOC: SS<br>Perforation Size: 25 & 10 mm                                                                | 2 set | ESBD  | BD/China          |    |
| 02.                             | <u>Automatic Rotary Screen:</u><br>Automatic screen to separate all medium & large solids inside effluent. SS constructed Hollow bar Rotary screen to protect entrance large solids into ETP to be installed at .reception tank<br>Control system: VFD (1 No)<br>MOC: SS 304<br>Rotary screen size: As per drain size. | 1 set | ESBD  | BD/China          |  |
| <b>B. SOLID SEPERATION TANK</b> |                                                                                                                                                                                                                                                                                                                        |       |       |                   |                                                                                       |
| 03.                             | <u>Moving bridge for Sand Collection:</u><br>The bridge is operated by a central gearbox connected to trolley drive wheels.<br>While grit continues to settle. The bridge travels back and forth. Travelling one way, it conveys the settled grit into the grit collection hopper through the bottom scraper.          | 1 lot | China | China             |  |

| SL                           | Item Description                                                                                                                                                                                                                                                                                                                                   | QTY                             | Brand           | Country of Origin | Photos                                                                                |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------|-------------------|---------------------------------------------------------------------------------------|
| <b>C. COLLECTION TANK:</b>   |                                                                                                                                                                                                                                                                                                                                                    |                                 |                 |                   |                                                                                       |
| 04.                          | <u>Effluent Transfer Pump from Collection Tank to Equalization tank:</u><br>Submersible specially made to handle effluent. None clogging, self-priming, open impeller type.<br>Each pump capacity: 90 m <sup>3</sup> /Hr.<br>Head: 12 meters.<br>Including lifting coupling & guide rod.<br>Control system: VFD (2 No's)<br>Brand: Danfos, Denmark | 2<br>No's<br>(1 R<br>+ 1<br>SB) | Tsurumi/<br>Eq. | China             |    |
| <b>D. EQUALIZATION TANK:</b> |                                                                                                                                                                                                                                                                                                                                                    |                                 |                 |                   |                                                                                       |
| 05.                          | <u>Effluent Transfer Pump from Equalization tank to neutralization:</u><br>Submersible specially made to handle effluent. None clogging, self-priming, open impeller type.<br>Each pump capacity: 90 m <sup>3</sup> /Hr.<br>Head: 12 meters.<br>Including lifting coupling & guide rod.<br>Control system: VFD (2 No's)<br>Brand: Danfos, Denmark  | 2<br>No's<br>(1 R<br>+ 1<br>SB) | Tsurumi/<br>Eq. | China             |  |
| 06.                          | <u>Coarse Bubble Diffuser for Equalization Tank:</u><br>Connection Method: PT 1" thread<br>Diameter: 150 mm, Height: 50 mm<br>Air flow capacity: 100 l/min ~ 450 l/min<br>Tough and durable construction.<br>Higher oxygen dissolution rate and corrosion resistance<br>Prevent backflow without clogging.                                         | 100<br>Nos.                     | Huixing         | China             |  |

| SL  | Item Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | QTY                                                   | Brand                                                                                                   | Country of Origin | Photos                                                                                                                                                                       |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|     | Diffuser Cover : Neoprene Rubber, resisting against acid and alkali, Diffuser Base: ABS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |                                                                                                         |                   |                                                                                                                                                                              |
| 07. | <u>Air Blower including canopy for Equalization &amp; Post aeration:</u><br><br>Total Air Requirement: 463 m <sup>3</sup> /Hr.<br>Model No: BKW-5006 (100-4")<br>Pressure: 0.8 Bar<br>Motor: 18.5 kW/ 25 HP.<br>Air Supply: 7.73 m <sup>3</sup> /min<br>Including accessories: Blower Main body, Coupling, Pulley and V-belt, Pressure relieve valve, Check valve, Inlet silencer (with air filter), Outlet silencer, public base (with belt cover), Rubber flexible joint and shock pad, Pressure gauge, Bolts and nuts and other connection parts, Motor etc.<br>Motor Manufacturer: Siemens Standard Motor Co. Brand: Beide.<br>Control system: VFD (2 No's).<br>Brand: Danfos, Denmark | 2<br>Nos.<br>(1<br>runni<br>ng +<br>1<br>Stan<br>dby) | Japan,<br>Manuf<br>acture<br>in<br>China<br>by B-<br>Tohin<br>Machi<br>ne<br>(Jiangs<br>u) Co.,<br>Ltd. | China.            | <br> |
| 08. | <u>Electromagnetic Flow Meter:</u><br>6.0" (DN 150)<br>Capacity: 22.0-290.0 m <sup>3</sup> /h<br>Pressure: 1.6 Mpa<br>Work Environment: Sensor -20~180 °C;<br>Converter -20~60 °C<br>Liner Material: PTFE<br>Body and Flange: Carbon Steel                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1<br>nos.                                             | Supm<br>ea                                                                                              | China.            |                                                                                         |

| SL                                   | Item Description                                                                                                                                                                                                                                                                                                                                  | QTY                            | Brand                                                  | Country of Origin | Photos                                                                                |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------|
|                                      | Brand: Supmea<br>Origin: Germany                                                                                                                                                                                                                                                                                                                  |                                |                                                        |                   |                                                                                       |
| <b>E. NEUTRALIZATION TANK:</b>       |                                                                                                                                                                                                                                                                                                                                                   |                                |                                                        |                   |                                                                                       |
| 09.                                  | <u>Acid Dosing &amp; correction system:</u><br>Dosing tank: PVC tank, 1000-liter capacity,<br>Dosing: By Dosing pump: SEKO/Eq.<br>Pump Capacity: 120 ltr/Hr.<br>Pipeline: UPVC.                                                                                                                                                                   | 1 lot                          | Gazi/Padma<br><br>SEKO                                 | BD<br><br>Italy   |    |
| 10.                                  | <u>Online pH meter:</u><br>Details: pH monitoring system.<br>Brand: Hangzhou Supmea Automation Co, Ltd<br>Control system: VFD (1 No)<br>Including additional probe: 1 no.                                                                                                                                                                         | 1 no.                          | Supmea/ Eq                                             | China.            |  |
| <b>F. BIOLOGICAL /AERATION TANK:</b> |                                                                                                                                                                                                                                                                                                                                                   |                                |                                                        |                   |                                                                                       |
| 11.                                  | <u>Air Blower with canopy:</u><br><br>Total Air Requirement: 1258 m <sup>3</sup> /Hr.<br>Model No: BKW-7011 (150-6")<br>Pressure: 0.9 Bar<br>RPM: 1250<br>Motor: 55 kW/ 75 HP. Air Supply: 20.97 m <sup>3</sup> /min<br>Including accessories: Blower Main body, Coupling, Pulley and V-belt, Pressure relieve valve, Check valve, Inlet silencer | 2 Nos. (1 running + 1 Standby) | Japan, Manufacture in China by B-Tohin Machine (Jiangs | China.            |  |

| SL  | Item Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | QTY      | Brand        | Country of Origin | Photos                                                                                |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------|-------------------|---------------------------------------------------------------------------------------|
|     | <p>(with air filter), Outlet silencer, public base (with belt cover), Rubber flexible joint and shock pad, Pressure gauge, Bolts and nuts and other connection parts, Motor etc.</p> <p>Motor Manufacturer: Siemens Standard Motor Co. Brand: Beide.</p> <p>Control system: VFD (2 No's).</p> <p>Brand: Danfos, Denmark</p>                                                                                                                                                                                                                                                                     |          | u) Co., Ltd. |                   |                                                                                       |
| 12. | <p><u>Disk type Air Diffuser:</u></p> <p>Disk type air diffuser with fine perforation capable to produce fine air bubble.</p> <p>MOC: EPDM (EPDM rubber (Ethylene propylene diene monomer (M-class) rubber), a type of synthetic rubber, is an elastomer characterized by a wide range of applications. The M refers to its classification in ASTM standard D-1418; the M class includes rubbers having a saturated chain of the polyethylene type.)</p> <p>Designed air flow: 1-3 m3/Hr.</p> <p>Bubble dia: 1-3 mm</p> <p>Service area: 0.25-0.45 m2/Pcs.</p> <p>Diffuser Size: Dia-200 mm</p> | 650 No's | Huixing      | China.            |  |
| 13. | <p><u>DO synchronize system:</u></p> <p>Details: DO monitoring system.</p> <p>Brand: Hangzhou Supmea Automation Co, Ltd</p> <p>Control system: VFD (1 No.)</p> <p>Including additional prove: 1 no.</p>                                                                                                                                                                                                                                                                                                                                                                                         | 1 no.    | Supmea/ Eq   | China.            |  |

| SL                                  | Item Description                                                                                                                                                                                                                                                                                      | QTY   | Brand | Country of Origin | Photos                                                                                                                                                                      |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>G. SECONDARY CLARIFIER TANK:</b> |                                                                                                                                                                                                                                                                                                       |       |       |                   |                                                                                                                                                                             |
| 14.                                 | <u>V-notch for Clarifier:</u><br>SS Plate: 3 mm Thickness<br>Uses in top of clarifier launder.<br>MOC: SS-304<br>For: 1 no. clarifier tank                                                                                                                                                            | 1 lot | ESBD  | BD                |                                                                                          |
| 15.                                 | <u>Double Layer Feed well ( EDI) for Clarifier:</u><br>Outer Layer Dia: 1500 mm<br>Inner Layer Dia: 900 mm<br>Height: 1200 mm<br>MoC: SS 304<br>Thickness: 1.5 mm                                                                                                                                     | 1 lot | ESBD  | BD                |                                                                                          |
| 16.                                 | <u>MUD SCRAPER:</u><br>Bridge: RCC<br>Bottom Scraper: SS constructed sludge collector<br>MOC: SS-304,<br>location: Clarifier tanks,<br>Qty: 1 set. Used is bottom of Clarifier tank.<br>Gear-Motor: 1.5 kW, 5-10 RPH.<br>Double gear system<br>Control system: VFD (1 No.)<br>Brand: Danfos, Denmark, | 1 lot | ESBD  | BD                |   |

| SL  | Item Description                                                                                                                                                                                                                                                         | QTY                              | Brand       | Country of Origin | Photos                                                                                |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------|-------------------|---------------------------------------------------------------------------------------|
| 17. | <u>Sludge Recirculation Pump:</u><br>Submersible pump specially made to handle effluent. None clogging, self-priming, open impeller type.<br>Capacity: 135 m3/hr.<br>Head: 12 m<br>Control system: VFD (2 No's)<br>Brand: Danfos, Denmark                                | 2<br>No's<br>(1 R<br>+ 1<br>SB)  | Tsurumi/Eq. | China.            |    |
| 18. | <u>Electromagnetic Flow Meter for RAS:</u><br>6" (DN 150)<br>Capacity: 22.0-290.0 m3/h<br>Pressure: 1.6 Mpa<br>Work Environment: Sensor -20~180 °C;<br>Converter -20~60 °C<br>Liner Material: PTFE<br>Body and Flange: Carbon Steel<br>Brand: Supmea<br>Origin: Germany, | 1<br>nos.                        | Supmea      | China.            |   |
| 19. | <u>Sludge Transfer Pump:</u><br>Centrifugal specially made to handle effluent. None clogging, self-priming, open impeller type.<br>Capacity: 30 m3/hr.<br>Head: 15 m                                                                                                     | 02<br>No's<br>(1 R<br>+ 1<br>SB) | Tsurumi/Eq. | China.            |  |

| SL                                | Item Description                                                                                                                                                                                                                                                                                                                                                                                   | QTY       | Brand    | Country of Origin | Photos                                                                                |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------|-------------------|---------------------------------------------------------------------------------------|
| <b>H. SLUDGE DEWATERING UNIT:</b> |                                                                                                                                                                                                                                                                                                                                                                                                    |           |          |                   |                                                                                       |
| 20.                               | <u>Screw Press Sludge Dewatering Machine:</u><br>Sludge Treatment Capacity: against 90 m <sup>3</sup> /hr. ETP<br>Dry sludge qty: 30-45 kgs.<br>Screw Shaft: 1.5 kW, Mixer: 1.1 kW<br>Washing Water Pressure: 0.1-0.2 Mpa<br>Washing Water quantity: 80 L/h.<br>Maintenance Frequency: 5 min/h<br>Screw Specification: Ø400 x 1<br>Distance form Mud cake outlet to Ground: 660 mm<br>Body: SS 304 | 1 set     | TNW      | China             |    |
| <b>I. FILTRATION UNIT:</b>        |                                                                                                                                                                                                                                                                                                                                                                                                    |           |          |                   |                                                                                       |
| 20.                               | <u>Multi-grade Filter:</u><br>Vessel: Dia: 2800 mm X2400 mm<br>Sheet: 6 mm MS.<br>Filter media: Graded sand & gravel.<br>Filter pump: Capacity: 90 m <sup>3</sup> /hr.<br>Head: 25 m<br>Quantity: 3 (1 Running + 1 Standby + 1 Backwash)<br>Control system: VFD (2 Nos.)<br>Brand: Danfos, Denmark,                                                                                                | 1<br>nos' | MS sheet | BD                |  |
|                                   |                                                                                                                                                                                                                                                                                                                                                                                                    | 3 no's    | CNP/e q  | China             |  |

| SL                            | Item Description                                                                                                                                                                                                                                                                                                                                                         | QTY        | Brand       | Country of Origin | Photos                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|-------------------|---------------------------------------------------------------------------------------|
| <b>J. TREATED WATER TANK:</b> |                                                                                                                                                                                                                                                                                                                                                                          |            |             |                   |                                                                                       |
| 21.                           | <u>Disk type Air Diffuser:</u><br>Disk type air diffuser with fine perforation capable to produce fine air bubble.<br>MOC: EPDM (EPDM rubber (Ethylene propylene diene monomer (M-class) rubber).<br>Designed air flow: 1-3 m <sup>3</sup> /Hr.<br>Bubble dia: 1-3 mm<br>Service area: 0.25-0.45 m <sup>2</sup> /Pcs.<br>Diffuser Size: Dia-300 mm, Manufacture in China | 20<br>No's | Huixing     | USA               |    |
| 22.                           | <u>Electromagnetic Flow Meter:</u><br>10'' (DN 250)<br>Capacity: 22.0-390.0 m <sup>3</sup> /h<br>Pressure: 1.6 Mpa<br>Work Environment: Sensor -20~180 °C;<br>Converter -20~60 °C<br>Liner Material: PTFE<br>Body and Flange: Carbon Steel<br>Brand: Supmea<br>Origin: Germany,                                                                                          | 1<br>nos.  | Supmea      | China.            |  |
| <b>K. OTHERS:</b>             |                                                                                                                                                                                                                                                                                                                                                                          |            |             |                   |                                                                                       |
| 23.                           | <u>Submersible propeller in anoxic tank:</u><br>MOC-SS 304<br>Motor: 0.85 kw                                                                                                                                                                                                                                                                                             | 1<br>Nos.  | Lansheng/Eq | China             |  |
| 24.                           | <u>Pipe Lines &amp; fittings:</u><br>All type of pipelines, MGF filter pipeline & fittings.<br>MOC: SS-304L                                                                                                                                                                                                                                                              | 1 lot      | -----       | China             |  |

| SL  | Item Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | QTY   | Brand   | Country of Origin | Photos                                                                                |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|-------------------|---------------------------------------------------------------------------------------|
|     | (Size & Thickness- as per engineering calculation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |         |                   |                                                                                       |
| 25. | <p><u>Automatic PLC Control Panel with manual option:</u></p> <p>Automatic Control Panel of the ETP to ON/OFF the all motors in the plant including PLC (10") &amp; HMI- Delta brand and manual option.</p> <p>Display control dashboard: 65" Monitor.</p> <p>Assemble: Bangladesh.</p> <p>Internal Cable: BRB/BBS, Equivalent, Bangladesh.</p> <p>Including GP 18 G, cable tray and necessary accessories.</p> <p>Electric device: ABB/Scheinder/Eq.</p> <p>As per RSC standard</p> <p>Manufacturing: BD / China</p> | 1 set | ABB/E q | China/BD          |    |
| 26. | <p><u>Lab Equipment:</u></p> <p>COD reactor, Spectrophotometer / Colorimeter, COD reagents, BOD analyzer, BOD incubator, multi parameter, pH, TDS and glass apparatus.</p>                                                                                                                                                                                                                                                                                                                                            | 1 set | China   | China             |  |

## **E. POWER & CHEMICAL CALCULATION Of ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

### **EFFLUENT TREATMENT PLANT (ETP)**

**CAPACITY: 90.0 M<sup>3</sup>/HR.**

# **1. ELECTRICITY COMSUMPTIONS OF 2160 M<sup>3</sup>/DAY. ETP:**

| Item Name                                 | Supplied Qty |     | Kw   |    | Running Qty | Total absorbed kw |           | Running Power-(VFD) |               |
|-------------------------------------------|--------------|-----|------|----|-------------|-------------------|-----------|---------------------|---------------|
| Automatic Rotary Bar Screen               | 1            | Nos | 1.5  | KW | 1           | 1.5               | KW        | 0.9                 | Running Hours |
| Cutter Pump for Sand Collection           | 2            | Nos | 1.5  | KW | 1           | 1.5               | KW        | 0.75                | 6             |
| Effluent Lifting Pump                     | 2            | Nos | 5.5  | KW | 1           | 5.5               | KW        | 3.3                 | 24            |
| pH Correction Dosing Pump                 | 2            | Set | 0.37 | KW | 1           | 0.37              | KW        | 0.37                | 24            |
| Roots Air blower for Equalization         | 2            | Set | 18.5 | KW | 1           | 18.5              | KW        | 11                  | 12            |
| Roots Air blower for Oxidation            | 2            | Set | 55   | KW | 1           | 55                | KW        | 33                  | 20            |
| Mud Scraper                               | 1            | Set | 1.5  | KW | 1           | 1.5               | KW        | 1                   | 20            |
| Activated Sludge Recirculation Pump (RAS) | 2            | Set | 5.5  | KW | 1           | 5.5               | KW        | 3.3                 | 24            |
| De-Coloring Dosing pump                   | 2            | Set | 0.37 | KW | 1           | 0.37              | KW        | 0.37                | -             |
| Filter Vessel Feed Pump                   | 2            | Set | 7.5  | KW | 1           | 7.5               | KW        | 4.5                 | 24            |
| Sludge Transfer Pump                      | 2            | Nos | 1.5  | KW | 1           | 1.5               | KW        | 1.5                 | 6             |
| De-watering Polymer Dosing Pump           | 2            | Set | 0.37 | KW | 1           | 0.37              | KW        | 0.37                | 6             |
| Dewatering Screw Press                    | 1            | Set | 1.5  | KW | 1           | 1.5               | KW        | 1.5                 | 6             |
| <b>Total</b>                              |              |     |      |    |             | <b>100.67</b>     | <b>KW</b> | <b>61.86</b>        |               |

So, for per m<sup>3</sup> treatment electricity consumption: **2.2 kW**

## 2. CHEMICAL CONSUMPTION PER m<sup>3</sup>: CHEMICAL COST FOR 2160 m<sup>3</sup>/day:

| Sl. No.                              | Name of Chemical               |   | Consumption per m <sup>3</sup> | Consumption per day         | Unit price       | Total price Per day |
|--------------------------------------|--------------------------------|---|--------------------------------|-----------------------------|------------------|---------------------|
| a)                                   | H <sub>2</sub> SO <sub>4</sub> | : | 15 ml/ m <sup>3</sup>          | 32 Liter                    | Tk. 35.00/ liter | Tk. 1,120.00        |
| b)                                   | Polymer                        | : | 2 gm/ m <sup>3</sup>           | Optional for color removing |                  |                     |
| c)                                   | Decoloring Agent               | : | 50 gm/ m <sup>3</sup>          |                             |                  |                     |
| Total cost per day BD Taka: 1,120.00 |                                |   |                                |                             |                  |                     |

- Total Plant Capacity: 2160 m<sup>3</sup>/day. So, per m<sup>3</sup> Chemical treatment cost: 0.52 Tk.
- Note: As per ECR 2023, color removal is mandatory.

## **Annex-E: ETP Layout and Flow Diagram**

## **Annex-F: Sewage Treatment Plant (STP) Details**

- A. STP BASIC INFORMATIONS**
- B. PROCESS FLOW DIAGRAM**
- C. DESIGN CALCULATION**
- D. ELECTRO-MECHANICAL BOQ**
- E. POWER AND CHEMICAL CALCULATION**

## **A. STP BASIC INFORMATION OF ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

### **SEWAGE TREATMENT PLANT (STP)**

**CAPACITY: 2 M<sup>3</sup>/HOUR**

## 1. GENERAL INFORMATION

|                           |   |                                                   |
|---------------------------|---|---------------------------------------------------|
| <b>Name of Client</b>     | : | <b>ASPIRE WASHING LTD.</b>                        |
| <b>Location</b>           | : | 103 - SUDKHIRA, JAMIRTA, SINGAIR, MANIKGANJ.      |
| <b>Type of Sewage</b>     | : | Commode Flush (Black Water)                       |
| <b>Quantity of Sewage</b> | : | 44 m <sup>3</sup> /Day. (2.0 m <sup>3</sup> /Hr.) |
| <b>Treatment Hours</b>    | : | 22 hrs./day                                       |
| <b>Treatment Concept</b>  | : | Biological MBR Treatment Process.                 |

## 2. WATER INLET & OUTLET DESIGN PARAMETER:

| SL No | Pollutant Index  | Design Value (Inlet) | Design value (Outlet) | Legal Requirement of DoE, (ECR) 2023 |
|-------|------------------|----------------------|-----------------------|--------------------------------------|
| 1.    | pH               | 7-8                  | 6-9                   | 6-9                                  |
| 2.    | Oil & Grease     | <15 mg/L             | 0                     | <10                                  |
| 3.    | Temperature      | 25-35°C              | <40°C                 | 30                                   |
| 4.    | BOD <sub>5</sub> | <300 mg/L            | <10 mg/L              | <30                                  |
| 5.    | COD              | <750 mg/L            | <40 mg/L              | 125                                  |
| 6.    | TSS              | <400 mg/L            | <5 mg/L               | <100                                 |
| 7.    | Phosphate        | <25 mg/L             | <15 mg/L              | <15                                  |
| 8.    | Nitrate          | <80 mg/L             | <50 mg/L              | <50                                  |
| 9.    | Coliform         | N/A                  | <200 (no. per 100 ml) | <1000                                |

\* Source: Inlet parameters are taken from similar projects.

### 3. STP CAPACITY CALCULATION:

| Determination of population:            |                   |                   |                          |                                                                |
|-----------------------------------------|-------------------|-------------------|--------------------------|----------------------------------------------------------------|
| Total Estimated Manpower:               |                   | 1000 People       |                          |                                                                |
| Fixture                                 | Regular occupancy | Water Consumption | Total wastewater (liter) | Remarks                                                        |
| Total Manpower                          | 1000              | 40 LPCD           | 40,000.00                | STP Capacity 2.0 m <sup>3</sup> /hr. (48 m <sup>3</sup> /Day). |
| Total Wastewater Generation:            |                   |                   | 40,000.00                |                                                                |
| Considering Sewage water + 15 % Safety: |                   |                   | 46,000.00                |                                                                |

Total Sewage Treatment Plant (STP) Capacity is considered as 2.0 m<sup>3</sup>/hr. (44 m<sup>3</sup>/Day).

### 4. BASIS OF THE PLANT DESIGN:

- **Source**

The raw Sewage shall be discharge to the proposed Sewage treatment plant from the process units.

- **Quantity**

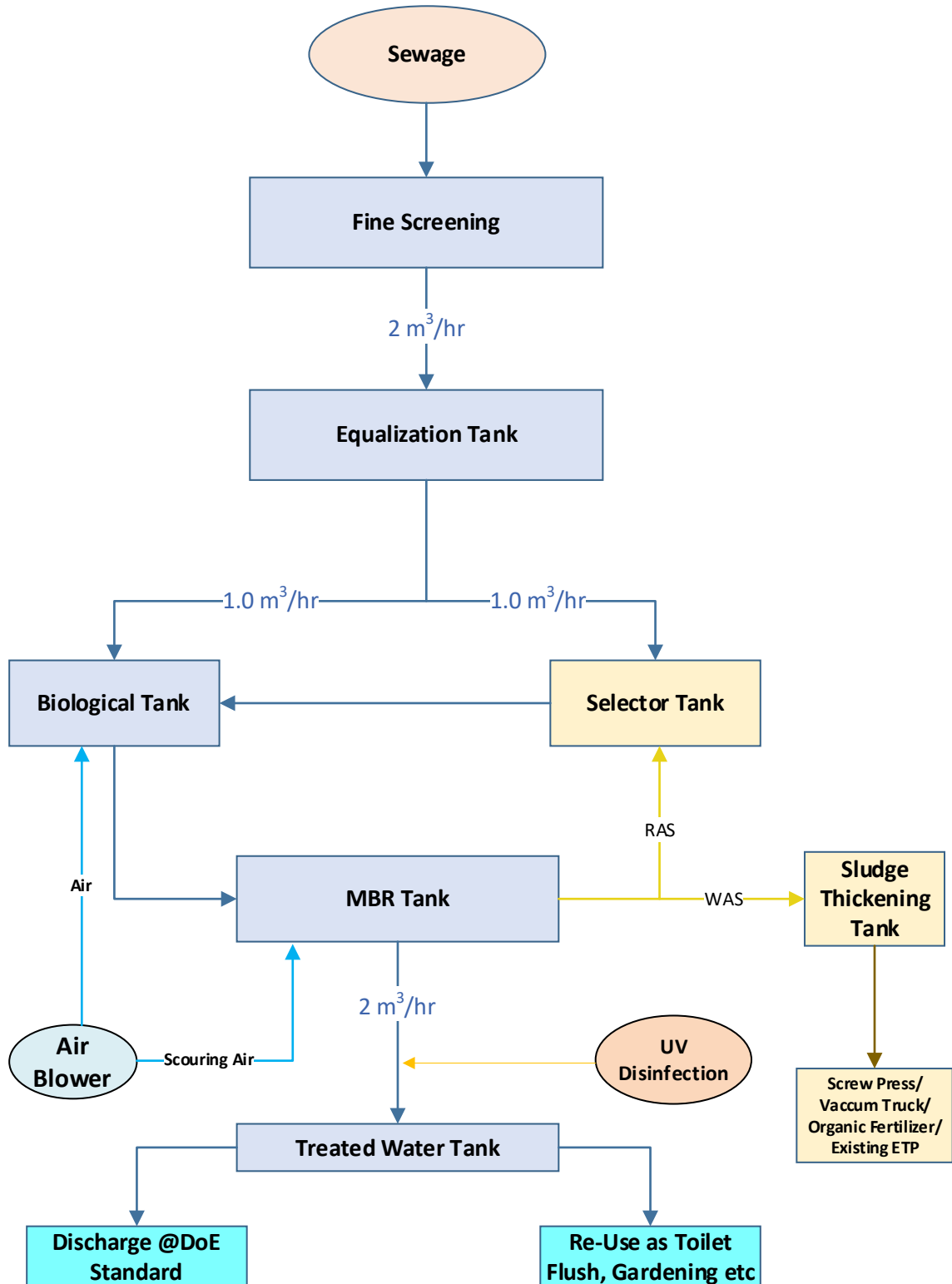
The quantity of Sewage to be treated shall be of the order of 44 m<sup>3</sup>/day.

**B. STP PROCESS FLOW DIAGRAM  
OF  
ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

**SEWAGE TREATMENT PLANT (STP)  
CAPACITY: 2 M<sup>3</sup>/HOUR**

# STP Process Flow Diagram



## **C. STP PROCESS DESCRIPTION**

### **OF**

### **ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

**SEWAGE TREATMENT PLANT (STP)**

**CAPACITY: 2 M<sup>3</sup>/HOUR**

## **1. OPERATIONAL PROCESSES**

### **A. BAR & FINE SCREENING**

Before entering the sewage effluent from process unit, it will pass through screening. Screening removes large solids, rags, and debris from Inlet. It increases the efficiency of the sewage treatment plant.

### **B. COLLECTION TANK**

The collection tank is the initial unit where incoming sewage wastewater is gathered and temporarily stored. It helps regulate flow, remove large debris through screening, and ensures a steady supply of sewage to subsequent treatment units. Proper design of the collection tank is essential for smooth and efficient operation of the entire treatment process.

### **C. EQUALIZATION TANK**

The effluent will be taken into equalization reactor where the homogeneous mixing will be done by the by submersible mixture. This homogeneous mixing will help to neutralize the pH effortlessly in next tank. And increase the efficiency of treatment system.

### **D. BIOLOGICAL OXIDATION TANK**

Biological oxidation tank is where air (or oxygen) is injected in the mixed liquor.

A continuous internal sewage recycling within the biological tank makes it possible for a full contact degradable for biological membrane on the fillings and organisms in the sewage.



**Figure: Rotary Blower & Aerator**

Air supply is to be provided by a rotary blower with an imported floating aerator, whose advantages lie in an even air distribution, long service life, high efficiency of oxygen utilization as well as convenient assembly & disassembly.

The basic facts of the improved semi-soft fillings lie in tensile strength of 6.8-7.1 G/filament, elongation of 4%, acid and alkali resistance of pH 2-12, weight loss rate <1% (100°C), specific surface area >198m<sup>2</sup>/m<sup>3</sup>, porosity >99 and film weight of 30-70Kg/m<sup>3</sup> with an average service life of 8-10 years.

#### **E. MEMBRANE BIO-REACTOR (MBR) BIOLOGICAL TANK**

Membrane Bioreactor (MBR) Treatment technology combines the biological treatment process of an activated sludge system with a membrane filtration process. It uses fine filtration membranes to separate solids, bacteria, and microorganisms from the treated wastewater, producing a high-quality effluent that involves,

- **Biological Treatment:** The wastewater is introduced into an aeration tank where microorganisms, typically activated sludge, break down organic matter through the



process of biodegradation. These microorganisms consume and convert pollutants into carbon dioxide, water, and biomass.

- **Membrane Filtration:** The mixed liquor containing the microorganisms and suspended solids is then passed through a filtration system consisting of fine membranes. These membranes act as a physical barrier, allowing clean water molecules to pass through while retaining suspended solids, bacteria, and other contaminants.
- **Permeate Collection:** The treated water that successfully passes through the membranes, known as permeate, is collected and considered as high-quality effluent. It is typically free from suspended solids, pathogens, and most pollutants, meeting stringent environmental standards.
- **Sludge Separation:** The retained solids, also known as membrane sludge or concentrate, accumulate on the membrane surface. To maintain the filtration efficiency, a portion of the concentrate is continuously or intermittently removed and returned to the aeration tank, while the remaining portion is discharged as waste sludge.
- **Cleaning and Maintenance:** Periodically, the membranes need to be cleaned to prevent fouling and maintain their filtration performance. This involves chemical cleaning or physical methods such as backwashing or air scouring to remove any accumulated particles or biofilm on the membrane surface.



In Membrane Bioreactor (MBR) systems, several key reactions occur as part of the wastewater treatment process. These reactions are essential for the removal of pollutants and the treatment of wastewater. Here are some of the reactions that take place in MBR systems:

- **Aerobic Biodegradation:** The primary reaction in MBR systems is aerobic biodegradation, where microorganisms, such as bacteria and protozoa, consume organic matter in the wastewater. Oxygen is supplied through aeration to support the

growth of aerobic microorganisms. These microorganisms break down organic compounds into simpler forms, such as carbon dioxide and water, through biological reactions.

- **Nitrification:** In MBR systems, nitrification is an important reaction that converts ammonia ( $\text{NH}_3$ ) to nitrate ( $\text{NO}_3^-$ ) through two sequential steps. Ammonia-oxidizing bacteria (AOB) convert ammonia into nitrite ( $\text{NO}_2^-$ ), and then nitrite-oxidizing bacteria (NOB) further convert nitrite into nitrate. Nitrification is essential for removing nitrogen from wastewater and preventing environmental issues such as eutrophication.
- **De-nitrification:** De-nitrification is another reaction that occurs in MBR systems to remove nitrate from the wastewater. Under SELECTOR or low-oxygen conditions, denitrifying bacteria convert nitrate into nitrogen gas ( $\text{N}_2$ ), effectively removing nitrogen from the system. This process helps to reduce the potential for nitrogen pollution in receiving water bodies.
- **Membrane Filtration:** The membrane filtration process in MBR systems involves physical reactions, where the membranes act as a barrier to retain suspended solids, bacteria, and other contaminants while allowing clean water molecules to pass through. This separation process ensures that the treated effluent meets the required quality standards.

These reactions collectively contribute to the effective removal of pollutants, organic matter, nitrogen, and phosphorus from the wastewater, resulting in a high-quality effluent in MBR systems. The specific reactions and their rates may vary depending on the wastewater composition, operating conditions, and system design.

## F. SELECTOR TANK

This Tank is most commonly used for biological nitrogen removal from sewage treatment. The process consists of a SELECTOR tank followed by the aeration tank where nitrification occurs. Nitrate produced in the aeration tank is recycled back to the SELECTOR tank. Because the organic substrate in the sewage water provides the electron donor for oxidation reduction reactions using nitrate, the process is termed sub-state de-nitrification. Further, because the SELECTOR process precedes the aeration tank, the process is known as a pre-SELECTOR de-

nitrification. Biological de-nitrification involves the biological oxidation of many organic substrates in wastewater treatment using nitrate or nitrite as the electron acceptor instead of oxygen. In the absence of DO or under limited DO concentrations, the nitrate reductase enzyme in the electron transport respiratory chain is induced, and helps to transfer hydrogen and electrons to nitrate as the terminal electron acceptor. The nitrate reduction reactions involve the following reduction steps from nitrate to nitrite, to nitric oxide, to nitrous oxide, and to nitrogen gas:



(In wastewater engineering by Metcalf and Eddy, page 619)

The oxygen will be consumed by the bacteria and the nitrogen gas releases to the atmosphere.

#### **G. RECYCLE/ OUTLET TANK**

Since the outlet water after treatment contains some toxic virus or bacteria, etc. the water has to be disinfected or sterilized by UV to avoid transmission or spreading of epidemics, before being drained to the natural water resources.

The routine disinfection or sterilization, based on the project size and requirements on bacteria killing, is divided into several types like chlorine dioxide generator, chlorine storage bottle and addition of chlorine tablets, etc.

Due to the fact that this project is Sewage Treatment Project and is to be operated and maintained by untrained staff, the disinfection/sterilization process adopts the mode of disinfection/sterilization UV Sterilizer.

## H. SLUDGE THICKENING TANK

Sludge tanks are used for sludge separation processes, specifically to separate solids and liquids. Liquids are sent to the equalization tank.

### DIMENSIONS, VOLUME & HRT OF STP COMPONENTS:

| SL No . | Tank's Name               | Dimensions (L x W x H), ft | Active Depth (ft) | Volume (ft <sup>3</sup> ) | HRT (hr) | Remarks |
|---------|---------------------------|----------------------------|-------------------|---------------------------|----------|---------|
| 1       | Collection Tank           | 5' x 8' x 11'              | 10                | 400                       | 5.67     | R.C.C   |
| 2       | Equalization Tank         | 13' x 8' x 11'             |                   | 1040                      | 14.72    |         |
| 3       | Biological Oxidation Tank | 14' x 8' x 11'             |                   | 1120                      | 15.86    |         |
| 4       | Selector Tank             | 5' x 8' x 11'              |                   | 400                       | 5.67     |         |
| 5       | Biological MBR Tank       | 5' x 8' x 11'              |                   | 400                       | 5.67     |         |
| 6       | Sludge Thickening Tank    | 5' x 8' x 11'              |                   | 400                       | —        |         |
| 7       | Recycle/ Outlet Tank      | 3'4" x 8' x 11'            |                   | 266.4                     | 3.78     |         |

## **D. STP DESIGN CALCULATION OF ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

**SEWAGE TREATMENT PLANT (STP)  
CAPACITY: 2 M<sup>3</sup>/HOUR**

## 1. Design Calculation of 2.0 m<sup>3</sup>/hr. Sewage Treatment Plant (STP)

| Sl No                                      | Parameters                                       | Symbols     | Value | Unit                | Type of value       |
|--------------------------------------------|--------------------------------------------------|-------------|-------|---------------------|---------------------|
| <b>Incoming Wastewater Characteristics</b> |                                                  |             |       |                     |                     |
| 1.                                         | Flow rate hourly                                 | $Q_0$       | 2     | m <sup>3</sup> /hr  | Design value        |
| 2.                                         | Daily running time                               | $T$         | 22    | hr                  | Design value        |
| 3.                                         | Flow rate daily                                  | $Q_0$       | 44    | m <sup>3</sup> /day | Design value        |
| 4.                                         | Average Inlet COD concentration                  | $S_{0-COD}$ | 800   | mg/l                | Design value        |
| 5.                                         | Inlet BOD <sub>5</sub> concentration             | $S_{0-BOD}$ | 600   | mg/l                | Design value        |
| 6.                                         | Outlet COD concentration                         | $S_1$       | 150   |                     | Design value        |
| 7.                                         | TDS                                              | $TDS$       | <2000 | mg/l                | Design value        |
| 8.                                         | Temperature                                      | $T$         | 35    | °C                  |                     |
| 9.                                         | p <sup>H</sup>                                   | $p^H$       | 6 – 9 | —                   | Measured            |
| 10.                                        | Daily COD load                                   | $L_{COD}$   | 35.2  | kg/day              | Calculated          |
| <b>Equalization Tank</b>                   |                                                  |             |       |                     |                     |
| 11.                                        | HRT of equalization tank                         | $HRT_{py}$  | 12.00 | hr                  | Legal requirement   |
| 12.                                        | Volume of equalization tank                      | $V_{eq}$    | 24    | m <sup>3</sup>      | Calculated          |
| 13.                                        | Air requirement for mixing                       | $Air_{eq}$  | 17    | m <sup>3</sup> /hr  | Calculated          |
| <b>Oxidation Tank</b>                      |                                                  |             |       |                     |                     |
| 14.                                        | COD in WWTP Outlet                               | $S_1$       | 150   | mg/l                | Measured            |
| 15.                                        | COD treated in biological treatment system daily | $S_r$       | 28.6  | kg/day              | Calculated          |
| 16.                                        | F/M ratio is                                     | $f/m$       | 0.15  | Kg MLSS-d           | COD/kg<br>Empirical |
| 17.                                        | Ideal (by weight) MLSS needed in biological tank | $P_x$       | 191   | kg                  | Calculated          |
| 18.                                        | Concentration of MLSS in the biological tank     | $X_0$       | 6000  | mg/l                | Empirical           |

| SI No                      | Parameters                               | Symbols     | Value | Unit                           | Type of value     |
|----------------------------|------------------------------------------|-------------|-------|--------------------------------|-------------------|
| 19.                        | Ideal Tank size for biological oxidation | $V_{ar}$    | 32    | m <sup>3</sup>                 | Calculated        |
| 20.                        | HRT of oxidation tank                    | $HRT_{bio}$ | 16    | hours                          | Calculated        |
| 21.                        | MLSS and MLVSS ratio                     | $ss/vss$    | 70    | %                              | Empirical         |
| 22.                        | Total MLVSS in the aeration tank         | $P_{vss}$   | 133   | kg                             | Calculated        |
| <b>Membrane Bioreactor</b> |                                          |             |       |                                |                   |
| 23.                        | Membrane filtration time                 | $MBR_{op}$  | 18.0  | hr                             |                   |
| 24.                        | Flow rate through membrane               | $MBR_f$     | 2     | m <sup>3</sup> /hr             |                   |
| 25.                        | Membrane pore size                       | $\mu$       | 0.05  | μm                             | Membrane type     |
| 26.                        | Membrane flux                            | $M_f$       | 18.0  | l/m <sup>2</sup> /hr           | Manufacturer data |
| 27.                        | Membrane surface area                    | $A_m$       | 136   | m <sup>2</sup>                 | Calculated        |
| 28.                        | Surface area per module (can be changed) | $A_{mo}$    | 35    | m <sup>2</sup>                 | Manufacturer data |
| 29.                        | Number of module                         | $Mo_n$      | 4     | pcs                            | Calculated        |
| 30.                        | Number of module per cassette            | $Mo_c$      | 62    | pcs                            | Manufacturer data |
| 31.                        | Total number of cassette                 | $C_n$       | 1     | pcs                            | Calculated        |
| 32.                        | Length of each MBR cassette              | $L_{MBR}$   | 0.5   | m                              | Manufacturer data |
| 33.                        | Width of each MBR cassette               | $W_{MBR}$   | 0.5   | m                              | Manufacturer data |
| 34.                        | Height of each MBR cassette              | $H_{MBR}$   | 1.0   | m                              | Manufacturer data |
| 35.                        | Submergence depth of the MBR cassette    | $SD_{MBR}$  | 1.5   | m                              | Manufacturer data |
| 36.                        | Space around MBR cassette                | $Sp_{MBR}$  | 0.5   | m                              | Manufacturer data |
| 37.                        | Packing density                          | $PD_c$      | 217   | m <sup>2</sup> /m <sup>3</sup> | Manufacturer data |
| 38.                        | Volume of the each MBR cassette          | $V_c$       | 0.63  | m <sup>3</sup>                 | Calculated        |
| 39.                        | Total Volume of MBR cassette             | $TV_c$      | 0.63  | m <sup>3</sup>                 | Calculated        |

| SI No                                        | Parameters                                                | Symbols        | Value     | Unit                               | Type of value     |
|----------------------------------------------|-----------------------------------------------------------|----------------|-----------|------------------------------------|-------------------|
| 40.                                          | Volume of the MBR tank                                    | $V_{MBR}$      | 8         | m <sup>3</sup>                     | Calculated        |
| 41.                                          | HRT of the MBR tank                                       | $HRT_m$        | 3.75      | hr                                 | Calculated        |
| 42.                                          | Specific aeration demand (SAD)                            | $Air_m$        | 0.15      | m <sup>3</sup> -air/m <sup>2</sup> | Manufacturer data |
| 43.                                          | <b>Total Aeration demand</b>                              | $Air_{m-t}$    | <b>20</b> | m <sup>3</sup> -air/hr             | Calculated        |
| 44.                                          | Cassette (each) plan area                                 | $PA_c$         | 0.25      | m <sup>2</sup>                     | Calculated        |
| 45.                                          | Scouring air velocity                                     | $Sv_c$         | 0.023     | m/s                                | Calculated        |
| Calculation for Oxidation Air Requirement    |                                                           |                |           |                                    |                   |
| 46.                                          | Oxygen required for per kg COD removal with nitrification | $O_{2-ox}$     | 1.42      | kg O <sub>2</sub> /kg COD          | Empirical         |
| 47.                                          | <b>Oxygen transfer needed</b>                             | $O_{2-t}$      | <b>41</b> | <b>kg O<sub>2</sub> per day</b>    | Calculated        |
| 48.                                          | Considering SOTE 15%, the oxygen requirement              | $SOTE$         | 271       | kg/day                             | Calculated        |
| 49.                                          | Ratio of SOTE from clean to effluent water is 90%         | $\alpha$       | 80        | %                                  | Empirical         |
| 50.                                          | Diffuser fouling                                          | $F$            | 80        | %                                  | Empirical         |
| 51.                                          | Air requirement                                           | $O_{2-r}$      | 423       | kg/day                             | Calculated        |
| 52.                                          | Oxygen in the air (21%)                                   | $O_{2-air}$    | 21        | %                                  | Empirical         |
| 53.                                          | Air requirement                                           | $Air_r$        | 2014      | kg per day                         | Calculated        |
| 54.                                          | Specific gravity of air at 30 <sup>0</sup> C is           | $SG_{air}$     | 1.17      | kg/m <sup>3</sup>                  | constant          |
| 55.                                          | Daily air requirement in m <sup>3</sup>                   | $Air_{r-day}$  | 1729      | m <sup>3</sup> /day                | Calculated        |
| 56.                                          | Air requirement in m3                                     | $Air_{r-hour}$ | 72        | m <sup>3</sup> per hour            | Calculated        |
| Excess Sludge, Sludge Recirculation and MCRT |                                                           |                |           |                                    |                   |
| 57.                                          | Biomass yield coefficient                                 | $Y$            | 0.30      | mg VSS/mg COD                      | Empirical         |
| 58.                                          | Endogenous respiration coefficient                        | $b$            | 0.06      | g VSS/g VSS.day                    | Empirical         |
| 59.                                          | Daily biomass yield                                       | $P_{x-d}$      | 9         | kg/day                             | Calculated        |

| SI No                         | Parameters                                  | Symbols       | Value        | Unit                   | Type of value |
|-------------------------------|---------------------------------------------|---------------|--------------|------------------------|---------------|
| 60.                           | Biodegradable fraction of MLSS              | $f_b$         | 0.70         | g VSS/g SS             | Empirical     |
| 61.                           | Biomass removed with Endogenous respiration | $P_{x-r}$     | 5.6          | kg/day                 | Calculated    |
| 62.                           | Net biomass yield                           | $P_x$         | 3.0          | kg/day                 | Calculated    |
| 63.                           | Concentration of MLSS in return sludge      | $X_w$         | 6720         | mg/l                   | Empirical     |
| 64.                           | Daily excess sludge removal                 | $Q_w$         | 0            | m <sup>3</sup> /day    | Calculated    |
| 65.                           | MCRT (Mean Cell residence time)             | $\theta_c$    | 64           | days                   | Calculated    |
| 66.                           | Return sludge ratio (maximum)               | $Q_o/Q_r$     | 4            |                        | Empirical     |
| 67.                           | RAS recirculation rate                      | $Q_r$         | 176          | m <sup>3</sup> /day    | Calculated    |
| <b>Sludge Thickening Tank</b> |                                             |               |              |                        |               |
| 68.                           | WAS flow                                    | $F_{WAS}$     | 0.44         | m <sup>3</sup> /day    | Calculated    |
| 69.                           | Assumed WAS solids                          | $WAS_s$       | 0.6          | %                      | Calculated    |
| 70.                           | Dry solids load                             | $S_{load}$    | 2.65571<br>4 | kg/day                 | Calculated    |
| 71.                           | Design solids loading                       | $DS_{load}$   | 30           | kg/m <sup>2</sup> ·day | Calculated    |
| 72.                           | Required thickener area                     | $TA_{sludge}$ | 0.08852<br>4 | m <sup>2</sup>         | Calculated    |
| 73.                           | Equivalent circular diameter                | $Dia_t$       | 0.5          | m                      | Calculated    |
| 74.                           | Side water depth                            | $H_t$         | 3            | m                      | Calculated    |
| 75.                           | Tank working volume                         | $V_t$         | 0.59         | m <sup>3</sup>         | Calculated    |
| 76.                           | Hydraulic detention time                    | $HRT_t$       | 31.9         | hr                     | Calculated    |
| 77.                           | Thickened sludge at 4% solids               | $Sludge_t$    | 0.07         | m <sup>3</sup> /day    | Calculated    |

## **E. STP ELECTRO-MECHANICAL BOQ OF ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

**SEWAGE TREATMENT PLANT (STP)**

**CAPACITY: 2 M<sup>3</sup>/HOUR**

## 1. ELECTRO-MECHANICAL EQUIPMENT BOQ FOR 44 M<sup>3</sup>/DAY STP

| SL | Item Description                                                                                                                                                                                                                                                                                                                             | QTY             | Brand        | Origin     | Photos                                                                                |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|------------|---------------------------------------------------------------------------------------|
| 1. | <b><u>Bar Screen:</u></b><br>Bar screen to separate all medium & large solids inside effluent. SS constructed Hollow bar Rotary screen to protect entrance large solids into ETP to be installed at .reception tank<br>MOC: SS<br>Perforation Size: 25 & 12 mm                                                                               | 1 set           | LS           | BD         |    |
| 2. | <b><u>Mechanical Rotary Fine Screen:</u></b><br>Mechanical screen to separate all medium & large solids inside effluent. SS constructed Automatic Fine Rotary screen to protect entrance large solids into ETP to be installed at reception .tank<br>MOC: SS 304<br>Rotary screen size: As per drain/Chamber size.<br><b>Pore Size: 2 mm</b> | 1 set           | ESBD/Eq      | China      |   |
| 3. | <b><u>Sewage Lifting Pump from Collection Tank to Equalization Tank:</u></b><br>Flow rate: 2 m <sup>3</sup> /h<br>Pump Head: 5 meters.<br>Power: 0.75 KW<br>Mechanical Seal: Double type with variant face combination<br>High speed TC with installation rack.<br>Manufactured: China                                                       | 2 Nos. (1W+1 S) | Tsurumi/ Eq. | Japan/ Eq. |  |
| 4. | <b><u>Sewage Lifting Pump from Equalization Tank to Biological Tank:</u></b><br>Flow rate: 2 m <sup>3</sup> /h<br>Pump Head: 5 meters.<br>Power: 0.75 KW<br>Mechanical Seal: Double type with variant face combination<br>High speed TC with installation rack.<br>Manufactured: China                                                       | 2 Nos. (1W+1 S) | Tsurumi/ Eq. | Japan/ Eq. |  |
| 5. | <b><u>Supporting submersible agitator /Propeller:</u></b><br>MOC-SS<br>Impeller Diameter: 300 mm<br>Motor Power: 0.85 KW<br>Impeller Resolution: 740 rpm                                                                                                                                                                                     | 1 no.           | Lanshen/ Eq. | China/ Eq. |  |

| SL | Item Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | QTY     | Brand        | Origin     | Photos                                                                                |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|------------|---------------------------------------------------------------------------------------|
| 6. | <b><u>Electromagnetic Flow Meter:</u></b><br>1" (DN 25)<br>Min flow rate: 0.1 m/s Max flow rate: 10m/s Temperature limit: 4° C to 50° C<br>Sensor material: Stainless Steel<br>Electrode Material: Stainless Steel<br>Brand: Hangzhou Supmea Automation Co, Ltd, Manufactured: China                                                                                                                                                                                                                                                                                                           | 2 nos.  | Supmea / Eq. | Germany    |    |
| 7. | <b><u>Air Blower for Aeration &amp; MBR Tank:</u></b><br>Motor: HC-50S Dia 1.25" (DN 32)<br>Air capacity: 63.6 m³/Hr.<br>Qty: 2 nos. (1 R + 1 SB).<br>Pressure: 0.4 Bar<br>Motor: 1.5 kW<br>Air Flow: 1.06 m³/min<br>RPM: 430<br>Including accessories: Blower Main body, Coupling, Pulley and V-belt, Pressure relieve valve, Check valve, Inlet silencer (with air filter), Outlet silencer, Public base (with belt cover), Rubber flexible joint and shock pad, Pressure gauge, Bolts and nuts and other connection parts, Motor etc.<br>Manufactured: China                                | 2 No's  | BK/Eq.       | Japan/ Eq. |    |
| 8. | <b><u>Disk type Air Diffuser:</u></b><br>Disk type air diffuser with fine perforation capable to produce fine air bubble.<br>MOC: EPDM (EPDM rubber (Ethylene propylene diene monomer (M-class) rubber), a type of synthetic rubber, is an elastomer characterized by a wide range of applications. The M refers to its classification in ASTM standard D-1418; the M class includes rubbers having a saturated chain of the polyethylene type.)<br>Designed air flow: 1-3 m³/Hr.<br>Bubble dia: 1-3 mm<br>Service area: 0.25-0.45 m²/Pcs.<br>Diffuser Size: Dia-200 mm<br>Manufactured: China | 20 No's | Huixing      | USA        |  |

| SL  | Item Description                                                                                                                                                                                                                                                                                                                    | QTY                  | Brand                     | Origin        | Photos                                                                                |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|---------------|---------------------------------------------------------------------------------------|
| 9.  | <b><u>DO synchronize system:</u></b><br>Details: DO monitoring system.<br>Brand: Hangzhou Supmea Automation Co, Ltd<br>Manufactured: China                                                                                                                                                                                          | 1 no.                | Supmea/<br>Eq.            | Germany       |    |
| 10. | <b><u>Hollow fiber Membrane Bioreactor &amp; components system:</u></b><br>Component parameters membrane material Poly vinylidene fluoride (PVDF) & Hydrophobic<br><b>Nominal pore size (µm) 0.05</b><br>Tip material ABS<br>Seal the pouring material Epoxy/silicone/polyurethane<br>Conditions of Use Temperature Range (°C) 5~45 | 1 Lot                | Motian/<br>Motimo/<br>Eq. | China         |    |
| 11. | <b><u>Sludge Recirculation Pump:</u></b><br>Submersible pump specially made to handle sludge. None clogging, open impeller type.<br>Flow rate: 12 m <sup>3</sup> /h<br>Pump Head: 6 meters.<br>Power: 1.1 KW<br><b>MOC: CI</b><br>Including Lifting coupling & Guide rod.                                                           | 2 Nos.<br>(1W+1 S)   | Tsurumi/<br>Eq.           | Japan/<br>Eq. |  |
| 12. | <b><u>Automation Valve &amp; Accessories for MBR:</u></b><br>Water production electric valve, Backwash valve, Chemical auto dosing valve, Manual valve, Rota meter, Vacuum gauge, pressure gauge, pressure transmitter with standard accessories.                                                                                   | 1 lot                | Meicon                    | China         |  |
| 13. | <b><u>High Pressure Suction Pump:</u></b><br>Centrifugal pump specially made to handle sludge. None clogging, open impeller type.<br>Flow rate: 2.0 m <sup>3</sup> /h<br>Pump Head: 6 meters.<br>Motor: 0.75 KW<br><b>MOC: SS 304</b>                                                                                               | 2 Nos.<br>(1R + 1 S) | CNP/eq.                   | China/E<br>q. |  |

| SL  | Item Description                                                                                                                                                                                                  | QTY                  | Brand     | Origin        | Photos                                                                                |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------|---------------|---------------------------------------------------------------------------------------|
| 14. | <b><u>Backwash Pump:</u></b><br>Centrifugal pump specially made to handle sludge. None clogging, open impeller type.<br>Flow rate: 2.0 m <sup>3</sup> /h<br>Pump Head: 4 meters.<br>Motor: 0.75 KW<br>MOC: SS 304 | 2 Nos.<br>(1R + 1 S) | CNP/Eq.   | China/Eq      |    |
| 15. | <b><u>CIP dosing tank for MBR:</u></b><br>NaOCl tank: 200 L<br>Acid tank: 200 L<br>Pipeline: UPVC.                                                                                                                | 3 Set                | LS        | BD/China/ Eq. |    |
| 16. | <b><u>CIP dosing pump for MBR:</u></b><br>Dosing: By Dosing pump: SEKO/Eq.<br>Pump Capacity: 60 ltr/Hr.<br>Pipeline: UPVC.                                                                                        | 3 nos                | Seko      | China         |    |
| 17. | <b><u>Agitator for Sludge Thickening Tank &amp; Selector Tank:</u></b><br>Gear-motor: 2 set.<br>Including SS shaft, propeller and structure.                                                                      | 1 Set                | LS        | China         |  |
| 18. | <b><u>UV Sterilizer for Disinfection:</u></b><br>Net Capacity: 3 m <sup>3</sup> /hr.<br>Spare Light: 1 no.                                                                                                        | 1 no.                | -         | China         |  |
| 19. | <b><u>Pressure &amp; Vacuum Sensor:</u></b>                                                                                                                                                                       | 1 lot                | Supmea/eq | China         |  |
| 20. | <b><u>Ultrasonic Level Sensor:</u></b>                                                                                                                                                                            | 1 lot                | Supmea/eq | China         |  |

| SL  | Item Description                                                                                                                                                                                                                                                                                                                                                                                      | QTY   | Brand | Origin        | Photos                                                                              |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|---------------|-------------------------------------------------------------------------------------|
| 21. | <b><u>Pipelines &amp; fittings:</u></b><br>All type of pipelines & fittings.<br>MOC: SS & UPVC.<br>SS pipe: Hundai/Seah steel, & fittings,<br>UPVC valve & fittings: BD & China<br><b><u>NB:</u></b> PVC pipe: BRB/Bengal/Lira/Bd. (For<br>water transfer line, Airline (air<br>distribution line), chemical dosing line,<br>sludge line etc.).<br>Source: Local.<br>Underwater UPVC & Above Water SS | 1 lot | ----- | BD &<br>China |  |
| 22. | <b><u>PLC Based Control Panel:</u></b><br>Control Panel of the STP to ON/OFF all<br>motors in the plant.<br>PLC: Delta/Eq.<br>HMI: Delta.<br>Size: 10"<br>Assemble: Bangladesh.<br>Internal Cable: BRB/BBS, Equivalent,<br>Bangladesh.<br>Including GP cable tray 16 SWG with<br>capsule hole & Cover and necessary<br>accessories.                                                                   | 1 set | LS    | Korea         |  |

## **F. STP POWER CALCULATION OF ASPIRE WASHING LTD.**

Factory: Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.

**SEWAGE TREATMENT PLANT (STP)**

**CAPACITY: 2 M<sup>3</sup>/HOUR**

## 1. STP ELECTRICITY CONSUMPTION

| SL. NO.                                 | EQUIPMENT / QTY.                 | QTY | RATED POWER (KW) | OPERATIONAL MOTOR QTY. | OPERATIONAL HOUR | CONNECTING POWER IN (KW) | OPERATING POWER (KW)/DAY |
|-----------------------------------------|----------------------------------|-----|------------------|------------------------|------------------|--------------------------|--------------------------|
| 1                                       | Air Blower for Oxidation         | 2   | 1.5              | 1                      | 24               | 3                        | 36                       |
| 3                                       | Lifting pump (Collection to Eq)  | 2   | 0.75             | 1                      | 20               | 1.5                      | 8.5                      |
| 4                                       | Lifting pump (Eq to Bio)         | 2   | 0.75             | 1                      | 20               | 1.5                      | 8.5                      |
| 5                                       | Supporting submersible Propeller | 1   | 0.85             | 1                      | 10               | 0.85                     | 8.5                      |
| 6                                       | Sludge Recirculation Pump:       | 2   | 1.1              | 1                      | 20               | 2.2                      | 22                       |
| 7                                       | Gear-motor                       | 2   | 0.75             | 2                      | 10               | 1.5                      | 15                       |
| 8                                       | MBR pump                         | 2   | 0.75             | 1                      | 20               | 1.5                      | 15                       |
| Total Operating Power per day: 113.5 KW |                                  |     |                  |                        |                  |                          |                          |

## **Annex- G: STP Layout and Flow Diagram**

## **Annex-H: Environmental Monitoring Reports**

### AMBIENT AIR QUALITY ANALYSIS REPORT

**GECL/Lab CODE (TR) :** 2187  
**Factory Name :** Aspire Washing Ltd.  
**Factory Address :** Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.  
**Location (GPS) Coordinate:** 23°47'41.20"N & 90°14'17.83"E

**Sample Collector :** Global Environment Consultants Ltd. (GECL Monitoring Team).  
**Description of Sample :** Ambient Air Quality Analysis Report (Factory outside area).  
**Sampling & Testing date :** 14<sup>th</sup> March, 2026  
**Analysis & Reporting date:** 06<sup>th</sup> April, 2026

#### Description of analysis

| Sample Description                                   | GPS Coordinate            | Concentration present of different parameter in ambient air. |                                        |                                         |                                         |                                         |                                                                 |                       |       |
|------------------------------------------------------|---------------------------|--------------------------------------------------------------|----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------------------------------|-----------------------|-------|
|                                                      |                           | SPM                                                          | PM <sub>10</sub>                       | PM <sub>2.5</sub>                       | NO <sub>x</sub>                         | SO <sub>2</sub>                         | O <sub>3</sub>                                                  | CO                    | VOC   |
| West Side                                            | 23°47'42.3"N 90°14'17.1"E | 226                                                          | 108                                    | 51                                      | 22                                      | 14                                      | 13                                                              | 267                   | <0.01 |
| North Side                                           | 23°47'42.0"N 90°14'20.1"E | 212                                                          | 102                                    | 54                                      | 24                                      | 16                                      | 14                                                              | 271                   | <0.01 |
| East Side                                            | 23°47'40.5"N 90°14'19.6"E | 224                                                          | 107                                    | 49                                      | 19                                      | 13                                      | 12                                                              | 229                   | <0.01 |
| South Side                                           | 23°47'40.4"N 90°14'17.0"E | 219                                                          | 104                                    | 46                                      | 25                                      | 17                                      | 15                                                              | 272                   | <0.01 |
| Units                                                |                           | µg/m <sup>3</sup>                                            |                                        |                                         |                                         |                                         |                                                                 |                       |       |
| Test Duration (Hours)                                |                           | 8                                                            |                                        |                                         |                                         |                                         |                                                                 |                       |       |
| Method of Analysis                                   |                           | Gravimetric                                                  |                                        | NEDA-Visible at 540nm                   | TCM-Visible at 560 nm                   | KI UV method At 352 nm                  | Iodine penta-oxide Method                                       | Electro-Chemical Cell |       |
|                                                      |                           |                                                              |                                        |                                         |                                         |                                         |                                                                 |                       |       |
| Bangladesh Ambient Air Quality Standards (APCR) 2022 | NYS                       | 150 µg/m <sup>3</sup> (24-hour average)                      | 65 µg/m <sup>3</sup> (24-hour average) | 80 µg/m <sup>3</sup> (24-hour average)  | 80 µg/m <sup>3</sup> (24-hour average)  | 100 µg/m <sup>3</sup> (8 hours average) | (5 mg/m <sup>3</sup> ) 5000 µg/m <sup>3</sup> (8 hours average) | NYS                   |       |
| National Ambient Air Quality Standards (NAAQS) 2009  | NYS                       | 100 µg/m <sup>3</sup> (24-hour average)                      | 60 µg/m <sup>3</sup> (annual average)  | 80 µg/m <sup>3</sup> (24-hour average)  | 80 µg/m <sup>3</sup> (24-hour average)  | 100 µg/m <sup>3</sup> (8 hours average) | (2 mg/m <sup>3</sup> ) 2000 µg/m <sup>3</sup> (8 hours average) | NYS                   |       |
| IFC/World Bank Standard-2007                         | NYS                       | 150 µg/m <sup>3</sup> (24-hour average)                      | 75 µg/m <sup>3</sup> (24-hour average) | 100 µg/m <sup>3</sup> (1 hour average)  | 125 µg/m <sup>3</sup> (24-hour average) | 100 µg/m <sup>3</sup> (8 hour average)  | NYS                                                             | NYS                   |       |
| World Health Organization (WHO) 2021                 | NYS                       | 150 µg/m <sup>3</sup> (24-hour average)                      | 75 µg/m <sup>3</sup> (24-hour average) | 120 µg/m <sup>3</sup> (24-hour average) | 125 µg/m <sup>3</sup> (24-hour average) | NYS                                     | (4 mg/m <sup>3</sup> ) 4000 µg/m <sup>3</sup> (8 hours average) | NYS                   |       |

**Equipment Used Details:** This ambient air monitoring report was usually accomplished by – High Volume Sampler (Model- Ecotech India AAS-217 NL) and Fine Particulate Sampler (Model- Ecotech India AAS-127) Equipment calibrated by NABL Accredited Lab.  
**Abbreviation:** Fine Particulate Matter (PM<sub>2.5</sub>), Respirable Dust Content (PM<sub>10</sub>), Suspended Particulate Matter (SPM), Oxides of Nitrogen (NO<sub>x</sub>), Sulphur di-Oxide (SO<sub>2</sub>), Carbene Mono-Oxide (CO), Ozone (O<sub>3</sub>), Volatile Organic Compounds (VOC), Microgram per cubic meter (µg/m<sup>3</sup>), Not found (NF) & Not Yet Set (NYS).

- Air Pollution Control Rules (APCR) Bangladesh Gazette SRO 255-Law/2022 of 26<sup>th</sup> July 2022.
- National Ambient Air Quality Standards (NAAQS) CPCB India, 18th November, 2009.
- Air Emission and ambient air quality, IFC/World Bank, 30th April 2007.
- World Health Organization (WHO)-2021.

As part of environmental monitoring, a high-volume air sampler with gaseous impingers was used at Sudkhira, Jamirta, Singair, Manikganj, Bangladesh., for the quantitative analysis of ambient air quality parameters. Key air quality parameters, including PM<sub>2.5</sub>, PM<sub>10</sub>, SPM, SO<sub>2</sub>, NO<sub>x</sub>, O<sub>3</sub>, and CO, were determined based on an 8-hour time-weighted average (TWA) sampling. The concentrations of these parameters, as shown in the table above, were found to be within the standard limits set by the Ambient Air Quality Standards (Bangladesh Gazette, SRO No. 255-Law/2022, Schedule-1) under the Bangladesh Air Pollution Control Rules 2022, as well as the AQI Standards of India (CPCB), IFC/WB, and WHO guidelines. Anthropogenic activities and the presence of other industries in the locality may contribute to the pollutant levels observed at Aspire Washing Ltd. During the sampling period, the monsoon wind direction was from the southeast to the northwest.

  
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 Chief Executive Officer  
 Environmental Analysis & Development  
 Global Environment Consultants Ltd (GECL).

  
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### AMBIENT NOISE LEVEL ASSESSMENT REPORT

GECL/Lab CODE (TR) : 2187  
 Factory Name : Aspire Washing Ltd.  
 Factory Address : Sudkhira, Jamirta, Singair, Manikganj, Bangladesh.  
 Location (GPS) Coordinate: 23°47'41.20"N & 90°14'17.83"E

Sample Collector : Global Environment Consultants Ltd. (GECL Monitoring Team).  
 Description of Sample : Ambient Noise Level Assessment (Outside Area).  
 Sampling & Testing date : 14<sup>th</sup> March, 2026  
 Analysis & Reporting date: 06<sup>th</sup> April, 2026

#### Description of analysis

| SN                                                                                     | Sample Location | GPS Coordinate              | Site Condition   | Concentration present (LAeq) dBA |            |
|----------------------------------------------------------------------------------------|-----------------|-----------------------------|------------------|----------------------------------|------------|
|                                                                                        |                 |                             |                  | Day time                         |            |
| 01                                                                                     | West-South Side | 23°47'40.2"N 90°14'16.7"E   | Proposed Project |                                  | 57.3       |
| 02                                                                                     | West North Side | 23°47'42.8"N 90°14'16.9"E   |                  |                                  | 54.4       |
| 03                                                                                     | East South Side | 23°47'40.2"N 90°14'19.6"E   |                  |                                  | 59.2       |
| 04                                                                                     | East North Side | 23°47'41.9"N 90°14'20.1"E   |                  |                                  | 53.5       |
| 05                                                                                     | West Side       | 23°47'42.3"N 90°14'16.5"E   |                  |                                  | 56.1       |
| 06                                                                                     | East Side       | 23°47'41.04"N 90°14'20.00"E |                  |                                  | 52.3       |
| 07                                                                                     | North Side      | 23°47'42.39"N 90°14'18.27"E |                  |                                  | 53.4       |
| 08                                                                                     | South Side      | 23°47'39.87"N 90°14'17.77"E |                  |                                  | 58.1       |
| Bangladesh Noise Pollution (Regulation and Control) Rules 2006 ("SRO no 212-law/2006") |                 |                             |                  | Day Time                         | Night Time |
| Industrial area                                                                        |                 |                             |                  | 75                               | 70         |
| Commercial Area                                                                        |                 |                             |                  | 70                               | 60         |
| Mixed Area                                                                             |                 |                             |                  | 60                               | 50         |
| Residential Area                                                                       |                 |                             |                  | 55                               | 45         |
| Silent Area                                                                            |                 |                             |                  | 50                               | 40         |
| World Bank/IFC Standard                                                                |                 |                             |                  | Day Time                         | Night Time |
| Industrial                                                                             |                 |                             |                  | 70                               | 70         |
| Residential; Intiutional; Educational                                                  |                 |                             |                  | 55                               | 45         |

All units are in (LAeq) dBA. Note: This noise data was usually accomplished by – Lutron Sound Level Meter (Model – 4012).

Note 1: Bangladesh Noise Pollution (Regulation and Control) Rules 2006.

Note 2: IFC/WB EHS Guideline: Noise Management dated April 30, 2007 gives, Noise level guideline for Residential, institutional and educational receptors in daytime (07:00 to 22:00) and night time (22:00 to 07:00) as 55 and 45 one hour Leq dBA respectively. For Industrial and Commercial receptors it is 70 one hour Leq dBA for both night and day time.

Note 3: Area categories are: A. Silent zone, B. Residential area, C. Mixed area (mainly residential area, and also commercial and industrial areas), D. Commercial area, and E. Industrial area.

Note 4: "Day" and "Night" of Bangladesh Noise Standards indicate 6 AM to 9 PM, and 9 PM to 6 AM respectively.

#### COMMENT:

The standard level of ambient noise has set up by (Regulation and Control) Rules 2006 (Bangladesh Gazette "SRO no 212-law/2006"). According to the DOE & Bangladesh Gazette the perfect sound condition for Bangladesh is 50 dB for the daytime [6 am to 9 pm] and 40 dB for the night [9 pm to 6 am] in silent areas, 55 dB for the daytime and 45 dB for the night in residential areas, 60 dB for the daytime and 50 dB for the night in mixed areas (residential, commercial and industrial localities), 70 dB for the daytime and 60 dB for the night in commercial areas and 75 dB for the daytime and 70 dB for the night in industrial areas.



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Figure: Ambient Noise Level Sampling

### GROUND WATER QUALITY ANALYSIS REPORT

GECL/Lab Code (TR) : 2187  
 Factory Name : Aspire Washing Ltd.  
 Factory Address : Sudkhira, Janirta, Singair, Manikganj, Bangladesh.  
 Location (GPS) Coordinate: 23°47'41.20"N & 90°14'17.83"E

Sample Collector : Global Environment Consultants Ltd. (GECL Monitoring Team).  
 Description of Sample : Ground water quality analysis. (Source of Submersible pump)  
 Sampling & Testing date : 14<sup>th</sup> March, 2026  
 Analysis & Reporting date : 06<sup>th</sup> April, 2026  
 Location (GPS) Coordinate: 23° 47' 41.6976" N, 90° 14' 18.7224" E (Project Ground Water)

#### Description of analysis

| SN | Parameter                   | Concentration Present. | Bangladesh (DoE) Standard (Drinking Water) (ECR-2023, Schedule-2, Sub-Rule-Kha) | Method of analysis                               |
|----|-----------------------------|------------------------|---------------------------------------------------------------------------------|--------------------------------------------------|
| 01 | pH                          | 7.39                   | 6.5-8.5                                                                         | pH Meter                                         |
| 02 | Total Dissolved Solid (TDS) | 113 mg/l               | 1000 mg/l                                                                       | Electrode                                        |
| 03 | Iron                        | 0.02 mg/l              | 0.3-1.0 mg/l                                                                    | 1,10 Phenanthroline UV-visible spectrophotometer |
| 04 | Alkalinity                  | 35 mg/l                | -                                                                               | Burette Method 8221                              |
| 05 | Hardness                    | 45 mg/l                | 500 mg/l                                                                        | Complexo-metric titration by EDTA                |
| 06 | Chloride (Cl <sup>-</sup> ) | 51 mg/l                | 250 mg/l                                                                        | Silver nitrate -Mohr method                      |
| 07 | Arsenic (As)                | <0.001                 | 0.05 mg/l                                                                       | Silver DDTC UV-visible                           |

**Comments:** The laboratory analyses have been used for the determination of above mentioned parameters (Iron, Chloride, TDS, Hardness and Alkalinity) and buffered calibrated pH meter has been used for determining its value. The ground water quality of the **Aspire Washing Ltd** was good and the values of parameters were within the limit of water quality standard (DOE/EPA). The groundwater quality parameters were within the acceptable limits of Drinking water guidelines as per ECR-2023, DoE, Bangladesh. Therefore, the water is considered safe for drinking and domestic use.



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Figure: Ground Water Sampling.



### SURFACE WATER QUALITY ANALYSIS REPORT

GECL/Lab Code (TR) : 2187  
 Factory Name : Aspire Washing Ltd.  
 Factory Address : Sudkhira, Jamirra, Singair, Manikganj, Bangladesh.  
 Location (GPS) Coordinate: 23°47'41.20"N & 90°14'17.83"E

Sample Collector : Global Environment Consultants Ltd. (GECL Monitoring Team).  
 Description of Sample : Surface water quality analysis. (Source of Dhaleshwari River and Canal)  
 Sampling & Testing date : 14<sup>th</sup> March, 2026  
 Analysis & Reporting date: 06<sup>th</sup> April, 2026

| Code | Location                     | GPS Coordinate                     |
|------|------------------------------|------------------------------------|
| SW-1 | Dhaleshwari River Upstream   | 23° 47' 37.91" N, 90° 14' 30.20" E |
| SW-2 | Dhaleshwari River Downstream | 23° 47' 36.08" N, 90° 14' 29.64" E |
| SW-3 | Canal Upstream               | 23° 47' 35.97" N, 90° 14' 14.50" E |
| SW-4 | Canal Downstream             | 23° 47' 36.01" N, 90° 14' 13.26" E |

#### Description of analysis

| SN | Parameter                 | Unit | Concentration Present |                    |                  |                    | DoE (Bangladesh)<br>Standard for Inland<br>surface water ECR-<br>2023-SRO no 32-<br>law/2023),<br>Schedule-4 | Method of<br>analysis |
|----|---------------------------|------|-----------------------|--------------------|------------------|--------------------|--------------------------------------------------------------------------------------------------------------|-----------------------|
|    |                           |      | Dhaleshwari River     |                    | Canal            |                    |                                                                                                              |                       |
|    |                           |      | SW-1<br>Upstream      | SW-2<br>Downstream | SW-3<br>Upstream | SW-4<br>Downstream |                                                                                                              |                       |
| 01 | pH                        | -    | 6.87                  | 6.85               | 6.34             | 6.36               | 6-9                                                                                                          | pH Meter              |
| 02 | TDS                       | mg/l | 345                   | 346                | 679              | 678                | 2100 mg/l<br>(ECR-97)                                                                                        | TDS Meter             |
| 03 | SS                        | mg/l | 3.4                   | 3.3                | 6.3              | 6.4                | 100 mg/l                                                                                                     | Gravimetric           |
| 04 | DO                        | mg/l | 3.84                  | 3.86               | 2.18             | 2.19               | 4.5-8.5 mg/l<br>(ECR-97)                                                                                     | Azide<br>modification |
| 05 | BOD <sub>5</sub> at 20 °C | mg/l | 27                    | 25.2               | 32               | 33                 | 30 mg/l                                                                                                      | DO Meter              |
| 06 | COD                       | mg/l | 51                    | 52                 | 57               | 62                 | 200 mg/l                                                                                                     | COD<br>Refraction     |

TDS= Total dissolve solid, TSS= Total suspended solid, DO= Dissolve oxygen, BOD<sub>5</sub>=Biological oxygen demand within 5 days,  
 COD= Chemical oxygen demand.

**Comments:** Appropriate analytical methods were used to determine the physicochemical parameters of surface water, including pH, DO, BOD<sub>5</sub>, TDS, SS, and COD. The surface water sample from Aspire Washing Ltd was collected from a nearby Dhaleshwari River and Canal. The measured physicochemical parameters pH, SS COD were found to be below the standard levels of ECR 2023 set by the Department of Environment (DoE), Government of Bangladesh, for surface water quality. The value of BOD<sub>5</sub> at 20 °C at two locations was higher level as per ECR 2023 and other two location lower level as per ECR 2023.



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Figure: Surface Water Sampling.

## **Annex-I: Approval Letter and Meeting Minutes of Public Consultation**

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার  
পরিবেশ অধিদপ্তর  
মানিকগঞ্জ জেলা কার্যালয়  
সমন্বিত সরকারি অফিস ভবন (৭ম তলা)  
বেউথা, সদর, মানিকগঞ্জ।  
[www.doe.gov.bd](http://www.doe.gov.bd)

নং-২২.০২.৫৬০০.১৪১.৯৯.১২০.১৬ (৩য় খন্ড). ১৬৮

১৫/১২/১৪৩২ বঙ্গাব্দ।

তারিখ: .....

২৯/০৩/২০২৬ খ্রিস্টাব্দ

বিষয়: পরিবেশগত প্রভাব নিরূপন প্রতিবেদন প্রস্তুতের জন্য জনমত জরীপ যাচাই কার্যক্রমের কার্যবিবরণী অনুমোদন।  
সূত্র: এ্যাসপায়ার ওয়াশিং লিমিটেড এর ২৯/০৩/২০২৬ খ্রি. তারিখের আবেদন।

উপর্যুক্ত বিষয়ের প্রেক্ষিতে জানানো যাচ্ছে যে, আপনার মালিকানাধীন এ্যাসপায়ার ওয়াশিং লিমিটেড এর পরিবেশগত প্রভাব নিরূপন প্রতিবেদন প্রস্তুত করার জন্য গত ১৪/০৩/২০২৬ খ্রি. তারিখে জনমত যাচাই এর কার্যক্রম পরিচালনা করা হয়। জনমত যাচাই সভার কার্যবিবরণী ২৯/০৩/২০২৬ খ্রি. তারিখে অত্র দপ্তরে দাখিল করা হয় এবং জনমত যাচাই সভার কার্যবিবরণী পর্যালোচনান্তে কার্যবিবরণী অনুমোদনের সিদ্ধান্ত গৃহীত হয়।

জনমত যাচাই সভার কার্যবিবরণী অনুমোদনপত্র ব্যবস্থাপনা পরিচালক, এ্যাসপায়ার ওয়াশিং লিমিটেড বরাবর পত্রের মাধ্যমে অবহিত করা হলো।

ব্যবস্থাপনা পরিচালক  
এ্যাসপায়ার ওয়াশিং লিমিটেড  
সুদক্ষিরা, জার্মিতা, সিংগাইর, মানিকগঞ্জ।

  
(মুহাম্মদ আব্দুল্লাহ আল মামুন)  
উপপরিচালক  
ফোন: ০২-৯৯৮৮১৪১৩০

অনুলিপি: সদয় অবগতির জন্য-

১। পরিচালক, পরিবেশ অধিদপ্তর, ঢাকা অঞ্চল কার্যালয়, ঢাকা।

২। সহকারী পরিচালক, মহাপরিচালক মহোদয়ের দপ্তর, পরিবেশ অধিদপ্তর, সদর দপ্তর, ঢাকা।

## এয়াসপায়ার ওয়াশিং লিমিটেড প্রকল্পের পরিবেশগত প্রভাব নিরূপণের জন্য

### জনমত যাচাই সভার কার্যবিবরণী

- **সভার তারিখঃ** ১৪ মার্চ ২০২৬ (১লা চৈত্র, ১৪৩২ বঙ্গাব্দ)
- **সভার সময়ঃ** সকাল ১১:০০ ঘটিকা হতে দুপুর ১:৩০ ঘটিকা পর্যন্ত
- **সভার স্থানঃ** এয়াসপায়ার ওয়াশিং লিমিটেড, গ্রাম – বিনাডাংগী, মৌজা – সুদক্ষিরা, ইউনিয়ন – জামির্তা, উপজেলা – সিংগাইর, জেলা – মানিকগঞ্জ, বাংলাদেশ
- **সভায় আলোচ্য বিষয়সূচিঃ** এয়াসপায়ার ওয়াশিং লিমিটেড, ডেনিম ওয়াশিং উৎপাদন কারখানার পরিবেশগত প্রভাব নিরূপণ সমীক্ষার জন্য জনমত যাচাই।
- **সভার উপস্থিতিঃ**
  ১. মুহাম্মদ আব্দুল্লাহ আল মামুন  
উপপরিচালক, মানিকগঞ্জ জেলা কার্যালয়, পরিবেশ অধিদপ্তর
  ২. এ কে এম কোহিনূর ইসলাম  
নির্বাহী পরিচালক, এয়াসপায়ার ওয়াশিং লিমিটেড
  ৩. মোঃ ছানোয়ার হোসেন  
সাধারণ সম্পাদক, বাংলাদেশ জাতীয়তাবাদী দল (সিংগাইর)
  ৪. রোকন আল মাহমুদ  
সহকারী মহাব্যবস্থাপক (প্রোকিউরমেন্ট), এয়াসপায়ার ওয়াশিং লিমিটেড
  ৫. মোঃ লাবু মিয়া  
ব্যবসায়ী, জামির্তা, মানিকগঞ্জ
  ৬. মোঃ বখতিয়ার  
ব্যবসায়ী, জামির্তা, মানিকগঞ্জ
  ৭. মোঃ আশিকুর রহমান  
টিম লিডার, ইএসবিডি (পরামর্শক প্রতিষ্ঠান)
  ৮. ইঞ্জিঃ অতনু রায়  
সিনিয়র এনভায়রনমেন্টাল ইঞ্জিনিয়ার, ইএসবিডি (পরামর্শক প্রতিষ্ঠান)
  ৯. রাহুল আচার্য্য  
এনভায়রনমেন্টাল ইঞ্জিনিয়ার, ইএসবিডি (পরামর্শক প্রতিষ্ঠান)
  ১০. মানস রায়  
জুনিয়র এনভায়রনমেন্টাল ইঞ্জিনিয়ার, ইএসবিডি (পরামর্শক প্রতিষ্ঠান)
  ১১. স্থানীয় বাসিন্দা, জনপ্রতিনিধি ও প্রকল্পের অংশীদারগণ (উপস্থিতি তালিকা সংযুক্ত)

- **সভার উদ্দেশ্যঃ**

এ্যাসপায়ার ওয়াশিং লিমিটেড প্রকল্পের পরিবেশগত প্রভাব নিরূপণ সমীক্ষার জন্য জনমত যাচাই সভার মূল উদ্দেশ্য ছিল প্রস্তাবিত বিষয়ে জনগণের অবগতি ও মতামত প্রাপ্ত করা। এ লক্ষ্যে, ১১, ১২ ও ১৩ মার্চ ২০২৬ তারিখে মাইকিং, আমন্ত্রনপত্র প্রেরণ, টেলিফোন কল এবং জাতীয় দৈনিক সংবাদপত্রে (১৪ মার্চ ২০২৬ **মানবকণ্ঠ, সংযুক্ত**) বিজ্ঞপ্তি প্রকাশ করা হয়। স্থানীয় বাসিন্দা, ব্যবসায়ী, জমির মালিকসহ ২৫ জনেরও বেশি লোক সভায় অংশ নেন। পরিবেশ অধিদপ্তর, মানিকগঞ্জ জেলা কার্যালয়ের প্রতিনিধিগণও উক্ত সভায় উপস্থিত ছিলেন।

**উক্ত সভার লক্ষ্যবস্তু নিম্নে দেয়া হলঃ**

- জনগণকে প্রকল্প সম্পর্কে অবহিত ও সচেতন করা, প্রকল্পের পরিচিতি তুলে ধরা এবং জনমত যাচাই সভা সম্পর্কে তথ্য প্রদান করা।
- প্রস্তাবিত কারখানা পরিচালনার কারনে সম্ভাব্য পরিবেশ, জনস্বাস্থ্য এবং সামাজিক ইতিবাচক ও নেতিবাচক প্রভাব সমীক্ষা এবং আলোচনা করা।
- ইআইএ রিপোর্টে উল্লেখিত পরিবেশ এবং সামাজিক প্রভাব সম্বন্ধে জনগণের মতামত এবং পরামর্শ সংগ্রহ করা।
- প্রস্তাবিত কারখানা দ্বারা প্রভাবিত জনগোষ্ঠীর মতামত এবং প্রভাবিত সম্প্রদায় ও প্রকল্প উদ্যোক্তার মধ্যে পারস্পরিক সহযোগিতা ও যোগাযোগ এর ব্যবস্থা করা।
- জনগণের কাছ থেকে ইআইএ রিপোর্ট ও প্রকল্পের পরিবেশ, জনস্বাস্থ্য এবং সামাজিক প্রভাব সম্পর্কিত মতামত, সংশয়, সমর্থন ও পরামর্শ সংগ্রহ করা।
- প্রকল্প বিষয়ে স্থানীয় বাসিন্দা, জনপ্রতিনিধি ও প্রকল্পের অংশীদারগণদের ইতিবাচক ও নেতিবাচক মতামত গ্রহন ও প্রশমনের ব্যবস্থা গ্রহণ।

- **উদ্বোধনী মন্তব্যঃ**

পরিবেশ পরামর্শক প্রতিষ্ঠান আর্থ স্কেয়াড বিডি (ইএসবিডি) এর টিম লিডার মোঃ আশিকুর রহমান অংশগ্রহণকারীদের স্বাগত জানিয়ে সভার সূচনা করেন। পরিবেশ অধিদপ্তর, মানিকগঞ্জ জেলা কার্যালয়ের প্রতিনিধি উপপরিচালক জনাব মুহাম্মদ আব্দুল্লাহ আল মামুন ও উক্ত সভায় উপস্থিত অংশগ্রহণকারীদের পরিচয় প্রদান করেন ও জনমত সভার উদ্দেশ্য সম্পর্কে সংক্ষিপ্তভাবে ব্যাখ্যা করেন।

- **প্রকল্প বিষয়ক বক্তব্যঃ**

পরামর্শক প্রতিষ্ঠান ইএসবিডি-এর টিম লিডার মোঃ আশিকুর রহমান সভায় পরিবেশ অধিদপ্তর মানিকগঞ্জ জেলা কার্যালয়ের প্রতিনিধির উপস্থিতিতে প্রকল্পের প্রাথমিক তথ্য, সম্ভাব্য সুফল, প্রকল্পের সম্ভাব্য পরিবেশগত ও সামাজিক ইতিবাচক-নেতিবাচক প্রভাব এবং সেগুলোর প্রশমন পদ্ধতি, পাশাপাশি প্রকল্প এলাকার অতীত ও বর্তমান পরিস্থিতি সম্পর্কে বিস্তারিত আলোচনা করেন। তিনি প্রকল্পের প্রাথমিক তথ্য ও পরিবেশগত প্রভাব সংক্রান্ত সংক্ষিপ্ত বিবরণী (সংযুক্ত) উপস্থিত সকলের মাঝে বিতরণের জন্য অনুরোধ করেন এবং প্রতিটি বিষয় সংক্ষেপে ব্যাখ্যা করেন।

**উদ্যোক্তা পক্ষের মন্তব্যঃ**

উদ্যোক্তা প্রতিষ্ঠান এ্যাসপায়ার ওয়াশিং লিমিটেড এর পক্ষ্যে নির্বাহী পরিচালক এ. কে. এম কোহিনুর ইসলাম অংশগ্রহণকারীদের স্বাগত জানিয়ে সংক্ষিপ্তভাবে প্রকল্পের কার্যক্রমের বিবরণ প্রদান করেন। এ্যাসপায়ার ওয়াশিং একটি ডেনিম ওয়াশিং প্রস্তুতকারী প্রতিষ্ঠান যা এখন নির্মাণাধীন আছে। তিনি আরও জানান যে, বিগাডাংগী এলাকার মানুষ এবং জনপ্রতিনিধিগন এই প্রকল্প সম্পর্কে ভালভাবে অবগত। আজকের সভায় জনপ্রতিনিধিগনকে আমন্ত্রণ জানানো হলেও, তাদের প্রকল্প নিয়ে কোনো আপত্তি নেই বলে বেশিরভাগই আজ অনুপস্থিত।

- **পরিবেশ অধিদপ্তরের প্রতিনিধির মন্তব্যঃ**

পরিবেশ অধিদপ্তর, মানিকগঞ্জ জেলা কার্যালয় এর উপপরিচালক জনাব মুহাম্মদ আব্দুল্লাহ আল মামুন সভায় অংশগ্রহণকারীদের স্বাগত জানান এবং প্রকল্পের প্রাথমিক তথ্য, প্রকল্পের সম্ভাব্য পরিবেশ এবং সামাজিক ইতিবাচক ও নেতিবাচক প্রভাব, প্রশমনের উপায় সমূহ সংক্ষিপ্তভাবে ব্যাখ্যা করেন। কারখানা চলমান হলে কঠিন ও তরল বর্জ্য সৃষ্টি, পুনঃব্যবহারের মাধ্যমে বর্জ্য ব্যবস্থাপনা, বায়ু ও শব্দদূষণ এর প্রভাব, সামাজিক ও জনস্বাস্থ্যের উপর সম্ভাব্য প্রভাব ইত্যাদি বিস্তারিতভাবে ব্যাখ্যা করেন। তিনি উপস্থিত সবাইকে সভায় অংশগ্রহণ ও জনমত যাচাই এর গুরুত্ব এবং সকলের কাছ থেকে প্রশ্ন ও স্বতঃস্ফূর্ত মতামত প্রকাশের প্রত্যাশা ব্যক্ত করেন। তিনি জনমত যাচাই কার্যক্রম শুরু করার নির্দেশনা প্রদান করেন।

- **স্থানীয় বাসিন্দাদের মতামত প্রদান ও প্রশ্নোত্তর পর্বঃ**

প্রকল্প বিষয়ক বিবরণী আলোচনা শেষে, জনমত যাচাই ও প্রশ্নোত্তর অধিবেশন অনুষ্ঠিত হয়েছিল, যা নীচের টেবিলে সংক্ষেপিত করা হয়েছে। কিছু প্রশ্ন এবং মতামত সভার অংশীদারগণ দ্বারা উত্থাপিত হয়েছিল, তবে তাদের প্রশ্নের উত্তর পেলে, প্রকল্প নিয়ে কোনও আপত্তি প্রকাশ করেননি।

| ক্রঃ<br>নং | নাম ও প্রতিষ্ঠান                                                                            | প্রশ্ন/মতামত                                                                                                                             | জবাব/ব্যাখ্যা                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ১.         | মুহাম্মদ আব্দুল্লাহ আল মামুন,<br>উপপরিচালক, মানিকগঞ্জ<br>জেলা কার্যালয়, পরিবেশ<br>অধিদপ্তর | ১. প্রকল্প বিষয়ে স্থানীয় বাসিন্দাদের<br>মতামত জানতে চান<br>২. প্রকল্প বাস্তবায়িত হলে<br>স্থানীয়দের কোন অসুবিধা হবে<br>কিনা জানতে চান | <b>মোঃ বখতিয়ার (৪৫), স্থানীয় ব্যবসায়ী জানানঃ</b><br>১. কারখানা চলমান হলে এলাকার উন্নয়ন হবে বলে<br>জানান।<br>২. স্থানীয় লোকজনের কর্মসংস্থান এর ব্যবস্থা হবে।<br>৩. প্রকল্পটি সুপরিকল্পিত হওয়ায় স্থানীয় লোকজনের<br>কোন অসুবিধা হবে না বলে জানান।                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| ২.         | শাহীদুল ইসলাম জাহাঙ্গীর,<br>বিগ্নাডাংগী নব জাগরণ সংঘ<br>(সভাপতি)                            | ১. নির্গত ধোঁয়া এলাকার চারপাশে<br>কিরূপ প্রভাব ফেলবে?<br>২. শব্দ দূষণ এর সম্ভাবনা আছে<br>কিনা?                                          | <b>পরামর্শক প্রতিষ্ঠান ইএসবিডি এর পরামর্শক ও<br/>পরিবেশগত প্রভাব নিরূপণ সমীক্ষার মোঃ<br/>আশিকুর রহমান জবাবে জানান,</b><br>১. আশেপাশে কোন রকম ক্ষতি হবে না বলে তিনি<br>জানান, কারন ১৫ মিটার লম্বা চিমনির মাধ্যমে ধোঁয়া<br>উন্মুক্ত করা হবে যা সরাসরি আমাদের শরীরের<br>সংস্পর্শে আসবে না।<br>২. জেনারেটর থেকে সৃষ্ট শব্দ দূষণ নিয়ন্ত্রণের জন্য<br>সাঁউন্ডপ্রুফ ক্যানোপি ব্যবহার করা হবে যা শব্দ দূষণ<br>রোধে সাহায্য করবে।                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ৩.         | মোঃ আওলাদ হোসেন,<br>বিগ্নাডাংগী নব জাগরণ সংঘ<br>(সাধারণ সম্পাদক)                            | ১. ব্যবহার করা পানি নদী নালায়<br>নিষ্কাশন করা হলে পরিবেশের<br>ক্ষতি হবে কিনা?                                                           | <b>পরামর্শক প্রতিষ্ঠান ইএসবিডি এর পরামর্শক ও<br/>পরিবেশগত প্রভাব নিরূপণ সমীক্ষার মোঃ<br/>আশিকুর রহমান জবাবে জানান,</b><br>১. এখানে একটি পরিবেশবান্ধব বায়োলজিক্যাল<br>ট্রিটমেন্ট প্ল্যান্ট স্থাপন করা হয়েছে, যা ডেনিম ওয়াশিং<br>থেকে নির্গত তরল বর্জ্য ১০০% পরিশোধন করতে<br>সক্ষম। পরিশোধিত পানি পুনঃব্যবহারের মাধ্যমে<br>ভূগর্ভস্থ পানির ব্যবহার প্রায় ২০-৩০% পর্যন্ত কমানো<br>সম্ভব। এই পদ্ধতিতে কোনো রাসায়নিক পদার্থ ব্যবহার<br>করা হয় না, ফলে পানিতে থাকা উদ্ভিদ ও প্রাণীর ক্ষতির<br>সম্ভাবনা থাকে না।<br><br><b>মানিকগঞ্জ জেলা কার্যালয়, পরিবেশ অধিদপ্তর<br/>এর উপপরিচালক মুহাম্মদ আব্দুল্লাহ আল মামুন<br/>জবাবে জানান,</b><br>১. তিনি বলেন, এলাকার রাস্তা ও পরিবেশ অত্যন্ত<br>মনোমুগ্ধকর এবং এই পরিবেশের কোনো ধরনের ক্ষতি<br>যেন না হয় তা নিশ্চিত করতে হবে। শিল্পায়নের ফলে<br>পরিবেশের ওপর নেতিবাচক প্রভাব পড়ছে কিনা তা<br>পর্যবেক্ষণের জন্য পরিবেশ অধিদপ্তর বছরে ২ বার |

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|    |                                                                                     |                                                                                                      | তরল বর্জ্যের নমুনা সংগ্রহ করে পরীক্ষাগারে পরীক্ষা করবে। পরীক্ষার ফলাফল যদি পরিবেশ অধিদপ্তরের নির্ধারিত মানমাত্রার সঙ্গে সামঞ্জস্যপূর্ণ না হয়, তাহলে বিধি অনুযায়ী সংশ্লিষ্ট প্রতিষ্ঠানের বিরুদ্ধে প্রয়োজনীয় ব্যবস্থা গ্রহণসহ জরিমানা আরোপ করা হবে।                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ৪. | লাবু সরকার (৩৬), স্থানীয় বাসিন্দা (ব্যবসা)                                         | ১. এই প্রতিষ্ঠানের কার্যক্রম এলাকার মানুষের জীবনযাত্রার মান এবং কর্মসংস্থানের উপর কী প্রভাব ফেলবে?   | <p><b>এ. কে. এম কোহিনূর ইসলাম, নির্বাহী পরিচালক, এ্যাসপায়ার ওয়াশিং লিমিটেড, জবাবে জানান যে,</b></p> <p>১. তিনি এই এলাকারই বাসিন্দা এবং এলাকার মানুষের জীবনযাত্রার মানোন্নয়নে অবদান রাখতে আগ্রহ প্রকাশ করেন।</p> <p>২. তিনি জানান, তার এই প্রতিষ্ঠানে প্রায় ৩৫০-৪০০ জন মানুষের কর্মসংস্থানের সুযোগ সৃষ্টি হতে পারে।</p> <p>৩. তিনি আরও বলেন, প্রতিষ্ঠানের নির্ধারিত নিয়ম-কানুন যথাযথভাবে মেনে চললে আরও অনেকের কর্মসংস্থানের সুযোগ সৃষ্টি হবে।</p>                                                                                                                                                                                                                                                                                                                                |
| ৫. | মুহাম্মদ আব্দুল্লাহ আল মামুন , উপপরিচালক, মানিকগঞ্জ জেলা কার্যালয়, পরিবেশ অধিদপ্তর | <p>১. প্রকল্পের জন্য কেউ ক্ষতিগ্রস্ত হয়েছেন কি?</p> <p>২. প্রকল্প নিয়ে কারও কোন আপত্তি আছে কি?</p> | <p><b>স্থানীয় বাসিন্দারা জবাবে জানান যে,</b></p> <p>১. প্রকল্প বাস্তবায়িত হলে স্থানীয়দের জীবনযাত্রার মান-উন্নয়ন ও নতুন কর্মক্ষেত্রের ব্যবস্থা হবে।</p> <p>২. প্রকল্পের জন্য কেউ ক্ষতিগ্রস্ত হয়েছে বলে তারা কখনো শুনে নি।</p> <p>৩. প্রকল্প নিয়ে কারও কোন আপত্তি নেই বলে জানান।</p> <p><b>এ. কে. এম কোহিনূর ইসলাম, নির্বাহী পরিচালক, এ্যাসপায়ার ওয়াশিং লিমিটেড জবাবে জানান যে ,</b></p> <p>১. এ যাবৎ তাদের কার্যক্রম নিয়ে স্থানীয় বাসিন্দা, প্রতিবেশী বা সংশ্লিষ্ট কোন অধিদপ্তর হতে কোন আপত্তি পান নি।</p> <p>২. এ্যাসপায়ার ওয়াশিং লিমিটেড পরিবেশ, জনস্বাস্থ্য ও সামাজিক ব্যবস্থাপনা নিয়ে খুবই সচেতন।</p> <p>৩. তিনি আরও জানান যে, ডেনিম ওয়াশিং করার আগেই তারা তরল বর্জ্য ব্যবস্থাপনার জন্য সুপরিচিত আর্থ স্কোয়াড (বিডি) কে দিয়ে ইটিপি স্থাপন কাজ সম্পূর্ণ করবেন।</p> |

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|  |  |  | <p>পরামর্শক প্রতিষ্ঠান ইএসবিডি এর পরামর্শক ও পরিবেশগত প্রভাব নিরূপণ সমীক্ষার মোঃ আশিকুর রহমান জবাবে জানান ,</p> <p>১. ত্রিআর (3R) ও জিরো ডিসচার্জ পরিকল্পনার তথ্যাদী ইআইএ প্রতিবেদনে সংযুক্ত করা হবে</p> <p>২. তিনি চলমান পরিবেশগত বেসলাইন পর্যবেক্ষণের (Environmental Baseline Monitoring) জন্য সংশ্লিষ্ট সকলকে আমন্ত্রণ জানান।</p> |
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● সমাপনী মন্তব্য

পরিবেশ অধিদপ্তর মানিকগঞ্জ জেলা কার্যালয় এর উপপরিচালক জনাব মুহাম্মদ আব্দুল্লাহ আল মামুন, সভায় অংশগ্রহণকারীদের কোনো প্রশ্ন, মতামত বা পরামর্শ আছে কিনা জানতে চান। প্রকল্প নিয়ে কারও কোন আপত্তি আছে কিনা সে বিষয়ে জনমতামত জানতে চান এবং প্রকল্প নিয়ে কারও কোন আপত্তি নেই দেখে সকলের সম্মতিক্রমে প্রকল্প বাস্তবায়িত হচ্ছে বলে মতামত নেন। অবশেষে সভায় উপস্থিত সকলকে অংশগ্রহণের ধন্যবাদ জানিয়ে সভার সমাপ্তি ঘোষণা করেন ও তিনি চলমান পরিবেশগত বেসলাইন পর্যবেক্ষণ (Environmental Baseline Monitoring) করেন।

● ভিন্ন মন্তব্য/আপত্তিঃ

প্রকল্প নিয়ে কারও কোন আপত্তি বা ভিন্নমত পাওয়া যায়নি।

● ইএসবিডি পরামর্শক দলের মন্তব্যঃ

সভার মাধ্যমে অংশীজনদের প্রশ্নের উত্তর দেওয়া হলে কোনো অংশগ্রহণকারী প্রকল্পের বিরোধিতা করেননি। প্রকল্প বাস্তবায়িত হলে স্থানীয়দের জীবনযাত্রার মান-উন্নয়ন ও কর্মক্ষেত্রের ব্যবস্থা হবে বলে স্থানীয় বাসিন্দারা অভিমত ব্যক্ত করেন। জনমত যাচাই সভার মতামত, পরামর্শ এবং আলোচিত বিষয়গুলো ইআইএ প্রতিবেদন এবং প্রকল্প পরিকল্পনায় যুক্ত করা হবে।

● জনমত যাচাই সভার কার্যবিবরণী অনুমোদনঃ

১. এ্যাসপায়ার ওয়াশিং লিমিটেড এর  
পক্ষেঃ

২. পরামর্শক প্রতিষ্ঠান ইএসবিডি এর পক্ষেঃ

৩. পরিবেশ অধিদপ্তর, মানিকগঞ্জ জেলা  
কার্যালয় এর পক্ষেঃ



  
**মুহাম্মদ আব্দুল্লাহ আল মামুন**  
 উপপরিচালক  
 পরিবেশ অধিদপ্তর  
 মানিকগঞ্জ জেলা কার্যালয়  
 গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

অনুমোদিত স্বাক্ষর

অনুমোদিত স্বাক্ষর

অনুমোদিত স্বাক্ষর

## সংযুক্তি ১ -

জাতীয় দৈনিক সংবাদপত্রে প্রকাশিত বিজ্ঞপ্তি



## সংযুক্তি ২ -

প্রকল্পের প্রাথমিক তথ্য ও পরিবেশ প্রভাব বিষয়ক

সংক্ষিপ্ত বিবরণী

## এ্যাসপায়ার ওয়াশিং লিমিটেডের সাধারণ তথ্যাবলি

এ্যাসপায়ার ওয়াশিং লিমিটেড একটি ডেনিম ওয়াশিং উৎপাদন কারখানা। কারখানাটির অবস্থান: গ্রাম – বিনাডাংগী, মৌজা – সুদক্ষিরা, ইউনিয়ন – জামিতা, উপজেলা – সিংগাইর, জেলা – মানিকগঞ্জ, বাংলাদেশ। প্রকল্পের স্থানটি জিরো পয়েন্ট, ঢাকা (জিপিও) হতে প্রায় ২৩.২ কিলোমিটার এবং হযরত শাহজালাল আন্তর্জাতিক বিমানবন্দর থেকে ৩২.১ কিলোমিটার দূরে অবস্থিত এবং প্রকল্পের স্থানটি হেমায়েতপুর বাস স্ট্যান্ড থেকে প্রায় ৪ কিলোমিটার দূরত্বে অবস্থিত। ভৌগোলিকভাবে প্রকল্পটি ২৩° ৪৭' ৪১.৬৯৭৬" উত্তর, ৯০°১৪' ১৮.৭২২৪" পূর্বে অবস্থিত।

কারখানাটিতে সর্বমোট ৬১০ জন দক্ষ ও অদক্ষ শ্রেণির কর্মচারী নিযুক্ত আছেন। তন্মধ্যে ৫ জন পরিবেশগত ব্যবস্থাপনার লক্ষ্যে নিয়োজিত। কারখানাটির উৎপাদন ক্ষমতা ২০০ মেট্রিক টন বার্ষিক। মানসম্পন্ন পণ্য উৎপাদনের লক্ষ্যে কারখানাটি সর্বাধুনিক যন্ত্রপাতি দিয়ে সজ্জিত। প্রকল্পের মোট আয়তন হল ১১, ৭৫, ৯৬৬ বর্গফুট (১০, ৯২৫ বর্গমিটার)।

### প্রকল্পের উপাদান

এ্যাসপায়ার ওয়াশিং লিমিটেড নিম্নলিখিত ইউনিট নিয়ে গঠিত, যা হল-

| ক্রমিক নং | ইউনিটসমূহ                  | আকার           |
|-----------|----------------------------|----------------|
| ১.        | প্রশাসন / অফিস             | ৪১৪ বর্গমিটার  |
| ২.        | কারখানা / উৎপাদন কার্যক্রম | ৪৫৬৪ বর্গমিটার |
| ৩.        | কাঁচামাল সংরক্ষণাগার       | ৪৯৮ বর্গমিটার  |
| ৪.        | পানি পরিশোধনাগার           | ১০৪৫ বর্গমিটার |
| ৫.        | জেনারেটর                   | ৪৯০ বর্গমিটার  |
| ৬.        | অন্যান্য                   | ২৭৯১ বর্গমিটার |

## প্রাথমিক তথ্যাদি

এ্যাসপায়ার ওয়াশিং লিমিটেড প্রকল্পের প্রাথমিক তথ্যাদি নিচের সারণীতে দেখানো হয়েছে-

| প্রকল্পের নাম                                          | এ্যাসপায়ার ওয়াশিং লিমিটেড                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| প্রকল্পের উদ্যোক্তা                                    | কামরুল হক                                                                                                                                                                                                                                                                                                                                                                                             |
| প্রকল্পের অবস্থান                                      | গ্রাম – বিন্নাডাংগী, মৌজা – সুদক্ষিরা, ইউনিয়ন – জামির্তা, উপজেলা – সিংগাইর, জেলা – মানিকগঞ্জ                                                                                                                                                                                                                                                                                                         |
| অফিসের ঠিকানা                                          | ১০৩, সুদক্ষিরা, জামির্তা, সিংগাইর, মানিকগঞ্জ-১৮২২                                                                                                                                                                                                                                                                                                                                                     |
| প্রকল্পের ধরন                                          | ডেনিম ওয়াশিং উৎপাদন কারখানা                                                                                                                                                                                                                                                                                                                                                                          |
| প্রকল্প ব্যয়                                          | ১৩২,৭৬,৬০,০০০ টাকা মাত্র<br>(একশত বত্রিশ কোটি ছিয়ান্নার লক্ষ ষাট হাজার টাকা মাত্র)                                                                                                                                                                                                                                                                                                                   |
| উৎপাদন ক্ষমতা                                          | ২০০ মেট্রিক টন বার্ষিক                                                                                                                                                                                                                                                                                                                                                                                |
| উৎপাদিত পণ্য                                           | ডেনিম ওয়াশিং পণ্য                                                                                                                                                                                                                                                                                                                                                                                    |
| কর্মচারীর সংখ্যা                                       | ৬১০ জন (দক্ষ ও অদক্ষ)                                                                                                                                                                                                                                                                                                                                                                                 |
| পরিবেশগত ব্যবস্থাপনার সাথে সংশ্লিষ্ট কর্মকর্তার সংখ্যা | ৫ জন                                                                                                                                                                                                                                                                                                                                                                                                  |
| কর্মঘন্টা                                              | ২৪ ঘন্টা প্রতিদিন                                                                                                                                                                                                                                                                                                                                                                                     |
| মোট জমির পরিমাণ                                        | ১০, ৯২৫ বর্গমিটার                                                                                                                                                                                                                                                                                                                                                                                     |
| প্রকল্প কর্তৃক ব্যবহৃত জমির পরিমাণ                     | ৭৩১৪ বর্গমিটার                                                                                                                                                                                                                                                                                                                                                                                        |
| ব্যবহৃত কাঁচামাল ও কাঁচামালের উৎস                      | এনজাইম, ডিটারজেন্ট, পিউমিস পাথর, সোডিয়াম হাইপোক্লোরাইট, ক্যালসিয়াম হাইপোক্লোরাইট, পটাশিয়াম পারম্যাঙ্গানেট, হাইড্রোজেন পারঅক্সাইড, অ্যাসিটিক অ্যাসিড, সোডিয়াম মেটাবাইসালফাইট, সোডিয়াম থাইওসালফেট (হাইপো), ডাইরেক্ট ডাই, সালফার ডাই, পিগমেন্ট, ফিক্সিং এজেন্ট, সফটনার, অ্যান্টি-ব্যাক স্টেইনিং এজেন্ট, সিকুয়েস্টারিং এজেন্ট, ওয়েটিং এজেন্ট এবং বুস্টার।<br>কাঁচামালের উৎস দেশীয় ও বৈদেশিক বাজার |
| দৈনিক ব্যবহৃত পানির পরিমাণ                             | ২৩০০ ঘন মিটার                                                                                                                                                                                                                                                                                                                                                                                         |
| দৈনিক ব্যবহৃত পানির উৎস                                | নিজস্ব ডিপ টিউবওয়েল                                                                                                                                                                                                                                                                                                                                                                                  |
| প্রয়োজনীয় বিদ্যুতের পরিমাণ                           | ২০০০ কিলোওয়াট-ঘন্টা দৈনিক                                                                                                                                                                                                                                                                                                                                                                            |
| প্রয়োজনীয় জ্বালানির পরিমাণ                           | ৭০০ লিটার দৈনিক (ডিজেল)                                                                                                                                                                                                                                                                                                                                                                               |

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| জেনারেটরের ক্ষমতা                                              | ৮০০ কিলো ওয়াট-এম্পায়ার (২টি)                                                                                                                                                                                                                                                   |
| বয়লারের ক্ষমতা                                                | ৪০০০ কেজি (১টি) ও ৩০০০ কেজি (১টি)                                                                                                                                                                                                                                                |
| তরল বর্জ্য উৎপাদনের পরিমাণ                                     | ৭৫ ঘনমিটার প্রতিঘন্টা অথবা ১৮০০ ঘনমিটার প্রতিদিন                                                                                                                                                                                                                                 |
| তরল বর্জ্য শোধনাগারের ক্ষমতা                                   | ৯০ ঘনমিটার প্রতিঘন্টা অথবা ২,১৬০ ঘনমিটার প্রতিদিন                                                                                                                                                                                                                                |
| তরল বর্জ্য শোধন পদ্ধতি                                         | জৈবিক পরিশোধন পদ্ধতি                                                                                                                                                                                                                                                             |
| তরল বর্জ্য শোধনাগারের ইউনিটসমূহ                                | সলিড সেপারেশন, কালেকশন ট্যাঙ্ক, ইকুয়ালাইজেশন ট্যাঙ্ক, নিউট্রালাইজেশন ট্যাঙ্ক, বায়োলজিকাল অক্সিডেশন ট্যাঙ্ক, সেকেন্ডারি ক্লারিফায়ার ট্যাঙ্ক, পোস্ট গ্র্যারেশন ট্যাঙ্ক, স্লাজ থিকেনিং ট্যাঙ্ক, স্লাজ হোল্ডিং ট্যাঙ্ক, মাল্টি গ্রেড ফিল্টার, সিলেক্টর ট্যাঙ্ক, রিসাইকেল ট্যাঙ্ক। |
| প্রকল্প কর্তৃক উৎপাদিত তরল বর্জ্যের চূড়ান্ত নিষ্কাশন ব্যবস্থা | ইটিপি এর মাধ্যমে পরিশোধিত হয়ে পার্শ্ববর্তী ধলেশ্বরী নদীতে।                                                                                                                                                                                                                      |
| ড্রেনের মালিকানা                                               | নিজস্ব মালিকানাধীন                                                                                                                                                                                                                                                               |
| কঠিন বর্জ্য ব্যবস্থাপনা পদ্ধতি                                 | পুনঃচক্রায়ন                                                                                                                                                                                                                                                                     |

## সম্ভাব্য ইতিবাচক প্রভাব

এই প্রজেক্টের সম্ভাব্য ইতিবাচক প্রভাব গুলো নিম্নরূপ-

- নতুন কর্মসংস্থানের সুযোগ
- স্থানীয় ব্যবসাসমূহের সহায়তা ও অগ্রগতি
- অবকাঠামো উন্নয়ন এবং
- স্থানীয় পরিষদের অবকাঠামো উন্নয়ন এবং রাজস্ব বৃদ্ধি

## সম্ভাব্য নেতিবাচক পরিবেশগত প্রভাব এবং প্রশমন ব্যবস্থা

| ক্ষতিগ্রস্থ<br>পরিবেশগত<br>উপাদান | প্রত্যাশিত<br>প্রভাব         | প্রস্তাবিত/বাস্তবায়িত প্রশমন/<br>বর্ধিতকরণ পরিমাপ                                                                                                                                     |
|-----------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| পানি                              | পানি দূষণ                    | <ul style="list-style-type: none"> <li>❖ প্রকল্পের ইটিপি এবং তরল বর্জ্য শোধনাগারের যত্ন নিতে হবে।</li> <li>❖ সচেতনতা এবং প্রশিক্ষণের মাত্রা বৃদ্ধি করতে হবে</li> </ul>                 |
| শব্দ                              | শব্দ দূষণ                    | <ul style="list-style-type: none"> <li>❖ বাধা বা বিন্ডিং দ্বারা শব্দ প্রতিরোধ</li> <li>❖ কোলাহলপূর্ণ এলাকায় পিপিই এর কঠোর ব্যবহার</li> <li>❖ নিয়মিত শব্দের মান পর্যবেক্ষণ</li> </ul> |
| বায়ুর গুণমান                     | বায়ু দূষণ                   | <ul style="list-style-type: none"> <li>❖ কঠিন বর্জ্যের সঠিক ব্যবস্থাপনা</li> <li>❖ যানবাহন চলাচলের কার্যকর নিয়ন্ত্রণ</li> <li>❖ ভালো মানের জ্বালানি পোড়ানো</li> </ul>                |
| কঠিন বর্জ্য                       | বায়ু, পানি এবং<br>মাটি দূষণ | <ul style="list-style-type: none"> <li>❖ সঠিক কঠিন বর্জ্য ব্যবস্থাপনা ব্যবস্থা</li> <li>❖ পর্যাপ্ত সংখ্যক বর্জ্য হ্যান্ডলিং বিন</li> <li>❖ সচেতনতা এবং প্রশিক্ষণ</li> </ul>            |

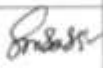
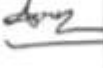
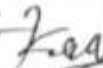
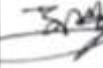
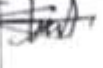
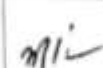
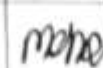
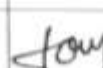
## সংযুক্তি ৩ -

### জনমত যাচাই সভার উপস্থিতি তালিকা

**উপস্থিতির তালিকা**

| সাক্ষাতের স্থান: এয়াসওয়াশিং ওয়াশিং লিঃ |                                                           |                          |                                                                                                                       | তারিখ: ১৪/০১/২০২৬ |          |
|-------------------------------------------|-----------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------|----------|
| ক্রঃ নং                                   | নাম                                                       | মোবাইল নং                | গ্রাম                                                                                                                 | পেশা              | স্বাক্ষর |
| ১।                                        | মুহাম্মদ আব্দুল্লাহ আল মামুন<br>চিমপরিষদক পরিবেশ অধিদপ্তর | ৫২৭২২০২৩৮২               | মুহাম্মদ আব্দুল্লাহ আল মামুন<br>উপপরিচালক<br>পরিবেশ অধিদপ্তর<br>মানিকগঞ্জ জেলা কার্যালয়<br>গলজাভাত্তী বাংলাদেশ সরকার |                   |          |
| ২।                                        | শ্রী: জম কোচিপুত্র<br>হুমায়ুন                            | ০১৭২৪২৫১০৮৫              | বিদ্যাসহী                                                                                                             | চাকর              |          |
| ৩।                                        | শ্রী: হুমায়ুন<br>(হুমায়ুন)                              | ০১৭১১-৩৬০১৩৬             | বিদ্যাসহী                                                                                                             | চাকর              |          |
| ৪।                                        | শ্রী: জাম মাহমুদ                                          | ০১৭২১১৪৪৩৭২              | ৫১                                                                                                                    | চাকর              |          |
| ৫।                                        | শ্রী: আব্দুল হক<br>হুমায়ুন                               | ০১৭১৩৬৬২৫৫০              | ESBD                                                                                                                  | Consultant        |          |
| ৬।                                        | শ্রী: আব্দুল হক<br>হুমায়ুন                               | ০১৭১১৫১০২৭               | হুমায়ুন হুমায়ুন                                                                                                     | হুমায়ুন          |          |
| ৭।                                        | বকতিয়ার                                                  | ০১৪২০ ৬০৭৩৭৩             | শ্রী: জাম হুমায়ুন                                                                                                    | চাকর              |          |
| ৮।                                        | শ্রী: আব্দুল হক হুমায়ুন                                  | ০১৭১২-৩৫৬৭৭              | ৫১                                                                                                                    | চাকর              |          |
| ৯।                                        | শ্রী: আব্দুল হক হুমায়ুন                                  | ০১৪১৬-১৩৭৩<br>৬৫         | শ্রী: আব্দুল হক হুমায়ুন                                                                                              | চাকর              |          |
| ১০।                                       | শ্রী: আব্দুল হক হুমায়ুন<br>হুমায়ুন                      | ০১৭২২০২৩৮২<br>০১৪১৬১৫১৫৫ | শ্রী: আব্দুল হক হুমায়ুন                                                                                              | চাকর              |          |
| ১১।                                       | শ্রী: আব্দুল হক হুমায়ুন                                  | ০১৬৭৪৬৬/৩০               | জামিতি                                                                                                                | চাকর              |          |
| ১২।                                       | শ্রী: আব্দুল হক হুমায়ুন                                  | ০১৭১২৩১৭৫২২              | ৫১                                                                                                                    | চাকর              |          |

উপস্থিতির তালিকা

| সাক্ষাতের স্থানঃ এ্যাসপায়ার ওয়াশিং লিঃ |                            |              |            | তারিখঃ ১৪/০৩/২০২৬ |                                                                                       |
|------------------------------------------|----------------------------|--------------|------------|-------------------|---------------------------------------------------------------------------------------|
| ক্রঃ নং                                  | নাম                        | মোবাইল নং    | গ্রাম      | পেশা              | স্বাক্ষর                                                                              |
| ২২।                                      | Engr. S.M. Satter          | 01628-133934 | Consultant | Engineer.         |    |
| ২৩।                                      | লুৎফুর রহমান               | 01842175564  | কাজি       | চাকরি             |    |
| ২৪।                                      | আলমশাহী                    | 01712-625934 | "          | চাকরি             |    |
| ২৫।                                      | মোঃ আকিম                   | 016-3883053  | "          | চাকরি             |    |
| ২৬।                                      | বাসিম                      | 016035422    | বিমানাণী   | পুলিশ             |   |
| ২৭।                                      | কামরুজ্জামান               | 0184512222   | "          | চাকরি             |  |
| ২৮।                                      | মজিবুল                     | 01626243510  | আমির       | চাকরি             |  |
| ২৯।                                      | জিরাজুল                    | 01747901114  | আমির       | চাকরি             |  |
| ২০।                                      | Engr. Kamal<br>Md. Mostafa | 01712241648  | বিমানাণী   | Business          |  |
| ২১।                                      | মিলন                       | 01743310133  | "          | চাকরি             |  |
| ২২।                                      | মোঃ হুমায়ুন               | 01711909207  | কাজি       | Driving           |  |
| ২৩।                                      | মোঃ বাবুল                  | 0121933332   | "          | চাকরি             |  |

### উপস্থিতির তালিকা

[illegible]

## সংযুক্তি ৪ -

### জনমত যাচাই সভার প্রামাণ্যচিত্র







## **Annex-J: DOE Approved EIA TOR of Aspire Washing Ltd.**

Government of the People's Republic of Bangladesh  
Department of Environment  
Head Office  
Poribesh Bhaban, E-16, Agagaon, Sher-E-  
Banglanagar, Dhaka-1207  
www.doe.gov.bd

Date: 02/03/2026

**Record No:** 22.02.5600.141.072.002.26.1

**Subject: Approval of Terms of Reference (ToR) for the EIA of the Aspire Washing Limited, Sudkhira, Jamirta, Singair, Manikganj**

Reference: Your application received on 23.12.2025

With reference to the subject mentioned above, the Department of Environment hereby gives approval of the Terms of Reference (ToR) for Environmental Impact Assessment (EIA) of **Aspire Washing Limited** at Sudkhira, Jamirta, Singair, Manikganj, subject to fulfilling the following terms and conditions:

- A. The project authority shall conduct a comprehensive Environmental Impact Assessment (EIA) considering the overall activity of the said project in accordance with the ToR submitted to the Department of Environment (DoE). The EIA study shall be conducted as per the provisions laid down in the Environmental Conservation Rules, 2023.
- B. The EIA report shall be prepared in accordance with the guidelines provided in Schedule-11 and Rules-15, 16 of the ECR, 2023.
- C. Multidisciplinary experts are required in the study team to prepare the EIA report.
- D. Consultation with Stakeholders/Public Consultation should be done in accordance with Rule 16 of the Environmental Conservation Rules, 2023.
- E. Hence, the Department of Environment issues additional ToR to include in the EIA as follows:

**Environmental and Social Baseline information should include:**

Project site-specific micro-meteorological data including temperature, humidity, wind speed & direction and rainfall;

Surface water quality of the nearby river/Canal (100 meters upstream and downstream of the discharge point) and other surface drains at 8 locations;

Noise level monitoring at 8 (eight) locations within the study area.

Detailed description of flora and fauna existing in the study area with special reference to rare, endemic and endangered species.

Socio-economic status of the study area.

Methodology for Data Collection:

A one-season (non-monsoon) baseline survey will be carried out for data collection

Sampling locations will be indicated on the location map

The testing methods and instruments to be used shall be clearly specified

**Anticipated Environmental and Social Impacts due to the project shall be identified and assessed for their magnitude:**

Water Quality (Surface & ground water)

Hazardous waste

Noise

Offensive Odor

Flora and fauna

Livelihoods, community health and safety, vulnerable groups and gender issues

**Environmental Mitigation, Management and Monitoring Plan shall include:**

Treatment of wastewater from different plant operations, the recycling and reuse of wastewater for different purposes shall be included. In the EIA report, information regarding ETP and STP should be included following Schedule 12 of the Environmental Conservation Rules, 2023.

**The Occupational Health and Safety Plan should include:**

Details of exposure to specific occupational health and safety hazards;

Plan and fund allocation to ensure the occupational health and safety of all workers;

Annual report of the health status of workers with special reference to OHS.

- F. As per Rule 16 of the ECR'23, a soft copy of the draft EIA report shall be sent to the DoE (mimshameem@gmail.com and nrahmanasif@gmail.com) in order to publish the report on the DoE's website for public comments.
- G. The project authority shall submit the final EIA report to the Head Office of DoE in Dhaka.
- H. Without approval of the EIA report by the Department of Environment, the project authority shall not make any land and infrastructure development.



02-03-2026

Masud Iqbal Md Shameem

Director

222218342

direc@doe.gov.bd

Mr. Kamrul Huq, Managing Director

Aspire Washing Ltd., Sudkhira, Jamirta, Singair, Manikganj-1822

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**Record Number:** 22.02.5600.141.072.002.26.1/1 (1)

**Date:** 02/03/2026

**A Copy for has been sent consideration and necessary (if applicable) action :**

1. Deputy Director, Department of Environment, Manikganj District Office, Manikganj.



03-03-2026

Mia Mahmudul Hoque

Deputy Director

## **Annex-K: Legal Documents**