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Environment and Social Impact Assessment

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Appendix A Climate Change Risk Assessment

Appendix B Stakeholder Engagement Plan

Appendix C Air Dispersion Modelling Settings

Appendix D Critical Habitat Screening

Appendix E Human Rights Impact Assessment

ACRONYMS AND ABBREVIATIONS

Acronyms	Description
AAQS	Ambient air quality standards
ALARP	As low as reasonably practicable
AQIA	Air quality impact assessments
ASRs	Air sensitive receptors
ATSDR	Agency for Toxic Substances and Disease Registry
AZE	Alliance of Zero Extinction
AoI	Area of Influence
As	Arsenic
BIA	Biodiversity impact assessment
CBD	Convention on Biological Diversity
CC	Civil Code
CDC	Centers for Disease Control and Prevention
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CHA	Critical Habitat Assessment
CHS	Community health and safety
CHSMP	Community Health and Safety Management Plan
CH_4	Methane
CIA	Cumulative impacts assessment
CITES	Convention on International Trade in Endangered Species
CO	Carbon Monoxide
COD	Chemical oxygen demand
CR	Critically Endangered
CR	Critically Endangered
CWMP	Construction Waste Management Plan
Cd	Cadmium
Co	Cobalt
CoC	Code of Conduct
Cr	Chromium
Cu	Cooper
DIV-S	Dutch Intervention Values for Soil
EAAA	Ecologically appropriate area of analysis
EBRD	European Bank for Reconstruction and Development
EDI	Electrodeionization

Acronyms	Description
EHS	Environmental Health and Safety
EN	Endangered
EOO	Extent of Occurrence
EP4	Equator Principles version 4
ERP	Emergency response plan
ERSP	Unified Social Protection Register
ESIA	Environmental and Social Impact Assessment
ESLs	Effects Screening Levels
ESLs	Effects Screening Levels
ESMM	Environmental and Social Management and Monitoring
ESMPs	Environmental and social management plans
FGDs	Focus group discussions
FPIC	Free, Prior and Informed Consent
FSR	Feasibility Study Report
GBV	Gender-Based Violence
GBVH	Gender-Based Violence and Harassment
GDI	Gender Development Index
GHGs	Green House Gases
GII	Gender Inequality Index
GIIP	Good International Industry Practice
GM	Grievance Mechanism
GN	Guidance notes
GN	Guidance Note
GRM	Grievance Redress Mechanism
GSNI	Gender Social Norms Index
HCl	Hydrogen chloride
HDI	Human Development Index
HF	Hydrogen fluoride
HR	Human resource
HRIAs	Human Rights Impact Assessments
Hg	Mercury
H_2S	Hydrogen sulfide
IAQM	Institute of Air Quality Management
IBA	International Bird Areas

Acronyms	Description
ICP	Informed Consultation and Participation
IDLH	Immediately Dangerous to Life or Health
IFC	International Finance Corporation
ILO	International Labor Organization
IOM	International Organization for Migration
IUCN	International Union for Conservation of Nature
KBAs	Key Biodiversity Areas
KII	Key Informant Interviews
LC	Land Code
LCP	Local Content Plan
LOI	Loss on Ignition
LOTO	Lockout – Tagout
LPG	Liquefied petroleum gas
MFY	Mahalla Fuqarolar Yig'ini
MIGA	Multilateral Investment Guarantee Agency
MPC	Maximum Permissible Concentrations
MRLs	Minimal Risk Levels
MSW	Municipal Solid Waste
Mn	Manganese
NCDs	Non-Communicable Disease
NH_3	Ammonia
NO_x	Nitrogen oxides
NSRs	Noise Sensitive Receivers
Ni	Nickel
OHS	Occupational health and safety
OTL	Overhead transmission line
PAPs	Project affected people
PAs	Protected Areas
PC	Project Contribution
PCDDs	Polychlorinated Dibenzo-p-dioxins
PCDFs	Polychlorinated Dibenzofurans
PDCA	Plan, Do, Check, Act
PEC	Predicted Environmental Concentration
PM	Particulate matter

Acronyms	Description
PM_{10}	Particulate Matter 10 micrometers or less
$PM_{2.5}$	Particulate Matter 2.5 micrometers or less
POPs	Pollution observation posts
PPE	Personal protective equipment
PS	Performance standard
Pb	Lead
R/R	Receptors / Resources
RO	Reverse osmosis
SDS	Safety Data Sheet
SEAH	Sexual exploitation, abuse and harassment
SEP	Stakeholder Engagement Plan
SIA	Social Impact Assessment
SME	Small and Medium Enterprises
SNCR	Selective Non-Catalytic Reduction
SO_2	Sulfur dioxide
SO_x	Sulfur oxides
SPL	Sound pressure level
SS	Suspended sediments
STIs	Sexually transmitted infections
Sb	Antimony
TCEQ	Texas Commission on Environmental Quality
TEQs	Toxic Equivalents
TOC	Total organic carbon
TP	Total Phosphorus
TSP	Total Suspended Particulates
Tl	Thallium
ToR	Terms of Reference
UDHR	Universal Declaration of Human Rights
UF	Ultrafiltration
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNGPs	United Nations Guiding Principles
V	Vanadium
VECs	Valued Environmental and Social Components

Acronyms	Description
VOCs	Volatile organic compounds
VU	Vulnerable
WBG	World Bank Group
WHO	World Health Organization
WtE	Waste-to-energy

1. INTRODUCTION

1.1 BACKGROUND

SUS Environment (hereinafter as "SUS" or the "Client"), a company specializing in waste-to-energy (WtE) and circular economy practices, has been providing integrated municipal solid waste management services globally since 2014. In 2025, SUS invested in a WtE project (hereinafter as "the Project") in Samarkand, Uzbekistan to promote a cleaner environment and to support Uzbekistan's transition to a green economy.

The Project was established under Presidential Decree No. PP-118, dated March 24, 2025, titled "On measures to implement the investment project 'Production of electrical energy by incinerating solid household waste in the Kashkadarya and Samarkand regions.'"

Located 10 km southwest of downtown Samarkand, Uzbekistan, the Project occupies a total area of approximately 8 ha. The 8-hectare site was a part of the Samarkand City Landfill.

- Samarkand City Landfill, a 98-hectare municipal waste disposal site operational since 1982, originally functioned as an unlined open dump without leachate collection, landfill gas management or seepage prevention systems. The processing capacity of Samarkand City Landfill was 1,200 to 1,300 tons per day in recent years. To improve local solid waste management capacity and mitigate environmental risks, an improving project of Solid Domestic Waste Management System in Samarkand was jointly implemented since 2018 by the European Union (EU), the French Development Agency(FDA) and the Government of Uzbekistan. The project scope of improving project of Solid Domestic Waste Management System in Samarkand covers:
  - The construction of a center for the sorting of solid domestic waste and a standard sanitary landfill of 20 hectares;
  - The environmental closure and rehabilitation of 20-hectare open landfill area;
  - Other areas do not have clear plans for closure and rehabilitation;
  - The construction and upgrading of 200 waste collection points;
  - The procurement of 70 sets of waste collection and earthmoving equipment including refuse trucks, dumper trucks, bulldozers and excavators; and
  - The installation of landfill biogas treatment facilities.

The WTE Project is being developed by a local entity of SUS, "SUS ENVIRONMENT SAMARKAND" FE LLC (the "Project Company"), which comprises of a WtE plant with a treatment capacity of 1,500 t/d and an annual electricity generation capacity of 371.4 million kWh. It further includes a 600m 110-kV transmission line and a 300m 10-kV transmission line for power output and supply, respectively.

SUS has appointed ERM (Shanghai) Limited (hereinafter as "ERM") to undertake an Environmental and Social Impact Assessment (ESIA) for the proposed Project in line with the following standards ("Applicable Standards"):

- Uzbekistan laws, regulations, and standards that pertain to environmental and social issues;
- Equator Principles version 4 ("EP4");
- Multilateral Investment Guarantee Agency ("MIGA") Environmental and Social Performance Standards (2013);
- IFC Performance Standards on Environmental and Social Sustainability (2012);
- World Bank Group Environmental Health and Safety Guidelines ("WBG EHS Guidelines") including General Guidelines, Guidelines for Waste Management Facilities (2007) and Guidelines for Electric Power Transmission and Distribution (2007).

1.2 ESIA OBJECTIVES

The specific objectives of the ESIA study are to:

- Provide a detailed description of the proposed Project (including relevant alternatives) in terms of the planned activities and the expected environmental and social aspects associated with the activities.
- Establish the existing state of the environmental and socio-economic conditions and identify any sensitive resources and receptors.
- Identify and assess the associated and potential environmental and socio-economic impacts and risks of the project, including potential secondary and cumulative impacts.
- Recommend appropriate mitigation measures (adopting the Mitigation Hierarchy, which is a set of guidelines that aim to achieve no overall negative impacts through avoid, minimize, restore and offset sequential steps) to address the identified impacts of the project.
- Develop an appropriate ESMP to detail how mitigation measures will be implemented and how environmental performance will be managed for the project throughout the Project's life.
- Prepare and submit a detailed ESIA Report presenting clear and concise information on the findings of the ESIA study.

1.3 RESPONSIBILITY FOR THE ESIA EXECUTION

The responsibilities of different parties for the ESIA execution are described in ***Table 1-1***.

TABLE 1-1 RESPONSIBILITY FOR THE ESIA EXECUTION

Responsibility	Company Name	Job Description
Project Owner	"SUS ENVIRONMENT SAMARKAND" FE LLC (the "Project Company")	The Project Company will be responsible for the construction of the WtE plant and the transmission line. The Project Company will operate the WtE plant for 30 years. The Project Company is responsible for the land acquisition processes relevant to the project construction and operation.

Responsibility	Company Name	Job Description
Design Institute	Guangzhou WeTech Engineering Co., Ltd.	The designated design institute will be responsible for the Feasibility Study Report ("FSR") and the preliminary design of the Project.
Engineering, Procurement and Construction (EPC) Contractor	Shandong Zijian Construction Group Co., Ltd.	EPC Contractor will be responsible for the design, procurement, construction of the project.
Environmental and Social Consultant	ERM	ERM is a world leading sustainability consulting firm with over 30 years' international experience of undertaking bankable ESIAs to international standards across a wide range of sectors and developments. ERM has a diverse team of 8,000+ world-class experts in over 150 offices in 40 countries and territories. ERM is responsible for legislation and internation standards review, scoping assessment, ESIA reporting.
	"BEZOPASNOST' I KONTROL'" ("BIK")	Established in 2009, BIK has undertaken hundreds of environmental and social related consulting services in Uzbekistan. BIK boasts a team of experienced experts from various fields, including biodiversity, noise, water, air emission and social, enabling them to provide comprehensive solutions to client. BIK is engaged by ERM to conduct environmental and social baseline survey, stakeholder engagement during the scoping and ESIA phases.

1.4 ASSUMPTIONS AND LIMITATIONS

1.4.1 SCOPE OF ACTIVITY

This ESIA report has been informed by desktop studies, ERM scoping site visit between 12 and 15 January, 2026, social baseline survey between 7 and 9 February, environmental baseline survey between 15 March and 15 May, as well as the data and information provided by the Project Company by the time of writing (March 2026). Any future changes to the project description upon which this report is based on, or additional relevant information revealed as project design, equipment and service procurement proceed may affect the analysis, assessment and conclusions contained in this ESIA report.

This report is based upon the application of scientific principles and professional judgment to certain facts. Professional judgments expressed herein are based on the currently available

facts within the limits of the existing data, scope of work, budget and schedule. To the extent that more definitive conclusions are desired by the Project Company than are warranted by the currently available facts, it is specifically ERM's intent that the conclusions stated herein are intended as guidance and not necessarily as a firm course of action, except where explicitly stated as such. ERM makes no warranties, expressed or implied, including, without limitation, warranties as to merchantability or fitness for a particular purpose. In addition, the information provided in this ESIA Report is not to be constructed as legal advice.

1.4.2 LIMITATION OF USE

ERM is not engaged in environmental auditing and reporting for the purposes of advertising, sales promotion, or endorsement of any client's interests, including raising investment capital, recommending investment decisions, or other publicity purposes. The Project Company acknowledges that this report has been prepared for the exclusive use of the Project Company for the Project, and agrees that ERM reports, or correspondence, will not be used or reproduced, in full or in a part, for any other purpose than to demonstrate that the Project Company has conducted an environmental and social impact assessment for the Project, and may not be used or relied upon in any prospectus of offering circular. The Project Company also agrees that none of its advertising, sales promotion, or other publicity matter containing information obtained from this Report will mention or imply the name of ERM.

2. PROJECT DESCRIPTION AND ALTERNATIVES

2.1 OVERVIEW AND LOCATION

The Project site is located adjacent to Samarkand city landfill on an industrial land parcel of 8 ha in Samarkand City, Samarkand Region, Uzbekistan. The Project will use Municipal Solid Waste (MSW) collected from the Samarkand region as the main feedstock and intends to serve the entire Samarkand Region.

As the largest MSW landfill in the Samarkand region, most of the MSW from Samarkand region is originally landfilled at the Samarkand City Landfill and partly at other existing landfills. Once operational, the project will incinerate 1500 tons per day of MSW collected across the Samarkand region for power generation and reduce landfilling.

The local government is responsible for the collection and transportation of MSW, while SUS is responsible for reception of MSW and incineration for power generation.

●

The electricity produced will be connected directly to the national grid at the nearby substation via a 600-m overhead transmission line (OTL). Key design properties of the Project are presented in ***Table 2-1***.

TABLE 2-1 KEY DESIGN PROPERTIES OF THE PROJECT

Item	Value
Waste treatment capacity	1,500 t/d
Total power generation	371.4 million kWh/a
On-grid power generation	328.3 million kWh/a
Annual operation time	8,000 h/a
Design lower calorific value	8,374 kJ/kg

During the scoping site visit, local people expressed serious concerns about the landfill's operations and waste disposal. Scattered MSW was observed around the existing landfill (**-**).

FIGURE 2-1 THE MSW OBSERVED ALONG THE "SAMARKAND HALAQA YO'LI"

Source: ERM Site Visit in January 2026

The power production process includes waste collection, weighing, storage, incineration with heat recovery, power generation, and grid connection (***Figure 2-2***). The typical composition of MSW in cities in Uzbekistan is shown in ***Table 2-2***.

FIGURE 2-2 OVERALL PRODUCTION PROCESS

TABLE 2-2 TYPICAL COMPOSITION OF MSW IN CITIES, BY WEIGHT %

No.	Waste fractions	Season			
		Winter	Spring	Summer	Autumn
1	Paper	20.5	18.3	18.8	18.1
2	Food waste	35.3	36.8	39.2	42.2
3	Wood	4.7	4.2	3	7.8
4	Metal	5.0	3.9	2.2	2.3
5	Textiles	3.7	3.3	3.9	4.3
6	Leather, rubber	2.0	0.7	0.4	0.4
7	Glass	4.7	4.5	0.3	1.9
8	Stones	6.4	10.5	16.8	8.0
9	Other parts, including polyethylene and other plastics	17.7	17.8	15.4	15.0

The collection and transportation of MSW from region to the Project site will be managed by the local government. Upon delivery, SUS will conduct a visual inspection of the incoming MSW and will reject any waste that the Project is not technically suitable for incineration. The treatment of rejected waste will be the responsibility of the local government.

The following categories of waste will not be accepted for incineration by the Project:

TABLE 2-3 NON-ACCEPTABLE WASTE

Category (Basis for Exclusion)	Waste Type / Description
Operational & Technical Constraints	Waste that may damage the grate or boiler during the incineration process
	Automobile shredder residue or other waste containing amounts of heavy metals and/or plastic etc.
	Large automobile vehicle parts, engine blocks and transmissions, agricultural and farm machinery and equipment, marine vessels, trailers and other large machinery, equipment, wire and cable.
	Waste containing ashes, metal furniture, spring mattress, refrigerator, concrete rubble or other non-processable waste
	Building debris, rock, gravel, other earthen materials or other non-combustible waste
	Large non–combustible objects like pieces of concrete
Hazardous Properties	Sludge from decanting and from breakdown of drilling and grinding emulsion, oil saturated earth
	Waste acid, waste alkaline
	Chlorinated hydrocarbons
	Radioactive waste and explosives
	Explosives such as gun powder, gasoline, thinner, light oil, gas bomb or other explosive refuse and chemicals such as poisons or hazardous chemical substances etc.
	Waste containing sparks, like cigarettes firing
Environmental Compliance Risks	Waste containing pollutant contents unsuitable for incineration
	Paint, lacquer, industrial plastics, adhesives, grease, glucose, PVC containers

Category (Basis for Exclusion)	Waste Type / Description
Biological & Sanitary Risks	Surgical and pathogenic waste from hospitals
	Offal from slaughterhouses.
	Waste containing micro-organisms, infectious waste without pre-treatment, human or animal body parts coming from hospital or other bio-hazardous wastes

The nearest residential area, Navruz Mahalla, is 360 m to the northeast of the Project. The nearest surface water body is an irrigation canal originating from the Dargom Canal, which is situated 600 meters to the north of the Project. Agricultural land is present in the vicinity of the Project, including a small farmland located to the north of the Project site with an approximate width of 400 m, and a larger tract of farmland located to the west and east of the Project site, with the closest distance of approximately 1.8 km from the Project site.

FIGURE 2-3 PROJECT LOCATION

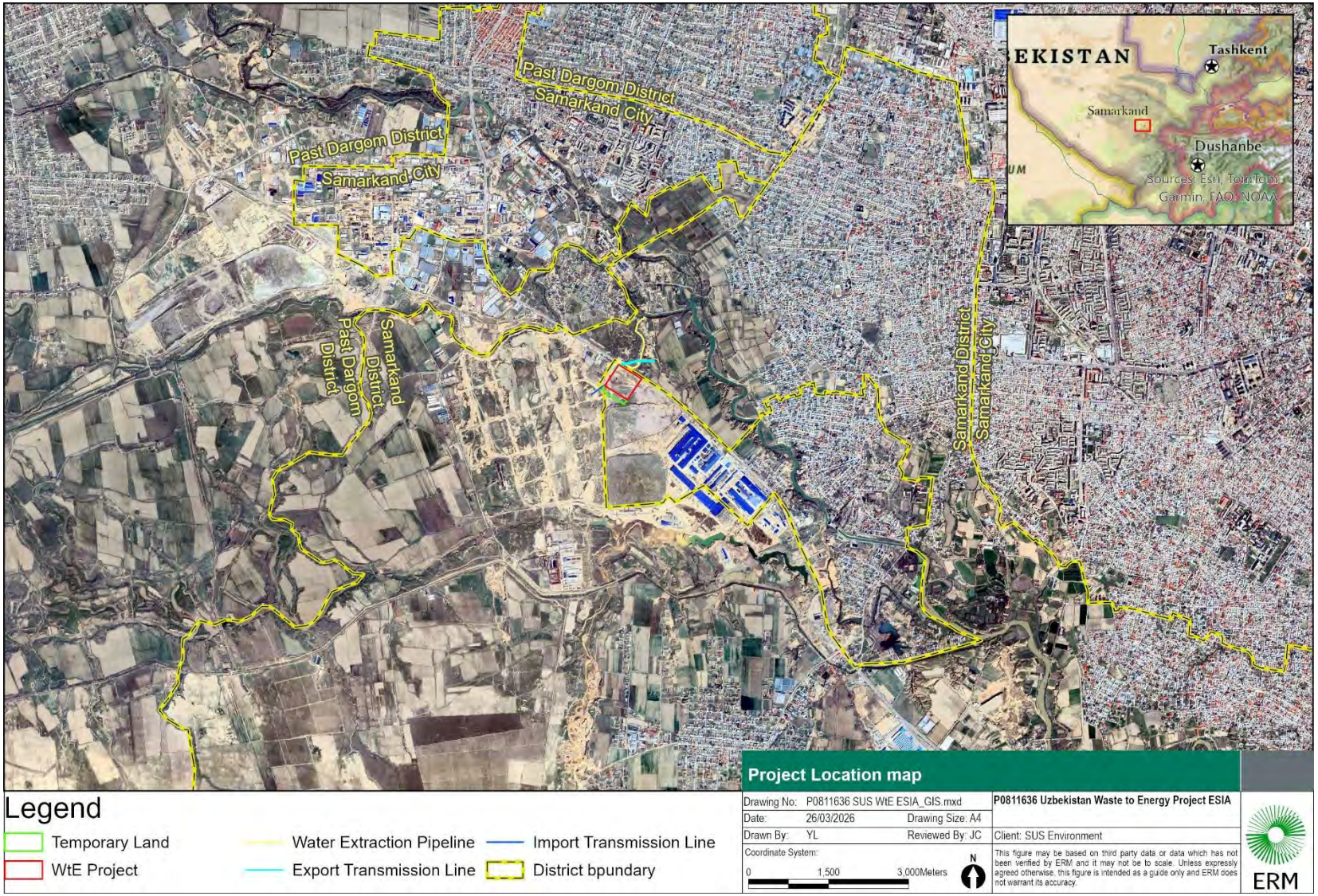


FIGURE 2-4 SURROUNDING CONDITIONS OF PROJECT SITE

Existing land fill (Eastern and Southern of site)

Samarkand Ring Road (Samarkand halaqa yo'li, northern of site)

Project site

Existing road (Western of site)

2.2 PROJECT COMPONENTS

The Project site is divided into three functional zones, including the main production area, the auxiliary production area, and the landscape area.

- The main production area comprises the main workshop, the discharge stack and access ramp. The main workshop includes waste collection hall, waste storage pit, incinerators, flue gas treatment system, waste heat boilers, turbine, generator, fly ash stabilization system, power distribution unit and stacks.
- The auxiliary production area comprises the pump station, combined production and firefighting water tanks, cooling towers, two tank farms (oil and ammonium), water purification stations, wastewater treatment plants, hazardous waste storage room, storage yard of bottom ash and weighbridge.
- The landscape area comprises the administration building and gatehouse.

The Project layout is depicted in ***Figure 2-5***.

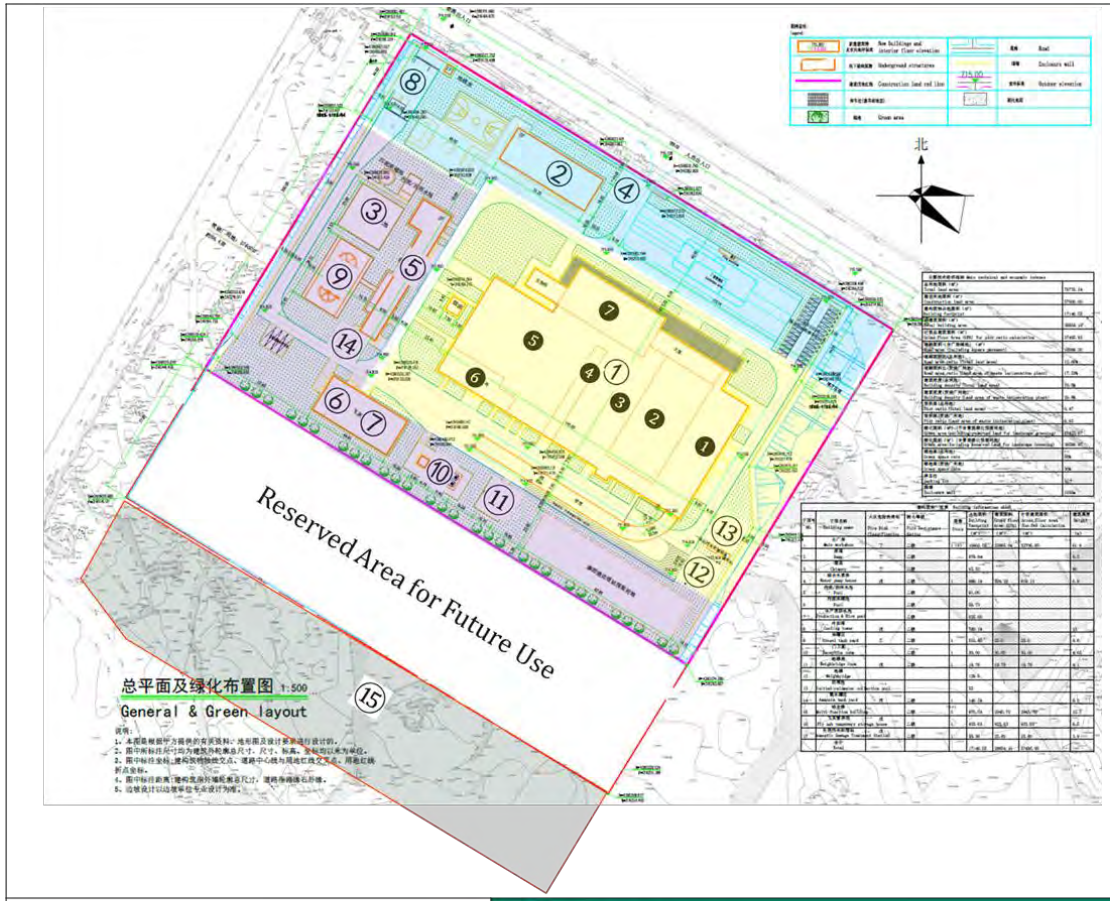
The raw and auxiliary materials to be used for the Project and their consumption are presented in the ***Table 2-4.***

TABLE 2-4 CONSUMPTION OF RAW AND AUXILIARY MATERIALS

No.	Material	Consumption
1.	Municipal Solid Waste	500,000 ton/ year

No.	Material	Consumption
2.	Quicklime	6,750 ton/ year
3.	Activated Carbon	250 ton/ year
4.	Diesel	212 ton/ year
5.	Natural Gas	0.244 million m^3/ year
6.	Lubrication Oil	15 ton/ year
7.	20% Ammonia solution	1,752 ton/ year
8.	Scale Inhibitor	15 ton/ year
9.	Chelating Agent	573 ton/ year

FIGURE 2-5 LAYOUT OF THE PROJECT



① Main workshop:
- ❶ Waste collection hall
- ❷ Waste Storage Pit
- ❸ Incinerators
- ❹ Bottom ash pool
- ❺ Waste gas treatment system
- ❻ Fly ash stabilization
- ❼ Turbine and generator

② Multi-function building
③ Production & fire-fighting pool
④ Reception room
⑤ Water pump station
⑥ Hazardous waste Warehouse
⑦ Fly ash warehouse
⑧ Weighbridge
⑨ Cooling tower
⑩ Diesel tank farm
⑪ Ammonia solution tank farm
⑫ Percolate storage tank
⑬ Domestic sewage treatment station
⑭ Initial rainwater collection pool
⑮ Project Laydown Area and Bottom Ash Laydown Area

Legend

- Main Production Area
- Auxiliary Production Area
- Landscape Area
- Temporary Use Area

Project Location

Date: 11 February 2026	Drawn Size: 21x15 cm	**SUS Uzbekistan Waste to Energy Project**
Drawn by: SX	Reviewed by: MD	
Coordinate System/Source: WGS 1984		Client: SUS Environment

This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

ERM

2.2.1 MAIN WORKSHOP

The main workshop includes waste collection hall, waste storage pit, incinerators, bottom ash pool, waste gas treatment system, fly ash stabilization, turbine and generator.

2.2.1.1 WASTE COLLECTION HALL

The waste collection hall is located within the main workshop and serves as the designated area for waste reception. It has dimensions of 67.75 m × 21 m × 16.5 m (L × W × H), with a ground elevation of +8 m.

Waste transport vehicles, after being weighed at the weighbridge, access the waste collection hall via the access ramp. At the collection hall, the vehicles discharge waste onto an unloading platform. This platform is designed with a 2% lateral slope towards the waste storage pit, allowing leachate generated from the waste trucks to be collected and conveyed into the waste pit.

Five air-tight doors are installed to separate the unloading platform from the main hall, effectively preventing odor and dust from escaping into surrounding areas.

2.2.1.2 WASTE STORAGE PIT

Upon reception at the waste collection hall, the waste is transferred to a semi-underground waste storage pit. The pit covers an area of approximately 1,652 m² (28 m × 59 m) and has a total effective storage volume of around 21,476 m³, which corresponds to a maximum storage capacity of approximately 9,664 tons of waste. This is equivalent to around 6.4 days of plant operation at the design capacity.

Within the pit, the waste undergoes mixing, turning, and partially dewatering. During storage, the moisture content of the waste is naturally reduced through drainage. Leachate generated from the waste percolates through drainage openings at the bottom of the pit and is collected in a leachate collection sump located beneath the waste pit at the bottom of pit. The collected leachate is then conveyed to a leachate storage tank for temporary storage before being sent for incineration together with MSW.

Both the waste storage pit and the leachate collection sump are constructed using C40 concrete with impermeability grade P8 and incorporate an integrated anti-seepage layer to ensure hydraulic integrity. The anti-seepage lining includes: 1) a 1 mm cementitious crystalline layer on the pit interior, with a 1.5 mm polyurethane membrane at the bottom of waste storage pit; and 2) two layers of SBS modified asphalt membranes with 3mm and 4mm on the exterior of waste storage pit. The permeability coefficient of the linings will be no greater than 1.0×10^{-11} cm/s, ensuring effective prevention of leachate seepage.

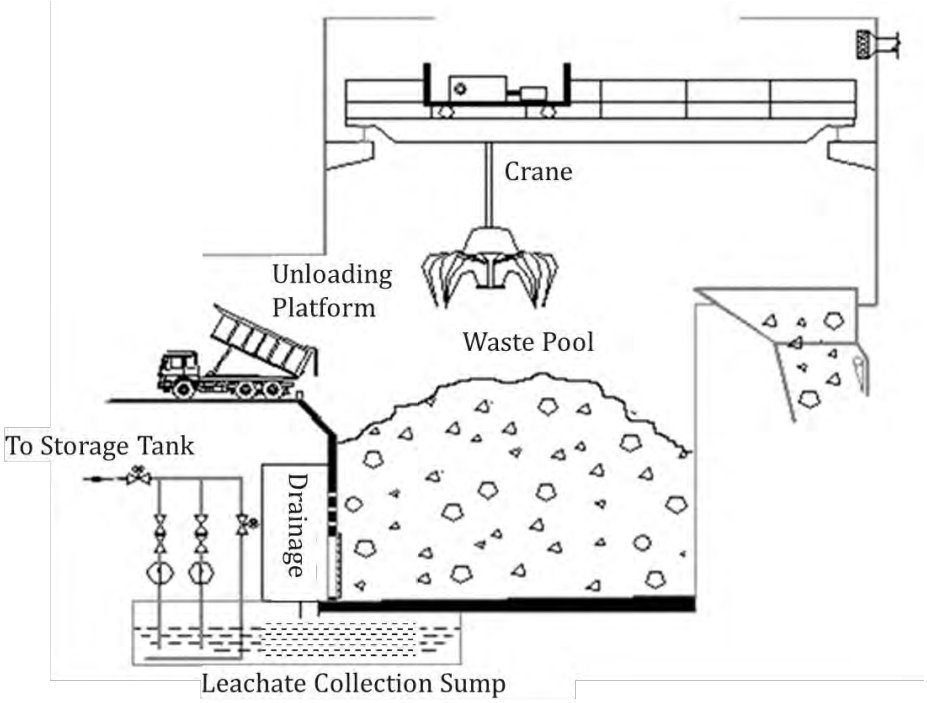
A liquid level monitoring system, together with toxic gas detectors for hydrogen sulfide (H_2S) and ammonia (NH_3), will be installed in the leachate collection sump to provide early warning in the event of abnormal leachate accumulation or leakage.

The waste storage pit is fully enclosed to prevent the uncontrolled release of odorous and potentially hazardous gases generated by the degradation of organic matter, such as hydrogen sulfide (H_2S), ammonia (NH_3), and methane (CH_4), into the ambient environment. The pit is operated under negative pressure, and the extracted gases are directed to the incinerator, where they are utilized as primary combustion air.

The leachate storage tank is located outdoors to the northeast of the main workshop. It is aboveground with a storage capacity of 720 m^3. Drainage ditches are installed around the tank, which are connected to the equalization basin with a capacity of 24 m^3. In addition, leachate transfer pumps are installed near the tank. In the event of an accident or significant leakage, the leachate can be diverted to leachate collection sump and waste storage pit.

Two overhead cranes are installed above the waste pit to handle the waste and feed it continuously into the incinerators.

FIGURE 2-6 THE ILLUSTRATION OF WASTE STORAGE PIT



2.2.1.3 INCINERATORS

The Project is equipped with two incinerators, each with a treatment capacity of approximately 750 tons of waste per day. Each incinerator comprises two main combustion zones, namely a primary combustion zone and a secondary combustion zone.

The secondary combustion zone is operated at a temperature of not less than 850°C, with a residence time of at least 2 seconds, to ensure the effective decomposition of toxic and persistent organic pollutants, including dioxins, furans, and other hydrocarbon compounds.

The flue gas, which contains particulate matter, acid gases (such as nitrogen oxides (NO_x), sulfur oxides (SO_x), hydrogen chloride (HCl) and hydrogen fluoride (HF)), heavy metals, and residual organic compounds, will be treated by the air pollution control system prior to discharge to the atmosphere.

Other components of MSW which have not been combusted are discharged from the bottom of the incinerator chambers and conveyed to a bottom ash remove system. The bottom ash is quenched with water and temporarily stored in the bottom ash yard prior to further utilization.

Diesel fuel and natural gas will be used primarily for initial start-up and to support combustion when the calorific value of the waste is insufficient.

The design capacity for leachate incineration is 4 m^3/h per incinerator.

Table 2-5 summarizes main parameters of a typical waste incinerator.

TABLE 2-5 MAIN PARAMETERS OF WASTE INCINERATOR

No.	Parameter	Value
1.	Single unit disposal capacity of incinerator	750 tons/day
2.	Disposal capacity of incinerator during overload operation	825 tons/day
3.	Annual design working hours of incinerator	8,000 h
4.	Retention time of flue gas in combustion chamber	⩾ 2s
5.	Temperature of flue gas at the exit of combustion chamber	850°C
6.	Minimum low heat value of waste without auxiliary fuel to ensure stable combustion of waste	8,374 kJ/kg
7.	Loss on Ignition (LOI) of Incinerator Bottom Ash	⩽ 5%

2.2.1.4 FLUE GAS TREATMENT SYSTEM AND STACKS

The flue gas primarily contains particulate matter, acidic gases (NO_x, SO_2, HCl, HF), heavy metals (e.g., Hg, Pb, Cd), and trace toxic organic compounds such as dioxins (PCDDs) and furans (PCDFs). The project will employ two comprehensive flue-gas treatment systems comprising Selective Non-Catalytic Reduction (SNCR) for NOx control, a dry desulfurization process, activated-carbon adsorption for the removal of heavy metals and residual PCDDs/PCDFs, and bag filters for particulate-matter removal.

Following treatment, the flue gas will be discharged via a single 80-meter clustered stack with an outlet measuring 8.2 meters by 7.8 meters. The clustered stack is composed of two individual stacks, each flue-gas treatment system and stack serving an incinerator.

2.2.1.5 WASTE HEAT BOILERS

The flue gas leaving the incineration chambers at approximately 850°C is directed to the boilers for steam generation. The Project is equipped with two boilers, each with a steam generation capacity of 93.4 tons per hour. The boilers produce steam at an average pressure of 13.5 MPa and a temperature of approximately 450°C. After heat exchange within the boilers, the flue gas temperature decreases to around 130°C.

2.2.1.6 TURBINE AND GENERATOR

The generated steam is then conveyed to steam turbine to produce mechanical energy, which is subsequently converted electricity by the generator.

The Project is equipped with one 50 MW steam turbine and one 50 MW generator, with the generator rated at 10.5 kV. Key parameters of the turbine generators are presented in ***Table 2-6.***

TABLE 2-6 KEY PROPERTIES OF THE TURBINE AND GENERATOR

No.	Parameter	Value
1.	Capacity	50 MW
2.	Speed of rotation	5,000/300 rpm
3.	Flow	186.8 h
4.	Power factor	0.8
5.	Voltage	10.5 kV

The steam flow after rotating the turbine will be cooled down and condensed to water at the condensers. The condensed water will then be heated at low pressure before being recirculated back to the boilers.

2.2.1.7 FLY ASH STABILIZATION SYSTEM

The fly ash generated from the incineration process will be collected and temporarily stored in two fly ash silos located within the main workshop. Each silo has a storage capacity of 180 m³, which is equivalent to three to five days of plant operation at design capacity.

The fly ash will then be conveyed to a mixer, where it will be blended with water and a chelating agent to produce a slurry. The chelating agent reacts with the heavy metals in the fly ash to form stable chelates, thereby reducing their toxicity and mobility. Following stabilization, the slurry will be solidified and molded using a solidification molding machine, stored at the temporary storage area, and subsequently transported to the local landfill for final disposal.

The annual quantity of fly ash generated is estimated at 19,162 tons, which increases to approximately 23,489 tons per year after stabilization.

2.2.1.8 POWER DISTRIBUTION UNIT AND TRANSMISSION LINE

The electricity generated by the Project will be transmitted to an existing 110kV transmission line. A power distribution unit is installed within the Project site. One 63 MVA main transformer will step up the voltage from 10.5 kV to 110 kV and facilitate the transfer of electricity to the transmission line. The 100kV transmission line extends 659 m in total, comprising a 154 m underground segment and a 505 m overhead section supported by four towers (20–30 m in height), connecting the project's step-up station to the existing transmission line.

2.2.2 AUXILIARY FACILITIES

2.2.2.1 WATER SUPPLY SYSTEM

During the operations, the nearby Dargom Canal will serve as the main water source. A water

intake pump will be installed adjacent to the canal. After being extracted from the Dargom Canal, the raw water will be pumped and conveyed to the Project site via a 1 km pipeline. The pipeline alignment is shown in ***Figure 2-3***. Both open-cut excavation and pipe-jacking methods will be used for the pipeline installation.

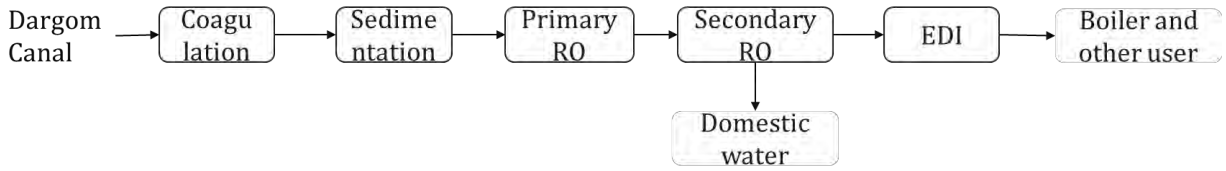
A water extraction permit has been issued by Ministry of Water Resources of the Republic of Uzbekistan, approving a maximum abstraction volume of 1.64 million m³/yr.

The raw water will be treated before being supplied for production and domestic purposes. The Project will be equipped with two water purification stations, each with a treatment capacity of 175 t/h, operating in a one-duty-one-standby configuration. The purification process includes coagulation and sedimentation. A 1,900 m^3 combined production and firefighting water storage tank will be installed.

For boiler use, makeup for steam loss and SNCR etc., the above filtered water will be further treated in two demineralization systems, each with a capacity of 20 m^3/h. The boiler feed water treatment system includes a two-stage reverse osmosis (RO) system followed by an electrodeionization (EDI) process.

Domestic water is extracted from the RO section of the demineralized water treatment system. An 18 m^3 water tank will be installed to store domestic water before distribution. The water tank will be constructed by C30 concrete with a water permeability resistance class of P6.

FIGURE 2-7 KEY PROCESSES OF THE WATER PURIFICATION



2.2.2.2 POWER TRANSMISSION AND TRANSFORMATION SYSTEM

The electricity during the construction phase will be provided by the municipal grid.

The project uses 15% of self-generated electricity for normal operations and transforms the remaining 85% to the municipal grid. The substation and transmission line (about 600 m with 4 towers) is a part of the project.

A 300 m overhead transmission line with a voltage of 10 kV, approximately 8 m in height, from the municipal substation in the southwest to the site and to the substation in the construction camp have been commissioned. The temporary power supply system for construction phase will serve as backup power during operation phase.

2.2.2.3 COOLING TOWERS

Two cooling towers, each with a circulation capacity of 5,550 m³/h, are installed to cool water from the condensers and other auxiliary equipment. The cooling water is circulated within a closed-loop system, while a regular make-up water supply of 3,803 m³/d is required to compensate for evaporative loss, drift, and blowdown.

The inlet temperature of water entering the cooling towers is approximately 41.5 °C, and the cooled water is discharged at around 33 °C. The water tank of cooling tower will be constructed by C30 concrete with a water permeability resistance class of P6.

2.2.2.4 WASTEWATER TREATMENT PLANTS

- Construction phase

Domestic sewage will be transported by tanker trucks to off-site treatment facilities, where it is treated and discharged. No wastewater will be discharged into Dargom Canal.

- Operation phase

Domestic water, wastewater from lab, initial rainwater and the floor flushing water will be treated by WWTP 1, with a capacity of 48 m^3/d. The treatment process consists of bar screening, equalization, anoxic treatment, aerobic treatment, ultrafiltration, active carbon filtration and disinfection. The treated effluent will be reused as make-up water for the cooling towers, landscape water and road sprinkling water.

The blowdown water generated by the cooling towers will be treated by WWTP 2, with a capacity of 450 m^3/d. The treatment process consists of equalization, sedimentation, filtration, ultrafiltration, and RO. The treated effluent will be reused as make-up water for the cooling towers, while the concentrated brine will be reused for the bottom ash conveyor quenching.

The receiving tank and other structures of WWTP will be constructed with C40 concrete of impermeability grade P8.

2.2.2.5 TANK FARMS

There are three tank farms within the Project site: one for diesel storage, one for ammonia storage and the other for leachate storage.

- Diesel tank

The underground diesel storage area is enclosed by a 416 m^3 containment dike and accommodates two 45 m^3 diesel tanks. The volume of containment dike is more than 110% of the volume of a single diesel tank. The tanks are fully covered with compacted sand soil for secondary containment and fire protection.

The anti-seepage system comprises the following components, arranged from interior to exterior: 1) 1 mm cementitious crystalline waterproofing layer; 2) 2 mm epoxy resin coat and Fiberglass reinforced plastic; 3) 350 mm structural wall of C40 concrete with impermeability grade P8; and 4) 2 mm polyurethane waterproof membrane. The permeability coefficient of the linings will be no greater than 1×10^{-11} cm/s.

- Ammonia tank

20% ammonia is stored in a 40 m^3 aboveground tank, which is installed within a containment bund measuring 10.6 m × 10.7 m with a height of 1 m. The containment bund provides a total containment capacity of 113.4 m^3, sufficient to retain more than 110% of the tank volume.

The containment bund is sealed with a 1.5 mm polyurethane waterproof coating. The permeability coefficient of the linings will be no greater than 1×10^{-11} cm/s.

Ammonia tank is covered by a protective canopy.

- Leachate storage tank

The leachate storage tank is located outdoors to the northeast of the main workshop. It is aboveground with a storage capacity of 720 m^3. Drainage ditches are installed around the

tank, which are connected to the equalization basin with a capacity of 24 m^3. In addition, leachate transfer pumps are installed near the tank. In the event of an accident or significant leakage, the leachate can be diverted to leachate collection sump and waste storage pit.

The containment bund is sealed with a 1.5 mm polyurethane waterproof coating. The permeability coefficient of the linings will be no greater than 1×10^{-11} cm/s.

2.2.2.6 LABORATORY

The Project is equipped with an on-site laboratory responsible for routine analysis of water and steam, municipal waste.

Water and steam testing covers raw water, wastewater, demineralized water, with key parameters such as COD, BOD_5,TP and SS.

Waste analyses include Loss on ignition (LOI).

2.3 PROJECT ACTIVITIES

2.3.1 CONSTRUCTION ACTIVITES

The construction phase primarily includes the following activities:

- Land use permit processing
- Transportation of construction materials
- Clearance of the Project area and site formation
- Construction of WtE Plant, transmission line, water supply system
- Presence of workforce (residing in the temporary worker camps)
- Presence of security personnel
- Procurement of goods and services
- General utility supply

2.3.2 OPERATION ACTIVITIES

The Project Company plans to commence operation for 30 years starting from 2027. The planned and potential unplanned events that could give rise to environmental and social impacts are as follows:

- Transportation of chemicals and waste
- Presence and operation of WtE Plant (excluding transmission Line, water supply system)
- Presence and operation of Transmission Line
- Presence of Workforce
- Presence of security personnel
- Procurement of goods or services
- General utility supply (including water supply system)

Potential unplanned events include:

- Fire accident and explosion
- Spill and leak of chemical (including on-site and during transportation)
- Traffic accidents

2.4 AREA OF INFLUENCE

The Project's Area of Influence (AoI) is defined as the area where the planned Project activities will take place (project site and immediate surroundings) and a wider area likely to be vulnerable to direct and indirect impacts on the natural and human environment. The AoI varies according to Project activities and environmental and social subjects. ***Table 2-7*** describes the Project's AoI.

TABLE 2-7 PROJECT AREA OF INFLUENCE

Type	Construction Phase	Operation Phase
Air Quality	350 m from the boundary of the Project construction sites (including WtE plant, OTL and water supply system)	10 km from the boundary of the WtE plant
Noise	500 m from the boundary of the Project construction sites (including WtE plant, OTL and water supply system)	500 m from the boundary of the WtE plant and pump station
Soil	The boundary of the Project construction sites (including WtE plant, OTL and water supply system)	1000 m from the boundary of the WtE plant
Groundwater	Underlying aquifer of Project area	
Biological Environment	500 m from the boundary of the Project construction sites (including WtE plant, OTL and water supply system)	3 km from the boundary of the Project components (including WtE plant, OTL and water supply system)
Socio-Economic	A radius of 2 km around the Project to capture communities that may be affected by direct and indirect impacts from Project activities or have interactions with the Project, including Dostlik MFY[1], Navruz MFY, Sakhovat MFY, Urta Turkman MFY, Yoslik MFY, and Kamolat MFY.	

2.5 PROJECT SCHEDULE

The construction work of the Project commenced in July 2025 and will be expected to last for approximately 24 months. The Project plans to be put into operation in July 2027.

Site leveling, pile driving and concrete work have been completed, and above-ground works are currently underway.

2.6 RESOURCE REQUIREMENT

2.6.1 PROJECT WORKFORCE

Direct Workforce

[1] The full spell of MFY is "Mahalla Fuqarolar Yig'ini", which is the self-governing community institution, combining traditional neighborhood solidarity with official local administrative functions.

The Project's construction commenced in July 2025 and is expected to be completed by June 2027. During the construction phase, around 24 direct employees of the Project Company work onsite, including 4 Uzbeks and 20 Chinese nationals. Direct workers will live in camps provided by the Project Company within the Project site. Local Uzbek workers can choose to return home for accommodation. The Project Company provides bus transport to site for workers.

During the operation phase, the number of Project's direct workforce is planned to increase to around 64 direct employees and 20 to 30 contracted workers such as cleaners and security guards. The overall employment strategy will follow a phased transition approach: a higher proportion of Chinese staff will be deployed at the initial stage of operations, with local employees gradually taking over the roles and responsibilities of Chinese staff in the subsequent phases until the localized staffing is fully realized. The organization structure will remain consistent with construction phase including the General Business Department, Finance Department, EHS Department, Production Preparation Department, and Engineering Department. The Project will provide the dormitory and a canteen for the workers.

Regarding the working hours, for the operation phase, the staffing follows the mode of four-shift allocation with three-shift operation for frontline operational staff, with each shift lasting 8 hours; administrative and management personnel shall work a standard 8-hour workday.

Contracted Workforce

The Project will engage an EPC contractor during the construction phase. The peak number of contracted workers during the construction phase is expected to be around 400, with no more than 50% being Chinese nationals and over 50% of the workforce will be Uzbek nationals.

The Project will provide on-site dormitory accommodation for contracted workers by constructing a dedicated construction camp. The total floor area of the workers' residential zone will be 20,000 square meters, which can accommodate approximately 400 people, with 2 to 4 workers sharing one room. The contracted workers who reside in the construction camp can walk to the construction site. The Project's camp area will also be equipped with amenities, including a retail store, a communal bath, centralized hot water supply, a smoking area, and a coffee break room. The local Uzbek workers can choose to return home for accommodation. No information related to any provision of transportation for local workers who commute from home to the Project site.

Construction workers will work from 7:00 to 18:00 daily. Workers will typically work 8 hours per day.

Security Personnel

During the construction and operation phase, the Project's security personnel will be provided by the local security companies. During the construction phase, 4 security personnel will be employed. This number will increase to 6 to 10 security personnel during the operation phase. Security personnel will not carry firearms but will be equipped with shields and rubber batons.

2.6.2 LAND

The Project will occupy state-reserved land of approximately 10 ha. It includes 8 ha to be used for the WtE plant (8 ha), which will be leased for 30 years from the government. In addition, the Project will also occupy a Project Layout Area of 1 ha for temporary use during the construction phase and Bottom Ash Laydown Area of 1 ha for temporary use during the initial

stage (approx. 1 year) of operation phase. According to the confirmation from the Samarkand City Cadastral Department, the 10 ha land has been state-reserved land in the past 10 years with no land users.

In addition, the 600m-long overhead transmission line will build four tower foundations with each occupying ~36 m^2 of land. The sum of land for tower foundations is ~144 m^2. The overhead transmission line requires the establishment of servitude with an overall corridor width of approximately 25 m, plus a horizontal safety distance of 10 m measured from the outer edge of each side of the conductors. Within the servitude area, land use shall be controlled, and crop or vegetation height shall be managed to ensure a minimum vertical clearance of 4 m from the conductors, while permanent structures and high-growing vegetation are prohibited. The area of the transmission line is state-reserved unused land.

A pump station will be constructed near the Dargom Canal to supply fresh water during the operational phase of the project. An approximately 1km long pipeline will be installed between the pump station and the Project site to convey the required water. Both the pump station location and the pipeline route are situated on state-reserved unused land.

The pipeline will be buried at a depth of not less than 1 meter. During construction, temporary land occupation will be required for trench excavation, pipe laying, backfilling, and subsequent reinstatement of the surface. Once construction is completed and the land is restored, no long-term impacts on land use are expected. The pump station itself will require long-term land leasing for its construction and operation.

The following table shows specific land use of the Project.

TABLE 2-8 PROJECT LAND USE

Land Use Category	Item	Area	Land Use Method	Current Land Use
Long-term Land Lease	WtE Plant	~8 ha	Land lease from the government for 30 years	Fenced for Project construction. Unused state-reserved land prior to Project construction.
	Transmission Line Tower Foundation	~144m^2 (0.0144 ha)	TBD	Unused state-reserved land
	Pump water station	~54 m^2 (0.0054 ha)	TBD	Unused state-reserved land
Temporary Land Use	Temporary Laydown Area	~1 ha	Land lease from the government until 30 days after Project	Unused state-reserved land

Land Use Category	Item	Area	Land Use Method	Current Land Use
			Commercial Operation Date[2]	
	Project Bottom Ash Laydown Area	~1 ha	Land lease from the government for 30 years	Unused state-reserved land
	Construction of the water pipeline	Approximately 0.3 ha	TBD	Unused state-reserved land

2.6.3 POWER SUPPLY

Construction phase: The electricity during the construction phase will be provided by the municipal grid. The total electricity consumption during construction phase is 2.62 million kWh.

Operation phase: The Project will use self-generated electricity during the operation phase. No external power supply is needed under normal conditions. The temporary power supply system for construction phase will serve as backup power during operation phase.

The energy required by the Project during the construction and operation is summarized in the table below.

TABLE 2-9 ENERGY CONSUMPTION

Type	Construction	Operation
Electricity	2.62 million kWh during the whole construction phase (from grid)	43.1 million kWh/yr (self-generated)

2.6.4 WATER SUPPLY

Source:

During the construction phase, groundwater is used for building maintenance and toilet flushing, etc. Purchase water that can meet the SanPiN RUz No. 0083-24 from external supplier for dust suppression. Bottled Drinking water is sourced by local suppliers during construction phase.

During the operation phase, the nearby Dargom Canal will be used as water source.

Water Consumption during Construction:

24,000 t during the whole construction phase.

[2] In accordance with the Land Lease Agreement relating to 1,500 ton-per-day Waste-to Energy Plant in the Samarkand Region between Waste Management and Circular Economy Development Agency under the Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan as Lessor and "SUS ENVIRONMENT SAMARKAND" FE LLC as Lessee, dated 30 June 2025.

Domestic sewage will be transported by tanker trucks to off-site treatment facilities, where it is treated and discharged. No wastewater will be discharged into Dargom Canal.

Water Consumption during Operations: The Project expects to consume about 3,311.1 m^3/d, of which 3,279.5 m^3/d is for production use and 31.6 m^3/d is for domestic use, based on the annual average meteorological conditions. The water will be taken from two main sources:

- Surface water from Dargom Canal: about 3,153.8 m^3/d (annual average).
- Recycled water from the water purification stations: about 157.3 m^3/d (annual average).

The water balance during operational phase diagram is shown in the ***Figure 2-8.***

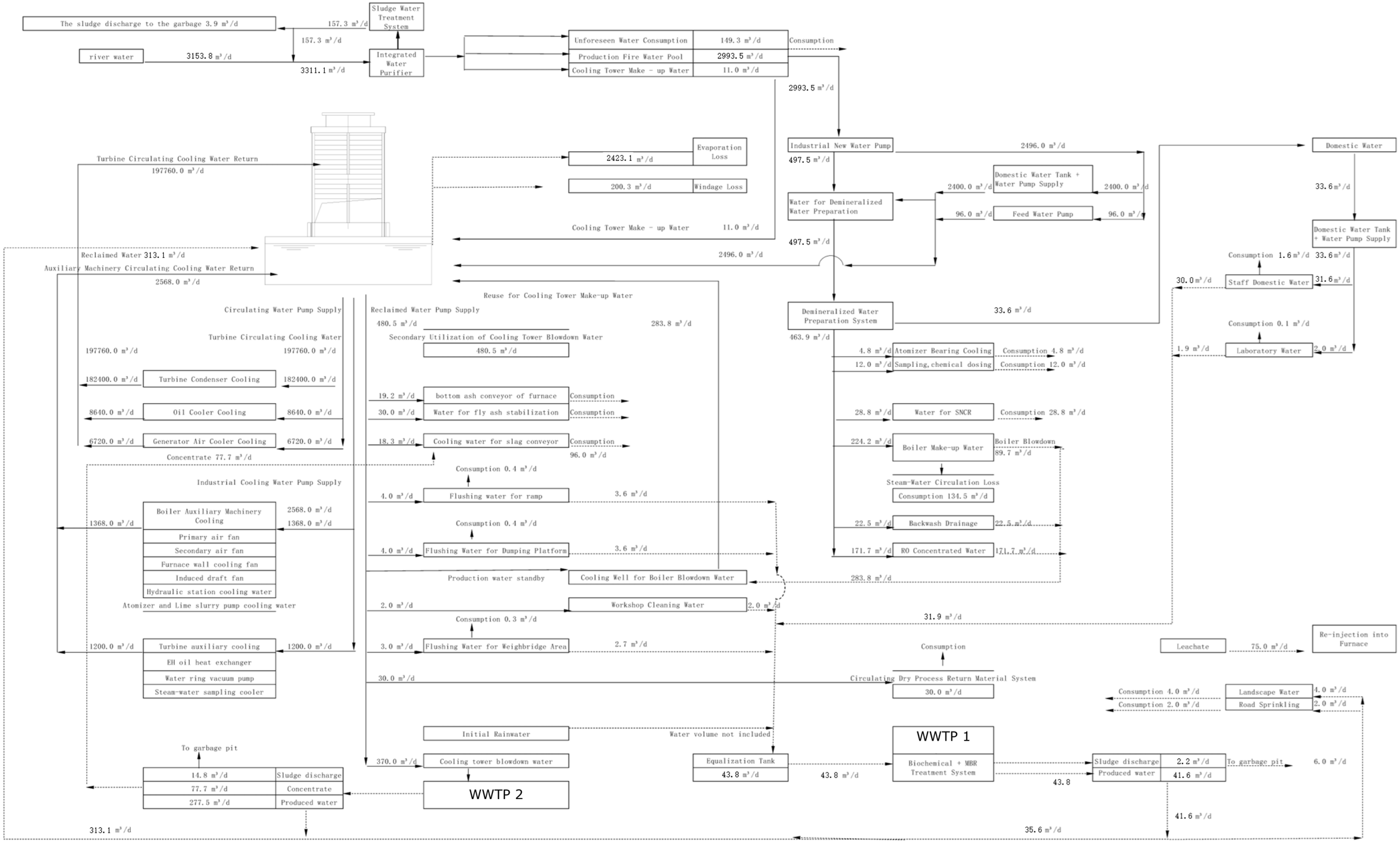
The Project adopts a zero-discharge strategy. Wastewater generated from production or domestic activities will not be discharged into any open water body, onto the ground surface, or into the municipal sewer network. Instead, all wastewater will be treated onsite and subsequently reused.

Cooling water for the turbine condenser, oil cooler, generator and other auxiliary equipment is circulated in the closed loops and is not discharged. The cooling tower is regularly replenished with 5,671.9m^3/d, with a loss of water of 2,623.4 m^3/d. The effluent from cooling tower (370 m^3/d) is treated by WWTP 2 and reused onsite.

Other wastewater sources include domestic sewage, laboratory effluent, boiler blowdown, backwash effluent from the demineralization system and floor-washing water. All of this wastewater stream (43.8 m^3/d) is treated by WWTP 1 and reused onsite.

The reclaimed water is utilized for bottom ash quenching (37.5 m^3/d), fly ash stabilization (30 m^3/d), floor washing (13 m^3/d), and air pollutant control system (30 m^3/d). Any remaining reclaimed water is supplied as makeup water for the cooling tower.

FIGURE 2-8 WATER BALANCE DIAGRAM



2.6.5 PROJECT ACCESS ROAD

The Project will use the local public road "Samarkand Halaqa Yo'Li" as the main access road for the Project's construction and future operation of garbage trucks. Besides the Project site, the road also connects the Samarkand metallurgical plant and local mahallas such as Chilquduk MFY and Yoshlik MFY. The road is a four-lane, two-way cement-paved road, with concrete bollards installed along the median as physical separation. The ***Figure 2-9*** shows the access road.

FIGURE 2-9 PROJECT'S ACCESS ROAD

2.7 CONSIDERATION OF ALTERNATIVES

The key alternatives considered for the Project are as follows:

2.7.1 NO PROJECT ALTERNATIVE

The option to not proceed with the Project will result in the proposed project area remaining in its current environmental condition. No action alternative entails no change to the status quo, in other words, the plant construction and equipment installation activities will not be conducted. While this scenario would avoid direct environmental and social impacts associated construction impacts, combustion emissions, ash generation, and technology/operational risks, it would also forgo a range of strategic national and local development opportunities, as outlined below:

- **Alignment with the National and Regional Policy:** According to Uzbekistan issued Presidential Decrees UP-56 and PQ-118 in March 2025, the project serves as one of the eight officially approved large-scale waste-to-energy plants nationwide. Waste-to-energy is classified as a low-carbon renewable energy sector to cut reliance on fossil fuels and complies with *Uzbekistan 2030 Development Strategy* which prioritizes circular economy and green energy transition.
- **Impacts on Local Development:** By attracting foreign investment, generating local jobs, providing reliable utilities, the project acts as a catalyst for achieving the

development goals. Municipal solid waste is mainly managed through landfilling in Samarkand region, which faces several significant challenges, including large land requirements, risks of air, soil, and groundwater pollution, and strong public opposition. By diverting waste from landfills and generating energy, the Project aims to promote a cleaner environment, boost the local economy and provide abundant and stable power supply.

- **Environmental and Social Considerations**: The project is designed to incorporate environmental and social management and mitigation measures to reduce its adverse impact and operate within regulatory thresholds. Air emissions are controlled under EU standards and wastewater are 100% recycled, making the Project more eco-friendly.

In summary, while the no-project scenario would avoid specific site-level impacts, it would also result in missed opportunities to strengthen regional industrial capacity and generate employment. Given the project's strategic alignment with national policy and local development objectives, and the planned application of environmental and social safeguards, project implementation is considered preferable to the no-project alternative.

2.7.2 SITE SELECTION

The selection of the Project involved a thorough evaluation of alternative locations based on engineering, environmental and social considerations. During the feasibility study, SUS and Uzbekistan's Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) discussed WTE site selection. SUS suggested the site selection should consider four criteria: (1) proximity to an existing road for MSW transport; (2) proximity to a water source, given the project's high-water demand; (3) adjacency to existing power transmission lines for efficient energy export; and (4) exclusion from ecological protection areas.

The final decision is supported by the following reasons:

- **Avoidance of biodiversity and social sensitive area:** There are no Key Biodiversity Areas (KBAs) or Protected Areas (PAs) within a 10 km radius of the Project site, which reduces potential impacts on biodiversity or conservation zones. The site also avoids cultural or historical landmarks, further minimizing potential social impacts. The site is located on modified habitat, avoiding natural habitat loss.
- **Minimizing environmental impacts:** The Project site is located approximately 400 m from the existing transmission line and about 600 m from irrigation river of the Dargom Canal. No residential areas are situated within 700 m downwind of the site in the prevailing wind direction (east to southeast); the nearest residential area is approximately 360 m from the site, located laterally to prevailing wind direction. This proximity minimizes the need for long transmission lines and water pipelines, thereby reducing land disturbance, habitat fragmentation, and associated environmental impacts.
- **Proximity to the existing landfill:** The Project site is located adjacent to an existing landfill. As the largest MSW landfill in the Samarkand region, most of the MSW from Samarkand region is originally landfilled at the Samarkand City Landfill and partly at other existing landfills. Once operational, the project will incinerate 1500 tons/day of MSW collected from Samarkand region, replacing landfilling. Consequently, MEEPCC strongly recommended siting the WTE facility adjacent to Samarkand City Landfill, ensuring

minimal change to MSW transport volumes in the surrounding area and the existing MSW collection system.

Based on the above criteria, MEEPCC intended the site should be close to Samarkand City Landfill and proposed the project site. After an initial assessment by SUS, the site could meet the main selection criteria mentioned above. Both parties finally agreed on the project location.

The project's exterior facade has been thoughtfully designed to harmonize with the surrounding buildings' architectural character.

2.7.3 TECHNOLOGY SELECTION

2.7.3.1 INCINERATION TECHNOLOGY

Municipal solid waste (MSW) incineration technologies generally include several types, such as mechanical grate furnaces, fluidized-bed incinerators, rotary kiln incinerators, and pyrolysis–gasification systems. The principle of each incineration technology is outlined as follows:

Mechanical grate furnace: Mixed MSW is fed onto a moving grate where it undergoes drying, ignition, combustion, and burnout in sequential zones.

Fluidized-bed incinerator: Waste (typically pre-treated) is mixed with a bed material (e.g., sand) and combusted in a fluidized state.

Rotary kiln incinerator: Waste is slowly tumbled and combusted in a rotating refractory-lined kiln, followed by a secondary combustion chamber.

Pyrolysis–gasification system: Waste undergoes thermal decomposition under low-oxygen or oxygen-free conditions, generating syngas for secondary combustion.

The comparison between incineration technologies is summarized in the ***Table 2-10***.

Given the technology's maturity, wide application, stable operation and low operational cost, mechanical grate furnaces are adopted by the Project.

TABLE 2-10 COMPARISON OF MSW INCINERATION TECHNOLOGIES

Technology	Feedstock Compatibility	Advantages	Limitations
Mechanical grate furnaces	**High** — Suitable for mixed MSW with high moisture content and without pre-treatment.	• Most mature and widely adopted technology globally. • High operational stability and tolerance to heterogeneous waste composition. • Proven large-scale applications with long operating records.	• Higher mechanical wear of grate components. • Relatively higher capital investment.

Technology	Feedstock Compatibility	Advantages	Limitations
Fluidized-bed incinerators	**Moderate to Low** — Requires pre-processing such as shredding and screening; sensitive to waste particle size and moisture.	• High combustion efficiency and uniform temperature distribution. • Suitable for co-incineration with biomass.	• Poor adaptability to unprocessed MSW. • Operational complexity and stricter feedstock requirements.
Rotary kiln incinerators	**Moderate** — Capable of handling solids, liquids, sludges, and hazardous waste.	• Very robust and flexible for various waste types. • Long residence time ensures high destruction efficiency.	• High capital and operational costs. • Not economically optimal for large-scale MSW treatment.
Pyrolysis–gasification systems	**Low** — Requires stable, pre-sorted waste streams with low moisture.	• Potential for high energy efficiency. • Lower fly ash generation.	• Limited commercial maturity. • High sensitivity to waste characteristics and operational instability. • Few proven large-scale MSW applications.

The local government will designate a landfill for project-generated fly ash and is still to be determined at the time of preparation of this ESIA.

2.7.3.2 WASTE MANAGEMENT METHOD

A comparison between common waste management methods is presented in ***Table 2-11***.

TABLE 2-11 COMPARISON OF WASTE MANAGEMENT METHODS

	Waste-to-Energy (WtE)	Improved Sanitary Landfill	Material Recycling	Aerobic Composting
Volume & Mass Reduction	High mass reduction; solves waste buildup thoroughly	Nearly no reduction; waste occupies land permanently	Reuses recyclables; large residues remain	Medium volume reduction for organics; non-biodegradable parts need re-disposal

	Waste-to-Energy (WtE)	Improved Sanitary Landfill	Material Recycling	Aerobic Composting
Environmental Impacts	No methane, odor or pests; flue gas and wastewater fully controlled per strict standards	Methane, leachate and persistent odor pose long-term pollution risks	Cuts raw material use; yet cleaning wastewater and impure recyclables cause secondary pollution	Reduces methane; but odor, ammonia, N_2O and heavy metal contamination exist
Energy & Carbon Emission	Supplies stable clean power; greatly reduces carbon emissions	Low landfill gas recovery; high carbon footprint	Saves manufacturing energy; no power output	Lower methane emissions; zero power generation and extra GHG release
Economic Performance	High initial cost; stable long-term revenue via power sales & slag reuse	Low upfront cost; heavy ongoing expenditure and subsidy reliance	Volatile profits; high sorting & transport costs	Minor fertilizer income; high operation costs and subsidy dependence
Social & Operational Management	Automated & easy to supervise; creates quality formal jobs; fits tourism city needs	Simple operation; severe NIMBY issues, poor working conditions & hard supervision	Relies on resident sorting; informal jobs and unregulated pollution	Strong odor triggers public complaints; low efficiency and unattractive jobs

Waste-to-Energy stands out as the optimal choice for Samarkand. It delivers remarkable waste reduction, fully controllable environmental risks and stable clean power supply. With sustainable revenue and standardized operation, it outperforms landfill, recycling and composting in comprehensive benefits.

3. INSTITUTIONAL AND LEGAL FRAMEWORK

3.1 RELEVANT GOVERNMENT AUTHORITIES

Key organizations with responsibilities for environmental management in Uzbekistan are:

- Cabinet of Ministers of the Republic of Uzbekistan (COM)
- Ministry of Ecology, Environmental Protection and Climate Change; and
- The Center for State Ecological Expertise, which is under the Ministry of Ecology, Environmental Protection and Climate Change.

- **Cabinet of Ministers of the Republic of Uzbekistan** acts as the supreme executive power of the government, and ensures that the Constitution, presidential decrees, and parliament laws are carried out across the country. It holds ultimate executive authority, regulatory oversight, and final approval power over the Project.
- **Ministry of Ecology, Environmental Protection and Climate Change** acts as the primary permitting body, environmental regulator, and waste feedstock coordinator. It will be the ultimate body responsible for environmental permitting and EIA approvals; PPP oversight and environmental inspections.
- **The Center for State Ecological Expertise** operates as a specialized branch under the national environmental authority and is the ultimate gatekeeper for the physical construction and legality of the Project.

Due to the cross-cutting nature of sustainable development and the environment, virtually all other state bodies have some responsibility towards the Project. Other ministerial-level stakeholders that are relevant to the Project are listed below:

- **Ministry of Employment and Poverty Reduction**. It formulates national policies on employment, labor market development. vocational skills programs, and poverty reduction. These mandates are relevant to the Project's labor recruitment strategy and the design of livelihood-related measures for vulnerable groups.
- **Ministry of Energy**. It regulates the production, transmission, distribution, and consumption of electric and thermal energy, coal, oil, and gas. It formulates Law on Renewable Energy that the Project should follow.
- **Ministry of Construction and Housing and Communal Services**. It is responsible for enforcing the Law on Drinking Water Supply and Wastewater Discharge and Urban Planning Code that the Project needs to follow.
- **Ministry of Health**. It is responsible for preserving the health of all citizens and it formulates and enforces national public-health, disease-prevention, sanitary-epidemiological, and health-facility standards. These mandates are relevant to the Project with respect to community health and safety, occupational health requirements for the workforce and its emergency medical preparedness.
- **Ministry of Transport**. It is responsible for the development and implementation in the field of metropolitan transport, among others. One of its core functions is to develop transport and road management and transport safety investigations. During the construction phase and operation phase, the Project will rely heavily on public road networks and generate heavy-vehicle movements, which would interact with national road grid.

- **Ministry of Culture**. It is responsible for formulating and enforcing national policies on culture, art, and the protection of tangible and intangible cultural heritage. Its mandate on preserving and enhancing national cultural and spiritual heritage requires the Project to ensure that no cultural heritage sites are adversely impacted by Project activities.
- **Ministry of Water Resources**. It is responsible for enforcing the Code of Water that aims to achieve and maintain sustainable water supply for the population, economic sectors and ecological systems. Updates on water-resources legislation, such as requirements for abstracting water or industrial water usage may affect the construction and operation of the Project. It authorizes the permit for special use of water of special consumption of water to the Project.
- **National Agency for Social Protection**. It serves as a coordinator to deliver comprehensive and integrated social-protection services nationwide, including social assistance, disability assessment and services, protection of vulnerable groups. During Project construction and operation, the Project may involve and engage with vulnerable groups. This requires the alignment with the implementation of social protection and provision of social services of National Agency for Social Protection.
- **Waste Management and Circular Economy Development Agency.** It is established under the Ministry of Ecology, Environmental Protection and Climate Change. It is responsible for organizing the collection, transportation, and disposal of waste across the country, as well as implementing systemic reforms in the field of waste management. These mandates align with the Project's reliance on regulated waste flows, making it an institution the Project must coordinate with. The Project also rents land from the Waste Management and Circular Economy Development Agency.

At the regional level, government authorities related to the Project that are identified as stakeholders are listed below:

- **Regional Department of Ecology, Environmental Protection and Climate Change.** It enforces national laws, tracks pollution, and fights climate change in a specific local area. Specifically, it monitors regional pollution control, nature protection, among other mandates.
- **Regional Department of Energy.** The Regional Department of Ecology, Environmental Protection, and Climate Change conducts mandatory site verification and inspections and is responsible for the oversight of local public hearings.
- **Regional Department of Construction and Housing and Communal Services**. It oversees the regional implementation of construction-sector regulations and standards, supervises building permitting and compliance inspections and coordinates housing and communal utilities planning at regional level. The Project and its auxiliary facilities must comply with regional construction controls and inspection regimes.
- **Regional Department of Employment and Poverty Reduction**. It is responsible for implementing national labor-market and poverty-reduction policies at the regional level. It influences the availability of labor markets, and the coordination of training or employment initiatives linked to major investments in the region. Any revisions to regional employment policies or poverty-reduction policies may influence the Project's recruitment and the design of livelihood restoration measures.
- **Zarafshan Irrigation Systems Basin Department**. It is the regional office of water resources ministry. It is responsible for water resources management, including allocation

and monitoring of irrigation water. The Project abstracts water from the Dargom Canal, which is part of the irrigation infrastructure under the Department's jurisdiction.

- **Regional Department of Transport**. It oversees the regional implementation of national transport policies and standards, including planning and regulation of road transport, and traffic safety management. The construction phase and operation phase will generate heavy-vehicle movements and utilize nearby road connections. Updates to regional transport regime, such as traffic management requirements on oversized or overweight vehicles, will affect the Project's logistics planning.
- **Regional Department of Culture**. It is responsible for implementing national culture and cultural-heritage policies at the regional level, such as coordinating on the protection and management of tangible and intangible cultural heritage at regional level. Its function is relevant to the Project in relation to ensuring that any unforeseen cultural heritage within Project's AoI is identified and protected.
- **Regional Department of Health**. It is responsible for implementing national health and sanitary policies at the regional level, including oversight of healthcare facilities, disease surveillance, environmental health monitoring, and emergency medical preparedness. The Project's construction and operation may generate risks on community health and safety, and on occupational health and safety from including air-quality impacts, noise, dust, potential odor emissions and others. The department may need to allocate additional staff to supervise or inspect the construction and operation of the Project.
- **Regional Department of National Agency for Social Protection Regional Office**. It implements national social-protection policies at the regional level, including administration of social assistance programs for low-income households, disability assessment and benefits, social services for vulnerable groups. During stakeholder engagement activities, the Project would need to identify and support vulnerable groups and follow the assistance protocols to mitigate livelihood impacts to those who are most affected.
- **Regional Department of Waste Management and Circular Economy Development Agency**. It is responsible for the implementation of national policies on waste management, recycling, and circular-economy development at the regional level. It coordinates activities in the field of waste management and waste disposal facilities. It operates the Samarkand Landfill which will be closed after the operation of the Project.

At district level, relevant stakeholders identified are listed as below:

- **City Mayor Office**. It is the primary local government authority responsible for municipal governance, urban development, service coordination, and oversight of public infrastructure at the city level. The design and development of the Project need to coordinate on land-use decisions, transportation system, and align with local urban development priorities.
- **Department for Ecology and Climate Change.** The Samarkand City Department for Ecology and Climate Change is responsible for the protection of nature and air quality in the city. It acts as the immediate local field office and conducts and presents in the Project's public hearing.
- **Department of Sanitary-Epidemiological Well-being and Public Health**. It is responsible for public-health surveillance, enforcement of sanitary and epidemiological norms, environmental-health monitoring, and oversight of disease prevention at the city level. During the construction and operation phase of the Project, public health risks may

be induced, such as air emissions, dust, noise, odor and others. This requires close collaboration between the Project and the Department.

- **Samarkand City Environmental and Ecological Protection Inspection**. It is responsible for monitoring and enforcing compliance with environmental protection requirements at the city level, including oversight of air emissions, waste management practices, dust and noise control. The construction and operation of the Project need to align with local environmental regulations and city-level ecological standards.
- **Samarkand City Culture Department**. It is responsible for the protection, management, and oversight of tangible and intangible cultural heritage within the city, including local cultural sites, historical assets and cultural events. The Project needs to work closely with the Department to ensure that Project activities do not cause adverse impacts on the city's cultural heritage.
- **Samarkand City Department for Poverty Reduction and Employment Support**. It is responsible for implementing city-level programs on poverty reduction and employment services. The Project may collaborate with the Department on local hiring process and the identification of alternative employment.
- **Cadastral Agency Samarkand City Department**. It is responsible for maintaining the official land cadaster within the city, including registration of land plots and parcel boundary demarcation. For the Project, the Department may confirm land parcel boundaries and their legal land status

3.2 NATIONAL LEGISLATION

The following table summarizes the national legislation related to the Project and analyses the gaps between the Uzbek laws and international standards.

TABLE 3-1 NATIONAL LAWS APPLICABLE TO THE PROJECT AND GAP ANALYSIS

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
Section-specific documents				
PS 1	2019 Concept of Environmental Protection in the Republic of Uzbekistan until 2030	Regulates state environmental supervision over industrial facilities, requiring the WtE plant to undergo periodic inspections related to emissions, waste handling, and compliance with environmental permits during operations.	These instruments do not fully meet MIGA/ IFC PS requirements for integrated ESIA/ESMS, particularly the lack of requirements on SIA and ESMP. Gaps also exist in information disclosure, mitigation hierarchies, meaningful stakeholder engagement and grievance mechanism.	Addressed in mitigation measures in Sections 8.4.4, 8.6.4, 10.4.2.1, 10.4.2.2, 10.5.2.1, 10.6.2.1, HRIA 9.1–9.4, and 11.3.4–11.5.4.
	2013 Law on Environmental Control (amended in 2022)			
	2000 Law on State Ecological Expertise and 2018 Regulation on Ecological Expertise (amended in 2021)			
	2020 Resolution of the Cabinet of Ministers of the Republic of Uzbekistan «On further improvement of the mechanism for	Sets requirements for conducting EIA studies, audits and inspections, including identification of emission sources, waste streams, and proximity to receptors, all directly	These instruments do not fully meet MIGA/ IFC PS requirements for integrated ESIA/ESMS, particularly the lack of requirements on SIA and ESMP. Gaps also exist in information disclosure, mitigation hierarchies,	

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	assessing the impact on the environment» (amended in 2022)	applicable to WtE plant design and environmental assessment.	meaningful stakeholder engagement and GM, etc.	
	2019 Resolution of the Cabinet of Ministers of the Republic of Uzbekistan «On improving the environmental monitoring system in the Republic of Uzbekistan»			
	2014 Resolution of the Cabinet of Ministers of the Republic of Uzbekistan «On approval of the regulation on the procedure for the development and agreement of projects with environmental standards» (amended in 2022)			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	2020 Resolution of the Cabinet of Ministers of the Republic of Uzbekistan «On approval of general technical regulations of environmental safety» (amended in 2022)			
	2021 Law on Environmental Audit and 2015 Regulation on Environmental Audit			
	2000 Law on Environmental Inspection			
	2020 Resolution on Further Improvement of the Environmental Impact Assessment Mechanism			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	2014 Regulation on the Procedure for the Development and Agreement of Draft Environmental Standards			
	Appendix 3 of the Resolution of the Cabinet of Ministers No. 541 dated 07/09/2020 outlines the procedures for conducting EIA and ensures that public participation is a critical component of the decision-making process for projects that may have environmental and social impacts.	The stakeholder engagement framework mandates public participation and disclosure during project planning and approval. The Project must conduct consultations, disclose relevant environmental and social information, and incorporate stakeholder feedback into decision-making processes.	The legal stakeholder engagement framework does not fully meet MIGA/ IFC PS requirements for ongoing lifecycle engagement, stakeholder identification and analysis, differentiated measures for vulnerable groups, informed consent participation of those significantly affected, documentation of feedback incorporation, and continuous disclosure/monitoring.	Addressed in mitigation measures in Sections 10.3.2.1–10.3.2.4, 10.4.2.1–10.4.2.2 and 10.5.2.1
PS 2	Labor Code of the Republic of Uzbekistan (1996), as amended in 2022.	The labor and employment framework governs working conditions, employment rights, and social protection for the Project's	The legal labor and employment framework does not fully establish PS2 requirements for worker grievance mechanism,	Addressed in mitigation measures in HRIA Sections

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Law "On the Employment of the Population" (No. 642, 2020).	workforce during both construction and operation.	contractor/subcontractor labor management, supply chain labor risks, migrant worker protections, accommodation standards, and monitoring of workforce compliance.	9.1–9.2 and Sections 10.6.2.1–10.6.2.2 and 10.7.2.1.
	Resolution of the Ministry of Labor and Social Protection of the Population and the Ministry of Health of the Republic of Uzbekistan, registered on July 29, 2009, registration number 1990, titled "On the Approval of the List of Occupations with Unfavorable Conditions, in which the Labor of Persons Under 18 Years of Age is Prohibited."			
	Decree No. 133 dated March 11, 1997, approving normative acts necessary for the			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	implementation of the Labor Code of the Republic of Uzbekistan.			
	Decree No. 964 dated December 5, 2017, "On Measures to Enhance the Activities of Self-Government Bodies Aimed at Ensuring Employment, Primarily for Youth and Women."			
	Decree of the Cabinet of Ministers No. 965 dated December 5, 2017, "On the Measures for Further Improving the Procedure for Establishing and Reserving a Minimum Number of Job Places for the Employment of Persons in Need of Social Protection, Who Face Difficulties in Job			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Searching, and Who are Incapable of Competing in the Labor Market on Equal Terms."			
	Decree of the Cabinet of Ministers No. 1011 dated December 22, 2017, "On Improving the Methodology for Assessing the Number of Individuals in Need of Job Placement, including the Methodology for Observing Households Concerning Employment Issues and Developing Labor Resource Balance, Employment, and Job Placement for the Population."			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
PS 3	2002 Law on Waste (amended in 2021 with Decree No. 5580) 2019 No. RP-4291 Resolution of the President of the Republic of Uzbekistan, On the approval of the Strategy for Municipal Solid Waste Management in the Republic of Uzbekistan for 2019 — 2028 2023 Resolution on Actions Aimed at Improving the Environmental Situation in Certain Industries, Reducing the Negative Impact of Waste on the Environment and Public Health, and the Effective Use of Alternative Energy Sources	The waste management framework governs the Project's core function, including the collection, treatment, and disposal of municipal solid waste and resulting residues. National strategies and recent decrees promote reduction of landfill use and encourage waste-to-energy solutions, under which the Project is a key implementation mechanism.	The national waste management framework does not fully establish MIGA/ IFC PS requirements for integrated ESIA/ESMS, mitigation hierarchy, GIIP-based waste hierarchy and residue management, hazardous ash handling, stakeholder engagement and grievance mechanism (GM), labor and community health and safety, etc.	Addressed in mitigation measures in Section 8.6.4.

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	2024 Cabinet Resolution No. 916 On measures for further improvement of control over waste management, certain types of hazardous products, and chemicals in the territory of the Republic of Uzbekistan			
	Decree of the President of the Republic of Uzbekistan (DP-5 2024) On measures for enhancement of management system waste and to decrease in their negative impact on ecological situation.			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	1996 Law on Ambient Air Protection (amended in 2019)	The Law on Ambient Air Protection establishes emission limits and air quality requirements that directly apply to the WtE plant's construction and operations.	The law does not fully establish MIGA/ IFC PS requirements for integrated ESIA/ESMS, mitigation hierarchy, GIIP-based emissions control, cumulative air quality assessment, stakeholder engagement and grievance mechanism (GM), community health and safety, and lifecycle monitoring.	Addressed in mitigation measures in Sections 8.1.5, 10.4.2.1 and 10.4.2.2
	Green Economy Transition Strategy (2019-2030)	Promotes circular economy solutions, to which the Project contributes by diverting municipal waste from landfill and generating energy from waste streams.	Primarily high-level policy alignment without project-level MIGA/ IFC PS requirements—lacking ESIA/ESMS integration, mitigation hierarchy, GHG quantification and lifecycle monitoring, stakeholder engagement and grievance mechanism (GM), community health and safety assessment, and cumulative impact management—resulting in potential unmanaged E&S risks beyond technical/sectoral compliance.	Addressed in mitigation measures in Sections 8.2.1–8.2.15
	Concept Note for Ensuring Electric Supply in the Republic of Uzbekistan for 2020-2030	Supports diversification of generation sources, with the Project contributing additional dispatchable electricity from waste-based fuel.		

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Strategy for Innovative Development of the Republic of Uzbekistan for 2019-2021	Encourages adoption of modern industrial technologies, which the Project reflects through advanced incineration and emissions control systems.		
	Strategy for the Development of Electric Networks in the Republic of Uzbekistan until 2025	Defines grid expansion and connection requirements, with the Project adhering to this framework to integrate generated electricity into the national grid.		
	Law on the Rational Use of Energy (amended in April 2020)	Promotes energy efficiency, requiring the Project to optimize conversion efficiency of waste-to-energy processes.		
	Nationally Determined Contributions (ratified in 2018)	Commits to reducing GHG emissions, to which the Project contributes by reducing landfill methane and partially displacing fossil-based power.		

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	2050 Roadmap to Carbon-Neutral Electricity Sector in Uzbekistan	Supports transition to low-carbon electricity, with the Project contributing as a lower-carbon alternative to conventional generation.		
	Concept Note for Ensuring Electricity Supply in Uzbekistan 2020-2030	Emphasizes reliable power supply, with the Project providing stable baseload electricity from waste processing.		
	2020 Resolution on Approval of General Technical Regulations of Environmental Safety	The resolution requires industrial facilities to prevent environmental harm through safe design and operation, including control of emissions, waste, and accident risks. The Project must comply by ensuring safe operation of combustion and waste handling processes throughout its lifecycle.		

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	2018 Decree on Approval of Rules for Protection of Power Grid Facilities	The Decree establishes protection zones and restrictions around power grid infrastructure to ensure safe and uninterrupted operation, including limits on construction and land use near transmission assets. The Project must comply with national standards when designing and routing its grid connection.		
PS 4	2007 Sanitary Norms and Rules to Ensure Safety for People Living near High Voltage Power Transmission Lines	Defines safety buffer distances from transmission lines, influencing routing of grid connection infrastructure associated with the Project.	The national regulation does not mandate integrated, lifecycle community health and safety assessment or requirements manage community exposure beyond the fence line. The sanitary framework sets general public-health standards but does not require project-specific assessment and management of project0induced disease – vector breeding from waste handling, water-borne risk or communitcable disease (including from	Addressed in Sections 2.6.2, 8.6, 10.4.2.1–10.4.2.2, and 11.3.4–11.5.4. Addressed under Section 10. 4, across Section 8 and under GM in the Annex SEP Addressed in mitigation

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
			construction/operation labor influx), joint project-communry emergency planning and proactive disclosure of accident risks and warning arrangements. No national framework aligned to Voluntary Principles on Security and Human Rights – no statutory propoortionate-force code for private guards, human rights vetting and training, and community engagement.	measures in Sections 8.3.4 and 8.4.4
	Law on Sanitary and Epidemiological Well-being of the Population (amended 2015)	Establishes sanitary and hygiene requirements to protect public health from environmental factors, including pollution and industrial activities. The law regulates Project-related air emissions, waste handling, and potential exposure pathways affecting nearby communities.	The law provides health-based standards and oversight mechanisms but focuses on compliance with norms rather than integrated risk management, lacking explicit requirements for cumulative risk assessment, community engagement as required under PS4.	Addressed under Section 10. 4, across Section 8 and under GM in the Annex SEP

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Law on Road Traffic (2024, No. LRU-900)	The law regulates road use, traffic management, and safety requirements for infrastructure design and operation. Project related transport must adhere to local laws to control accident risks along access routes.	The law ensures general road safety and technical compliance but does not require project-specific traffic risk assessments or mitigation planning for increased traffic loads.	
	1993 Law on Water and Water Use (amended in 2021)	The Law on Water and Water Use regulates water abstraction, use, and wastewater discharge, aiming to protect water resources and prevent pollution. The project shall obtain permits, manage water use efficiently, and treat and discharge wastewater in compliance with applicable standards to prevent impacts on community health and water quality.	The Law on Water and Water Use provides a strong regulatory basis for water resource management, permitting, and pollution control, but shows moderate gaps against PS4, particularly in relation to community health risk assessment and stakeholder enagagements with affected communities.	Addressed in mitigation measures in Sections 8.3.4 and 8.4.4
PS 5	Civil Code of the Republic of Uzbekistan (amended in 2022)	The land-related legal framework establishes the procedures for acquisition, valuation, and use of	The land-related laws does not fully meet MIGA/ IFC PS5 requirements for with regards to providing	PS 5 is not triggered in the Project

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Land Code of the Republic of Uzbekistan (amended in 2024)	land required for the Project footprint and associated infrastructure. The Project must comply with defined procedures for potential stakeholder engagements, land withdrawal, compensation, and registration.	entitlements to informal/non-title holders, identification and support to vulnerable groups, resettlement planning, grievance mechanism, and post-compensation monitoring.	
	Law of the Republic of Uzbekistan on State Land Cadaster No.666-I of 28.08.1998.			
	Presidential Decree No UP-5495. Decree «On measures on cardinal improvement of investment climate in the republic of Uzbekistan».			
	2021 Decree on Measures to Ensure Equality & Transparency in Land Relations, Reliable Protection of Land Rights & Their Transformation into a Market Asset.			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	2007 Resolution on Actions to Increase Employment and Improve the Activities of Labor and Social Protection Bodies			
	Appendix No. 2 to the Resolution of the Cabinet of Ministers No 146 (2011), regulation «On the Procedure for Compensation for Losses of Land Owners, Users, Tenants and Owners, as well as Losses of Agricultural and Forestry Production».			
	Resolution No. 911 of the Cabinet of Ministers (2019) «On the Procedure for withdrawal of land plots and compensation to owners			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	of immovable property located on the land plot».			
	Law No 781 "On procedures for the withdrawal of land plots for public needs with compensation" October 1st, 2022. The Law specifies cases when the land plots can be acquired for public need among which construction (reconstruction) of roads and railways of national and local significance is also specified. Law No. 781 also prescribes procedures of land acquisition, communication with Project affected people (PAPs), compensation calculation, and			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	demolition of affected assets. As of October 1st, 2022, all projects that require the acquisition of land for public needs should be managed in accordance with this Law			
	Article 30 of the Land Code (LC) identifies engineering, electrical power, and other lines and constructions as valid reasons for securing the right to servitude. According to Article 30 of the Land Code, Article 173 of the Civil Code (CC), and Article 30 of Annex 1 of Resolution No. 1060 dated December 29,			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	2018, servitude is established through an agreement between those seeking the servitude and the landowner, user, lessee, or proprietor of the land. If an agreement cannot be reached, servitude may be imposed through a court decision upon the request of the user. The agreement must be registered with the state and remains valid even if the land plot is transferred to another party. Such agreements may also be terminated if the circumstances that justified their establishment no longer exist.			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Article 173 of CC further clarifies that establishing a servitude does not deprive the landowner of their rights to possess, use, or dispose of the parcel.			
	Calculation and compensation of losses due to servitude agreement are performed following Law No. 781 "On procedures for the withdrawal of land plots for public needs with compensation" (if it is a Project for public needs), the Resolutions of Cabinet of Ministers No. 146 from 25 May 2011 "On measures to improve the procedure for granting land plots for urban development			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	activities and other non-agricultural purposes," and No. 911 from 16 November 2019 "On additional measures for enhancing modalities of providing compensation on withdrawal and allocation of land plots and safeguarding the property rights of legal and physical entities."			
	Article 86 of the LC states that individuals affected by limitations on their land rights due to land acquisition are entitled to full compensation for their losses, including lost profits. Compensation comes from the relevant centralized funds set aside for reimbursing individuals and legal			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	entities impacted by land seizure for public purposes, and from businesses or organizations whose operations may limit the rights of landowners, land users, or lessees, or degrade the quality of adjacent lands as mandated by law.			
	Article 173 of the CC specifies that the parcel owner burdened with the servitude has the right, unless otherwise stipulated by law, to request proportional payment from the party benefiting from the servitude for the use of their land parcel.			
PS 6	1998 National Strategy and Action Plan on	The biodiversity-related legal framework requires the Project to	The national biodiversity framework does not fully establish PS6	Addressed in mitigation

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Biodiversity Conservation	assess and manage impacts on terrestrial and aquatic ecosystems, including protected areas, sensitive habitats, and species of conservation importance. National laws obligate the Project to avoid or minimise disturbance to habitats, particularly where critical or migratory species may be present.	requirements for habitat classification, critical habitat assessment, ecosystem services, no net loss/net gain, biodiversity offsets, supply chain biodiversity risks, and PS1-aligned ESMS, stakeholder engagement, GM and lifecycle monitoring.	measures in Section 8.7.5 / B1–B2
	2004 Law on Protected Natural Territories (updated in 2014 and amended in 2022)			
	1997 Law on Protection and Use of Flora (updated in 2016)			
	1997 Law on Protection and Use of Fauna (updated in 2016)			
	2019 Red book of the Republic of Uzbekistan (flora and fauna)			
	Strategy for Biodiversity Conservation in the Republic of Uzbekistan (2019 – 2028)			

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Convention on Biological Diversity, adopted in 1995			
	Ramsar Convention, adopted in 2002			
	Bonn Convention on migratory species, adopted in 2002			
	IUCN Red List (updated in 2023)			
	2022 Resolution on Actions for Implementation of the Project "Conservation and Management of Lakes, Wetlands and Coastal Territories as a Basis for Supporting Sustainable Life on Degraded Landscape of the Aral Sea Reservoir Landscape" with	It aims to enhance the ecological resilience of landscapes and secure sustainable livelihoods through coordinated water resource management, sustainable land management, conservation of globally significant biodiversity, and internation cooperation and community engagement.	Although the Resolution promotes biodiversity conservation at a strategic level, it does not establish enforceable, project-specific requirements aligned with MIGA/ IFC PS6, including the mitigation hierarchy, critical habitat assessment, and no net loss/net gain outcomes.	Addressed in mitigation measures in Sections 8.7

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Participation of the United Nations and Global Environmental Fund Development Programs			
PS 7	N/A			
PS 8	Constitution of the Republic of Uzbekistan and the Criminal Code of the Republic of Uzbekistan. Law No. ZRU-229 "On Protection and Use of the Objects of Archaeological Heritage" (October 13, 2009).	The cultural heritage framework requires identification, protection, and preservation of archaeological and cultural resources that may be affected by project activities. The Project must assess the presence of cultural or archaeological assets within its footprint and coordinate with authorities if any are identified.	The cultural heritage laws do not fully establish PS8 requirements for systematic cultural heritage screening, chance finds procedure, consultation with affected communities/cultural heritage users, management of intangible cultural heritage, benefit-sharing for affected communities, and lifecycle monitoring.	No cultural heritage was identified for the Project

Relevance to Performance Standard	National Legislations	Aspects Related to The Project	Gap Analysis	Proposed Gap-Filling Measures
	Law No. 269-II "On the Protection and Use of Cultural Heritage Sites" (August 30, 2001, as amended).			
	Presidential Decree No. R-5181 "On Improving the Protection and Use of Objects of Tangible Cultural and Archaeological Heritage" (January 16, 2018).			
	Presidential Decree No. PP-4068 "On Strengthening the Protection, Management, and Enhancement of Tangible and Intangible Cultural Heritage" (December 19, 2018).			

3.3 INTERNATIONAL STANDARDS

3.3.1 INTERNATIONAL CONVENTIONS

Uzbekistan is a signatory to a number of international conventions and agreements relating to industry, development, and environmental management. In certain cases, conventions and agreements have influenced policy, guidelines and regulations and therefore are relevant to planning, construction and operation of the Project.

Table 3-2 lists the relevant international conventions and protocols to which Uzbekistan is signatory.

TABLE 3-2 INTERNATIONAL TREATIES APPLICABLE TO THE PROJECT

Name of the Convention	Ratification Year	Aspects Related to the Project
United Nations Convention on Biological Diversity (CBD) (1992)	Accession: 1995	The objectives of the CBD must be considered in the ESIA.
Montreal Protocol on Substances that Deplete the Ozone Layer (with London, Copenhagen, Montreal amendments)	Accession: 1998	The Project will support Uzbekistan's contribution towards the protection of the ozone layer by refraining from the use of ozone-depleting substances.
Vienna Convention on the Protection of Ozone Layer	Accession: 1993	
Convention on Migratory Species of Wild Animals	1998	The Project will implement mitigation and management measures to ensure conservation of terrestrial and avian migratory species where identified.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Accession: 1997	The Project staff and workers will be strictly forbidden from trading in any wild flora and fauna found in the Project site or outside the Project boundaries.
Basel Convention on Hazardous Waste (1989)	Accession: 1996	If applicable, obtain consent from the receiving country before the transboundary movement of hazardous waste.
United Nations Convention to Combat Desertification	1995	The Project will not result in accelerated desertification through sourcing of its materials and will contribute to sustainable development.
Convention concerning the Protection of the World Cultural and Natural Heritage (1972)	1993	The Project will implement mitigation and management measures where items/sites/monuments of cultural or natural heritage are identified within or near the Project boundaries and notify the relevant authorities immediately.

Name of the Convention	Ratification Year	Aspects Related to the Project
UNESCO Convention for the Safeguarding of Intangible Cultural Heritage (2003)	2008	Integration of the UNESCO Convention for the Safeguarding of intangible cultural heritage identified within the Project study area during the construction and operation phase.
Abolition of Forced Labor Convention, 1957 (No. 105)	1997	Ensure that forced labor is prohibited and that human resource (HR) policies and procedures are developed and implemented to ensure this.
Minimum Age Convention, 1973 (No. 138)	1998	Ensure that employment policies include prohibitions on the employment of children and that such policies are adhered to.
Worst Forms of Child Labor Convention, 1999 (No. 182)	2003	Ensure that employment policies include prohibitions on the employment of children and that such policies are adhered to.
Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)	1992	Ensure that the Project recognizes workers freedom of association and protection of the right to organize.
Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	2006	Discrimination in the field of employment and occupation should be expressly forbidden.
International Convention on the Elimination of All Forms of Racial Discrimination (1969)	1997	All workplace racial discrimination should be expressly forbidden.
Convention on the Elimination of All Forms of Discrimination against Women:1981 (CEDAW)	1995	Ensure that non-discrimination against women is enshrined in HR policies and practices for the proposed Project.
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment: 1987	1995	Torture in all workplaces should be expressly forbidden.
The Convention for the Protection of All Persons from Enforced Disappearance	2017	Intends to prevent forced disappearance, which, as defined in international law, is part of crimes against humanity
The Convention on the Rights of Persons with Disabilities	2019	Promotes, protects and ensures the full and equal enjoyment of all human rights and fundamental freedoms by all people with disabilities, and to promote respect for their inherent dignity

Name of the Convention	Ratification Year	Aspects Related to the Project
Convention on the Rights of the Child (1990)	1994	Ensure that employment policies include prohibitions on the employment of children.
International Covenant on Economic, Social and Cultural Rights 1976	1995	Ensure that economic, social and cultural rights are respected in the proposed Project.
International Covenant on Civil and Political Rights 1976	1995	Ensure civil and political rights are observed in the proposed Project.
Framework Convention on Climate Change (1992)	Accession: 1993	The Project will comply with all national standards for GHG emissions in order to contribute to Uzbekistan's targets.
Kyoto Protocol to UNFCCC	1999	
Paris Agreement to UNFCCC	Signed in 2017, Ratified 2018	

3.3.2 INTERNATIONAL PROTOCOLS AND STANDARDS RELATED TO HUMAN RIGHTS

Table 3-3 and ***Table 3-4*** presents the findings of the Human Rights Screening related to applicable international protocols, technical conventions and labor standards.

TABLE 3-3 INTERNATIONAL PROTOCOLS ON HUMAN RIGHTS AND UZBEKISTAN STATUS

Convention	Uzbekistan Status
The First Optional Protocol to the International Covenant on Civil and Political Rights;	Ratified in 1997
The Optional Protocol to the Convention on the Rights of Persons with Disabilities	Ratified in 2016
The Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict	Ratified in 2002
The Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography	Ratified in 2008

Uzbekistan has ratified eight out of ten ILO Fundamental Conventions as shown in ***Table 3-4***.

TABLE 3-4 INTERNATIONAL TECHNICAL CONVENTIONS AND UZBEKISTAN STATUS

Convention	Uzbekistan Status
C029 - Forced Labor Convention, 1930 (No. 29)	Ratified in 1992
C087 - Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)	Ratified in 1995

Convention	Uzbekistan Status
C098 - Right to Organize and Collective Bargaining Convention, 1949 (No. 98)	Ratified in 1995
C100 - Equal Remuneration Convention, 1951 (No. 100)	Ratified in 1995
C105 - Abolition of Forced Labor Convention, 1957 (No. 105)	Ratified in 1995
C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	Ratified in 1995
C138 - Minimum Age Convention, 1973 (No. 138) (minimum age specified is 14 years)	Ratified in 1997
C182 - Worst Forms of Child Labor Convention, 1999 (No. 182)	Ratified in 2002
C155 - Occupational Safety and Health Convention, 1981 (No. 155)	Ratified in 2000
C187 - Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)	Not ratified

In addition, Uzbekistan has ratified several relevant technical Conventions as shown in ***Table 3-5***.

TABLE 3-5 INTERNATIONAL LABOR STANDARDS AND UZBEKISTAN STATUS

Technical Convention	Uzbekistan Status
C001 – Hours of Work (Industry) Convention, 1919	Ratified in 1992
C006 – Night Work of Young Persons (Industry) Convention, 1919	Ratified in 1995
C014 – Weekly Rest (Industry) Convention, 1921	Ratified in 1998
C017 – Workmen's Compensation (Accidents) Convention, 1925	Ratified in 1995
C018 – Workmen's Compensation (Occupational Diseases) Convention, 1925	Ratified in 1994
C019 – Equality Treatment (Accident Compensation) Convention, 1925	Ratified in 1995
C089 – Night Work (Women) Convention, 1948	Ratified in 1995
C107 – Indigenous and Tribal Populations Convention, 1989	Not ratified

3.3.3 INTERNATIONAL STANDARDS AND GUIDELINES

In addition to Uzbek standards, the Project will be subject to the following international environmental and social standards and good practice guidance documents as required by lenders:

- MIGA's Performance Standards on Environmental and Social Sustainability (2013)
- IFC Performance Standards on Environmental and Social Sustainability (2012)
- Equator Principles (2020)
- World Bank Group (WBG)/IFC General EHS Guidelines (2007)
- WBG/IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution (2007)
- WBG/IFC Environmental, Health, and Safety Guidelines for Waste Management Facilities (2007)

Where different standards are prescribed by the different organizations/entities, the most stringent between the national laws or the international standards will be considered.

3.3.3.1 MIGA AND IFC PERFORMANCE STANDARDS

MIGA and IFC are member institutions of the World Bank Group, which promotes development directed at the private sector with a greater focus on developing countries.

The Performance Standards defined by MIGA/IFC are:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- Performance Standard 2: Labor and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

Together, these eight Performance Standards establish standards that are expected to be met throughout the life of an investment by MIGA/IFC. The Performance Standards are directed towards providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate and, manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of direct investments for MIGA/IFC (including project and corporate finance provided through financial intermediaries), MIGA/IFC requires that its clients apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities are enhanced (MIGA, 2013). The MIGA/IFC Performance Standards, and each of their requirements to the proposed Project and this scoping report, are outlined in ***Table 3-6*** below.

TABLE 3-6 SUMMARY OF MIGA/IFC PERFORMANCE STANDARDS REQUIREMENTS

MIGA/IFC Performance Standard	Project Requirements
Assessment and Management of Environmental and Social Risks and Impacts Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project (any business activity that is subject to assessment and management).	• Identify and evaluate environmental and social risks and impacts of the Project. • Adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. • Promote improved environmental and social performance of clients through the effective use of management systems.

MIGA / IFC Performance Standard	Project Requirements
	• Ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. • Promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.
Labor and Working Conditions Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by the protection of the fundamental rights of workers. For any business, the workforce is a valuable asset, and a sound worker-management relationship is a key ingredient in the sustainability of a company. The requirements set out in this Performance Standard have been in part guided by a number of international conventions and instruments, including those of the International Labor Organization (ILO) and the United Nations (UN).	• Promote the fair treatment, non-discrimination, and equal opportunity of workers. • Establish, maintain, and improve the worker-management relationship. • Promote compliance with national employment and labor laws. • Protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. • Promote safe and healthy working conditions, and the health of workers. • Avoid the use of forced labor.
Resource Efficiency and Pollution Prevention Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. This Performance Standard outlines a project-level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices.	• Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. • Promote more sustainable use of resources, including energy and water. • Promote the reduction of project related Green House Gases (GHGs) emissions.
Community Health, Safety and Security	• Anticipate and avoid adverse impacts on the health and safety of the Affected Community during the

MIGA / IFC Performance Standard	Project Requirements
Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration and/or intensification of impacts due to project activities. While acknowledging the public authorities' role in promoting the health, safety, and security of the public, this Performance Standard addresses the client's responsibility to avoid or minimize the risks and impacts to community health, safety, and security that may arise from project related activities, with particular attention to vulnerable groups.	project life from both routine and non-routine circumstances. • Ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities. • Note: This Performance Standard addresses potential risks and impacts to the Affected Communities from project activities. Occupational health and safety requirements for workers are included in Performance Standard 2. Environmental standards to avoid or minimize impacts on human health and the environment due to pollution are included in Performance Standard 3.
Land Acquisition and Involuntary Resettlement Performance Standard 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. This Performance Standard applies to physical and/or economic displacement resulting from land-related transactions. It does not apply to resettlement resulting from voluntary land transactions (i.e., market transactions in which the seller is not obliged to sell, and the buyer cannot resort to expropriation or other compulsory procedures sanctioned by the legal system of the host country if negotiations fail). It also does not apply to impacts on livelihoods where the project is not changing the land use of the affected groups or communities.	• Avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs. • Avoid forced eviction. • Anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost; and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. • Improve, or restore, the livelihoods and standards of living of displaced persons. • Improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.
Biodiversity Conservation and Sustainable Management of Living Natural Resources	• Protect and conserve biodiversity. • Maintain the benefits from ecosystem services. • Promote the sustainable management of living natural resources through the adoption of practices that

MIGA / IFC Performance Standard	Project Requirements
Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystems services, and sustainably managing living and natural resources are fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological Diversity.	integrate conservation needs and development priorities.
Indigenous Peoples Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development.	• Ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples. • Anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. • Promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. • Establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life cycle. • Ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. • Respect and preserve the culture, knowledge, and practices of Indigenous Peoples.
Cultural Heritage Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. The requirements of this Performance Standard apply to cultural heritage regardless of whether or not it has been legally protected or previously disturbed	• Protect cultural heritage from the adverse impacts of project activities and support its preservation. • Promote the equitable sharing of benefits from the use of cultural heritage.

3.3.3.2 EQUATOR PRINCIPLES (2020)

The Equator Principles is a risk management framework adopted by financial institutions to assess and manage environmental and social risks in projects, primarily for large-scale infrastructure and industrial developments. Updated in July 2020, the Equator Principles (EP4) aim to ensure that projects are developed in a socially responsible and environmentally sustainable manner. EP4 is aligned with international standards such as the IFC PS and the United Nations Guiding Principles on Business and Human Rights (UNGPs).

The 2020 update of the Equator Principles places a stronger emphasis on human rights, in alignment with the UNGPs. Projects with significant risks to human rights are now required to conduct Human Rights Impact Assessments (HRIAs). This includes identifying and addressing potential adverse impacts on vulnerable groups, such as local communities and workers. The HRIA process involves:

- Identifying Risks: Assessing Project activities that may infringe on human rights, such as forced displacement, labor violations, or harm to cultural heritage.
- Stakeholder Engagement: Actively consulting affected communities and stakeholders to understand their concerns and ensure their participation in decision-making.
- Mitigation Measures: Developing strategies to avoid, minimize, or compensate for adverse human rights impacts.
- Grievance Mechanisms: Establishing accessible and transparent mechanisms to address human rights complaints from affected parties.

The Project will adhere to the steps outlined above to ensure that human rights associated with the Project development and the supply chains are well protected.

According to EP4, a Physical CCRA (PRA) is required:

- For all Category A and, as appropriate, Category B projects, will include the consideration of relevant physical risks as defined by the Recommendations of the Task Force on Climate-Related Financial Disclosures (TCFD).

EP4 also requires a Transition CCRA (TRA):

- For all Projects, in all locations, when combined Scope 1 and Scope 2 Emissions are expected to be more than 100,000 tonnes of CO2 equivalent annually.
- The TRA must also include a completed alternatives analysis which evaluates lower greenhouse gas (GHG) intensive alternatives. The selected alternative needs to balance optimising GHG intensity, with economic viability and avoiding/minimising impacts to other environmental and social (E&S) aspects.
    - Evaluation of technically and financially feasible and cost-effective options available to reduce Project-related GHG emissions during the design, construction and operation of the Project (e.g., product changes to use of low-carbon fuels, reduced material use, sustainable agricultural practices, material recycling, use of cement additives or changes of business operations) (also a requirement under International Finance Corporation (IFC) Performance Standard (PS) 3).
    - For Scope 1 emissions, determination of the best practicable environmental option (this may be supported by reference to relevant IFC Environmental Health and Safety (EHS)

sectoral guidelines and other Good International Industry Practice (GIIP)) and will include consideration of alternative fuel or energy sources if applicable.

- For Projects in high carbon intensity sectors, the GHG alternatives analysis will include comparisons of the selected technology to other viable technologies used in the same industry sector and the country or region, including energy efficiency and GHG intensity ratios, as appropriate.

The Guidance Note (GN) on CCRA recommends that the CCRA should include:

- A high-level assessment of the current and anticipated physical and transition risks present with regard to the Project and its operations;
- A high-level assessment of the client's plans, processes, policies and systems in place to manage (i.e., to mitigate, transfer, accept or control) these risks; and
- A high-level review of the compatibility with National Climate Commitments under the Paris Agreement as well as any other nationally developed commitments.

As part of the Project ESIA process, a standalone CCRA report has been developed as ***Appendix A*** with reference to the Equator Principles 4 (EP4) and the Guidance Note (GN) on CCRA published by EP4 in May 2023.

3.3.3.3 WORLD BANK GROUP/IFC ENVIRONMENTAL HEALTH AND SAFETY GUIDELINES

The WBG EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP) and are referred to in the World Bank's Environmental and Social Framework and in the IFC's Performance Standards. The EHS Guidelines contain the performance levels and measures that are normally acceptable to the World Bank Group and that are generally considered to be achievable in new facilities at reasonable costs using existing technology.

The World Bank Group requires borrowers and clients to apply the relevant levels or measures of the EHS Guidelines. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects will be required to achieve whichever is more stringent.

General EHS Guidelines, EHS Guidelines for Waste Management Facilities and EHS Guidelines for Electric Power Transmission and Distribution are applicable to the Project.

The EHS Guidelines for Waste Management cover facilities or projects dedicated to the management of municipal solid waste and industrial waste, including waste collection and transport; waste receipt, unloading, processing, and storage; landfill disposal; physic-chemical and biological treatment; and incineration projects.

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid.

The General EHS Guidelines contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors.

Both the General and Sectoral EHS Guidelines contain the following information: environmental, occupational health and safety, community health and safety during construction, operational and decommissioning phases.

4. ESIA PROCESS OVERVIEW

4.1 SCOPING

For this Project, the scoping site visit was conducted from 12th to 16th January 2026.

The key objective of the scoping phase is to identify activities which can be "scoped in" or "scoped out" from the ESIA study. Activities will only be "scoped out" for the ESIA if it is determined that there will be no significant impacts resulting from these activities. Activities will not be scoped out if it is determined that there is insufficient information to be confident that the activity will have no significant impact. The greater the level of definition that can be given to the Project description, legal scope and baseline at the scoping stage, the less "precautionary" the process can be in scoping activities in or out of the ESIA.

The scoping process for the Project involves setting out the scope of the ESIA for these categories. Then, based on knowledge of the intended activity at the time of scoping and the Project's environmental and socioeconomic setting, identifying the key issues for the ESIA to address.

The scoping process is informed by interaction with the Project design team but can also be further refined based on consultation with a range of stakeholders during its preparation.

The scoping result will determine the Terms of Reference (ToR) for the ESIA. However, it should be noted that scoping is effectively an ongoing aspect of ESIA, allowing the ESIA process to consider new information, respond to it and include it in the ESIA as required.

4.2 EXISTING PHYSICAL BIOLOGICAL AND SOCIAL BASELINES

Baseline conditions are defined using a combination of publicly available data and information, as well as specially commissioned surveys, specific to the Project. Each topic scoped into the impact assessment will have its relevant study area (in terms of scale and receptors) and data sources it has drawn from (including specific surveys).

4.3 PROJECT DESCRIPTION

This report includes a description of the Project as it is currently understood. However, it is important to note that the Project design process is iterative and informed by the ESIA process and other studies being undertaken in parallel that are gathering additional information/data on the proposed Project and site.

The Project includes a detailed design phase, where the mitigations of the ESIA and other reviews will be taken into consideration in order to mitigate the impacts. Certain aspects of the Project design will therefore evolve throughout the ESIA process. In order to accommodate this required flexibility, and at the same time maintain a rigorous ESIA process, the assessment considers a project description based on a design "envelope" using a reasonable, worst-case approach.

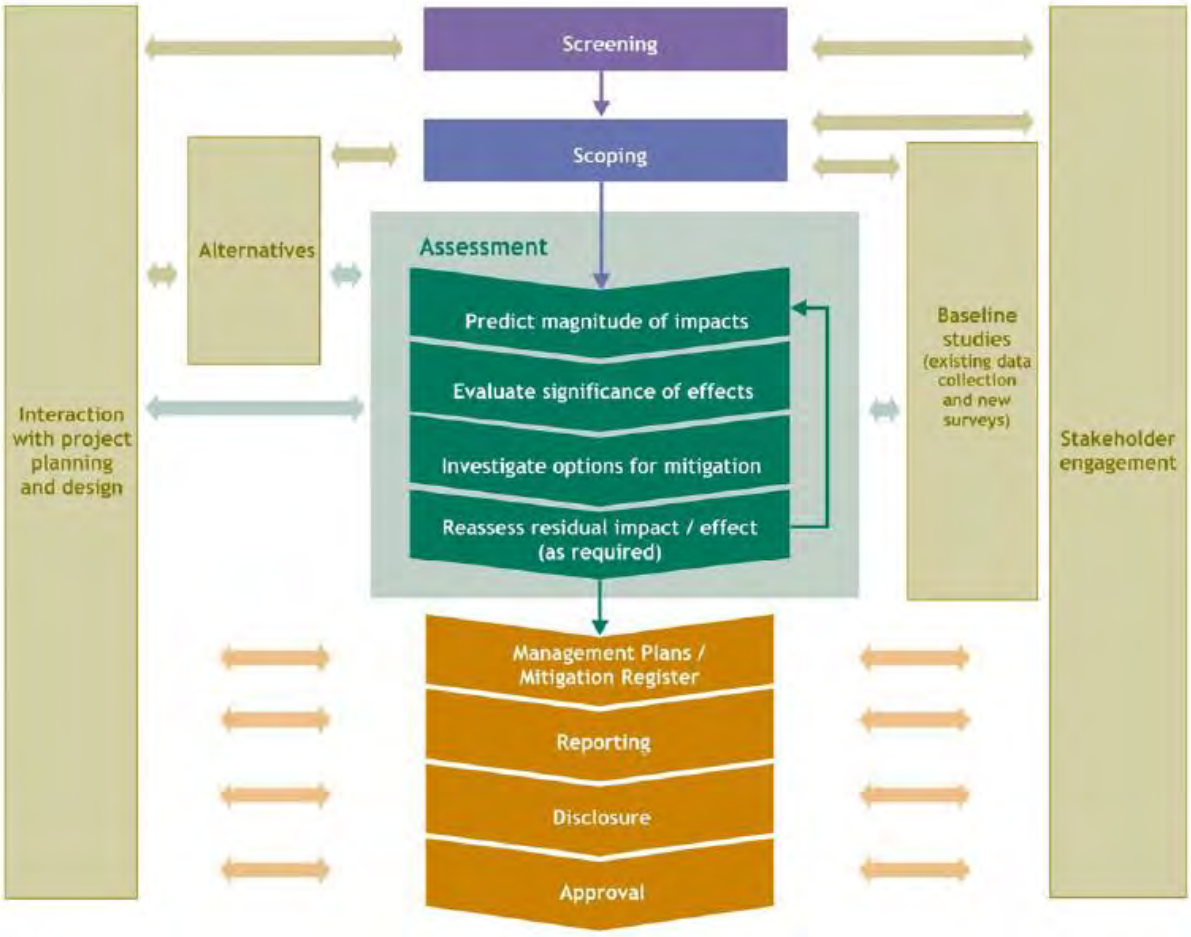
4.4 IMPACT ASSESSMENT

Impact identification and assessment start with scoping and continues through the remainder of the impact assessment process. The principal impact assessment steps comprise:

- **Impact prediction:** to determine what could potentially happen to resources/receptors as a consequence of the Project and its associated activities;

- **Impact evaluation:** to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource/receptor;
- **Mitigation and enhancement:** to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts; and
- **Residual impact evaluation:** to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

FIGURE 4-1 ESIA APPROACH



4.4.1 IMPACT PREDICTION

Prediction of impacts is the determination of what is likely to happen with the environmental and socio-economic Receptors / Resources (R/R) as a consequence of the Project and its associated activities.

At the stage of impact prediction, the following characteristics/ parameters are identified:

- Project-related activities;
- Impacts' Receptors / Resources (R/R);
- All potentially impacts;
- Embedded controls - measures envisaged by the Project to prevent / reduce impacts.

Project-related activities or **factors of impacts** (earthworks, traffic associated with the project needs, wastewater discharges, etc.) are determined to further identify the potential adverse and positive impacts.

The environmental and socio-economic components altered as a consequence of Project-related activities are **Receptors / Resources** (R/R) exposed to impacts.

The same factor can affect different R/Rs. For instance, the "traffic" impact factor influences several components and their condition, such as ambient air quality, vegetation and soil quality and population/company's personnel safety and, in some cases, public health.

As a rule, the identification of impact factors and R/Rs is performed at the scoping or pre-ESHIA stage in the form of the Leopold matrix. At the full ESIA stage, a list of all potential impacts of the Project is formed on its base.

In addition, at the stage of impact prediction, the embedded controls (planned mitigation measures provided in the design documentation) are considered. Assessment of expected impacts is carried out taking into account the embedded controls. Potential impacts prevented at a source by the Project embedded controls are excluded from the impact assessment.

Environmental, social, and health impacts of the Project activities can be direct, indirect and cumulative.

Direct impacts result from a direct interaction between the Project and a R/R (e.g., between the occupation of a plot of land and the habitats which are affected).

Indirect impacts follow as a result of subsequent interactions between the Project and the environment (e.g., viability of a species population resulting from the loss of part of a habitat as a result of the Project activities). Indirect impacts may be of different orders and may also occur in remote areas.

Cumulative impacts need to be addressed specifically in the assessment process. These are additional impacts and effects that arise as a result of an impact from the Project interacting with an impact from other activities, not related to the Project. Cumulative effects may be sudden, for example, as a result of a combination of ongoing or historical impacts (accumulated pollution, etc.), or intensification of impacts and effects of the Project throughout its lifecycle. The methodology of the cumulative impacts assessment (CIA) is presented in ***Chapter 13***.

4.4.2 IMPACT EVALUATION

Once the prediction of impacts is complete, each Impact and R/R are described in terms of its various relevant characteristics and finally impact significance is assessed.

The significance of the impact is assessed in three steps:

- **Step 1.** Assessment of the ***Impact Magnitude*** that is a combined characteristics of scale, duration, frequency and extent:
- **Step 2.** Assessment of the ***Sensitivity /Vulnerability/ Importance*** of R/Rs.
- **Step 3.** Determination of ***Impact Significance*** is the final step, conducted qualitatively in a matrix based on the previously assessed Impact Magnitude (Step 1) and R/R Sensitivity /Vulnerability/ Importance (Step 2), with the results expressed as Negligible, Minor,

Moderate or Major. A detailed description of the impact significance evaluation steps is provided below.

Step 1. Impact Magnitude Evaluation

Magnitude of impact is evaluated with consideration of the following characteristics/parameters of an impact: Scale, Duration, Frequency, Extent.

The Magnitude of impacts results from a combination of the basic characteristics (extent, frequency and duration) and the scale of impact (***Table 4-1***). Out of extent, frequency and duration of impacts, the basic characteristic is selected, i.e. the most unfavorable (for example, if an impact is characterized as long-term instantaneous and local, the "long-term" will be used as the basis for evaluation).

TABLE 4-1 IMPACT MAGNITUDE

Basic Characteristic				**Scale**			
Duration	**Frequency**	**Extent**		**Negligible**	**Small**	**Medium**	**Large**
Temporary	**One-off**	**Site**		**Negligible**			
Short-term	**Rare**	**Local**			**Small**		
Medium-term	**Occasional**	**Regional**				**Medium**	
Long-term	**Often**	**National**					
Permanent	**Continuous**	**International**					**Large**

1. **Frequency of Impact**

Frequency describes the occurrence of impacts and their consequences. Frequency is ranged as: one-off, rare, occasional, often and continuous.

Criteria identifying the Frequency of impact are detailed in ***Table 4-2***.

TABLE 4-2 IMPACT FREQUENCY

Frequency	**Criteria**
One-off (unlikely)	Impact might occur once during Project implementation
Rare	Impact is caused by the features of the construction or production cycle and might occur
Occasional	Impact occurs with a regular frequency (a high probability of occurrence)
Often	Impact occurs with a frequency of once a month or more (predetermined)
Continuous	Means static impact without discontinuity points over a certain period

2. **Duration of Impact**

Duration describes the temporal length of the Project's impact. Duration is ranged as: temporary, short-term, medium-term, long-term and permanent.

Criteria identifying the Duration of impact are detailed in the ***Table 4-3***.

TABLE 4-3 IMPACT DURATION

Duration	Criteria	
	Environmental part of IA	**Social part of IA**
Temporary	Temporary, short impact on ecosystems, not affecting the seasonal background processes	Impact lasting several months
Short-term	Temporary, lasts from one season up to one year, predicted usually for the construction phase	Impact that lasts up to one year
Medium-term	Temporary, lasts for one to five years, usually in case of long-term construction and commissioning period, in the early stages of operation	Impacts during certain stages of Project implementation (first and second stages of construction operations, etc.) - several years
Long-term	Temporary, lasts for five or more years, until the Project ends and the baseline conditions are restored	Impact during the Project lifetime (several decades)
Permanent	Persistent (permanent) change in the baseline conditions during the Project that are not restored after the closure	Permanent change in the characteristics of objects

3. **Extent of Impact**

Extent describes the spatial distribution of the impact and is ranged as site, local, regional, national and international.

Criteria identifying the Extent of impact are detailed in ***Table 4-4***.

TABLE 4-4 IMPACT EXTENT

Extent	Criteria	
	Environmental part of IA	**Social part of IA**
Site	Impact that does not go beyond the limits of impacts on primary natural complexes (local populations of species, geological and soil ranges, etc.)	Impact bounded to the site locations and immediate surroundings
Local	Impact affects baseline properties of particular landscapes and locations, not	Impacts that are limited to the local communities around the

Extent	Criteria	
	Environmental part of IA	**Social part of IA**
	usually associated with an impact on long watercourses	Project site and in the wider districts (i.e. the Social Area of Influence (AoI)
Regional	Impacts related to a change in the baseline conditions of natural regions, usually associated with the impact on long water courses and significant air pollution	Impacts that extend beyond the Social AoI, in the wider Tashkent Region
National	Affects significant national resources, territories and sustainable development of nations	
International	Affects environmental components, territories and processes of international importance	

4. **Scale of Impact**

Scale means intensity of the impacts, which is determined depending on the quantity, level and other characteristics of the impact factor. The scale of impacts can be classified into negligible, small, medium and large categories.

Scale, where possible, is a quantitative evaluation of predicted consequences (for instance, elevated concentrations of pollutants in the air, water and soils; areas of land plots allocated for Project implementation in percentage of land areas used for economic activities prior to Project implementation; a reduction in number of affected species, etc.). At that, the multivariable and diverse range of impacts does not always allow the use of quantitative methodologies of evaluation, in such cases it is admitted the use of semi-quantitative and qualitative approaches.

The scale of impact on each environmental and social component are defined individually.

5. **Likelihood of Unplanned Events**

This ESIA considers the impacts that are expected to result from planned activities on the physical, biological and the socioeconomic environment. It also considers cumulative impacts and impacts from unplanned events such as accidents.

These are different to impacts that would reasonably be predicted to occur in the normal course of activities (including the application of in-built control measures) during construction and operations.

The assessment approach and criteria for unplanned events differ from other topics; further details are provided in ***Section 11.1***.

Step 2. Receptors / Resources Sensitivity /Vulnerability/ Importance Evaluation

1. **Vulnerability/ Importance/ Value of Receptors / Resources**

The evaluation of Vulnerability/ Importance/ Value of the affected R/Rs is based on the following properties:

- International / national standards and regulations;
- Protected status;
- Expert opinion of specialists involved in the ESIA development;
- Policy of the regional government;
- Economic value;
- Views of stakeholders; etc.

2. Sensitivity of Receptors / Resources

The Sensitivity of RRs is identified based on their adaptation/recovery abilities (***Table 4-5***).

TABLE 4-5 SENSITIVITY OF RECEPTORS / RESOURCES

Sensitivity	Environmental / Biophysical	Social
Low	High ability to recover the initial properties and functions, minor changes of spatial and dynamic indicators.	High ability to adapt to changing conditions under the impact of the Project and associated activities
Medium	Limited / low ability to recover the initial properties and functions. Measures to minimize disturbance of ecosystems are required.	Limited ability to adapt to changing conditions under the impact of the Project and associated activities
High	Lack of ability to recover the initial properties and functions. Irreversible disturbances may be caused by minor impacts.	Adaptation to changing conditions under the impact of the Project and associated activities is extremely difficult / impossible

Step 3. Impact Significance Evaluation

The overall Significance of impacts is now finally determined by a combination of **Magnitude of impact** and **Sensitivity /Vulnerability/ Importance of Resources / Receptors** using the matrix as shown in ***Table 4-6***. The Significance of a given impact falls within the categories of Negligible, Minor, Moderate or Major.

TABLE 4-6 IMPACT SIGNIFICANCE EVALUATION

Significance of impact	**Sensitivity /Vulnerability/ Importance of Receptors / Resources**		
Magnitude of Impact	**Low**	**Medium**	**High**
Negligible	**Negligible**		
Small		**Minor**	
Medium		**Moderate**	
Large			**Major**

The significance of positive impacts is not evaluated.

Assessment of expected impacts is carried out taking into account the embedded controls. Potential impacts prevented at source by the Project embedded controls are excluded from the impact assessment.

A description of categories of environmental and social impacts' significance is presented in ***Table 4-7***.

TABLE 4-7 IMPACT SIGNIFICANCE

Impact Significance	Verbal Description
Positive	There will be a beneficial impact to a resource/receptor, that will provide an opportunity for improvements of the baseline conditions. When possible, measures to enhance the positive impact can be recommended.
Negligible	An impact of negligible significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is indistinguishable from natural background variations, i. e. practically does not change the environmental baseline conditions or conditions of livelihoods, culture or quality of life.
Minor	An impact of minor significance is one where a resource/receptor will experience a noticeable effect, but the predicted effect is not accompanied by long-term degradation of sensitive resources and long-term reductions in livelihood or quality of life. Effects are usually reversible and minor (with or without mitigation). In either case, the magnitude should be well within applicable standards. Receptors either easily adapt to changes brought by the Project or their livelihood remains unchanged.
Moderate	An impact of moderate significance is one where a resource/receptor will experience a notable effect and the predicted effect is accompanied by long-term degradation of sensitive resources, long-term reductions in livelihood or quality of life, and irreversible loss of species and habitats. Changes can mainly be reversible. Impact magnitude is within the accepted limit or standard, but close to the threshold. Clearly, designing an activity so that its effects only just avoid exceeding allowed thresholds and/or a major impact is not best practice. The aim of the approach to the moderate impacts is therefore to demonstrate that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor but that moderate impacts are being managed effectively and efficiently. Adaptation of the receptors might be challenging, and they will be able to return to their former livelihood under condition of some support**.**
Major	An impact of major significance is one where the predicted effect is irreversible: long-term degradation of baseline conditions or long-term impoverishment or societal breakdown; exceedance of the national environmental standards, transnational environmental issues; effects of toxic substances on receptors and

Impact Significance	Verbal Description
	potential emergencies affecting critical resources and sensitive receptors. Affected receptors are not able to adapt to changes or proceed with their previous livelihood. Mitigation measures are required to reduce impact significance to at least a moderate degree. IA aims to avoid any major residual impacts of the Project, especially the ones that would be long-term or extend over a large area.

4.4.3 MITIGATION AND ENHANCEMENT

One of the key objectives of an ESIA is to identify and define socially and environmentally acceptable, technically feasible and cost-effective mitigation measures. These should avoid unnecessary damage to the environment; safeguard valued or finite resources, natural areas, habitats and ecosystems; and protect humans and their associated social environments. For each significant adverse impact of the Project identified during the ESIA process, the specialists undertaking the assessments will identify mitigation measures that are consistent with statutory requirements and good practice in their respective field. Mitigation measures are developed to avoid, minimize, reduce or remedy (e.g., reinstate or restore) any negative impacts identified, and to create or enhance positive impacts such as environmental and social benefits. In this context, mitigation measures are taken to include design measures and construction practices, as well as management actions. In some instances, mitigation alone may not be sufficient to reduce an impact or effect to acceptable levels and other measure such as offsets can be considered. However, it is good practice to consider mitigation measures in the form of a hierarchy where avoidance is the primary objective and offset is a last resort. These measures are often established through industry standards and may include:

- Changes to the design of the Project during the design process (e.g., location of components, size of structures).
- Construction working practices (e.g., routing of construction traffic, dust suppression).

Operational plans and procedures (e.g., Environmental Management Systems).

For impacts that are initially assessed to be of major significance, a design change is usually required to avoid, minimize, or reduce these, followed by a reassessment of significance. For impacts assessed to be of moderate significance, specific mitigation measures such as engineering controls are usually required to reduce the impacts and their impacts to levels as low as reasonably practicable. This approach considers the technical and financial feasibility of mitigation measures. Impacts assessed to be of minor significance are usually managed through the implementation of management plans, good industry practice, operational plans and procedures.

Once the significance of an impact has been characterized, the next step is to evaluate what mitigation and enhancement measures are warranted. ERM will adopt the following mitigation hierarchy:

- **Avoid at Source; Reduce at Source:** avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity);
- **Abate on Site:** add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping);
- **Abate at Receptor:** if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site);
- **Repair or Remedy:** some impacts involve unavoidable damage to a resource (e.g., agricultural land and forestry due to creating access, labor camp or storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures; and
- **Compensate in Kind; Compensate Through Other Means:** where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

4.4.4 RESIDUAL IMPACT EVALUATION

In case implementation of any additional (not assumed under the Project design documentation embedded controls) mitigation, restoration and offset measures are possible, the relevant actions will be included in the ESMP, and any residual impacts will be assessed taking into account such measures. Residual impacts of **negligible**, **minor** and **moderate** significance are considered acceptable.

However, for some aspects there may be **major** residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in deciding on the Project.

Recommended additional measures to reduce residual impact significance are obligations undertaken by the Company based on the ESIA results. These measures are to be included in the "Commitments Register" and then into the environmental and social management plans (ESMPs) and the regular monitoring plans.

5. STAKEHOLDER ENGAGEMENT

5.1 SUMMARY OF PREVIOUS STAKEHOLDER ENGAGEMENT

Between April 2025 and February 2026, the Project conducted multi-stage stakeholder engagement activities including a public hearing, community profiling, Focus Group Discussions (FGDs), household surveys, and Key Informant Interviews (KIIs) with local communities, government authorities, public service providers, farms, nearby companies, and waste pickers. Stakeholder engagement was carried out across the EIA, scoping, and ESIA stages, with activities respectively conducted in April 2025, January 2026, and February 2026.

During public hearing held on April 29, 2025, for EIA, representatives of relevant authorities and stakeholders presented information on the Project background, scope, and environmental commitments. The Deputy Mayor of Samarkand introduced the national context of waste management and the legal basis for the Project, and provided information on the Project capacity, municipal solid waste supply arrangements, and electricity purchaser during operation. The Samarkand City Department for Ecology and Climate Change explained the public hearing procedures in accordance with applicable legal requirements, while the SUS representative presented the Project location, siting, and the company's commitments to control emissions, waste, noise, dust, gas, and wastewater in compliance with environmental and sanitary regulations under the supervision of relevant sanitary authorities. In addition, the Navruz chairperson expressed support for the project, noting that the company's activities will contribute to the development of the community, and resolutions from Navruz residents were presented during the hearing.

During the ESIA stage, stakeholder engagement activities were supported through the preparation and distribution of a Project flyer to provide stakeholders with accessible information on the Project. In addition, a standardized cover statement introducing the Project and the purpose of stakeholder engagement was incorporated into the interview materials to ensure stakeholders were adequately informed prior to consultations.

Table 5-1 below summarizes the engagement activities at each stage with different stakeholders and respective concerns and expectations.

TABLE 5-1 STAKEHOLDER ENGAGEMENT SUMMARY

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
Local EIA Stage	29 April 2025	Local Communities	Navruz MFY member	Public hearing	*Concerns:* • No specific concerns were raised during the public hearing. *Expectations:* • The Project contribute to the development of the community; • It was highlighted to prioritize environmental protection, apply technologies to protect residents, and comply with ecological requirements.
			Chairperson of Navruz MFY		
		Government Authorities	Samarkand City administration representative		
			Department for Ecology, Environmental Protection and Climate Change		
Scoping Stage	13 January 2026	Local Communities	Navurz Mahalla	Community Profiling	*Concerns:* • There might be potential environmental impacts, such as emissions, odors, waste handling, and possible effects on air quality. These impacts were considered as potential and manageable. *Expectations:* • The Project would improve local social infrastructure, landscaping and enhance living conditions; • The Project would boost employment which should be prioritized in local hiring; • The Project would address existing problems with waste collection and disposal and enhance waste management capacities and bring a cleaner environment;
			Yoshlik Mahalla		
	14 January 2026		Dustlik Mahalla		
			Shakovat Mahalla		
			Urta Turkman Mahalla		
	9 February 2026		Komalot Mahalla		

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
					• The Project would create opportunities for selling locally produced goods and services related to the Project; • Stakeholders noted the need for the Project to provide social support and assistance, particularly in addressing local social needs; • It was suggested to maintain transparent communication and prompt response to complaints through an effective grievance mechanism; • The Project would improve the reliability and quality of electricity supply.
	13 January 2026		General Public	Focus Group Discussions	*Concerns:* • The respondents expressed concerns related to gas supply, specifically its potential decrease due to the Project's potential gas consumption. *Expectations:* • The Project could provide social support to the local community; • It was suggested to establish regular communication and cooperation between the Project representatives and the community.
	12 January 2026	Government Authorities	Department of Ecology, Environmental Protection, And Climate Change Samarkand City Khokimiyat	Key Informant Interviews	*Concerns:* • It was noted that the issue of dioxin emissions from WtE projects remained under consideration; • Air emissions from incineration might impact public health, if not properly handled; • The construction and operation of the Project plant may increase traffic volumes due to the additional Project-related vehicles, which could affect the existing traffic flow during peak traffic time.

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
			Employment and Poverty Reduction Department of Samarkand City		*Expectations:* • It was suggested to ensure compliance with allowable emission thresholds for dioxins and other hazardous pollutants and considering prevailing wind directions to minimize exposure risks to nearby communities; • The Project operation would contribute to improved environmental cleanliness and increase public awareness and responsibility regarding compliance with environmental norms and waste management requirements; • The Project would contribute to the creation of new jobs and support the growth of household incomes in the city; • The Project would help to improve the city's social infrastructure; • The Project would enhance the systematic management and treatment of municipal solid waste, thereby reducing uncontrolled disposal, minimizing odor generation, and mitigating associated public health risks. • It was suggested to comply with health and sanitary requirements, conduct regular health awareness and information sessions, and implement vaccination measures in accordance with national health regulations; • It was suggested to arrange waste transportation and other Project-related heavy vehicle movements during off-peak/night hours, specifically between 22:00 and 08:00; • It is recommended that the Project implement traffic safety and mitigation measures, including the installation of pedestrian crossings, traffic lights, street lighting, and roadside greenery (tree planting); • It was suggested to organize regular information and consultation sessions with local communities in accessible and neutral venues; • It was recommended to apply modern emission control technologies and conduct strict environmental monitoring
			Department of Health of Samarkand City		
			Department of Architecture and Construction of Samarkand Region/City		
	9 February 2026		The Cadastre Department		

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
	12 January 2026	Nearby farm	Ooo "Dargom Parranda Fayz" Zone №5		*Concerns:* • Air emissions could potentially be directed toward the farm, depending on the wind directions and the operation of the Project; • The construction and operation of the Project may affect its reputation and product sales, mainly due to public perceptions associated with waste incineration. *Expectations:* • It was suggested to provide clear information, technical explanations, and transparency regarding emission controls and environmental safeguards.
	12 January 2026	Nearby Companies	SMZ "SAMARQAND METALLURGIYA ZAVODI"		*Concerns:* • The Project may cause cumulative air quality impacts, depending on its operational characteristics and emission controls. • Project construction and operation may increase road congestion and potentially contribute to indirect air emissions and noise from vehicles. *Expectations:* • It is considered necessary and beneficial, particularly in terms of environmental improvement and better waste management; • It was emphasized to install effective air filtration and emission control systems to protect workers' health.
	13 January 2026	Local Communities	Waste pickers	Brief On-Site Interview	Interviews focused solely on understanding the demographic profile, livelihood practices, and working conditions of waste pickers to inform ESIA stage engagement. Waste pickers did not

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
					raise specific concerns or express views on the Project at this stage.
	14 January 2026	Government Authorities	Samarkand City Landfill		Interview focused on understanding overall landfill operations and the dynamics of informal waste picking activities from both community waste pickers and Mugat waste pickers. From the discussion, a general insight was gathered into waste management and the landfill operation. Additionally, the request to interview Mugat waste pickers was denied. No specific concerns or views on the Project were raised during the interview.
ESIA Stage	8 February 2026	Nearby Company	Taychan		No concerns nor expectations were raised during the interview.
		Other livelihoods	Dilshod Agro		*Concerns:* • The Project may potentially affect soil fertility, if dust emissions and air pollutants are not properly controlled; • The Project may affect irrigation water availability if abstracting from the canal, especially in dry seasons; • Potential noise during operational phase from machinery, transport or daily operation. *Expectations:* • Tree planting was recommended as a preventive measure.
	9 February 2026	Public Infrastructure	Zarmed Hospital		*Concerns:* • There may be potential technogenic illness or an increase in seasonal diseases if environmental and sanitary standards are not properly maintained; • Possible release of carbon monoxide and other harmful emissions into the atmosphere;
			City Clinical Hospital No.1		

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
					• Language barrier in case of foreign worker's medical treatment. *Expectations:* • Modern filtration system was recommended to protect public health; • It was recommended to provide a translator or an interpreter to assist medical treatment of foreign workers.
		Government Authorities	Samarkand City Cadastral Agency		The interview focused on clarifying land use status and planning relevant to the Project, particularly for the water pipeline/pump areas and the electricity transmission line area. It has been confirmed that the area is unused state-reserved land. It helped establish the institutional perspective on land administration, the existing land use framework, and the agency's understanding of the land categories relevant to the Project's key infrastructure components. No concerns or expectations were raised during the interview.
	7-9 February 2026		Dustlik Mahalla • Women • Youth		*Concerns:* • Participants expressed concerns related to environmental issues, particularly potential impacts on air quality; • It was highlighted that the Project should not negatively affect the environment or public health. Particular attention was given to potential air pollution and the need for compliance with environmental standards. *Expectations:* • The Project would create employment opportunities, improve road conditions, and help address electricity

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
					supply issues, as well as help to reduce the amount of accumulated waste; • The Project would help to improve overall socio-economic conditions in the mahalla; • The Project would create additional employment opportunities for women and youth; • It was recommended to initiate training courses on women's professional skills and qualifications; • It was suggested to build a sports hall; • It was highlighted to follow strict emission control and apply modern filtration technologies to prevent negative effects on public health and the environment.
	9 February 2026		Komalot Mahalla • Women • Youth		*Concerns:* • It was emphasized to prevent unpleasant odors and environmental pollution during construction and operation; • The Project would cause potential impacts on the atmosphere, and that air emissions could affect environmental quality and public health; *Expectations:* • The Project would bring more job opportunities for the youth; • It was suggested to follow strict emission control and apply effective filtration systems to prevent air pollution; • It was suggested to build a polyclinic to enhance access to healthcare services, a kindergarten near or within the school area, and a sports playground.
	7 February 2026		Navruz Mahalla • Women • Youth		*Concerns:* • The Project would cause potential noise pollution during the operational phase and impact nearby living conditions; • Participants were concerned about the presence and effectiveness of air filtration systems.

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
					Expectations: • The Project would help to improve sanitation conditions and reduce accumulated waste, and enhance regional development by generating stable electricity; • It was recommended to prioritize employment opportunities for local youth, including both permanent positions and temporary jobs during operation; • It was suggested to build textile workshop, a sports ground/stadium and to help upgrade transformers.
	9 February 2026		Sakhovat Mahalla • Farmer • Youth		*Concerns:* • The Project would improve overall sanitary conditions, which could have a positive effect on nearby agricultural land; • The Project should not deteriorate air quality or overall environmental conditions in the area. *Expectations:* • The Project would create more job for the local residents; • It was highlighted that the Project comply with environmental standards, maintain transparency in its operations, and ensure ongoing communication with the local community to promptly address potential issues; • The Project would improve overall sanitary conditions, which could have a positive effect on nearby agricultural land; • It was suggested to build a green buffe zone consisted of trees to control the spread of dust and potential emission, as well as improve the local microclimate; • It was suggested to install effective filtration systems to prevent negative impacts on the environment and nearby agricultural land;

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
					• It was suggested to build a sports hall and develop recreational areas along the Dargom Canal.
	7 February 2026		Urta Turkman Mahalla • Women • Youth		*Concerns:* • Participants expressed concerns of the potential environmental impact of the Project and emphasized the importance of ensuring it does not negatively affect the environment or public health; • There might be noise pollution during the operational phase; • Participants expressed concerns about potential chemical emissions and highlighted the need to strictly control and minimize harmful emissions protect public health and the environment. *Expectations:* • The Project would create employment opportunities for women and youth; • The Project would contribute to socio-economic development and infrastructure improvement; • It was suggested to build a kindergarten and a shuttle bus for workers to ensure safe and convenient transportation to and from the workplace.
	7-9 February 2026		General Community Households (93 households were interviewed under this category)	Household Survey (a total 104 households were interviewed)	*Concerns:* • There might be air emissions and related health risks; • The Project might impact domestic or irrigation water resources from its water consumption; • There might be unpleasant odors; • The Project might produce solid waste issues during construction; • There might be a loss of vegetation or degradation of the greenery; • There might be potential noise pollution during construction and operation;

Stage	Date	Stakeholder Type	Stakeholders Involved	Engagement Type	Concerns or Expectations
					• The Project might cause traffic disruption or increase vehicle movement; • Participants also expressed safety concerns linked to possible accidents, spread of disease or conflicts from labor influx, and loss of income. *Expectations:* • The project would boost employment, especially for women and youth; • The Project would help infrastructure development and enhance sanitation and public health conditions; • The Project might contribute to the growth of tourism; • It was recommended to install effective and advanced filtration system.
			Community waste pickers (11 households were interviewed under this category)		*Concerns:* • The Project might cause air emission which could impact public health; • The Project would cause loss of income and vegetation cover; • There might be unpleasant odors and noise pollution during construction or operation; • There might be impact on domestic or irrigation water resource from the Project's water consumption. *Expectations:* • The Project would boost employment and enhance infrastructure development; • There would be improvement of sanitation conditions and public health

5.2 STAKEHOLDER CONCERNS AND PERCEPTION OF THE PROJECT

The Project conducted consultations during scoping and ESIA stage. This section summarizes stakeholders' concerns and perceptions of the Project, drawing on consultations conducted during scoping stage and ESIA stage.

5.2.1 SUMMARY OF CONCERNS AND ISSUES

Generally speaking, the Project has received support and confidence from both affected mahallas and government authorities. However, certain concerns exist. Based on data collected during both scoping stage and ESIA stage, stakeholders' major concerns primarily relate to potential environmental impacts and associated risks, such as air emissions, odors, and their implications for public health. In addition, household survey provides other insights into perceived project impacts, with top three most concerned impacts being unpleasant odors, health problems from air emissions, and water shortage. ***Table 5-2*** presents the key perceived impacts reported by households surveyed.

TABLE 5-2 PROJECT CONCERNS AND RESPONSE MATRIX

Stakeholder Type	Concerns	Integration into Project ESIA
Local communities	Potential air emissions, odors, air quality deterioration, environmental pollution, noise pollution during both construction and operation.	Impacts on potential air emissions, odors, air quality deterioration, environmental pollution, noise pollution are assessed in Sections 8.1, 8.5 and 10.4; mitigation measures proposed in Sections 8.1.5, 8.5.4, including emission treatment/CEMS, odor control, dust suppression, noise control, monitoring, disclosure and GM.
	Impacts on public health during operation	Impacts on public health during operation are assessed in Section 10.4.2.2; mitigation measures proposed in Section 10.4.2.2, including CHSMP, air-quality monitoring/disclosure, SEP implementation and accessible GM.
	Potential vegetation degradation	Impacts on potential vegetation degradation are assessed in Sections 8.1, 8.7 and 10.4; relevant measures are proposed/recorded in Section 5.2 as stakeholder-requested green buffer/tree planting/landscaping, and in Section 8.7 through minimized clearance, restricted disturbance, restoration of disturbed areas and biodiversity awareness/training.
	Impacts on domestic and irrigation water resources.	Impacts on domestic and irrigation water resources are assessed in Section 8.3, Sections 10.3 and 10.5; mitigation measures are proposed in Section 8.3.4

Stakeholder Type	Concerns	Integration into Project ESIA
		through zero wastewater discharge, onsite treatment/reuse, anti-seepage/containment, rain-sewage separation and groundwater monitoring, and in Section 10.5.2 through water-use disclosure, engagement with water authorities/community representatives, and GM for utility or water-related concerns.
	Labor influx-related accidents, including disease spread, conflicts, and possible income loss.	Labor influx-related accidents, disease spread, conflicts and possible income loss are assessed in Sections 10.3, 10.4, and 10.6; mitigation measures are proposed in Section 10.3 through livelihood support, vocational training, job disclosure and priority hiring, in Section 10.4 through CHSMP, disease prevention, CoC/GBV-SEAH controls, SEP and GM, and in Section 10.6 through EHS procedures, worker training, PPE, emergency preparedness and Workers Accommodation Management Plan.
	Potential reduction in gas supply due to Project gas consumption.	Potential reduction in gas supply due to Project gas consumption is assessed in Section 5.2 and addressed under Section 10.5; mitigation measures are proposed in Section 10.5.2 through resource-use disclosure, engagement with utility authorities/community representatives, and GM for utility-related concerns, while the impact is

Stakeholder Type	Concerns	Integration into Project ESIA
		considered negligible as gas is mainly used for start-up rather than continuous operation.
	Poor waste handling could impact nearby communities	Poor waste handling impacts on nearby communities are assessed in Section 8.6 and Section 10.4; mitigation measures are proposed in Section 8.6.4 through CWMP/WMP, designated storage, qualified transporters, waste inventory, fly ash stabilization, leachate incineration, containment, labelling, training and emergency response, and in Section 10.4 through CHSMP, monitoring/disclosure, stakeholder engagement and GM for community health concerns.
	Traffic risks from heavy vehicles	Traffic risks from heavy vehicles are assessed in Section 10.4 and Section 11.5; mitigation measures are proposed in Section 11.5.4 through Traffic Management Plan, designated routes, speed limits, signage, driver licensing/screening, fatigue management, vehicle inspection, incident reporting and emergency response, and in Section 10.4.2.1; 10.4.2.2, and 10.5.2.1 through community disclosure, engagement and GM for traffic-related complaints
Government authorities	Dioxin emissions from WtE operations affecting public health, if not properly handled	Dioxin emissions from WtE operations affecting public health are assessed in Section 8.1 and Section 10.4.2.2; mitigation measures are proposed

Stakeholder Type	Concerns	Integration into Project ESIA
		in Section 8.1.5 through combustion control, activated carbon adsorption, baghouse filters, CEMS and dioxin monitoring, and in Section 10.4.2.2 through CHSMP, public disclosure of air monitoring results, SEP and GM for odor/dust/smoke/health concerns.
	Increased traffic volumes and congestion from Project vehicles.	Increased traffic volumes and congestion from Project vehicles are assessed in Sections 10.4.2.1, 10.5.2.1 and Section 11.; mitigation measures are proposed in Section 11.5.4 through Traffic Management Plan, designated routes, speed limits, driver screening/fatigue management and incident reporting, and Sections 10.4 and 10.5 through community disclosure, engagement, advance notice and GM for traffic-related complaints.
Public Infrastructure	Potential risks on technogenic illness or an increase in seasonal diseases	Potential risks of technogenic illness or increased seasonal diseases are assessed in Section 10.4; mitigation measures are proposed in Section 8.1 and 8.6 through emission, odour and waste-management controls, and in Section 10.4 through CHSMP, health awareness/disease prevention, coordination with health authorities, SEP, disclosure and GM for health-related concerns.

Stakeholder Type	Concerns	Integration into Project ESIA
	Possible release of carbon monoxide and other harmful emissions into the atmosphere	Possible release of carbon monoxide and other harmful emissions into the atmosphere is assessed in Section 8.1 and Section 10.4.2; mitigation measures are proposed in Section 8.1.5 through flue-gas treatment, CEMS for CO and other pollutants, stack/ASR monitoring, regular maintenance, odour/fugitive emission control and dust suppression, and in Section 10.4.2 through CHSMP, public disclosure, SEP and GM for air-quality/health concerns.
	Language barrier in case of foreign worker's medical treatment	Language barrier in foreign workers' medical treatment is assessed in Sections 10.4 and 10.6; mitigation measures are proposed though coordination with local health providers, multilingual health/EHS information and training, culturally appropriate GM, and emergency communication in languages understood by foreign workers.
Nearby farm	Air emissions could potentially be directed toward the farm.	Air emissions potentially directed toward the farm are and assessed in Sections 7.1 and 7.4, Section 8.1, and Section 10.4.2.2; mitigation measures are proposed in Section 8.1.5 through flue-gas treatment, CEMS, downwind/ASR monitoring, odour/fugitive emission control and maintenance, and in Section 10.4.2.2 through green buffer zone

Stakeholder Type	Concerns	Integration into Project ESIA
		recommendations, disclosure, stakeholder engagement and GM for air-quality.
	The construction and operation of the Project may affect its reputation and product sales	Reputation and product sales impact assessed in Section 10.4.2, mitigation measures are proposed in Section 10.4.2 through stakeholder engagement, information disclosure, grievance mechanism and green buffer zone and emission control.
	Degradation on soil fertility	Potential impacts on soil is assessed in assessed in Sections 7.3 and 8.4, and Section 10.3, and mitigation measures are proposed in Section 8.4.4 through soil protection, spill prevention, waste management and controlled material handling, and in Section 10.3 through land-use management, monitoring and stakeholder engagement to minimize impacts on agricultural productivity.
	Impacts on irrigation water resources	Impacts on irrigation water resources are assessed in Sections 7.6 and 8.3, and Section 10.5, and mitigation measures are proposed in Section 8.3.4 through water abstraction control, wastewater treatment and full reuse (zero discharge), anti-seepage design and runoff management, and in Section 10.5 through stakeholder engagement, disclosure and grievance mechanism for water-related concerns.

Stakeholder Type	Concerns	Integration into Project ESIA
	Noise disturbance during operational phase from machinery, transport or daily operation	Noise disturbance from machinery, transport and daily operation is assessed in Sections 7.5 and 8.5, and Section 10.4.2, and mitigation measures are proposed in Section 8.5.4 through low-noise equipment, enclosure/silencing, maintenance and operational controls, and in Section 10.4.2 through community disclosure, stakeholder engagement and grievance mechanism for noise-related complaints.
Nearby companies	cumulative air quality impacts	Cumulative air quality impacts are assessed in Sections 8.1 and 12.6, and Section 10.4.2, and mitigation measures are proposed in Section 8.1.5 through flue-gas treatment systems (SNCR, dry scrubbing, activated carbon, bag filters), CEMS and modelling-based emission control, and in Section 10.4.2 through disclosure, stakeholder engagement and grievance mechanism for air-quality-related concerns.
	Project construction and operation may increase road congestion and potentially contribute to indirect air emissions and noise from vehicles.	Traffic congestion and potential indirect air emissions and noise is assessed in Sections 8.1 and 8.5, and Section 10.4.2, and mitigation measures are proposed in Section 8.1.5 and 8.5.4 through traffic management, vehicle emission control, dust suppression, routing and scheduling, and in Section 10.4.2 through community disclosure, stakeholder

Stakeholder Type	Concerns	Integration into Project ESIA
		engagement and grievance mechanism for traffic-related air and noise concerns.

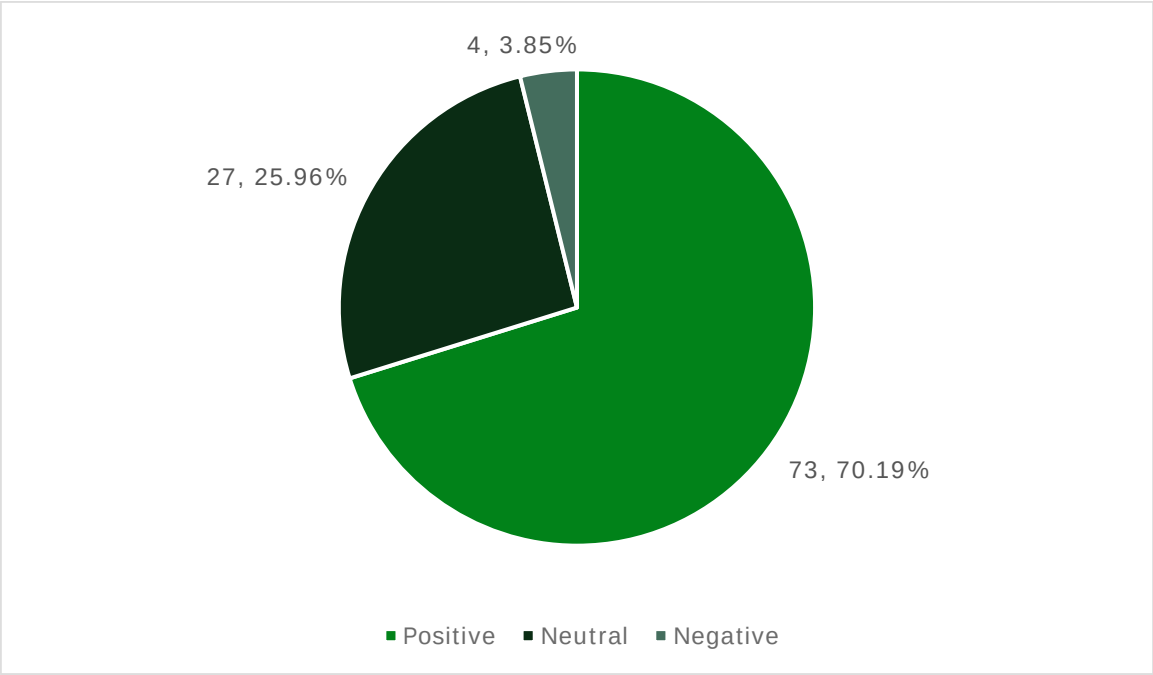
5.2.2 PERCEPTION TOWARDS THE PROJECT

The Project carried out various engagement activities, and the results demonstrate a generally positive attitude toward the Project from the local mahallas.

During 7 to 9 February 2026, ERM, together with its local partner BIK, conducted a household survey in five mahallas that falls into the social Area of Influence (AoI) of the Project, namely Navurz mahalla, Komalot mahalla, Sakhovat mahalla, Urta Turka mahalla and Yoshlik mahalla.

Among all 104 households surveyed, 73 households (70.19%) expressed support to the Project, noting the Project's potential to promote the comprehensive development of mahallas, expand employment opportunities and enhance living environment. The remaining 31 households, accounting for 29.81% of the total, maintained a neutral or negative stance. They generally expressed a lack of confidence in the Project, with some raising concerns over the potential environmental impacts. This indicates a need for a timely information disclosure and continued public engagement activities. The figure below illustrates the overall perceptions of households surveyed toward the Project

FIGURE 5-1 SURVEYED HOUSEHOLD PERCEPTION ON THE PROJECT



In addition, the household survey indicates that, among 104 surveyed households, 61 households (58.65%) reported no concerns about the Project, while 10 households (9.62%) responded "don't know" and 33 households (31.73%) expressed specific concerns. Among these 33 households, the most frequently cited concern relates to air emissions and associated health impacts, followed by potential impacts on domestic and irrigation water resources due to the Project's water consumption, and increased traffic volume.

In terms of envisaged positive impacts from the Project, 90 respondents (86.54%) believed the Project would generate benefits, while 14 (13.46%) did not identify any. The most commonly anticipated benefits include job creation, improved sanitation conditions and public health, and enhanced infrastructure.

Below table demonstrates both negative and positive perceptions towards the Project as indicated in the household survey.

TABLE 5-3 SUMMARY OF NEGATIVE AND POSITIVE PERCEPTIONS

Negative Perceptions		**Positive Perceptions**	
Description	**Number (%)**	**Description**	**Number (%)**
Air emissions and related health conditions	30 (28.85%)	Job creation for local residents	75 (72.12%)
Impacts on domestic and irrigation water from Project water consumption	5 (4.81%)	Improved sanitation and public health	40 (38.46%)
Increased traffic volume	5 (4.81%)	Upgrade of Infrastructure	19 (18.27%)
Don't know	10 (9.62%)	Increase in tourism	18 (17.31%)
No concerns	61 (58.65%)	None	12 (11.54%)
Others (unspecified)	1 (0.96%)	Others (unspecified)	2 (1.92%)

Source: Household Survey undertaken by ERM in Feb 2026

5.2.3 COMMUNITY NEEDS ASSESSMENT

During community profiling activities carried out in January 2026, top three needs are i) internal roads upgrading; ii) better street lightings; and iii) other livelihood facilities, including the upgrade of sewage system, electricity supply, water pipeline and irrigation supply, and access to/ the construction of a school. ***Table 5-4*** below gives a detailed description of needs of all affected mahallas.

TABLE 5-4 MAHALLA-LEVEL COMMUNITY NEEDS

Mahalla	**Major Needs Raised**
Dustlik	• Installation and improvement of street lighting • Improvement of internal roads • Irrigation infrastructure and water supply irrigation
Komalot	• Improvement of internal roads • Street lighting
Navruz	• Improvement of internal roads • Installation and improvement of street lighting poles • Replacement and upgrading of water supply pipelines

Mahalla	Major Needs Raised
Sakhovat	• Installation and improvement of street lighting • Construction or upgrading of an electrical substation • Improvement of internal roads
Urta Turkman	• Installation and improvement of street lighting • Children playground • Kindergarten/Pre-school facilities
Yoshlik	• Improvement of internal roads • Expansion of the sewage system • Installation and improvement of street lighting

Source: Community Profiling undertaken by ERM in Jan 2026

5.3 CONSIDERATION FOR FUTURE STAKEHOLDER ENGAGEMENT

5.3.1 ESIA DISCLOSURE

Engagement activities under the ESIA require regular communication with national and local government authorities, CSOs, NGOs, Project Affected Communities, and other relevant stakeholders such as the EPC and contractors. This ongoing dialogue is essential to establish a feedback loop that captures stakeholders' inputs on the Project's impacts, and the proposed mitigation and implementation measures outlined in this ESIA and HRIA.

The Stakeholder Engagement Plan, including detailed past stakeholder engagement records, information disclosure and Grievance Redress Mechanism, is proposed in ESIA ***Appendix B Stakeholder Engagement Plan***.

5.3.2 ONGOING ENGAGEMENT DURING CONSTRUCTION AND OPERATION PHASES

Engagement activities during the construction and operation phases will focus on maintaining regular communication with Project Affected Communities, relevant government authorities, vulnerable groups, waste pickers, public service providers, and other stakeholders identified in ESIA ***Appendix B Stakeholder Engagement Plan***. Ongoing engagement at these stages is essential to ensure that stakeholders remain informed of construction and operation progress, potential impacts, and the implementation of mitigation measures. This includes proactive disclosure of construction and operational activities, expected disturbances (such as noise, dust, odor, and traffic changes), workforce arrangements, and any Project updates that may affect local communities or service providers.

5.4 PROJECT GRIEVANCE MECHANISM

From the commencement of construction, the Project has established and publicly disclosed a Grievance Mechanism (GM) to ensure that stakeholders have accessible and transparent channels to raise concerns related to project activities. The grievance channel has been publicized via suggestion boxes installed at both the Project main gate and the entrance to the worker accommodation. A gap analysis has been conducted related to eligibility clarity, gender

and GBV-responsiveness, confidentiality safeguards, cultural appropriateness, submission channels and recording and monitoring system. An enhanced GM has been proposed in the ESIA ***Appendix B Stakeholder Engagement Plan***.

6. SCREENING AND SCOPING

6.1 INTRODUCTION

The scoping phase of an ESIA process aims to identify those impacts that are most likely to be significant and which need to be assessed as part of the ESIA process.

The following key activities were undertaken during the screening and scoping process:

- Gathered information on the Project activities;
- Listed the potentially relevant environmental and social resources in the study area;
- Mapped potential interactions between the Project activities and environmental and social resources by way of a Scoping Matrix; and
- Taking into consideration the information gathered on the extent and nature of the Project activities, and the existing condition/sensitivities of the resources, the potential interactions have been prioritized in terms of their likelihood of causing significant impacts.

6.2 SCOPING MATRIX

Potential impacts have been identified through a systematic process whereby the features and activities associated with the construction and operation of the Project have been considered with respect to their potential to interact with environmental and social resources/receptors. A Scoping Matrix has been developed to support this assessment and to enable the identification of interactions in a consistent way. Potential impacts have each been classified in one of four categories:

- No interaction: where the Project is unlikely to interact with the receptor (colored white);
- Interaction likely, but not likely to be significant: where there is likely to be an interaction, but the resultant impact is unlikely to change baseline conditions in an appreciable/detectable way (colored grey);
- Significant interaction: where there is likely to be an interaction, and the resultant impact has a reasonable potential to cause a significant effect on the resource/receptor (colored black); and
- Positive interaction: where an interaction is reasonably possible and at least one of the resulting impacts is likely to lead to an effect that is significantly positive (colored green).

TABLE 6-1 SCOPING MATRIX

Receptor / Resources / Project Activities	Physical Environment							Biological Environment		Socio-economic							
	Air Quality (including GHG)	Noise	Soil	Surface Water	Groundwater	Waste	Landscape and Vision Character	Terrestrial and freshwater aquatic Biodiversity[3]	Ecosystem Service	Local governance and social dynamics	Land use and livelihood	Occupational Health and Safety	Community Health and Safety	Human Rights	Economy, Employment and Income	Cultural Heritage	Public Infrastructure and Facilities
Construction																	
Land acquisition/lease																	
Transportation of construction materials	■	▒										■	■	■			▒
Clearance of the Project area and site formation	■	■	▒			■	▒	▒				■	▒	■			
Construction of WtE Plant, transmission line, water supply system	■	■	▒			▒	▒	▒				■	▒	■			▒
Presence of workforce (residing in the temporary worker camps)	▒					▒		▒		▒		■	■	■	■		▒
Presence of security personnel	▒					▒						■	■	■			
Procurement of goods and services														▒	■		
General utility supply	▒				▒												▒
Operation and Maintenance																	
Transportation of chemicals and waste	▒	▒										■	▒	■			

[3] The impacts of the Project's Construction and the presence of the workforce are expected to be not significant due to the highly modified landfill habitat, but they will still be assessed in the ESIA.

Presence and operation of WtE Plant (excluding transmission Line, water supply system)																		
Presence and operation of Transmission Line																		
Presence of Workforce																		
Presence of security personnel																		
Procurement of goods or services																		
General utility supply (including water supply system)																		
Unplanned Events																		
Fire and explosion																		
Spill and leak of chemical (including on-site and during transportation)																		
Traffic accidents																		

	An interaction is not reasonably expected and will be scoped out of further consideration in the Impact Assessment process.
	An interaction is reasonably possible but none of the resulting impacts are likely to lead to significant effects.
	The interaction is reasonably possible and at least one of the resulting impacts is likely to lead to an effect that is significantly negative.
	The interaction is reasonably possible and at least one of the resulting impacts is likely to lead to an effect that is significantly positive

6.3 SCOPING RESULTS

TABLE 6-2 SCOPING RESULTS

Impact Receptors/Resources	Construction Phase	Operation Phase
Environment		
Ambient Air	• Construction equipment and transportation vehicles powered by diesel emit pollutants such as nitrogen oxides (NOx), hydrocarbon (HC), particulate matter (PM), sulfur dioxide (SO_2) and CO. These pollutants can lead to adverse health impacts and affect amenity and ecology. • Construction works are associated with dust raising activities (earthwork, and traffic on unpaved areas). These can settle on nearby vegetation and structures, potentially leading to environmental and aesthetic concerns. • The project will generate GHG emissions linked to fossil fuel combustion and electricity consumption during construction phase.	• The operation of incinerator will generate PM, SO_2, NOx, HCl, HF, heavy metals, Dioxins and CO. • The handling and storage of waste will generate odorous emissions (NH_3, H_2S). • The project will generate GHG emissions linked to fossil fuel and waste combustion during operation phase. • *Scoped out* - Given the roads within the site will be paved and Samarkand Ring Road has already paved, emissions from vehicles are unlikely to lead to significant impact and are scoped out for further assessment.
Noise	• Onsite construction activities will lead to the noise level increase in the surrounding noise environment, potentially affecting nearby receptors. • *Scoped out* – the transportation of construction materials and workforce is not expected to be significant potential noise sources.	• The operation activities (cooling tower, water pump station etc.) may lead to the noise level increase in the surrounding noise environment. • *Scoped out* – the transportation of raw materials and workforce is not expected to be significant potential noise sources.
Soil	• *Scoped out* –As the land was previously used as a landfill, activities such as land clearance, site formation, stripping of topsoil, foundation excavation and backfilling within the project construction area has completed in rainless season and would not lead to significant excavation damage, loss of vegetation cover and loss of ground surface protection, resulting in reduced soil water storage capacity and soil erosion.	• Leachate dripped and was washed by rainfall into soil and groundwater during on-site transport. • Incineration emissions diffuse and deposit into soil, then leach into groundwater via rainfall. • Other operation activities affect the soil quality. • Anti-seepage failure is considered in unplanned events, not under normal operating conditions.

Impact Receptors/Resources	Construction Phase	Operation Phase
Groundwater	• *Scoped out* –Negligible impact on water quantity and no impact on water quality. o The project will intake maximum 80 m³ per day from three wells during construction phase, representing 0.02% of residual water resources for groundwater in Samarkand region (explored reserves groundwater is 0.78 km^3/yr and withdrawal 0.66 km^3/yr). o Most of the construction water is used for dust suppression and the consumption is 1- 2 L/m² per day. The water will be absorbed by the surface soil or vegetation. Due to local evaporation far exceeds precipitation, the spraying water is almost impossible to reach the aquifer (below the ground surface by over 40 meters).	• Leachate dripped and was washed by rainfall into soil and groundwater during on-site transport. • Incineration emissions diffuse and deposit into soil, then leach into groundwater via rainfall. • Anti-seepage failure is considered in unplanned events, not under normal operating conditions.
Waste	• Hazardous and non-hazardous waste will be generated during construction phase.	• Hazardous and non-hazardous waste will be generated during operation phase.
Surface Water	• No impact - considering the distance to nearest surface water body and no wastewater will be discharged into surface water body. o Domestic sewage will be transported by tanker trucks to off-site treatment facilities, where it is treated and discharged. No wastewater will be discharged into Dargom Canal.	• *Scoped out* –Negligible impact on water quantity and no impact on water quality. o The Dargom Canal serves primarily for irrigation. The project will intake 3,146.8 m³ per day from Dargom Canal, representing 0.04% of the Dargom Canal's flow. o Domestic and industrial wastewater will be treated and reused onsite, no wastewater will be discharged into surface water body.
Landscape and Visual Character	• *Scoped out* – As the land was previously used as a landfill, the earthwork and the presence of construction machineries are not expected to impact significantly on the aesthetics of the landscape	• *Scoped out* - the architectural design of WtE plant has already taken into account local customs and will not cause disharmony with the surrounding community
Biodiversity		

Impact Receptors/Resources	Construction Phase	Operation Phase
Terrestrial Habitats, Flora and Fauna (Birds, Mammals, Reptiles, Amphibians)	• Direct loss of habitat for birds due to the land use of the site clearing, transmission line, pipeline, and pump station. The impact is expected to be not significant due to the highly modified landfill habitat, but they will still be assessed in the ESIA. • Illegal killing of fauna for food (hunting) or collection from the workforce. The impact is expected to be not significant due to the highly modified landfill habitat, but they will still be assessed in the ESIA.	• *Scoped out* – secondary impact to the biodiversity of pollutant discharge, air and noise emission. • *Scoped out* – the negligible impact of transmission line on bird collision. As the transmission line, linked with existing grid, is only for 800m.
Freshwater aquatic Habitats, Flora and Fauna	• *Scoped out* No credible interaction with surface-water ecosystems, as all construction water will be sourced from groundwater wells, with no abstraction, discharge or works involving surface water bodies.	• *Scoped out* – The negligible impact of water abstraction on the freshwater aquatic biome. As water abstraction rate is lower than 1% of average water flow of the river.
Ecosystem Service	• *Scoped out* - Project area is a highly modified and fragmented urban landscape with no credible pathway of impact or project dependency on natural ecosystem services.	• *Scoped out* – The negligible impact of water abstraction on water provisioning service.
Social and Human Rights		
Socio-Economic		
Local governance and social dynamics	*Scoped out* • Project construction is expected to bring limited impacts to local governance and social dynamics through worker influx induced by construction workers.	*Scoped out* • The closure of Samarkand City Landfill which is only partially attributable to the Project, could potentially lead to the loss of partial livelihood of nearby waste pickers and impact the local governance dynamic on waste-pickers. However, considering the small number of affected waste pickers, the impact on local

Impact Receptors/Resources	Construction Phase	Operation Phase
		governance and social dynamics is expected to be limited. • The scale of labor-influx during the operation phase is substantially smaller than construction phase, which will bring minimal impacts on local cultures, values, and power structure.
Land use and livelihood	*Scoped out* • It is confirmed through consultation with the Cadastral Department of Samarkand City as well as local communities that the land for the Project, including the WtE plant, the water pipeline and pump, and the transmission line, is all state-reserved land with no community land users in the past 5 years. No economic or physical displacement has been conducted in the past 5 years or is expected to occur in the future for the Project.	• The closure of Samarkand City Landfill which is only partially attributable to the Project, could potentially lead to the loss of partial livelihood of nearby waste pickers and Mugat waste pickers, and loss of jobs of the 10 direct employees of the Samarkand City Landfill. • The Project will source its water from the Dargom Canal which may create tensions with nearby communities that rely on the canal for irrigation. This could potentially further affect local agriculture and livelihoods.
Occupational health and safety	• There is the potential for workers to be exposed to unsafe and unhealthy working conditions (e.g. extended working hours or heat weather conditions) during construction due to their inadequate safety procedures or their poor implementation and enforcement, insufficient risk assessments, defective or inappropriate tools and equipment, or a lack of adequate training. • The labor right risks and occupational health and safety risks may be exacerbated by the engagement of multiple tiers of contractors. Without an adequate contractor management system and plan, this structure can increase the risk of unfair labor practices and non-compliance issues, including but not limited to poor working conditions, discrimination, and excessive working hours. • Worker accommodation will be provided with both direct and contracted workforce. If there is low hygiene and safety standards, the health and wellbeing of the workers could be negatively affected.	• The operational phase could result in unsafe or unhealthy working conditions if there are no policies, procedures and processes (including the right equipment and monitoring mechanisms) in place. Potential OHS impacts include: o Biological impacts: Exposure to toxic by-products (VOCs, H_2S, dioxins) and diseases from waste handling. o Chemical impacts: Presence of hazardous chemicals in waste and plant operations. o Physical hazards: Risks from heavy truck operations and repair activities. o Psychological problems: Odor annoyance linked to stress and health concerns. Inadequate workplace health and safety measures could lead to serious or irreversible impacts, including injuries or in worst case, fatalities. These issues could have long-term health and wellbeing

Impact Receptors/Resources	Construction Phase	Operation Phase
		impacts on workers, and indirectly on local communities, workers' families or dependents. • Similar to the construction phase, the health and wellbeing of the workers could be negatively affected by low hygiene and safety conditions resulted from lack of management of the worker accommodation.
Community Environment, Health and Safety	• Environmental impacts such as air emissions and noise during construction phase from land clearance and site formation as well as installation of Project facilities have the potential to affect the health of residents living near the Project site. • Transportation of Project construction materials may generate increased heavy vehicle movements on local roads, potentially leading to road safety risks for other road users. • An influx of workers could increase the transmission of communicable disease and add further strain to existing insubstantial health care and other public services, which could negatively impact the health of the communities. • Inappropriate behavior by the Project security personnel—such as the potential use of excessive force—could lead to tensions and conflicts within the community. • Inappropriate conduct by the predominantly male working-age project workforce may increase the risk of Gender-Based Violence (GBV) and petty crime affecting the safety of local communities.	• Environmental impacts such as emission from waste combustion; Accidental leakage of untreated water or leachate, etc., have the potential to affect the health of residents living near the Project site. • A modest increase in local traffic is expected from the transport of workers, goods and materials (including the municipal waste feedstock) during operation phase, which may pose safety risks to other road users. • Inadequate training and poor behavior of the Project security personnel may pose risks on community health and safety. • Worker influx and poor conduct can bring out the risk of Gender-based violence to the local community. • Inappropriate fly-ash disposal or failed fly-ash landfill treatment may pose risk to community health. • Given the limited number of workers to be employed during the operational phase, the potential risks to community health and safety, including increased communicable diseases, pressure on local medical services, and petty crime, are considered insignificant.
Economy, Employment and Income	• Employment of local workforce will bring potential for skills transfer and increased income leading to indirect benefits for the local economy. • The Project may lead to positive benefits to the local economy as they purchase goods and acquire services.	• Employment of local workforce will bring potential for skills transfer and increased income leading to indirect benefits for the local economy. • The Project may lead to positive benefits to the local economy as they purchase goods and acquire services.

Impact Receptors/Resources	Construction Phase	Operation Phase
Public Infrastructure and Transportation	• *Scope out* – Given the small volume of electricity, gas, and groundwater abstraction from wells during the short construction phase, the potential for crowding-out of other energy and water users is not significant. Relevant engagement measures will be proposed in the Stakeholder Engagement Plan of the Project to address any unforeseeable community concerns. • Scope out – Limited amounts of traffic increase, short construction time and limited resource needs all make this impact less significant.	• The Project is expected to bring positive impact on local electricity supply through waste to energy operations. • Although the Project's impact on water quantity of the Dargom Canal during the operation phase is considered negligible, water users of the Dargom Canal who depend on it as their main irrigation source have raised concerns about water shortages from November to March, the potential small impact of the project's water use on agricultural livelihood of the Dargon Canal water users will be assessed in section above. • *Scope out* – Before and after the Project becomes operational, the traffic generated by vehicles accessing the WtE plant and those travelling between the WtE plant and the adjacent landfill is not expected to result in any significant increase in traffic volume.
Cultural Heritage	*Scoped out* • No risk factors have been identified for possible cultural heritage overlapping with the Project footprint or within Project AoI. Also considering it is a brownfield project which build on the abandoned phosphate landfill, impacts from the Project on cultural heritage resources are not anticipated.	
Indigenous People	*Scoped out* • There are no indigenous communities present in the social AoI based on desktop research and stakeholder engagement with relevant stakeholders.	
Human Rights		
Labor and Working Conditions	• If no appropriate labor policy and management procedures are in place, the absence of management system can induce potential violations of workers' rights, including: o Potential employment of children or forced or bonded labor.	• If no appropriate labor policy and management procedures are in place, the absence of management system can induce potential violations of workers' rights, including: o Potential employment of children or forced or bonded labor.

Impact Receptors/Resources	Construction Phase	Operation Phase
	o Accidents, injuries or other health and safety risks, which can arise from hostile or unsafe working conditions, such as excessive overtime and insufficient rest. o Potential for discriminatory practices to occur in the hiring process, decisions regarding remuneration, and exercising the rights to freedom of association and collective bargaining. o Inappropriate or delayed payments to workers especially for the contracted worker.	o Accidents, injuries or other health and safety risks, which can arise from hostile or unsafe working conditions, such as excessive overtime and insufficient rest. o Potential for discriminatory practices to occur in the hiring process, decisions regarding remuneration, and exercising the rights to freedom of association and collective bargaining. o Inappropriate or delayed payments to workers especially for the contracted worker.
Labor rights in the supply chain	*Scoped out* • No primary upstream materials will be purchased at this stage of the Project.	• Waste Collection and Segregation are within the primary supply chain of the WtE Plant, gathering municipal solid waste (MSW), industrial residues, agricultural waste, and other biomass streams can cause injury, disease infections and spreads, if without proper protection and monitoring. • Waste Collection and Segregation workers may potentially face low wages, deteriorated living conditions, forced labor, long working hours, lack of training and equipment, etc.
Vulnerable and Marginalized Groups	• Vulnerable groups in employee cohorts or communities are likely to face several disadvantages. Marginalized groups in particular (e.g. ethnic or religious minorities, and women) may face barriers to effectively speak out on issues or be sidelined for employment due to local social or political influences. This could result in negative impacts on access to employment and basic services by vulnerable groups in favour of those with better social and political access.	• Vulnerable groups (e.g. informal waste pickers, elderly, ethnic or religious minorities) could face safety concerns from Project security personnel and police force if attempting to collect waste or face further social exclusion. • Vulnerable groups may remain marginalized if their specific issues and access to opportunities remain unresolved and grievance mechanisms are not inclusive, accessible, trustworthy and fair.
Access to Remedy	• The lack of an effective remedy for individuals and communities who may suffer from potential human rights risks directly or indirectly related to company actions is a concern.	• If the grievance mechanisms are absent during the operation phase, the individuals and communities who may suffer from potential human rights risks directly or indirectly related to company actions will fail to access remedy.

Impact Receptors/Resources	Construction Phase	Operation Phase
Community Security Associated with Employment of Security Personnel	• During the construction, the Project's security personnel will be provided by the local security companies. The private security company could employ poorly trained security workers who may inflict excessive force on community members in the event of inappropriate behaviors including excessive force.	• Same as construction phase, the Project's security personnel will be provided by the local security companies. The private security company could employ poorly trained security workers who may inflict excessive force on community members in the event of inappropriate behaviors including excessive force.
Unplanned Events		
Fire and explosion	• Explosions and fire may endanger the health and safety of workers and the community. • Explosion and fire may release pollutants into the atmosphere, including particulate matter, volatile organic compounds (VOCs), and potentially hazardous gases, which may degrade air quality. • Direct exposure to fire and explosion may cause significant harm to terrestrial flora and fauna. Wildlife habitats can be destroyed, leading to displacement and potential injury/mortality of animals. • Ecosystem services of vegetation cover, such as pollination and carbon sequestration, can be adversely affected by fire and explosion.	
Spill and leak of chemical (including on-site and during transportation)	• Accidental spillage / leak of chemicals / hazardous materials around unpaved areas may lead to contamination of soil and ground water. • Failure of anti-seepage systems during operation phase may cause contamination of soil and groundwater. • If chemical / materials can volatilize to atmosphere, it may affect the ambient air near the accident area and endanger the health and safety of workers and surrounding communities.	
Traffic accidents	• As the road networks to the Site are public road, this could potentially increase the risk of accidents with other road users and hance potential safety risks to the surrounding community from accidental/ unplanned event.	

7. ENVIRONMENTAL BASELINE

7.1 CLIMATE AND METEOROLOGY

7.1.1 TEMPERATURE

The climate of Samarkand city is sharply continental. Summers in Samarkand are hot, arid, and clear, while winters are very cold, snowy, and sometimes cloudy. Throughout the year, temperatures usually range from -2 °C to 33 °C and rarely fall below -9 °C or rise above 37 °C. The annual average temperature over the years is 15.5 °C.

Summer lasts from May to September, with a maximum daily average temperature above 28 °C. The hottest month of the year in Samarkand city is July, with an average daily maximum temperature of 33 °C and a minimum of 19 °C. The absolute maximum temperature in Samarkand city is 42.0 °C (2021.7.8). The relative humidity in winter is around 25%.

Winter lasts from November to March, with a minimum daily average temperature below 11 °C. The coldest month of the year in Samarkand city is January, with an average daily maximum temperature of 6 °C and a minimum of -2 °C. The absolute minimum temperature in Samarkand city is -20.0 °C (2008.1.23). The relative humidity in winter is around 59%.

7.1.2 PRECIPITATION

The rainy period of the year lasts from October to May, with a rolling 31-day rainfall of at least 13 mm. The month with the most rain in Samarqand is March, with an average rainfall of 33 mm.

The rainless period of the year lasts from May to October. The month with the least rain in Samarqand is August, with an average rainfall of 1 mm.

The maximum annual precipitation is 564.8 mm (2002), while the minimum annual precipitation is 158.4 mm (2001). The maximum snow depth over the years is 32 cm.

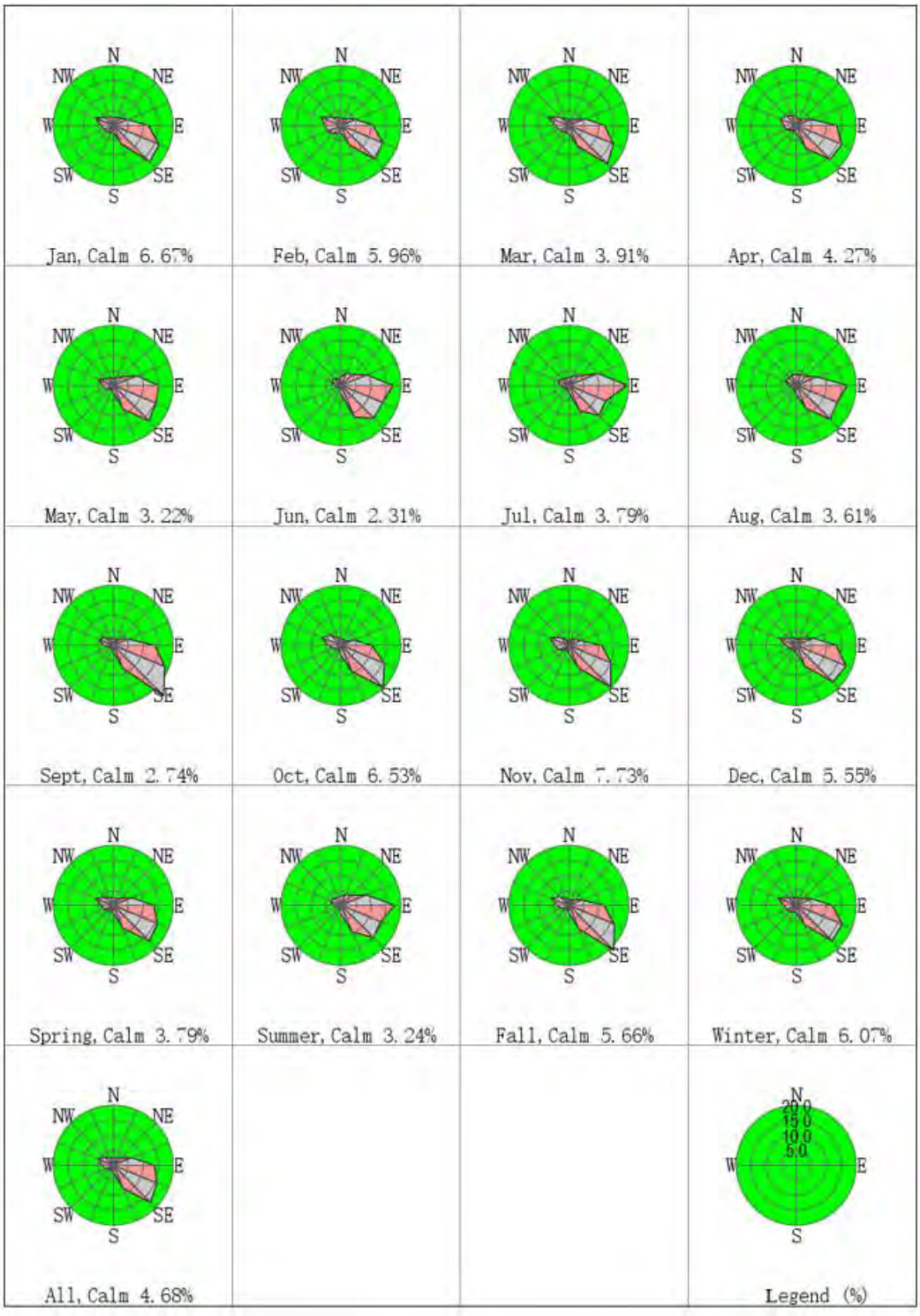
7.1.3 WIND

The windier part of the year lasts from June to September, with average wind speeds of over 3.6 m/s. The windiest month of the year in Samarqand is July, with an average hourly wind speed of 4.4 m/s.

The calmer time of year lasts from September to June. The calmest month of the year in Samarqand is November, with an average hourly wind speed of 2.8 m/s.

The wind rose diagram based on meteorological data of over a period of five years (2020 to 2024) is shown in ***Figure 7-1***. The prevailing wind direction of the area is SE.

FIGURE 7-1 WIND ROSE



7.2 TOPOGRAPHY AND GEOLOGY

7.2.1 TOPOGRAPHY

The project site is located in an alluvial plain, with a relatively open terrain, some undulations, numerous pits and depressions, and a Gobi Desert landscape. The natural ground elevation ranges from 702 m to 717 m, and the municipal road to the north of the site is at an elevation of approximately 715 m.

7.2.2 GEOLOGY

According to the Geotechnical Engineering Investigation Report prepared by Nuclear Industry Jinhua Survey and Design Institute Co., Ltd., within the maximum exploration depth of 40.0m, the strata revealed at this site consist of plain fill and silt interbedded with sand. The lithology of the strata is described in detail from top to bottom as follows:

① Plain Fill (Q^4_{ml}): Yellowish-brown to grayish-yellow, dry, loose, mainly composed of silt, silty sand, and domestic waste, mixed with a small amount of plant roots. This layer is prevalent throughout the site, with a thickness of 0.4 m – 3.2 m, averaging 1.73 m; bottom elevation of the layer: 709.5 m – 713.8 m, averaging 712.0 m; bottom burial depth: 0.4 m – 3.2 m, averaging 1.7 m.

② Silty loam with sand (Q^4_{al+pl}): Yellowish-brown to grayish-yellow, dry to slightly moist, medium-dense to dense, moderate shaking response, rough cut surface, low dry strength and low toughness, containing medium-dense to dense silty sand, with a thickness ranging from 1.0 m to 3.0 m, locally transitioning to silty clay. This layer is prevalent on the site, with a thickness of 6.2 m to 12.7 m, averaging 9.0 m; a bottom elevation of 691.55 m to 709.65 m, averaging 701.8 m; and a bottom depth of 6.2 m to 12.7 m, averaging 9.25 m. Indoor geotechnical tests indicate that this layer is generally collapsible.

③ Silt with sand (Q^3_{al+pl}): Yellowish-brown to grayish-yellow, slightly moist, dense, moderate shaking response, rough cut surface, low dry strength and low toughness, containing dense silt, with a thickness ranging from 2.0 m to 5.0 m, and locally transforming into silty clay.

7.3 SOIL

7.3.1 SAMPLING METHODOLOGY

Soil sampling was carried out by specialists from OOO Hydrotech on 10th October 2025. Six (6) Soil samples were collected at target depths in five (5) selected locations. Soil samples were transferred to laboratory for analysis. pH, As, Cd, Co, Cr, Cu, Fe, Hg, Mo, Pb, Tl, V, Zn and Aromatic compounds concentrations were analyzed.

7.3.2 SAMPLING LOCATIONS

The location of soil sampling points is shown in ***Table 7-1*** and ***Figure 7-2***.

TABLE 7-1 SOIL BASELINE SAMPLING POINT

Soil Sampling Point	Coordinates	Description
S-1	39°38'40.05"N; 66°51'36.26"E	East site boundary
S-2	39°38'39.81"N; 66°51'33.08"E	Waste storage pit- depth 0.5 m
S-3	39°38'39.81"N; 66°51'33.08"E	Waste storage pit- depth 10 m
S-4	39°38'35.61"N; 66°51'26.95"E	South site boundary
S-5	39°38'42.42"N; 66°51'24.03"E	West site boundary

Soil Sampling Point	Coordinates	Description
S-6	39°38'43.80"N; 66°51'32.97"E	North site boundary

FIGURE 7-2 SOIL BASELINE SAMPLING POINT

Legend	SUS soil baseline monitoring point			
Soil baseline monitoring point SUS permanent area SUS temporary area	Date: 23 Mar 2026	Drawn Size: 16x11 cm	SUS soil baseline monitoring point	ERM
	Drawn by: SW	Reviewed by: JC		
	Coordinate System/Source: WGS 1984		Client: SUS Environment	
	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.			

7.3.3 SAMPLING RESULTS

The results of laboratory analyses of the soil samples are given in ***Table 7-2***. The obtained measurement results are compared with Maximum Permissible Concentrations ("MPC"). The Dutch Intervention Values for Soil ("DIV-S", Version 2013) of the Dutch Ministry of Public Housing, Spatial Planning and Environment, which is widely used throughout Europe and Asia, is also listed in the below table for comparison. The tested result does not show any elevated concentration for all parameters.

TABLE 7-2 SOIL QUALITY BASELINE RESULT

Baseline result (mg/kg)	S-1	S-2	S-3	S-4	S-5	S-6	MPC (1)	DIV-S
pH (Dimensionless)	6.57	5.45	7.46	7.49	7.32	7.88	- (2)	-

Baseline result (mg/kg)	S-1	S-2	S-3	S-4	S-5	S-6	MPC (1)	DIV-S
As	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	76
Cd	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	13
Co	0.13	<0.10	<0.10	<0.10	<0.10	0.20	-	190
Cr	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	6	-
Cu	<0.10	1.97	<0.10	<0.10	<0.10	<0.10	3	190
Fe	771	920	618	738	507	863	-	-
Hg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.1	-
Mo	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	10	190
Pb	1.10	2.15	<0.05	<0.05	<0.05	0.24	32	530
Sb	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	4.5	22
Tl	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-
V	0.16	<0.1	<0.1	<0.1	<0.1	<0.1	150	-
Zn	8.1	4.9	0.33	<0.1	0.19	<0.1	23	720
Aromatic compounds and pesticides (3)								
2,4,5,6-Tetrachloro-m-xylene	0.372	ND (4)	ND	ND	ND	ND	-	-
α-Hexachlorocyclohexane	0.025	ND	ND	ND	ND	ND	-	17
Heptachlor	0.014	ND	ND	ND	ND	ND	-	4

Note: (1) Sanitary Maximum Permissible Concentrations (MPCs) and Tentative Permissible Concentrations (TPLCs) of Exogenous Hazardous Substances in Soils. SanPiN RUz No. 0191-05.

(2) Not listed in the standard.

(3) Only detected parameters are listed in the table.

(4) Not detected in the sample.

7.4 AIR QUALITY

7.4.1 MONITORING METHODOLOGY

H_2S sampling was undertaken using Palmes type diffusion tubes for each round of sampling; HCl sampling was undertaken using Radiello diffusion tubes and BTEX sampling was undertaken using high-temperature stainless steel thermal desorption sorbent tube.

Diffusion tubes are passive samplers that consist of small plastic tubes or metal tubes which contain a chemical reagent to absorb the pollutant to be measured directly from the air. Preparation and analysis of the diffusion tubes was undertaken in accordance with BS EN 13528. There is best practice guidance, adopted by this assessment, available from the US EPA and from the UK Department for the Environment, Food and Rural Affairs (DEFRA) on the siting and deployment of tubes.

The analysis of the exposed tubes was undertaken by Gradko (UKAS-accredited, No. 2187; ISO/IEC 17025:2017 certified).

Ambient particulate-bound metals were monitored using Dustscan passive samplers. Particulate matter were collected on 47 mm MCE filters. Filters were analyzed per lab procedure : metals were digested and quantified by ICP/OES. Results were normalized to sampled air volume to determine airborne metal concentrations.

7.4.2 MONITORING POINT LOCATION

The location of ambient air sampling points is shown in ***Table 7-3*** and ***Figure 7-3***.

TABLE 7-3 AMBIENT AIR BASELINE SAMPLING POINT

Ambient Air Sampling Point	Coordinates	Description	Land use
AQ-1	39°38'23.58"N; 66°53'22.37"E	~2.6 km East of site (upwind)	Residential
AQ-2	39°38'44.64"N; 66°52'37.46"E	~1.4 km East of site (upwind)	Residential
AQ-3	39°39'5.94"N; 66°51'24.30"E	~0.6 km North of site (upwind)	Residential
AQ-4	39°38'13.84"N; 66°50'35.00"E	~1.3 km Southwest of site (downwind)	Farm
AQ-5	39°38'30.36"N; 66°50'9.52"E	~1.7 km West of site (downwind)	Farm
AQ-6	39°39'3.76"N; 66°49'32.62"E	~2.7 km West of site (downwind)	Wasteland
POP No.1	39°39'9.74"N; 66°58'25.52"E	~9.8 km Northeast of site (upwind)	Commercial land
POP No.2	39°40'0.22"N; 66°55'39.59"E	~6.3 km Northeast of site (upwind)	Museum
POP No.3	39°38'23.43"N; 66°55'23.25"E	~5.4 km East of site (upwind)	College

Ambient Air Sampling Point	Coordinates	Description	Land use
POP No.4	39°40'3.88"N; 66°58'17.93"E	~9.9 km Northeast of site (upwind)	College
POP No.5	39°38'39.68"N; 66°57'22.83"E	~8.3 km East of site (upwind)	College

A. Government monitoring locations

POP No.1 to POP No.4 are manual ambient air monitoring station set up by Uzbekistan government, the official website[4] will disclose the daily average concentration.

- POP No.1 discloses daily average concentration of NO, NO_2, SO_2 and NH_3;
- POP No.2 discloses daily average concentration of NO_2, SO_2, NH_3, HF and TSP;
- POP No.3 discloses daily average concentration of NO_2, SO_2, NH_3 and HF;
- POP No.4 discloses daily average concentration of NO_2, SO_2 and TSP.

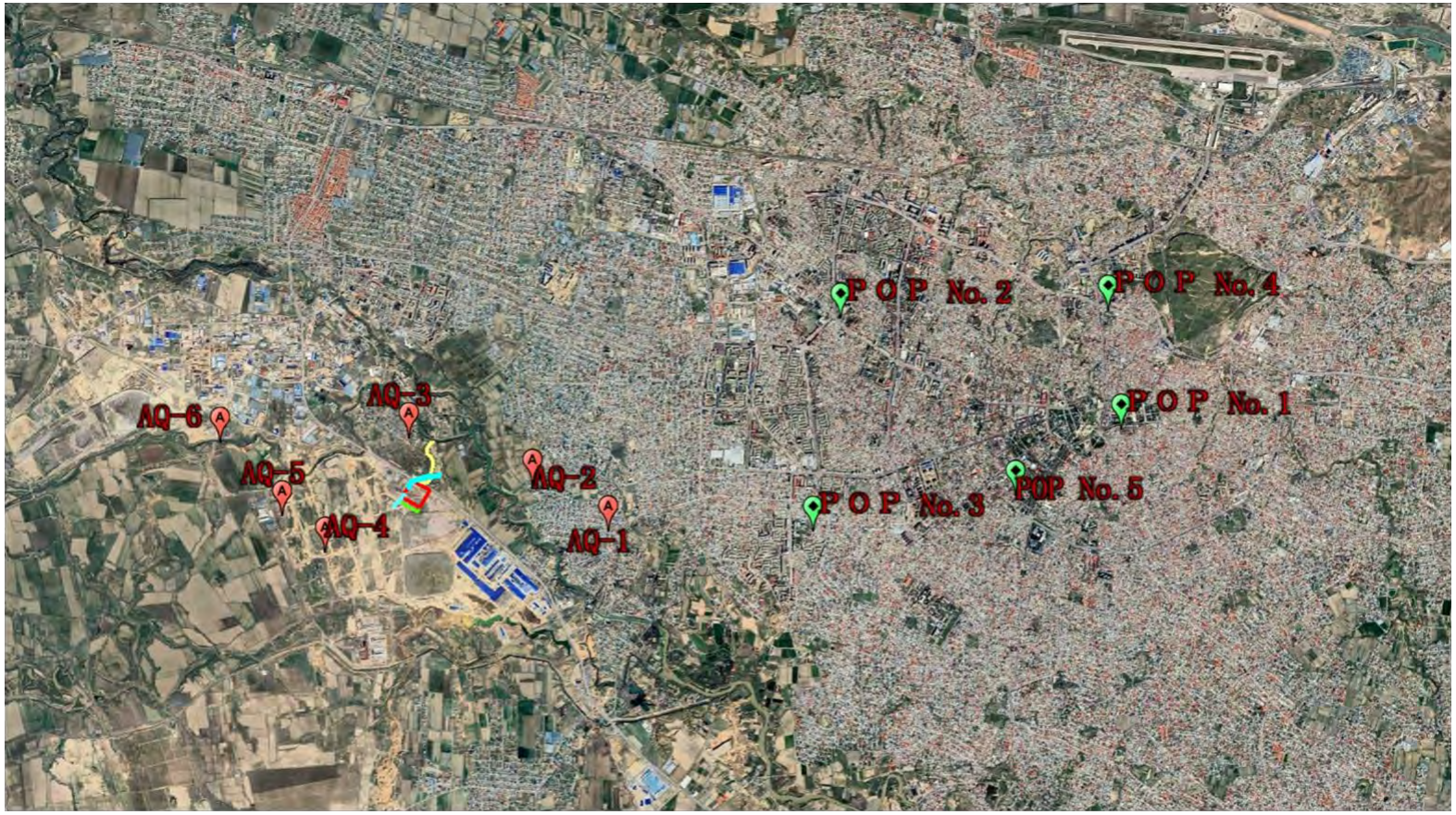
POP No.5 is automatic ambient air monitoring station set up by Uzbekistan government, the official website[4] will disclose the hourly average concentration of $PM_{2.5}$, PM_{10}, O_3, CO, NO, NO_2 and SO_2.

B. Project monitoring locations

AQ-1 to AQ-6 are manual ambient air monitoring location for the project. Each location will monitor monthly average concentration of H_2S, HCl, BTEX and metal (Pb, As, Hg, Ni, Mn, Cd, Cr and Tl, etc.)

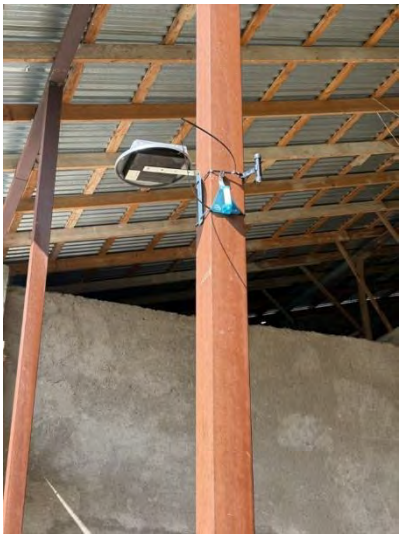
[4] https://monitoring.meteo.uz/

FIGURE 7-3 AMBIENT AIR SAMPLING LOCATION



Legend	Project Location		
Government monitoring location	Date: 30 March 2026	Drawn Size: 21x15 cm	**SUS Uzbekistan Waste to Energy Project**
Project monitoring location	Drawn by: SX	Reviewed by: MD	
	Coordinate System/Source: WGS 1984		Client: SUS Environment
	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

FIGURE 7-4 AMBIENT AIR SAMPLING LOCATION AT PROJECT MONITORING LOCATIONS



AQ-1

AQ-2

AQ-3

AQ-4

AQ-5

AQ-6

7.4.3 MONITORING RESULTS

TABLE 7-4 AIR QUALITY DATA (WET SEASON 2026)

Parameter (Unit: μg/m³)		AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	POP No.1	POP No.2	POP No.3	POP No.4	POP No.5	AAQS	Source of AAQS
Total Suspended Particulates (TSP)	24-hour Average								90~**170**		70~130		150	National AAQS
	Monthly Average								118.8		105.0		/	/
Particulate Matter 10 (PM_{10})	24-hour Average											11.074~ 112.880	150	WHO AQG
	Monthly Average											44.613	/	/
Particulate Matter 2.5 ($PM_{2.5}$)	24-hour Average											7.157~ 44.368	60	National AAQS
	Monthly Average											23.265	/	/
Carbon Monoxide (CO)	1-hour Average											1~395	5000	National AAQS
	24-hour Average											ND~331	3000	National AAQS
	Monthly Average											121	/	/
Nitrogen oxide (NO)	24-hour Average							10				3~4	250	National AAQS
	Monthly Average							10.0				3.9	/	/
Nitrogen dioxide (NO_2)	1-hour Average											ND~4	85	National AAQS
	24-hour Average							10~20	10~20	10~20	10~20	ND	60	National AAQS
	Monthly Average							12.5	12.5	11.3	11.3	ND	/	/
Sulfur dioxide (SO_2)	1-hour Average											16~19	500	National AAQS
	24-hour Average							8~18	12~17	12~16	11~17	17~18	50	National AAQS
	Monthly Average							13.8	14.8	14.3	14.8	17.1	/	/

Parameter (Unit: μg/m³)		AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	POP No.1	POP No.2	POP No.3	POP No.4	POP No.5	AAQS	Source of AAQS
Hydrogen fluoride (HF)	24-hour Average								1	1			8	National AAQS
	Monthly Average								1.0	1.0			/	/
Ammonia (NH_3)	24-hour Average							10~20	10~20	10~20			120	National AAQS
	Monthly Average							13.8	15.0	14.7			/	/
Hydrogen chloride (HCl)	Monthly Average	0.37	0.67	0.63	0.97	0.39	0.38						/	/
Hydrogen sulfide (H_2S)	Monthly Average	0.12	ND	ND	ND	0.12	0.10						/	/
Benzene	Monthly Average	2.1	2.3	1.6		0.75	0.95						/	/
Toluene	Monthly Average	7.2	7.2	8.5		2.3	5.5						/	/
Ethyl Benzene	Monthly Average	0.71	0.75	1.1		ND	0.49						/	/
Xylene	Monthly Average	3.5	3.7	5.7		1.07	2.18						/	/
Arsenic (As)	Monthly Average	<0.0024	<0.0024	<0.0024		<0.0024	<0.0024						/	/
Mercury (Hg)	Monthly Average	<0.024	<0.024	<0.024		<0.024	<0.024						0.6	National AAQS
Nickel (Ni)	Monthly Average	<0.024	<0.024	<0.024		<0.024	<0.024						1.5	National AAQS
Manganese (Mn)	Monthly Average	0.036	0.119	0.059		0.036	0.008						/	/
Cadmium (Cd)	Monthly Average	<0.0024	<0.0024	<0.0024		<0.0024	<0.0024						1.6	National AAQS
Chromium (Cr)	Monthly Average	<0.0119	<0.0119	<0.0119		<0.0119	<0.0119						/	/
Thallium (Tl)	Monthly Average	<0.0119	<0.0119	<0.0119		<0.0119	<0.0119						/	/

Note: (1) ▪ Permissible Hygienic Standards for Harmful and Toxic Substances, Producer Microorganisms, Bacterial Preparations and Aeroions in the Ambient Air of Human Settlements of the Republic of Uzbekistan (SanPiN 0053-23) is the national air quality standard of Uzbekistan, hereinafter as "National AAQS".

▪ 24-hour concentration limit of PM_{10} refers to WHO Air Quality Guidelines and WHO Air Quality Guidelines for Europe, hereinafter as "WHO AQG", as the international standards are more stringent than the national limits.

- There are no applicable monthly AAQS for As, Mn, Cr, Cr^{6+} and Tl.

(2) A positive non-linear relationship exists between BTEX and PCDDs/PCDFs concentrations in flue gas from WTE facilities. Due to non-linearity, reliable quantitative conversion coefficients cannot be established. Given local monitoring capacity for PCDDs/PCDFs is limited, BTEX serves as an auxiliary tracer to estimate background level of PCDDs/PCDFs.

(3) The detection limit of POP No.1 to POP No.5 has not been disclosed.

(4) The detection limit of H_2S is 0.10 μg/m^3.

(5) The detection limit of Ethyl Benzene is 0.3 μg/m^3.

(6) Metal parameters are calculated with Maximum concentration of TSP in all monitoring locations and metal content in air.

TABLE 7-5 AIR QUALITY DATA (DRY SEASON 2026)

Parameter (Unit: **μ**g/m^3)		AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	POP No.1	POP No.2	POP No.3	POP No.4	POP No.5	AAQS	Source of AAQS
Total Suspended Particulates (TSP)	24-hour Average								60~**190**		60~**210**		150	National AAQS
	Monthly Average								119.5		122.0		/	/
Particulate Matter 10 (PM_{10})	24-hour Average											17.362~116.346	150	WHO AQG
	Monthly Average											46.879	/	/
Particulate Matter 2.5 ($PM_{2.5}$)	24-hour Average											7.174~45.908	60	National AAQS
	Monthly Average											19.344	/	/
Carbon Monoxide (CO)	1-hour Average											1~111	5000	National AAQS
	24-hour Average											0.2~46	3000	National AAQS
	Monthly Average											23	/	/
	24-hour Average							ND~10				2~4	250	National AAQS

Parameter (Unit: μg/m³)		AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	POP No.1	POP No.2	POP No.3	POP No.4	POP No.5	AAQS	Source of AAQS
Nitrogen oxide (NO)	Monthly Average							9.5				3.9	/	/
Nitrogen dioxide (NO_2)	1-hour Average											ND	85	National AAQS
	24-hour Average							10	10~20	10~20	10~20	ND	60	National AAQS
	Monthly Average							10.0	11.0	11.5	11.0	ND	/	/
Sulfur dioxide (SO_2)	1-hour Average											17~20	500	National AAQS
	24-hour Average							9~16	9~17	11~17	9~17	17~19	50	National AAQS
	Monthly Average							13.9	14.2	14.3	14.2	17.8	/	/
Hydrogen fluoride (HF)	24-hour Average								1~2	1~2			8	National AAQS
	Monthly Average								1.3	1.4			/	/
Ammonia (NH_3)	24-hour Average							10~30	10~30	10~30			120	National AAQS
	Monthly Average							15.5	14.5	16.0			/	/
Hydrogen chloride (HCl)	Monthly Average												/	/
Hydrogen sulfide (H_2S)	Monthly Average												/	/
Benzene	Monthly Average												/	/
Toluene	Monthly Average												/	/
Ethyl Benzene	Monthly Average												/	/
Xylene	Monthly Average												/	/
Arsenic (As)	Monthly Average												/	/
Mercury (Hg)	Monthly Average												0.6	National AAQS

Parameter (Unit: μg/m³)		AQ-1	AQ-2	AQ-3	AQ-4	AQ-5	AQ-6	POP No.1	POP No.2	POP No.3	POP No.4	POP No.5	AAQS	Source of AAQS
Nickel (Ni)	Monthly Average												1.5	National AAQS
Manganese (Mn)	Monthly Average												/	/
Cadmium (Cd)	Monthly Average												1.6	National AAQS
Chromium (Cr)	Monthly Average												/	/
Thallium (Tl)	Monthly Average												/	/

Note: (1) The detection limit of POP No.1 to POP No.5 has not been disclosed.

(2) The detection limit of H_2S is 0.10 μg/m³.

(3) The detection limit of Ethyl Benzene is 0.3 μg/m³.

Ambient air baseline summary:

- The max 24-hour average concentration of TSP exceeded the SanPiN 0053-23 (National AAQS of Uzbekistan), with an exceedance rate of 6.9%:
  - There are 16 effective 24-hour average concentration of TSP POP No.2 during wet season and 2 data exceed the AAQS.
  - There are 20 effective 24-hour average concentration of TSP POP No.2 during dry season and 1 data exceed the AAQS.
  - There are 20 effective 24-hour average concentration of TSP POP No.4 during dry season and 2 data exceed the AAQS.
- 24-hour average concentration of PM_{10} can meet the WHO AQG;
- 24-hour average concentration of $PM_{2.5}$, CO, NO, NO_2, SO_2, HF, NH_3, Hg, Ni and Cd can meet the SanPiN 0053-23 (National AAQS of Uzbekistan);
- 1-hour average concentration of CO, NO_2, SO_2 can meet the SanPiN 0053-23 (National AAQS of Uzbekistan);
- No applicable limit to monthly average of TSP, PM_{10}, $PM_{2.5}$, CO, NO, NO_2, SO_2 ,HF, NH_3, HCl, H_2S, Toluene, Ethyl Benzene, Xylene, As , Mn, Cr and Tl.

7.5 NOISE

7.5.1 MONITORING METHODOLOGY

Baseline ambient noise measurements were conducted to understand the prevailing noise baseline. 48-hour continuous measurement was carried out by ERM specialists, from 15 to 17 March, 2026.

The measurements were carried out using the AWA5688A noise meter. The measurement kit is a Class 2 sound level meter in accordance with the requirements of IEC 61672-1:2013. Device calibration was performed before and after each measurement. The calibration values for each measurement were all 93.8 dB(A).

The measuring microphone was placed at a height of 1.5 m from the ground on a special tripod. Acoustic interference that requires interruption of current measurements or rejection of part of the time period (passage of a train or aircraft flight) was not noted during any of the measurements performed.

L_{Aeq}, L_{90}, L_{Amin} and L_{Amax} were recorded for reference. Descriptions of these noise descriptions have been attached in ***Table 7-6***. The monitoring procedures data analysis and interpretation were carried out in accordance with the WBG Environmental Health and Safety (EHS) General Guidelines: Environmental Noise Management.

TABLE 7-6 NOISE DESCRIPTORS

Noise Descriptor	Description
$L_{Aeq,\ 1\ h}$	The A-weighted, equivalent continuous sound pressure level for 1 hour.
L_{day}	Equivalent continuous sound pressure level when the monitoring time is from 7:00 AM to 23:00 PM.
L_{night}	Equivalent continuous sound pressure level when the monitoring time is from 23:00 PM to 7:00 AM.
L_{max}	Maximum time-weighted and A-weighted sound pressure level.
L_{10}	Noise level exceeded 10 percent of the time and represents the noise level during the louder periods.
L_{90}	Noise level exceeded 90 percent of the time and represents the background levels.
L_{min}	Minimum time-weighted and A-weighted sound pressure level.

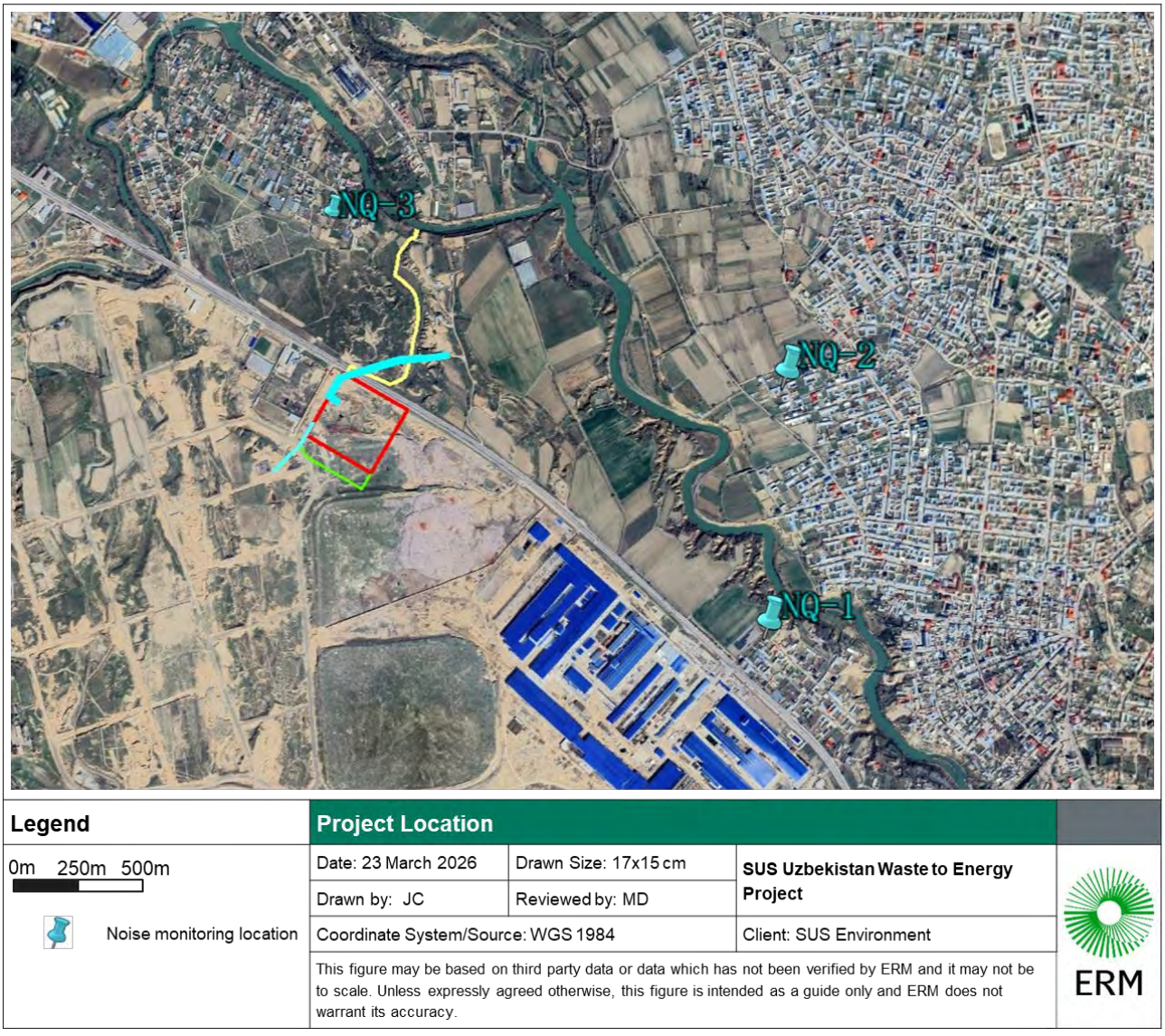
7.5.2 MONITORING POINT LOCATION

The Noise Sensitive Receivers (NSRs) for this Project are selected at representative recent residential areas, which are NQ-1, NQ-2 and NQ-3. Baseline ambient noise measurements were conducted at these NSRs to understand the prevailing noise baseline.

TABLE 7-7 AMBIENT NOISE BASELINE SAMPLING POINT

Ambient Noise Sampling Point	Coordinates	Description
NQ-1	39°38'13.32"N; 66°52'34.23"E	~1.6 km east of the project, Yoshlik MFY
NQ-2	39°38'44.55"N; 66°52'37.22"E	~1.4 km east of the project, Sakhovat MFY
NQ-3	39°39'5.21"N; 66°51'23.86"E	~574 m north of the project, Kamalot MFY.

FIGURE 7-5 AMBIENT NOISE SAMPLING POINT



7.5.3 MONITORING RESULTS

The summary of sampling result is presented in ***Table 7-8***.

TABLE 7-8 SUMMARY OF NOISE BASELINE

Point	Monitoring duration	Parameter		Baseline dB(A)	Nation Standard dB(A)	WBG General EHS Guidelines dB(A)	Exceedance rate %
NQ-1	From 17:56:55 on 15 March 2026 to 17:56:55 on 17 March 2026	L_{day}	7:00~23:00	44.0	55	55	/
		$L_{eq,\ 1\ h}$		36.2~49.5			/
		L_{night}	23:00~7:00	36.0	45	45	/
		$L_{eq,\ 1\ h}$		29.8~40.6			/
		L_{max}		92.4	/	/	/
		L_{10}		48.5	/	/	/
		L_{90}		32.1	/	/	/
		L_{min}		24.3	/	/	/
NQ-2	From 16:49:16 on 15 March 2026 to 16:49:16 on 17 March 2026	L_{day}	7:00~23:00	40.9	55	55	/
		$L_{eq,\ 1\ h}$		26.9~47.0			/
		L_{night}	23:00~7:00	35.4	45	45	/
		$L_{eq,\ 1\ h}$		26.6~41.1			/
		L_{max}		84.9	/	/	/
		L_{10}		43.4	/	/	/
		L_{90}		29.6	/	/	/
		L_{min}		21.2	/	/	/
NQ-3	From 19:36:55 on 15 March 2026 to 19:36:55 on 17 March 2026	L_{day}	7:00~23:00	45.0	55	55	/
		$L_{eq,\ 1\ h}$		37.4~49.3			/
		L_{night}	23:00~7:00	42.2	45	45	/
		$L_{eq,\ 1\ h}$		33.3~45.9			6.2%

Point	Monitoring duration	Parameter	Baseline dB(A)	Nation Standard dB(A)	WBG General EHS Guidelines dB(A)	Exceedance rate %
		L_{max}	99.6	/	/	/
		L_{10}	48.6	/	/	/
		L_{90}	35.5	/	/	/
		L_{min}	24.7	/	/	/

Note: a. The primary noise sources during measurement are:

- NQ-1: The main source of noise is livestock-related sounds (e.g., dog).
- NQ-2: The main source of noise is livestock-related sounds (e.g., ox).
- NQ-3: The main source of noise is Road Traffic Noise.

b. The specific $L_{eq,\ 1\ h}$ of NQ-3 in night is listed in the following table:

Monitoring duration	$L_{eq,\ 1\ h}$ dB(A)	Monitoring duration	$L_{eq,\ 1\ h}$ dB(A)
23:00-0:00, 15 March 2026	40.2	23:00-0:00, 15 March 2026	43.6
0:00~1:00, 16 March 2026	40.4	0:00~1:00, 16 March 2026	42.6
1:00~2:00, 16 March 2026	38.9	1:00~2:00, 16 March 2026	43.0
2:00~3:00, 16 March 2026	40.3	2:00~3:00, 16 March 2026	44.2
3:00~4:00, 16 March 2026	41.3	3:00~4:00, 16 March 2026	43.7
4:00~5:00, 16 March 2026	39.2	4:00~5:00, 16 March 2026	43.5
5:00~6:00, 16 March 2026	33.3	5:00~6:00, 16 March 2026	43.8
6:00~7:00, 16 March 2026	38.6	6:00~7:00, 16 March 2026	**45.9**

Based on the measured noise levels, an exceedance event of $L_{eq\text{-}1\ h}$ occurred at 6:00 AM on March 17 in NQ-3, attributable to traffic noise, with an exceedance rate of 6.2% (=1/16). Other measured noise levels were compliance with national standard (SanPiN 0267-09) and WBG General EHS Noise Limits.

7.6 WATER RESOURCE

7.6.1 SURFACE WATER

Samarkand city is located in the foothills of Tien Shan, where various watercourses, including rivers and canals, intersect. The main rivers that feed the city include the Zarafshan River and its tributaries. The closest surface water is the Dargom Canal 600 m to the north of the project site.

Zarafshan River rises at the Zarafshan Glacier, close to where the Turkestan Range and the Zeravshan Range of the Pamir-Alay mountains meet, in Tajikistan. It flows due west for around 300 kilometers, passing Panjakent before entering Uzbekistan, then flowing past the legendary city of Samarkand, where it feeds the Dargom Canal. Then it flows west north of Navoi and further to the south-west, passing Bukhara before it is lost in the desert beyond the city of Karakul. The river is 877 kilometers long and has a basin area of 17,700 square kilometers.

Dargom Canal has a length of about 100 km. It irrigates 67,500 hectares of land in Samarkand and 50,000 hectares in Kashkadarya region. According to the project water uptake permit, the water flow of the canal is 90 m^3/s.

The canal departs from the Zeravshan River near the mahalla of Ravatkhoja near the border of Uzbekistan with Tajikistan. It ends by flowing into the branch of the Zeravshan Karadarya in the area of the mahalla of Kumaryk.

The Samarkand cascade has been built on the canal, which includes five hydroelectric power plants with a total capacity of 46.1 MW: Khishrau (21.9 MW), Irtyshar (6.4 MW), Taligulyanskaya-1 (3 MW), Taligulyanskaya-3 (8.8 MW) and Urgutskaya (3 MW). Four more hydropower plants are planned on the canal.

7.6.1.1 SAMPLING METHODOLOGY

Surface water sampling was carried out by specialists from OOO State Ecological Certification and Standardization Center on 2nd and 3rd October 2025. Samples were collected by water bottles in four (4) selected locations.

7.6.1.2 SAMPLING POINT LOCATION

Surface water sampling was carried out by specialists from OOO State Ecological Certification and Standardization Center on 2nd and 3rd October 2025. Samples were collected by water bottles in four (4) selected locations. After collection, the samples were dozed with suitable preservative, stored in cooling boxes and sent to lab for quantitative chemical analysis. Parameters of analysis include pH, petroleum, COD, nitrate, chloride, zinc, hexavalent chromium, iron, aluminum, calcium and magnesium.

The location of surface water sampling points is shown in ***Table 7-9*** and ***Figure 7-6***.

TABLE 7-9 SURFACE WATER BASELINE SAMPLING POINT

Soil Sampling Point	Coordinates	Description
SW-1	39°39'11.19"N; 66°51'58.18"E	Upstream of water intake point
SW-2	39°39'4.89"N; 66°51'38.46"E	Water intake point
SW-3	39°39'15.04"N; 66°51'27.59"E	About 1 km downstream of the water intake point
SW-4	39°39'21.53"N; 66°51'19.56"E	About 2 km downstream of the water intake point

FIGURE 7-6 SURFACE WATER BASELINE SAMPLING POINT

Legend	SUS surface water baseline monitoring point		
Surface water monitoring point Water pipeline	Date: 1 Apr 2026	Drawn Size: 16x11 cm	SUS surface water baseline monitoring point
	Drawn by: SW	Reviewed by: JC	
	Coordinate System/Source: WGS 1984		Client: SUS Environment
	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

7.6.1.3 SAMPLING RESULTS

Sanitary Rules, Norms and Hygienic Standards for the Protection of Underground and Surface Water Bodies (SanPiN RUz No. 0083-24) is a sanitary regulation for environmental water protection in the Republic of Uzbekistan, officially approved on 22 November 2024. This standard applies to all surface water bodies (rivers, lakes, reservoirs, canals) and groundwater aquifers across Uzbekistan. SanPiN RUz No. 0083-24 is NOT a drinking water standard.

The drinking water standard is *Drinking water. Hygienic requirements and quality control* (O'z DSt 950:2011), which applies to potable water, not raw water sources.

Surface water sampling was conducted after site leveled and no surface water bodies adjacent to the site. The nearest surface water body, Dargom Canal, is approximately 600 meters away from the site. The surface water monitoring results therefore reflect natural background conditions of Dargom Canal, unaffected by construction activities. The results of laboratory analyses of the surface water samples are given in ***Table 7-10***.

The obtained measurement results were compared with limits and MAC raised by SanPiN RUz No. 0083-24 (Sanitary Rule, Norm and Hygiene Standard for the Protection of Underground and Surface Water). The results show petroleum contamination and chemical oxygen demand (COD) both exceeded the applicable regulatory quality standards by more than two-fold and

are classified as significantly exceeded. In contrast, concentrations of chloride, sodium, antimony, boron, bromine, iron, and cadmium remained within twice of the quality limits and were classified as slightly exceeded. All other monitored parameters were fully complied with quality standards.

The possible sources of pollution include[5]:

- Agricultural runoff with pesticides, fertilizers, and salts.

- Industrial discharges of heavy metals and toxic chemicals.

- Municipal wastewater, mostly untreated.

- Transboundary inputs from upstream countries.

TABLE 7-10 SURFACE WATER QUALITY BASELINE RESULT

Baseline result (mg/L)	**SW-1**	**SW-2**	**SW-3**	**SW-4**	**SanPiN RUz No. 0083-24**
pH (Dimensionless)	8.30	7.45	8.40	8.23	- (1)
Petroleum	2.54	2.86	3.34	1.12	0.3
COD	286	354	261	184	15
Nitrite	0.6	0.6	0.6	0.12	3
Chloride	500	500	500	92	350
Zinc	<0.01	<0.01	<0.01	<0.01	5
Hexavalent Chromium	<0.025	<0.025	<0.025	<0.025	0.05
Aluminum	0.095~0.107	0.039~0.0424	0.028~0.0311	<0.02	0.2
Calcium	52	192	62	32	- (1)
Magnesium	32	42	45	31	50
Nitrate	44.0	8.21	16.31	8.82	45
Carbonate	<0.05	<0.05	<0.05	<0.05	- (1)
Bicarbonate	305	24	280	195	- (1)
Phosphate	<0.05	0.11	0.14	<0.05	- (1)

[5] (99+) Water Pollution in Uzbekistan's Major Rivers: Challenges, Impacts, and Strategies for Sustainable Management

Baseline result (mg/L)	SW-1	SW-2	SW-3	SW-4	SanPiN RUz No. 0083-24
Fluoride	1.24	1.31	0.86	0.45	1.5
Volatile phenol	<0.002	<0.002	<0.002	<0.002	- (1)
Sodium	524	40	177	44	200
Potassium	30	4	19	3	- (1)
Manganese	<0.0005	0.0019	<0.0005	0.0031	0.1
Selenium	<0.01	<0.01	<0.01	<0.01	0.01
Sulfur	210	53	180	40	- (1)
Antimony	<0.005	<0.005	0.01	<0.005	0.005
Arsenic	<0.005	<0.005	<0.005	<0.005	0.01
Copper	<0.001	<0.001	<0.001	<0.001	1
Barium	0.0002	0.0348	0.0312	0.0249	0.7
Beryllium	0.0001	0.0002	0.0002	0.0001	0.0002
Boron	0.582	0.0773	0.0667	0.0637	0.5
Bromine	0.240	0.210	0.345	0.216	0.2
Zinc	<0.002	<0.002	<0.002	0.0038	5
Iron	0.588	<0.001	<0.001	<0.001	0.3
Silver	<0.005	<0.005	<0.005	<0.005	0.05
Tin	<0.01	<0.01	<0.01	<0.01	- (1)
Cobalt	<0.002	<0.002	<0.002	<0.002	0.1
Chromium	<0.001	<0.001	<0.001	<0.001	0.05
Silicon	5.58	1.57	4.8	1.84	20
Titanium	<0.001	<0.001	<0.001	<0.001	0.1
Vanadium	<0.002	0.004	0.0023	0.0054	0.1

Baseline result (mg/L)	SW-1	SW-2	SW-3	SW-4	SanPiN RUz No. 0083-24
Cadmium	0.0018	0.0012	0.0007	<0.0001	0.001
Lead	<0.003	<0.003	<0.003	<0.003	0.01
Mercury	<0.00005	<0.00005	<0.00005	<0.00005	0.0005
Nickel	<0.003	<0.003	<0.003	0.0061	0.02

Note: (1) Not listed in the standard

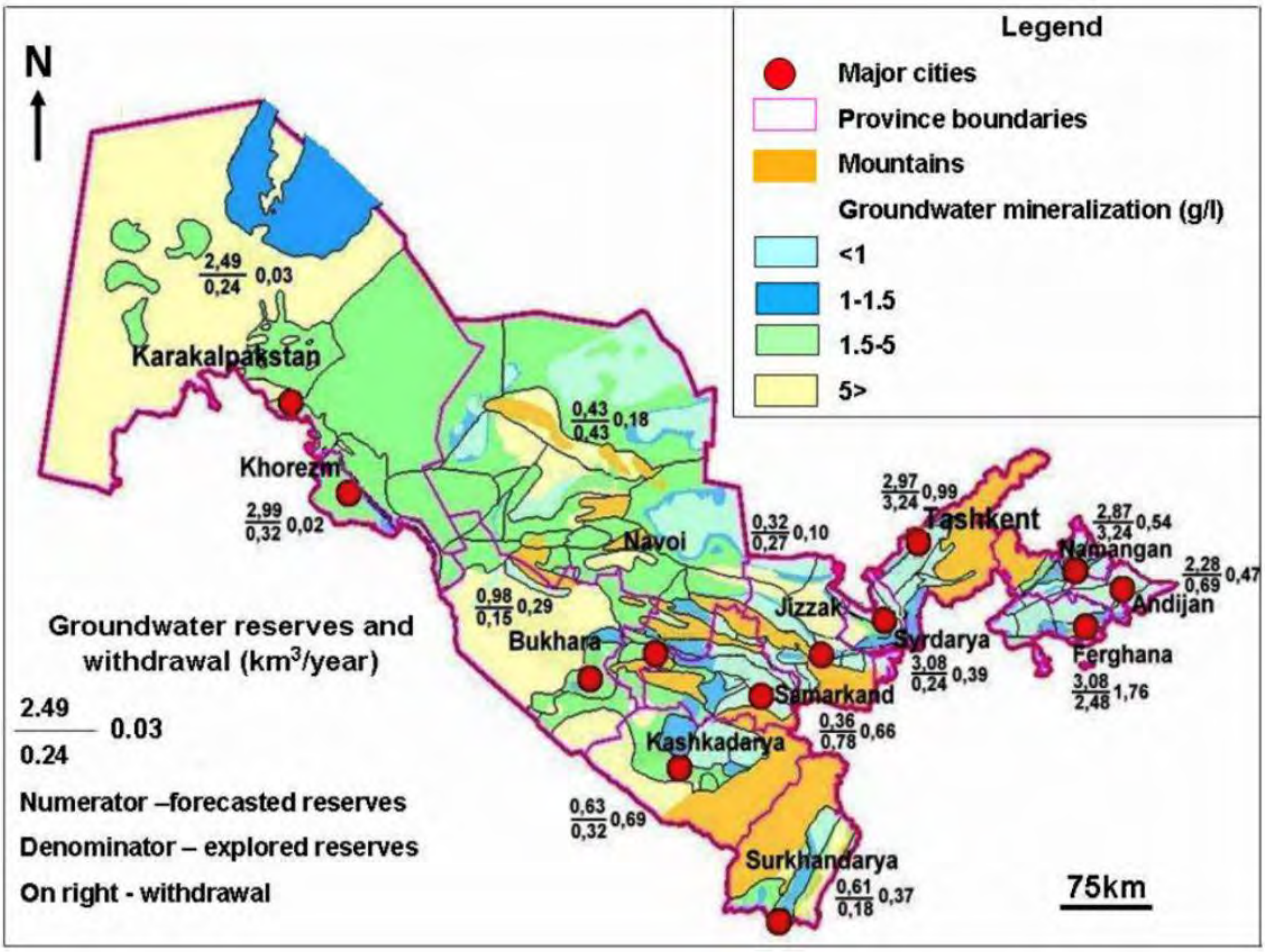
7.6.2 GROUNDWATER

According to the Geotechnical Engineering Investigation Report prepared by Nuclear Industry Jinhua Survey and Design Institute Co., Ltd., groundwater was not encountered within the investigation depth of 40.0 m.

According to a public study[6], the groundwater reserve explored in Samarkand region where the project is located is 0.78 km^3/year. The main sources of groundwater in the project area are filtration losses from the Zarafshan River, infiltration of surface water, and atmospheric precipitation.

[6] Shavkat Rakhmatullaev, Frédéric Huneau, Jusipbek Kazbekov, Hélène Celle-Jeanton, Mikael Motelica-Heino, et al. Groundwater resources of Uzbekistan: an environmental and operational overview. Central European Journal of Geosciences, 2012, 4 (1), pp.67-80. ff10.2478/s13533-011-0062- yff. ffinsu-00683342f

FIGURE 7-7 GROUNDWATER RESERVE AND WITHDRAWAL IN UZBEKISTAN



Source: Groundwater resources of Uzbekistan: an environmental and operational overview, 2012

7.6.2.1 SAMPLING METHODOLOGY

Groundwater sampling was carried out by specialists from OOO State Ecological Certification and Standardization Center on 3rd October 2025. Groundwater samples were extracted from taps connecting to the four (4) pumping wells. The samples were collected in one litre HDPE containers, labelled accordingly, and placed in cooler boxes. A chain of custody was observed in the transfer of the samples to a nationally accredited laboratory, with a holding time not exceeding 48 hours. Parameters of analysis include pH, nitrate, carbonate, bicarbonate, phosphate, fluoride, volatile phenol, sodium, potassium, manganese, selenium, sulfur, aluminum, antimony, arsenic, copper, barium, beryllium, boron, bromine, zinc, iron, silver, tin, cobalt, chromium, silicon, titanium, vanadium, cadmium, mercury, nickel.

Sampling was conducted after site leveling.

7.6.2.2 SAMPLING POINT LOCATION

The location of ground water sampling points is shown in ***Table 7-11*** and ***Figure 7-8***.

TABLE 7-11 GROUND WATER BASELINE SAMPLING POINT

Soil Sampling Point	Coordinates	Description
GW-1	39°38'40.05"N; 66°51'36.26"E	North of east site boundary
GW-2	39°38'37.43"N; 66°51'33.83"E	Center of east site boundary
GW-3	39°38'39.81"N; 66°51'33.08"E	Waste storage pit
GW-4	39°38'36.73"N; 66°51'20.43"E	Southwest of site boundary

FIGURE 7-8 GROUNDWATER BASELINE SAMPLING POINT

7.6.2.3 SAMPLING RESULTS

According to the Geotechnical Engineering Investigation Report prepared by Nuclear Industry Jinhua Survey and Design Institute Co., Ltd., groundwater was not encountered within the investigation depth of 40.0 m. Although groundwater was not encountered within 40 m depth, potential infiltration pathways through unsaturated soils cannot be fully excluded. However, given that site grading activities are confined to a shallow depth (from ground level to

approximately 10 m below ground level), and are of relatively short duration, the potential for pollutant migration from ground leveling activities is limited. Therefore, the impact of ground leveling activities on groundwater quality is expected to be negligible. Therefore, the impact of ground leveling activities on groundwater quality is expected to be negligible, and the groundwater baseline condition mainly comes from the former landfill.

The results of laboratory analyses of the groundwater samples are given in ***Table 7-12***. The results are compared with limits and MAC raised by SanPiN RUz No. 0083-24. The tested results show Selenium, Antimony, Cadmium, Petroleum and chemical oxygen demand (COD) exceeded the applicable regulatory quality standards by more than twice and were classified as significantly exceeded. In contrast, concentrations of Bromine remained within twice the quality limits and was classified as slightly exceeded. All other monitored parameters were fully complied with quality standards.

TABLE 7-12 GROUNDWATER QUALITY BASELINE RESULT

Baseline result (mg/L)	GW-1	GW-2	GW-3	GW-4	SanPiN RUz No. 0083-24
pH (Dimensionless)	8.62	8.61	8.63	8.61	- (1)
Nitrate	3.14	3.54	1.10	4.59	45
Carbonate	<0.05	<0.05	<0.05	<0.05	- (1)
Bicarbonate	170	158	183	170	- (1)
Phosphate	<0.05	<0.05	<0.05	<0.05	- (1)
Fluoride	0.54	0.42	0.74	0.61	1.5
Volatile phenol	<0.002	<0.002	<0.002	<0.002	- (1)
Sodium	10	9.29	9.39	9.12	200
Potassium	3	4	5	3	- (1)
Manganese	<0.0005	<0.0005	0.0255	<0.0005	0.1
Selenium	0.105	<0.01	<0.01	<0.01	0.01
Sulfur	16	22	21	21	- (1)
Aluminum	<0.01	<0.01	<0.01	<0.01	0.2
Antimony	0.0195	0.0161	<0.005	0.0274	0.005
Arsenic	<0.005	0.008	<0.005	<0.005	0.01

Baseline result (mg/L)	GW-1	GW-2	GW-3	GW-4	SanPiN RUz No. 0083-24
Copper	<0.001	<0.001	<0.001	<0.001	1
Barium	0.0169	0.0173	0.0208	0.0182	0.7
Beryllium	0.0002	0.0001	0.0001	0.0002	0.0002
Boron	0.0161	0.0206	0.019	0.0198	0.5
Bromine	0.225	0.201	0.216	0.214	0.2
Zinc	<0.002	<0.002	<0.002	<0.002	5
Iron	<0.001	<0.001	0.0117	<0.001	0.3
Silver	<0.005	0.0176	0.0167	0.0058	0.05
Tin	<0.01	<0.01	<0.01	<0.01	- (1)
Cobalt	<0.002	<0.002	<0.002	<0.002	0.1
Chromium	<0.001	<0.001	<0.001	<0.001	0.05
Silicon	2.26	2.20	2.26	5.17	20
Titanium	<0.001	<0.001	<0.001	<0.001	0.1
Vanadium	<0.002	<0.002	<0.002	<0.002	0.1
Cadmium	0.0014	<0.0001	0.0017	0.0025	0.001
Lead	<0.003	<0.003	<0.003	<0.003	0.01
Mercury	<0.00005	<0.00005	<0.00005	<0.00005	0.0005
Nickel	<0.003	<0.003	<0.003	<0.003	0.02
Petroleum	2.22	2.35	2.62	2.54	0.3
COD	132	133	106	115	15
Nitrite	0.24	0.25	0.22	0.24	3
Chloride	141	152	120	124	350
Hexavalent Chromium	<0.025	<0.025	<0.025	<0.025	0.05

Note: (1) Not listed in the standard.

7.7 BIOLOGICAL ENVIRONMENT

No biodiversity baseline data was collected during regulatory EIA phase.

Samarkand is located in the expansive arid interior of Central Asia, where natural vegetation and ecosystems are characterized by a continental dryland climate and desert–steppe landscapes, featuring desert, semi-desert, and steppe ecosystems. These drylands form part of the broader Palearctic steppe-desert biome, shaped by extreme continental climate with low and highly seasonal precipitation, high summer temperatures, cold winters, and soils often with high salinity and low water availability, features that define dryland ecoregions across Central Asia.[7] The region typically experiences low precipitation levels, with annual rainfall amounts rarely exceeding a few hundred millimeters. This environment has led to the development of a distinct biome characterized by the presence of xerophilous grasses, such as *Stipa* and *Festuca* species, and drought-tolerant shrubs, including *Artemisia L.* and chenopods. These plants have adapted to conditions of limited moisture and significant seasonal temperature variations. This unique biome is of ecological significance as it supports specialized flora and fauna adapted to aridity and seasonality.[8]

Influenced by Zarafshan River, the city and its surroundings form an irrigated river oasis within this dryland ecoregion, altering the local natural vegetation and ecosystem structure. This results in alterations to the local natural vegetation and ecosystem structure. Samarkand is strategically located in the Middle Zarafshan River valley, where the perennial water from the river supports riparian vegetation and long-established irrigation systems. These riparian ecosystems, locally known as **tugai forests** when present, support a unique array of plant species (e.g., *Populus euphratica* and *Tamarix*) and higher vegetation density compared to the surrounding semi-desert landscape. They function as focal areas of biodiversity within the otherwise arid environment. While this irrigated agricultural and riparian mosaic has been modified by human activity and is not a pristine natural ecoregion, it is ecologically significant because it increases local habitat diversity and moisture availability relative to the broader Central Asian drylands.[9]

To summarize, Samarkand is located in a semi-arid, continental dryland ecoregion where the landscapes of steppe, semi-desert and irrigated river valley meet. Its broad ecoregion classification aligns with Central Asian deserts and xeric shrublands, particularly transitional zones around the Central Asian southern desert, while its local ecological character is strongly influenced by the riverine oasis environment created by the Zarafshan River and extensive irrigation infrastructure.

7.7.1 LEGALLY PROTECTED AND INTERNATIONALLY RECOGNISED BIODIVERSITY AREAS

Legally Protected Areas (“PAs”) include areas that are legally designated or officially proposed for biodiversity protection and conservation. For this ESIA, and in line with IFC PS6,

[7] https://pmc.ncbi.nlm.nih.gov/articles/PMC7546705/
[8] https://encyclopedia.uia.org/strategy/conserving-central-asian-desert-ecoregion
[9] https://www.scirp.org/journal/paperinformation?paperid=104155

internationally recognized areas of biodiversity include Key Biodiversity Areas (KBA[10], including Alliance of Zero Extinction (AZE) [11] and International Bird Areas (IBA) [12], UNESCO World Heritage sites, and Ramsar sites.

7.7.1.1 KEY BIODIVERSITY AREAS

Key Biodiversity Areas (KBA) are sites contributing significantly to the global persistence of biodiversity, in terrestrial, freshwater, and marine ecosystems. Sites qualify as global KBAs if they meet one or more of 11 criteria[13], clustered into five categories: threatened biodiversity; geographically restricted biodiversity; ecological integrity; biological processes; and, irreplaceability. They include but are not limited to Important Bird and Biodiversity Areas (IBAs) and Alliance for Zero Extinction (AZE) sites.

With regards to the Project, three international KBAs are identified within 50 km of the Project footprint with key information summarized in ***Table 7-13***. All KBAs are over 10 km away from the Project and not expected to be affected by the Project.

A major urban area, Samarkand City, lies between the Zarafshan State Nature Reserve and the Kattakurgan Reservoir, creating a high-disturbance barrier weaken the terrestrial connectivity between these two KBAs. The Zarafshan River flows north of the city, providing some hydrological linkage and partial movement potential for aquatic or riparian species, whose estuaries/channels flowing through the city for irrigation are modified and fragmentated. Aerial connectivity remains possible through migration flyways, most likely following either the northern river valley or the southern ridges instead of the urban area in the middle. Farmland below the southern ridge may offer secondary, conditional linkage when disturbance is low, but generally does not form a continuous ecological corridor. Overall, the landscape between the two KBAs is moderately fragmented, with weak terrestrial linkage, partial river-based continuity, and conditional aerial pathways, making the two KBAs functionally complementary but largely disconnected.

TABLE 7-13 SUMMARY OF KBAS IN THE VICINITY OF THE PROJECT

#	KBAs	Area (km^2)	Distance / Direction to Project Area	KBA Trigger Species	Remarks
1	Zarafshan State Nature Reserve[14]	26.6	19 km to the East	A narrow 47-km strip of riparian tugai forest and floodplain habitats, supporting	IBA

[10] IUCN Species Survival Commission and IUCN. A Global Standard for the Identification of Key Biodiversity Areas - https://portals.iucn.org/union/sites/union/files/doc/a_global_standard_for_the_identification_of_key_biodiversity_areas_final_web.pdf

[11] AZE is a joint initiative of biodiversity conservation organizations from around the world working to prevent extinctions by promoting the identification and ensuring the safeguard and effective conservation of key sites that are the last remaining refuges of one or more Endangered or Critically Endangered species

[12] IBAs are areas identified by Birdlife International using an internationally agreed set of criteria (Globally threatened, Restricted-range, Biome-restricted, and Congregation). See Birdlife International (2023). Data Zone: IBA Criteria. http://datazone.birdlife.org/site/ibacriteria

[13] IUCN (2016) A Global Standard for the Identification of Key Biodiversity Areas. https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf

[14] https://www.keybiodiversityareas.org/site/factsheet/22518

#	KBAs	Area (km^2)	Distance / Direction to Project Area	KBA Trigger Species	Remarks
				river-dependent birds and diverse riparian biodiversity. No species listed as KBA triggers, but it names 218 species of avifauna, two species of amphibians, 18 species of fish, 10 species of reptiles and 24 species of mammals with the preserved tugai forest, pointing out its importance as a biodiversity hotspot.	

#	KBAs	Area (km²)	Distance / Direction to Project Area	KBA Trigger Species	Remarks
2	Kattakurgan Reservoir[15]	140.4	47.5 km to the Northwest	A large congregatory wetland, important for waterbirds and seasonal concentrations of waterbirds. No species listed as KBA triggers, but 115 species have been recorded, 61 of which are breeding.	IBA
3	Sarazm[16]	42.9	49 km to the East	No species listed as KBA triggers. 80% of the area is covered with flood-plain forest consisting of thickets of *Elaeagnus orientalis*, *Hippophae rhamnoides*, *Tamarix arceuthoides*, and others. The rich herb, bushy and tree vegetation and nearness of springs create favourable conditions for 124 species of bird including 41 residents, 61 nesting, 11 migrants, 2 wintering, 2 vagrants.	IBA

7.7.1.2 PROTECTED AREAS

In addition to the KBAs, two legally Protected Areas (PAs) have been identified within 50 km of the Project site. The Zarafshan State Nature Reserve has been designated as both a KBA and a PA, but the designated areas are slightly different. A summary of the Protected Areas in the vicinity of the Project Site is provided in ***Table 7-14*****.** All PAs are over 10 km away from the Project and not expected to be affected by the Project.

TABLE 7-14 PROTECTED AREAS WITHIN 10 KM OF THE PROJECT SITE

#	Protected Area Name	Area (km²)	Distance / Direction to Project Area	Summary
1	Zarafshan State Nature Reserve[17]	24.26	19 km to the East	IUCN Management Category: II Type: Terrestrial and Inland Waters Protected Areas Management Authority: Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan
2	Omankutan National Nature Park[18]	15.0	35 km to the South	IUCN Management Category: II Type: Terrestrial and Inland Waters Protected Areas

[15] https://www.keybiodiversityareas.org/site/factsheet/22280
[16] Key Biodiversity Areas
[17] https://www.protectedplanet.net/1770
[18] https://www.protectedplanet.net/555703560

#	Protected Area Name	Area (km^2)	Distance / Direction to Project Area	Summary
				Management Authority: Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan

7.7.2 HABITAT

The Project is located on the southern edge of Samarkand City, occupying the site of a former landfill. To the north lies the urban built-up area, including residential land, while to the south are croplands.

For the purpose of the biodiversity baseline evaluation, the Project's Area of Influence (AoI) has been conservatively defined as a 3 km radius from the Project facilities/boundary. Habitats have been categorised into modified or natural habitat as per IFC PS6 standards:

- **Modified habitats** are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. Modified habitats may include areas managed for agriculture, forest plantations, reclaimed coastal zones and reclaimed wetlands.
- **Natural habitats** are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/ or where human activity has not essentially modified an area's primary ecological functions and species composition.

Five (5) habitats and land cover types are identified within Project AoI. Because the Project site was previously used as a landfill, the vast majority of the land surrounding the Project is modified by anthropogenic activity. Among all habitats, four are terrestrial and one are freshwater: landfilled site, built areas, croplands, barren land and freshwater bodies (canal), as described in ***Table 7-15***.

Figure 7-9 describes the various types and extent of habitats within the AoI, based on the definitions stated in ***Table 7-15***. The land cover information primarily comes from a desktop review of satellite imagery via Geography Information System combined with information from the site survey.

FIGURE 7-9 MAP OF LANDCOVER TYPE

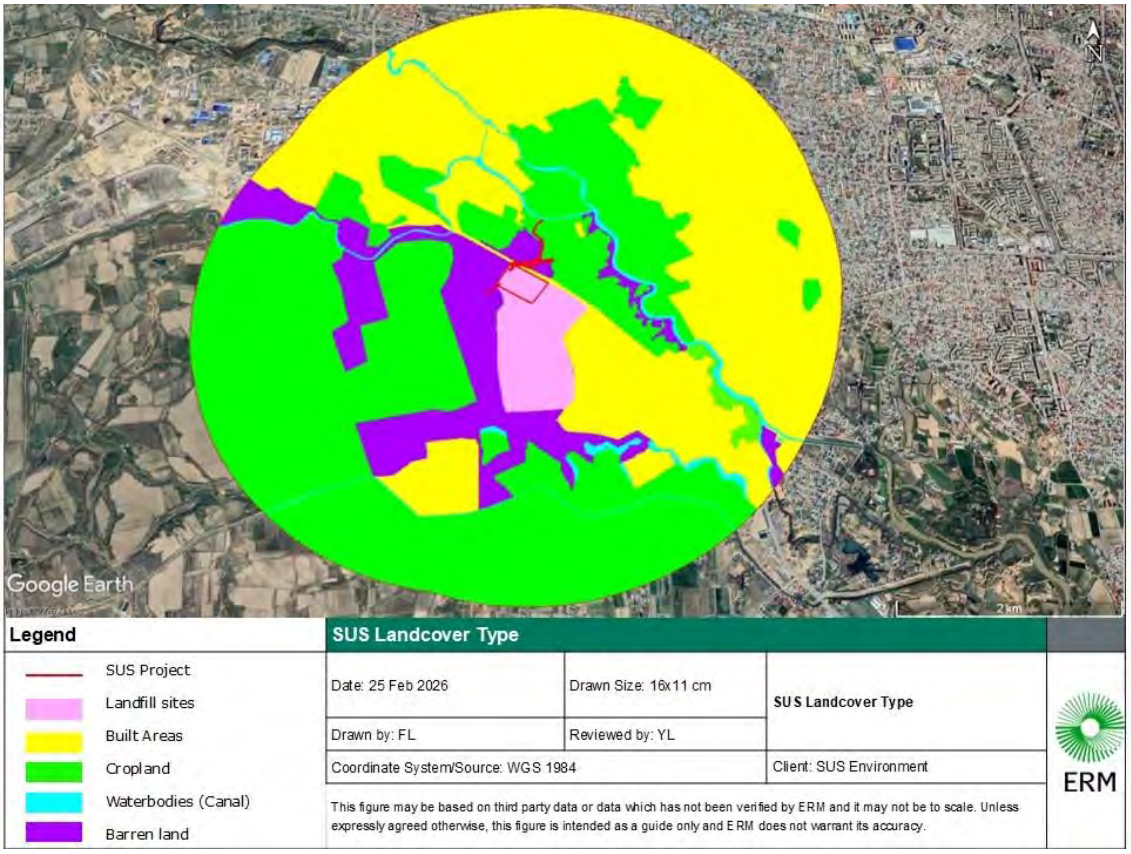


TABLE 7-15 HABITATS WITHIN THE STUDY AREA AND WITHIN A 3-KILOMETER BUFFER ZONE AROUND THE AREAS

Habitat Type	Description	Extent within AoI (km^2)	Habitat Type
Landfill sites	The land designated for the domestic waste landfill, where the domestic waste will be air dried on this site.	~1.08	Modified
Built Areas	Area covered by the building for residential or industrial use.	~17.12	Modified
Cropland	The crop lands in the survey area are planted with various crops, such as cotton, wheat, nuts, falx, etc.	~14.39	Modified
Waterbodies (Canal)	Canal for agricultural irrigation or human use is managed artificial dams hydrologically.	~0.63	Modified
Barren land / Abandoned cropland / Fallow land	The barren land was identified as abandoned cropland or fallow land with signs of decommissioned cultivation or landfill. It is currently characterized by a cover of native weedy vegetation and shrubs or exposed, representing a stage of early natural restoration.	~3.31	Modified

7.7.3 FLORA AND FAUNA

7.7.3.1 FLORA

The city of Samarkand is located within the semi-arid interior of Central Asia. However, its contemporary biological conditions no longer resemble a natural steppe or riparian ecosystem. Centuries of permanent settlement, intensive irrigation, agriculture, and urban expansion have resulted in the near-total replacement of native vegetation and fauna within the urban footprint.

The flora of Samarkand city is significantly influenced by artificial elements. Native steppe and floodplain vegetation has been removed, and present-day plant cover is dominated by planted, or heavily managed tree species (e.g. poplar, elm, mulberry, plane tree) used for shading and dust control. Spontaneous vegetation is largely restricted to disturbance-tolerant weeds and halophytic species along roadsides, construction sites, and irrigation canals. Channelization, altered flow regimes, and irrigation infrastructure have had a significant impact on the native riparian vegetation, often replacing it with simplified reed beds or invasive shrubs that offer limited ecological benefits. Consequently, urban green spaces in Samarkand offer microclimatic and aesthetic benefits, but do not constitute native habitats or serve as natural plant community.

7.7.3.2 FAUNA

Faunal diversity within the city is similarly low and highly homogenized. Urban Samarkand supports only a small number of human-tolerant generalist species, a pattern well documented across arid and semi-arid cities globally and in Central Asia specifically. The mammalian fauna is limited almost exclusively to commensal rodents (rats and mice), while medium-sized animals observed in urban areas are overwhelmingly domestic or feral (dogs and cats). It is evident that native steppe and riparian mammals are not present in urban environments. These species can only be found in fragmented habitats located far outside the city limits. The presence of reptiles, amphibians and native invertebrate communities is extremely limited or non-existent due to a combination of factors, including habitat loss, pollution and a lack of suitable refugees for these species.

Bird community is species-poor and highly homogenized and dominated by human-tolerant generalist species such as pigeons, house sparrows, crows, magpies, and mynas. These species rely on human-made resources such as buildings, refuse, and irrigated landscaping rather than natural resources. The city has a low level of ecologically meaningful bird diversity. This increases slightly outside the urban area, where there are opportunities for foraging and resting for birds in areas such as peri-urban farmland, irrigation canals, reservoirs and less-degraded sections of the Zarafshan basin. Even in these surrounding landscapes, bird assemblages are dominated by generalist and water-associated species, while habitat specialists and species of conservation concern are largely absent.

7.7.4 SUMMARY OF SITE VISIT

During the three-day scoping site visit to the Project site and surrounding area in January, the presence of birds was noted. The bird community was dominated by species feeding on the garbage at the landfilling site. The species could be recognized as common myna (*Acridotheres tristis*, LC) and common raven (*Corvus corax*, LC) based on the photos (***Figure 7-10***) taken

on the site. Besides, the Eurasian Magpie (*Pica Pica*, LC) was found during the site visit in March, 2026. Notably, no raptors and migratory waterbirds were observed during the site visit.

FIGURE 7-10 THE BIRDS OBSERVED DURING THE SITE VISIT

common raven (*Corvus corax*)

common myna (*Acridotheres tristis*)

Eurasian Magpie *(Pica Pica*)

Additionally, transmission lines were frequently found around the Project site (***Figure 7-11***) and no bird collision observed along the transmission lines. Since the proximity of the Project already supports a dense network of transmission towers and overhead lines, where local avian communities are habituated to comparable structures and activity. The newly built transmission lines with 10-20 meters height will link to the existing local power grid or substation, including 600-meter one at the north going through the highway and 200-meter one at the south. No detailed design was finalized for the overhead transmission lines.

FIGURE 7-11 THE TRANSMISSION TOWERS OBSERVED DURING THE SITE VISIT

7.7.5 CRITICAL HABITAT ASSESSMENT

A Critical Habitat Assessment (CHA) has been conducted as part of this ESIA Report. It is initially identified 252 species that potentially meet the thresholds for CH Criteria 1, 2, and 3 (as defined by IFC PS6 and Guidance) according to the Project-specific IBAT report, including: Five (5) mammals, 230 birds, one (1) reptile, seven (7) insects, seven (7) ray-finned fishes, and two (2) plants.

The biodiversity features likely to occur within the study area were screened against the five (5) CH defining criteria defined in terms of IFC PS6 Guidance Note 6 (IFC, 2019):

- Criterion 1: Habitat of significant importance to Critically Endangered (CR) and/or Endangered (EN) species
- Criterion 2: Habitat of significant importance to endemic and/or restricted-range species
- Criterion 3: Habitat supporting globally significant concentrations of migratory species and/or congregatory species
- Criterion 4: Highly threatened and/or unique ecosystems
- Criterion 5: Areas associated with key evolutionary processes

The screening process was further informed by additional guidance provided in GN69 to GN97 of the IFC Guidance Note (GN) 6: 'Biodiversity Conservation and Sustainable Management of Living Natural Resources' (2019). The five criteria are essentially 'triggers' in whether an area of habitat meets any one of the qualifying criteria and is within the defined thresholds.

Of all species and biodiversity values assessed, only four (4) species are considered as CH candidate species but do not meet the Critical Habitat values for this Project's EAAA (see detailed analysis in ***Appendix D***)

7.7.6 SUMMARY OF BIODIVERSITY VALUE

In summary, the Project is located at the southern edge of Samarkand City, within a highly modified urban landscape of low ecological integrity. Native floras and faunas have been almost eliminated, and present biodiversity is restricted to planted vegetation, weeds, pests, and a few disturbance-tolerant animal species. Long-term land conversion in Samarkand city has a detrimental effect on natural biodiversity communities and the original ecosystem structure, resulting in highly simplified, human-maintained biological assemblages rather than functioning ecosystems. Flora is dominated by planted or ruderal species with no natural regeneration, and fauna is limited to a small number of disturbance-tolerant, human-associated species, particularly commensal mammals and common urban birds, with no raptors or migratory waterbirds detected during the site visit.

For the context of regional biodiversity, the landscape is highly disturbed and moderately fragmented because of the urban development of Samarkand City. The Project is not expected to affect any legally protected areas or biodiversity hot spots. Between the two KBAs the east (Zarafshan State Nature Reserve) and west (Kattakurgan Reservoir) protect distinct riparian and wetland values, respectively, but are separated by the urban matrix. As a result, terrestrial connectivity between them is very weak. Limited hydrological continuity exists only through the Zarafshan River on the northern side, while aerial movement of birds would most likely follow either the northern river valley or, for soaring species, the southern ridges. For the proximity of the Project, an existing transmission-line corridor characterized by transmission towers and overhead lines are observed. The planning transmission lines serving the Project will cause negligible bird collision risk.

Overall, the biodiversity value and sensitivity of the Project's AoI is low.

TABLE 7-16 SENSITIVITY / RESPONSIVITY OF HABITATS WITHIN THE STUDY AREA

Habitat/ Land Class	Extent within Study Area (ha)	Description / Notes	Habitat Type	Sensitivity Rating
Landfill sites	108	The land has used for the waste landfill for decades. Since the habitat is highly disturbed and dominated by waste materials, it lost most of its function to support biological activity.	Modified	Low
Built Areas	1,712	Natural vegetation and habitat structure have largely been removed by human development. With frequent anthropogenic activity, noise, lighting, and traffic, the suitability to support species diversity is low.	Modified	Low

Habitat/ Land Class	Extent within Study Area (ha)	Description / Notes	Habitat Type	Sensitivity Rating
Cropland	1,439	It is intensively managed and regularly disturbed through agricultural activity, especially with the use of agrochemicals. The habitat complexity to support native species activities are highly reduced and limited.	Modified	Low
Waterbodies (Canal)	63	Dams are located both upstream and downstream. The ecological connectivity is low, and the species movement is limited. With small size and restricted water flow, its capacity to support diverse aquatic communities or function as viable habitat for migratory species is low.	Modified	Low
Barren land / Abandoned cropland / Fallow land	331	It is typically degraded and lacks stable, well-developed natural habitat features due to past and current anthropogenic activities. Vegetation cover is sparse and patchy, offering limited shelter, foraging, or breeding opportunities for wildlife.	Modified	Low

8. ENVIRONMENTAL IMPACT ASSESSMENT

8.1 AIR QUALITY

8.1.1 INTRODUCTION

This section sets out the air quality impact assessments (AQIA) on ambient air quality during construction and operation phases of the Project.

8.1.2 SCOPE OF ASSESSMENT

As identified in the scoping phase, the following activities have the potential to significantly impact on the ambient air quality during the Project life cycle:

Construction phases

- Land clearance
- Site formation (including ground levelling and earth excavation)
- Construction of the plant, access roads, main workshop and other infrastructures

Operation phase

- Operation and maintenance of the waste incinerators
- Handling and storage of waste

The potential air quality impacts from the construction activities of the Project include:

- Construction Dust: Construction works are associated with dust raising activities (earthwork, traffic on unpaved areas and dusty material handling, like concrete batching). Dust can settle on nearby vegetation and structures, potentially leading to environmental and aesthetic concerns.
- Construction Traffic: Construction vehicular movement can result in an increase of emissions of Nitrogen Oxides (NO_x) and particulate matter (PM), leading to deteriorating air quality in surrounding areas.

The potential air quality impacts from the operation activities of the Project include:

- Flue gas emissions, e.g. PM, Sulfur Dioxide (SO_2), oxides of nitrogen and by association nitrogen dioxide (NO_x and NO_2), Hydrogen Chloride (HCl), Hydrogen Fluoride (HF), heavy metals, Dioxins and Carbon Monoxide (CO);
- Fugitive odor emissions (e.g. Ammonia (NH_3), Hydrogen Sulfide (H_2S) as an odor proxy noting that odor is a complex mix of multiple compounds) from waste storage pit under scheduled incinerator maintenance conditions (during normal operations, no odor emissions will arise).
- Due to the limited emissions, the working and standing loss from the storage tanks of hydrochloric acid, fuel oil, and ammonia will be excluded from the air dispersion modeling. Similarly, dust release from the silos of activated carbon for flue gas treatment, fly ash and lime will not be included in the modeling as these silos will be equipped with dust-removal units (baghouse dust collectors) and located within the enclosed main workshop.

Above-mentioned pollutants can negatively impact human health should health thresholds be exceeded.

8.1.3 IMPACT ASSESSMENT CRITERIA

According to IFC General EHS Guidelines, *"Projects with significant sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:*

Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards, or in their absence, the current World Health Organization (WHO) Air Quality Guidelines or other internationally recognized sources;

Emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. As a general rule, this Guideline suggests 25 percent of the applicable air quality standards to allow additional, future sustainable development in the same airshed."

Uzbekistan has established national legislated standards of ambient air quality[19]. The ambient air quality standards (AAQS) of project related pollutants SO_2, NO_2, CO, PM (TSP and PM_{10}), HCl, HF, NH_3, H_2S, Dioxins and heavy metals (Pb, As, Hg, Ni, Mn, Cd and Cr^{6+}) are listed in *Hygienic Standards for Harmful and Toxic Substances, Producer Microorganisms, Bacterial Preparations and Aeroions in the Ambient Air of Human Settlements of the Republic of Uzbekistan (SanPiN 0053-23)* (see ***Table 8-1***).

TABLE 8-1 AMBIENT AIR QUALITY STANDARD (NATIONAL)

Pollutant	**Air Quality Standard (μg/m^3)**		
	1-h	24-h	Annual
SO_2	500	50	/
NO_2	85	60	40
CO	5000	3000	3000
TSP	500	150	75
PM_{10}	500	300	50
$PM_{2.5}$	/	60	35
HCl	200	100	20
HF	12	8	2.5
NH_3	200	120	40
H_2S	8	/	2

[19] https://lex.uz/docs/6676993

Pollutant	Air Quality Standard (μg/m^3)		
	1-h	24-h	Annual
Lead (Pb)	1	0.3	0.15
Arsenic (As)	/	/	/
Mercury (Hg)	/	0.3	0.015
Nickel (Ni)	/	1	0.05
Manganese (Mn)	10	1	0.05
Cadmium (Cd)	/	0.3	/
Chromium (Cr)*	/	1.5	0.008
Hexavalent Chromium (Cr^{6+})	/	1.5	0.008
Dioxin	/	0.0000005	/

Note: * As SanPiN 0053-23 does not specify an air quality standard for total chromium, the standard for hexavalent chromium (in terms of chromium trioxide) is referenced as a conservative approach.

There are no applicable AAQS for Thallium and Arsenic in national AAQS of Uzbekistan, nor are there criteria values for certain durations (1-hour, 24-hour or annual) of specific pollutants. In this case, internationally recognized standards are referenced, including the World Health Organization ("WHO") Global Air Quality Guideline[20] and WHO Air Quality Guidelines for Europe[21] (in priority) and other international standards, i.e. Minimal Risk Levels ("MRLs") for Hazardous Substances (Agency for Toxic Substances and Disease Registry ("ATSDR"), U.S. Department of Health and Human Services, 2024)[22] and Effects Screening Levels ("ESLs") from Texas Commission on Environmental Quality ("TCEQ")[23]. Where more than one international standard is available, the most stringent value is adopted.

The WHO Global Air Quality Guidelines and the WHO Air Quality Guidelines for Europe are referenced for the standards of PM_{10} and annual limits of As, Cr^{6+} and Ni. And the 1-hour limits of Tl and annual limits of Tl and Dioxin are referenced to the ESLs from TCEQ. In addition, the 1-hour limits of Ni, Hg, As, Cr^{6+}, Mn and HCl, as well as the annual limits of Cd, HCl and Dioxin

[20] WHO Global Air Quality Guideline: assets-global.website-files.com/61822390f9078179b84556a4/61afe06d1187005644448835_WHO-2021-AQ-Guidelines.pdf
[21] WHO Air Quality Guidelines for Europe: https://iris.who.int/bitstream/handle/10665/107335/9789289013581-eng.pdf?sequence=1
[22] Minimal Risk Levels (MRLs) for Hazardous Substances: https://wwwn.cdc.gov/TSP/MRLS/mrlsListing.aspx
[23] Effects Screening Levels (ESLs) from Texas Commission on Environmental Quality: https://www.tceq.texas.gov/toxicology/esl.

are referenced to the ESLs from TCEQ, as the international standards are more stringent than the national limits.

TABLE 8-2 REFERENCE LIMITS FOR OTHER POLLUTANTS

Pollutant	Guideline Value	Duration	Remark
PM_{10}	150	24-hour	WHO Air Quality Guidelines (ug/m^3)
	70	Annual	
$PM_{2.5}$	75	24-hour	WHO Air Quality Guidelines (ug/m^3)
	35	Annual	
HCl	7.9	Annual	Long-term ESLs (ug/m^3)
	190	1-hour	Short-term ESLs (ug/m^3)
Arsenic (As)	0.0066	Annual	WHO Guidelines, 1:100,000 lifetime risk (ug/m^3)
	3	1-hour	Short-term ESLs(ug/m^3)
Mercury (Hg)	0.025	Annual	Long Term ESLs (ug/m^3)
	0.25	1-hour	Short Term ESLs (ug/m^3)
Nickle (Ni)	0.025	Annual	WHO Guidelines, 1:100,000 lifetime risk
	0.33	1-hour	Short-term ESLs (ug/m^3)
Manganese (Mn)	0.15	Annual	WHO Guideline (ug/m^3)
	2.7	1-hour	Short-term ESLs(ug/m^3)
Cadmium (Cd)	0.0033	Annual	Long Term ESLs (ug/m^3)
Thallium (Tl)	0.1	Annual	Long Term ESLs (ug/m^3)
	1	1-hour	Short Term ESLs (ug/m^3)
Hexavalent Chromium (Cr^{6+})	0.00025	Annual	WHO Guidelines, 1:100,000 lifetime risk (ug/m^3)
	0.39	1-hour	Short-term ESLs(ug/m^3)

Pollutant	Guideline Value	Duration	Remark
Dioxin	0.3	Annual	Long-term ESLs(pg TEQ[24] /m^3)

Note: The annual lead guideline value of WHO Guidelines(2000) is lower than the national standard of Uzbekistan and is not adopted as a referenced AAQS limit.

8.1.4 SUMMARY OF BASELINE CONDITIONS

- The max 24-hour average concentration of TSP exceeded the SanPiN 0053-23 (National AAQS of Uzbekistan), with an exceedance rate of 6.9%.
- 24-hour average concentration of PM_{10} can meet the WHO AQG;
- 24-hour average concentration of $PM_{2.5}$, CO, NO, NO_2, SO_2, HF, NH_3, Hg, Ni and Cd can meet the SanPiN 0053-23 (National AAQS of Uzbekistan);
- 1-hour average concentration of CO, NO_2, SO_2 can meet the SanPiN 0053-23 (National AAQS of Uzbekistan);
- No applicable limit to monthly average of TSP, PM_{10}, $PM_{2.5}$, CO, NO, NO_2, SO_2 ,HF, NH_3, HCl, H_2S, Toluene, Ethyl Benzene, Xylene, As , Mn, Cr ,Cr^{6+} and Tl.

8.1.5 IMPACT ASSESSMENT

8.1.5.1 CONSTRUCTION PHASE (FUGITIVE DUST)

Assessment Methodology

Impact magnitudes of the identified potential ambient air quality impacts during the construction phase (fugitive dust) are assessed following the methodology presented in ***Figure 8-1***. The methodology aligns with that prescribed by the Institute of Air Quality Management (IAQM, 2024) on the Assessment of Dust from Demolition and Construction. The primary purpose of the dust risk assessment is to identify whether standard, best practice mitigation is sufficient in managing the risk, or if additional site-specific measures are required to effectively reduce the dust risk to an acceptable level.

Impact significances of the identified impacts are subsequently determined based on the matrix of impact magnitude and receptor sensitivity defined in ***Section 4.4***.

Embedded Control

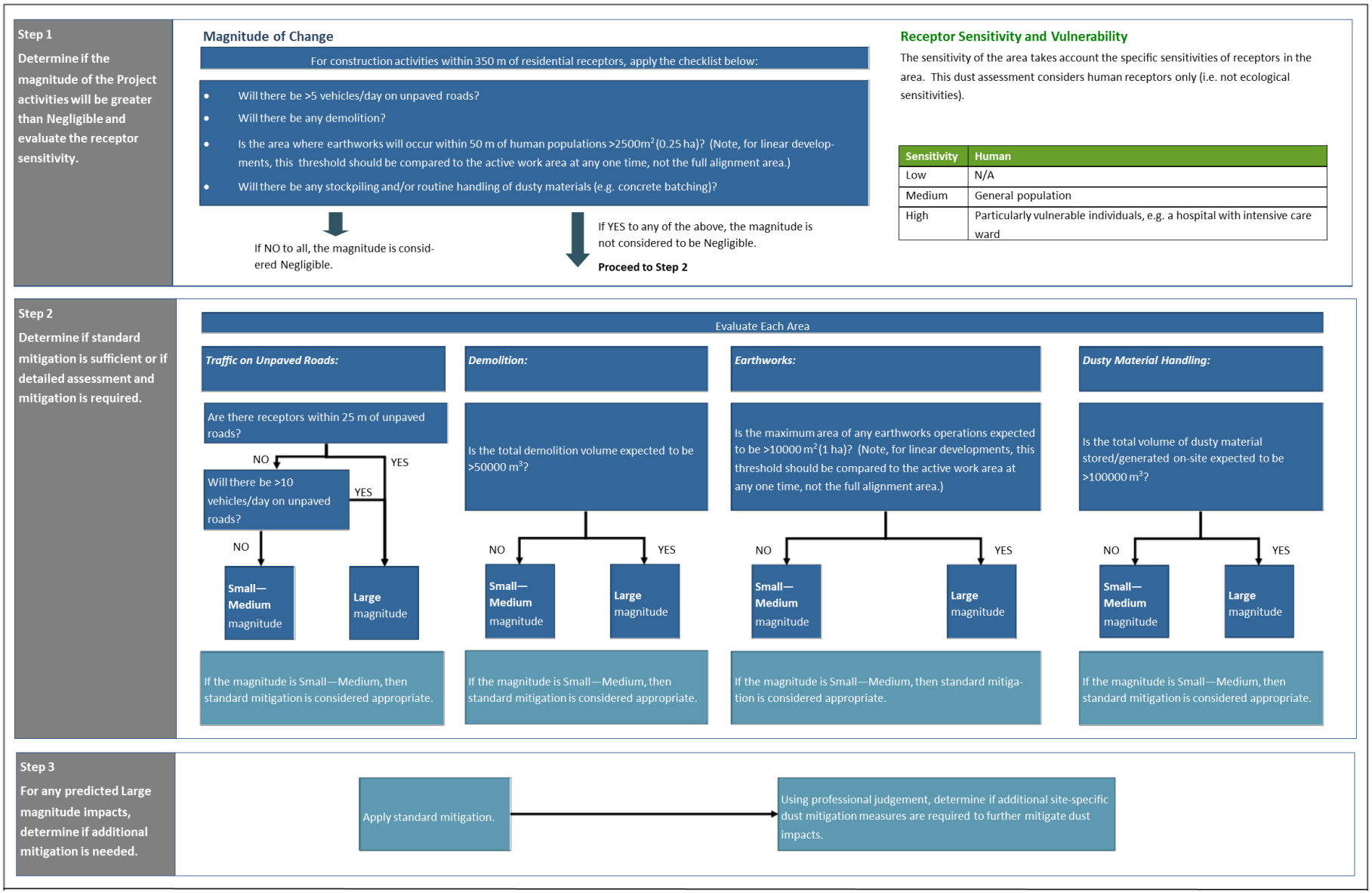
Based on Project regulatory EIA and Site's established dust control and management procedure, the following Project-specific embedded measures for fugitive dust control during construction phase were identified:

- Organize regular watering to suppress dust on roads and open areas of the construction site.
- Conduct regular maintenance of diesel engines to minimize exhaust emissions.

[24] TEQ: Toxic Equivalent Quantity

- Cover vehicles transporting soil and other dusty materials with removable tarpaulins.
- Cover all earth stockpiles and open storage areas that will not be used within 24 hours to prevent dust generation.
- Ensure cement is delivered to the construction site in sealed bags only.
- Install enclosed hoardings along the construction boundary.
- Implement wheel washing system to remove dirt from the vehicle wheels before leaving the site.
- Drop heights from loading shovels and hoppers will be minimized.
- Harden site access roads and internal haul roads except active working areas.

FIGURE 8-1 AQIA METHODOLOGY FOR FUGITIVE DUST EMISSION



Significance of Impact

The nearest sensitive receptor, Navruz Mahalla, is located approximately 650 m northwest of the Project boundary, which is outside the 350-meter AOI. Hence **negligible impact magnitude of construction dust** is expected during the construction phase of the Project.

Impact		**Impact of Fugitive Dust in Construction Phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Direct result of earthwork and dusty material handling.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The spatial impact of fugitive dust is considered as **Low**, since it will be localized within 350 m from Project site.					
	Duration	Temporary	Short-term	**Medium-term**	Long-term	Permanent
	Frequency	Continuous				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	The temporal impact of fugitive dust is considered as **Medium**, since it will occur during the approximate 24-month construction phase.					
IMPACT MAGNITUDE		**Negligible**	Small	Medium	Large	
		Impact magnitude is a combination of spatial and temporal effects above.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Sensitivity of receptor is considered **Medium** for general residential community.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Residual Impact

With the implementation of the embedded mitigation measures, impacts to ambient air quality due to fugitive dust are expected to be **Negligible**.

8.1.5.2 CONSTRUCTION PHASE (TRAFFIC)

Assessment Methodology

Impact magnitudes of the identified potential ambient air quality impacts of construction traffic are assessed following the methodology presented in ***Figure 8-2***. The

fundamental aspects of the methodology are based on the UK Highways Agency Design Manual for Roads and Bridges (2024).

Impact significances of the identified impacts are subsequently determined based on the matrix of impact magnitude and receptor sensitivity presented in ***Section 4.4***.

Embedded Control

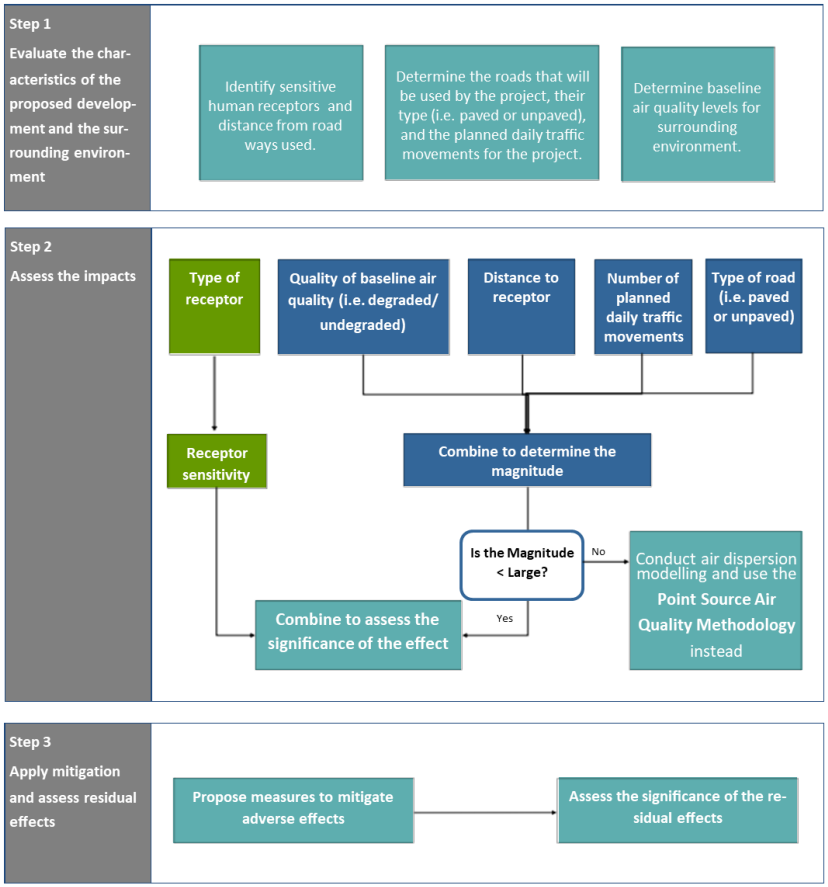
The Project Feasibility Study and regulatory EIA do not indicate any embedded controls for air quality impact caused by traffic during construction phase.

FIGURE 8-2 AQIA METHODOLOGY FOR ROAD TRAFFIC

Overview

The IFC are not prescriptive in determining the threshold of road traffic which may result in significant impacts. The only guidance provided is that operators of fleets with greater than 120 Heavy Goods Vehicles should consider using lower emission vehicles. This methodology is therefore based upon the UK Highways Agency Design Manual for Roads and Bridges assuming Euro 3 or equivalent fleet .

The methodology is based upon the calculated increases in vehicles needed to trigger the significance thresholds, based upon the interpretation of the IFCs significance criteria.



Receptor Sensitivity

Note that this methodology applies only to human receptors (i.e. not ecological receptors). The table below provides receptor sensitivity with respects to human health.

Sensitivity	Description
Negligible	N/A
Low	N/A
Medium	General population
High	Particularly vulnerable individuals, e.g. a hospital with intensive care ward

Magnitude of Change

The magnitude of the impacts to air quality from project traffic are determined using the combination of factors illustrated to the left. The first step in this process is identifying the relative level of traffic.

Road Type	Type of Traffic	Annual Average Daily Traffc (AADT), e.g. number of traffic movements	Level of Project Traffic (Relative to the Baseline Air Quality)	
			Undegraded Airshed	Degraded Airshed
Paved Roads	Heavy Duty Vehicles (HDV)	<440	Negligible	Negligible
		<1000	Negligible	Small
		<3200	Small	Medium
		<15000	Medium	Large
		>15000	Large	Large
	Light Duty Vehicles (LDV)	<7600	Negligible	Negligible
		<17000	Negligible	Small
		<55000	Small	Medium
		<250000	Medium	Large
		>250000	Large	Large

This methodology applies to road traffic exhaust emissions. Emissions of dust arising from the use of unpaved roads by vehicles is assessed separately .

The magnitude can then be determined using the matrix below.

Level of Project Traffic	Distance of Receptor to Road				
	>100m	<100m	<50m	<20m	<5m
Large	Negligible	Small	Medium	Large	Large
Medium	Negligible	Small	Small	Medium	Large
Small	Negligible	Negligible	Negligible	Small	Small
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Significance of Impact

According to Project construction plan, the Project will utilize limited numbers of trucks for the construction (maximum 50 vehicles). Hence, the average daily traffic movements will be maximum 100 vehicles, assuming 1 round trip to and from the Site. In this regard, the magnitude of the air quality impact from construction traffic is considered **Negligible**.

Impact		**Impact of Traffic in Construction Phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Direct result of road traffic from vehicles during construction phase.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The spatial impact of traffic is considered as **Low**, since it will be Localized within 50 m from road.					
	Duration	Temporary	Short-term	**Medium-term**	Long-term	Permanent
	Frequency	Often				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	The temporal impact of traffic is considered as **Medium**, since it will occur during the approximate 24-month construction phase.					
IMPACT MAGNITUDE		**Negligible**	Small	Medium	Large	
		The Project will utilize limited numbers of trucks for the construction (maximum 50 Vehicles). Hence, the average daily traffic movements will be maximum 100 vehicles, assuming 1 round trip to and from the Site. As per the magnitude matrix in *Section 4.4*, the impact magnitude is determined as **Negligible.**				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		The identified human sensitive receptors are general population and classified with **Medium** sensitivity.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Residual Impact

Residual impact to ambient air quality due to construction traffic is expected to be **Negligible**.

8.1.5.3 OPERATION PHASE

Assessment Methodology

The operation phase AQIA uses dispersion model, AERMOD, to determine the Project Contribution (PC) quantitatively at sensitive receptors by applying meteorological data of over a period of three years (2020 to 2024). The worst-case 1-hour or 24-hour average and annual average predicted ground level concentrations of SO_2, NO_2, Dust (TSP, PM_{10} and $PM_{2.5}$), HCl, HF, Dioxin, and heavy metals (As, Hg, Pb, Cr, Cr^{6+}, Cd, Ni, Mnand Tl) across the five modelled meteorological years are used to define the PC at each modelled receptor.

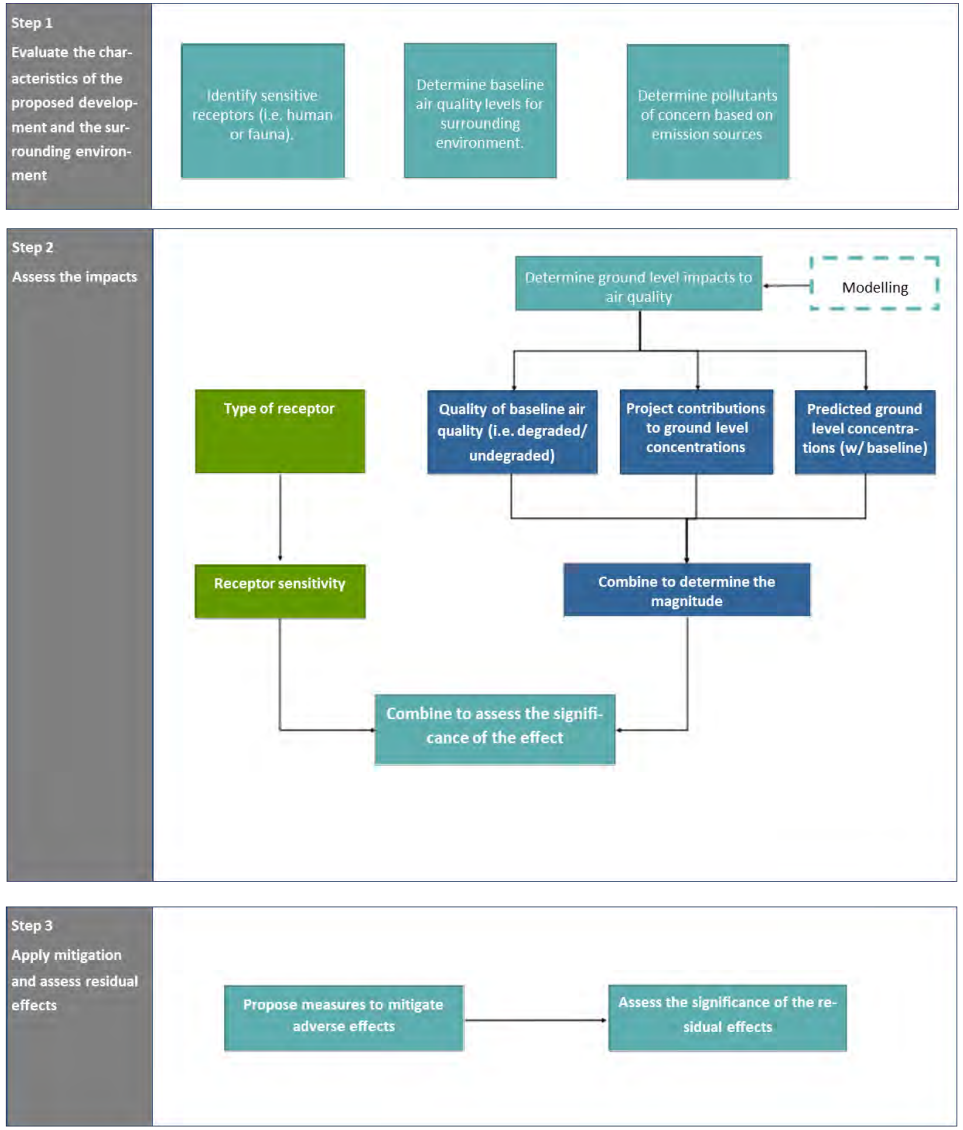
The identified potential ambient air quality impacts during the operation phase are determined following a three-stage approach provided in ***Figure 8-2*** Impact magnitude is determined based on the comparison of PC and Predicted Environmental Concentration (PEC) results with the applicable AAQS.

Impact significances are subsequently designated relative to the impact magnitude and sensitivity of the receptor using the matrix in ***Section 4.4***.

The extent of the airshed in which potential air quality impacts are considered extends 10 km from the center of the Project site. This spatial extent is considered of sufficient size to capture the maximum offsite PC.

As 24-hour AAQS limit of Uzbekistan of Hg, Ni and Cr^{6+} is higher than the 1-hour AAQS limit referenced from international standards, it's no meaning to modeling for the 24-hour PC of Hg, Ni and Cr^{6+}.

FIGURE 8-3 AQIA METHODOLOGY FOR INDUSTRIAL EMISSION SOURCES



Receptor Sensitivity

The sensitivity of ecological receptors is defined on the basis of their designated importance as an ecological resource. Any significant ecology impacts from air quality on non-designated sites will be assessed qualitatively as part of the Ecology assessment. This is typically determined on the basis of the statutory protection conferred on a receptor (for example, under the Ramsar convention). The table below provides receptor sensitivity with respects to human health. Sensitivity criteria for ecological receptors is as defined in the biodiversity methodology.

Sensitivity	Human	Ecology
Negligible	N/A	Non-designated habitats
Low	N/A	Locally designated sites
Medium	General population	Nationally designated sites
High	Particularly vulnerable individuals, e.g. a hospital with intensive care ward	Internationally designated sites

Magnitude of Change

The results of the air dispersion modelling are compared to the relevant air quality standards or guidelines (either for human health or ecology). Different standards/ guidelines will apply depending on the pollutant of concern and the averaging period. To determine magnitude, the Project's Contributions (PCs) to ground level pollutant concentrations are assessed in tandem with the total Predicted Environmental Contributions (PECs), where the PEC is the sum of the baseline concentration and the PC for a particular pollutant. The criteria used is presented below. Where national guidance exists for impact magnitude levels, this should take precedent to the value provided below.

PC as % of AQS	Magnitude
Undegraded Airsheds Where PEC < Air Quality Standards/Guidelines	
<10%	***Negligible***
10-25%	***Small***
25-75%	***Medium***
>75%	***Large***
Degraded Airsheds, i.e. Where PEC > Air Quality Standards/Guidelines	
<5%	***Negligible***
5-10%	***Small***
10-25%	***Medium***
>25%	***Large***

Note that in some countries a site-specific methodology is required to assess ecology impacts from air emissions (e.g. acid deposition and eutrophication). In such cases, an additional assessment would be required using site-specific ecology criteria.

Embedded Control

Per Project feasibility study and regulatory EIA, the following exhaust treatment measures are adopted and considered as embedded control.

Under normal incineration conditions

- Adopt the "3T+E" method to control the generation of dioxin:
  - Temperature: Maintain the flue gas temperature at ≥ 850°C before it enters the waste heat boiler to ensure complete decomposition of dioxins in the furnace.
  - Time: Ensure the residence time of the flue gas in the furnace and the secondary combustion chamber is ⩾ 2 seconds.
  - Turbulence: Ensure sufficient mixing and turbulence of the flue gas to achieve complete combustion.
  - Excess air: Maintain an oxygen concentration of ≥ 6% to ensure adequate excess air for complete combustion.
  - Additional Control: During flue gas treatment, minimize the residence time within the 250–800°C range—particularly 300–500°C—and reduce the temperature of the flue gas before it enters the dust collector to prevent the reformation of dioxins.
- Flue gas treatment and monitoring:
  - Selective Non-Catalytic Reduction (SNCR) for NOx removal.
  - Dry lime slurry for acidic gases (SO_2, HCl, HF) removal.
  - Activated carbon spraying for dioxins and heavy metal adsorption.
  - Baghouse filters for PM removal.
  - Treated flue gases from each of the two incinerators are emitted separately via Stack #1 and Stack #2.
  - Per feasibility study of the Project, a set of CEMS (Continuous Emission Monitoring System) monitoring system will be installed on both stacks. The monitored parameters include SO_2, NO_x, HCl, HF, CO, CO_2, O_2, H_2O, NH_3, PM, flue gas flow rate, and flue gas temperature.
- Odor control measures
  - Fully enclosed waste reception hall and waste storage pit to prevent odor escape.
  - Maintain negative pressure inside the waste storage pit.
  - Use extracted air as combustion air inside the furnace to destroy odor compounds.

Odor control under scheduled incinerator maintenance conditions

- Inspect one incinerator at a time.

- Install an additional exhaust fan to maintain adequate negative pressure inside the waste storage pit.
- Under scheduled incinerator maintenance conditions, Odorous air collected by the additional fan will be treated through an activated carbon adsorption unit before being discharged via Stack #3.

Significance of Impact

Modelled Receptors

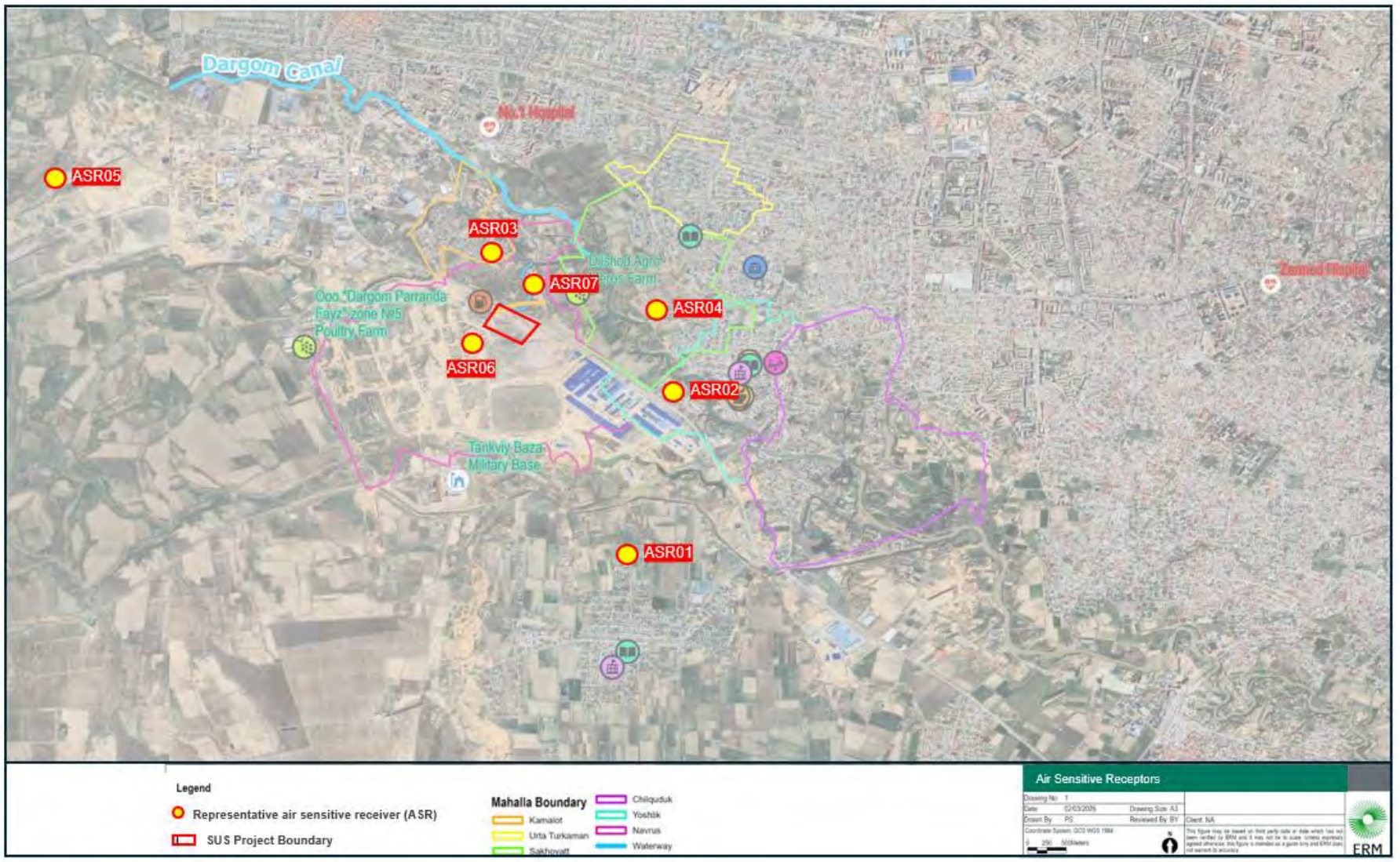
A receptor grid extending 10 km from the center of the Project site is set up in the dispersion model. In addition to the receptor grid, the receptors likely to be worst affected by the Project are identified as the representative air sensitive receptors (ASRs) and are listed in ***Table 8-3***.

There are no highly sensitive ecological sites (nationally/ internationally designated ecological sites) identified within the AoI for AQIA. Thus, AQ impact to ecological receptors is thus not assessed. Locations of these ASRs are presented in ***Figure 8-4***.

TABLE 8-3 SUMMARY OF REPRESENTATIVE AIR SENSITIVE RECEPTORS

Type of Receptor	ASR ID	Description	Coordinates	Receptor Sensitivity	Nearest Distance to the Project Site (m)
Human receptor	ASR1	Dustlik Mahalla	39°37'7.33"N; 66°52'12.38"E	Medium	2,740
	ASR2	Yoshlik Mahalla	39°38'11.33"N; 66°52'29.98"E	Medium	1,450
	ASR3	Kamalot Mahalla	39°39'2.65"N; 66°51'27.78"E	Medium	495
	ASR4	Sakhovatt Mahalla	39°38'45.76"N; 66°52'33.16"E	Medium	1,250
	ASR5	Marokanda Mahalla	39°39'38.30"N; 66°47'28.95"E	Medium	5,590
	ASR6	Navrus Mahalla	39°38'30.61"N; 66°51'14.96"E	Medium	280
	ASR7	Navrus Mahalla	39°38'52.82"N; 66°51'40.95"E	Medium	350

FIGURE 8-4 LOCATIONS OF AIR SENSITIVE RECEPTORS



Emission Sources

The emissions include the flue gas emission stacks under normal incineration conditions and the odorous exhaust emission stack under scheduled incinerator maintenance conditions, and the fugitive emissions from waste storage pit. Details of the stack emissions and fugitive emissions are provided as follows:

(1) Stack emission

Under normal incineration conditions, the treated flue gases from each of the two incinerators are emitted separately via Stack #1 and Stack #2.

Under scheduled incinerator maintenance conditions, odorous air collected by an additional fan will be treated through an activated carbon adsorption unit before being discharged via Stack #3.

The emission inventory is derived from Project feasibility study, regulatory EIA and other design documents. Flue gas emissions are designed to comply with the emission limits stipulated in EU Directive 2010/75, which replaced EC Directive 2000/76 and was further amended by EU Directive 2024/1785.

The release parameters for stacks are detailed in ***Table 8-4***.

TABLE 8-4 SOURCE RELEASE PARAMETERS

Parameter	Unit	Stack #1	Stack #2	Stack #3	Reference
		Flue gas	Flue gas	Odorous gas	
Temperature	℃	160	160	25	Project Design Documents including Feasibility Study
Flow	Nm^3/h	177,990	177,990	70,000	
Height	m	80	80	22	
Diameter	m	2.5	2.5	2	
Emission hour	h/a	8,000	8,000	760	
TSP	mg/Nm^3	10	10	/	
	g/s	4.944E-01	4.944E-01	/	
PM_{10}	mg/Nm^3	10	10	/	Assuming 100% of PMs are $PM_{2.5}$, from conservative perspective
	g/s	4.944E-01	4.944E-01	/	
$PM_{2.5}$	mg/Nm^3	10	10	/	
	g/s	4.944E-01	4.944E-01	/	

Parameter	Unit	Stack #1	Stack #2	Stack #3	Reference
		Flue gas	Flue gas	Odorous gas	
HCl	mg/Nm^3	10	10	/	Project Design Documents including Feasibility Study
	g/s	4.944E-01	4.944E-01	/	
SO_2	mg/Nm^3	50	50	/	
	g/s	2.472E+00	2.472E+00	/	
NO_x	mg/Nm^3	180	180	/	
	g/s	8.9	8.9	/	
Dioxin	ng TEQ/Nm^3	0.1	0.1	/	
	g/s	4.944E-09	4.944E-09	/	
HF	mg/Nm^3	1	1	/	
	g/s	4.944E-02	4.944E-02	/	
Hg	mg/Nm^3	0.05	0.05	/	
	g/s	2.472E-03	2.472E-03	/	
Tl	mg/Nm^3	0.05	0.05	/	
	g/s	2.472E-03	2.472E-03	/	
Pb	mg/Nm^3	0.303	0.303	/	
	g/s	1.498E-02	1.498E-02	/	
Cr	mg/Nm^3	0.0631	0.0631	/	
	g/s	3.120E-03	3.120E-03	/	
Cd	mg/Nm^3	0.05	0.05	/	
	g/s	2.472E-03	2.472E-03	/	
Ni	mg/Nm^3	0.0631	0.0631	/	
	g/s	3.120E-03	3.120E-03	/	

Parameter	Unit	Stack #1	Stack #2	Stack #3	Reference
		Flue gas	Flue gas	Odorous gas	
Cr^{6+}	mg/Nm^3	0.00037	0.00037	/	Guidance on Assessing Group 3 Metal Stack Emissions from Incinerators (Version 4) from UK Environment Agency
	g/s	1.834E-05	1.834E-05	/	
As	mg/Nm^3	0.02	0.02	/	
	g/s	9.888E-04	9.888E-04	/	
Mn	mg/Nm^3	0.34	0.34	/	
	g/s	1.681E-02	1.681E-02	/	
NH_3	mg/Nm^3	/	/	1.484E-01	-Odorous gases generation coefficients under 30°C: NH_3 86.68 and H_2S 8.87g/a t waste. -Waste storage pit capacity 21476m ³ and can contain 7-day garbage. -Adsorption efficiency of activated carbon: 80%.
	g/s	/	/	2.886E-03	
H_2S	mg/Nm^3	/	/	1.519E-02	
	g/s	/	/	2.953E-04	

NOTE: * COORDINATE OF (0,0) IS 39°38'47.06"N, 66°51'25.14"E.

(2) Fugitive emission

The waste reception hall and waste storage pit are fully enclosed, and the waste storage pit is maintained under negative pressure. Nevertheless, fugitive odorous gas emissions to the ambient environment are on occasion unavoidable, particularly during waste unloading activities. From a conservative perspective, the waste storage pit is therefore considered a potential source of fugitive emissions of NH_3 and H_2S.

The parameters of the fugitive emission source are detailed in ***Table 8-5***.

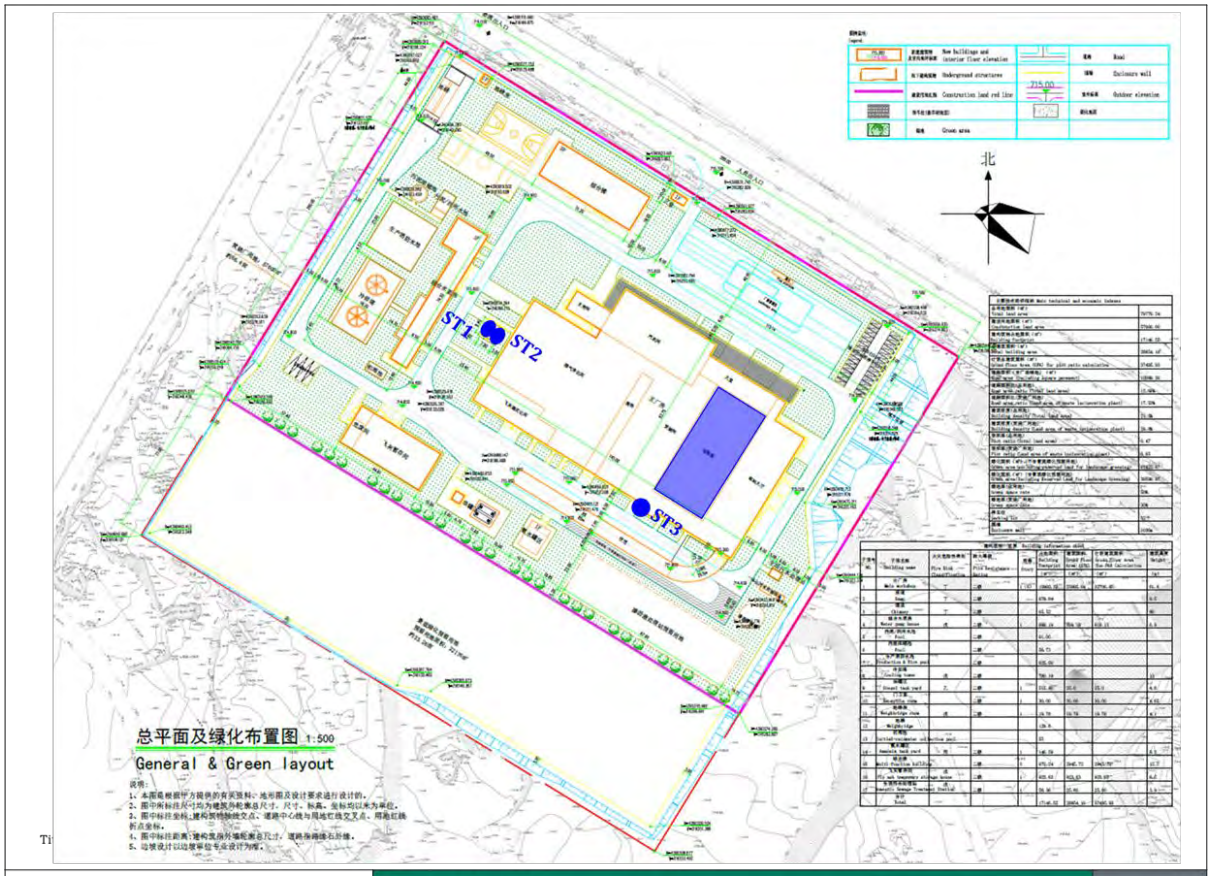
TABLE 8-5 SOURCE RELEASE PARAMETERS FOR AREA SOURCE

Area source information				**Emission Information**		**Reference**
No.	Name	Scale(m*m)	Height(m)	Pollutant	Rate (kg/h)	-Odorous gases generation coefficients under 30°C: NH_3 86.68 and H_2S 8.87g/a t waste.
A1	Waste Storage Pit	29 * 61	8	NH_3	1.06E-02	
				H_2S	7.43E-03	

Area source information				Emission Information		Reference
						-Waste storage pit capacity 21,476m ³ and can contain 7-day garbage. - 10% of odorous gases emitted into the atmospheric environment.

The locations of emission sources are shown in ***Figure 8-5***.

FIGURE 8-5 LOCATIONS OF EMISSION SOURCES



Legend	Project Location			
Stack Emission Source Area Emission Source	Date: 11 February 2026	Drawn Size: 16x15 cm	SUS Uzbekistan Waste to Energy Project	ERM
	Drawn by: MX	Reviewed by: JC		
	Coordinate System/Source: WGS 1984		Client: SUS Environment	
	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.			

Modelling Result

The modeling result is summarized in ***Table 8-6*** and ***Table 8-7***. The air dispersion modelling setting and contour figures are presented in ***Appendix C***.

TABLE 8-6 MODELING RESULT 1 FOR AERMOD DISPERSION MODEL

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
1-hour Average NO_2 Results (Air Quality Impact to Human Health) (d)									
Max. on grid	25	85	7.4	8.7	32.4	38.1	NA	Negligible	NA
ASR1	25	85	2.1	2.4	27.1	31.9	Medium	Negligible	Negligible
ASR2	25	85	2.9	3.4	27.9	32.8	Medium	Negligible	Negligible
ASR3	25	85	5.8	6.8	30.8	36.2	Medium	Negligible	Negligible
ASR4	25	85	3.4	4.0	28.4	33.4	Medium	Negligible	Negligible
ASR5	25	85	2.3	2.7	27.3	32.1	Medium	Negligible	Negligible
ASR6	25	85	6.8	8.0	31.8	37.4	Medium	Negligible	Negligible
ASR7	25	85	5.1	5.9	30.1	35.4	Medium	Negligible	Negligible
24-hour Average NO_2 Results (Air Quality Impact to Human Health)									
Max. on grid	20	60	1.8	4.6	21.8	54.5	NA	Negligible	NA
ASR1	20	60	0.3	0.6	20.3	50.8	Medium	Negligible	Negligible
ASR2	20	60	0.6	1.6	20.6	51.5	Medium	Negligible	Negligible
ASR3	20	60	0.6	1.5	20.6	51.5	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR4	20	60	0.8	1.9	20.8	52.0	Medium	Negligible	Negligible
ASR5	20	60	0.3	0.9	20.3	50.8	Medium	Negligible	Negligible
ASR6	20	60	1.1	2.7	21.1	52.8	Medium	Negligible	Negligible
ASR7	20	60	0.5	1.4	20.5	51.3	Medium	Negligible	Negligible
Annual Average NO_2 Results (Air Quality Impact to Human Health) (c)									
Max. on grid	12	40	0.9	2.2	12.9	32.3	NA	Negligible	NA
ASR1	12	40	0.1	0.2	12.1	30.3	Medium	Negligible	Negligible
ASR2	12	40	0.2	0.5	12.2	30.5	Medium	Negligible	Negligible
ASR3	12	40	0.1	0.3	12.1	30.3	Medium	Negligible	Negligible
ASR4	12	40	0.2	0.4	12.2	30.5	Medium	Negligible	Negligible
ASR5	12	40	0.2	0.5	12.2	30.5	Medium	Negligible	Negligible
ASR6	12	40	0.5	1.1	12.5	31.3	Medium	Negligible	Negligible
ASR7	12	40	0.1	0.3	12.1	30.3	Medium	Negligible	Negligible
1-hour Average SO_2 Results (Air Quality Impact to Human Health)									
Max. on grid	20	500	6.2	1.2	26.2	5.2	NA	Negligible	NA
ASR1	20	500	1.7	0.3	21.7	4.3	Medium	Negligible	Negligible
ASR2	20	500	2.4	0.5	22.4	4.5	Medium	Negligible	Negligible
ASR3	20	500	4.9	1.0	24.9	5.0	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR4	20	500	2.9	0.6	22.9	4.6	Medium	Negligible	Negligible
ASR5	20	500	2.0	0.4	22.0	4.4	Medium	Negligible	Negligible
ASR6	20	500	5.7	1.1	25.7	5.1	Medium	Negligible	Negligible
ASR7	20	500	4.3	0.9	24.3	4.9	Medium	Negligible	Negligible
24-hour Average SO_2 Results (Air Quality Impact to Human Health)									
Max. on grid	19	50	1.5	3.1	20.5	41.0	NA	Negligible	NA
ASR1	19	50	0.2	0.4	19.2	38.4	Medium	Negligible	Negligible
ASR2	19	50	0.5	1.1	19.5	39.0	Medium	Negligible	Negligible
ASR3	19	50	0.5	1.0	19.5	39.0	Medium	Negligible	Negligible
ASR4	19	50	0.6	1.3	19.6	39.2	Medium	Negligible	Negligible
ASR5	19	50	0.3	0.6	19.3	38.6	Medium	Negligible	Negligible
ASR6	19	50	0.9	1.8	19.9	39.8	Medium	Negligible	Negligible
ASR7	19	50	0.5	0.9	19.5	39.0	Medium	Negligible	Negligible
1-hour Average TSP Results (Air Quality Impact to Human Health) (d)									
Max. on grid	244	500	1.25	0.25	245.25	49.1	NA	Negligible	NA
ASR1	244	500	0.35	0.07	244.35	48.9	Medium	Negligible	Negligible
ASR2	244	500	0.49	0.10	244.49	48.9	Medium	Negligible	Negligible
ASR3	244	500	0.98	0.20	244.98	49.0	Medium	Negligible	Negligible
ASR4	244	500	0.58	0.12	244.58	48.9	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR5	244	500	0.39	0.08	244.39	48.9	Medium	Negligible	Negligible
ASR6	244	500	1.14	0.23	245.14	49.0	Medium	Negligible	Negligible
ASR7	244	500	0.85	0.17	244.85	49.0	Medium	Negligible	Negligible
24-hour Average TSP Results (Air Quality Impact to Human Health)									
Max. on grid	210	150	0.31	0.20	210.31	**140.2**	NA	Negligible	NA
ASR1	210	150	0.04	0.03	210.04	**140.0**	Medium	Negligible	Negligible
ASR2	210	150	0.01	0.00007	210.01	**140.0**	Medium	Negligible	Negligible
ASR3	210	150	0.49	0.33	210.49	**140.3**	Medium	Negligible	Negligible
ASR4	210	150	0.11	0.07	210.11	**140.1**	Medium	Negligible	Negligible
ASR5	210	150	0.02	0.01	210.02	**140.0**	Medium	Negligible	Negligible
ASR6	210	150	0.98	0.65	210.98	**140.7**	Medium	Negligible	Negligible
ASR7	210	150	0.10	0.07	210.1	**140.1**	Medium	Negligible	Negligible
Annual Average TSP Results (Air Quality Impact to Human Health) (c)									
Max. on grid	119	75	0.07	0.05	119.07	**158.8**	NA	Negligible	NA
ASR1	119	75	0.01	0.0001	119.01	**158.7**	Medium	Negligible	Negligible
ASR2	119	75	0.02	0.01	119.02	**158.7**	Medium	Negligible	Negligible
ASR3	119	75	0.01	0.01	119.01	**158.7**	Medium	Negligible	Negligible
ASR4	119	75	0.01	0.01	119.01	**158.7**	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR5	119	75	0.02	0.01	119.02	**158.7**	Medium	Negligible	Negligible
ASR6	119	75	0.04	0.02	119.04	**158.7**	Medium	Negligible	Negligible
ASR7	119	75	0.01	0.01	119.01	**158.7**	Medium	Negligible	Negligible
1-hour Average PM_{10} Results (Air Quality Impact to Human Health) (d)									
Max. on grid	116.346	500	1.25	0.25	117.596	23.52	NA	Negligible	NA
ASR1	116.346	500	0.35	0.07	116.696	23.34	Medium	Negligible	Negligible
ASR2	116.346	500	0.49	0.10	116.836	23.37	Medium	Negligible	Negligible
ASR3	116.346	500	0.98	0.20	117.326	23.47	Medium	Negligible	Negligible
ASR4	116.346	500	0.58	0.12	116.926	23.39	Medium	Negligible	Negligible
ASR5	116.346	500	0.39	0.08	116.736	23.35	Medium	Negligible	Negligible
ASR6	116.346	500	1.14	0.23	117.486	23.50	Medium	Negligible	Negligible
ASR7	116.346	500	0.85	0.17	117.196	23.44	Medium	Negligible	Negligible
24-hour Average PM_{10} Results (Air Quality Impact to Human Health)									
Max. on grid	116.3	150	0.31	0.20	116.61	77.7	NA	Negligible	NA
ASR1	116.3	150	0.04	0.03	116.34	77.6	Medium	Negligible	Negligible
ASR2	116.3	150	0.01	0.00	116.31	77.5	Medium	Negligible	Negligible
ASR3	116.3	150	0.49	0.33	116.79	77.9	Medium	Negligible	Negligible
ASR4	116.3	150	0.11	0.07	116.41	77.6	Medium	Negligible	Negligible
ASR5	116.3	150	0.02	0.01	116.32	77.5	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR6	116.3	150	0.98	0.65	117.28	78.2	Medium	Negligible	Negligible
ASR7	116.3	150	0.10	0.07	116.40	77.6	Medium	Negligible	Negligible
Annual Average PM_{10} Results (Air Quality Impact to Human Health) (c)									
Max. on grid	45.7	50	0.07	0.10	45.77	91.5	NA	Negligible	NA
ASR1	45.7	50	0.01	0.01	45.71	91.4	Medium	Negligible	Negligible
ASR2	45.7	50	0.02	0.02	45.72	91.4	Medium	Negligible	Negligible
ASR3	45.7	50	0.01	0.01	45.71	91.4	Medium	Negligible	Negligible
ASR4	45.7	50	0.01	0.02	45.71	91.4	Medium	Negligible	Negligible
ASR5	45.7	50	0.02	0.02	45.72	91.4	Medium	Negligible	Negligible
ASR6	45.7	50	0.04	0.05	45.74	91.5	Medium	Negligible	Negligible
ASR7	45.7	50	0.01	0.01	45.71	91.4	Medium	Negligible	Negligible
24-hour Average $PM_{2.5}$ Results (Air Quality Impact to Human Health)									
Max. on grid	45.9	60	0.31	0.41	46.21	61.6	NA	Negligible	NA
ASR1	45.9	60	0.04	0.06	45.94	61.3	Medium	Negligible	Negligible
ASR2	45.9	60	0.01	0.01	45.91	61.2	Medium	Negligible	Negligible
ASR3	45.9	60	0.49	0.65	46.39	61.9	Medium	Negligible	Negligible
ASR4	45.9	60	0.11	0.14	46.01	61.3	Medium	Negligible	Negligible
ASR5	45.9	60	0.02	0.02	45.92	61.2	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR6	45.9	60	0.98	1.30	46.88	62.5	Medium	Negligible	Negligible
ASR7	45.9	60	0.10	0.13	46.00	61.3	Medium	Negligible	Negligible
Annual Average $PM_{2.5}$ Results (Air Quality Impact to Human Health) (c)									
Max. on grid	21.3	35	0.07	0.20	21.37	61.1	NA	Negligible	NA
ASR1	21.3	35	0.01	0.01	21.31	60.9	Medium	Negligible	Negligible
ASR2	21.3	35	0.02	0.05	21.32	60.9	Medium	Negligible	Negligible
ASR3	21.3	35	0.01	0.03	21.31	60.9	Medium	Negligible	Negligible
ASR4	21.3	35	0.01	0.04	21.31	60.9	Medium	Negligible	Negligible
ASR5	21.3	35	0.02	0.04	21.32	60.9	Medium	Negligible	Negligible
ASR6	21.3	35	0.04	0.10	21.34	61.0	Medium	Negligible	Negligible
ASR7	21.3	35	0.01	0.02	21.31	60.9	Medium	Negligible	Negligible
1-hour Average HCl Results (Air Quality Impact to Human Health) (d)									
Max. on grid	1.94	190	1.25	0.66	3.19	1.7	NA	Negligible	NA
ASR1	1.94	190	0.35	0.18	2.29	1.2	Medium	Negligible	Negligible
ASR2	1.34	190	0.49	0.26	1.83	1.0	Medium	Negligible	Negligible
ASR3	1.26	190	0.98	0.51	2.24	1.2	Medium	Negligible	Negligible
ASR4	1.94	190	0.58	0.30	2.52	1.3	Medium	Negligible	Negligible
ASR5	1.94	190	0.39	0.21	2.33	1.2	Medium	Negligible	Negligible

Receptor	Baseline Concentration (µg/m³)	AAQS (µg/m³) (g)	PC (µg/m³) (a)	PC/AAQS (%)	PEC (µg/m³) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR6	1.94	190	1.14	0.60	3.08	1.6	Medium	Negligible	Negligible
ASR7	1.94	190	0.85	0.45	2.79	1.5	Medium	Negligible	Negligible
24-hour Average HCl Results (Air Quality Impact to Human Health)									
Max. on grid	1.94	100	0.31	0.31	2.25	2.25	NA	Negligible	NA
ASR1	1.94	100	0.04	0.04	1.98	1.98	Medium	Negligible	Negligible
ASR2	1.34	100	0.11	0.11	1.45	1.45	Medium	Negligible	Negligible
ASR3	1.26	100	0.10	0.10	1.36	1.36	Medium	Negligible	Negligible
ASR4	1.94	100	0.13	0.13	2.07	2.07	Medium	Negligible	Negligible
ASR5	1.94	100	0.06	0.06	2.00	2.00	Medium	Negligible	Negligible
ASR6	1.94	100	0.18	0.18	2.12	2.12	Medium	Negligible	Negligible
ASR7	1.94	100	0.09	0.09	2.03	2.03	Medium	Negligible	Negligible
Annual Average HCl Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.97	7.9	0.07	0.87	1.04	13.2	NA	Negligible	NA
ASR1	0.97	7.9	0.01	0.07	0.98	12.4	Medium	Negligible	Negligible
ASR2	0.67	7.9	0.02	0.20	0.69	8.7	Medium	Negligible	Negligible
ASR3	0.63	7.9	0.01	0.12	0.64	8.1	Medium	Negligible	Negligible
ASR4	0.97	7.9	0.01	0.18	0.98	12.4	Medium	Negligible	Negligible
ASR5	0.97	7.9	0.02	0.19	0.99	12.5	Medium	Negligible	Negligible
ASR6	0.97	7.9	0.04	0.46	1.01	12.8	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR7	0.97	7.9	0.01	0.10	0.98	12.4	Medium	Negligible	Negligible
1-hour Average HF Results (Air Quality Impact to Human Health) (d)									
Max. on grid	2.7	12	0.125	1.04	2.825	23.5	NA	Negligible	NA
ASR1	2.7	12	0.035	0.29	2.735	22.8	Medium	Negligible	Negligible
ASR2	2.7	12	0.049	0.41	2.749	22.9	Medium	Negligible	Negligible
ASR3	2.7	12	0.098	0.82	2.798	23.3	Medium	Negligible	Negligible
ASR4	2.7	12	0.058	0.48	2.758	23.0	Medium	Negligible	Negligible
ASR5	2.7	12	0.039	0.33	2.739	22.8	Medium	Negligible	Negligible
ASR6	2.7	12	0.114	0.95	2.814	23.5	Medium	Negligible	Negligible
ASR7	2.7	12	0.085	0.71	2.785	23.2	Medium	Negligible	Negligible
24-hour Average HF Results (Air Quality Impact to Human Health)									
Max. on grid	2.0	8	0.031	0.38	2.031	25.4	NA	Negligible	NA
ASR1	2.0	8	0.004	0.05	2.004	25.1	Medium	Negligible	Negligible
ASR2	2.0	8	0.011	0.13	2.011	25.1	Medium	Negligible	Negligible
ASR3	2.0	8	0.010	0.12	2.010	25.1	Medium	Negligible	Negligible
ASR4	2.0	8	0.001	0.02	2.001	25.0	Medium	Negligible	Negligible
ASR5	2.0	8	0.006	0.07	2.006	25.1	Medium	Negligible	Negligible
ASR6	2.0	8	0.002	0.02	2.002	25.0	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR7	2.0	8	0.114	1.43	2.114	26.4	Medium	Negligible	Negligible
Annual Average HF Results (Air Quality Impact to Human Health) (c)									
Max. on grid	1.2	2.5	0.007	0.28	1.207	48.3	NA	Negligible	NA
ASR1	1.2	2.5	0.001	0.02	1.201	48.0	Medium	Negligible	Negligible
ASR2	1.2	2.5	0.002	0.06	1.202	48.1	Medium	Negligible	Negligible
ASR3	1.2	2.5	0.001	0.04	1.201	48.0	Medium	Negligible	Negligible
ASR4	1.2	2.5	0.001	0.06	1.201	48.0	Medium	Negligible	Negligible
ASR5	1.2	2.5	0.002	0.06	1.202	48.1	Medium	Negligible	Negligible
ASR6	1.2	2.5	0.114	4.56	1.314	52.6	Medium	Negligible	Negligible
ASR7	1.2	2.5	0.018	0.73	1.218	48.7	Medium	Negligible	Negligible
1-hour Average CO Results (Air Quality Impact to Human Health)									
Max. on grid	395	5000	6.22	0.12	401.22	8.0	NA	Negligible	NA
ASR1	395	5000	1.74	0.03	396.74	7.9	Medium	Negligible	Negligible
ASR2	395	5000	2.43	0.05	397.43	7.9	Medium	Negligible	Negligible
ASR3	395	5000	4.89	0.10	399.89	8.0	Medium	Negligible	Negligible
ASR4	395	5000	2.88	0.06	397.88	8.0	Medium	Negligible	Negligible
ASR5	395	5000	1.96	0.04	396.96	7.9	Medium	Negligible	Negligible
ASR6	395	5000	5.70	0.11	400.70	8.0	Medium	Negligible	Negligible
ASR7	395	5000	4.24	0.08	399.24	8.0	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
24-hour Average CO Results (Air Quality Impact to Human Health)									
Max. on grid	331	3000	1.52	0.05	332.52	11.1	NA	Negligible	NA
ASR1	331	3000	0.21	0.01	331.21	11.0	Medium	Negligible	Negligible
ASR2	331	3000	0.53	0.02	331.53	11.1	Medium	Negligible	Negligible
ASR3	331	3000	0.48	0.02	331.48	11.0	Medium	Negligible	Negligible
ASR4	331	3000	0.64	0.02	331.64	11.1	Medium	Negligible	Negligible
ASR5	331	3000	0.29	0.01	331.29	11.0	Medium	Negligible	Negligible
ASR6	331	3000	0.91	0.03	331.91	11.1	Medium	Negligible	Negligible
ASR7	331	3000	0.44	0.01	331.44	11.0	Medium	Negligible	Negligible
Annual Average CO Results (Air Quality Impact to Human Health) (c)									
Max. on grid	72	3000	0.34	0.011	72.34	2.4	NA	Negligible	NA
ASR1	72	3000	0.03	0.001	72.03	2.4	Medium	Negligible	Negligible
ASR2	72	3000	0.08	0.003	72.08	2.4	Medium	Negligible	Negligible
ASR3	72	3000	0.06	0.002	72.06	2.4	Medium	Negligible	Negligible
ASR4	72	3000	0.07	0.002	72.07	2.4	Medium	Negligible	Negligible
ASR5	72	3000	0.08	0.003	72.08	2.4	Medium	Negligible	Negligible
ASR6	72	3000	0.18	0.006	72.18	2.4	Medium	Negligible	Negligible
ASR7	72	3000	0.05	0.002	72.05	2.4	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
1-hour Average NH_3 Results (Air Quality Impact to Human Health) (d)									
Max. on grid	32	200	1.252	0.63	33.252	16.6	NA	Negligible	NA
ASR1	32	200	0.059	0.03	32.059	16.0	Medium	Negligible	Negligible
ASR2	32	200	0.159	0.08	32.159	16.1	Medium	Negligible	Negligible
ASR3	32	200	0.417	0.21	32.417	16.2	Medium	Negligible	Negligible
ASR4	32	200	0.232	0.12	32.232	16.1	Medium	Negligible	Negligible
ASR5	32	200	0.028	0.01	32.028	16.0	Medium	Negligible	Negligible
ASR6	32	200	0.555	0.28	32.555	16.3	Medium	Negligible	Negligible
ASR7	32	200	0.545	0.27	32.545	16.3	Medium	Negligible	Negligible
24-hour Average NH_3 Results (Air Quality Impact to Human Health)									
Max. on grid	30	120	0.198	0.50	30.198	25.2	NA	NA	NA
ASR1	30	120	0.004	0.01	30.004	25.0	Medium	Negligible	Negligible
ASR2	30	120	0.011	0.03	30.011	25.0	Medium	Negligible	Negligible
ASR3	30	120	0.054	0.13	30.054	25.0	Medium	Negligible	Negligible
ASR4	30	120	0.021	0.05	30.021	25.0	Medium	Negligible	Negligible
ASR5	30	120	0.003	0.007	30.003	25.0	Medium	Negligible	Negligible
ASR6	30	120	0.070	0.17	30.07	25.1	Medium	Negligible	Negligible
ASR7	30	120	0.050	0.13	30.05	25.0	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
Annual Average NH_3 Results (Air Quality Impact to Human Health) (c)									
Max. on grid	15	40	0.053	0.13	15.053	37.6	NA	Negligible	NA
ASR1	15	40	<0.001	<0.01	15.000	37.5	Medium	Negligible	Negligible
ASR2	15	40	0.001	<0.01	15.001	37.5	Medium	Negligible	Negligible
ASR3	15	40	0.007	0.02	15.007	37.5	Medium	Negligible	Negligible
ASR4	15	40	0.001	0.003	15.001	37.5	Medium	Negligible	Negligible
ASR5	15	40	0.001	0.001	15.001	37.5	Medium	Negligible	Negligible
ASR6	15	40	0.007	0.02	15.007	37.5	Medium	Negligible	Negligible
ASR7	15	40	0.004	0.01	15.004	37.5	Medium	Negligible	Negligible
1-hour Average H_2S Results (Air Quality Impact to Human Health) (d)									
Max. on grid	0.24	8	0.963	12.0	1.203	15.0	NA	Minor	NA
ASR1	0.24	8	0.100	1.2	0.340	4.3	Medium	Negligible	Negligible
ASR2	<0.20	8	0.194	2.4	0.394	4.9	Medium	Negligible	Negligible
ASR3	<0.20	8	0.411	5.1	0.611	7.6	Medium	Negligible	Negligible
ASR4	0.24	8	0.233	2.9	0.473	5.9	Medium	Negligible	Negligible
ASR5	0.24	8	0.092	1.1	0.332	4.2	Medium	Negligible	Negligible
ASR6	0.24	8	0.546	6.8	0.786	9.8	Medium	Negligible	Negligible
ASR7	0.24	8	0.478	6.0	0.718	9.0	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
Annual Average H_2S Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.12	2	0.044	2.20	0.164	8.20	NA	Minor	NA
ASR1	0.12	2	0.001	0.05	0.121	6.05	Medium	Negligible	Negligible
ASR2	<0.10	2	0.003	0.16	<0.103	5.15	Medium	Negligible	Negligible
ASR3	<0.10	2	0.005	0.27	<0.105	5.25	Medium	Negligible	Negligible
ASR4	0.12	2	0.003	0.16	0.123	6.15	Medium	Negligible	Negligible
ASR5	0.12	2	0.004	0.18	0.124	6.20	Medium	Negligible	Negligible
ASR6	0.12	2	0.012	0.60	0.132	6.60	Medium	Negligible	Negligible
ASR7	0.12	2	0.004	0.19	0.124	6.20	Medium	Negligible	Negligible
1-hour Average Pb Results (Air Quality Impact to Human Health) (d)									
Max. on grid	0.0488	1	0.038	3.80	0.0868	8.68	NA	Negligible	NA
ASR1	0.0488	1	0.011	1.10	0.0598	5.98	Medium	Negligible	Negligible
ASR2	0.0488	1	0.015	1.50	0.0638	6.38	Medium	Negligible	Negligible
ASR3	0.0488	1	0.03	3.00	0.0788	7.88	Medium	Negligible	Negligible
ASR4	0.0488	1	0.017	1.70	0.0658	6.58	Medium	Negligible	Negligible
ASR5	0.0488	1	0.012	1.20	0.0608	6.08	Medium	Negligible	Negligible
ASR6	0.0488	1	0.035	3.50	0.0838	8.38	Medium	Negligible	Negligible
ASR7	0.0488	1	0.026	2.60	0.0748	7.48	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
24-hour Average Pb Results (Air Quality Impact to Human Health)									
Max. on grid	0.042	0.3	0.009	3.00	0.051	17.00	NA	Negligible	NA
ASR1	0.042	0.3	0.001	0.33	0.043	14.33	Medium	Negligible	Negligible
ASR2	0.042	0.3	0.003	1.00	0.045	15.00	Medium	Negligible	Negligible
ASR3	0.042	0.3	0.003	1.00	0.045	15.00	Medium	Negligible	Negligible
ASR4	0.042	0.3	0.004	1.33	0.046	15.33	Medium	Negligible	Negligible
ASR5	0.042	0.3	0.002	0.67	0.044	14.67	Medium	Negligible	Negligible
ASR6	0.042	0.3	0.006	2.00	0.048	16.00	Medium	Negligible	Negligible
ASR7	0.042	0.3	0.003	1.00	0.045	15.00	Medium	Negligible	Negligible
Annual Average Pb Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.0238	0.15	0.0021	1.40	0.0259	17.27	NA	Negligible	NA
ASR1	0.0238	0.15	0.0002	0.13	0.024	16.00	Medium	Negligible	Negligible
ASR2	0.0238	0.15	0.0005	0.33	0.0243	16.20	Medium	Negligible	Negligible
ASR3	0.0238	0.15	0.0003	0.20	0.0241	16.07	Medium	Negligible	Negligible
ASR4	0.0238	0.15	0.0004	0.27	0.0242	16.13	Medium	Negligible	Negligible
ASR5	0.0238	0.15	0.0005	0.33	0.0243	16.20	Medium	Negligible	Negligible
ASR6	0.0238	0.15	0.0011	0.73	0.0249	16.60	Medium	Negligible	Negligible
ASR7	0.0238	0.15	0.0003	0.20	0.0241	16.07	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
1-hour Average As Results (Air Quality Impact to Human Health) (d)									
Max. on grid	0.00488	3	0.002	0.07	0.00688	0.23	NA	Negligible	NA
ASR1	0.00488	3	0.001	0.03	0.00588	0.20	Medium	Negligible	Negligible
ASR2	0.00488	3	0.001	0.03	0.00588	0.20	Medium	Negligible	Negligible
ASR3	0.00488	3	0.002	0.07	0.00688	0.23	Medium	Negligible	Negligible
ASR4	0.00488	3	0.001	0.03	0.00588	0.20	Medium	Negligible	Negligible
ASR5	0.00488	3	0.001	0.03	0.00588	0.20	Medium	Negligible	Negligible
ASR6	0.00488	3	0.002	0.07	0.00688	0.23	Medium	Negligible	Negligible
ASR7	0.00488	3	0.002	0.07	0.00688	0.23	Medium	Negligible	Negligible
Annual Average As Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.00238	0.0066	0.00014	2.12	0.00252	38.18	NA	Negligible	NA
ASR1	0.00238	0.0066	0.00001	0.15	0.00239	36.21	Medium	Negligible	Negligible
ASR2	0.00238	0.0066	0.00003	0.45	0.00241	36.52	Medium	Negligible	Negligible
ASR3	0.00238	0.0066	0.00002	0.30	0.00240	36.36	Medium	Negligible	Negligible
ASR4	0.00238	0.0066	0.00003	0.45	0.00241	36.52	Medium	Negligible	Negligible
ASR5	0.00238	0.0066	0.00003	0.45	0.00241	36.52	Medium	Negligible	Negligible
ASR6	0.00238	0.0066	0.00007	1.06	0.00245	37.12	Medium	Negligible	Negligible
ASR7	0.00238	0.0066	0.00002	0.30	0.00240	36.36	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
1-hour Average Hg Results (Air Quality Impact to Human Health) (d)									
Max. on grid	0.0488	0.25	0.006	2.50	0.0548	21.92	NA	Negligible	NA
ASR1	0.0488	0.25	0.002	0.70	0.0508	20.32	Medium	Negligible	Negligible
ASR2	0.0488	0.25	0.002	1.00	0.0508	20.32	Medium	Negligible	Negligible
ASR3	0.0488	0.25	0.005	2.00	0.0538	21.52	Medium	Negligible	Negligible
ASR4	0.0488	0.25	0.003	1.20	0.0518	20.72	Medium	Negligible	Negligible
ASR5	0.0488	0.25	0.002	0.80	0.0508	20.32	Medium	Negligible	Negligible
ASR6	0.0488	0.25	0.006	2.30	0.0548	21.92	Medium	Negligible	Negligible
ASR7	0.0488	0.25	0.004	1.70	0.0528	21.12	Medium	Negligible	Negligible
Annual Average Hg Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.0238	0.015	0.00035	2.33	0.02415	161.00	NA	Negligible	NA
ASR1	0.0238	0.015	0.00003	0.20	0.02383	158.87	Medium	Negligible	Negligible
ASR2	0.0238	0.015	0.00008	0.53	0.02388	159.20	Medium	Negligible	Negligible
ASR3	0.0238	0.015	0.00005	0.33	0.02385	159.00	Medium	Negligible	Negligible
ASR4	0.0238	0.015	0.00007	0.47	0.02387	159.13	Medium	Negligible	Negligible
ASR5	0.0238	0.015	0.00008	0.53	0.02388	159.20	Medium	Negligible	Negligible
ASR6	0.0238	0.015	0.00018	1.20	0.02398	159.87	Medium	Negligible	Negligible
ASR7	0.0238	0.015	0.00004	0.27	0.02384	158.93	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
1-hour Average Ni Results (Air Quality Impact to Human Health) (d)									
Max. on grid	0.0488	0.33	0.008	2.38	0.0568	17.21	NA	Negligible	NA
ASR1	0.0488	0.33	0.002	0.67	0.0508	15.39	Medium	Negligible	Negligible
ASR2	0.0488	0.33	0.003	0.93	0.0518	15.70	Medium	Negligible	Negligible
ASR3	0.0488	0.33	0.006	1.87	0.0548	16.61	Medium	Negligible	Negligible
ASR4	0.0488	0.33	0.004	1.10	0.0528	16.00	Medium	Negligible	Negligible
ASR5	0.0488	0.33	0.002	0.75	0.0508	15.39	Medium	Negligible	Negligible
ASR6	0.0488	0.33	0.007	2.18	0.0558	16.91	Medium	Negligible	Negligible
ASR7	0.0488	0.33	0.005	1.63	0.0538	16.30	Medium	Negligible	Negligible
Annual Average Ni Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.0238	0.025	0.00044	1.7	0.02424	96.96	NA	Negligible	NA
ASR1	0.0238	0.025	0.00003	0.1	0.02383	95.32	Medium	Negligible	Negligible
ASR2	0.0238	0.025	0.00010	0.4	0.02390	95.60	Medium	Negligible	Negligible
ASR3	0.0238	0.025	0.00006	0.2	0.02386	95.44	Medium	Negligible	Negligible
ASR4	0.0238	0.025	0.00009	0.4	0.02389	95.56	Medium	Negligible	Negligible
ASR5	0.0238	0.025	0.00010	0.4	0.02390	95.60	Medium	Negligible	Negligible
ASR6	0.0238	0.025	0.00023	0.9	0.02403	96.12	Medium	Negligible	Negligible
ASR7	0.0238	0.025	0.00005	0.2	0.02385	95.40	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
1-hour Average Mn Results (Air Quality Impact to Human Health) (d)									
Max. on grid	0.244	2.7	0.042	1.6	0.286	10.59	NA	Negligible	NA
ASR1	0.244	2.7	0.012	0.4	0.256	9.48	Medium	Negligible	Negligible
ASR2	0.244	2.7	0.017	0.6	0.261	9.67	Medium	Negligible	Negligible
ASR3	0.122	2.7	0.033	1.2	0.155	5.74	Medium	Negligible	Negligible
ASR4	0.244	2.7	0.020	0.7	0.264	9.78	Medium	Negligible	Negligible
ASR5	0.244	2.7	0.013	0.5	0.257	9.52	Medium	Negligible	Negligible
ASR6	0.244	2.7	0.039	1.4	0.283	10.48	Medium	Negligible	Negligible
ASR7	0.244	2.7	0.029	1.1	0.273	10.11	Medium	Negligible	Negligible
24-hour Average Mn Results (Air Quality Impact to Human Health)									
Max. on grid	0.21	1	0.010	1.0	0.220	22.00	NA	Negligible	NA
ASR1	0.21	1	0.001	0.1	0.211	21.10	Medium	Negligible	Negligible
ASR2	0.21	1	0.004	0.4	0.214	21.40	Medium	Negligible	Negligible
ASR3	0.105	1	0.003	0.3	0.108	10.80	Medium	Negligible	Negligible
ASR4	0.21	1	0.004	0.4	0.214	21.40	Medium	Negligible	Negligible
ASR5	0.21	1	0.002	0.2	0.212	21.20	Medium	Negligible	Negligible
ASR6	0.21	1	0.006	0.6	0.216	21.60	Medium	Negligible	Negligible
ASR7	0.21	1	0.003	0.3	0.213	21.30	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
Annual Average Mn Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.119	0.05	0.0024	4.80	0.1214	242.80	NA	Negligible	NA
ASR1	0.119	0.05	0.0002	0.40	0.1192	238.40	Medium	Negligible	Negligible
ASR2	0.119	0.05	0.0005	1.00	0.1195	239.00	Medium	Negligible	Negligible
ASR3	0.0595	0.05	0.0003	0.60	0.0598	119.60	Medium	Negligible	Negligible
ASR4	0.119	0.05	0.0005	1.00	0.1195	239.00	Medium	Negligible	Negligible
ASR5	0.119	0.05	0.0005	1.00	0.1195	239.00	Medium	Negligible	Negligible
ASR6	0.119	0.05	0.0012	2.40	0.1202	240.40	Medium	Negligible	Negligible
ASR7	0.119	0.05	0.0003	0.60	0.1193	238.60	Medium	Negligible	Negligible
24-hour Average Cd Results (Air Quality Impact to Human Health)									
Max. on grid	0.0042	0.3	0.0015	0.50	0.0057	1.90	NA	Negligible	NA
ASR1	0.0042	0.3	0.0002	0.07	0.0044	1.47	Medium	Negligible	Negligible
ASR2	0.0042	0.3	0.0005	0.17	0.0047	1.57	Medium	Negligible	Negligible
ASR3	0.0042	0.3	0.0005	0.17	0.0047	1.57	Medium	Negligible	Negligible
ASR4	0.0042	0.3	0.0006	0.20	0.0048	1.60	Medium	Negligible	Negligible
ASR5	0.0042	0.3	0.0003	0.10	0.0045	1.50	Medium	Negligible	Negligible
ASR6	0.0042	0.3	0.0009	0.30	0.0051	1.70	Medium	Negligible	Negligible
ASR7	0.0042	0.3	0.0005	0.17	0.0047	1.57	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
Annual Average Cd Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.00238	0.0033	0.00035	10.61	0.00273	82.73	NA	Minor	NA
ASR1	0.00238	0.0033	0.00003	0.91	0.00241	73.03	Medium	Negligible	Negligible
ASR2	0.00238	0.0033	0.00008	2.42	0.00246	74.55	Medium	Negligible	Negligible
ASR3	0.00238	0.0033	0.00005	1.52	0.00243	73.64	Medium	Negligible	Negligible
ASR4	0.00238	0.0033	0.00007	2.12	0.00245	74.24	Medium	Negligible	Negligible
ASR5	0.00238	0.0033	0.00008	2.42	0.00246	74.55	Medium	Negligible	Negligible
ASR6	0.00238	0.0033	0.00018	5.45	0.00256	77.58	Medium	Small	Minor
ASR7	0.00238	0.0033	0.00004	1.21	0.00242	73.33	Medium	Negligible	Negligible
24-hour Average Cr Results (Air Quality Impact to Human Health)									
Max. on grid	0.021	1.5	0.0019	0.13	0.0229	1.53	NA	Negligible	NA
ASR1	0.021	1.5	0.0003	0.02	0.0213	1.42	Medium	Negligible	Negligible
ASR2	0.021	1.5	0.0007	0.05	0.0217	1.45	Medium	Negligible	Negligible
ASR3	0.021	1.5	0.0006	0.04	0.0216	1.44	Medium	Negligible	Negligible
ASR4	0.021	1.5	0.0008	0.05	0.0218	1.45	Medium	Negligible	Negligible
ASR5	0.021	1.5	0.0004	0.03	0.0214	1.43	Medium	Negligible	Negligible
ASR6	0.021	1.5	0.0011	0.07	0.0221	1.47	Medium	Negligible	Negligible
ASR7	0.021	1.5	0.0006	0.04	0.0216	1.44	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
Annual Average Cr Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.0119	0.008	0.00044	5.50	0.01234	154.25	NA	Negligible	NA
ASR1	0.0119	0.008	0.00003	0.38	0.01193	149.13	Medium	Negligible	Negligible
ASR2	0.0119	0.008	0.00010	1.25	0.01200	150.00	Medium	Negligible	Negligible
ASR3	0.0119	0.008	0.00006	0.75	0.01196	149.50	Medium	Negligible	Negligible
ASR4	0.0119	0.008	0.00009	1.13	0.01199	149.88	Medium	Negligible	Negligible
ASR5	0.0119	0.008	0.00010	1.25	0.01200	150.00	Medium	Negligible	Negligible
ASR6	0.0119	0.008	0.00023	2.88	0.01213	151.63	Medium	Negligible	Negligible
ASR7	0.0119	0.008	0.00005	0.63	0.01195	149.38	Medium	Negligible	Negligible
1-hour Average Cr^{6+} Results (Air Quality Impact to Human Health) (d) (f)									
Max. on grid	0.39	0.39	0.000049	0.01	0.390049	100.01	NA	Negligible	NA
ASR1	0.39	0.39	0.000010	0.003	0.390010	100.00	Medium	Negligible	Negligible
ASR2	0.39	0.39	0.000020	0.01	0.390020	100.01	Medium	Negligible	Negligible
ASR3	0.39	0.39	0.000036	0.01	0.390036	100.01	Medium	Negligible	Negligible
ASR4	0.39	0.39	0.000020	0.01	0.390020	100.01	Medium	Negligible	Negligible
ASR5	0.39	0.39	0.000010	0.003	0.390010	100.00	Medium	Negligible	Negligible
ASR6	0.39	0.39	0.000040	0.01	0.390040	100.01	Medium	Negligible	Negligible
ASR7	0.39	0.39	0.000030	0.01	0.390030	100.01	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
Annual Average Cr^{6+} Results (Air Quality Impact to Human Health) (c) (f)									
Max. on grid	0.00025	0.00025	0.0000026	1.04	0.0003026	121.04	NA	Negligible	NA
ASR1	0.00025	0.00025	0.0000002	0.08	0.0003002	120.08	Medium	Negligible	Negligible
ASR2	0.00025	0.00025	0.0000006	0.24	0.0003006	120.24	Medium	Negligible	Negligible
ASR3	0.00025	0.00025	0.0000004	0.16	0.0003004	120.16	Medium	Negligible	Negligible
ASR4	0.00025	0.00025	0.0000005	0.20	0.0003005	120.20	Medium	Negligible	Negligible
ASR5	0.00025	0.00025	0.0000006	0.24	0.0003006	120.24	Medium	Negligible	Negligible
ASR6	0.00025	0.00025	0.0000013	0.52	0.0003013	120.52	Medium	Negligible	Negligible
ASR7	0.00025	0.00025	0.0000003	0.12	0.0003003	120.12	Medium	Negligible	Negligible
1-hour Average Tl Results (Air Quality Impact to Human Health) (d)									
Max. on grid	0.0244	1	0.006	0.6	0.0304	3.04	NA	Negligible	NA
ASR1	0.0244	1	0.002	0.2	0.0264	2.64	Medium	Negligible	Negligible
ASR2	0.0244	1	0.002	0.2	0.0264	2.64	Medium	Negligible	Negligible
ASR3	0.0244	1	0.005	0.5	0.0294	2.94	Medium	Negligible	Negligible
ASR4	0.0244	1	0.003	0.3	0.0274	2.74	Medium	Negligible	Negligible
ASR5	0.0244	1	0.002	0.2	0.0264	2.64	Medium	Negligible	Negligible
ASR6	0.0244	1	0.006	0.6	0.0304	3.04	Medium	Negligible	Negligible
ASR7	0.0244	1	0.004	0.4	0.0284	2.84	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
Annual Average Tl Results (Air Quality Impact to Human Health) (c)									
Max. on grid	0.0119	0.1	0.00035	0.35	0.01225	12.25	NA	Negligible	NA
ASR1	0.0119	0.1	0.00003	0.03	0.01193	11.93	Medium	Negligible	Negligible
ASR2	0.0119	0.1	0.00008	0.08	0.01198	11.98	Medium	Negligible	Negligible
ASR3	0.0119	0.1	0.00005	0.05	0.01195	11.95	Medium	Negligible	Negligible
ASR4	0.0119	0.1	0.00007	0.07	0.01197	11.97	Medium	Negligible	Negligible
ASR5	0.0119	0.1	0.00008	0.08	0.01198	11.98	Medium	Negligible	Negligible
ASR6	0.0119	0.1	0.00018	0.18	0.01208	12.08	Medium	Negligible	Negligible
ASR7	0.0119	0.1	0.00004	0.04	0.01194	11.94	Medium	Negligible	Negligible
1-hour Average NH_3 Results (Air Quality Impact to Human Health)-maintenance (short-term) (d)									
Max. on grid	32	200	1.252	0.63	1.252	0.63	NA	Negligible	NA
ASR1	32	200	0.087	0.04	0.087	0.04	Medium	Negligible	Negligible
ASR2	32	200	0.181	0.09	0.181	0.09	Medium	Negligible	Negligible
ASR3	32	200	0.457	0.23	0.457	0.23	Medium	Negligible	Negligible
ASR4	32	200	0.255	0.13	0.255	0.13	Medium	Negligible	Negligible
ASR5	32	200	0.045	0.02	0.045	0.02	Medium	Negligible	Negligible
ASR6	32	200	0.589	0.29	0.589	0.29	Medium	Negligible	Negligible
ASR7	32	200	0.545	0.27	0.545	0.27	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
24-hour Average NH_3 Results (Air Quality Impact to Human Health)-maintenance (short-term)									
Max. on grid	30	100	0.203	0.20	30.203	30.20	NA	Negligible	NA
ASR1	30	100	0.006	0.01	30.006	30.01	Medium	Negligible	Negligible
ASR2	30	100	0.013	0.01	30.013	30.01	Medium	Negligible	Negligible
ASR3	30	100	0.054	0.05	30.054	30.05	Medium	Negligible	Negligible
ASR4	30	100	0.022	0.02	30.022	30.02	Medium	Negligible	Negligible
ASR5	30	100	0.004	0.00	30.004	30.00	Medium	Negligible	Negligible
ASR6	30	100	0.071	0.07	30.071	30.07	Medium	Negligible	Negligible
ASR7	30	100	0.051	0.05	30.051	30.05	Medium	Negligible	Negligible
1-hour Average H_2S Results (Air Quality Impact to Human Health)-maintenance (short-term) (d)									
Max. on grid	0.24	8	0.712	8.9	0.952	11.90	NA	Negligible	NA
ASR1	0.24	8	0.034	0.4	0.274	3.43	Medium	Negligible	Negligible
ASR2	<0.20	8	0.088	1.1	<0.288	3.60	Medium	Negligible	Negligible
ASR3	<0.20	8	0.239	3	<0.439	5.49	Medium	Negligible	Negligible
ASR4	0.24	8	0.13	1.6	0.37	4.63	Medium	Negligible	Negligible
ASR5	0.24	8	0.017	0.2	0.257	3.21	Medium	Negligible	Negligible
ASR6	0.24	8	0.31	3.9	0.55	6.88	Medium	Negligible	Negligible
ASR7	0.24	8	0.318	4	0.558	6.98	Medium	Negligible	Negligible

Receptor	Baseline Concentration ($\mu g/m^3$)	AAQS ($\mu g/m^3$) (g)	PC ($\mu g/m^3$) (a)	PC/AAQS (%)	PEC ($\mu g/m^3$) (b)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance

Note:

(a) The contribution of the emissions of the Project is taken as PC.

(b) The contribution of the emissions of the Project combined with baseline is taken as PEC.

(c) The annual average concentration use the average of monthly concentrations during dry and wet seasons.

(d) For those monitoring locations without hourly monitoring data, double the max monthly average concentration as the hourly concentration.

(e) ASR uses baseline data from the same location where available; otherwise, it uses the maximum value across all monitoring locations.

(f) In the absence of Cr^{6+} baseline data, we conservatively assume PEC will exceed the AAQS to evaluate the worst-case scenario. We assumed the baseline concentration of Cr^{6+} is equal to AAQS value as the worst-case scenario.

(g) AAQS reference and acceptance criteria are detailed in Table 8-1 and Table 8-2.

TABLE 8-7 MODELING RESULT 2 FOR AERMOD DISPERSION MODEL

Receptor	Baseline Concentration (pg TEQ $/m^3$)(a)	AAQS (pg TEQ $/m^3$)	PC (pg TEQ $/m^3$)	PC/AAQS (%)	PEC (pg TEQ $/m^3$)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
24-hour Average Dioxin Results (Air Quality Impact to Human Health)									
Max. on grid	0.5	0.5	0.0031	0.61	0.5031	100.62	NA	Negligible	NA
ASR1	0.5	0.5	0.0004	0.09	0.5004	100.08	Medium	Negligible	Negligible
ASR2	0.5	0.5	0.0011	0.22	0.5011	100.22	Medium	Negligible	Negligible
ASR3	0.5	0.5	0.0010	0.20	0.5010	100.20	Medium	Negligible	Negligible

Receptor	Baseline Concentration (pg TEQ /m^3)[(a)]	AAQS (pg TEQ /m^3)	PC (pg TEQ /m^3)	PC/AAQS (%)	PEC (pg TEQ /m^3)	PEC/AAQS (%)	Receptor Sensitivity	Impact Magnitude	Impact Significance
ASR4	0.5	0.5	0.0013	0.26	0.5013	100.26	Medium	Negligible	Negligible
ASR5	0.5	0.5	0.0006	0.12	0.5006	100.12	Medium	Negligible	Negligible
ASR6	0.5	0.5	0.0018	0.36	0.5018	100.36	Medium	Negligible	Negligible
ASR7	0.5	0.5	0.0009	0.18	0.5009	100.18	Medium	Negligible	Negligible
Annual Average Dioxin Results (Air Quality Impact to Human Health)									
Max. on grid	0.3	0.3	0.0007	0.23	0.3007	100.23	NA	Negligible	NA
ASR1	0.3	0.3	0.0001	0.02	0.3001	100.03	Medium	Negligible	Negligible
ASR2	0.3	0.3	0.0002	0.05	0.3002	100.07	Medium	Negligible	Negligible
ASR3	0.3	0.3	0.0001	0.03	0.3001	100.03	Medium	Negligible	Negligible
ASR4	0.3	0.3	0.0001	0.05	0.3001	100.03	Medium	Negligible	Negligible
ASR5	0.3	0.3	0.0002	0.05	0.3002	100.07	Medium	Negligible	Negligible
ASR6	0.3	0.3	0.0004	0.12	0.3004	100.13	Medium	Negligible	Negligible
ASR7	0.3	0.3	0.0001	0.03	0.3001	100.03	Medium	Negligible	Negligible

Note:

(a) In the absence of Dioxin baseline data, we conservatively assume PEC will exceed the AAQS to evaluate the worst-case scenario. We assumed the baseline concentration is equal to AAQS value as the worst-case scenario.

According to the modelling result, the impacts of NO_2, SO_2, PM (TSP, PM_{10}, $PM_{2.5}$), HCl, HF, CO, NH_3, H_2S, Dioxin, and selected heavy metals (Pb, Cd, Tl, Cr, etc.) on ASRs are **Negligible to Minor**.

Impact		**Impact on Operation Phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
	Extent	Site	**Local**	Regional	National	International
	Scale	Small	**Medium**	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The spatial impact is considered as **Low**, since the impact is expected to be limited to the vicinity of the Project Site and can therefore be considered as local, up to 10km from the Project site.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	Often				
	TEMPORAL EFFECTS	Negligible	Low	Medium	**High**	
	The temporal impact is considered as **High**, since it will occur throughout the operation phase.					
IMPACT MAGNITUDE		**Negligible**	**Small**	Medium	Large	
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		The identified human sensitive receptors are general population and classified with **Medium** sensitivity.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Mitigation Measure

According to project feasibility study, a set of CEMS (Continuous Emission Monitoring System) monitoring system will be installed on both stacks. The monitored parameters include SO_2, NO_x, HCl, CO, CO_2, O_2, H_2O, HF, NH_3, PM, flue gas flow rate, and flue gas temperature.

In addition, to demonstrate compliance with applicable emission standards and verify impacts on the surrounding ASRs, the following monitoring program outlined in ***Table 8-8*** is recommended.

A suitably trained person with knowledge of air quality monitoring will manage the stack emission monitoring performance and findings. Monitoring data will be available for third party reviews where necessary and appropriate to do so.

TABLE 8-8 AIR EMISSION AND SENSITIVE RECEPTOR MONITORING PROGRAMME

Item	Monitoring Type	Monitoring Location	Monitoring Parameters	Monitoring Frequency
1	Stack Emission Testing	Stacks of flue gases (ST1-ST2)	• Manual calibration and testing: SO_2, NO_x, HCl, CO, O_2, HF, NH_3, PM, flue gas flow rate, and flue gas temperature, etc.;	Follow the requirements of the CEMS product manual.
			• Manual sampling: Hg, Cd+Tl, Sb +As+Pb+Cr+Co+Cu+Mn+Ni+V, TOC and Dioxin;	Semiannually in the first year of commercial operation and annually from the second year
2	ASR Monitoring	⩾2 downwind ASRs	• Manual sampling: SO_2, NO_2, PM, HCl, HF, CO, NH_3, H_2S, Cr^{6+}, As, Pb, Cd, Ni and Hg.	Annually during operation phase

Although the air dispersion modelling results indicate that the Project will have negligible / small impacts on ambient air quality, the following mitigation measures are recommended as good industry practice:

- Conduct regular maintenance and calibration of the CEMS, in accordance with the equipment manufacturer's guidelines.
- To minimize odor generation during waste ageing, waste should be preferably stored in the waste storage pit for not longer than seven days.
- Where practicable, maintain at least one incinerator in operation, including during periods of scheduled maintenance, and use the additional fan as needed to assist in maintaining adequate negative pressure within the waste storage pit to reduce the likelihood of odorous air release. Exhaust air collected by the additional fan shall be treated through an activated carbon adsorption unit prior to discharge to the environment.
- All air pollution control and treatment facilities shall undergo periodic inspection and maintenance to ensure effective performance.
- Implement good housekeeping practices to minimize fugitive emissions and control dust and PM within the facility.
- Apply water spraying on access roads as necessary to control dust emissions generated by vehicles transporting waste to the plant.

Residual Impact

The impacts to ambient air quality due to project operation are expected to be **Negligible to Minor**.

8.2 GHG EMISSIONS

8.2.1 INTRODUCTION

The development and operation of the Project will result in greenhouse gas (GHG) emissions during both the construction and operational phases. However, unlike conventional industrial projects that represent a net addition to the global carbon footprint, the Project, as a Waste-to-Energy (WtE) facility, serves as a demonstrable net carbon mitigation solution by diverting waste from landfills and replacing fossil-fuel-intensive grid electricity. Consequently, the Project's overall impact is expected to result in a measurable net reduction of regional GHG emissions compared to continued reliance on traditional disposal and energy supply methods.

While the long-term operational objective is net mitigation, the Project will initially incur a discrete carbon footprint during its implementation:

- In the construction phase, emissions are expected mainly from the combustion of fossil fuels in construction machinery and vehicles, including excavators, cranes, graders, concrete pump trucks, and various transport vehicles used for the movement of materials, equipment, and personnel. Additional emissions may result from electricity consumption through temporary construction power supplies supporting activities such as lighting, welding and steel fabrication, concrete batching, water pumping, and the operation of site offices and worker accommodation facilities.
- In the operation phase, emissions will primarily result from the controlled thermal treatment of Municipal Solid Waste (MSW), which generates direct process emissions of CO_2, CH_4 and N_2O. The Project is designed to be self-sufficient by utilizing its own generated power for internal operations, minor indirect emissions associated with the national grid may occur during infrequent maintenance or emergency shutdowns. Such emissions are considered negligible and are excluded from the primary inventory due to the Project's role as a net energy exporter. Furthermore, the Project is anticipated to generate a net positive climate impact by displacing two major baseline emission sources: grid displacement, where recovered energy from waste replaces fossil-fuel-intensive generation within the national energy mix, and landfill methane avoidance, whereby diverting organic waste prevents the anaerobic decomposition and subsequent release of methane that would otherwise occur at a conventional disposal site. Additional minor emissions, such as the use of auxiliary fuels (e.g., diesel or LPG) for furnace start-up and the operation of onsite mobile equipment, are acknowledged as supportive Scope 1 sources.

8.2.2 SCOPE OF ASSESSMENT

The GHG assessment is conducted in accordance with EP4, MIGA performance Standard 3 and IFC Performance Standard 3. Organizational and operational boundaries are defined referring to the GHG Protocol Corporate Accounting and Reporting Standard and the GHG Protocol for Project Accounting, developed jointly by the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI).

8.2.2.1 METHODOLOGY FOR QUANTIFICATION OF GHG EMISSIONS

The Project's GHG emissions have been estimated by combining measured or estimated activity data with appropriate emission factors reflecting the carbon content or energy intensity of each source. The general calculation method follows the standard activity data approach, as illustrated in the following equation:

$$\boldsymbol{GHG\ Emission\ =\ Activity\ Data \times Emission\ Factor \times GWP}$$

Where:

- Activity Data represents the measurable quantities associated with each emission source (e.g., litres of diesel consumed, kWh of electricity purchased, tonnes of LPG used).
- Emission Factors (EF) correspond to the emissions per unit of activity for, such as tCO_2 per MWh of electricity, per tonne of fuel, or per unit of material processed.
- To enable comparison across different greenhouse gases, emissions are converted into carbon dioxide equivalents (CO_2e) using the Global Warming Potential (GWP) values. GWP represents the cumulative radiative forcing of a greenhouse gas over a specific time horizon, typically 100 years, relative to CO_2. For example, methane (CH_4) and nitrous oxide (N_2O) have significantly higher GWP values than CO_2 and therefore contribute disproportionately to CO_2e emissions even at lower concentrations.

The quantification approach is based on the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (including subsequent refinements). Given that the Project is currently at a development stage, a hierarchical data selection strategy has been adopted:

- Tier 1 Approach: Applied where detailed measurements are not yet available (e.g., fossil fuel carbon content of MSW). This utilizes IPCC default emission factors to ensure a conservative and standardized assessment.
- Tier 2 Approach: Applied where regional or national data are available, particularly for waste composition. By integrating country-specific waste characterization with IPCC recognized material parameters (such as DOC values and fossil carbon fractions per waste category), the assessment achieves a composition-weighted estimate. This provides a more representative profile of the regional waste stream compared to aggregate Tier 1 factors, ensuring the calculation reflects the national operational context.

Global Warming Potential (GWP) values from the IPCC Sixth Assessment Report (AR6) have been used for CO_2e conversion.

In accordance with the GHG Protocol standards, CO_2 emissions derived from the combustion or decomposition of biogenic materials are excluded from the Project's total GHG inventory and are reported separately as memorandum items. This separation ensures a clear distinction between short-cycle biogenic carbon and long-cycle fossil carbon. Furthermore, the assessment quantifies avoided emissions, including the prevention of methane generation from landfills and the displacement of grid-connected fossil fuel power, providing a comprehensive evaluation of the Project's net environmental benefits and its contribution to climate change mitigation.

In accordance with GHG Protocol requirements, CO_2 emissions derived from the combustion or decomposition of biogenic materials are excluded from the total GHG inventory and reported separately as memorandum items, ensuring a clear distinction between short-cycle biogenic carbon and long-cycle fossil carbon. The assessment also quantifies avoided emissions,

including the prevention of methane generation from landfills and the displacement of grid-connected fossil fuel power, providing a comprehensive evaluation of the Project's net environmental benefits and its contribution to climate change mitigation.

To accurately reflect the distinct emission mechanisms and carbon cycles associated with the Project, the assessment applies the following specific quantification methodologies:

- Emission Factor Approach (Combustion & Energy): This approach is utilized to quantify GHG emissions from fossil fuel combustion (e.g., diesel and LPG) and indirect emissions from grid electricity consumption. Activity Data are derived from measurable resource consumption, including fuel volumes and the total electricity imported from the national grid (kWh). For fossil fuels, Emission Factors are sourced from IPCC default values, while for electricity, a country-specific grid emission factor for Uzbekistan is applied to reflect the carbon intensity of the national energy generation mix.
- Mass-Balance Approach (WtE Process Emissions): Direct process emissions from the thermal treatment of Municipal Solid Waste (MSW) are quantified using a mass-balance logic. The Activity Data consists of the total annual tonnage of MSW processed by the facility. Emission Factors are parameterized via a Country-Specific Tier 2 Approach based on national waste characterization data. This methodology enables the precise determination of the Fossil Carbon Fraction to quantify fossil-derived CO2 emissions.
- Heat Content Method (Energy Recovery / Avoided Emissions): The Heat Content Method is applied to estimate avoided emissions associated with electricity generation from waste, which displaces fossil-fuel-intensive power in the baseline scenario. Activity Data are based on the net electricity exported to the grid (MWh) after accounting for the internal parasitic load of the facility. Emission Factors are calculated by correlating the Lower Heating Value (LHV) of the specific waste stream with the displacement of the applicable national grid emission factor, thereby quantifying the Project's contribution to energy-related carbon displacement.
- First-Order Decay (FOD) Logic (Methane Avoidance): To estimate the methane emissions avoided by diverting organic waste from landfill disposal, the assessment follows the IPCC First-Order Decay (FOD) methodology. The Activity Data incorporates the quantity and specific composition of organic waste diverted from the landfill baseline. Emission Factors are derived through a Country-Specific Tier 2 Approach, integrating national waste composition with IPCC default carbon fractions for each waste category to determine the Degradable Organic Carbon (DOC) content. In instances where only organic matter data are available, appropriate carbon conversion factors are applied to maintain consistency with IPCC definitions and ensure a robust estimation of prevented methane generation.

8.2.2.2 SCOPE OF QUANTIFICATION

The assessment scope is defined according to the GHG Protocol, which categorises emissions within three system boundaries, described as Scope 1, Scope 2 and Scope 3:

- Scope 1 describes 'direct' greenhouse gas emissions from sources that are owned by or under the direct control of the reporting entity.
- Scope 2 describes 'indirect' greenhouse gas emissions associated with the Project but occurring at sources owned or controlled by another organisation and therefore not under the direct control of the reporting entity.

- Scope 3 describes wider greenhouse gas emissions occurring upstream and downstream of the reporting entity and typically associated with the 'life cycle' of its product. Scope 3 emissions are not under the direct control of the reporting entity.

The Project is an integrated waste management facility. In defining the GHG accounting boundary, the assessment focuses on emission sources within the Project's operational control, in accordance with the GHG Protocols. Certain upstream and downstream activities, such as inbound waste transportation and off-site residue management (e.g., transport and final disposal of bottom ash and treated fly ash), may give rise to Scope 3 emissions. However, these activities are typically undertaken by municipal authorities or third-party contractors and therefore fall outside the Project's operational control boundary. In addition, at the ESIA stage, key parameters associated with these activities, including transportation distances, routing, and fuel efficiencies, remain subject to significant uncertainty, limiting the robustness of quantitative estimation. **Accordingly, the quantitative assessment focuses on Scope 1 and Scope 2 emissions, which represent the primary and most controllable sources of GHG emissions associated with the Project, which include:**

TABLE 8-9 EMISSIONS SOURCES

Phase	Scope 1 Emissions	Scope 2 Emissions
Construction Phase	• Emissions from the combustion of diesel in construction machinery and vehicles, including excavators, cranes, pile drivers, and trucks used for site preparation, and structural assembly of the incineration plant. • Emissions from combustion of gasoline in passenger vehicles for personnel transport.	• Emissions from temporary construction power connections used to support site offices, workforce accommodation facilities, fabrication workshops, and water pumping systems.
Operation Phase	• Emissions of CO_2, CH_4, and N_2O originating from the controlled thermal treatment (incineration) of MSW. This includes both fossil-derived carbon (from plastics/synthetics) and biogenic carbon (reported separately). • Emissions from the combustion of auxiliary fuels (e.g., Diesel or LPG) used for furnace pre-heating, start-up/shutdown operations, and maintaining required combustion temperatures (e.g., 850°C) during fluctuations in waste calorific value. • Emissions from diesel and gasoline used by onsite operational equipment, such as wheel loaders for the waste pit, forklifts, and site maintenance vehicles. • Emissions from the occasional testing and operation of emergency diesel generators required for critical safety systems and black-start capabilities. • Emissions from combustion of gasoline in passenger vehicles for personnel transport.	• Minor indirect emissions may occur during maintenance shutdowns or emergency outages when internal power generation is unavailable, and electricity is imported from the national grid to maintain essential services (e.g., odor control, leachate treatment, and security lighting).

Phase	Scope 1 Emissions	Scope 2 Emissions
	• Potential release of refrigerants from HVAC systems in the control room and administrative buildings, as well as any specialized cooling systems for plant utilities.	

8.2.2.3 DATA SOURCES

• Activity data used in this assessment are derived from the Project's feasibility study, current design, regulatory EIA report, engineering specifications, material and energy balance estimates, and the construction schedule provided by the Company representatives. Emission factors (EFs) used to convert activity data into GHG emissions are sourced from internationally recognised references where project-specific or national factors are not available.

TABLE 8-10 PROJECT ACTIVITY DATA BY EMISSION SOURCE DURING CONSTRUCTION AND OPERATION

Phase	Scope 1 Emissions	Scope 2 Emissions
Construction Phase	• The estimated diesel consumption for construction machinery and equipment is 500 tonnes.	• The estimated electricity consumption is 2.62 GWh.
	• The estimated gasoline consumption for personnel transport is 5 tonnes.	
Operation Phase	• The estimated annual 0# Light Diesel consumption is 272 t/a.	• The estimated annual electricity consumption for maintenance shutdowns or emergency outages is currently unavailable.
	• The estimated annual MSW consumption is 500,000 tonnes.	
	• The estimated annual diesel and gasoline consumption is currently unavailable.	
	• The estimated annual refrigerants fugitive release is currently unavailable.	

GWP values are taken from the IPCC Sixth Assessment Report (AR6), ensuring consistent conversion of individual greenhouse gases, such as CO_2, CH_4, N_2O, and HFCs, into CO_2 equivalent (CO_2e).

TABLE 8-11 GLOBAL WARMING POTENTIALS

Industrial Designation or Common Name	Chemical Formula	Global Warming Potential for 100 years' Time Horizon from IPCC Sixth Assessment Report (AR6)[25]
Carbon dioxide	CO_2	1
Methane – non-fossil	CH_4	27.0
Methane – fossil	CH_4	29.8

[25] https://ghgprotocol.org/sites/default/files/2024-08/Global-Warming-Potential-Values %28August 2024%29.pdf

Industrial Designation or Common Name	Chemical Formula	Global Warming Potential for 100 years' Time Horizon from IPCC Sixth Assessment Report (AR6)[25]
Nitrous oxide	N_2O	273
Nitrogen trifluoride	NF_3	17,400
Sulfur hexafluoride	SF_6	24,300

In light of the unavailability of data for the Project, which is currently in the construction phase, assumptions were made regarding activity data, and these are listed in the below.

TABLE 8-12 ASSUMPTIONS

<table>
<tr><th>Item</th><th>Assumption</th><th>Source</th></tr>
<tr><td>National grid emission factor</td><td>0.467 kgCO₂/kWh</td><td>Harmonized IFI Default Grid Factors 2021 v3.2[26]</td></tr>
<tr><td>Operating margin grid emission factor</td><td>0.612 kgCO₂/kWh</td><td>Harmonized IFI Default Grid Factors 2021 v3.2[27]</td></tr>
<tr><td>Carbon oxidation factor of diesel and gasoline</td><td>1</td><td>2006 IPCC Guidelines for National Greenhouse Gas Inventories[28]</td></tr>
<tr><td>Waste Composition</td><td><table><tr><th>Waste fractions</th><th>Average</th></tr><tr><td>Paper</td><td>18.90%</td></tr><tr><td>Food waste</td><td>38.40%</td></tr><tr><td>Wood</td><td>4.90%</td></tr><tr><td>Metal</td><td>3.40%</td></tr><tr><td>Textiles</td><td>3.90%</td></tr><tr><td>Leather, rubber</td><td>0.80%</td></tr><tr><td>Glass</td><td>3.70%</td></tr><tr><td>Stones</td><td>8.90%</td></tr><tr><td>Other parts, including polyethylene and other plastics</td><td>17.10%</td></tr></table></td><td>Regulatory EIA</td></tr>
</table>

[26] Harmonized_IFI_Default_Grid_Factors_2021_v3.2_0.xlsx
[27] Harmonized_IFI_Default_Grid_Factors_2021_v3.2_0.xlsx
[28] ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

<table>
<tr><th>Item</th><th>Assumption</th><th>Source</th></tr>
<tr><td>Waste characteristics</td><td>
<table>
<tr><th>Waste fractions</th><th>Dry matter content in % of wet weight</th><th>Total carbon content in % of dry weight</th><th>Fossil carbon fraction in % of total carbon</th><th>Degradable Organic Carbon (DOC) content in % of wet waste</th></tr>
<tr><td>Paper</td><td>90%</td><td>46%</td><td>1%</td><td>40%</td></tr>
<tr><td>Food waste</td><td>40%</td><td>58%</td><td>0%</td><td>15%</td></tr>
<tr><td>Wood</td><td>85%</td><td>50%</td><td>0%</td><td>43%</td></tr>
<tr><td>Metal</td><td>100%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Textiles</td><td>80%</td><td>50%</td><td>20%</td><td>24%</td></tr>
<tr><td>Leather, rubber</td><td>84%</td><td>67%</td><td>20%</td><td>39%</td></tr>
<tr><td>Glass</td><td>100%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Stones</td><td>100%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Other parts, including polyethylene and other plastics</td><td>100%</td><td>75%</td><td>100%</td><td>0%</td></tr>
</table>
</td><td>2006 IPCC Guidelines for National Greenhouse Gas Inventories[29]</td></tr>
<tr><td>Fraction of DOC which Decomposes (DOCf)</td><td>0.50</td><td>2006 IPCC Guidelines for National Greenhouse Gas Inventories[30]</td></tr>
<tr><td>Methane Correction Factor (MCF)</td><td>0.80</td><td>2006 IPCC Guidelines for National Greenhouse Gas Inventories[31]</td></tr>
<tr><td>Fraction of CH_4 in Generated Landfill Gas (F)</td><td>0.50</td><td>2006 IPCC Guidelines for National Greenhouse Gas Inventories[32]</td></tr>
<tr><td>Oxidation Factor (OX) for solid waste disposal sites</td><td>0.1</td><td>2006 IPCC Guidelines for National Greenhouse Gas Inventories[33]</td></tr>
</table>

[29] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf
[30] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf
[31] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf
[32] https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_3_Ch3_SWDS.pdf
[33] Microsoft Word - V5_Ch3_SWDS_Final_v2.doc

8.2.3 SUMMARY OF BASELINE CONDITIONS

- The baseline GHG emission profile for Uzbekistan is derived from the authoritative national data reported under the United Nations Framework Convention on Climate Change (UNFCCC). The primary reference is the Nationally Determined Contribution 3.0 (NDC 3.0), submitted by the Government of Uzbekistan in November 2025. [34]
- According to this latest inventory, the country's total GHG emissions reached 201.15 Mt CO_2e in 2022, representing the most recent and comprehensive baseline available for the national inventory.

8.2.4 ASSESSMENT OF PROJECT EMISSIONS

- This section presents the results of that assessment carried out following the internationally accepted approach set out in the GHG protocol. The assessment period covers the construction and operation of the Project. The Project construction is estimated to be two years and will be operated for 30 years.

8.2.4.1 IMPACTS DURING CONSTRUCTION PHASE

- During the construction phase, the main sources of GHG emissions are from diesel combustion and electricity consumption. The total construction period of the Project is expected to be two years. The total release of GHG emissions during construction phase is estimated to be 2,821.82 tCO_2e throughout construction period.

TABLE 8-13 EMISSIONS BREAKDOWN BY SCOPE AND ACTIVITY DURING CONSTRUCTION

Emission Scopes	Total Emission during Construction (two years) (tCO_2e)
Scope 1 Emissions	
Emissions from combustion of diesel in construction machinery and vehicles, including excavators, concrete mixers, trunks, and equipment.	1,583.18
Emissions from combustion of gasoline in passenger vehicles for personnel transport.	15.10
Scope 2 Emissions	
Emissions from temporary construction power connections used to support site offices, workforce accommodation facilities, fabrication workshops, and water pumping systems.	1,223.54
Total Emissions	**2,821.82**

8.2.4.2 IMPACTS DURING OPERATION PHASE

- During the operation phase, the Scope 1 GHG emissions would be primarily from the incineration of MSW. The Scope 2 GHG emissions is limited due to the Project is designed to be

[34] Uzbekistan Third NDC.pdf

self-sufficient by utilizing its own generated power for internal operations, minor indirect emissions associated with the national grid may occur during infrequent maintenance or emergency shutdowns. The annual GHG emission during the operation phase is estimated to be 251,616.64 tCO_2e, while the net emissions benefit is estimated to be 797,310.62 tCO_2e, contributing to a net annual emission of -545,693.98 tCO_2e.

TABLE 8-14 EMISSIONS BREAKDOWN BY SCOPE AND ACTIVITY DURING OPERATION

Emission Scopes	Emission/year (tCO_2e/year)
Scope 1 Emissions	
Fossil-derived carbon emissions of CO_2, CH_4, and N_2O originating from the incineration of MSW	250,755.39
Emissions from the combustion of auxiliary fuels	861.25
Gross Emissions	**251,616.64**
Biogenic emissions	
Biogenic carbon emissions from annual MSW consumption	373,007.18
Avoided Emissions	
Avoided emissions from annual grid displacement	201,012.62
Avoided emissions from annual landfill gas avoidance	596,298.00
Net Benefit	**797,310.62**
Net Emissions	**-545,693.98**

The Project is expected to have a lifespan of 30 years. The total estimated Scope 1 and Scope 2 GHG emissions arising from the Project is summarised in ***Table 8-15*** below.

TABLE 8-15 GHG EMISSIONS FROM THE PROJECT

Project Phase	Emission/year ($ktCO_2e$/year)	Total Emission throughout the Project ($ktCO_2e$)
Construction Phase	-	2.82
Operation Phase	251.62	7,548.50

8.2.4.3 RESULT COMPARISON TO GHG EMISSIONS

- According to the NDC 3.0 of Uzbekistan and the First Biennial Transparency Report (BTR1, 2024), the national GHG inventory reported total baseline emissions of 201.15 $MtCO_2e$ in 2022.[35] Within this national context, the Project's construction phase emissions of 1.42 $ktCO_2e$/a and gross operational emissions of 251.62 $ktCO_2e$/a are expected to account for approximately 0.001% and 0.125% of the country's annual total emissions, respectively.
- However, the Project serves as a critical mitigation infrastructure, providing a considerable net positive climate impact through a grid displacement of -201.01 $ktCO_2e$/a, and

[35] NIR_BTR_kadastrGHG_Uzbekistan_0.pdf

landfill gas avoidance of -596.30 $ktCO_2e/a$. When contextualized within the energy sector (the nation's largest emission source at 133.5 $MtCO_2e$ in 2022), the Project's grid displacement of -201.01 $ktCO_2e$ represents a tangible contribution of approximately 0.15% toward decarbonizing the national grid by replacing fossil-fuel-intensive generation with recovered energy. While when measured against the Waste sector, which emitted 10.5 $MtCO_2e$ in 2022 (representing 5% of the national total), the Project's methane avoidance alone addresses nearly 5.68% of the entire sector's footprint.

8.2.5 MITIGATION OF GREENHOUSE GAS EMISSIONS

The carbon profile of the Project is uniquely characterized by its role as a net energy exporter and a methane mitigation facility. To ensure the Project maximizes its decarbonization potential and aligns with Uzbekistan's Green Economy transition, the following tailored measures are recommended throughout the Project's lifecycle.

To minimize the temporary carbon footprint during construction, the Project is recommended to implement the following controls:

- The Construction Traffic Management Plan (CTMP) will prioritize the consolidation of delivery schedules and routes for major equipment and materials to reduce total Vehicle Kilometers Traveled (VKT).
- Where practicable, opportunities to utilize lower-emission transport options for long-distance haulage will be evaluated within the constraints of Uzbekistan's logistics infrastructure.
- All major construction machinery and vehicle fleets will be required to comply with Euro IV/V-equivalent emission standards. Furthermore, good operational practices—including a strict "No-Idling" policy and a rigorous preventive maintenance program—will be enforced to ensure fuel efficiency and minimize exhaust emissions, specifically black carbon.
- Energy consumption at site offices and worker accommodation will be minimized through the use of high-efficiency LED lighting and equipment.
- Grid electricity will be prioritized where available to reduce reliance on standalone diesel generators. Where the use of generators is unavoidable, units will be selected and operated to match actual load demand, thereby optimizing fuel economy.
- Where feasible, the Project will consider the use of locally sourced materials and optimized material logistics to reduce transport-related emissions and overall embodied carbon associated with construction activities.
- Training programs will be conducted for site personnel to promote energy-saving behaviors and ensure the effective implementation of the No-Idling policy and efficient equipment operation

During operation, mitigation measures will primarily focus on maintaining efficient combustion conditions, reducing auxiliary energy demand, and optimizing internal energy use to maximize net electricity generation and associated avoided emissions:

- Specific operational procedures will be applied during start-up and shutdown phases to minimize auxiliary fuel use and avoid incomplete combustion conditions.

- The Project will operate under controlled combustion conditions, including the maintenance of furnace temperatures and a stabilized waste feed.
- Operational parameters, such as the excess air ratio, will be optimized to balance combustion efficiency with internal power use, while auxiliary fuel consumption will be minimized through proactive management of incoming waste to maintain a consistent calorific value.
- Heat losses will be reduced through high-specification insulation of boilers and associated steam systems, which maintains process efficiency—particularly during start-up, shutdown, and low-load conditions.
- The Project will implement an energy management approach with reference to ISO 50001 principles, which includes the technical optimization of high-load systems such as induced/forced draft fans, boiler feed pumps, and compressed air networks.
- Integrated process measures will be implemented, including the reuse of air extracted from the waste reception hall as primary combustion air to optimize thermal efficiency and reduce auxiliary energy demand.
- Systematic waste mixing and crane management will be implemented to ensure a homogeneous feedstock, which stabilizes the combustion temperature and prevents localized cold spots that could lead to incomplete combustion.
- The leachate treatment units will be designed and operated to minimize parasitic load, utilizing variable-speed pumping and optimized aeration systems aligned with actual organic loading.
- The Project will explore opportunities for the beneficial reuse of incinerator bottom ash (e.g., in road construction or brick making) to offset the carbon footprint of traditional aggregate and cement production.
- A comprehensive greenhouse gas inventory consistent with the GHG Protocol will be maintained. Key parameters, including stack emissions and auxiliary fuel intensity, will be monitored via Continuous Emissions Monitoring Systems (CEMS).
- Periodic reporting and third-party verification will be undertaken in accordance with international standards and lender requirements to ensure long-term carbon performance and transparency.
- Monitoring results will be periodically reviewed to identify opportunities for continuous improvement in energy efficiency and GHG performance over the Project lifecycle.

8.3 WATER

8.3.1 INTRODUCTION

This section sets out an evaluation of the potential impacts of the Project on surface water and groundwater resources, including in terms of water quality and quantity, based on impacts identified in the scoping assessment, taking note of existing embedded / in-place controls for the Project.

8.3.2 SCOPE OF ASSESSMENT

According to Feasibility Study Report, water for construction activities and domestic use for workers will be obtained from groundwater (three onsite groundwater wells), water requirement for operation phase (such as cooling water, demineralized water, firefighting water, domestic water etc.) will be taken from surface water (Dargom Canal) located approximately 600 meters north of the project site.

The assessment considers the following types of impact:

- Impacts on water resources, including
  - o Intake water from ground water during construction and surface water during operation. According to Chapter 6.3, the project's impact on water quantity has been scoped out.
- Impacts on water quality, including:
  - o Leachate dripped and was washed by rainfall into groundwater during on-site transport.
  - o Incineration emissions diffuse and deposit into soil, then leach into groundwater via rainfall.
  - o Leachate generated from waste storage and handling areas, which, if not properly collected and treated, may infiltrate into groundwater. The project has already taken anti-seepage measures into consideration. Anti-seepage failure is considered in ***Chapter 12***, not under normal operating conditions.
  - o In the event of chemicals or leachate leakage into unpaved areas, infiltration may contaminate groundwater. This scenario is considered and analyzed in ***Chapter 12***. and
  - o In the event of a fire or explosion incident generating a substantial volume of firefighting water, failure to implement proper containment and collection measures may result in contaminated runoff discharging via the stormwater drainage system or uncontrolled discharging out of the site. Such discharges may potentially threaten the quality of both surface and groundwater. This scenario is considered and analyzed in ***Chapter 12***.

8.3.3 IMPACT ASSESSMENT CRITERIA

Potential impacts on water resources associated with the construction and operation phases of the Project have been reviewed. Based on the review, potential sources of impact to water have been identified and are presented in the following sections. The criteria for sensitivity and magnitude of the impact on water quality are defined in ***Table 8-16*** and ***Table 8-17*** respectively.

TABLE 8-16 RECEPTOR SENSITIVITY

Category	Designation / Importance / Vulnerability
High	• The water resource supports economically important or biologically unique aquatic species or provides essential habitat for such species.

Category	Designation / Importance / Vulnerability
	• The water resource is wholly relied upon locally, with no suitable technically or economically feasible alternatives, or is important at a regional or transboundary watershed level for provisioning services.
Medium	• The water resource supports diverse populations of flora and / or fauna. • The water resource has local importance in terms of provisioning services but there is ample capacity and / or adequate opportunity for alternative sources of comparable quality.
Low	• The water resource does not support diverse aquatic habitat or populations or supports aquatic habitat or population that is of low quality. • The water resource has little or no role in terms of provisioning or sanitary services for the local community.

TABLE 8-17 IMPACT MAGNITUDE

Category	Extent / Duration / Scale / Frequency
Large	• Major (e.g., order of magnitude) change in comparison to baseline conditions and / or likely to regularly or continually exceed applicable norms and standards for mode of use.
Medium	• Clearly evident (e.g., perceptible and readily measurable) change from baseline conditions and / or likely to approach and even occasionally exceed applicable norms and standards for mode of use.
Small	• Perceptible change from baseline conditions but likely to be within applicable norms and standards for mode of use.
Negligible	• No perceptible or readily measurable change from baseline conditions.

8.3.4 ASSESSMENT OF IMPACTS

8.3.4.1 SOURCE OF IMPACT

The following planned activities may impact on surface water and groundwater during the Project lifecycle:

- Operation Phase:
  - Leachate dripped and was washed by rainfall into soil and groundwater during on-site transport; and
  - Incineration emissions diffuse and deposit into soil, then leach into groundwater via rainfall.

8.3.4.2 EMBEDDED CONTROL

Based on a review of received information and onsite interview, the following Project-specific embedded measures were identified:

Construction phase

- Buried collection tanks are installed on site to collect construction wastewater. The collected construction wastewater is regularly transported out for treatment with no discharge to the site around environment;
- A septic tank will be constructed at the construction camp during construction phase. The collected domestic sewage will be regularly transported out for further treatment and reuse;
- Construction vehicles are regularly maintained at external repair shops to prevent oil leakage. No vehicle washing or maintenance activities will be carried out onsite.
- Commercial concrete was procured off-site; consequently, no on-site concrete mixing was performed.
- Bottled Drinking water is sourced by local suppliers during construction phase.
- Groundwater extracted during construction phase is used for dust suppression, building maintenance and toilet flushing, etc. Not for drinking.

Operation phase

- Domestic wastewater, cooling tower blowdown water are all treated by wastewater treatment system and fully reused for production:
    - The WWTP 1, with a treatment capacity of 48 m^3/d, employs a treatment process comprising preliminary screening, flow equalization, anoxic and aerobic biological treatment, an integrated ultrafiltration membrane unit, activated carbon filtration, and ozone disinfection. The treated effluent will be reused as make-up water for the cooling towers, landscape water and road sprinkling water;
    - The WWTP 2 is designed with a capacity of 450 m^3/d and employs a treatment process consisting of an equalization tank, chemical softening, sedimentation, ultrafiltration (UF), and reverse osmosis (RO). The treated effluent will be reused as make-up water for the cooling towers, while the concentrated brine will be reused for the bottom ash conveyor quenching.
- All waste-pit leachate is entirely collected and sprayed into the incinerator for incineration. There is no discharge to the external environment.
    - The waste pit and leachate collection sump are designed with double-layer anti-seepage structures with the permeability coefficient of the liner is $\leqslant 1\times10^{-11}$ cm/s and the leachate basin equipped with liquid level monitoring system to prevent any leakage during operation;
    - A drainage channel is installed around the leachate storage tank. In the event of leachate leakage, the collected leachate by drainage channel will be diverted to the leachate collection sump and waste storage pit to prevent any accidental leakage from being discharged to the environment.
- A rain–sewage separation system is adopted. First-flush rainwater (the first 15 minutes of initial stormwater runoff) is directed to a first-flush rainwater tank (10 m × 8 m × 4 m) for treatment and reuse; only clean rainwater during extended rainfall is collected in the rainwater reuse tank (7.9 m x 4.4 m x 3.5 m) for subsequent treatment and reuse. Clean

rainwater will not be discharged to pipeline until rainwater reuse tank is full. Rainwater collection and reuse reduces freshwater abstraction from surface water, easing pressure on local resources. It also mitigates peak runoff in rainy season, lowers flood risk, and improves hydrological balance and ecological sustainability.

- Bunds are provided around the ammonia storage tank, providing a total containment capacity of 113.4 m³ (which is exceeding 110% of the aggregate tank volume) to prevent any leakage during operation.
- Firefighting wastewater is designed to be collected into first-flush rainwater tank, preventing direct discharge into the environment.
- Hazardous waste is temporarily stored in impermeable, sheltered, and spill-proof warehouses and regularly removed by licensed units.
- For drinking water during the operation phase, a water purification system will be installed to treat it to meet *Drinking water. Hygienic requirements and quality control* (O'z DSt 950:2011, drinking water standards of Uzbekistan).

8.3.4.3 OPPERATION PHASE

Significance of Impact to groundwater

The project occupies an area of approximately 8 ha. The auxiliary areas such as tank farm, wastewater treatment area have been hardened and equipped with impermeable liners to minimize the risk of infiltration. All internal transportation roads are paved to further limit direct contact between surface runoff. In addition, a dedicated rainwater drainage system has been designed. A 320 m^3 first-flush rainwater tank and a 122 m^3 rainwater reuse tank will be constructed to collect initial rainwater and accident wastewater thereby preventing uncontrolled discharge and infiltration.

The main production areas including the unloading platform, garbage pool, incineration room, flue gas purification room and turbine room are located within the building. The likelihood of outdoor leakage is relatively low, and potential leakage is expected to be minimal in volume.

All domestic and industrial wastewater will be collected and reused after treatment. No wastewater will be discharged to groundwater.

Impact		**Impact Assessment to groundwater during operation phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Impact is direct				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	There will not be area impacted by discharge. The spatial effects are considered Low.					
	Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
		Uzbekistan is a water-scarce country. Most precipitation occurs from November to May. The duration is considered as **short-term**.				
	Frequency	Occasional				

	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High
	Even though the expected changes would be minimal, it will have a constant effect on the groundwater throughout the entire project operation period. The temporal effects are considered **Low**.				
IMPACT MAGNITUDE		Negligible	**Small**	Medium	Large
		Groundwater quality and quantity has negligible change within natural variation with the embedded control measures. The establishment of the site entails minor modifications to existing drainage regimes and characteristics, without materially affecting their overall functionality or performance. Hence, the impact magnitude is considered as **Small**.			
RECEPTOR VULNERABILITY		**Low**	Medium	High	
		With Low sensitivity for the aquifer is approximately 80 meters below the ground.			
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major

The significance of impacts is expected to be **Negligible**.

Additional mitigation measure:

Given the groundwater baseline concentration of Se, Sb, Cd, Br, Petroleum and COD exceeded the *Sanitary Rules, Norms and Hygienic Standards for the Protection of Underground and Surface Water Bodies (SanPiN RUz No. 0083-24)* and WTE project pose a potential groundwater contamination risk, semiannual monitoring of the six parameters is recommended to track groundwater quality changes.

In addition, SUS management has agreed to shift sprinkling water source in construction phase from groundwater to purchased freshwater to prevent any potential adverse impact.

8.4 SOIL

8.4.1 INTRODUCTION

This Section presents an assessment of the potential impacts of the operation of the Project on soil resources.

8.4.2 SCOPE OF ASSESSMENT

In the operation phase, the potential soil contamination will be caused by:

- Leachate dripped and was washed by rainfall into soil and groundwater during on-site transport;
- Incineration emissions diffuse and deposit into soil, then leach into groundwater via rainfall;
- Generation of solid waste during the maintenance activities: metal scrap, e-waste oil-containing waste and domestic waste;
- Generation of domestic and industrial wastewater; and
- Accidental discharge of oil-containing storm water from the transformer area. This scenario is considered and analyzed in ***Chapter 12***.

8.4.3 IMPACT ASSESSMENT CRITERIA

The overall value of soil considering sensitivity and vulnerability is defined in ***Table 8-18***.

The magnitude of impacts to soil considering the intensity (or scale), spatial coverage and long evity of an impact is defined in ***Table 8-19***.

TABLE 8-18 RECEPTOR SENSITIVITY

Category	Designation / Importance / Vulnerability
High	Intensively farmed, highly fertile soils, wetland soils, soils which host shallow aquifers relied upon for abstraction or essential for river Baseflow, soils of Specific characteristics (e.g. pH, carbon content, mineralogy) that support Specific Significant or high value flora or faunal habitats.
Medium	Typical agricultural land, soils supporting specific habitats (e.g. forests), soils on resid ential sites.
Low	Low soil fertility not used for agriculture, contaminated made-ground soils at brownfield sites, soils not supporting any particularly sensitive or imp ortant habitats.

TABLE 8-19 IMPACT MAGNITUDE

Category	Extent / Duration / Scale / Frequency
Large	• Change is likely to cause a direct adverse permanent or long-term (e.g. > 10 years) effect on the quality/value of the soil over a large area (e. g. > 100 ha)
Medium	• Change over a moderate (e.g. 1 - 100 ha) to large area, likely to adversely affect the quality/value of the soil but recovery is predicted in the medium term (e.g. 5 - 10 years) and there is predicted to be no permanent impact to its integrity. • Conversely, change over a small area (e.g. < 1 ha) with direct adverse permanent or long-term effects.
Small	• Change likely to adversely affect the quality/value of the soil but recovery is expe cted in the short term (e.g. 1 - 4 years). Changes are over a small to moderate ar ea. Impacts beyond levels of natural variation that do not exceed assessment crit eria (e.g. low intensity), for any duration or geographic extent.
Negligible	• Change well within the bounds of normal natural variation. No effect detectable or recovery within a very short timescale (< 1 year). Could occur over any size of area.

8.4.4 ASSESSMENT OF IMPACTS

According to the geotechnical investigation, the subsurface strata within the maximum drilling depth of 40 m primarily consist of miscellaneous fill, silty soil interlayered with sand, and localized man-made fill. The existing fill materials originate mainly from site leveling and excavation activities, and are composed predominantly of silt and sand with minor gravel fragments and plant roots.

Silty soils exhibit capillary action and generally have low to moderate permeability, while sandy interlayers possess moderate to high permeability. Considering the composite stratigraphy of silt interbedded with sand, the overall soil permeability at the site is assessed as moderate to relatively strong.

The regional geological structure is stable with no significant active faults, and the site is considered geologically stable.

The primary soil environmental risk during the operation phase arises from potential spills, leaks, or seepage of chemicals and wastewater. In the event of a spill, the adsorption and migration characteristics of the soil determine the extent of impact. Under the site's moderately strong permeability conditions, contaminants may infiltrate relatively quickly through sandy layers and become adsorbed within silty layers, with the potential for further downward migration. Special attention should be paid to the changes in soil quality around the leakage point. If not contained and remediated promptly, such contamination could adversely affect surface soil properties, soil microbial communities and soil quality.

Within 200 m of the plant boundary, land use consists predominantly of barren land and landfill, with only minimal areas dedicated to economic crop cultivation (fruit trees). Therefore, it is necessary to pay attention to the possible impact of the continuous emission of waste gas on the surrounding agricultural soil.

Embedded Control

The measures to control the impact by contamination of soil include the following:

- Anti-seepage engineering in key areas: The foundations of waste pit, loading/unloading zones, wastewater treatment units, and hazardous waste warehouse are designed to be constructed with engineered impermeable layers (e.g., impermeable concrete, epoxy resin, polyurethane waterproof membrane), meeting the requirements of relevant anti-seepage standards;
- Bund walls for tank farms: The containment volume shall meet 110% of the capacity of the largest tank or 25% of the total tank capacity to prevent leaked chemicals from spreading into surrounding soils;
- Separated drainage system: First-flush rainwater (the first 15 minutes of initial stormwater runoff) is directed to a first-flush rainwater tank (10 m × 8 m × 4 m) for treatment and reuse; only clean rainwater during extended rainfall is collected in the rainwater reuse tank (7.9 m x 4.4 m x 3.5 m) for subsequent treatment and reuse. Clean rainwater will not be discharged to pipeline until rainwater reuse tank is full;
- Ground hardening: Hazardous chemical transportation and loading areas shall adopt impermeable concrete pavement to prevent direct infiltration into soil;
- Leakage collection system: Leak collection pipelines will be installed beneath storage tanks to divert spills to the waste pit; and
- Non-hazardous waste, domestic waste and hazardous waste will be segregated and collected in the temporary storage room.

Significance of Impact

Impact		**Impact of leakage to Soil in Operation Phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		This impact is direct.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	**Medium**	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The spatial impact of contamination of soil is considered as **Low**, since the leakage should be localized within and near the designated area of hazardous materials handling, hazardous waste disposal and accidental spills.					
	Duration	**Temporary**	Short-term	Medium-term	Long-term	Permanent
	Frequency	Impact on soil through leakage is expected to occur occasionally during the operational phase.				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	The temporal impact of contamination of soil is considered as **Medium**, since it will occur occasionally during the operational phases in consideration of the long operational life of the Project.					
IMPACT MAGNITUDE		**Negligible**	**Small**	Medium	Large	
		The site is a moderate area. Given the project site was a landfill, the operation activities will not result in significant adverse impact on the quality or value of soil. the impact caused by leakage is considered as **Small to Negligible**.				
RECEPTOR VULNERABILITY		**Low**	Medium	High		
		The project is located on an abandoned landfill and now is planned for industrial use. The vulnerability is considered as **Low.**				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Impact		**Impact of normal emission to Soil in Operation Phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		This impact is direct.				
	Extent	Site	**Local**	Regional	National	International
	Scale	Small	**Medium**	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The spatial impact of contamination of soil is considered as **Low**, since the leakage should be localized within and near the designated area of hazardous materials handling, hazardous waste disposal and accidental spills.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	The emission of flue gas is considered as continuous.				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	The temporal impact of contamination of soil is considered as **Medium**, since flue gas emissions persist throughout the project duration.					

IMPACT MAGNITUDE	Negligible	**Small**	Medium	Large
	The estimated max concentration contributed by SUS is approximately 17 ng TEQ/kg [1]. Refer to the limit of dioxins (1000 ng-TEQ/kg) in soil set by Japanese Ministry of the Environment [36] and remedial goal (40 ng-TEQ/kg) for agricultural land set by DTSC [37], the impact caused by project normal emission is considered as **Small**.			
RECEPTOR VULNERABILITY	Low	**Medium**	High	
	The project is located on an abandoned landfill and now is planned for industrial use. Within 1 kilometers of the plant boundary, a portion of the land is used as agriculture use. The vulnerability is considered as **Medium.**			
IMPACT SIGNIFICANCE	Negligible	Minor	Moderate	Major

Note: [1] Refer to data disclosed by EPA, Columbus Municipal Waste-to-Energy facility discharged 1000 grams dioxin Toxic Equivalents (TEQs) per year and continued for about 10 years. The soil concentrations of dioxins within 2 miles of the incinerator ranged from 4 to 60 ng TEQ/kg. SUS will discharge Dioxins 0.2848 kg per year, and the estimated max concentration contributed by SUS is approximately 17 ng TEQ/kg.

Additional Mitigation Measure

The significance of impacts is expected to be **Negligible** to **Minor**. The following mitigation measures are recommended to further reduce the significance of impacts from contamination of soil:

- Mitigation measures for waste gas emission should refer to ***Section 8.1***;
- Establish, adapt and implement a plan on onsite chemical storage and handling, including designation of appropriate area for chemical storage with seepage-proofing equipment and/or secondary containment, tracking record for chemical storage and use and a system for supervision and monitoring;
- Establish, adapt and implement a Waste Management Plan, including designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring;
- Establish, adapt and implement an Emergency Response Plan to deal with potential accidental spill;
- The anti-seepage system shall be inspected at regular intervals. Any identified damage must be repaired promptly; and
- Conduct regular environmental monitoring of onsite soil to identify impact from potential accidental release of hazardous substances.

Residual Impact

With the additional mitigation measures outlined, it is expected the significant of residual impacts from contamination of soil during operation phase will be **Negligible**.

[36] https://www.env.go.jp/hourei/12/000025.html
[37] https://savenoyoheadlands.org/dtsc/HHRA-Note-2-dioxin-2017-04-06-2021A.pdf

8.5 NOISE

8.5.1 INTRODUCTION

This Section presents an assessment of the noise impacts of the construction and operation phase.

8.5.2 SCOPE OF ASSESSMENT

The Project Lifecycle has been reviewed to identify the Project activities with potential to generate noise (***Table 8-20***). The noise sources identified are associated mainly with the use of powered mechanical equipment during construction phase and operation of fixed plant items during the operation phase. No significant vibration sources are anticipated in view of the nature of the construction activities and the operation of the Project.

TABLE 8-20 POTENTIAL SOURCES OF NOISE FROM THE PROJECT LIFECYCLE

Project Activity	Potential Noise Sources
Construction Phase • Site clearance and earth work; • Identification and clearance of access roads; • Construction of temporary facilities, such as temporary living area; • Construction of building; and • Installation of equipment, transmission towers and transmission line, etc.	• Noise from the use of powered mechanical equipment for the activities during the construction phase.
Operation Phase • Waste collection and incineration; • Turbine and generator; • Utilities operation (e.g. freshwater treatment, cooling tower); and • Environmental protection facilities operation (e.g. flue gas treatment, wastewater treatment).	• Operational noise from equipment and utilities operation.

8.5.3 IMPACT ASSESSMENT CRITERIA

Potential impacts have been evaluated and their impact significance determined considering the impact characteristics, impact consequences, magnitude of the impact and receptor sensitivity.

The criteria for sensitivity and magnitude of the impact to ambient noise environment are defined in ***Table 8-21*** and ***Table 8-22*** respectively. Disturbance impact means impact from unwanted or disturbing sound in the environment that affects the health and well-being of humans and other living organisms. Amenity impact is from where ambient levels are low, or open space areas. A Project may have a disturbance impact and an amenity impact. Amenity impact magnitudes usually only outweigh disturbance impact magnitudes where existing ambient noise levels are low.

TABLE 8-21 IMPACT SIGNIFICANCE FOR NOISE – DISTURBANCE IMPACTS

Duration / Frequency	Noise Receptor Type	Period	Project Noise Level (dB(A))[38]			
			Not Significant	Minor	Moderate	Major
Permanent / Constant	Residential, institutional, educational	Daytime	<50	50-55	>55-60	>60
		Nighttime	<40	40-45	>45-50	>50
	Industrial, commercial	Daytime & Nighttime	<65	65-70	>70-75	>75
Temporary, long-term / Often	Residential, institutional, educational	Daytime	<55	55-60	>60-65	>65
		Nighttime	<45	45-50	>50-55	>55
	Industrial, commercial	Daytime & Nighttime	<70	70-75	>75-80	>80
Temporary, medium-term / Occasional	Residential, institutional, educational	Daytime	<65	65-70	>70-75	>75
		Nighttime	<45	45-50	>50-55	>55
	Industrial, commercial	Daytime & Nighttime	<70	70-75	>75-80	>80
Temporary, short-term / Rare	Residential, institutional, educational	Daytime	<70	70-75	>75-80	>80
		Nighttime	<55	55-60	>60-65	>65
	Industrial, commercial	Daytime & Nighttime	<70	70-75	>75-80	>80

TABLE 8-22 IMPACT SIGNIFICANCE FOR NOISE - AMENITY IMPACTS

Duration / Frequency	Noise Receptor Type	Period	PNL $L_{Aeq,1hr}$ - $L_{A90,1hr}$ (for background noise above L_{A90} 30 dB)			
			Negligible	Minor	Moderate	Major
Permanent / Constant	Residential	All	<5	5-10	>10-15	>15

The noise prediction mode of point sources is selected for this Project. The prediction mode adopts the geometric dispersion attenuation mode of point sources as follows:

[38] The rating framework is referred to ERM IA methodology, drawn from British Standard 4142 and the Australian New South Wales Industrial Noise Policy.

(1) Outdoor point source attenuation mode

$$L_p(r_2) = L_p(r_1) - 20lg\frac{r_2}{r_1}$$

Where: $L_p(r_1)$ --Sound level at the distance, r_1, from the sound source, dB(A);

$L_p(r_2)$ --Sound level at the distance, r_2, from the sound source, dB(A);

r_1 --Distance between noise receptor 1 and the source, m;

r_2 --Distance between noise receptor 2 and the source, m;

(2) Noise superposition calculation mode

The formula for calculating the equivalent sound level contribution value generated by multiple sources at the same receptor is:

$$PNL = 10\,lg\frac{1}{T}\sum_i t_i\,10^{0.1L_{Ai}}$$

Where: PNL -- Project Noise Levels is Equivalent sound level contribution value of the source at the receptor, dB(A);

L_{Ai} -- A sound level generated by sound source i at the receptor, dB(A);

T -- the time period for prediction calculation at the receptor, s;

t_i -- the operation time of sound source i in the time period T, s.

(3) Calculation mode of total sound level at the prediction point

The formula for calculating the predicted equivalent sound level at the prediction point is:

$$L_{eq} = 10\,lg(10^{0.1PNL} + 10^{0.1L_{eqb}})$$

Where: L_{eqg} --the equivalent sound level contributed by all the sources at the receptor, dB(A);

L_{eqb} --background noise level at the receptor, dB(A).

8.5.4 IMPACT ASSESSMENT

8.5.4.1 CONSTRUCTION PHASE

Source of impact

Noise is sourced from the following activities in the construction phase:

- Site clearance (soil and vegetation) and earth work;
- Clearance of the access road;
- Construction of temporary facilities, such as temporary living area;
- Construction of building; and
- Installation of equipment, transmission towers and transmission line, etc.

Embedded control

- None

Significance of impact

Construction activity on site:

During the construction phase, noise will be generated from excavators, wheel loaders, compactors, etc.

The Project noise level (PNL) is 59.6 dB(A) at the NSR and the calculation result is summarized in ***Table 8-23***.

The noise impact is **Minor**.

Construction of Transmission Line

The main construction activities of the transmission line include construction of tower foundations, welding and erection of towers, as well as connecting wires between towers, etc. The construction work of transmission line is relatively minor and the construction period is short.

The Project noise level (PNL) is 63.3 dB(A) at the NSR and the calculation result is summarized in ***Table 8-23***.

The noise impact is **Medium**.

Construction of pump station:

During the construction phase, noise will be generated from foundation activities, etc.

The Project noise level (PNL) is 53.9 dB(A) at the NSR and the calculation result is summarized in ***Table 8-23***.

The noise impact is **Minor**.

TABLE 8-23 PREDICTED NOISE LEVEL

No.	Equipment	**Equipment count**	**Noise level for each equipment (dB(A))** [39]	Distance from site to **residential area** [a]	**Noise level after attenuation (dB(A))**
1	Dump truck	4	79	350 m	48.1
2	Loader	1	86	350 m	55.1
3	Excavator	3	75	350 m	44.1
4	Bulldozer	1	83	350 m	52.1
5	Diesel generator	3	65	556 m	30.1
6	Tower crane	2	77	350 m	46.1
7	Cutter	1	65	407 m	32.8

[39] Noise Level dB(A) refers to the sound pressure level (SPL) at 10m from Code of practice for noise and vibration control on construction and open sites Part 1: Noise (BS 5228-1:2009+A1:2014).

No.	Equipment	**Equipment count**	**Noise level for each equipment (dB(A))** [39]	Distance from site to **residential area** [a]	**Noise level after attenuation (dB(A))**
8	Air compressor	5	75	556 m	40.1
9	Concrete pump	1	82	360 m	50.9
The Noise level at the NSR caused by the Project (PNL)					59.6

No.	Equipment	Equipment count	Noise level **for each equipment** (dB(A)) [39]	Distance from pump station and pipeline to residential area [a]	Noise level after attenuation (dB(A))
1	Dump truck	1	79	65 m	62.7
2	Excavator	1	65	65 m	48.7
3	Concrete pump	1	75	133 m	52.5
The Noise level at the NSR caused by the Project (PNL)					63.3

No.	Equipment	Equipment count	Noise level **for each equipment** (dB(A)) [39]	Distance from OTL to residential area [a]	Noise level after attenuation (dB(A))
1	Excavator	1	65	128 m	42.9
2	Concrete pump	1	75	128 m	52.9
3	Mobile telescopic crane	1	67	128 m	44.9
The Noise level at the NSR caused by the Project (PNL)					53.9

Note: a. The distance to the NSR is conservatively assumed as the distance from the equipment operation area to the NSR.

b. Some other minor noise level machine may be required during the construction phase. Seeing that these machines are not major noise sources and are not considered in the quantitative construction noise impact assessment.

Impact		**Impact from Noise Generate from Construction Activities and Construction Machine**				
Impact Nature		**Negative**	Positive		Neutral	
IMPACT CHARACTER	**Type**	**Direct**	Indirect		Induced	
		This impact is a direct result of construction machinery associated with construction activities.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium		Large	

	SPATIAL EFFECTS	**Low**		Medium		High
	The spatial impact of construction machinery noise from the Project is considered as **Low**, since the nuisance impacts associated with noise emissions has the potential to affect the herdsman's houses nearby.					
	Duration	Temporary	**Short-term**	**Medium-term**	Long-term	Permanent
	Frequency	Construction noise levels mainly peak during the earthwork and foundation construction phases. Frequency is considered as often.				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	
	The impact of construction machine noise is considered as **Low**, since the distance allows the noise attenuation, leading to low noise increase.					
IMPACT MAGNITUDE		Negligible	**Small** (site& OTL)	**Medium** (pump station)	Large	
		Considering the construction activities are predominantly scheduled during daytime with Medium-term duration and frequency of often, the project noise level is from 53.9 to 63.3 dB(A), the impact magnitude of construction machine is determined to be **Small to Medium.**				
RECEPTOR VULNERABILITY		Low		**Medium**		High
		Receptor vulnerability is **Medium**, as there is residential area around the site.				
IMPACT SIGNIFICANCE		Negligible	**Minor** (site& OTL)	**Moderate** (pump station)	Major	

Recommended Mitigation Measures

The following control shall be applied to reduce the potential for noise impacts from construction machine to nearby receptors:

- Low-noise equipment will be adopted to control noise from the source;
- Position static equipment (e.g., generators) as far as practically possible from sensitive receptors (especially for the north residential area);
- Heavy machinery or high noise level generating equipment (i.e. excavators and crane) should be equipped with acoustic noise filters/ mufflers/ silencers, where appropriate, during use;
- Switch off all heavy machinery or high noise level generating equipment when not in operation;
- Brief site operatives to keep noise to a minimum;
- No noisy or high noise activities to be undertaken during nighttime (23:00-7:00) and during weekend without prior approval of the Project Company;
- Develop an external Grievance Mechanism. All noise complaints will be recorded, the cause identified and appropriate measures such as those presented in this table will be implemented to reduce noise in a timely manner. The frequency of site inspections will be increased when grievance arises; and
- All observations and non-conformances to be managed through corrective action tracker and reviewed monthly.

Residual impact

With the implementation of the recommended mitigation measures, residual impacts from construction machine noise are expected to be **Negligible** to **Minor**.

8.5.4.2 OPERATION PHASE

Source of impact

During the operation phase, noise emissions are expected to result from the operation of equipment. In the case of WtE project, these emissions may include noises originating from crane, incinerator, fan, steam turbine generator set, cooling tower, pumps and wastewater treatment plants, etc.

Embedded control

Based on a review of received information and onsite interview, the following Project-specific embedded measures for noise were identified:

- Specify low-noise equipment in procurement contracts and control noise at the source.
- Apply targeted noise controls: mufflers on steam and fan outlets; acoustic covers on generators and pumps; rubber joints and vibration pads on rotating equipment; structural isolation along transmission paths.
- Maximize automation for high-noise equipment (e.g. fans and pumps, etc.) and schedule maintenance to limit staff time in noisy areas to minimize on-site personnel exposure;
- Cluster noise sources within the closed building and use soundproof structures for operation workshops.
- Optimize site layout and enhance landscaping to leverage building walls and greenings for noise attenuation.
- Reduce traffic noise via vehicle management (e.g. enforce speed limits and non-honking rules).

Significance of impact

An inventory of the main noise emission sources (operational equipment) for the Project is presented in ***Table 8-24***. The quantity of equipment is estimated based on experience from similar project.

TABLE 8-24 MAIN NOISE EMISSION SOURCES FROM OPERATIONAL EQUIPMENT

No.	Equipment	Quantity	Noise Level before control measures (dB(A))[40]	Embedded Control	Noise Level after control measures (dB(A))
1	Turbine generator	1	105-110	Building Envelope Sound Insulation	70
2	Air compressor	3	90-95	Building Envelope Sound Insulation	70
3	Blower	2	85-90	Soundproof Enclosure and building Envelope Sound Insulation	70

[40] Noise Level dB(A) refers to the sound pressure level (SPL) at 1m.

No.	Equipment	Quantity	Noise Level before control measures (dB(A))[40]	Embedded Control	Noise Level after control measures (dB(A))
4	Drawer fan	2	85-90	Soundproof Enclosure and building Envelope Sound Insulation	70
5	Mixing machine	2	85-90	Building Envelope Sound Insulation	70
6	Safety valve	6	95-110	Building Envelope Sound Insulation	70
7	Condenser	2	85-95	Building Envelope Sound Insulation	70
8	Cooling tower	2	83-86	Sound Absorbing Device	72
9	Garbage crane	2	80-90	Building Envelope Sound Insulation	70
10	Bottom ash crane	1	80-90	Building Envelope Sound Insulation	70
11	Waste residue conveyor belt	2	80-90	Building Envelope Sound Insulation	70
12	Electric pump in pump station	2	68	Building Envelope Sound Insulation	60

The results of the predicted operational noise levels with embedded control at the NSR, Navruz, and comparison with the noise assessment criteria are presented in ***Table 8-25***.

The predicted noise level during daytime period at the nearest NSR is 47.5 dB(A), which complies with the local regulations (SanR&N RUz No. 0267-09) of 55 dB(A) during daytime period. The noise level increase is no more than 0.5 dB(A).

The predicted noise level during nighttime period at the nearest NSR are 47.1 dB(A). Although these predicted noise levels do not comply with the local regulations (SanR&N RUz No. 0267-09) of 45 dB(A)during nighttime period, the noise level increase of background noise levels is no more than 1.6 dB(A).

Hence no adverse noise impact due to the operation of the BESS Project is anticipated.

TABLE 8-25 PREDICTED NOISE LEVEL

No.	Equipment	Distance from site/pump station to **residential area** [b]	Distance from site/pump station to **shepherd's house** [b]
1	Turbine generator	418 m	499m
2	Air compressor	424 m	454 m
3	Blower	424 m	454 m
4	Drawer fan	424 m	454 m
5	Mixing machine	494 m	432 m
6	Safety valve	424 m	454 m
7	Condenser	418 m	499m
8	Cooling tower	471 m	420 m
9	Garbage crane	404 m	466 m
10	Bottom ash crane	418 m	448 m
11	Waste residue conveyor belt	418 m	448 m
12	Electric pump	133 m	1167m
The Noise level at the NSR caused by the Project (PNL)		31.8 dB(A)	31.1 dB(A)
Daytime	Baseline Noise Level (L_{day}) [a]	49.5 dB(A)	49.5 dB(A)
	The accumulated Noise level at the NSRs	49.6 dB(A)	49.6 dB(A)
	Increased Noise Level	0.1 dB(A)	0.1 dB(A)
Nighttime	Baseline Noise Level (L_{night}) [a]	45.9 dB(A)	45.9 dB(A)
	The accumulated Noise level at the NSRs	46.1 dB(A)	46.0 dB(A)
	Increased Noise Level	0.2 dB(A)	0.1 dB(A)

Note: a. The baseline noise level is maximum level of the L_{day}/ L_{night} of NQ-1 ~ NQ-3.

b. The distance to the residential area and shepherd's house are conservatively assumed as the distance from the workshops/ pump station to the NSR.

c. Some other minor noise level machine may be required during the construction phase. Seeing that these machines are not major noise sources and are not considered in the quantitative construction noise impact assessment.

Impact		**Impact from Facility Operation Noise in Operation Phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		This impact is a direct result from the facility operation.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The accumulated Noise level at the NSRs can meet guidelines values[41] in daytime and increased noise level to baseline in nighttime is 0.1 to 0.2 dB(A).					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	Constant				
	TEMPORAL EFFECTS	**Negligible**	Low	Medium	High	
	The temporal impact is considered as **Negligible**, since the accumulated Noise level at the NSRs can meet guidelines values[41] in daytime and increased noise level to baseline in nighttime is 0.1 to 0.2 dB(A).					
IMPACT MAGNITUDE		**Negligible**	Small	Medium	Large	
		Considering the project noise level(PNL) is no more than 31.8 dB(A) and PNL-L_{A90} is no more than 5 dB(A), the impact magnitude is determined to be **Negligible**.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Receptor vulnerability is **Medium** for residential area.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

Impacts are assessed of **Negligible** significance. The following mitigation measures shall be applied to further reduce the significance for noise impacts from facility operation:

- Give employees information, instruction and training;
- Equip with appropriate and necessary noise personal protective equipment;
- Regular maintenance of all equipment.

Residual impact

With the additional mitigation measures outlined, it is expected the significance of noise residual impacts from facility operation will remain as **Negligible**.

[41] Guidelines for Community Noise, World Health Organization (WHO), 1999. Guidelines values are 55 dB(A) for daytime and 45 dB(A) for nighttime.

8.6 WASTE

8.6.1 INTRODUCTION

The Project will generate waste during both the construction and operation phases. This section provides an assessment of the potential impacts associated with waste management, encompassing aspects such as storage, handling, collection, transportation, recycling, treatment, and disposal.

8.6.2 SCOPE OF ASSESSMENT

Table 8-26 presents the anticipated waste inventory detailing the types of waste that will be generated during the construction and operation phases, including estimated quantities.

TABLE 8-26 WASTE INVENTORY

Project Phase	Waste	Waste Generation Activity	Estimated Quantities and frequency
Construction Phase	Rubble/soil	• Site clearance • Earthworks	All excavated soil is reused on-site and more imported fill is required. There was little discarding of soil.
	Excess construction material (e.g. concrete, wooden formwork, packaging, scrap metals, excess cables)	Construction and installation works	180 t for construction phase
	Domestic waste	Construction workers	81 t for construction phase (0.50 kg per person per day)
Operation Phase	Domestic waste (e.g. paper, food waste)	From onsite workers	66.64 t/yr
	Scrap ferrous metal	Generated from inspection and maintenance activities.	2 t/yr
	Used LED	LED will be replaced regularly.	0.02 t/yr
	Waste active carbon	Active carbon will be used in the wastewater and waste gas treatment ,and will be replaced regularly to maintain treatment performance.	336 t/yr

Project Phase	Waste	Waste Generation Activity	Estimated Quantities and frequency
	Spent bag filters	Bag filters will be used to remove the dust in the flue gas and will be replaced regularly to maintain treatment performance.	0.89 t/yr
	Sludge	Generated in the water purification and wastewater treatment.	Dependent on water/wastewater quality.
	Membrane	Membrane provides high-efficiency separation and purification and will be replaced regularly to maintain performance.	Dependent on water/wastewater quality.
	Bottom ash	Incombustible materials remain as residue after incineration and accumulate at the bottom of the combustion chamber.	93,483.96 t/yr
	Fly ash	Incombustible mineral matter breaks down into fine particles, entrained in the upward gas flow, and eventually captured by air pollutant control system.	23,133.54 t/yr
	Leachate	Leachate will accumulate during the storage of MSW.	Dependent on waste component.
	Waste oil	Generated form inspection and maintenance activities.	6.4 t/yr
	Oil contaminated rag	Generated form inspection and maintenance activities.	0.5 t/yr

8.6.3 IMPACT ASSESSMENT CRITERIA

The criteria for sensitivity and magnitude of the impact of waste will be set out in the following sub-sections.

TABLE 8-27 IMPACT MAGNITUDE FOR WASTE

Category	Extent / Duration / Scale / Frequency
Large	Change in waste disposal and treatment over a large area that lasts over the course of several months with quality likely to cause secondary impacts on ecosystems and nearest household or community. Affects the majority of the area or population in the

Category	Extent / Duration / Scale / Frequency
	area of influence and / or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area, ecosystem or number of people and / or is of medium duration. Frequency may be occasional, and impact may potentially be regional in scale.
Small	The change in waste disposal and treatment exceeds the expected. Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Changes in relation to waste disposal and treatment correspond to the expected range. Change remains within the range commonly experienced within the household or community.

TABLE 8-28 RECEPTOR SENSITIVITY FOR LOCAL COMMUNITIES

Category	Designation / Importance / Vulnerability
High	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project.
Medium	Some but few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project.
Low	Minimal vulnerability; consequently, with a high ability to adapt to changes brought by the Project and opportunities associated with it.

8.6.4 ASSESSMENT OF IMPACTS

8.6.4.1 WASTE GENERATION AND MANAGEMENT (CONSTRUCTION PHASE)

Embedded control

Based on a review of received information and onsite interview, the following Project-specific embedded measures for construction waste were identified:

- On-site storage: Designated storage areas for construction waste and domestic waste will be marked onsite.
- Waste disposal: Wastes will be collected by qualified disposal vendors for reuse or landfill, depending on the waste nature.
    - Fly ash is stored separately with anti-seepage lining and landfilled after chemical stabilization.
    - Bottom ash is processed for resource recovery after metal recycling.

Significance of impact

Impact		**Impact from Waste Generation, Collection, Transport and Disposal in Construction Phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS		Direct	**Indirect**	Induced		
	Type	Indirect impacts associated with the improper handling, storage, transport and disposal of solid waste may result in the contamination of the environment leading to health impact on receptors.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The spatial impact of solid waste handling, storage, transport and disposal is considered as **Low**, since the solid waste will be stored in a designated area onsite and disposed by qualified third party in a designated area offsite.					
	Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	Frequency	Temporary in construction phase				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	
	The temporal impact of solid waste handling, transporting and disposal is considered as **Low**, since the generation of solid waste in construction phase is temporary and the solid waste will be transported and disposed by a qualified third-party company offsite.					
IMPACT MAGNITUDE		Negligible	**Small**	Medium	Large	
		Waste will be stored onsite and removed offsite for correct disposal by a qualified third party offsite to waste facilities. Considering the low level of spatial and temporal effects, the impact magnitude of solid waste is determined to be **Small.**				
RECEPTOR VULNERABILITY		**Low**	Medium	High		
		Receptor vulnerability is **Low**, as the construction waste does not contain hazardous material and will be disposed in designated area.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

Impacts are assessed of **Minor** significance. The following mitigation measures shall be applied to reduce the potential impacts of waste:

- Construction Waste Management Plan (CWMP): Develop a CWMP for the construction phase aligned with waste mitigation hierarchy, including prevention, reuse, recycling, recovery and disposal. The CWMP should include explicit requirements and responsibilities for waste generation, collection, transport and disposal;
- Only engage with qualified waste transporters and management facilities;
- Maintain a Waste Inventory: Document and track construction waste generated and transported, categorized by waste types;
- Provide Training: Deliver awareness and management training to all personnel involved in waste management; Conduct ongoing housekeeping training for staff on litter prevention and proper waste handling; and

- Promote Recycling: Identify and engage vendor companies in nearby regions qualified to recycle specific types of waste generated by the project.

Residual impact

With the additional mitigation measures outlined, the significance of residual impacts from construction waste is expected to be **Negligible**.

8.6.4.2 WASTE GENERATION AND MANAGEMENT (OPERATION PHASE)

Embedded control

Based on a review of received information and onsite interview, the following Project-specific embedded measures for waste generated in the operation were identified:

- Designated storage areas will be established for the proper storage of non-hazardous waste and hazardous waste. The waste will be stored in the appropriate containers.
- A hazardous waste storage room with an area of approx. 923.63 m^2 will be established at the northern part of the Project site. The storage room will be divided into two separate zones: one designated for the storage of fly ash, and the other for storing additional hazardous waste generated during the operation phase.
- The Project is expected to generate about 23,133.54 tons fly ash per year. The fly ash will be stabilized by mixing with chelating agent. Stabilized fly ash will be temporarily stored in the onsite hazardous waste storage room and subsequently transported to the local landfill for final disposal.
- The designed residence time of waste in the combustion chamber is 1.5 to 2 hours to ensure complete combustion and reduce the amount of bottom ash generated.
- Bottom ash will be quenched using reclaimed water and then temporarily stored in the designated bottom ash storage yard before being transported to a disposal vendor for utilization.
- Leachate will be collected in the leachate storage tank and incinerated by the incinerators.
- Other waste will be incinerated by the incinerator.

Significance of impact

Impact		**Impact from Waste Generation, Collection, Transport and Disposal in Operation Phase**				
Impact Nature		**Negative**	Positive		Neutral	
IMPACT CHARACTERISTICS	**Type**	Direct	**Indirect**		Induced	
		Indirect impacts associated with improper handling, storage, transport and disposal or reuse of hazardous waste may result in the contamination of the environment, leading to health impacts on receptors.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**		Medium	Large	
	SPATIAL EFFECTS	**Low**		Medium	High	

	The spatial impact of waste generated during operation phase is considered as **Low**, since the waste will be stored in the appropriate containers, a hazardous waste storage room and a designated bottom ash storage yard is designed for the Project.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	The fly ash and bottom ash is expected to be generated constantly throughout the operation phase. Other waste is expected to be generated periodically throughout the operation phase.				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	Considering both the quantity and the frequency of generation as well as the uncertainties associated with final disposal, the temporal effect is regarded as **Medium.**					
IMPACT MAGNITUDE		Negligible	Small	**Medium**	Large	
		Classified as **Medium** scale based on the above.				
RECEPTOR VULNERABILITY		**Low**	**Medium**	High		
		Receptor vulnerability is **Medium,** since hazardous waste contains hazardous substances which will impact the environment and human health by potential release and exposure.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

Impacts are assessed of **Moderate** significance. The following mitigation measures shall be applied to reduce the potential impacts from waste:

- Use a waste throughput rate that provides sufficient agitation and residence time of the waste in the furnace at sufficiently high temperatures, including any ash burn-out areas, to achieve an ash loss on ignition (LOI) value of below 5 wt. percent (dry basis).
- Monitor the construction progress of the disposal vendor for bottom ash. If it fails to commence operation within one year, an alternative qualified disposal vendor should be identified in advance.
- Include hazardous waste in the WMP, focusing on the protection of human health and the environment from impacts associated with its generation, storage, handling, transportation, and disposal;
- All waste containers, especially the containers for fly ash and bottom ash designated for off-site shipment, should be secured.
- The designated bottom ash storage yard shall be constructed with impervious hard-standing surfaces.
- Sludge from the water/wastewater treatment facility should be collected regularly. This can be done manually using shovels and buckets or directly pumped out by a third party. Workers must be equipped with appropriate personal protective equipment (PPE), including gloves, masks, boots, and protective clothing, to minimize exposure to sludge during the collection process.
- Implement sludge dewatering techniques to reduce moisture content and thereby minimize the potential risk of leachate generation.

- Use appropriate containment systems for sludge short-term storage to prevent leachate and odor issues. Ensure that storage containers are designed to minimize risks of spills or leaks.
- Labelling and Handling: Mark waste containers clearly with appropriate warning labels that accurately describe their contents and safety precautions. Ensure labels are waterproof, securely attached, and written in Chinese and other required languages (e.g., Uzbekistan) for the workforce;
- Maintain a Waste Inventory: document and track waste(e.g. bottom ash, fly ash, etc.) generated and transported, categorized by waste types;
- Develop and implement an Emergency Response Plan in the event of an accidental release of hazardous waste.
- Deliver awareness and management training to all personnel involved in waste management.

Residual impact

With the additional mitigation measures outlined, the significance of residual impacts from waste generated during the operation phase is expected to be **Minor**.

8.7 BIODIVERSITY

8.7.1 INTRODUCTION

In accordance with IFC PS1 and PS6, the assessment process aims to predict and assess the Project's potential adverse impacts and risks to biodiversity values, in quantitative terms where possible. The objective of the biodiversity impact assessment (BIA) is to identify and quantify the potential Project impacts as identified through scoping; design measures to avoid, minimize, or restore/compensate potential adverse impacts; and identify likely residual impacts.

The baseline studies to identify relevant values have been reported in ***Section 7.7 Biological Environment*** and further detailed in ***Annex D Critical Habitat Screening***. The remaining steps reported in this chapter include:

- Clarification of the potentially significant impacts that have been scoped in for further analysis in this section;
- Providing details of any biodiversity specific methodology elements in addition to the general impact assessment methodology outlined in ***Chapter 4***;
- Providing a summary of the baseline conditions detailed earlier in the report;
- Impact analysis to assess the significance of potential biodiversity impacts considering habitats and species;
    - Development of mitigation measures to avoid and minimize the potential adverse impacts identified, with a priority given to impacts on features with significant biodiversity values; and
    - Determination of the significance of residual impacts.
    - Establishing a commitment to achieve no net loss of natural habitat and net gain for critical habitat values.

8.7.2 SCOPE OF ASSESSMENT

Following the scoping exercise, the following activities can have potentially significant impacts on terrestrial and freshwater biodiversity during the Project lifecycle:

- Site Preparation and Construction Phase:
  - Site Clearing / Ground Preparation (Operation phase is occupation of the site)
  - Contractor Camps / Laydown Areas and Worker Accommodation

Section 8.7.5 present the detailed assessments for the impacts scoped in.

8.7.3 IMPACT ASSESSMENT CRITERIA

Chapter 4 describes the overall approach used for the assessment of impacts and identification of mitigation options but specific considerations for the biodiversity impact assessment are provided in this section.

Sensitivity criteria for baseline biodiversity (habitat and species) values have already been defined in ***Chapter 7.7*** and a summary of the sensitivity of biodiversity values for this Project is provided in ***Section 8.7.5***. It should be noted that the biodiversity-specific sensitivity criteria is equivalent to the 'responsivity' measure reported in ***Chapter 4*** for affected receptors/ resources, and accounts for the combined characteristics of vulnerability, importance, value, and sensitivity of biodiversity receptors. Thus, for the purpose of this BIA, the term 'sensitivity' is used in lieu of 'responsivity'.

The criteria for magnitude of the impact to biodiversity are defined in ***Table 8-29*** for habitats and ***Table 8-30*** for species.

TABLE 8-29 MAGNITUDE CRITERIA FOR IMPACTS TO BIODIVERSITY – HABITAT

Magnitude	Definition
Negligible	No existing habitat is affected, or effect on the extent and the condition of the habitat is within the range of normal natural variation.
Small	Affects only a small area of habitat, such that there is no loss of viability/function of the habitat.
Medium	Affects part of the habitat but does not threaten the long-term viability/function of the habitat.
Large	Affects the entire habitat, or a significant proportion of it, and the long-term viability/function of the habitat is threatened.

TABLE 8-30 MAGNITUDE CRITERIA FOR IMPACTS TO BIODIVERSITY – SPECIES

Magnitude	Definition
Negligible	No species affected, or effect on the population of the species is within the range of normal natural variation.

Magnitude	Definition
Small	Effect does not cause a substantial change in the population of the species, or other species dependent on it.
Medium	Effect causes a substantial change in abundance and / or reduction in distribution of a population over one, or more generations, but does not threaten the long-term viability / function of that population, or any population dependent on it.
Large	Affects entire population, or a significant part of it causing a substantial decline in abundance and / or change in and recovery of the population (or another dependent on it) is not possible either at all, or within several generations due to natural recruitment (reproduction, immigration from unaffected areas).

8.7.4 SUMMARY BIODIVERSITY BASELINE CONDITIONS

In summary, the Project is located at the southern edge of Samarkand City, within a highly modified urban landscape of low ecological integrity. Native floras and faunas have been almost eliminated, and present biodiversity is restricted to planted vegetation, weeds, pests, and a few disturbance-tolerant animal species. Long-term land conversion in Samarkand city has a detrimental effect on natural biodiversity communities and the original ecosystem structure, resulting in highly simplified, human-maintained biological assemblages rather than functioning ecosystems. Flora is dominated by planted or ruderal species with no natural regeneration, and fauna is limited to a small number of disturbance-tolerant, human-associated species, particularly commensal mammals and common urban birds, with no raptors or migratory waterbirds detected during the site visit.

For the context of regional biodiversity, the landscape is highly disturbed and moderately fragmented because of the urban development of Samarkand City. The Project is not expected to affect any legally protected areas or biodiversity hot spots. Between the two KBAs the east (Zarafshan State Nature Reserve) and west (Kattakurgan Reservoir) protect distinct riparian and wetland values, respectively, but are separated by the urban matrix. As a result, terrestrial connectivity between them is very weak. Limited hydrological continuity exists only through the Zarafshan River on the northern side, while aerial movement of birds would most likely follow either the northern river valley or, for soaring species, the southern ridges. For the proximity of the Project, an existing transmission-line corridor characterized by transmission towers and overhead lines are observed. The planning transmission lines serving the Project will cause negligible bird collision risk.

Overall, the biodiversity value and sensitivity of the Project's AoI is low, according to ***Section 7.7.2***.

8.7.5 ASSESSMENT OF IMPACTS

8.7.5.1 SITE CLEARING / GROUND PREPARATION (CONSTRUCTION)

Significance of Impact

SUS will start their construction activities including land clearing, levelling, piling, structural construction, equipment installation, etc., for different project components, including the Project area, temporary worker camps, water supply pipeline, and transmission lines.

TABLE 8-31 LAND COVER AND NATURAL/ MODIFIED HABITAT POTENTIALLY IMPACTED

Habitat	Extent within Study Area (ha)	Permanent Area Lost to Land Clearing (ha)	Temporary Area Lost to Land Clearing (ha)	Habitat Sensitivity	Magnitude of Impact	Significance of impact
Modified Habitat						
Landfill sites	108	8	2*	Low	Negligible	Negligible
Barren Land	331	0	0.4**	Low	Negligible	Negligible

*It includes temporary laydown area.

*It includes temporary land used for Transmission line and pipeline.

The construction and operation of the Project will cause the permanent loss of the landfill sites and temporary loss of the landfill sites as well as barren land. The magnitude of the impact is considered as **Small**, since the loss of each habitat caused by the Project is small (<10%) within the AoI. Both habitats are identified as low sensitivity due to high disturbance of the anthropologic activities and have low ecological functionality.

From the site visit, some bird, including common myna (*Acridotheres tristis*, LC) and common raven (*Corvus corax*, LC), observed to forage in the landfill site and utilise the WtE plant's footprint. Even though the incineration process during the Project's operation activity will remove the waste, the bird species recorded in the area are highly adapted to human-modified environments. Therefore they are not expected to be significantly affected by the Project activities.

With respect to the threatened species potentially occur in the Project's EAAA (limited to four bird species), the habitat loss caused by the Project, located on the landfill sited within a highly urbanised setting, had negligible impact on these species' life stages.

In particular, the sociable lapwing (*Vanellus gregarius*) and great bustard (*Otis tarda*) transient or passage species in the broader Samarkand region, primarily relying on steppe habitats or sparsely wooded areas that provide shelter and concealment. The Project site does not represent a suitable stopover or migration corridor; therefore, impacts on their movement or behaviour are expected to be negligible.

The saker falcon (*Falco cherrug*), which is resident in the region, hunts medium-sized diurnal terrestrial rodents in open grassland habitats and typically nests in copses or cliffs. The Egyptian vulture (*Neophron percnopterus*) may use the wider region as breeding habitat, but typically nests on cliff ledges, caves, or large trees. No carcass dumped in this area and the

waste landfills are dominated by construction waste, plastics and inert materials, with very limited organic waste content, according to the site observation. Only small quantities of animal remain (e.g. bones) were occasionally observed, which is not a consistent food source for vultures. The presence of feral dogs suggests that any organic waste is likely rapidly consumed or dispersed, further reducing the availability of carrion. The Project area is not considered to represent suitable foraging or breeding habitat for Egyptian Vultures.

The Project site lacks the types of suitable habitat described above supports breeding, nesting, foraging or sheltering of these two species.

Overall, given the highly modified conditions, limited ecological functionality, and absence of suitable habitat, no credible impact pathway has been identified linking Project activities to significant effects on threatened bird species. Subject to standard mitigation measures, including strict prohibition of hunting by the workforce, residual impacts are expected to be negligible to minor under a precautionary but proportionate assessment approach.

TABLE 8-32 IMPACT TO TERRESTRIAL BIODIVERSITY FROM LAND CELARING

Impact		**Impacts to Terrestrial Biodiversity from land Clearing**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		There will be direct loss of habitat.				
	Extent	**Site**	Local	Regional	National	International
	Scale	Negligible	**Small**	Medium	Large	
	SPATIAL EFFECTS	**Low**	Medium	High		
	The impact is expected to be site level for habitats and small scale as the land clearance will only occur within the Project boundary. It is anticipated that the Project will cover a land area of approximately 8 ha, with two out of five habitat types subject to loss. For these reasons, the transformation is not anticipated to significantly alter ecosystem functions at the landscape level and is therefore considered localized, manageable, and mitigable within the planned environmental management framework.					
	Duration	**Temporary**	Short-term	Medium-term	Long-term	**Permanent**
	Frequency	Although the construction phase is finite and clearance occurs once, the loss or conversion of habitats will be permanent.				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	
	This impact is considered a permanent, one-off event.					
IMPACT MAGNITUDE		Negligible	**Small**	Medium	Large	
		Considering the permanent loss of areas of cleared habitats, impact is considered small. Part of the habitats will be affected.				
		Low	Medium	High		

RECEPTOR / RESOURCE SENSITIVITY	Sensitivity of the terrestrial environment (habitats and species) affected is considered low due to the unlikely presence of conservation significant species occurring in habitat types that will be lost during clearing. Additionally, the landfill site and barren lands are considered to be of high sensitivity.			
IMPACT SIGNIFICANCE	Negligible	Minor	Moderate	Major

Additional Mitigation Measures

The significance of this impact is expected to be **Negligible**. No additional mitigation measures will be proposed.

8.7.5.2 EMPLOYMENT AND INFLUX / PRESENCE OF WORKFORCE AND CONTRACTORS (CONSTRUCTION)

Significance of Impact

The Project's construction commenced in July 2025 and is expected to be completed by June 2027. During the construction phase, around 24 direct employees of the Project Company work onsite, accommodated in camps within the Project site or return home in Samarkand City.

The Project will engage an EPC contractor during the construction phase. The peak number of contracted workers during the construction phase is expected to be around 400, accommodated in the temporary laydown area. In addition, 4 security personnel will be employed during construction phase. Security personnel will not carry firearms but will be equipped with shields and rubber batons. While during operation phase, approximately 84 employees will work on the site.

Given above reasons, the overall magnitude of this impact is categorized as **low**.

TABLE 8-33 IMPACT TO TERRESTRIAL BIODIVERSITY FROM EMPLOYMENT OF LABOUR AND PRESENCE OF WORKFORCE (CONSTRUCTION PHASE)

Impact		**Impacts to Terrestrial Biodiversity from Employment of Labor and Presence of Workforce**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	**Indirect**	Induced		
		Potential direct impact from hunting/poaching. Disturbance caused to terrestrial fauna will be indirect, e.g., noise disturbance.				
	Extent	Site	**Local**	Regional	National	International
	Scale	Negligible	**Small**	Medium	Large	
	SPATIAL EFFECTS	**Low**	Medium	High		
	Impact will be localized to the Project Site.					
	Duration	Temporary	Short-term	**Medium-term**	Long-term	Permanent
	Frequency	The disturbance will last around two years during the construction phase, which is considered as medium-term.				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	

Impact	**Impacts to Terrestrial Biodiversity from Employment of Labor and Presence of Workforce**			
	Low temporal effect due to the medium-term presence of workers and contractors throughout the construction phase.			
IMPACT MAGNITUDE	Negligible	**Small**	Medium	Large
	Medium-term and small disturbances potentially resulting fauna displacement will reduce the abundance and distribution of resident species but may not threaten the long-term viability / function of habitats and species present.			
RECEPTOR / RESOURCE SENSITIVITY	**Low**	Medium	High	
	Sensitivity of the terrestrial environment (habitats and species) is considered low due to the low ecological functionality of the habitats and unlikely presence of the conservation significant species.			
IMPACT SIGNIFCANCE	Negligible	Minor	Moderate	Major

Additional Mitigation Measures

The significance of impacts is expected to be **Negligible**. The following mitigation measure should be considered for Employment of Labor and Presence of Workforce in relation to biodiversity:

- Conduct induction training for all workers on biodiversity awareness, including prohibition hunting and collection of plants or animals by the workforce.

Residual Impact

The significance of impacts is expected to be **Negligible** with embedded controls only.

9. SOCIAL BASELINE

This chapter describes the socioeconomic environment of the Waste to Energy (WtE) Plant Project area, based on primary data collected during scoping site visit and engagements in January 2026 and baseline stakeholder consultations in February 2026, as well as secondary data obtained from official sources and publications.

The socio-economic baseline study presents the existing conditions, trends, and dynamics that characterize the social landscape of the Project's Area of Influence (AoI) and Project footprint. It includes a profile of the local demographics, land use and livelihoods, health and education, access to infrastructure and services, road and transportation, vulnerable groups, and gender-based violence. This baseline establishes a benchmark to assess potential social risks and opportunities and to inform the prediction and analysis of direct, indirect, and cumulative social impacts throughout the Project lifecycle.

9.1 SOCIAL AREA OF INFLUENCE

For the Waste to Energy Project, the Social Area of Influence (AoI) has been delineated based on two key factors: (i) proximity to the Project site, and (ii) the nature and extent of potential interactions between surrounding communities and Project activities during the construction and operation phases.

For proximity, the AoI includes the settlements or facilities located within or adjacent to the Project Footprint and the areas affected by construction and operational activities, such as land use changes, pump station or transmission line constructions and operations, etc. Communities in this area are expected to experience direct, location-specific impacts.

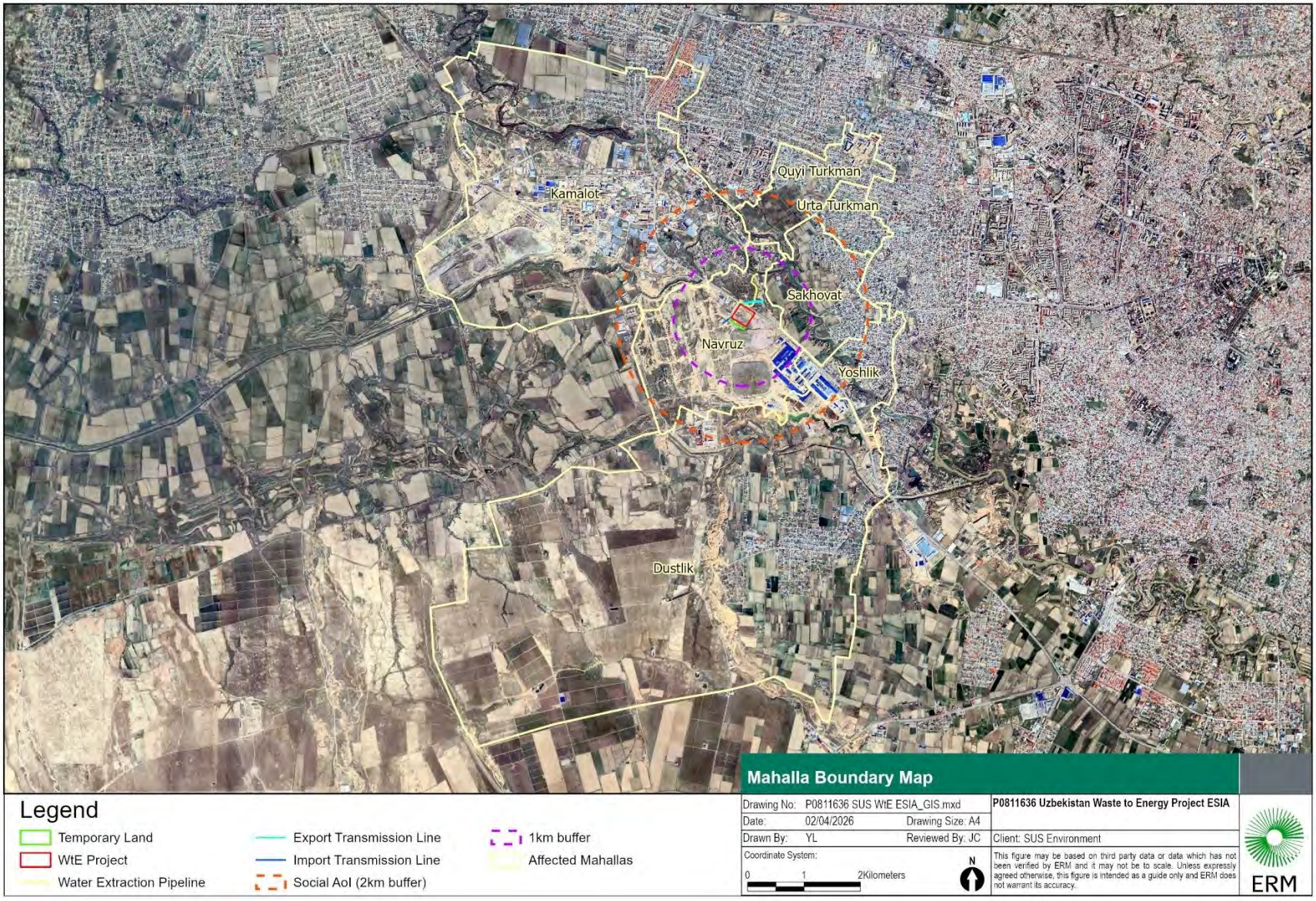
For Project activities and interactions with the surrounding community, communities within a 2 kilometers radius may receive:

- Direct impacts – Impacts that occur as a direct consequence of Project activities or land use changes within or adjacent to the Project Footprint. These may include disturbances from noise and vibration, air emissions, changes to local resource access, etc.
- Indirect impacts – Impacts that arise from Project-related activities beyond the immediate footprint. These may include interactions with the Project workforce, interaction with security personnel, and other induced changes affecting communities in a broader area.

For this Project, communities located immediately adjacent to the Project footprint are expected to receive both direct and indirect impacts arising from proximity. A wider set of settlements that are socio-economically or functionally connected to the Project area are expected to receive indirect or induced impacts due to workforce presence, increased demand for services, economic opportunities, and changes in community–Project interactions. Among which the AoI also captures induced impacts, particularly those related to community and Mugat waste pickers whose livelihoods depend on the nearby landfill, as the landfill closure and diversion of waste to the WtE facility will create downstream socioeconomic effects concentrated in MFYs closest to the site.

Given the geographical scope of the Project and the scale of potential social impacts, a radius of 2 kilometers around the Project footprint has been adopted, which includes six Mahallas (i.e., MFY) namely Dustlik MFY, Komalot MFY, Navruz MFY, Sakhovat MFY, Urta Turkman MFY and Yoshlik MFY.

FIGURE 9-1 SOCIAL AREA OF INFLUENCE



9.2 DATA COLLECTION METHODOLOGY

The scope and content of the social baseline have been tailored to the Project context. It draws on a review of available desktop data from a range of secondary sources and is supplemented with primary data gathered through stakeholder engagement activities and field observations. Methods for collecting baseline data in the Social AoI include:

- **Desktop research**

  ERM consulted government publications, public sources, academic research and satellite imagery of the Social AoI.

- **Key informant interviews to collect qualitative and quantitative data**

  During the scoping site visit (12 Jan to 15 Jan 2026), ERM organized and led Key Informant Interviews (KII) with city and region level government authorities (including Waste Landfill Directorate of Samarkand City, Head of Ecology and Environment Protection Department of Samarkand City, Deputy of Samarkand City Government, Lead Specialist of Health Department of Samarkand City, Chief Specialist of the Architecture Department, Head of Cadastral Department of Samarkand City, Specialist of the Cultural and Tourism Department of Samarkand Region) to obtain an overview of socio-economic background, disclose Project information and gather feedback about the Project.

  Moreover, KIIs were conducted with Project social sensitive receptors, including the directors of nearby farms, the director of the Samarkand City Landfill, and the director of metal processing plant to understand their baseline conditions and concerns.

  During the ESIA stage visit (7 Feb to 9 Feb 2026), KIIs were also conducted to gather local perspectives on potential Project impacts. These included two KIIs with the local hospitals that the Project intends to use as healthcare providers, and one KII with a farm owner located near the site to understand views on potential impacts on agricultural production. A KII was also held with the Samarkand City Cadastral Agency to verify the land use status of the Project's linear infrastructure. In addition, a key informant interview (KII) was also conducted with the sole metal scrap dealer in the area (Taychan Steel), which purchases metal waste from community waste pickers due to offering the highest prices, to assess potential economic impacts on both the dealer and the waste pickers.

- **Village-level interviews and community profiling to collect qualitative and quantitative data**

  During the scoping site visit, ERM together with local partner BIK conducted community profiling through meetings with various community representatives and heads of MFYs to develop an understanding of the socioeconomic context of the six MFYs in the Social AoI, specifically to obtain information of the community profile with respect to demographics, economy (including livelihoods), employment and income, land use and ownership, infrastructure and public services, traffic and transport, education and skills, informal waste-pickers, health, safety and security, human rights, cultural heritage and vulnerable groups. The meeting with MFY head also sought feedback about the Project and recommendations.

- **Focus group discussions (FGDs) to collect qualitative data**

  During scoping, a general public FGD with local villagers was conducted to understand local socio-economic status and the perceptions of the Project.

In addition, FGDs were conducted with 5 waste pickers from the Samarkand City Landfill to understand their socioeconomic status and concerns of the Project as the Samarkand City Landfill is estimated to be closed after the operation of the Project.

During ESIA phase, five FGDs with local women, six FGDs with local youth and one FGD with farmers were conducted to underscore women and youth's concerns and expectations of the Project, and the Project impact on local farming activities.

- **Household Surveys**

  During the ESIA stage, ERM conducted separate household surveys targeting the general public and the community waste pickers to profile their socio-economic status, access to public services, and perceptions of the Project, as well as the concerns and suggestions raised by waste pickers regarding the WtE Plant and the potential closure of the landfill. Household surveys with the general public were implemented using random sampling to ensure representation of typical households residing in the Project's Area of Influence. Surveys with community waste pickers were conducted through convenience sampling using a snowball approach, as this group is highly mobile, informally organised, and difficult to identify through probabilistic sampling. A total of 104 household surveys were collected, including 11 surveys with community waste pickers.

- **Field observations**

  ERM conducted the scoping visit in January 2026 to observe the socio-economic conditions, livelihoods and infrastructure in the Project area. The ESIA visit was conducted in February 2026 to gather in-depth information and baseline conditions. GPS locations and photographs of sensitive receptors were taken during both visits.

By way of limitations, not all questions were effectively answered by respondents, resulting in varying numbers of responses for each question (e.g., when asking about the age of respondents and their health status), this is potentially because the respondent was not willing to disclose the information.

In addition, the engagements with Mugat waste pickers were not conducted during scoping or ESIA stage, this is due to the lack of permission to enter the landfill where the Mugat community reside and work. Desktop research and consultation with local communities, scrape dealers, and Mahalla heads on the topic of Mugat people's livelihood and social acceptance were conducted in order to assess the Project impact on Mugat people's livelihood and living conditions.

9.3 ADMINISTRATIVE AND GOVERNANCE FRAMEWORK

9.3.1 NATIONAL AND REGIONAL LEVEL

In Uzbekistan, local governance follows a vertical hierarchy from the regional (viloyat) level down to the grassroots community (mahalla) level. Regional khokimiyats (viloyat khokimiyati) oversee regional policy implementation and coordinate directly with national ministries and agencies. Below them are district khokimiyats (tuman khokimiyati) and city khokimiyats of regional subordination, which run sectoral departments for land management, environmental protection, infrastructure, social affairs, and other administrative functions.

FIGURE 9-2 UZBEKISTAN'S ADMINISTRATIVE SUBDIVISIONS

Source: Multicolor Map of Uzbekistan with Regions. (2019). https://vemaps.com/uzbekistan/uz-07

Uzbekistan is divided into 12 regions (viloyatlar), one autonomous republic (respublika), and one independent city (shahar).

The Project is located in the Samarkand City of Samarkand Region in southern Uzbekistan. The Samarkand Region itself is divided into 14 districts: Bulungur, Ishtikhon, Jomboy, Kattakurgan, Koshrabot, Narpay, Nurabad, Oqdarya, Payariq, Pastdargom, Pakhtachi, Samarkand District, Taylak, and Urgut. In addition to these districts, the region includes two cities of regional significance—Samarkand City and Kattakurgan City.[42]

9.3.2 CITY AND DISTRICT LEVEL

Samarkand City serves as the administrative center of Samarkand Region in Uzbekistan and holds a special status as a city of regional subordination, meaning it is not part of any district but is directly governed under the regional authorities.[43] The city sits next to other districts under the Samarkand Region, including Pastdarg'om, Jomboy, Toyloq, and Oqdarya Districts.

9.3.3 LOCAL LEVEL

A Mahalla Fuqarolar Yig'ini (MFY, i.e. Mahalla) is traditional community-based institution in Uzbekistan, legally recognized as a citizens' self-governance body. Mahallas operate within a district (or city) and form the lowest tier of local governance in Uzbekistan. Each district

[42] Ibid.
[43] Golden Pages. (n.d.). *Administrative*. https://www.goldenpages.uz/en/administrative/

contains multiple mahallas, which work closely with district authorities to deliver social services, maintain community records, and implement local socio-economic programs.

A mahalla is a territorial community, either an urban neighborhood or a rural settlement, headed by an elected chairperson (mahallaboshi). It operates under the authority of the Law of the Republic of Uzbekistan "On Mahalla Citizens' Self-Governance Bodies" (1999).

As the grassroot administrative level, MFYs are responsible for local dispute resolution, providing social support, coordinating community initiatives, preventing crime, supporting vulnerable groups, and other basic administrative tasks.

This multi-tiered governance structure forms the institutional framework through which the Project will engage authorities on land access, environmental compliance, labor oversight, and community liaison.

The impacted Mahallas sit at the intersection of three district-level administrative boundaries, ***Table 9-1*** illustrates their administrative status:

TABLE 9-1 ADMINISTRATIVE STATUS OF MFYS UNDER THE SOCIAL AOI

District Level Administrative Unit	Mahalla
Samarkand City	Navruz
	Yoshlik
Pastdargom District	Komalot
Samarkand District	Sakhovat
	Urta Turkman
	Dustlik

9.4 POPULATION AND DEMOGRAPHICS

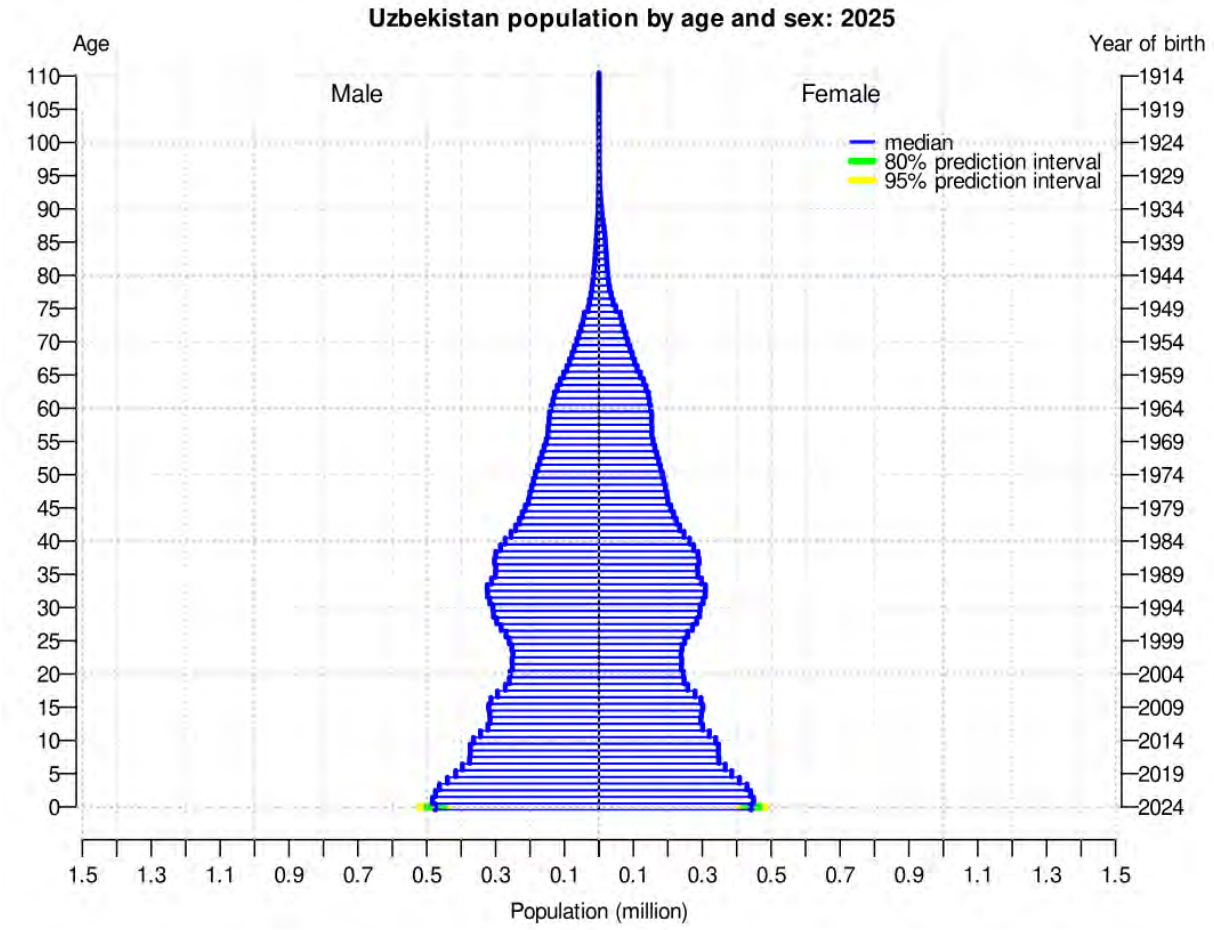
9.4.1 NATIONAL DEMOGRAPHICS

According to the World Bank database, Uzbekistan's total population in 2024 was 36,361,859.[44] The population increased by 2% in 2024 compared to the year before.

According to the Worldometer data in February 2025, 48.1% of the population of Uzbekistan is urban (17,835,913 people).[45] Worldometer data also shows the population structure of Uzbekistan in 2024, 66% of the population are working age population (age 16-60), 30% are under working age and 5% are above working age.[46]

[44] World Bank. (2024). *Uzbekistan - World Bank data*. https://data.worldbank.org/country/uzbekistan
[45] Worldometer. (2025). *Uzbekistan Demographics*. https://www.worldometers.info/demographics/uzbekistan-demographics/
[46] Worldometer – Uzbekistan Demographics. (2025). *Uzbekistan demographics*. https://www.worldometers.info/demographics/uzbekistan-demographics/

FIGURE 9-3 POPULATION PYRAMID OF UZBEKISTAN IN 2025



Source: United Nations, Department of Economic and Social Affairs, Population Division. (2024). World Population Prospects 2024: Population pyramids – Uzbekistan

9.4.2 CITY AND DISTRICT LEVEL

According to the Samarkand City Statistics Department, as of 1st Jan 2026, the total population of Samarkand city reached 605,800, including 293,800 man and 312,000 women and a gender ratio of 94 males per 100 females. The population increased by 10 thousand compared to the beginning of 2025 with an increase rate of 1.7%.[47]

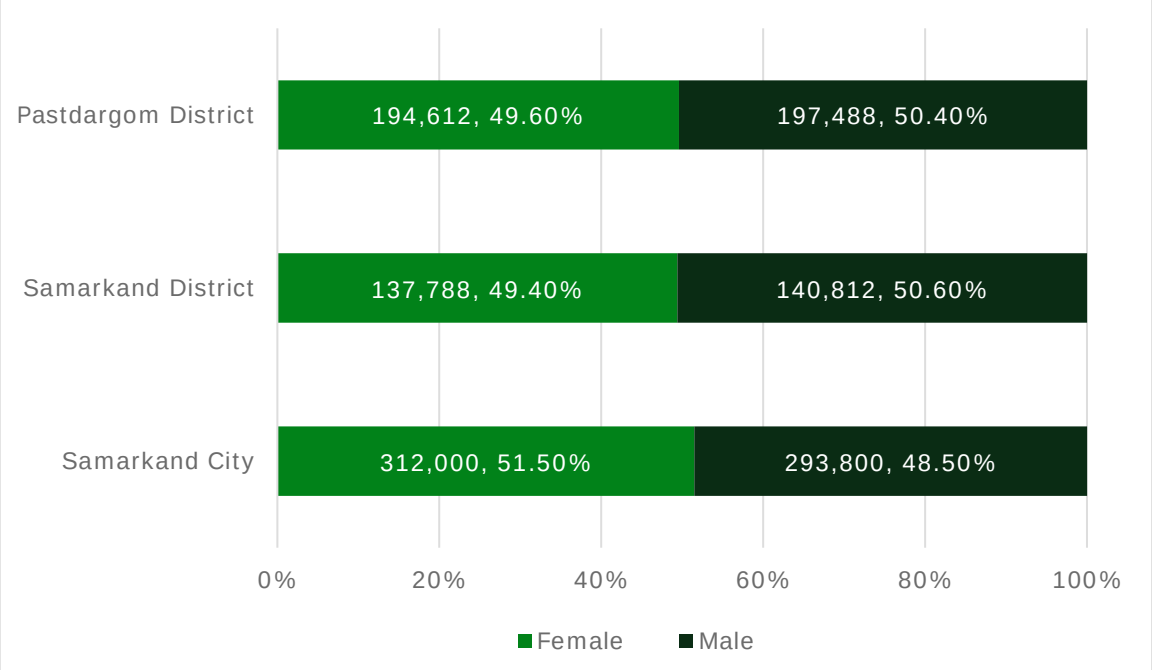
According to *2022–2024 Socio-Economic Development Report of Samarkand City* released by the Samarkand Region Statistics Department, as of the end of January 2025, the average age reached 31.5 years, with men averaging 30.1 years and women 32.8 years. In comparison, the 2024 averages were 31.3 years overall, 29.9 for men, and 32.6 for women.[48] Birth rate was 21.6 ‰ while death rate registered at 5.2‰, resulting in a natural growth rate of 16.4‰ in 2024.[49]

[47] Uzbekistan National Statistics Committee, Samarkand Regional Statistics Department. (2025). *Samarqand shahrining 2022–2024-yillarda ijtimoiy-iqtisodiy rivojlanish holati to'g'risida axborotnoma*. Samarkand.
[48] Ibid.
[49] Ibid.

In addition, the Pastdargom District had 392,100 permanent residents and the Samarkand District had 278,600 permanent residents in 2025.[50] All three district level administrative units showed a balanced gender structure, with Pastdargom District having about 101.5 males per 100 females and Samarkand District around 102.5 males per 100 females.[51]

The following figure shows the gender ratio at a district level.

FIGURE 9-4 DEMOGRAPHY OF THE IMPACTED DISTRICT LEVEL ADMINISTARTIVE UNITS



Source: Samarkand City Statistics Department, 2025; Statistics Agency under the President of the Republic of Uzbekistan, 2025

9.4.3 MAHALLA LEVEL

Table 9-2 presents the population and age structure of the MFYs within the AoI based on community profiling.

The surveyed area has a combined population of 26,128 people across 5,483 households. Household sizes range from 4.2 to 5.8 individuals per household.

Across all MFYs, the gender balance is moderately male-skewed compared with district/city level gender ratio, with gender ratios ranging from 100.6 to 127. The highest male predominance is observed in Dustlik MFY and Urta Turkman MFY, while Yoshlik MFY shows the most balanced distribution.

Overall, the area reflects a young, growing population supported by a stable working-age base similar to the national demographic age structure. Dustlik MFY, Komalot MFY, Navruz MFY, Sakhovat MFY and Urta Turkman MFY have large child and adolescent populations, forming a prominent share of their overall demographic structure. Komalot MFY, Sakhovat MFY and Urta Turkman MFY also show particularly strong mid-age working cohorts, reflecting a more sizable and active labor-force base. Yoshlik MFY differs from the other MFYs by showing a more

[50] Statistics Agency under the President of the Republic of Uzbekistan. (2025, March 26). *Demography*. https://stat.uz/en/official-statistics/demography
[51] Ibid.

balanced age structure, with both strong working-age groups and a relatively larger elderly population segment.

TABLE 9-2 POPULATION AND DEMOGRAPHICS IN THE AFFECTED MFYS IN 2025

MFY	Number of Households (Average household size)	Population (Male and female)	Age Structure	
Dustlik	545 (5.75)	3131 (1852: 1459) gender ratio 126.9	<15	1587
			16-40	645
			41-59	437
			60+	462
Komalot	1127 (5.35)	6028 (3064: 2964) gender ratio 103.4	<13	1455
			14-30	1106
			31-45	1269
			46-59	1568
			60+	630
Navruz	520 (4.71)	2448 (1255: 1193) gender ratio 105.2	<13	509
			14-30	659
			31-45	588
			46-59	380
			60+	312
Sakhovat	1012 (4.22)	4275 (2244:2031) gender ratio 110.5	<15	1385
			16-40	1105
			41-59	1421
			60+	364
Urta Turkman	927 (4.42)	4102 (2252: 1850) gender ratio 121.7	<15	1500
			16-40	820
			41-59	997
			60+	785
Yoshlik	520 (5.12)	2662 (1335: 1327) gender ratio 100.6	<13	609
			14-30	646
			31-45	645
			46-70	391
			71+	371

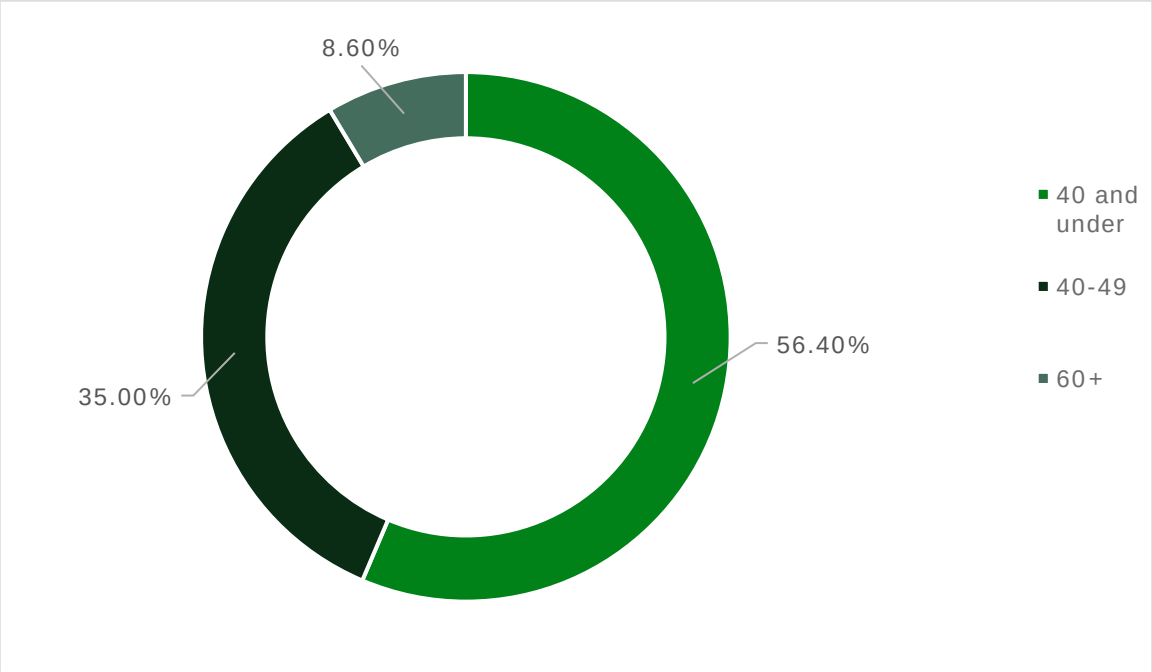
MFY	Number of Households (Average household size)	Population (Male and female)	Age Structure	
Total	5,483	26,128 (13,896:12,412) gender ratio 111.9	NA	NA

Source: Community Profiling undertaken by ERM in Jan 2026

9.4.4 PROJECT AOI LEVEL

According to the household surveys conducted in the social AoI, the population is of predominantly young to working-age as illustrated by ***Figure 9-5***: 56.4% are between under 40 years old, forming the core working-age group, while 35.0% fall within 41–59 years, indicating a substantial cohort of older working adults. This echoes the community profiling result that a young, working age population is present in the nearby communities.

FIGURE 9-5 AGE STRUCTURE OF THE SURVEYED POPULATION



Source: ERM Household Survey, February 2026

9.5 LANGUAGE, RELIGION AND ETHNICITY

9.5.1 NATIONAL BASELINE ON LANGUAGE, RELIGION AND ETHNICITY

Uzbek is the official language in Uzbekistan and spoken by most of its inhabitants, while Russian and Tajik are other common languages.

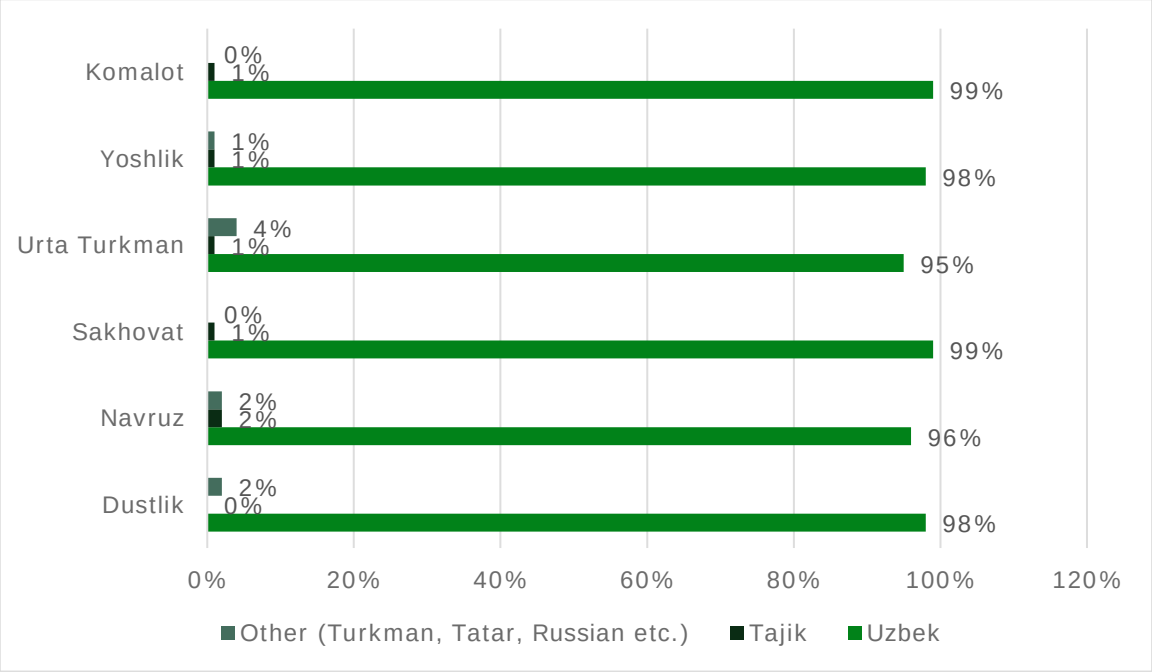
Islam is the predominant religion in Uzbekistan with most Uzbeks being Sunni Muslims. Legally, Article 31 of the Uzbekistan Constitution states that everyone shall have the right to profess or not to profess any religion. Empirically, it is estimated that 96% of Uzbekistan's population are Muslims—with most Muslims adhering to the Sunni Hanafi school and around 1% of the population is Shia of the Jaafari school, concentrated in Bukhara and Samarkand

provinces[52]. Russian Orthodox Christians made up approximately 2.2% of the population in 2020, down from 3.5% in 2019,[53] and their numbers continued to decline due to the emigration of ethnic Russians and other Orthodox individuals. The remaining 1.8% of the population, per the Uzbekistan government, included small communities such as Catholics, ethnic Korean Christians, Baptists, Lutherans, Seventh-day Adventists, evangelical Christians, Pentecostals, Jehovah's Witnesses, Buddhists, Baha'is, members of the International Society of Krishna Consciousness, and atheists.[54]

9.5.2 MAHALLA LEVEL

Similar to the national profile, the surveyed area is predominantly Muslim in terms of religion. Regarding ethnicity and languages, the MFY demography shows a mixture of Uzbek and Tajik population, using both Uzbek and Tajik as their primary languages.

FIGURE 9-6 ETHNICITY DISTRIBUTION OF THE MFYS



Source: Community profiling undertaken by ERM in Jan 2026

9.5.3 PROJECT AOI LEVEL

Ethnically, respondents from the social AoI are mainly Uzbek (89.4%) with smaller groups including Iranian (4.8%) and Tajik (3.8%), with Tajik and Uzbek as their main languages. Identical to the community profiling result, the surveyed population is 100% Muslim in terms of religion.

[52] U.S. Department of State. (2023). *2023 report on international religious freedom: Uzbekistan*. https://www.state.gov/reports/2023-report-on-international-religious-freedom/uzbekistan/
[53] Ibid.
[54] U.S. Department of State. (2023). *2023 report on international religious freedom: Uzbekistan*. https://www.state.gov/report/custom/6d346e7287/

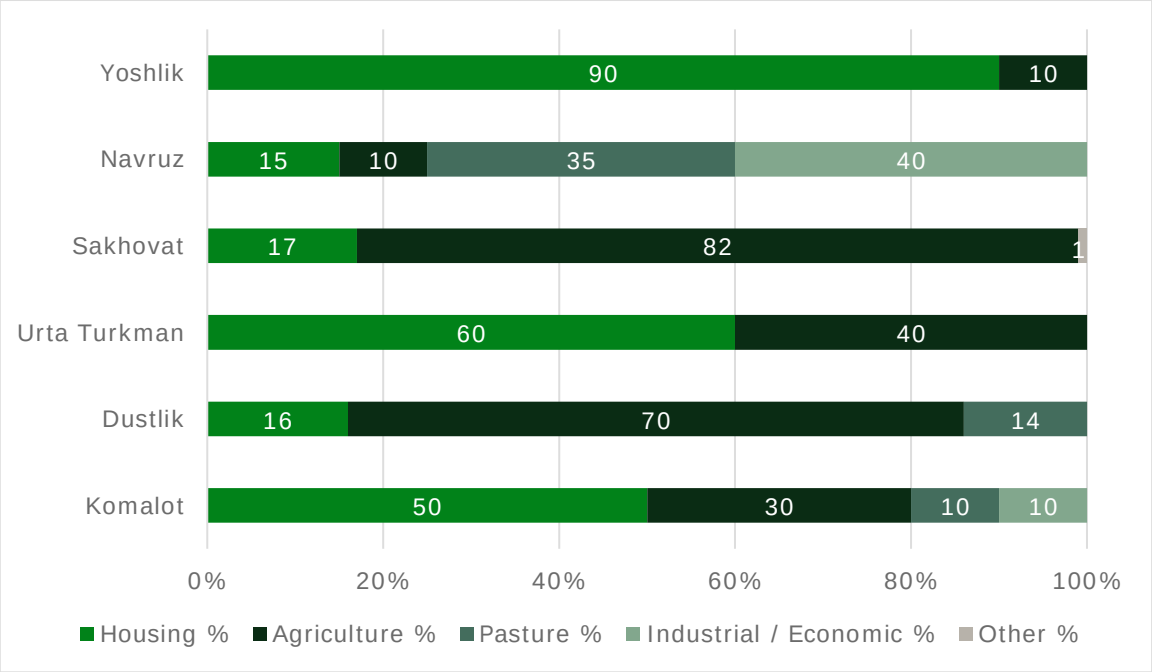
9.6 LAND USE

9.6.1 LAND USE IN THE SOCIAL AOI

Across the investigated mahallas, land-use patterns vary widely, reflecting a gradient from dense residential settlements to strongly agriculture- or pasture-dominated areas.

Komalot MFY shows a balanced mixed-use structure, with land divided among housing (50%), agriculture (30%), pasture (10%), and a further 10% allocated to industrial purposes. In contrast, Dustlik MFY is more agricultural, with 70% of its land under cultivation, 14% used as pasture, and only 16% occupied by housing. Navruz MFY is the most structurally diversified mahalla, consisting of only 15% housing and 10% agriculture, but significant allocations to pasture (35%) and a substantial 40% economic/industrial zone, making it unique within the project footprint. Finally, Yoshlik MFY is the most urbanized, with 90% of the land used for housing and 10% for small household-level agriculture, with no pasture or additional land categories identified. Detailed land use profile is presented in ***Figure 9-7***.

FIGURE 9-7 LAND USE PROFILE ACROSS SURVEYED MFYS



Source: Community profiling undertaken by ERM in Jan 2026

On the residential land use status, housing across all MFYs is dominated by individual houses, with nearly 100% of the housing stock in every mahalla consisting of stand-alone dwellings rather than apartments or multi-unit buildings. Rental availability is very limited: Dustlik MFY and Navruz MFY have only 3–4 houses available for rent, Yoshlik MFY has around 5, while Urta Turkman MFY have none.

On the use and status of local farmland, farmers in Sakhovat MFY cultivate grapes (the primary crop), vegetables, and fodder crops, with viticulture identified as the dominant agricultural activity. Their land is legally allocated and registered in 2024 for a 30-year tenure, giving farmers secure, formal land-use rights. The total agricultural area covers about 70 hectares, with each household typically managing about six ha. Annual farming follows a

continuous cycle of irrigation, fertilization, pest control, pruning, and maintenance, with the harvest season in September–October.

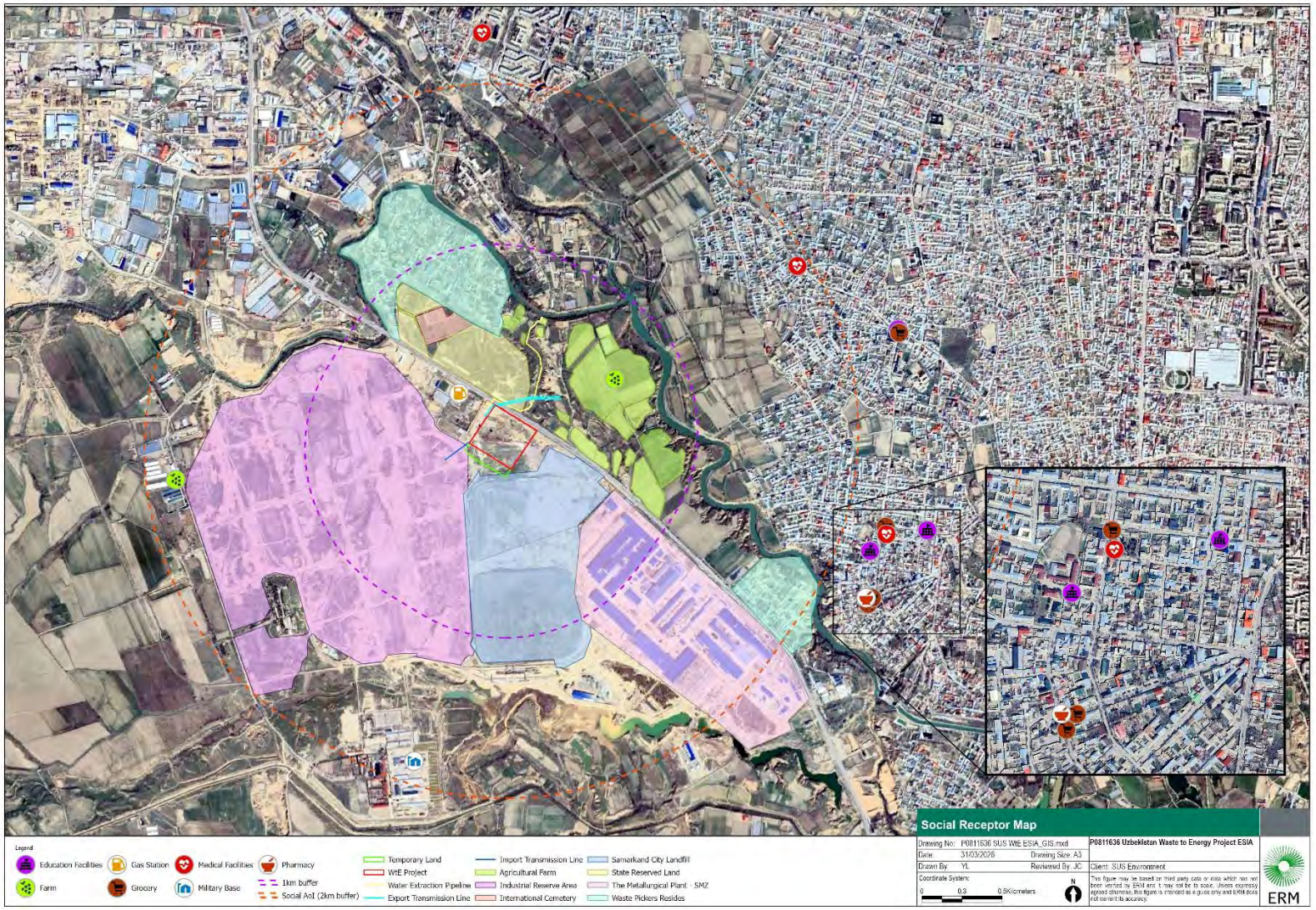
FIGURE 9-8 PROJECT NEARBY FARMLAND

Source: ERM Site Visit in January 2026

Another major farmland in the social AoI belongs to the Dilshod Agro farm which operates on approximately 100 hectares (1,000,000 m²) of agricultural land, which the farmer has legally leased since 2006 under a 49-year registered agreement, making the land formally recognized under national land regulations. The land is described as fertile and in excellent condition, suitable for both perennial orchard crops (grapes and apples) and seasonal grain and vegetable production, with stable yields under current irrigation and farming practices. Dilshod Agro practices a mixed-use agricultural system, combining fruit orchards, wheat production (one season annually), and seasonal vegetables like tomatoes and cucumbers.

The Dargom Parranda Fayz Poutry Farm, on the other hand, operates eight production blocks at the south-west of the Project site, covering approximately 34 hectares of land and produces approximately 2 million chicks per month for commercial sale. It relies entirely on groundwater wells for its water supply and employs around 130 workers, including seasonal labor, to run its chick-production operations.

FIGURE 9-9 LAND USE IN THE SOCIAL AOI



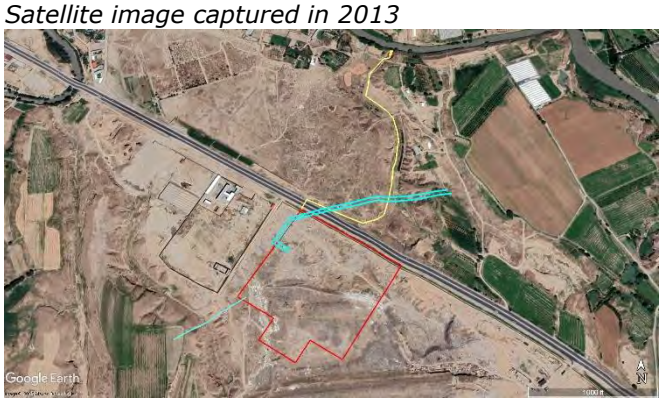
9.6.2 PROJECT AREA LAND USE

All consultations during scoping stages indicated that the area planned for the WtE plant was state-reserved land and was not used by any community members for any purposes which was confirmed by affected MFY heads and Cadastral Department of Samarkand City and that no significant changes in land use of the Project site have been observed in the past ten years.

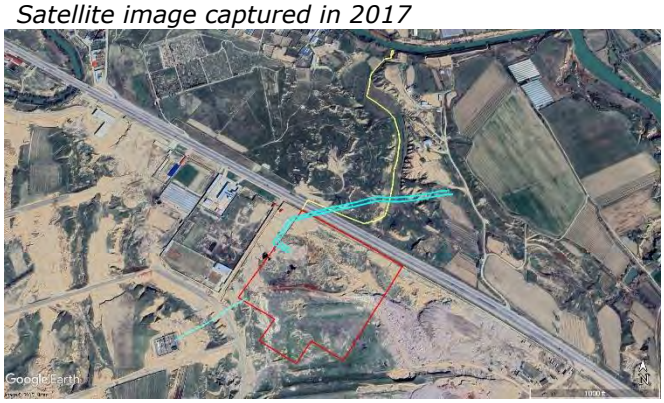
FIGURE 9-10 PROJECT AREA LAND USE HISTORY

Satellite image captured in 2013

Satellite image captured in 2017



Satellite image captured in 2021



Satellite image captured in 2025

The red rectangle is the planned location of the Project. The blue lines are the transmission lines and the yellow line is the water pipeline of the Project.

As for the Project's land use of its water pipeline and transmission line, KII with the Samarkand City Cadastral Agency confirmed that all land required for the Project's transmission line, water pipeline, and pump station is classified as State Reserve Land under the industrial land category, with no private, leased, agricultural, or informal users present in the past three years. The land allocation and registration processes follow the Land Code of Uzbekistan and Hokimiyat decisions, and the agency reported no overlapping land claims, disputes, or significant land-related risks, noting that the areas were already intended for industrial or infrastructure development. Site visits also confirmed the absence of any informal land users; therefore, no lost land access or compensation or lease termination is expected to occur.

9.7 ECONOMY, LIVELIHOOD AND INCOME

9.7.1 REGIONAL LEVEL

Regarding employment, 86,400 people were unemployed in the Samarkand Region, among which 10,600 people were unemployed in the Samarkand City. The regional employment rate in 2024 was 64.8%, slightly lower than the national employment rate at 68%.[55]

9.7.2 CITY AND DISTRICT LEVEL

Based on the statistics from the Samarkand City Statistics Department, Samarkand City exhibited a service- and industry-oriented economic profile in 2025. Specifically, the city's total industrial output reached UZS 70,217.0 billion (USD 5.76 billion), up by 9.3% from the implied 2024 level, compared with 12.0% growth at the regional aggregate. Services and industrial output jointly accounted for about 61% of the City's indicative total, while agriculture remained negligible (0.6%).[56] Retail turnover represented 18.8%, underscoring the role of domestic demand. Fixed capital investment declined (−13.8%), reducing its share in regional investment from 32.2% to 22.2%.[57] ***Table 9-3*** presents the total and per capita output by major industries.

TABLE 9-3 MAJOR INDUSTRIES OUTPUT OF THE SAMARKAND CITY

	Industrial Output (billion UZS)	**Industrial Output (change compared to 2024)**	**Industrial Output Per capita (thousand UZS)**	**Industrial Output Per capita (Change compared to 2024)**
Industry	203,86.5	+8.2%	33,931.5	+6.4%
Agriculture	8,483.8	+13.8%	14,120.8	+15.1%
Fixed capital investment	404.8	+0.3%	673.7	-1.4%
Construction works	5,378.6	+14.1%	8,952.3	+11.6%
Retail trade Turnover	13,171.4	+10.4%	21,923.0	+8.5%
Services	22,391.9	+20.8%	37,270.2	+18.7%

Source: Samarkand City Statistics Department, 2025

Industrial Economy

Compared to 2024, the total output of industrial sector of Samarkand city in 2025 is UZS 203,86.5 billion (USD 15.76 billion), with an 8.2% increase. As of January 1, 2026, the number of industrial enterprises increased by 26 year-on-year, with both large and small enterprises showing growth. Among these, industrial output is primarily driven by manufacturing, while mining recorded a slight year-on-year decline, and other sectors

[55] Statistics Agency under the President of the Republic of Uzbekistan. (2025). *Labor market*. Retrieved January 25, 2026, from https://stat.uz/en/official-statistics/labor-market
[56] Samarkand City Statistics Office. (2026). *Samarqand shahrining makroiqtisodiy koʻrsatkichlari: 2025-yil yanvar–dekabr*. State Committee of the Republic of Uzbekistan on Statistics.
[57] Ibid.

experienced growth. The ***Table 9-4*** following shows the changes of different industrial sectors between 2024 and 2025.

TABLE 9-4 OUTPUT OF MAIN INDUSTRAIL SECTORS

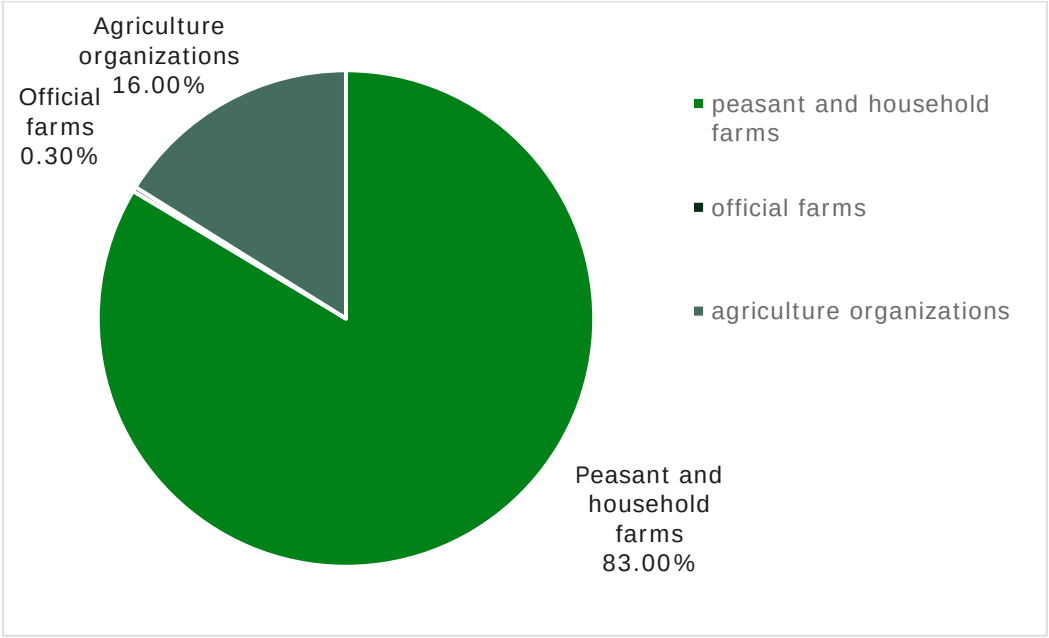
	Output in 2024 (billion UZS)	Output in 2025 (billion UZS)
Mining and Quarrying	438.0	60.8
Manufacturing	15,610.9	18,933.0
Other industries	942.3	1,392.7
Total	16,991.2	20,386.5

Agriculture

According to the Samarkand City Statistics Department, the total output of agriculture, forestry, and fisheries products (and services) reached UZS 404.8 billion (USD 31.27 million) from January to December 2025, representing a year-on-year increase of 100.3% compared with the same period in 2024.[58] Among them, crop production, livestock breeding, hunting, and related services amounted to USD 363.8 billion (USD 28.12 million) (up 100.6% year-on-year), fisheries reached UZS 4.4 billion (USD 0.34 million) (69.8%), and forestry amounted to UZS 36.6 billion (USD 2.83 million) (102.9%).[59] The urban share of the region's agriculture, forestry, and fisheries sector stood at 0.7%.[60]

More specifically, 83.7% of the total agricultural output was generated by peasant and household farms, 0.3% by official farms, and 16.0% by agriculture organizations engaged in agricultural activities, indicating that peasant and household farms contributed 83.7% of the total agricultural output. The following shows the distribution of agriculture output by different forms of production:

FIGURE 9-11 SAMARKAND CITY AGRICULTURAL OUTPUT COMPOSITIONS



Source: Samarkand City Statistics Department, 2025

[58] Ibid.
[59] Ibid.
[60] Ibid.

Besides, from January to December 2025, the output of livestock products reached UZS 302.8 billion (USD 23.39 million), representing a 104.3% increase compared with the same period in 2024. Livestock products accounted for 85.1% of the total agricultural output.[61]

Household Income

From January to December 2025, the average monthly nominal wage in Samarkand City amounted to UZS 6,365,900 (USD 491.5).[62] Nominal wage across different sectors has huge discrepancies. The economic industry represented by the bank and insurance industry has the highest average income with UZS 11,689,300 (USD 903.1) per month.[63] The medical and social service industry has relatively low average monthly income with UZS 4,342,900 (USD 335.4) per month.[64] The following ***Table 9-5*** shows the average monthly income across different sectors (Excluding agricultural and small enterprises).

TABLE 9-5 AVERAGE MONTHLY INCOME ACROSS DIFFERENT SECTORS

Sector	2025 Average Monthly Income (thousand UZS)
Industry	6,031.8
Construction	4,226.0
Transportation and Storage	10,791.0
Information and Communication	10,029.7
Banking, Insurance, Rental, Credit and Brokerage Services	11,689.3
Education	6,041.1
Healthcare and Social Services	4,342.9
All Sector	6,365.9

Source: Samarkand City Statistics Department, 2025

For Pastdargom District, the average quarterly income in 2025 was UZS 3,666,107 (USD 301), the figure for the Samarkand District was 4,578,305 (USD 377) per quarter.[65]

Employment

2022–2024 Socio-Economic Development Report of Samarkand City shows that, in 2024, the total labor force in Samarkand city reached 366,700 people, of whom 247,200 were economically active, accounting for 67.4% of the labor force. The number of employed people was 236,700. The employment rate is 95.8%, while the number of unemployed persons was 10,500, representing an unemployment rate of 4.3% of the economically active population.

According to data from the Statistics Agency under the President of the Republic of Uzbekistan, in 2025, the Pastdargom District recorded 7.9 thousand unemployed individuals out of 132,600

[61] Ibid.
[62] Ibid.
[63] Ibid.
[64] Ibid.
[65] Statistics Agency under the President of the Republic of Uzbekistan. (2025). *Labor market*. Retrieved March 12, 2026, from https://stat.uz/en/official-statistics/labor-market

economically active persons, corresponding to an employment rate of approximately 94.0%. In comparison, the Samarkand District reported 5,300 unemployed out of 110,500 economically active persons, reflecting a higher employment rate of about 95.2%.

9.7.3 MAHALLA LEVEL

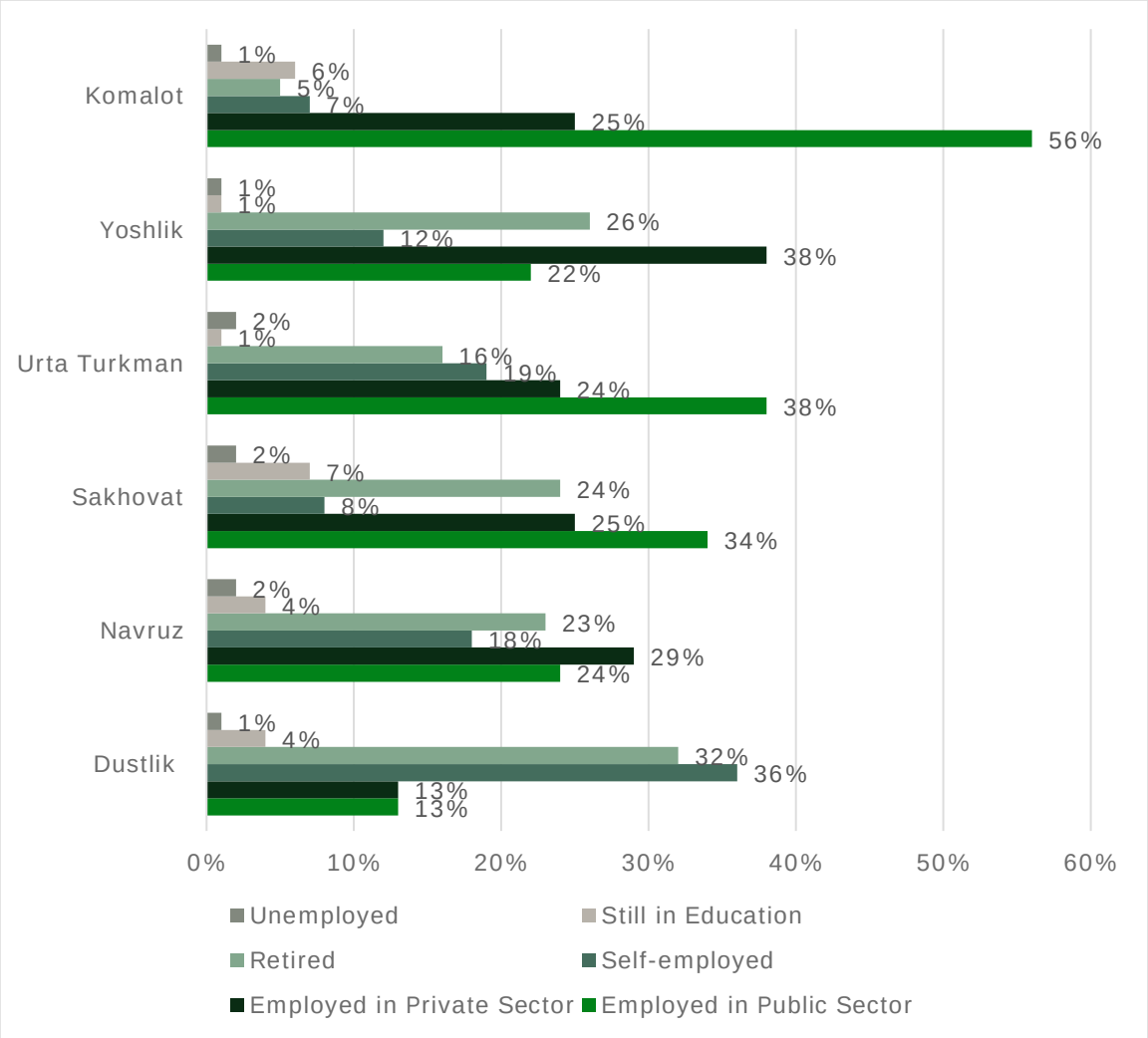
According to the result of community profiling, main economic activities in the surveyed communities include agriculture, livestock raising, service sector, government employment and industrial manufacturing.

Across the surveyed MFYs, employment patterns show substantial variation, reflecting differing socioeconomic compositions. Dustlik MFY and Navruz MFY exhibit relatively balanced labor structures by sector, with 13–24% of the working population in public jobs and 13–29% in private employment, alongside sizeable self-employment shares (36% and 18%, respectively). Komalot MFY, Sakhovat MFY, Urta Turkman MFY, and Yoshlik MFY show the highest concentration of formal sector work—public sector employment ranges from 22% to 56%, complemented by 24–38% private sector employment. Unemployment rate in the surveyed area is consistently low at 1–2%, indicating high levels of economic participation despite the varying balance between formal and informal work.

In FGDs, women and youth noted limited job availability and insufficient educational and vocational opportunities, indicating that structural constraints rather than skill deficits shape employment outcomes. In addition, some women emphasized the need for childcare infrastructure, as the lack of kindergartens restricts their ability to engage in paid labor.

Across the surveyed MFYs, children typically begin helping their families with agricultural and livestock activities from around the age of 15, mainly performing tasks such as grazing animals and assisting with household-based farming. These activities are generally considered informal, family-supported contributions rather than formal employment.

FIGURE 9-12 TYPES OF EMPLOYMENT OF THE SURVEY AREA (% OF WORKING POPULATION BETWEEN 16-60)



Source: Community Profiling conducted by ERM in Jan 2026.

Concerning agricultural income of the nearby MFYs, FGD of farmers in the Sakhovat MFY population reported that farming activities constitutes their primary income, bringing typically 8–9 million UZS (USD 656–738) monthly. The monthly farming expenses ranges from 5 to 6 million UZS (USD 410–492), mainly driven by plant protection products such as pesticides and disease-control treatments during the growing season. This leaves a modest margin, indicating that while viticulture provides a stable base livelihood, small disruptions in yield or fruit quality could affect farmers' household income.

9.7.4 PROJECT AOI LEVEL

The household survey results indicate a diverse livelihood system across both industrial and service sectors. Retail and office-based services constitute the single largest employment category, representing 20.2% out of all employed respondents, reflecting the importance of small shops, sales, clerical roles, and service counters in the local labor market. The manufacturing category, including electricians, mechanics, drivers, factory workers, welders and craftsmen, formed the second largest group with 17 respondents (16.3%), underscoring the prevalence of semi-skilled manual and technical occupations. Public-oriented service

sectors also play a strong role: education accounts for 14 respondents (13.5%), while health and care services account for 13 respondents (12.5%).

According to the household survey results, the median annual household income stands at UZS 53,720,000 (USD 4,409), while the median annual household expenditure stands at UZS 52,195,000 (USD 4,284). On a monthly basis, the surveyed median household income sits at UZS 4,476,667 (USD 367.4).

- Community waste pickers

Informal waste pickers are identified in both Navruz MFY and Komalot MFY. Approximately 20-30 waste pickers reside in the Navruz MFY according to community profiling, FGDs and engagements with community waste pickers, while less than 10 waste pickers reside in the Komalot MFY (refer to ***Table 9-6***). Waste picking at the Samarkand City Landfill serves as the primary or supplementary livelihood for the majority of the 30–40 community waste pickers. However, community profiling in Dustlik MFY indicated the existence of an additional two waste pickers, implying the possible existence of a small number of unidentified community waste pickers despite that the other four MFY heads and FGD participant's confirmation that there are no waste pickers in their MFYs.

According to the household surveys with community waste pickers, the median monthly household income is UZS 4,117,500 (USD 338), slightly lower than the median general community monthly income at USD 367 per household per month. The median annual household income of community waste pickers is UZS 49,410,000 (USD 4,055). Similarly, this figure is lower than the median general community income of UZS 53,720,000 (USD 4,409) per year per household.

Households typically have between one and three active waste pickers, with a total of 15 household members engaged in waste picking across the 11 surveyed households. Waste picking is generally conducted 6 to 10 hours daily, with eight households working year-round and three working seasonally. The waste categories collected include plastics (30–150 kg/day), paper/cardboard (20–200 kg/day), and metals (8–60 kg/day), with wide variations in price depending on material type. Plastics and paper are the most widely collected materials, while metals, particularly aluminum and copper, are collected by a smaller number of specialized households. Estimated daily waste-picking income ranges from UZS 50,000 to UZS 400,000 (USD 4.1 to USD 33) per worker.

TABLE 9-6 REPORTED WASTE CATEGORIES, PRICES AND QUANTITIES

Category	Typical Daily Collection Amount (kg)	Price (UZS/kg)
Plastics	30–150	1,000–1,800
Paper/Cardboard	20–200	700–1,000
Metals	8–60	3,000–100,000
Glass/Other	Low/None	—

Source: ERM Household Survey, February 2026

The survey data shows that of the 11 surveyed waste piker households, three households show a high reliance on waste picking activities, with waste-derived income contributing between roughly 86% and 100% of their monthly earnings. Another four households demonstrate a more mixed livelihood structure, where waste picking still plays a major role but is complemented by other sources of income: in these cases, waste picking accounts for

around 45% to 65% of total monthly income. The remaining four households obtain only about 24% to 30% of their income from waste picking, relying more heavily on construction work, service-sector jobs, pensions or other family earnings. Taken together, the survey reveals that while several households are almost entirely dependent on waste picking for their livelihoods, others use it as a supplementary income generating activity.

TABLE 9-7 LIVELIHOOD DIVERSIFICATION OF THE COMMUNITY WASTE PICKERS

Other Income Source	Frequency (out of 11 surveyed households)
Other salaried household members	4 households
Livestock/Agriculture	1 household
Pension income	3 households
No other income	3 households

Source: ERM Household Survey, February 2026

In terms of livelihood impacts and transitions, eight out of 11 respondents wish to continue working in the waste sector, and when asked how they would cope with landfill closure, most foresee switching to low-paid informal work. Preferences for alternative livelihoods coalesce around driver roles (2 mentions), factory/industrial jobs (2 mentions), service sector work (2 mentions), mechanic (1 mention), crane operator (1 mention), and general small-business activities. Training and certification needs are consistently identified, including driver's license, technical trades (welding, mechanics, crane operation), service/culinary, beauty/hairdressing, and language skills (Russian/English). Multiple respondents explicitly require financial support, start-up capital, or stipends to enable the transition.

FIGURE 9-13 WASTE PICKER COMMUNITIES

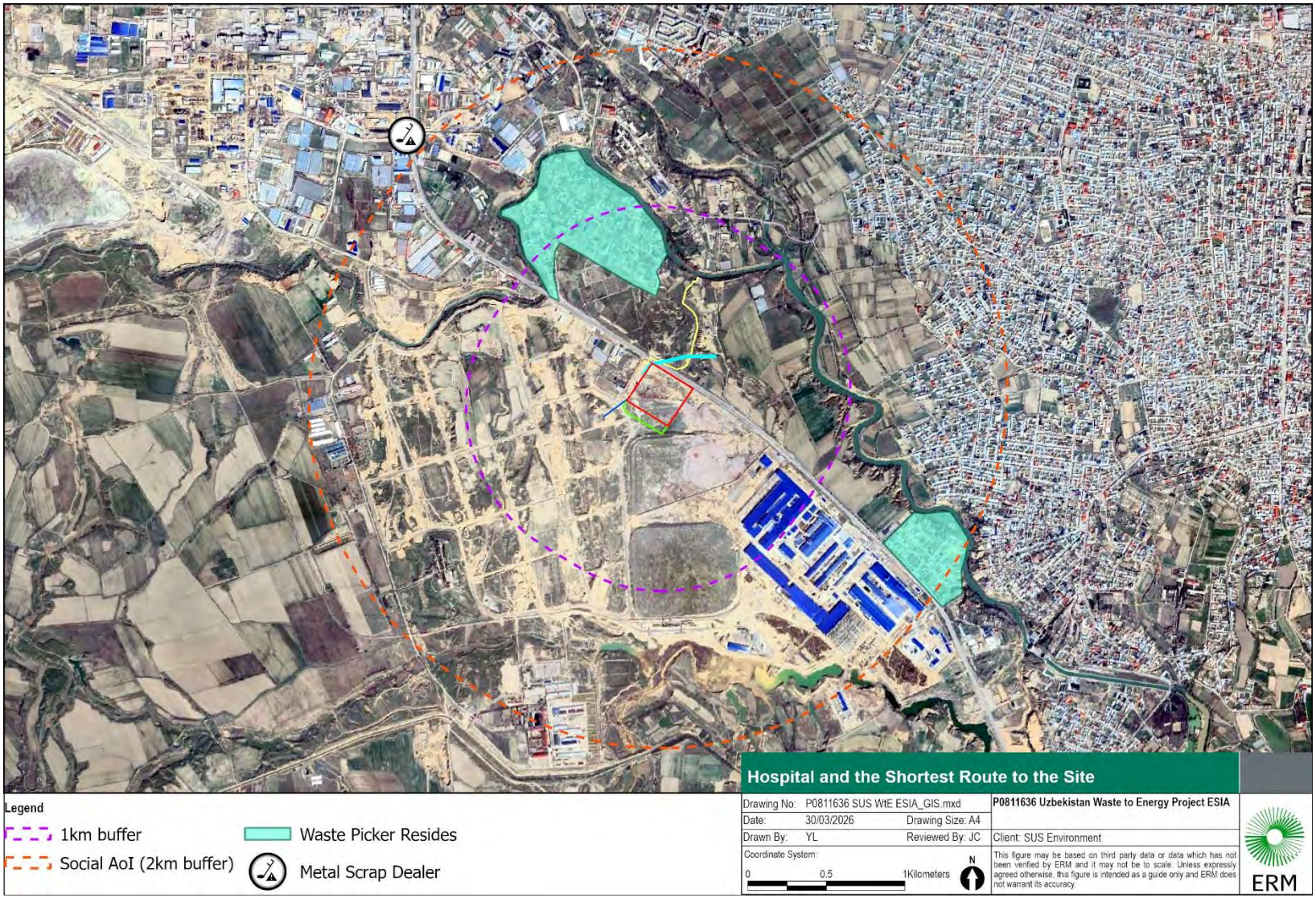


FIGURE 9-14 COMMUNITY WASTE PICKER

Source: ERM Site Visit in January 2026

- Mugat waste pickers

During the scoping visit on 10th January 2026, the Landfill Director reported that approximately 60–100 Mugat waste pickers reside within the landfill boundary and rely on daily waste picking—primarily paper and plastic—under an arrangement with a recycling company. According to the Director, the landfill maintains only an annual contract with the recycling company and does not participate in any arrangements between the company and the waste pickers. During summer months, the recycling company reportedly brings additional Mugat individuals from nearby regions, including Karshi and Jizzakh Region, increasing the population on site to over 100.

In addition, household survey with community waste pickers suggests strained relations between these groups due to competition over recyclable materials.

Waste Value Chain

Apart from the community and Mugat waste pickers, scrap dealers form another integral part of the local waste value chain, as they purchase recyclable materials collected by waste pickers and channel them into downstream recycling markets.

During the ESIA site visit, two scrap-buying actors were identified: Taychan Steel, previously the primary buyer of metal waste from community waste pickers but currently not accepting steel due to operational and cost considerations according to KII results, and a scrap dealer operating inside the Samarkand City Landfill, reportedly buying recyclables from both community and Mugat waste pickers. However, because access to the landfill was not granted by authorities, direct engagement with the latter dealer was not possible, limiting available baseline information.

9.8 EDUCATION

9.8.1 NATIONAL AND REGIONAL LEVEL

The right to education is guaranteed to all citizens of the Republic of Uzbekistan under the Constitution. Data shows that the national literacy rate has stabilized at 99.9%.[66] The State

[66] Statistics Agency under the President of the Republic of Uzbekistan. (2025). *Labor market*. Retrieved January 25, 2026, from: https://stat.uz/en/official-statistics/social-protection

oversees education and provides free education up to secondary school. According to the 2023 UNDP Human Development Report, Uzbekistan ranked at the 106th place in the High Human Development category.[67]

In Uzbekistan, 11 years of education are compulsory and free, beginning with 4 years at primary school, and followed by two phases of secondary education taking 5 years at general secondary school and 2 to 3 years at either general or technical vocational school.

With regard to tertiary education, non-university-level tertiary education is provided by national enterprise training centers and a number of business schools, as well as lycea[68] that train professionals in new economic and service fields. Higher education is available from several universities and over 50 higher education institutes.[69]

In terms of education span, the expected years of schooling in Uzbekistan in 2024 is 12 years, and the mean year of schooling is 11.9 years.[70]

In 2024, the number of female students in colleges nationwide was 29,422, significantly more than the number of enrolled male college students (which was 9,609).[71] In the Samarkand Region, a total of 45,280 female students and 45,387 male students were enrolled in colleges in 2024, reflecting broadly balanced gender representation.[72]

9.8.2 CITY AND DISTRICT LEVEL

Generally, across the 2023–2024 and 2024–2025 academic years, the total number of schools in the Samarkand city increased from 109 to 111, accompanied by a rise in student enrollment from 112,171 to 115,032. During the same period, the number of graduates grew from 15,073 to 16,510, while the number of teachers (part-time teachers excluded) increased from 6,875 to 7,192, reflecting steady expansion in both educational capacity and staffing.[73]

For Pastdargom District, 6,660,000 students under 15 years old were enrolled in general education institutions in 2025. For the Samarkand District, this figure was 4,172,000 in 2025.[74]

Preschool Education

2022–2024 Socio-Economic Development Report of Samarkand City shows that, by January 1, 2025, the total number of public and non-public preschool education institutions in Samarkand

[67] UNDP, Human Development Report 2023/2024. https://hdr.undp.org/system/files/documents/global-report-document/hdr2023-24reporten.pdf
[68] A lyceum is a three-year specialized secondary school (typically grades 10–12) designed for academically strong students who intend to continue to university. (According to: UNESCO-IBE. (2011). *World Data on Education: Uzbekistan (7th ed.)*. International Bureau of Education. http://www.ibe.unesco.org/en/document/world-data-education-seventh-edition-2010-11)
[69] UNDP, Human Development Report 2023/2024. https://hdr.undp.org/system/files/documents/global-report-document/hdr2023-24reporten.pdf
[70] Trading Economics. (2025). *Uzbekistan school life expectancy.* https://tradingeconomics.com/uzbekistan/school-life-expectancy-primary-and-secondary-male-years-wb-data.html
[71] Statistics Agency under the President of the Republic of Uzbekistan. (2025). *Social sphere, minimum indicators of guarantees of children's rights.* Retrieved January 25, 2026, from: https://stat.uz/en/official-statistics/social-protection
[72] Ibid.
[73] Ibid.
[74] Statistics Agency under the President of the Republic of Uzbekistan. (2025, March 26). *Social Sphere*. Retrieved March 12, 2026, from: https://stat.uz/en/official-statistics/social-protection

City (including home-based non-public kindergartens) is 385. Among these, the total number of available seats is 29,089 with 28,874 children currently enrolled.

Secondary Education

According to *2022–2024 Socio-Economic Development Report of Samarkand City*, there are 10 high schools in the city, with 3,670 students enrolled and 377 teachers employed.

Vocational and Higher Education

According to *2022–2024 Socio-Economic Development Report of Samarkand City*, there is 1 vocational school enrolling 639 students and employing 27 teachers; 2 colleges with 1,795 students and 156 teachers; and 11 technical colleges accommodating 8,988 students and staffed by 373 teachers.

9.8.3 MAHALLA LEVEL

According to the Mahalla heads during community profiling, all of the community members have access to primary and secondary education free of charge and the vast majority of adult members have completed secondary education. There are seven schools available for children from the mahallas in the social AoI to attend obligatory education, although daily travel outside the mahalla may be required.

In Dustlik MFY, two kindergartens, including one public facility and one private pre-school are serving the community. Navruz MFY has three pre-school institutions, comprising two public kindergartens and one private kindergarten. Sakhovat MFY hosts three private kindergartens, while Yoshlik MFY has six private kindergartens and one primary school serving not only Yoshlik MFY but also the other nearby communities.

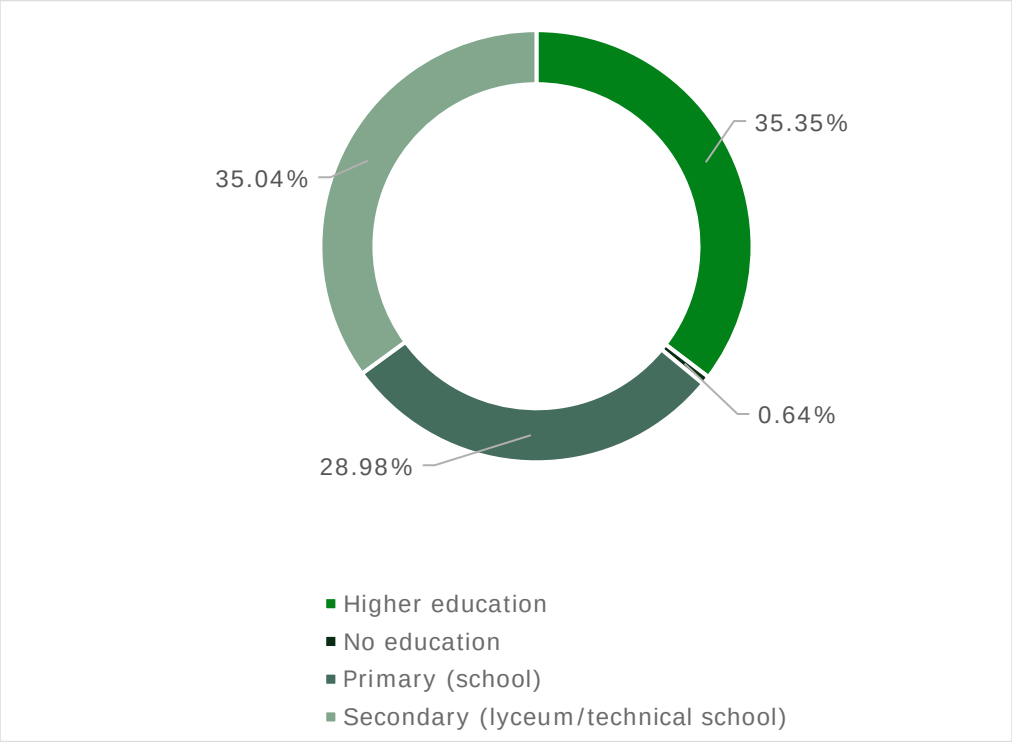
FIGURE 9-15 KINDERGARTEN AND SCHOOL IN THE SOCIAL AOI

Source: ERM Site Visit in January 2026

9.8.4 PROJECT AOI LEVEL

Based on the household survey results, 35.35% of the surveyed community members received higher education, 28.98% merely received primary education, while 35.04% of respondents received secondary education, including secondary, lyceum, and technical education. This indicates a workforce with moderate secondary attainment and a meaningful tertiary-educated segment suitable for semi-skilled roles.

FIGURE 9-16 EDUCATION BASELINE OF THE SURVEYED POPULATION



Source: Household survey conducted by ERM in Feb 2026.

9.9 HEALTH

9.9.1 NATIONAL LEVEL

In Uzbekistan, the most common cause of death is Non-Communicable Disease (NCDs), which accounted for 80.1% of deaths in the population in 2021. The premature mortality from NCDs, in 2018 is 143,500 people, with 75,900 males (53%) and 67,600 (47%) females. The most common NCDs in Uzbekistan is cardiovascular diseases, responsible for 58% of the NDCs mortality, followed by cancers (10%) and diabetes (6%). The other NDCs include Chronic respiratory diseases, etc.[75] The second most common cause of death is communicable, maternal, perinatal and nutritional conditions, accounting for 12.3% of deaths, followed by injuries (4.8%) and COVID-19 pandemic-related outcomes (2.8%).[76]

In 2021, heart disease was responsible for 237 deaths per 100,000 population, followed by stroke (76 per 100,000 population), Cirrhosis of the liver (24 per 100,000 population), and diabetes (21 per 100,000 population). Uzbekistan has been officially certified by WHO as a malaria-free country since 2018.

As of 2024, the maternal morality ratio of Uzbekistan was 0.148‰, and the number for The Samarkand Region was 0.902‰, and the ratio for the Samarkand City was 0.157‰.[77] All these numbers were significantly lower than the goal set by the WHO's SDG target to reduce

[75] WHO, Noncommunicable diseases Uzbekistan 2018 country profile, https://www.who.int/publications/m/item/noncommunicable-diseases-uzb-country-profile-2018
[76] WHO, Leading causes of death, Uzbekistan. https://data.who.int/countries/860
[77] Ibid.

the global maternal mortality ratio to less than 0.7‰ by 2030[78]. The infant mortality rate in Uzbekistan was 8.96‰ in 2024, and the same figure for the Samarkand Region was 7.35‰.[79] These figures meet WHO's SDG goal to reduce the infant mortality rate to below 12‰ by 2030.[80]

In terms of occupational health and safety, according to the 2023 WHO data for Uzbekistan, 11 out of 100,000 people of working age dies from diseases due to occupational risks every year, which puts the country in a leading position in the region (minimum = 9/100,000, maximum in 41/100,000).[81] Four out of 100,000 people of working age dies from injuries due to occupational risks every year, which matches a middle-rank in the region.

Regarding road safety, Uzbekistan is among mid-performing countries globally according to relative road safety indicators – 63.5 killed/100,000 vehicles (2021) and 6.7 killed/100,000 inhabitants (2022) by the United Nations Economic Commission for Europe (UNECE). The highest number of vehicles involved in road accidents are passenger cars, while the number of trucks involved merely accounts for 6.4% of the road accidents in Uzbekistan in 2021.[82]

Regarding sexually transmitted diseases, data from the International Organization for Migration (IOM) shows that in 2023, there were 48,000 people living with HIV in Uzbekistan, 13% of whom were migrants.[83]

9.9.2 CITY AND DISTRICT LEVEL

Top three most common diseases in Samarkand city in 2024 are digestive system diseases, respiratory diseases, blood and blood-forming diseases and certain diseases affecting the immune mechanism. ***Table 9-8*** illustrates major diseases in Samarkand city and their respective number of cases in 2024.

TABLE 9-8 MAIN DISEASES IN SAMARKAND CITY AND NUMBER OF CASES IN 2024

Diseases	Number of Cases recorded
Diseases of the digestive system	105,548
Diseases of the respiratory system	84,754
Diseases of the blood, blood-forming organs, and certain disorders involving the immune mechanism	63,997
Diseases of the nervous system	55,442
Diseases of the genitourinary system	38,033

[78] World Health Organization. (2024). SDG Target 3.1: Maternal mortality. WHO Global Health Observatory. Retrieved January 25, 2026, from https://www.who.int/data/gho/data/themes/topics/sdg-target-3-1-maternal-mortality
[79] Statistics Agency under the President of the Republic of Uzbekistan. (2025). *Labor market*. Retrieved January 25, 2026, from https://stat.uz/en/official-statistics/statistics-on-children
[80] World Health Organization. (2024). SDG Target 3.1: Maternal mortality. WHO Global Health Observatory. Retrieved January 25, 2026, from https://www.who.int/data/gho/data/themes/topics/sdg-target-3-2-2-neonatal-mortality-rate
[81] WHO, Health and environment scorecard – Uzbekistan, 2023. https://cdn.who.int/media/docs/default-source/country-profiles/environmental-health/environmental-health-uzb-2023.pdf?sfvrsn=6ca8c302_11&download=true
[82] UNECE, Road Safety Performance Review Uzbekistan (2024), https://unece.org/sites/default/files/2024-05/Road%20Safety%20Performance%20Review%20Uzbekistan.pdf.
[83] IOM Uzbekistan, Communities take the lead on HIV prevention in Uzbekistan, https://uzbekistan.iom.int/news/communities-take-lead-hiv-prevention-uzbekistan.

Diseases	Number of Cases recorded
Endocrine system diseases, nutrition, and metabolic disorders	28,123
Diseases of the circulatory system	23,960
Diseases of the eye and adnexa	23,279
Certain infectious and parasitic diseases	20,392
Pregnancy, childbirth, and the puerperium	17,476
Diseases of the musculoskeletal system and connective tissue	16,166
Injury, poisoning, and certain other consequences of external causes	15,618
Diseases of the ear and mastoid process	11,839
Symptoms and signs, or deviate from normal values found during clinical and laboratory examinations that are not categorized under other labels	10,776
Certain conditions originating in the perinatal period	1,696
Diseases of the skin and subcutaneous tissue	8,319
Newly diagnosed tumors	2,577
Mental and behavioural disorders	795
Congenital malformations, deformations, and chromosomal abnormalities[84]	267

Source: 2022–2024 Socio Economic Development Report of Samarkand City

At a regional level, there are 193 hospital facilities in the Samarkand Region as of 2024, 85 of them locate within the Samarkand City.[85] ***Table 9-9*** presents the health facilities and health conditions of population in the Samarkand City in 2024.

For the Pastdargom District, nine hospitals were functioning in 2024 and 17 hospitals were functioning for the Samarkand District.

TABLE 9-9 HEALTH FACILITIES AND POPULATION HEALTH CONDITIONS IN SAMARKAND CITY 2024

Health Facilities and Indicators	Samarkand City Data
Health care institutions	85
Number of Doctors	6,700
Number of Nurses	9,973
Number of Midwives	312
Number of Hospital Beds	6,550
Number of Received Patients	331,592
Number of Emergency Medical Staffs	281

[84] This indicator is measured in units. All other indicators are measured per person.
[85] Statistics Agency under the President of the Republic of Uzbekistan. (n.d.). *Labor market*. Retrieved January 25, 2026, from https://stat.uz/en/official-statistics/statistics-on-children

Source: 2022–2024 Socio Economic Development Report of Samarkand City

6,700 doctors were serving the Samarkand City, indicating that One doctor in Samarkand city serves 90.4 people on average, and one hospital bed serves about 92.5 residents. For the Pastdargom District, there were 409 doctors as of 2024 and in the Samarkand District, there were 550. Samarkand District shows a higher service capacity with one doctor per 506 residents, all figures above meet the WHO recommendations (1 doctor per 500–600 residents; 1 bed per 250–300 residents).[86] However, the Pastdargom District had a doctor-resident ratio of one doctor per 959 residents, falling below the WHO benchmark.

9.9.3 MAHALLA LEVEL

According to community profiling results, medical services are predominantly primary-care oriented and spatially uneven, prompting routine reliance on nearby urban facilities for specialized care. Yoshlik MFY hosts a family polyclinic but reports that primary care quality and capacity remain constrained, its residents similarly seek specialist treatment in the city (7 km away). Urta Turkman MFY and Navruz MFY lack in-mahalla hospitals and medical centers; residents typically use the Yoshlik MFY family polyclinic for primary care and travel to central city polyclinics and the maternity hospital in Samarkand city (7–8 km away) for specialist services, with common needs related to cardiovascular disease and diabetes and perceptions that local capacity is limited/insufficient at times. Dustlik MFY is comparatively better served, hosting one polyclinic that respondents consider generally good and sufficient for basic needs, while referrals go to the district medical center (9 km away) when higher-level care is required. Sakhovat MFY benefits from a local family polyclinic, judged adequate for minor conditions though serious or specialized cases are referred to Samarkand city (7–8 km away) whereas the Komalot MFY is served by an in-mahalla medical center and a pharmacy, the overall condition and quality of medical services are also assessed as satisfactory.

Findings from the community profiling indicate that first-contact healthcare is generally accessible within the MFYs. However, specialist and inpatient services are located 4 to 9 km away, creating potential access barriers for elderly individuals and persons with disabilities. Community profiling also raised concerns about the management of chronic diseases, especially hypertension and diabetes, as well as frequent cases of seasonal influenza and several condition-specific issues (e.g., prostate conditions, jaundice/hepatitis, and musculoskeletal problems).

[86] World Health Organization. (n.d.). *Home*. https://www.who.int/home

FIGURE 9-17 CLINIC IN THE SOCIAL AOI

Source: ERM Site Visit in January 2026

During FGDs, women reported a variety of common chronic and gender-specific health issues, including high blood pressure, diabetes, gynecological diseases, hernia, oncology-related conditions, and allergies. Although women did not consistently frame healthcare access as a direct complaint, both youth and women highlighted the absence of inadequacy of local healthcare facilities, with residents frequently traveling outside their mahallas for sufficient care.

9.9.4 PROJECT AOI LEVEL

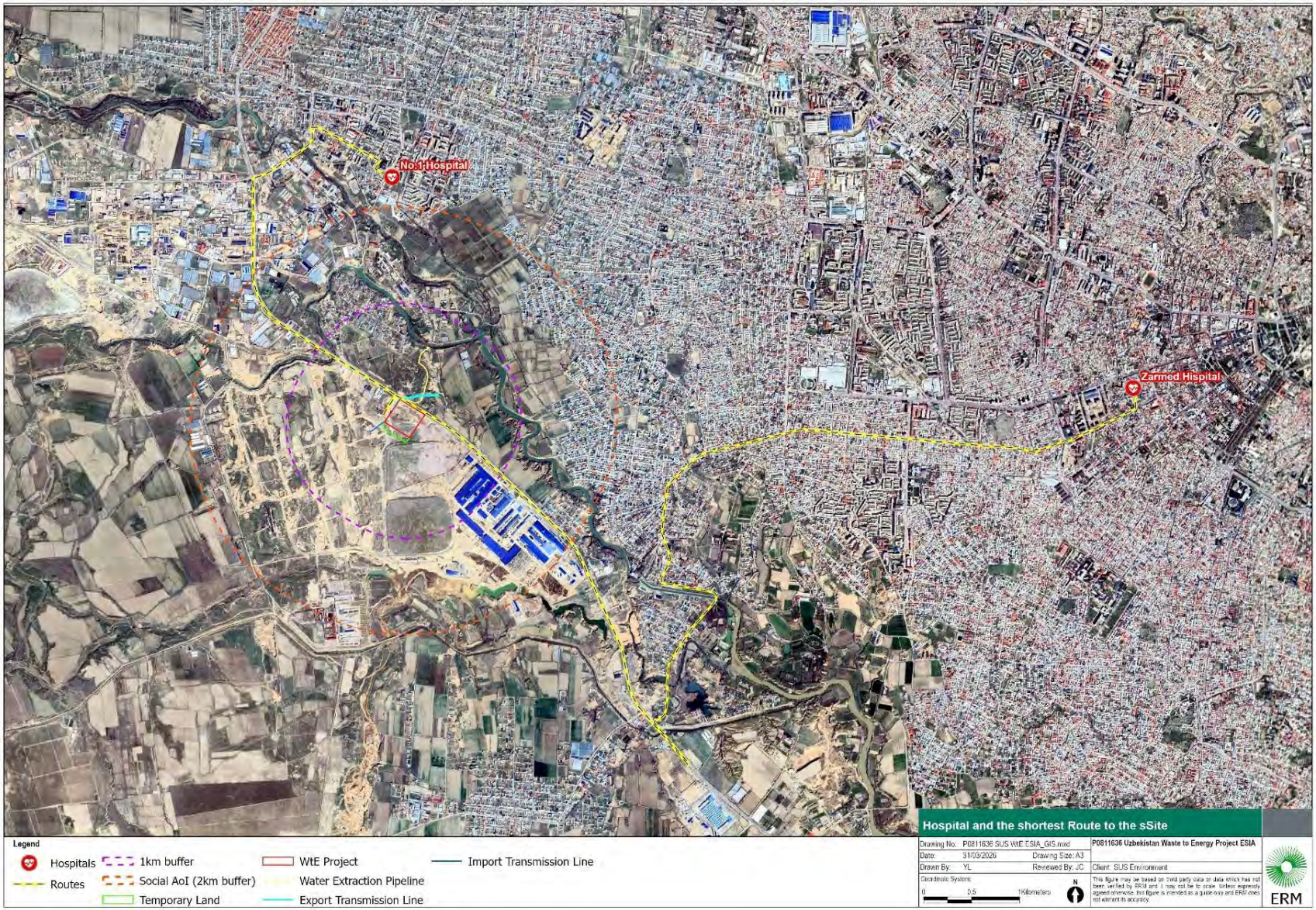
According to the household surveys, local health and healthcare access conditions show generally good physical accessibility but notable service-quality constraints.

Among the 104 households surveyed, 11.5% reported having at least one chronic illness, and an additional 15.4% reported specific health symptoms, most commonly cardiovascular conditions, neurological complaints, and hernia. Access to care is strong in terms of travel time: 99% of respondents can reach a primary healthcare provider within 30 minutes. Health insurance coverage is extremely limited, with only 1% of respondents having insurance. Perceived quality of healthcare is mixed, with only 49% rate local medical services as satisfactory or better, while dissatisfaction stems primarily from long waiting times (31.7%), unpleasant treatment (25%), and shortages of medicines or equipment (20.2%).

Healthcare-seeking behavior shows a strong reliance on higher-level facilities: about 90.4% of respondents rank private/public hospitals as their first choice for care, far surpassing clinics or medical centers.

According to the KIIs with hospitals which will be used to serve the Project workforce, the two hospitals (Zarmed Hospital and Samarkand City Hospital) collectively represent the core secondary-level medical infrastructure serving Samarkand City and nearby districts.

FIGURE 9-18 LOCATION OF HOSPITALS SERVING THE PROJECT AND ACCESS ROUTES



The Zarmed Hospital is a private secondary/tertiary-level hospital providing 24/7 inpatient, outpatient, surgical, and diagnostic services, supported by extensive specialist departments such as general surgery, neurosurgery, cardiac surgery, maternity, urology, traumatology, and pediatrics. It operates 60 inpatient beds, with a planned 30% increase, and maintains well-equipped operating theatres, diagnostics, emergency services, and a blood bank. In addition, the Samarkand City Hospital is a public secondary-level hospital that offers a comprehensive mix of services including surgery, ENT, gynecology, urology, internal medicine, ICU/resuscitation, and emergency stabilization. It currently has 55 inpatient beds, with a planned expansion of 80 beds to address increasing demand.

KII noted that Zarmed Hospital is staffed with 70 doctors (planned to increase to 110), 200 nurses, and additional interns, pharmacists and laboratory technicians, while the Samarkand City hospital operates with a more modest workforce of 16 doctors, 17 general practitioners, 20 nurses, and 3 laboratory technicians.

Taken together, the two hospitals confirmed that they have sufficient capacity to accommodate potential care-seekers from the Project workforce population during the engagements.

Emergency response arrangements differ significantly between the two facilities. Zarmed Hospital maintains its own emergency system, including two ambulances and three emergency medical teams, enabling rapid dispatch for medical emergencies and subsequent referral to public hospitals if specialized care is required. The Samarkand City Hospital, on the other hand, does not operate ambulances. Instead, emergency transport is managed through the State Emergency Medical Service, supported by three ambulance substations that deliver free services to the public.

9.10 SECURITY

9.10.1 NATIONAL LEVEL

In Uzbekistan, the National Guard, police, and military are central to maintaining national security and public order. The National Guard, an independent entity with the Armed Forces, is headquartered in Tashkent and comprises approximately 30,000 personnel.[87] Its responsibilities include ensuring public order, safeguarding diplomatic missions, and protecting vital facilities.[88]

In 2024, Uzbekistan reported a total of 132,298 crimes, with a crime rate of 200 offences per 100,000 people. Crimes were primarily driven by theft and fraud. Moreover, 59.4% of these offences were committed by young people, and 36.1% by repeat offenders.[89] According to the annual study by International SOS, Uzbekistan has a relatively low crime rate compared to its surrounding countries.[90]

[87] Kunu.Uz. (2025, January 9). *Uzbekistan's military capabilities: A comprehensive revie w of strengths and resources*. Kun.uz. https://kun.uz/en/news/2025/01/09/uzbekistans-military-capabilities-a-comprehensive-review-of-strengths-and-resources
[88] Ibid.
[89] State Committee of the Republic of Uzbekistan on Statistics. (2025). *Crime and justice* [Data set]. https://stat.uz/en/official-statistics/crime-and-justice
[90] UzReport. (2022, December 21). *International SOS: Uzbekistan among the safest countries in the world*. https://uzreport.news/society/international-sos-uzbekistan-among-the-safest-countries-in-the-world

In order to reduce the crime rate, several measures have been implemented. For example, the authorities strengthened efforts in crime detection and crackdown. At the community level, significant efforts were made to curb crime. In 2024, no crimes were recorded in 30.6% of all neighborhoods, while 14.3% of crime-affected neighborhoods were classified as "red zones".[91]

In terms of GBV, Uzbekistan has passed legislative reforms in April 2023 (Law No. ZRU-829) which criminalize domestic violence, expand definitions to include psychological and economic violence, and strengthen protections for women and children. The same Law also stated that the penalties for sexual harassment could be punishable by a fine of up to the equivalent of US $200 or up to 15 days of jail time. And it was illegal for a male supervisor to coerce a woman into a sexual relationship.[92] In 2022, 361 rape or attempted rape were reported across Uzbekistan and among which 44 incidents happened in the Samarkand Region.[93]

9.10.2 MAHALLA LEVEL

Based on community profiling results, no mahalla heads identify any prevailing security or crime problems, and no specific GBV concerns were raised. Day-to-day safety is therefore perceived as stable/low-risk from a community perspective.

According to the FGDs with women, women consistently reported no known or documented cases of gender-based violence (GBV), harassment, or significant safety threats affecting women or girls, and the community environment is considered safe.

Similarly, youth across the investigated communities perceive their environment as stable, low-risk, and generally safe, with no major safety threats, criminal activity, or GBV-related issues reported. Occasional safety concerns relate mainly to infrastructure limitations. Youth's FGD in Dustlik MFY reported minor issues with road safety and road quality, yet no community-level insecurity or harmful behaviors among youth were identified in any MFY.

9.10.3 PROJECT AOI LEVEL

The household survey indicates generally strong perceptions of community safety, with 99.0% of respondents reporting no observed or heard incidents of violence. The household survey identified one case of domestic violence, illustrating the extent to which GBV may remain unreported or invisible in the community. Crime concerns are similarly low with 90.4% reported no crime cases, 8.7% mentioned other minor issues, and 1.0% cited theft.

[91] State Committee of the Republic of Uzbekistan on Statistics. (2025). *Crime and justice* [Data set]. https://stat.uz/en/official-statistics/crime-and-justice
[92] Country Reports on Human Rights Practices for 2023. (2023). United States Department of State, Bureau of Democracy, Human Rights, and Labor [Report]. https://www.state.gov/wp-content/uploads/2024/01/528267_UZBEKISTAN-2023-HUMAN-RIGHTS-REPORT.pdf
[93] State Committee of the Republic of Uzbekistan on Statistics. (2025). *Crime and justice* [Data set]. https://stat.uz/en/official-statistics/crime-and-justice

9.11 PUBLIC INFRASTRUCTURE AND SERVICES

9.11.1 MAHALLA LEVEL

Electricity and Gas Supply

Across all affected mahallas, electricity access is universal, with 100% of households connected to the municipal power grid, and only a few households in some locations using supplementary solar panels (i.e., 3 households in the Yoshlik MFY) to improve reliability.

Natural gas supply coverage varies: Dustlik MFY, Yoshlik MFY, Sakhovat MFY, Komalot MFY and Navruz MFY report full or near-full access to municipal gas networks, while Urta Turkman MFY heavily on household-level alternatives such as electricity or solid fuels where gas networks do not fully reach all homes.

While energy supply infrastructure is in place, electricity and gas provision lacks consistent reliability, with persistent gas service gaps remaining in certain mahallas.

Water Supply and Wastewater Management

Domestic water supply conditions differ markedly across the surveyed mahallas. Navruz MFY, Komalot MFY and Sakhovat MFY report nearly full access to centralized municipal water systems, with only a small number of households using private wells. Dustlik MFY and Yoshlik MFY show a mixed model, where some households benefit from municipal water while others rely on groundwater wells, though no major access difficulties were raised. By contrast, Urta Turkman MFY have no centralized drinking water supply, the two MFYs are fully dependent on multiple groundwater wells for domestic use. Household survey data indicate that 54.8% of the respondents reported no domestic water shortages. While 32.7% of households experienced either seasonal interruptions, typically from June to August due to pressure drops during peak demand, or year-round scarcity of domestic water consumptions (12.5 %). Water availability also varies by mahalla: respondents from Navruz MFY, Sakhovat MFY, and Yoshlik MFY generally face more seasonal shortages; Komalot MFY reports comparatively higher levels of year-round shortages; while Urta Turkman MFY respondents tend to report reliable supply with no shortages. Overall, the data illustrates a clear pattern of summer-driven stress on domestic water availability, with certain mahallas facing persistent structural constraints.

Across all surveyed mahallas, irrigation is supplied exclusively through channels fed by the Dargom Canal, all agricultural activities—including annual crops, perennial orchards, vineyards, and pastures—depend on the Dargom canal system, which forms the primary and often the only functional irrigation infrastructure in the area. No mahalla indicated any domestic, industrial, or recreational use of river water, confirming that the Dargom Canal network serves a purely agricultural role across the communities.

According to the Farmers' FGD at Sakhovat MFY, farmers use irrigation water sourced from a dedicated branch of the Dargom Canal system, rather than the main canal flow, with no reported water shortages or dependency concerns linked to the Project's water demands.

The KII with the Dilshod Agro Farm director reflects a water use pattern consistent with broader regional conditions. The farm relies exclusively on the Dargom Canal for irrigation and does not pay for water abstraction. Although water availability typically decreases by approximately 50% during the winter, the farmer considers this a normal seasonal variation rather than an indication of chronic shortage. In recent years, increasing drought conditions

have led to stricter regulation and coordinated distribution by the Samarkand Regional Hishrov Hydropower Station (HPP), and the farm has not seen any water-related crises in the past three years. Nevertheless, given the farm's complete dependence on the canal, the farmer expressed concern that any additional abstraction associated with the Project could reduce irrigation supply during low-flow periods and potentially affect crop productivity.

In addition, KII with the Dargom Parranda Fayz poultry farm noted that this poultry farm relies entirely on onsite groundwater wells for its water supply, using two wells of approximately 80 meters depth within the fifth production block to meet all drinking, domestic, and operational needs, including poultry production.

Wastewater services are more limited: only Yoshlik MFY has partial sewerage coverage (10%), while the remaining mahallas rely entirely on on-site sanitation systems, including septic tanks and pit latrines, which are widely accepted and not associated with significant health concerns according to residents.

FIGURE 9-19 COMMUNITY WATER SOURCE AND WATER PUMP

Source: ERM Site Visit in January 2026

Other Infrastructures

As reported by the community profiling, transport infrastructure is generally similar across the MFYs, with all mahallas relying on public buses and minibuses for local and inter-district mobility. Street lighting and internal road improvements emerge as common infrastructure priorities, as mentioned by mahalla heads in Dustlik MFY, Navruz MFY, Urta Turkman MFY, Sakhovat MFY, and Yoshlik MFY. Youth FGD participants also emphasized the lack of sports grounds and recreational areas, indicating broader infrastructure deficits that limit safe and constructive leisure opportunities.

FIGURE 9-20 COMMUNITY INTERNAL ROADS

Source: ERM Site Visit in January 2026

9.12 WASTE COLLECTION AND MANAGEMENT

9.12.1 NATIONAL LEVEL

Uzbekistan's solid waste management is transitioning from a low-recycling, landfill-dependent model toward a circular-economy system.

On waste generation and composition, official reporting indicates about 14.8 million tonnes of household waste in 2024, but only 900,500 tonnes (about 6.1%) were processed at 292 specialized enterprises.[94] Plastic constitutes about 10.3% of total national waste (249,200 t in 2022), with consumption driven by transport (24.9%), construction (22.2%), and packaging (22.1%).[95] Plastic waste volumes up 147% since 2013, underscoring structural pressure on recycling capacity.[96]

On waste processing and infrastructure, roughly 200 sanitation companies and 290 processing enterprises are operating nationwide,[97] though the household recycling rate remains about 4–5%.[98] To accelerate diversion from landfills, the Uzbek government has launched several WtE projects across the country, aiming to cut landfill area by 50% by 2030.[99]

9.12.2 CITY AND DISTRICT LEVEL

According to the Project feasibility report, domestic waste composition in the Samarkand city is dominated by easily decomposable organic matter, including food scraps, vegetables, and plant residues, which further complicates handling when mixed with non-organic components.

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[94] Daryo. (2025, March 4). *Uzbekistan generates 14.8mn tons of waste in 2024, processes 900,500 tons*. https://daryo.uz/en/uftEV3yT
[95] Kun.uz. (2025, February 3). *Over 10% of Uzbekistan's waste is plastic, but recycling capacity remains insufficient – Ministry of Ecology.* https://kun.uz/en/news/2025/02/03/over-10-of-uzbekistans-waste-is-plastic-but-recycling-capacity-remains-insufficient-ministry-of-ecology
[96] Ibid.
[97] Bright Uzbekistan. (2025, August 14). *Of 14 million tons of waste – billions of sums of raw materials*. https://buzb.uz/en/news/of-14-million-tons-of-waste-billions-of-sums-of-raw-materials
[98] Eurasian Star. (2025, August 15). *Uzbekistan set to improve waste processing and recycling*. https://www.eurasianstar.com/uzbekistan-set-to-improve-waste-processing-and-recycling/
[99] Tashkent Times. (2024, October 21). *Eight waste incineration plants to be erected in Uzbekistan*. https://www.tashkenttimes.uz/national/13880-eight-waste-incineration-plants-to-be-erected-in-uzbekistan

Despite an estimated generation rate of 0.5–0.55 kg of domestic waste per person per day, the city does not implement source-level segregation; all types of waste, including hazardous waste, are mixed and disposed of together. Collection services operate ineffectively: while urban districts receive some regular collection by municipal environmental companies, rural and suburban areas—particularly those far from major roads—experience very low or nearly nonexistent waste collection coverage. As a result, much of the waste is delivered directly to landfills without prior treatment.

Consultation with the Samarkand Regional Waste Landfill Directorate indicates that Samarkand City manages municipal solid waste through a centralized system established under *Presidential Decree No. DP-5 (2024)*, whereby waste is collected from households, commercial entities, and institutions according to an approved schedule and transported by specialized refuse collection trucks to designated landfill sites. Waste collection and transportation are carried out primarily by the single operator "Marakand Obod," which manages around 100 garbage trucks and provides 100% service coverage across the city.

The city and region currently operate 13 municipal solid waste landfills—one within Samarkand City and twelve across surrounding districts—although detailed capacity figures are maintained by authorities. The Samarkand City Landfill (i.e., the Project nearby landfill) receives approximately 1,200–1,500 tons of mixed municipal waste per day, amounting to 438,000–547,500 tons annually, as waste streams are not yet segregated at source.

9.12.3 MAHALLA LEVEL

All surveyed mahallas are served by municipal solid waste collection, typically operating once per week, with waste transported to designated disposal sites. Residents across all MFYs reported no major issues or disruptions, except for occasional delays during summer months in Dustlik MFY that may cause short-term waste accumulation.

9.13 VULNERABLE GROUPS

9.13.1 NATIONAL LEVEL

Uzbekistan's targeted social assistance system for vulnerable groups is built on a structured, multi-tiered framework that integrates national legislative foundations with district-level implementation, ensuring both legal clarity and localized responsiveness.

At the national level, four core normative acts form the system's backbone, supported by supplementary policies to address specific vulnerabilities. The cornerstone is the Law "On State Social Assistance" (No. ZRU-719, 22 April 2021), which defines key terms like "low-income families" and outlines eligible support measures such as allowances, subsidies, and one-time aid.

Complementing this, Presidential Resolution No. PP-4898 (30 December 2020) established the Unified Social Protection Register (ERSP), a digital tool that serves as the primary gatekeeper for verifying beneficiary eligibility and assigning benefits, while Presidential Resolution No. PP-5172 (18 June 2021) introduced social "notebooks" (Women's, Youth, and Iron Notebooks) to

document individuals and families in crisis.[100] The three types of social "notebooks" are used to systematically register and support specific vulnerable groups—unemployed or economically disadvantaged women (Women's Notebook), unemployed or at-risk youth (Youth Notebook), and households in crisis, particularly low-income or at-risk families (Iron Notebook).

The Law "On Employment" (2020, Revised) further ties into this framework by regulating employment support for vulnerable groups, including training programs and self-employment subsidies, aligning with broader initiatives like the UNDP's post-pandemic skills-building Project that targets youth, women, and returning migrants.

9.13.2 MAHALLA LEVEL

According to the definition in Multilateral Investment Guarantee Agency Performance Standards on Environmental and Social Sustainability (2013), The International Finance Corporation Performance Standards (IFC PS) (2012), and the Equator Principles 4 (EP4), "disadvantaged or vulnerable status may stem from an individual's or group's race, color, sex, language, religion, political or other opinion, national or social origin, property, birth, or other status. The client should also consider factors such as gender, age, ethnicity, culture, literacy, sickness, physical or mental disability, poverty or economic disadvantage, and dependence on unique natural resources."

For this Project, the following groups are identified as vulnerable groups considering both Uzbekistan regulations and applicable international standards:

- Women-headed Households
- The Elderly (person aged 60+ years)
- Persons with Disabilities
- Low-income Persons[101]
- Receiving Social Assistance[102]
- Informal Community Waste Pickers (number estimated at 30-40 individuals)
- Mugat Waste Pickers (number estimated to range from around 60 to more than 100 individuals)

[100] The term "iron" comes from a traditional rural practice in which shopkeepers kept meticulous debt records in durable "iron notebooks" (temir daftar), ensuring that entries were only erased once debts were fully repaid, symbolizing the register's reliability and formality in monitoring vulnerability. Cabinet of Ministers of the Republic of Uzbekistan. (2024, May 31). *On improving the provision of social services and assistance through the "Iron Notebook," as well as the procedure for forming and utilizing the funds of the "Sakhovat va Kumak" Fund* [Resolution No. 313]. https://lex.uz/docs/7370550

[101] Consumer spending less than UZS 669,000 per person per month; According to: Doniĭhor Tuhsinov. (2025, February 4). *Minimum consumer spending in Uzbekistan increased by 21,000 UZS*. *Kun.uz*. https://kun.uz/en/news/2025/02/04/minimum-consumer-spending-in-uzbekistan-increased-by-21000-uzs

[102] *Moddiy yordam* — material (financial) assistance provided by the state to low-income or vulnerable groups of the population, including: Low-income families officially recognized as needing support; Elderly people without guardianship; Persons with disabilities; Single parents with children

TABLE 9-10 VULNERABILITY PROFILE OF THE MFYS

Category MFY	The Elderly	Disabled People	Women-headed households	Low-income households	People receiving social assistance	Community Waste pickers[103]	Vulnerability Rate
Dustlik	462	83	30	25	24	1-2	19.96%
Komalot	630	32	18	38	12	Approximately 10	12.11%
Navruz	312	29	58	37	5	Approximately 20-30	18.01%
Sakhovat	364	92	40	26	46	NA	13.28%
Urta Turkman	785	49	15	5	7	NA	20.98%
Yoshlik	371	43	95	23	43	NA	21.60%

9.13.3 PROJECT AOI LEVEL

Among the 104 surveyed households with a total of 314 recorded adult household members, five individuals with physical or mental disabilities are identified, along with two female headed households and two elderly above 60 years old. The total vulnerability rate of the surveyed population stands at 2.9%. In addition to these vulnerable groups, community waste pickers and Mugat waste pickers are also present the Project AoI.

Community Waste Pickers

There are approximately 30–40 informal waste picker households across Navruz and Komalot MFYs, of whom 11 waste picker households (39 family members and 15 waste pickers in total) were interviewed during the ESIA, representing a socially and economically vulnerable group.

Reported work experience in waste-picking shows a median of 10 years (range 2–30), with year-round participation (12 months) as the norm and one case of seasonal (6–8 months/year) participation. Daily work hours are long (ranging from 5 to 9.5 hours). Reported waste selected by community waste pickers include plastics, paper and metals. All respondents operate at the Samarkand City Landfill and sell directly to on-site buyers (some also sell metals to nearby scrap buyers), indicating tight spatial and buyer dependence. All waste pickers identify as self-employed (no recruiting agent or no contracts), situating them outside formal employer protections.

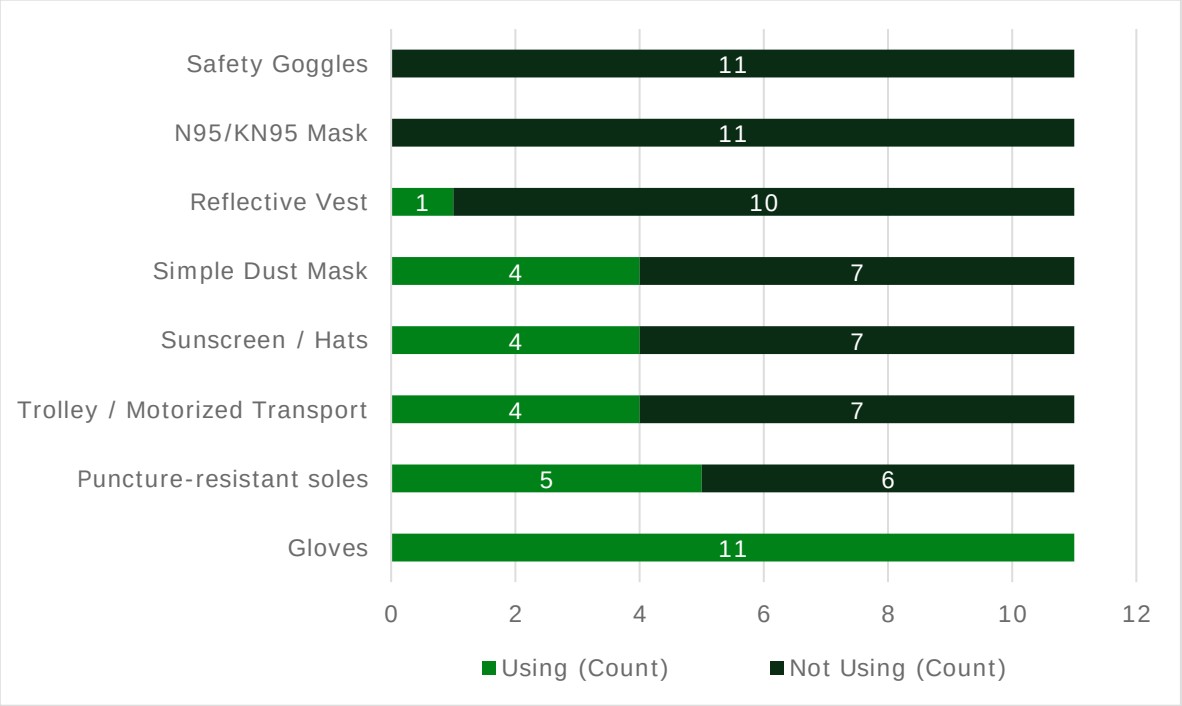
Household income and expenditure patterns are tightly balanced, with a median annual income of UZS 49.5 million and median annual expenditure of UZS 48 million, while food alone accounts for roughly 50% of monthly outlays. Community awareness of the Project among the waste pickers is high with 81.8% respondents aware of the Project.

Based on survey data, community waste picker's minimum working ages are between 14–18, while the earliest reported age at first job is 12, indicating the presence of historically low

[103] The specific number of distributions of waste picker in each MFY is not available.

work-age thresholds in the waste picking labor sphere with adolescents' participation as a form of economy support for the families. PPE use is basic and uneven across the eleven households as illustrated in ***Figure 9-21***. Self-reported incidents range from minor cuts/scratches and seasonal colds to health conditions associated with the work (hernia; leg issues from prolonged standing/walking). Overall, controls appear insufficient for sharps, dust, weather, and traffic exposures.

FIGURE 9-21 PPE AND WAST PICKING TOOL USE AMONG 11 SURVEYED COMMUNITY WASTE PICKERS



Source: ERM Household Survey, February 2026

Notably, drinking water insecurity affects three out of the 11 surveyed households, who reported significant year-round shortages, and irrigation/livestock water shortages affect an additional two households. Seven households rely on wells for drinking water, despite universal access to grid electricity and gas. This indicates localized water-infrastructure limitations.

Furthermore, six out of 11 respondents reported chronic health problems, notably heart/circulatory diseases and hernia, and none have health insurance, making them vulnerable to hazards from the landfill and income interruptions. Among the household members, two cases of physical or mental disabilities were reported, along with two elderly members over 60 years old, which indicates a more complex vulnerability profile of the community waste pickers. Although physical access to healthcare is generally adequate (all respondents reach primary healthcare within 30 minutes), perceived service quality is unsatisfactory: six respondents rate services as unsatisfactory, citing long waiting times and lack of medicine or equipment. Combined with high prevalence of chronic illness and lack of insurance, this suggests a community with low health resilience, vulnerable to additional community health and safety stressors such as emissions, odor, traffic, or emergency events. Despite this, most respondents did not spontaneously raise CHS-related complaints.

Mugat Waste Pickers

Desktop research has been made to understand Mugat people's general background and social inclusion status. According to desktop research, the Mugat (also called Luli, Jughi, or Multani) are a traditionally itinerant community in Central Asia whose origins trace back to the northern Indian subcontinent, forming part of the broader Dom/Domari Indo-Aryan diaspora.[104] Historical accounts note that some ancestors migrated into Central Asia after the 1296–1297 Siege of Multan, a documented movement that contributed to their establishment across the region, and Mugat oral tradition holds that their community was already present in Central Asia by the time of Timur in the 14th century.[105] Over centuries, they gradually adopted local Tajik and Uzbek languages and Islamic practices while retaining distinct social structures organized into clans (tupar) and extended family units.[106] Traditionally, the Mugat practiced nomadic or semi-nomadic livelihoods, including small-scale trading, itinerant craftsmanship, entertainment, begging, and waste collection—occupations similar to Dom and Romani groups elsewhere.[107]

In modern Uzbekistan, including Samarkand, the Mugat have largely settled in peripheral urban neighborhoods but continue to face systemic marginalization, limited access to documentation and services, linguistic barriers, poverty, and discrimination, with many working in informal labor, scrap collection, and low-wage services.[108] Despite these challenges, the Mugat maintain distinct cultural identities and endogamous community structures while navigating the pressures of post-Soviet nation-state systems that often obscure or stigmatize their presence.[109]

For more Mugat waste pickers' information, refer to the ***Section 9.7.3 Mahalla Level Economy, livelihood and Income baseline*** of the report.

9.14 CUTURAL HERITAGE

9.14.1 PRELIMINARY SCREENING OF CULTURAL HERITAGE

According to ERM's scoping stage results, there are no known tangible culture heritage resources present in the social AoI based on desktop research and consultation with the Samarkand City and Samarkand Region governments.

There are no recreational facilities or cultural features of national or international importance on or near the Project site. The Project has previously enquired the local governments about the planned land use areas and understood impacts on cultural heritage are unlikely.

[104] Ajam Media Collective. (2025). *Hidden in Plain Sight: Field Notes from Central Asia's Luli Communities.* [meforum.org]
[105] Ibid.
[106] Mugat Ghorbati. (n.d.). Wikipedia
[107] Ibid.
[108] Minority Rights Group International. (2025). The Mugats of Kyrgyzstan: Resistance amid adversity. [trendsresearch.org]
[109] Ibid.

9.15 GENDER EQUALITY AND GENDER-BASED VIOLENCE AND HARASSMENT

9.15.1 NATIONAL LEVEL

The Gender Development Index (GDI) shows a female HDI value of 0.731 compared to 0.755 for males, resulting in a GDI of 0.968,[110] placing Uzbekistan in Group 2 by the standard of UNGP, which indicates medium gender equality in human development achievements.[111] The Gender Inequality Index (GII) stands at 0.236, ranking Uzbekistan 71st out of 172 countries,[112] reflecting moderate inequality in reproductive health, empowerment, and labor market participation. Women hold only 32.7% of parliamentary seats, and 94.6% of females have at least some secondary educations, compared to 96.2% of males.[113] Labor force participation is notably lower for women (47.1%) than men (71.3%).[114] Additionally, the Gender Social Norms Index (GSNI) highlights persistent societal biases, with 88.6% of people holding at least one gender bias,[115] particularly in political and economic domains. These figures underscore the need for continued efforts to promote gender equality in both policy and societal attitudes.

The incidence of GBV is believed to be underreported.[116] In 2022, about 87% of the protection orders were requested by family members against other family members, with husbands registered as perpetrators against their spouses in more than three-quarters of cases. In 2023, 62% of Uzbek's mahalla leaders reported GBV as either a small problem or not a problem at all in their community during interviews for a World Bank survey that covers approximately 600 mahalla leaders per month and 7,200 mahalla leaders in the year.[117]

9.15.2 MAHALLA LEVEL

Gender roles across the MFYs remain largely traditional. In Navruz MFY, Urta Turkman MFY, and Sakhovat MFY, women are primarily responsible for household duties, childcare, and family care, and often participate in agriculture informally (sorting, packaging, or supporting greenhouse operations). While men are typically identified as the primary income earners, working in construction, driving, technical trades, agriculture, and livestock according to community profiling. Mahalla heads also mentioned that women influence household finances, children's education, and health-related decisions, despite their lower formal labor participation. Yoshlik MFY and Komalot MFY are two exceptions based on profiling results. Yoshlik MFY shows a mixed division of labor, with women increasingly generating income, contributing to household decisions, and operating in both formal and informal sectors. Women of the Komalot MFY also combine domestic labor with income-generating work, most commonly

[110] United Nations Development Program. (2025). *Uzbekistan: Country profile. Human Development Data Centre*. https://hdr.undp.org/data-center/specific-country-data#/countries/UZB
[111] Ibid.
[112] Ibid.
[113] Ibid.
[114] Ibid.
[115] Ibid.
[116] World Bank and UK International Development. Country Gender Assessment for Uzbekistan. 2024. Retrieved from https://documents1.worldbank.org/curated/en/099052824010093257/pdf/P1756961bcc2a50811a9d21c373fd390418.pdf
[117] Ibid

sewing/tailoring and small-scale farming and these activities also contribute considerably to household livelihoods.

Women's FGDs mirror the conclusions above, stressing that women's economic roles are characterized by a mix of informal, home-based, agricultural, and small-enterprise work, while men more commonly occupy formal, salaried, and public-sector positions, creating a gendered but complementary division of labor. Navruz's women's FGDs reflected that men generally have access to more stable or higher-income employment, noting that men's dominance in formal salaried work and their traditional leadership role in household decision-making persists. An exception appears in Komalot MFY's women's FGD, where participants stated that women are often more economically active and may earn more than men, reflecting stronger female participation in income-generating activities in the Komalot MFY. Despite differing labor patterns, women across multiple mahallas hold leadership roles within local institutions, participate in decision-making, and contribute significantly to community life, demonstrating women's economic and social influence is growing across the settlements.

On GBV concerns, no mahalla head identified specific risks such as harassment, domestic violence, or sexual exploitation within the community profiling questionnaires. Women's FGD results confirmed this finding. However, there is one case of domestic violence noted in the household survey as illustrated in ***Section 9.10.3***, which highlights the risk of gender-based violence being reduced to domestic disputes and the difficulty to understand domestic violence in societies that seldom applicate public laws within the domestic realms.

10. SOCIAL IMPACT ASSESSMENT

10.1 OVERVIEW

This Social Impact Assessment (SIA) chapter describes the social receptors that were scoped in for the impact assessment. For each topic, a description is given in the sub-sections below of the relevant potential impacts, embedded controls[118] (if available), and the assessment of the impact significance.

The SIA assesses the Project impacts with regards to receptors of land use and livelihoods; community health, safety and security; public infrastructure; and employment and local economy. For labor and working conditions, which is also a scoped-in receptor, the SIA assesses only the occupational health and safety aspect, whereas a standalone Human Rights Impact Assessment (HRIA) developed for this Project will discuss salient human rights issues, including the potential impacts on labor and working conditions, potential for gender-based violence and harassment, potential occurrence of child labor, potential impact on workers' rights along the value chain, potential impact associated with the employment of security personnel, and potential inability of rightsholders to participate and/or access remedy. The HRIA has also included additional measures and safeguards required to prevent or remediate potential human rights risks and impacts associated with the Project.

10.2 IMPACT ASSESSMENT METHODOLOGY

10.2.1 PREDICTION OF MAGNITUDE

The social impact assessment methodology follows the analysis process as presented in ***Section 4*** of the ESIA. However, the designation of Scale, Duration, Extent, Likelihood, Sensitivity, and Magnitude has been slightly amended.

Scale for social impact is the degree of change to a household level livelihood, individual or household level health status or quality of life. In the Project context, an impact that leads to a fundamental change in the way of life of people or to the livelihood patterns is considered as large, an impact that leads to evident change from the baseline of livelihood but remain part of the livelihood ability is considered as medium, and one that resulted in only subtle changes in conditions would be considered as small.

Duration is the timeframe over which an impact will be experienced, and it is classified into temporary, short-term, long-term, and permanent. In the Project context, it is defined that an impact that lasts for the construction period (i.e. 12 months) is considered as short-term, an impact that lasts shorter than the whole construction period is considered as temporary, an impact that lasts beyond the construction period but with a reasonable end to be expected during the Project operation is considered as long-term, an impact that lasts with no end unless interventions/mitigation measures are introduced is considered as permanent.

Extent is the geographical "reach" of the impact and takes into the account the proportion of the households or communities within a jurisdiction that are potentially affected by the change. Site – impacts that are bounded to the site locations and immediate surroundings; local – impacts that are limited to the local communities around the Project site and in the wider

[118] Defined as physical or procedural controls that are planned as part of the Project design, such as compliance with legal requirements or existing company standards and systems.

Samarkand City (i.e. the Social Area of Influence (AoI)); regional – impacts that extend beyond the Social AoI, in the wider Samarkand Region; national – impacts that affect social parameters that are nationally important; international – impacts that extend beyond the country.

Frequency is a measure of the constancy or periodicity of the impact: rare – not occurring very often; occasional – occurring irregularly; frequent – occurring many times at intervals; continuous – occurs constantly.

Magnitude is designated by taking Duration, Scale, Extent and Frequency into consideration, and the appropriate description is selected based on the overall combination of characteristics values. Impacts can be positive or negative. The impact magnitude is classified as negligible, small, medium or large for negative impacts, as defined in ***Table 10-1***.

TABLE 10-1 DESIGNATION OF IMPACT MAGNITUDE

Designating Magnitude	Description
Large	Change dominates over baseline conditions. Affects the majority of the area or population in the Area of Influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area or number of people and/or is of medium duration. Frequency may be occasional, and impact may be regional in scale.
Small	Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of households and is of a short duration.
Negligible	Change remains within the range commonly experienced within the household or community.

10.2.2 SENSITIVITY OF RECEPTORS

Sensitivity is the accepted term for describing the vulnerability of the receptors that will experience impacts. Receptor sensitivity is considered **High** when receptors have little capacity and means to adapt to a given change and to maintain or improve quality of life (i.e., when they have low resilience). In this context, "receptors of high sensitivity" may include vulnerable groups.[119]

Receptor sensitivity is considered **Medium** when there is limited capacity and means to adapt to a given change and maintain/improve quality of life (i.e., medium resilience). Receptors of Medium sensitivity may include the following:

[119] International Finance Corporation (IFC) Performance Standard 1 states that it is necessary to identify individuals and groups that may be differentially or disproportionately affected by the Project because of their disadvantaged or vulnerable status. Vulnerable individuals and groups may be more susceptible to adverse impacts or have a more limited ability to take advantage of beneficial impacts. Differentiated mitigation and management measures may be required so that adverse impacts do not fall disproportionately on these groups. Vulnerability is also an important factor in stakeholder engagement as certain groups of people may have less access to information and decision-making processes.

- Individuals who rely heavily on their livelihood to maintain their socioeconomic status and have a limited ability to adapt to change
- Individuals with moderate access to health and other necessary social services
- Businesses that have limited ability to adapt to change and are sensitive to any reduction in economic revenue or reputation
- Physical features likely to be subjected to moderate but sustainable change with physical integrity maintained

Receptor sensitivity is considered **Low** when there is a moderate to high capacity and means to adapt to a given change and maintain or improve quality of life (i.e., high resilience). Receptors of low sensitivity may include the following:

- Individuals who are able to quickly adapt to temporary disruption in their living conditions, livelihood status, or a change in the status of public infrastructure (such as a road closure)
- Individuals with good access to health and other necessary social services
- Businesses with a robust economic model that are able to adapt easily to any restrictions placed upon their activities, or who are able to benefit economically from such changes
- Features likely to remain unaffected or marginally affected

10.2.2.1 VULNERABLE GROUPS

For this Project, the following groups are identified as vulnerable groups:

- Women-headed Households
- The Elderly
- People with Disabilities
- Low-income Persons[120]
- People receiving Social Assistance[121]
- Community Waste Pickers
- Mugat Waste Pickers

There are some impacts which have been identified specifically in relation to vulnerable groups. Nonetheless, most impacts tend to be relevant to all community members, not just those that are vulnerable. Therefore, commentary is provided within each impact description where necessary to explain when vulnerable people are more likely to have a higher sensitivity to an impact than others.

10.2.3 EVALUATION OF SIGNIFICANCE

Once the magnitude of the impact and sensitivity of the resource/receptor has been characterized, the resulting impact *significance* is assigned using the significance matrix presented in ***Figure 10-1*** below.

[120] Consumer spending less than 669,000 UZS per person per month as defined by the Uzbek President's Official Statistics Office in 2025.
[121] This refers to "Moddiy yordam" — material (financial) assistance provided by the state to low-income or vulnerable groups of the population in Uzbekistan. The following group can receive social assistance required by law including: low-income families, elderly people without guardianship, persons with disabilities, and single parents with children.

FIGURE 10-1 IMPACT SIGNIFICANCE MATRIX

Evaluation of Significance		**Sensitivity/Vulnerability/Importance of Resource/Receptor**		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

Table 10-2 provides context for what the various impact significance ratings signify.

TABLE 10-2 CONTEXT OF IMPACT SIGNIFICANCE

Significance Designation	**Significance Context**
Negligible	A resource/receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.
Minor	A resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.
Moderate	Has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit.
Major	An accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors.
Positive	There will be a beneficial impact to a resource/receptor.

10.2.4 MITIGATION MEASURES

Any negative socioeconomic impact classified as Major, Moderate or Minor requires additional mitigation. Impact of Negligible significance is considered mitigated as far as practicable and necessary, and therefore, does not require further mitigation. After determining the mitigation measures, the same SIA methodology is repeated to identify the residual impacts.

Where the likely socioeconomic impacts are positive, the same SIA methodology is repeated to address the residual enhancement of likely benefits from Project activities.

10.2.5 ASSESSING AND REPORTING RESIDUAL IMPACT SIGNIFICANCE

The impact assessment process first considers the potential impacts in a pre-mitigated scenario (i.e. without the inclusion of mitigation measures) and then in a post-mitigated

scenario (i.e. including mitigation measures). The final remaining "mitigated" impacts are termed "residual" impacts.

Residual impacts will only be assessed for impacts for which mitigation measures are proposed (i.e. major, moderate and minor negative impacts). Impacts that are not eligible for mitigation (i.e. positive impacts or negligible negative impacts) will not be considered in residual impact assessment.

10.3 LAND USE AND LIVELIHOODS

10.3.1 OVERVIEW

Engagements with Cadastral Department of Samarkand City and local communities confirmed that no economic displacement or physical displacement have been conducted in the past 5 years or is planned for the future for the Project site, including the water pipeline, the pump and the transmission line.

The operation of the WtE plant may induce the closure of existing landfill. And according to the engagement with and the strategy of Samarkand Region government, the Samarkand City Landfill, which is located south to the Project, may be closed after the full operation of the Project. Closure of landfill may result in loss of livelihoods of the informal waste pickers. The closure of the landfill may also lead to the layoff of previous landfill employees. While these impacts stem from regional government policy rather than direct Project activities, measures are recommended to facilitate the livelihood transition of these waste pickers.

10.3.2 IMPACT ASSESSMENT

10.3.2.1 POTENTIAL IMPACTS ON LIVELIHOOD OF COMMUNITY WASTE PICKERS

Potential Impacts

According to FGDs with local waste pickers and interviews with mahalla heads, there are approximately 30-40 waste pickers (mainly from surrounding MFYs including Navruz MFY and Komalot MFY and sporadic distribution from other MFYs like Dustlik MFY) who collect waste in the Samarkand City Landfill. Waste picking is informal in nature. While the Samarkand City Landfill does not legally permit waste picking on its premises, it does not restrict or prevent access by waste pickers.

Household surveys were conducted with 11 waste picker households (7 households from Navrus MFY and 4 households from Komalot MFY, covering 15 waste pickers in total) from nearby mahallas to assess their livelihood conditions. Of the 11 households surveyed, three rely entirely on waste picking at the Samarkand City Landfill as their primary source of livelihood. The remaining eight households only generate partial income from waste picking: four reported waste picking as a supplementary income stream, with other household members or the waste pickers themselves engaged in alternative livelihood activities; an additional four households derive less than 30% of their total household income from waste picking, with other family members acting as the main breadwinners.

The permanent closure of the Samarkand City Landfill may result in a complete loss of livelihood for the three fully dependent households. For the other eight households, landfill closure is likely to cause partial income loss, notwithstanding the income and employment security provided by other working household members.

Regarding livelihood transition and alternative employment preferences, survey findings indicate that over half of the respondents (7 out of 11) prefer to continue working within the waste management sector, primarily due to the current lack of viable alternative job opportunities. The remaining respondents expressed willingness to switch to other occupations or cease waste-picking activities if no landfill sites remain accessible near their residences.

The Project 's impact on waste pickers is considered an induced negative impact. The closure of the existing Samarkand landfill is in accordance with Samarkand regional waste management strategy and is not a direct Project activity. Therefore, the livelihood impacts experienced by waste pickers arise from governmental waste sector reforms rather than directly from the Project itself. ERM therefore considers it appropriate for the Project to offer assistance in transitioning livelihoods but does not consider this to be a strict requirement to meet Lender standards.

The impact scale is considered as **Medium** given the degree of impact on different waste picker's livelihoods varies. The spatial effect is assessed as Medium.

The temporal effect of the impact is considered as High given the impact on change of livelihood pattern of waste pickers extends into the years after operation. Thus, the impact magnitude is assessed as **Medium**.

The receptor vulnerability is assessed as **Medium**. Although some waste pickers have other household members' income as buffers, approximately 36.3% of surveyed waste pickers who mainly depend on waste picking and less than half of overall waste pickers are estimated to be adversely affected, as they have limited capacity to adapt changes that Project would bring. As for other waste pickers, the closure of Samarkand landfill means that they have to shift to other occupations for livelihoods.

Therefore, the overall impact significance is **Moderate**.

Embedded Controls

No embedded control

Significance of Impacts

Impact		**Impact on livelihood of nearby community waste picker**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	Direct	Indirect	**Induced**		
		Direct negative impact on nearby community waste picker				
	Extent	Site	**Local**	Regional	National	International
	Scale	Small	**Medium**	Large		
	SPATIAL EFFECTS	Low	**Medium**	High		
	Medium spatial effect combining the local extent and large scale of impact.					
	Duration	Temporary	Short-term	Medium-term	Long-term	**Permanent**
	Frequency	Continuous				
	TEMPORAL EFFECTS	Negligible	Low	Medium	**High**	
	Combining permanent duration and constant frequency.					
IMPACT MAGNITUDE		Negligible	Small	**Medium**	Large	
		Combining the medium spatial effect and high temporal effect.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		The small portion of waste pickers without other income sources may face high vulnerability while the majority of the waste picker households have other income.				

IMPACT SIGNIFICANCE	Negligible	Minor	Moderate	Major

Recommended Mitigation Measures

To mitigate the Project impact on the livelihood of community waste pickers, the following measures are recommended:

- Consider providing in-kind livelihood support to vulnerable waste picker households, such as food baskets/boxes, clothing, blankets, housing utilities subsidies, and other necessary in-kind assistance to alleviate their living pressure.
- Collaborate with the local authorities to disclose vocational training information to help waste pickers to complement the vocational transition into other formal or informal employment sectors. Vocational training is recommended to support the diverse needs of vocational skills including language training (Russian and English), business trainings, and technical trainings (e.g., technical machinery operator, repair operator, and other mechanic occupations).
- Consult with the local authorities and assist them in promptly providing local scavengers with relevant information about job opportunities (if any), thereby helping them find alternative employment options.
- Disclose Project-related employment opportunities to waste pickers and give priority to recruiting them for such positions and comply with Uzbekistan labor laws, particularly for unskilled or semi-skilled roles, to help them secure stable income sources.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Minor**.

10.3.2.2 POTENTIAL IMPACTS ON LIVELIHOOD OF MUGAT WASTE PICKERS

Potential Impacts

The Samarkand City Landfill director reported that a group of 60 to 100 Mugat waste pickers also collect waste in the landfill, arranged by a company. The closure of the landfill may result in Mugat households losing their current access to the waste stream. No engagement was conducted directly with the Mugat waste picker households to understand the landfill closure's impact on their livelihood due to the prohibition of access from all levels of government and the Samarkand City Landfill director.

Secondary sources reveal potential vulnerability of the Mugat communities in Uzbekistan, such as high dependency, low skills, lack of documentation, and social marginalization which may hinder their capacity to adaption to such livelihood impacts.

The Project's impact on waste pickers is considered an induced negative impact. Given the government has prohibited both ERM and the Project Owner from conducting further field investigations, ERM recommends that the Project align and follow up with relevant government initiatives to support the livelihood transition of the Mugat waste picker group.

The scale of impact is therefore assessed as Medium, while the impact falls squarely within the Project's Social AoI, making the extent Local. Given the vulnerability of the Mugat communities, the receptor sensitivity is assessed at Medium, and the consequent impact significance is **Moderate**.

Embedded Controls

No Embedded Controls

Significance of Impacts

Impact		**Impacts of Landfill Closure on the Livelihood of Mugat Waste Pickers**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	Direct	Indirect	**Induced**		
		Negative indirect impact on Mugat People's livelihood.				
	Extent	Site	**Local**	Regional	National	International
	Scale	Small	Medium	**Large**		
	SPATIAL EFFECTS	Low	**Medium**	High		
	Fundamental change in Mugat people's livelihood but limited geographical reach.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	Impact occurs constantly after Project's commence of operation				
	TEMPORAL EFFECTS	Negligible	Low	Medium	**High**	
	Long term and constant impact on Mugat people's way of living.					
IMPACT MAGNITUDE		Negligible	Small	**Medium**	Large	
		Major loss of livelihoods among Mugat community and long-term impact.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Vulnerability status and particularly social marginalization and lack of alternative livelihoods.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

To further understand the livelihood of Mugat people and their alternative career transition opportunities, the following mitigation measures are recommended:

- Engage with the relevant government authorities such as the Waste Management and Circular Economy Development Agency under the Ministry of Ecology, Environmental Protection and Climate Change and Samarkand City Landfill to understand the livelihood transition measures adopted by them for the Mugat waste pickers.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Minor**.

10.3.2.3 POTENTIAL IMPACTS ON LOCAL AGRICULTURE DUE TO OPERATION PHASE WATER EXTRACTION

Potential Impacts

The Project expects to consume about 3,304.1 m3/d of water during operation, of which about 3,146.8 m3/d (annual average) will be extracted from the Dargom Canal and about 157.3 m3/d (annual average) will be recycled water from the water purification stations. Water extraction quantities are deemed negligible according to the Environmental Impact Assessment. However, considering the presence of local farms and the concerns on water use

presented during stakeholder engagements, the impact of water extraction on local agriculture is also considered in this SIA. According to the FGDs with farmers and the community profiling results, the water extraction points for irrigation in Dustlik MFY, Sakhovat MFY, Yoshlik MFY and Urta Turkman MFY are located in the upstream of the Project water extraction point, sharing priority when extracting water from the Dargom Canal. Therefore, the four Mahallas are not expected to experience impact brought by the Project water extraction. The Komalot MFY and Navruz MFY, although located at the downstream of the Project water extraction point, reported very limited presence of farmers due to their primarily industrial or residential land use status. Consequently, the two MFYs do not foresee perceptible impact from the Project water extraction.

As for the Dilshod Agro Farm, which locates near the Project water extraction point, could experience limited impact from water quantity changes. The Dilshod Agro Farm retrieves irrigation water from the Dargom Canal under a contract with the Samarkand Regional Hishrov Hydropower Station (HPP), which regulates and allocates the irrigation water along the Canal. This further ensures the irrigation water quantity and prevents the Project impact of water extraction.

Considering the limited amount of water extraction, limited impact scale on local farming activities, the impact magnitude effects are assessed as Negligible. Considering the lack of alternative irrigation sources, the vulnerability of receptors is assessed at Medium. The overall impact significance of water extraction on local agriculture is **Negligible**.

Embedded Controls

For embedded controls on operation phase water use, refer to **Section 8.2.4.3** of the **Environmental Impact Assessment**.

Significance of Impacts

Impact		Impact on local agriculture irrigation patterns due to water extraction during Project Operation				
Impact Nature		**Negative**		Positive		Neutral
IMPACT CHARACTERISTICS	**Type**	**Direct**		Indirect		Induced
		Negative and direct impact caused by Project operation activities.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**		Medium		Large
	SPATIAL EFFECTS	**Low**		Medium		High
	Negligible impact due to limited amount of extraction compared to total Dargom Canal water flow.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	Occasional impact during extraction phase.				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium		High
	Irregular impact occurring during Project operations.					
IMPACT MAGNITUDE		**Negligible**	Small	Medium		Large
		Negligible impact considering the minimal scale of influence.				
		Low	**Medium**	High		

RECEPTOR VULNERABILITY	Medium vulnerability of receptors based on full dependence on the Dardom Canal for irrigation.			
IMPACT SIGNIFICANCE	Negligible	Minor	Moderate	Major

Recommended Mitigation Measures

No mitigation measures required.

10.3.2.4 POTENTIAL IMPACTS ON LIVELIHOOD OF PREVIOUS LANDFILL EMPLOYEES

Potential Impacts

The loss of employment for the formally engaged landfill workers is classified as an induced negative impact resulting from the upcoming closure of the Samarkand City Landfill. The impact extent is assessed local as it is confined to a single nearby facility, and the scale is medium given the entire small workforce is affected. The potential job loss has a short but constant impact that lasts until reemployment, representing a medium-sized effect. On this basis, combining low spatial reach with low–medium temporal effects, the impact magnitude is assessed as Small. Receptor vulnerability is medium considering their formal employment status, transferrable skills, and the prospect of governmental or Project-facilitated reassignment reduce exposure. Applying the significance matrix, the interaction of small magnitude and medium sensitivity supports an overall **Minor** pre-mitigation impact significance.

Embedded Controls

No embedded controls

Significance of Impacts

Impact		**Impacts on Livelihood of Previous Landfill Employees due to Landfill Closure**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	Direct	Indirect	**Induced**		
		Induced negative impact				
	Extent	Site	**Local**	Regional	National	International
	Scale	Small	**Medium**	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	Low spatial impact due to small size of workforce and localized impact.					
	Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	Frequency	Constant				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	Short term but constant impact for landfill employees before new job opportunities occur for the employees.					
IMPACT MAGNITUDE		Negligible	**Small**	Medium	Large	
		Small magnitude considering limited scale of impact and medium temporal impact.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Medium level vulnerability considering receptor's status of being civil servants with transferable working skills and potential government support.				

IMPACT SIGNIFICANCE	Negligible	Minor	Moderate	Major

Recommended Mitigation Measures

To mitigate the Project impact on the livelihood of landfill employees, this SIA provides the following measures:

- Follow up with government authorities such as the Regional Department of Waste Management and Circular Economy Development Agency in terms of the reemployment of the Samarkand City Landfill Workers. And coordinate with the Samarkand Regional Waste Landfill Directorate to obtain updated information on the status and contractual conditions of the landfill employees.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Negligible**.

10.4 COMMUNITY HEALTH, SAFETY AND SECURITY

10.4.1 OVERVIEW

Project construction may introduce health and safety risks to nearby communities through air emissions, noise, construction traffic, worker–community interaction, and potential increases in communicable diseases, while the long-term operation of the WtE plant may also generate community concerns regarding air quality, odors, and emergency events. However, the closure of the Samarkand open landfill which is indirectly linked to the Project would have a benefit on environmental sanitation and odour for local communities. Besides, the male dominated labor influx might also increase the risks of Gender-based violence among local workers and local communities.

The inappropriate behaviors and unregulated use of lethal force of Project's security personnel might also impact the security of local communities. This part of assessment will be assessed in ***Annex B Human Rights Impact Assessment***, as its potential risk is directly linked to certain rights defined in Universal Declaration of Human Rights (UDHR).

10.4.2 IMPACT ASSESSMENT

10.4.2.1 POTENTIAL IMPACT ON COMMUNITY HEALTH FROM CONSTRUCTION-RELATED ENVIRONMENTAL EMISSIONS AND DISTURBANCES

Potential Impacts

Impacts on community health may arise during construction as a result of air emissions, noise and vibration, and wastewater discharge from construction activities. Noise may come from the transportation of construction materials, machines, and equipment. It might be also induced by the use of powered mechanical equipment for the activities during the construction phase. Noise disturbances may provoke stress and annoyance among local residents. Based on the results of Environmental Impact Assessment of noise in ***Section 8.4.4***, the impact of noise on nearby communities is Minor, as the noise level is not expected to increase by more than 3 dB(A), which has negligible impacts on the nearby communities.

Regarding the Project's impact on water quality of local community, the Project might increase contaminants washed into water bodies due to improper wastewater disposal and untreated during the construction phase through both surface water and underground water. This might cause risks to the health of local communities and arise possibilities of communicable diseases. Nevertheless, according to ***Section 8.2.4.1***, the impact on surface water is scoped out since the distance to the nearest surface waste body is too far and no wastewater will be discharged into surface water body. As for the groundwater, Project construction will only use it for domestic and construction in limited amounts. Construction concrete will be sourced as ready-mix commercial concrete and will not draw on local water resources. There will not be outlet for discharge of underground wastewater during construction, therefore the impact on groundwater and its accompanying health issues is scoped out. Therefore, the impact on local community's health due to the construction activities is negligible.

In terms of waste management, inappropriate disposal of waste, especially for the hazardous chemicals, would hamper the health of local communities. According to ***Section 8.5.1.1***, both on-site storage and qualified disposal vendors for landfill and reuse will be deployed to tackle the construction waste. In alignment with the Environmental Impact Assessment of Impact of

Waste Generation and Management, the impact of waste on local community health during the construction phase is Minor.

Air emissions such as nitrogen oxides (NOx), particulate matter (PM), sulfide dioxide (SO_2) and CO produced through the construction phase could also lead to adverse health impacts, including increased risks of respiratory diseases and even aggravated symptoms among vulnerable groups such as the elderly and waste pickers. According to the modeling results in ***Section 8.1.4***, the overall impact of ambient air emissions on community health tends to be Negligible. Both fugitive dust and emissions from the Project utilized trucks are estimated to be produced for approximately 24 months during the construction phase. As the nearest social AoI MFY, Navruz, is located approximately 650 m northwest of the Project boundary and the increase local traffic due to the Project's traffic is limited, thus the air emissions' impacts on local communities are minimal.

The environmental impact on the health of local communities is considered directly negative. Regarding the results of environmental impact assessment and its short period, the impact magnitude is assessed as **Small**. Receptor vulnerability is considered as **Medium**, as relatively poor medical conditions and uneven distribution of medical access among social AoI MFYs (details can be found in ***Section 9.9.4***). Therefore, the overall impact significance is **Minor**.

Embedded Controls

The embedded control of the Project's environmental impacts in terms of ambient air, water, noise, and waste can refer to ***Section 8.1.4, 8.2.4, 8.4.4***, and ***8.5.4***.

Significance of Impacts

Impact		**Potential Impact on Community Health During Construction**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Direct negative impact on community health				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	Low spatial effects to align with the results of environmental impact assessment.					
	Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	Frequency	Rare				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	
	Low temporal effects considering the impact only lasts through the construction period.					
IMPACT MAGNITUDE		Negligible	**Small**	Medium	Large	
		Combing the low spatial effect and low temporal effect.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Relatively poor medical conditions among social AoI MFYs.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

To mitigate all environmental impacts produced by the Project's construction activities including air, water quality, and waste, following mitigation measures are proposed:

- Implement all mitigation measures illustrated in ***Section 8 Environmental Impact Assessment*** and ensure compliance of environmental monitoring records with the regulatory requirements.
- Ensure the accessibility and transparency of the Grievance Mechanism (GM) for local communities to voice health concerns related to project activities, ensuring a timely response from project management.
- Pay special attention to potential noise impacts on nearby communities. Prior to any high-noise construction activities, consult with the nearest MFYs (e.g., Navruz, Komalot) to jointly determine the optimal timing for such works. Provide advance notice where necessary to residents and strictly adhere to the agreed construction schedule to minimize disturbance.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Negligible**.

10.4.2.2 POTENTIAL IMPACT ON COMMUNITY HEALTH FROM OPERATION-RELATED ENVIRONMENTAL EMISSIONS AND DISTURBANCES

Potential Impacts

The Project may introduce several pollution-related community health risks that could affect the health of nearby residents. Air emissions from waste-incineration processes, including particulate matter, NOx, SO_2, HCl, HF, heavy metals, and trace dioxins/furans, may contribute to degraded ambient air quality around the facility despite the presence of flue-gas treatment systems, thereby potentially increasing community exposure to respiratory and cardiovascular irritants.

In addition, odors and fugitive emissions from the waste-receiving hall or storage pit, if not fully contained under negative pressure, may affect nearby households' comfort and perceived environmental quality.

Air emission-related community health impacts from the Project constitute a direct negative impact that is local in extent, reflecting that potential effects are confined to communities within the Project's Social AoI. With reference to ***Section 8.1.1.2*** of the ***Environmental Impact Assessment***, the scale of impact is considered small, as the Project incorporates multiple structured emission-control measures that help limit the degree of change experienced by nearby households.

From a temporal perspective, the impact is characterized by frequent exposure due to the continuous nature of WtE operations, and long-term duration, as emissions will persist throughout the operating life of the plant. Combing the temporal and spatial characteristics, the overall impact magnitude is assessed as small, acknowledging that although continuous, the effect is moderated by embedded engineering controls that reduce pollutant levels at receptor locations. Receptor vulnerability is rated medium, recognizing both the presence of vulnerable households within the AoI and the baseline concerns over the limited quality and accessibility of healthcare services.

Taking magnitude and vulnerability together, the resulting impact significance is evaluated as **Minor**.

Embedded Controls

- For embedded control measures on air emission during Project operation, refer to **Section 8.1.1.2** of the **Environmental Impact Assessment.**

Significance of Impacts

Impact		**Impact on Community Health During WtE Plant Operation caused by Air Emissions**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Direct negative impact caused by Project emission activities.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	Low spatial effects considering sufficient embedded controls and localize impact.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	Frequent				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	Temporal effects assessed at Medium considering the frequent and long-term operation of the WtE plant.					
IMPACT MAGNITUDE		Negligible	**Small**	Medium	Large	
		Small magnitude considering the structured embedded control measures.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Considering the existence of vulnerable groups and less than satisfactory quality medical services in the social AoI.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

- Implement the mitigation measures on operation phase air emissions in the Environmental Impact Assessment.
- Develop and implement a **Community Health and Safety Management Plan (CHSMP),** including but not limited to the following measures:
  - Define procedures for monitoring air-quality risks, managing community exposure, responding to unexpected events of pollution, and coordinating with local authorities.
  - Publicly disclose air emission monitoring performance through Project information disclosure bulletins, notice boards in mahallas, or online dashboards summarizing air monitoring results to maintain trust and transparency where feasible.
  - Assign roles/responsibilities, reporting lines, and auditing protocols for managing community health and safety and for addressing community health and safety grievances.

- Implement the Stakeholder Engagement Plan (SEP) to ensure regular communication with mahalla leaders and households regarding plant performance, monitoring results, and any emerging air-quality concerns.
- Maintain an accessible, culturally appropriate Grievance Mechanism (GM) allowing community members to report odor, dust, smoke, or health concerns.

Residual Impacts

With the measures above, the residual impact on local health is assessed as **Negligible** for operation phase emissions and noises.

10.4.2.3 INCREASED RISKS OF COMMUNICABLE DISEASES DUE TO THE PRESENCE OF CONSTRUCTION WORKFORCE

Potential Impacts

During the construction, the Project will engage with an EPC (Shandong Zijian Construction Group Co., Ltd.) to recruit construction workers. The peak number of contracted workers during the construction phase is expected to be around 400, with no more than 50% being Chinese nationals. An average of 20-40 migrant direct workers (Chinese) will be at the project site at any one time. Additionally, 4 security personnel will be recruited during the construction phase. Thus, the presence of migrant construction workforce is estimated to be less than 400 people and mainly composed of Chinese. The scale of construction workforce is relatively small compared to population of nearby affected communities.

Both direct workers and migrant contracted construction workers will reside in camps within the Project site. Local workers, especially those who are recruited from local communities, can choose to commute between the Project site and their homes. Thus, this commuting pattern creates indirect interactions between nearby communities and the construction workforce, including potential overlaps in the use of local utilities and resources such as water and air. The presence of workers and their interaction with local communities may introduce communicable diseases and/or increase the number of people who might spread illness, which includes:

- Respiratory infections (e.g., flu), which may spread due to overcrowding and close contact in public or shared spaces during daily life or commuting; and
- Sexually transmitted infections (STIs), including HIV/AIDS. 13% of the HIV patients in Uzbekistan were migrants in 2023. The prevalence rate of STIs may raise because of the presence of a mainly male workforce with disposable income who may engage in high-risk sexual activities in the AoI. Although no gender data of the construction workforce was provided by the time of ESIA writing, according to the community profiling, male workforce is the dominant composition of construction works based on local skillset profiling.

The magnitude of impact is considered as **Small** by combing the low spatial effect and low temporal effect. The receptor vulnerability is assessed as **Medium** given the limited accessible health facilities in the community. As available medical services within the MFY are limited and not always sufficient in terms of quality and capacity based on results of community profiling. Thus, the overall impact significance is evaluated as **Minor**.

Embedded Controls

No Embedded Control

Significance of Impacts

Impact		**Increased Risks of Communicable Diseases due to the Presence of Construction Workforce**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Direct negative impact on community's health				
	Extent	Site	**Local**	Regional	National	International
	Scale	Small	**Medium**	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	Can bring impacts to the health status of the affected population but limited local impacts in the case of communicable disease outbreak.					
	Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	Frequency	Rare				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	
	Short-term and rare impacts during the construction phase.					
IMPACT MAGNITUDE		Negligible	**Small**	Medium	Large	
		Low spatial effects and low temporal effects				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Limited healthcare facilities available in the social AoI				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

To effectively control the emergence and transmission of the communicable diseases induced by Project labor, the following measures will be incorporated into the Project's **Community Health and Safety Management Plan (CHSMP)**:

- If workers require diagnostics or treatment for infectious diseases, have them taken directly to a hospital to avoid potential contact with community members' routes and areas.
- Incorporate communicable disease-related management measures into the Contractor's Code of Conduct (CoC), including:
  - Mandate worker participation in awareness sessions on communicable-disease prevention, respectful conduct, personal responsibility, and the consequences of violating CoC rules.
  - Enforce zero-tolerance for any form of sexual exploitation, transactional behavior, or inappropriate conduct that may increase the risk of STI/STD or other communicable diseases transmission.
- Worker accommodation should comply with the Workers' Accommodation: Process and Standards (IFC and EBRD 2009). This includes recommendations about spacing, amenities, and sanitary conditions of accommodation.
- Establish an onsite First-aid station and ensure all workers including subcontractors have equal access to it. Provide equipment to prevent communicable diseases such as face masks and sanitizers, along with education materials for the prevention and response of communicable diseases available in the languages (including Uzbek, and Chinese) used by employees and workers onsite.

- Inform local and regional health authorities in the event of an observed outbreak within the workforce and coordinate with authorities on response efforts for any potential outbreak.
- Coordinate with regional and local health providers on STI and other communicable disease education, prevention, and treatment programs when necessary.
- Implement Grievance mechanism to collect communicable diseases-related grievances and provide timely feedback in accordance with the grievance mechanism.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Negligible**.

10.4.2.4 INCREASED RISKS OF GENDER-BASED VIOLENCE DUE TO THE PRESENCE OF CONSTRUCTION WORKFORCE

Potential Impacts

During the construction phase, the Project will recruit 400 construction workers by engaging with an EPC, including no more than half of which will be Chinese workers and the remainder Uzbeks. The migrant workers are also most likely to be single or separated from their families or spouses and find themselves outside their usual sphere of social control. It is likely that the Project construction workforce would be male dominated. The gender ratio and social relationships in the surrounding areas may accordingly be slightly disrupted.

This situation has the potential to at times lead to instances of gender-based violence (GBV) and/or sexual exploitation, abuse and harassment (SEAH) among the Project workforce and the community members. GBV can include unwanted aggressive advances, sexual harassment of women and girls, and gender-based violence against women and children. The risk of sexual harassment is likely higher for local women, especially young women and girls, but it also exists for boys and men. A large influx of male labor can also lead to an increase in exploitative sexual relations and human trafficking, with women and young girls being forced into prostitution. The baseline data shows that Gender-based violence (GBV) in Uzbekistan is still an unresolved problem, with around 40,000 annual cases reported, predominantly domestic (85% occurring at home). In 2022, 87% of protection orders were filed against family members, predominantly husbands, highlighting the underreporting of GBV.[122]

Nevertheless, other factors in terms of local gender and population dynamics should also be taken into consideration. According to results of the community profiling, no GBV case was reported within the social AoI area. Although some local workers can choose to live in their own residences, most of Chinese migrant workers will live in the built camp within the project site. This will only bring limited interaction between the Project workforce and local communities. Besides, the scale of labor influx is estimated to keep around 300 to 400 people, which is relatively small compared to the local population. During the operation phase, there will only be around 60 to 100 direct workers on site. Its impact on local gender dynamics is assessed as innocuous.

While no clear proof shows existence of gender-based violence based on data from social baseline, it is still worth noting that certain risks related to it should be taken into consideration. As one of the most intimate forms of violence, which often occurs in private or

[122] Ibid.

informal settings, Gender-based violence is highly under-reported and difficult to detect[123]. The impacts of GBV are severe, spanning physical and mental health consequences, loss of economic opportunities, and long-term harm to families and communities, making it not only a human-rights violation but also a critical development challenge.

Thus, the severity of GBV cannot be underestimated, the scale of the impact is evaluated as Medium. Since this impact would only persist through the construction phase, its temporal effect is considered as Low. The impact magnitude is considered as **Medium**. Considering the lack of gender-specific grievance mechanism and standalone gender policy of Project company during the construction phase, the receptor vulnerability is considered **Medium**. Therefore, the overall impact significance is evaluated as **Moderate**.

Embedded Controls

No embedded Control

Significance of Impacts

Impact		**Gender-based Violence During the Construction Phase**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Direct negative impact on local community				
	Extent	Site	**Local**	Regional	National	International
	Scale	Small	**Medium**	Large		
	SPATIAL EFFECTS	Low	**Medium**	High		
		Medium spatial effect by taking small scale of labor influx and impact on local gender dynamics into consideration.				
	Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	Frequency	Rare				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	
		Low temporal effect lasts through the construction phase.				
IMPACT MAGNITUDE		Negligible	Small	**Medium**	Large	
		Small impact magnitude combining low spatial effect and low temporal effect.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Medium receptor vulnerability given the absence of existing gender dynamics management.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

To mitigate the impacts of Gender-based violence during the construction phase caused by the Project male dominated workforce, following mitigation measures are proposed from both internal policy making and external grievances mechanism development:

[123] World Bank. (2026). Addressing gender-based violence to accelerate gender equality (Gender Thematic Policy Notes Series: Issues and Practice Note). https://documents1.worldbank.org/curated/en/099847009292332841/pdf/IDU1cc2005701add314f2e1b62019a088534fc6e.pdf

- The Project Company shall develop, finalize and disclose a **GBV/SEAH Policy** for the Project and communicate it with both direct workers and contracted workers. The Policy should clearly define GBV/SEAH, define unacceptable conduct and behaviors, specify expected conduct for all workers (including contractors and security personnel), outline reporting and grievance mechanism channels, and specially consequences for violations. The GBV/SEAH Policy should be available in at least Chinese, Uzbek and Tajik.
- To uphold its gender/GBVH policy, the Project will build and maintain adequate organizational capacity—through staffing, training, procedures, and resourcing—to ensure effective implementation and compliance throughout the Project lifecycle.
- Ensure the commitments set out in the GBV/SEAH Policy are developed into Contractor worker's Code of Conduct.
- The GBV/SEAH Policy should be trained to all Project workforce, including both direct workforce and contracted workers, for example during the safety induction program and periodic refresh training when see necessary. The Project Company should record acknowledgement of its GBV/SEAH policies for all workers, including for contracted workers.
- Ensure the external Grievance Mechanism and the Worker Grievance Mechanism have the capacity to receive, resolve and record GBV and SEAH grievances. Adequately communicate such mechanisms to all workers as well as to the community, and ensure that support can be provided in Chinese, Uzbek, and Tajik.
- Conduct a mapping of existing GBV support services and identify available local resources, such as shelters, counselling, legal assistance, and health services. Through which, the Project can define clear, confidential, and survivor-centered procedures to connect affected individuals with appropriate medical, psychosocial, legal, and protection services. This Project shall then adequately communicate such information to employees through appropriate channels where necessary, and ensure the information is up to date.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Minor**.

10.5 PUBLIC INFRASTRUCTURE AND SERVICES

10.5.1 OVERVIEW

Although the Project's resource requirements represent a small proportion of overall regional capacity, any incremental strain may still affect local households, especially those already experiencing seasonal water limitations or inconsistent municipal services, including electricity, gas and waste management. Clear resource-use planning, transparent disclosure, and proactive coordination with local authorities and service providers are therefore essential to prevent disruptions and maintain community access to dependable utilities and public services.

10.5.2 IMPACT ASSESSMENT

10.5.2.1 INCREASED PRESSURE ON LOCAL UTILITIES AND SERVICES DURING CONSTRUCTION AND OPERATION

Potential Impacts

The Project construction activities may strain communal resources especially for the water and electricity due to the direct demand from the Project construction, and activities from presence of Project workforce including direct workers and contracted workers.

Construction Phase

- Electricity: During the construction phase, the Project use of electricity will be provided by nearby municipal grid. The total electricity consumption during construction phase is $2.62*10^6$ kWh. Based on community profiling, all six affected MFYs within social AoI are covered with the municipal electricity supply.

  It is still expected to bring pressure on local grids, which may make the local electricity provision less stable, especially during the peak of construction phase.

- Water: During the construction phase, both domestic and industrial use of water comes from groundwater. The total water consumption during the construction is 24,000t during the whole construction phase. According to the community profiling, municipal drinking water supply has not reached all households within the social AoI area. Certain proportions of households, including the whole Urta Turkman MFY and Dustlik MFY, use groundwater wells as alternative water sources for domestic purposes. According to ***Section 8.2.4***, the Project will intake maximum 80 m^3 per day from three wells during construction phase, representing only 0.02% of residual water resources for groundwater in Samarkand region (explored reserves groundwater is 0.78 km^3/yr and withdrawal 0.66 km^3/yr). Thus, the impact of Project's construction activities on local water use is negligible.

- Gas: During the construction phase, liquefied petroleum gas (LPG) will be used on site instead of natural gas. The impact on local gas use is scoped out of this assessment.

Operation Phase

- Electricity: During the operation phase, the Project will use self-generated electricity during the operation phase. A 10 kV diesel generator with an installed capacity of 2,400 kW is installed within the plant to serve as the plant's emergency power supply in the event of a total plant blackout. Thus, no extra pressure will be brought to the local municipal grid.

- Water: During the operation phase, the nearby Dargom Canal will be used as the main water source. The Project expects to consume about 3,304.1m^3/d, of which 3,277.5 m^3/d is for production use and 26.6 m^3/d is for domestic use, based on the annual average meteorological conditions. Water consumption from the Dargom Canal is about to be 3,146.8m^3/d. Besides, there will also be water from the water purification stations, whose consumption is about 157.3 m^3/d.

  Dargom water will only be used as irrigation water by local communities. The Project impact on local irrigation and agriculture livelihood has been assessed in ***Section 10.3.2.3***. Since the Project's intake of Dargom water only represents 0.04% of the Dargom Canal's flow, the impact on local water use during the operation phase is negligible.

- Gas: During the operation phase, the Project is not expected to consume a significant amount of gas. During the preparation of the ESIA, it remains uncertain whether natural gas will be required in substantial quantities in the future. If used, gas would be limited to the initial start-up phase of incinerators to support ignition. Once stable combustion is

achieved, the process is designed to be self-sustaining, and no continuous supply of gas is anticipated. Thus, the impact on gas use of local community is minimal.

The impact on local utilities and services is direct and negative. Only limited pressure on electricity supply during the construction phase is anticipated. The impact would be **Minor** for both construction and operation phase. The receptor vulnerability is assessed as **Medium** as local communities are facing lack of centralized municipal drinking water supply and falling short of irrigation water from the source of Dargom river. Thus, the overall impact significance is evaluated as **Minor**.

Embedded Controls

Embedded control about the Project's water use and waste discharge can refer to ***Section 8.2.4.2*** and ***Section 8.5.1.1***.

Significance of Impacts

Impact		**Impact on Local Utilities and Services during Construction and Operation**				
Impact Nature		**Negative** (Both construction phase and operation phase)		Positive		Neutral
IMPACT CHARACTERISTICS	**Type**	**Direct**		Indirect		Induced
		Direct negative impact of bringing pressure on local utilities and infrastructure.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**		Medium		Large
	SPATIAL EFFECTS	**Low** (Both construction phase and operation phase)		Medium		High
	Low spatial effect given the impact on local electricity.					
	Duration	Temporary	**Short-term** (Construction phase)	Medium-term	**Long-term** (Operation Phase)	Permanent
	Frequency	Constant use of local water and electricity resources during construction and operation phase.				
	TEMPORAL EFFECTS	Negligible	**Low** (Construction phase)	**Medium** (Operation phase)		High
	Medium temporal effect combining with the duration and constant use of local resources.					
IMPACT MAGNITUDE		Negligible	**Small** (Both construction and operation phase)	Medium		Large
		Medium spatial effects and medium temporal effects.				
RECEPTOR VULNERABILITY		Low	**Medium** (Both construction phase and operation phase)			High
		Medium vulnerability considering the shortage of centralized drinking water supply and irrigation water.				

IMPACT SIGNIFICANCE	Negligible	Minor (Both construction phase and operation phase)	Moderate	Major

Recommended Mitigation Measures

Following mitigation measures are proposed to mitigate Project's impact on local utilities, especially on pressure on water and electricity use:

- Improve the Project's information disclosure related to the intention, process, way, and quota of the use of the local resources. It is recommended that consulting with community representatives ahead in terms of potential impacts on the local utilities and resources.
- Finalize and implement the GM to collect grievances related to Project's impacts on local water resources and electricity and provide timely feedback.
- Disclose data on water and electricity consumption and recycling to local communities in a culturally appropriate manner in Uzbek or Tajik throughout operation phase.
- Establish transparent and collaborative relationships with local water authorities,
- As part of **Stakeholder Engagement Plan**, the Project should liaise and engage with community leaders, utility suppliers and relevant authorities to ensure continuity of supply and services provided to communities.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Negligible**.

10.5.2.2 POSITIVE IMPACT ON THE LOCAL GRID AND ENTERTAINMENT FACILITIES

Potential Impacts

The Project contributes to an increased supply of energy by converting waste into electricity through incineration, enabling more consumption of stable energy in the national grid, and enhancing the local electricity supply.

In addition, the Project plans to build sports facilities including one basketball field and a football field, which can be made accessible for community members, particularly the youth.

Significance of Impacts

Impact	Increased Supply of Stable Electricity in The National Grid and the Establishment of Sports Facilities		
Impact Nature	Negative	Positive	Neutral

Enhanced Measures

Not Applicable

10.6 OCCUPATIONAL HEALTH AND SAFETY

10.6.1 OVERVIEW

Construction and operation of the WtE plant expose workers to a wide range of OHS hazards, including heavy-equipment risks, working at height, trenching, traffic interactions, toxic or oxygen-deficient atmospheres in the waste pit, high-temperature and high-pressure systems,

chemical handling, energized electrical equipment, and complex non-routine maintenance tasks. These risks persist throughout the facility's lifecycle and require consistent application of structured controls, robust permit-to-work systems, competency-based training, emergency preparedness, and continuous monitoring to prevent accidents, reduce exposure, and protect both local and foreign workers. Strong OHS management is critical to minimizing work-related injuries and ensuring safe and reliable Project operations.

10.6.2 IMPACT ASSESSMENT

10.6.2.1 OHS RISKS DURING PROJECT CONSTRUCTION AND OPERATION

Potential Impacts

Given the Project's construction methods and the complex, high-temperature, high-voltage nature of WtE operations, workers face a multi-hazard profile spanning civil works, waste reception and handling, thermal processes, hazardous chemicals, electrical assets, ash/stabilization systems, and intensive road logistics.

During construction, risks concentrate around heavy equipment, excavation, trenching for the water pipeline, can create typical struck-by, fall, collapse, and traffic exposures.

As the plant enters commissioning and steady operation, the following risks becomes prevalent: maintaining stable combustion and materials handling; controlling toxic atmospheres in the negative-pressure waste pit; preventing burns, steam/pressure releases, and mechanical injuries around boilers, turbines, and rotating machinery; and managing ammonia solution, diesel, lime, activated carbon, and metal-bearing fly-ash safely. Additionally, handling energized systems and high truck throughput elevate electrocution, fire/explosion, and traffic collision risks if controls lapse. Non-routine work (shutdowns, confined-space entries, filter changes, silo maintenance) is a particular risk intensifier because it combines atypical energy states with chemical, thermal, and atmospheric hazards that require robust permit-to-work discipline.

Construction-Phase OHS Risks Include:

- Heavy civil works and machinery: risks of being struck-by, caught-between during site clearance or excavation; working-at-height and lifting operations exposures.
- Trenching and pipeline installation: potential trench collapse, unstable soils, confined-space–type atmospheres, and utilities strikes.

Operation-phase OHS risks include:

- Waste reception and pit operations
  - Overhead crane/hoist hazards (struck-by, dropped loads, entanglement) during continuous lifting/mixing over the semi-underground pit in the enclosed waste hall.
  - Toxic/oxygen-deficient atmospheres: gases associated with decomposing waste (e.g., H_2S, NH_3, CH_4) and pit maintenance/ inspection can create asphyxiation/toxic-inhalation risks without strict entry controls and gas testing.
  - Leachate handling (collection sump, transfer pumps, storage tank): contact exposure, slips, and accidental splash during routine operations or upset conditions.
- Combustion & boiler island

- High-temperature/pressure exposures at the incinerators and boilers: risks of burns, radiant heat, steam leaks, tube failures and over-pressurization events during abnormal operations.
- Process upsets (e.g., feed variability) may result in unstable combustion, increasing the chance of furnace/passage fouling interventions and hot-work at elevated risk.

- Flue-gas treatment system
  - Routine operation/maintenance around SNCR, dry desulfurization, activated-carbon dosing, and bag filters involves chemical exposure (reagents), fine particulate handling, confined-space–type tasks inside housings/ducts, and potential dust clouds on filter change-outs.
- Ash handling and stabilization
  - Fly-ash silos and stabilization lines (water + chelating agent) carry risks of respirable dust (often bearing heavy metals), skin/eye contact, and dust-explosion scenarios if housekeeping are inadequate. Bottom-ash quenching also presents hot-surface and wet-slip hazards.
- Chemicals and fuel storage/transfer
  - Ammonia solution (≈20%): 40 m^3 aboveground tank in bunded area—corrosive inhalation/contact, offloading/transfer mishaps, and emergency response needs for toxic release.
  - Diesel storage (two 45 m^3 underground tanks, secondary containment): flammability/explosion risks, ignition sources during tankering, and confined-space hazards when maintaining underground containment structures.
- Turbine-generator and cooling systems
  - Rotating machinery hazards (entanglement, crushing), high noise/vibration, and electrical risks around the 50 MW turbo-generator set and auxiliaries.
  - Closed-loop cooling with large circulation rates: risks of hot water/steam releases, pipe bursts, and water-treatment reagent exposure during chemical dosing and maintenance.
- Electrical or high-voltage systems
  - Substation and transmission line poses potential risks of electric shock/arc-flash/electrocution risks, plus working at height during inspection of line hardware and towers; transformer/switchgear oil-fire scenarios in substations.
- Industrial hygiene & routine exposure
  - Noise from fans and turbines; dust and powder handling (lime, carbon, ash); and odor/fugitive vapors if negative-pressure or door seals degrade.

Drawing on the Project's hazard profile, the operation-phase OHS impact is characterized by a local, long-term, and exposure potentials with high-consequence pathways.

Evidence and incidents from the WtE sector underscores these possibilities:

A hydrogen sulfide poisoning case in a Shandong waste-treatment power facility shows how anaerobic/sludge units can rapidly accumulate lethal gases when ventilation, gas testing, and

PPE are inadequate.[124] A pressure-testing fatality during performance verification of an incinerator cooling component in 2025 illustrates how mechanical energy release in the WtE supply chain can be catastrophic without rigorous test protocols and barricading.[125] The Tuas Incineration Plant explosion in 2021 demonstrates that high-voltage switching and PTW/LOTO failures in WtE utilities can lead to fatal outcomes and prolonged shutdowns, triggering regulatory sanctions and systemic safety reforms.[126]

Taken together, these industrial experiences indicate that the Project's OHS impact is plausibly large in scale, long-term in duration (throughout operations), and not entirely rare in exposure opportunity, even though the embedded control measures are in place.

In terms of receptor vulnerability, medical treatments are accessible in the collaborating hospitals in Samarkand city, however, the required traveling time and the presence of foreign workforce during operation and thus the language barrier can bring the vulnerability level to medium.

Consequently, the assessment believes that the overall impact magnitude to be **Major** for both construction and operation phases.

Embedded Controls

The Project owner has its EHS management procedures in place for both construction and operation stages of the Project as illustrated by the *SUS EHS Management Procedure for the Construction Phase of the Samarkand Project* and the *EHS Department Management Procedure for the Operation Phase of the Samarkand Project* as provided by the Project owner. The outline of these control measures include:

Construction Phase EHS Control Measures

- Establishment of EHS governance structure, including:
  - EHS Committee and office, defined responsibilities for project owner, contractors and supervisors
  - Mandatory compliance with national safety, occupational health and environmental laws
  - Regular EHS meetings including weekly site safety meetings and quarterly EHS committee meetings
- Occupational Safety and Competency
  - Training and competency management measures including:
    - Safety education systems
    - Special-operation permitting
    - Mandatory pre-work briefings
  - PPE requirements
    - Mandatory use of safety helmets, safety belts, protective equipment

[124] Aerbusili Genjiafu, A., Shi, M., Zhang, X., & Jian, X. (2023). *Case report: Analysis of a case of hydrogen sulfide poisoning in a waste treatment plant.* Frontiers in Public Health, 11, 1226282. https://doi.org/10.3389/fpubh.2023.1226282
[125] Word Korean. (2025, September 13). *40 Chinese workers died at a waste incineration plant in Ansan… "Soared 8 meters"*. https://wordkorean.com/40-chinese-workers-died-at-a-waste-incineration-plant-in-ansan-soared-8-meters/
[126] Wong, A. (2025, November 19). NEA fined $230k for safety lapses in 2021 fatal incineration plant blast. *The Straits Times*. https://www.magzter.com/

- High-Risk Activity Managements
  - Work-at-height controls including guardrails, safety nets, fall-prevention measures
  - Lifting and material handling controls including load limits, certified operators, pre-lift checks
  - Excavation and foundation safety including support systems, edge protection, post-rain inspections
  - Electrical safety including standardized distribution boxes, grounding, leakage protection
- Contractor and Site Management
  - Site layout and housekeeping requirements such as clear access routes, material storage control, dust suppression.
  - Equipment and machinery safety including entry inspection, maintenance, use by certified personnel
  - Hazard identification and corrective actions including routine inspections, and hidden-hazard management.
- Emergency Preparedness and Incident Management Measures
  - Construction-phase emergency response plan
  - Incident reporting and investigation

<u>Operation Phase EHS Control Measures</u>

- EHS Management and Responsibilities and EHS performance management
  - Annual EHS targets, indicators, clear responsibilities and regular evaluation mechanisms
- In-Built Facilities
  - Negative pressure operations of the waste hall to prevent toxic gas accumulations.
- Work Authorization and Operational Risk Controls
  - Energy isolation/Lockout–Tagout (LOTO) and non-routine task management measures.
  - Confined space entry management under a permit-to-work system.
  - Occupational hazard monitoring including noise, dust, chemicals, heat, odor, and toxic gas monitoring.
  - Equipment safety managements including routine inspections, preventive maintenance, safe operation of boilers, pressure vessels, lifting equipment, etc.
  - Combustible gas and oxygen monitoring including LEL-based alarm thresholds
  - Use of portable gas detectors and fixed gas alarm systems for hazardous work areas
- Occupational Health and Occupational Disease Preventions
  - Pre-employment, regular and exit medical examinations
  - PPE allocation and use with position-specific PPE matrices (e.g., ear protection, respirators, chemical gloves)
- Emergency Response & Incident Management
  - Plant-wide emergency response plan
  - Routine drills with annual drill plan including joint drills

- Incident reporting and investigation defining reporting channels, timelines, investigation responsibilities

Significance of Impacts

Impact		**OHS Risks of Project Construction and Operation**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Direct negative impacts and risks to workers brought by the Project construction and operation activities.				
	Extent	**Site**	Local	Regional	National	International
	Scale	Small	Medium	**Large**		
	SPATIAL EFFECTS	Low	Medium	**High**		
	High spatial effects considering the number of workers, potential harm and consequences.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	Rare, but recorded in industrial history.				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	Assessed at medium considering operation span, industrial experiences and the long-term negative residue impact after any OHS incidents.					
IMPACT MAGNITUDE		Negligible	Small	Medium	**Large**	
		Low-probability but high-severity events.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Medium treatment is available but language barrier, and travel distance may constrain effectiveness.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

The following mitigation measures are proposed to tackle potential EHS risks that Project has:

- Include IFC EHS Guidelines and relevant Uzbekistan EHS standards into the existing EHS Project EHS management procedures (including the SUS EHS Management Procedure for the Construction Phase of the Samarkand Project and the SUS EHS Management Procedure for the Operation Phase of the Samarkand Project) to ensure compliance, including but not limited to the following amendments:
  - Require contractors and subcontractors to meet Project EHS standards through standardized toolbox training, PPE kits, on-boarding checklists, periodic audits and other measures.
  - Include the IFC Waste Management EHS Guidelines (2007), [127] and the IFC EHS Guidelines for Waste Management Facilities (2007) [128] into the existing Project EHS Management Procedures, including standards such as the Threshold Limit Value (TLV®) occupational exposure guidelines and Biological Exposure Indices (BEIs®)

[127] International Finance Corporation (IFC). (2007). *Environmental, Health, and Safety (EHS) Guidelines: General EHS Guidelines – Waste Management*. World Bank Group. https://www.ifc.org/ehsguidelines
[128] International Finance Corporation. (2007). *Environmental, health, and safety guidelines for waste management facilities*. World Bank Group. https://www.ifc.org/content/dam/ifc/doc/2000/2007-waste-management-facilities-ehs-guidelines-en.pdf

published by American Conference of Governmental Industrial Hygienists (ACGIH), the United States National Institute for Occupational Health and Safety (NIOSH), Permissible Exposure Limits (PELs) published by the Occupational Safety and Health Administration of the United States (OSHA), Indicative Occupational Exposure Limit Values published by European Union member states, etc.

- Establish Multilingual (Uzbek/Chinese) emergency signage and communication materials considering foreign workforce.
- Establish effective and inclusive EHS trainings for all workers, use tools such as straightforward multilingual diagrams; daily pre-shift dynamic risk briefings; and near-miss reporting with no-blame protection.

- Establish and implement a detailed, Project-specific **Emergency Preparedness and Response Plan** to ensure OHS if any emergencies or unplanned events, for detailed information on emergencies and unplanned events, please refer to ***Section 11***.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Moderate**.

10.6.2.2 POTENTIAL IMPACT ON OCCUPATIONAL HEALTH AND LIVING STANDARDS THROUGH THE PROVISION OF ACCOMMODATION

Potential Impacts

During the construction phase, all project workforces including the direct workers and contracted workers will be provided with on-site camps as accommodations. During the operation phase, foreign direct workers will reside in project accommodation camps while local workers can back home for commuting.

The planned camp area covers approximately 20,000 m^2 and is designed to accommodate up to 400 workers. A range of basic amenities will be provided within the camp, including a small retail shop, communal shower rooms, centralized hot-water supply, designated smoking areas, and a tearoom. Living quarters are planned with a standard capacity of two to four people per room with the construction of prefabricated housing units.

By the time of ESIA writing, no specific management requirements on worker's accommodation have been proposed in both construction and operation phase. Inadequate accommodation may lead to increased risk of communicable diseases, injuries, and mental health deterioration particularly for vulnerable groups like migrant workers. There can also be an increase in the transmission of infectious disease among Project workers or the occurrence of occupational diseases, which can present long-term health implications.

The spatial effect is assessed **Low** since it is only constrained to on-site project camp. However, it will have **Medium** temporal effect since it could persist through the construction and operation phase although the frequency is rare. The receptor vulnerability is **Medium** given the absence of existing management and requirements on worker's accommodation and the presence of migrant workers as more vulnerable. Thus, the overall impact is considered as **Minor**.

Embedded Controls

No embedded Control

Significance of Impacts

Impact		**Impact on Occupational Health and Living Standard through The Accommodation Conditions**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		Direct negative impact on workers' health and safety conditions				
	Extent	**Site**	Local	Regional	National	International
	Scale	Small	**Medium**	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	Low spatial effect as impact will only be induced within the on-site Project camp.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	Rare				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	Medium temporal effects as the frequency would be rare but could persist through the construction and operation phase.					
IMPACT MAGNITUDE		Negligible	**Small**	Medium	Large	
		Small impact magnitude combing the low spatial effect and medium temporal effect.				
RECEPTOR VULNERABILITY		Low	**Medium**	High		
		Medium receptor vulnerability given the absence of existing management and requirements on worker's accommodation and the presence of migrant workers as vulnerable workers.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

Recommended Mitigation Measures

A **Workers Accommodation Management Plan (WAMP)** should be developed including following mitigation measures to remedy the OHS risks related to the accommodation conditions of the Project:

- Build and maintain the workers accommodations to meet the principles of EBRD/IFC "Workers' Accommodation: Processes and Standards (2009)".
- Ensure the standard and requirements of EBRD/IFC "Workers' Accommodation: Processes and Standards (2009)" are adequately implemented through the mechanism of monitoring and onsite auditing of workers' accommodation conditions in terms of hygiene, sanitation, safety, and living conditions. Non-compliances should be addressed promptly, and key findings should be communicated to workers to ensure transparency.
- Formalize the worker's grievance mechanism to make sure any concern related to the worker's living conditions can be proposed, responded, and resolved properly.

Residual Impacts

After applying the appropriate mitigation measures, residual impacts are considered to be **Negligible**.

10.7 EMPLOYMENT AND LOCAL ECONOMY

10.7.1 OVERVIEW

The Project will generate positive economic effects through local recruitment during construction and operation, increased demand for goods and services, and opportunities for skills transfer as operational roles transition gradually from foreign to local personnel. Maximizing these benefits requires transparent hiring processes, fair working conditions, and targeted capacity-building to ensure local workers, including vulnerable groups, can access and retain emerging job opportunities throughout the Project lifecycle.

10.7.2 IMPACT ASSESSMENT

10.7.2.1 CONTRIBUTION TO LOCAL EMPLOYMENT AND ECONOMY

Potential Impacts

During the construction phase, Project will engage with an EPC to recruit the contracted worker, with more than half of whom are expected to be sourced from local Uzbek communities (over 300 people at peak). Additionally, 4 out of 24 workers directly employed by the Project company will be Uzbeks during the construction phase. During the operation phase, the number of direct Project workers is around 60-100 people. The overall employment strategy will follow a phased transition approach: a relatively higher proportion of Chinese staff will be deployed at the initial stage of operations, with local employees gradually taking over the roles and responsibilities of Chinese staff in the subsequent phases until the localized staffing is fully realized.

The Project will first create corresponding job positions in sectors of administration, techniques, construction and daily labor for the local communities. Especially considering the skillset of local communities, it will create a positive impact on the provision of skilled and unskilled employment to locals.

Additionally, procurement contracts for items such as food or raw materials (including 70% of cable will be procured locally) will also be sourced from local communities. Furthermore, earnings from Project-related employment are likely to be spent on local goods and services, creating positive socio-economic effects for local residents. The skills and experience obtained from this limited temporary employment will also improve workers' future job opportunities.

Thus, the Project will bring direct positive impact on local employment and economy.

Significance of Impacts

Impacts		**Contribution to Local Employment and Economy**				
Impact Nature		Negative	**Positive**		Neutral	
IMPACT CHARACTERISTICS	**Type**	**Direct**	**Indirect**		Induced	
		Local procurement activities, including both employing local labor force and services as well as local material goods, could benefit local economy and employment.				
	Extent	Site	**Local**	Regional	National	International

Recommended Enhancement Measures

To promote and maximize the Project's positive contribution to the local economics and employment, this SIA proposes the following enhancement measures:

- (Good to Have) A **Local Content Management Plan (LCMP)** is recommended to be developed to meet the following requirements:
  - Prioritize the local labor force during the recruitment during the operation phase, particularly for any member from Project affected MFYs.
  - Ensure a transparent and non-discriminatory hiring process by clearly and widely disclosing recruitment information (e.g. potential vacancies, number of workers required, qualifications, recruitment process and timeline) to the local communities and wider areas in the district through transparent and culturally appropriate communications.
  - Identify training priorities as early as possible, especially for vocational training and retraining. Develop training plans according to different types of working positions and requirements. Ensure that Project affected Persons will have priority access to vocational training and employment
  - Prioritize procurement from local businesses and particularly Small and Medium Enterprises (SME) through methods such as package unbundling to invite more SMEs to compete and supply, mapping and maintaining a local procurement database and tracking the progress overtime.
- (Good to Have) Periodically report and disclose the Project’s positive contribution on the local economy and employment to the local authorities and communities. Build and sustain the cooperative relationship with the local community.

11. UNPLANNED EVENTS IMPACT ASSESSMENT

This chapter of the Environmental and Social Impact Assessment (ESIA) report addresses the critical aspect of unplanned or accidental events in relation to the proposed Project. Unforeseen incidents and accidents have the potential to create immediate and lasting environmental, social, and economic impacts, which must be thoroughly evaluated to ensure the overall safety, sustainability, and resilience of the Project.

This chapter outlines the methodologies employed to identify potential unplanned events, assess their potential consequences, and develop effective strategies for prevention, mitigation, and response. By analysing these scenarios and their associated risks, this chapter contributes to a comprehensive understanding of the Project's potential impact on the environment, communities, and stakeholders, and provides a foundation for robust emergency preparedness and management plans.

11.1 ASSESSMENT APPROACH AND CRITERIA

Impacts resulting from unplanned events are defined as being a combination of the likelihood (or frequency) of incident occurrence and the consequences of the incident should it occur.

The approach for assessing the impact of the unplanned events is staged as follows and further described in this Chapter:

- Hazards identification;
- Likelihood assessment;
- Consequence assessment; and
- Risk mitigation measures.

The Project scope is first reviewed to identify the potential hazards to the environment due to any accidental events. Generally, the substances handled by the Project are studied if release of these substances to environment will give any adverse impact. The associated scenarios due to accidental events are then populated for further analysis.

For each of the scenarios, the assessment of likelihood and the extent of the consequence effect is then carried out. The assessment takes a qualitative approach based on professional judgement and experience from similar Projects.

Definitions used in the assessment for likelihood is set out in ***Table 11-1*** and consequence of unplanned events is outlined in ***Table 11-2***.

TABLE 11-1 SIGNIFICANCE CRITERIA FOR UNPLANNED EVENTS – LIKELIHOOD

Likelihood	Explanation
Unlikely	The event is unlikely to occur but is known in similar projects.
Possible	The event is likely to occur once or more during project operation.
Likely	The event will occur more than twice per year, or is continuous or certain to occur during project operation.

TABLE 11-2 CONSEQUENCE OF UNPLANNED EVENTS

Strategy	Incidental	Minor	Moderate	Major
Physical Environment	Impacts such as localised or short-term effects or environmental media, meeting all environmental standards	Impacts such as widespread, short-term impacts to environmental media, meeting all environmental standards	Impacts such as widespread, long-term effects on environmental media, meeting all environmental standards	Impacts such as significant, widespread and persistent changes in environmental media OR Exceedance of environmental standards
Biological Environment	Impacts such as localised or short-term effects on habitat or species	Impacts such as localised, long-term degradation of sensitive habitat or widespread, short-term impacts to habitat or species	Impacts such as localised but irreversible habitat loss or widespread, long-term effects on habitat or species	Impacts such as significant, widespread and persistent changes in habitat or species
Social Environment	Slight, temporary, adverse impact on a few individuals	Temporary (<1 year), adverse impacts on community which are within international health standards	Adverse specific impacts on multiple individuals that can be restored in <1 year; Or one or more injuries, not lost-work injuries	Adverse long-term, multiple impacts at a community level, but restoration possible; Or one or more lost-work injuries to a member of the public including permanently disabling injuries

The potential impact of unplanned and non-routine event during construction and operation phases are assessed together, based on the methodology below.

TABLE 11-3 IMPACT SIGNIFICANCE OF UNPLANNED EVENTS

		Likelihood of Occurrence		
		Unlikely	Possible	Likely
Consequence	Incidental	Negligible	Negligible	Negligible
	Minor	Minor	Minor	Minor
	Moderate	Minor	Moderate	Moderate
	Major	Moderate	Major	Major

11.2 HAZARD IDENTIFICATION

The possible scenarios leading to release of the hazardous substances as unplanned events include:

- Fire and Explosion
- Leakage and Spill of Hazardous Substances ; and
- Traffic and on-Site Vehicle Incidents

The potential impacts of the abovementioned hazard include:

Ambient Air Quality

Unplanned events such as fire, explosion, chemical spills, abnormal combustion may release particulate matter, volatile organic compounds (VOCs), combustion gases, or other hazardous pollutants into the atmosphere. Such episodic releases may temporarily degrade air quality, with potential short-term health effects for onsite workers and nearby communities, including eye and respiratory irritation. Upset combustion conditions during emergency shutdowns may also increase odour levels or lead to brief exceedances of typical emission rates.

Soil and Groundwater

Unplanned events involving **chemical spills, fuel leaks, or leachate escape** present a clear risk of soil contamination and potential infiltration into shallow groundwater. Such incidents would require emergency containment, clean-up, and possibly longer-term environmental monitoring. While off-site migration is considered unlikely with timely response, unmanaged releases could cause localised degradation of groundwater quality.

Labour and Working Conditions

Unplanned events such as fire, explosion, boiler failure, electrocution, mechanical injury, or confined space incidents pose direct and immediate risks to worker safety. Potential impacts include injuries, fatalities, psychological stress, and temporary disruption to site operations. Emergency response actions may also involve additional labor risks if responders are exposed to hazardous conditions.

Community Health and Safety

Nearby communities may be exposed to smoke, hazardous gases, odours, or dust plumes during accidental fires, explosions, or chemical releases if any air emission related emergencies occur. Traffic accidents involving Project vehicles may also result in injuries to community members. Furthermore, although the Project adopts a zero-liquid-discharge system, accidental leaks of chemicals (e.g., ammonia solution, diesel, leachate) or failures in containment infrastructure could pose risks of soil or groundwater contamination, which may indirectly influence community health if exposure occurs through proximity, vapors, or contact with polluted surfaces.

11.3 FIRE AND EXPLOSION

11.3.1 SOURCE OF IMPACT

- **Diesel and ammonia tank area:** Leakage from valves or flanges, failure of storage tank, hose rapture or disconnecting during loading/unloading will form liquid pool and may form flammable vapor upon evaporation. Ignition sources such as open flames, static electricity, electrical sparks, mechanical impact sparks or lightning may cause fire or explosion.
- **Waste storage pit area:** Long-term stacking and fermentation of domestic waste generate heat accumulation, leading to smoldering and open fire; Methane and other gases from waste fermentation accumulate and explode when exposed to sparks. Flammable waste also poses a risk of fire or explosion during storage in waste pits.

11.3.2 EMBEDDED CONTROLS

Diesel and ammonia tank area:

- The underground diesel storage area is enclosed by a 416 m³ containment dike. The tanks are fully covered with compacted sand soil for secondary containment and fire protection.
- Ammonia tank is installed within a containment bund with containment capacity of 113.4 m³.
- The storage capacity of leachate storage tank is 720 m^3.
- Firefighting wastewater is designed to collected into first-flush rainwater tank, preventing direct discharge into the environment.
    - The designed water volume for outdoor fire hydrants is 144 m^3. And the volume of first-flush rainwater tank is 320 m^3.

Waste storage pit area:

- The domestic waste storage in the waste pit will be turned over regularly to prevent heat accumulation.
- The waste collection hall maintains continuous ventilation to prevent flammable gas accumulation. During incinerator operation, the exhaust air serves as combustion air; during shutdown, it is treated by an activated carbon adsorber before discharge.
- Garbage with large volume, low calorific value or potential risk are not within the disposal scope specified in the project investment agreement. If any garbage that does not fall under the disposal scope is found, it will be recovered by the robotic arm and handled separately by the government.

- Gas detectors (e.g. methane and hydrogen sulfide) are planned to install and connect to fire alarm system.
- Two firefighting water cannons, each with a 30 L/s flow rate, are mounted beside the garbage feed hopper and can cover the entire garbage pit. They are electrically activated, designed to operate continuously for 1 hour, and can be triggered either automatically via the fire control system or manually.
- The fire wastewater can be collected in the waste storage pit.

11.3.3 SIGNIFICANCE OF IMPACTS

The impact magnitude is expected to be small through the implementation of the existing control and mitigation measures with the existing controls in place. Most receptors/resources, including local communities, workers, are considered of medium sensitivity and terrestrial flora and fauna are considered of low sensitivity. The significance of impact from fire and explosion is considered to be **Minor**.

TABLE 11-4 IMPACT ASSESSMENT OF FIRE AND EXPLOSION

Impact		**Impact from fire and explosion**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		This impact is direct on flora and fauna, livelihood, community health and safety.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The spatial impact is expected to be localized and considered as Low.					
	Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	Frequency	Rare				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	
	Accidental events can be resolved quickly. The temporal impact is considered as Low.					
	Likelihood	Unlikely	**Possible**	Likely		
CONSEQUENCE		Incidental	**Minor**	Moderate	Major	
		Considering the low level of spatial and temporal effects, the consequence is determined to be Minor.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

11.3.4 MITIGATION MEASURES

Planning for Fire and Explosion Emergency Response

- Ensure that all people working on the Project Site shall receive an induction training on fire safety and emergency response, this induction shall include, but not limited to:
    - Evacuation procedures from offices and other buildings in event of fire, assembly point procedures;
    - Actions in the event of site alarm and assembly procedures; and
    - Selection and operation of firefighting equipment.

- Ensure that the flammable substances (i.e. chemicals/oil/diesel) will be controlled/distanced to ignition sources;
- Install signs to show flammable areas and no smoking areas;
- Establish and follow electricity safety regulations, check and maintain machines periodically.

Response to Fire Emergencies

- Any person seeing a fire and explosion must first raise the alarm either verbally, blowing of whistle, alarm call point, cell phone or radio call, and immediately report to his supervisor or foreman, who will report to the personnel in the Emergency Contact List;
- If it is a small fire, the person(s) who spotted the fire may attempt to use a portable fire extinguisher to control the fire from spreading;
- If the fire is beyond control or lives are endangered, inform the fire police and emergency evacuation shall be activated. Immediately inform the fire police in case that the fire cannot be controlled internally. All persons and rescue victims to assembly points as soon as possible and provide necessary first aid, if needed;
- The person(s) in charge shall report their headcount and any missing personnel and their last known location immediately. Rescue team shall be informed and instructed to organize search and rescue of all reported missing personnel immediately.

11.3.5 RESIDUAL IMPACTS

With the implementation of the above existing embedded/in place measures, as well as the above-recommended additional mitigation and management measures, it is expected that the residual significance of fire and explosion impacts would be reduced to **Negligible**.

11.4 LEAKAGE AND SPILL OF HAZARDOUS SUBSTANCES

11.4.1 SOURCE OF IMPACT

Spills and leaks can originate from various sources, each carrying the potential to create environmental, social, and economic consequences. Leakages and spills can happen in the oil material, ammonia and waste leachate storage area and loading area due to the following reasons:

- Tank corrosion, welding cracks or foundation settlement.
- Pipeline, valve or flange failure due to aging, corrosion or vibration.
- Mechanical seal failure of pumps.
- Hose rupture, disconnection or overflow during loading/unloading.
- External damage such as vehicle collision or construction excavation.

11.4.2 IMPACT ASSESSMENT CRITERIA

After the liquid chemical leakage, a liquid pool formed within the containment bund and volatile gas was generated through evaporation. Considering the storage volume and the toxic,

that ammonia leakage is considered as the scenario with the most serious consequences of leakage.

As ammonia has a molecular weight (17 g/mol) significantly lower than that of ambient air (~29 g/mol), resulting in rapid vertical dilution and predominantly upward transport under neutral or unstable atmospheric conditions. Ammonia is considered as light gas and will employ the AFTOX(Air Force Toxic) chemical dispersion model developed by the U.S. Air Force to simulate atmospheric diffusion.

11.4.2.1 THE AFTOX INPUT DATA

1) Source Term Parameters

Referring to Guidelines for Quantitative [129] and Risk Assessment Data Directory [130] , the most likely event for the storage tank is a 10 mm diameter leak, with a leakage frequency of 1×10^{-4} per year.

It is assumed that the leakage will be discovered within 5 minutes and leakage point will be handled within 10 minutes and the leakage will be collected and transferred within 15 minutes after sealing.

- Release Type: Instantaneous Release for 30 minutes
- Storage Temperature: 15.5℃ (annual average temperature)
- Release Rate: 0.55kg/s, the calculation method is as follows:

  Liquid leakage rate (Q_L) is calculated with the Bernoulli equation (with the restriction that no flash evaporation occurs within the discharge orifice):

$$Q_L = C_d \times A \times \rho \times \sqrt{\frac{2\times(P-P_0)}{\rho} + 2gh}$$

  Q_L— Liquid leakage rate, 0.55 *kg/s*

  P— Internal pressure of the vessel, 92900 *Pa*

  P_0— Ambient pressure, 92900 *Pa*

  ρ— Density of the leaking liquid, 920 *kg/m³*

  g— Gravitational acceleration, *9.80 m/s²*

  h—Height of the liquid above the crack, 7 *m*

  C_d— Liquid discharge coefficient, 0.65 for circular crack

  A— Area of the orifice/crack, 0.0000785 *m²*

- Spill Pool Area: 53.8 m^2, the leakage volume is 0.538 m^3 (0.55 kg/s ×900 seconds ÷920 kg/m^3) and the liquid pool height is set at 0.01 m.
- Mass Evaporation Rate: 0.0495 kg/s
  - $Q = \alpha \times p \times \frac{M}{RT_0} \times u^{\frac{(2-n)}{(2+n)}} \times r^{\frac{(4+n)}{(2+n)}}$

[129] TNO (CPR). (2010). Guidelines for Quantitative Risk Assessment (Purple Book)
[130] IOGP. (2010). Risk Assessment Data Directory (3rd Ed.). International Association of Oil & Gas Producers.

Q— Mass evaporation rate, kg/s;

p— Vapour pressure at the liquid surface, 92900 Pa;

R— Gas constant, 8.314 J/(mol·K);

T_0— Ambient temperature, 288.65 K;

M— Molar mass of the substance, 0.017 kg/mol;

u— Wind speed, 1.0 m/s;

r — Pool radius, 4.14 m;

a & n— Atmospheric stability coefficients, a=0.005285 & n=0.3 for atmospheric stability of F.

2) Meteorological Parameters

According to the meteorological data collected from 2020 to 2024, the most possible (8.4%) combination of atmospheric stability and wind speed is F and 1.0 m/s with an occurrence probability of 8.4%.

3) Terrain Parameters and limitation

The surrounding area of the project site is flat terrain and topography becomes non-uniform beyond approximately 100 meters from the site boundary.

The diffusion results beyond the 100-meter boundary are provided for reference only.

11.4.2.2 DIFFUSION RESULT

Under the specified accident scenario, short-term ammonia concentrations exceeding the Immediately Dangerous to Life or Health (IDLH) level may occur within the 180-meter downwind zone. The IDLH value adopted 300 ppm[131] (equivalent to approximately 241 mg/m^3) established by the U.S. Centers for Disease Control and Prevention (CDC).

The diffusion results are summarized in ***Table 11-5*** and ***Figure 11-1 .***

TABLE 11-5 DIFFUSION SUMMARY RESULT IN DOWNWIND

Downwind distance (m)	Time of arrival (min)	Peak concentration (mg/m^3)
10	0.17	**988.69**
20	0.33	**3011.70**
30	0.50	**2666.30**
40	0.67	**2075.50**
60	1.00	**1277.60**
80	1.33	**855.31**
100	1.67	**613.96**

[131] https://www.cdc.gov/niosh/idlh/7664417.html

Downwind distance (m)	Time of arrival (min)	Peak concentration (mg/m^3)
120	2.00	**463.96**
140	2.33	**364.33**
160	2.67	**294.66**
180	3.00	**243.91**
200	3.33	205.72
250	4.17	143.01
300	5.00	106.00
350	5.83	82.19
400	6.67	65.88
450	7.50	54.18
500	8.33	45.48
800	13.33	20.76
1000	16.67	14.29

FIGURE 11-1 THE DOWNWIND AREA MIGHT OVER IDLH

Legend	Project Location		
0m 40m 80m	Date: 12 March 2026	Drawn Size: 22x15 cm	**SUS Uzbekistan Waste to Energy Project**
Leakage area	Drawn by: JC	Reviewed by: MD	
Downwind area might over IDLH	Coordinate System/Source: WGS 1984		Client: SUS Environment
	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

11.4.3 EMBEDDED CONTROLS

Diesel and ammonia tank area:

- The underground diesel storage area is enclosed by a 416 m³ containment dike.
  - The volume of containment dike is more than 110% of the volume of a single diesel tank.
  - The anti-seepage system of diesel storage area comprises the following components, arranged from interior to exterior: 1) 1 mm cementitious crystalline waterproofing layer; 2) 2 mm epoxy resin coat and Fiberglass reinforced plastic; 3) 350 mm structural wall of C40 concrete with impermeability grade P8 ; and 4) 2 mm polyurethane waterproof membrane. The permeability coefficient of the linings will be no greater than 1×10^{-11} cm/s.
- Ammonia tank is installed within a containment bund with containment capacity of 113.4 m³ and covered by a protective canopy.
  - The volume of containment dike is more than 110% of the volume of ammonia tank.
  - The containment bund is sealed with a 1.5 mm polyurethane waterproof coating and permeability is no greater than 1×10^{-11} cm/s.
- The storage capacity of leachate storage tank is 720 m^3.
  - In the event of an accident or significant leakage, the leachate can be diverted to leachate collection sump and waste storage pit. The volume of waste storage pit is more than 110% of the volume of leachate tank.
  - The containment bund is sealed with a 1.5 mm polyurethane waterproof coating and permeability is no greater than 1×10^{-11} cm/s.

Waste storage pit area:

- Fire wastewater if fire occurs can be collected in the waste storage pit.
- Waste storage pit is constructed using C40 concrete with impermeability grade P8 and incorporate an integrated anti-seepage layer to ensure hydraulic integrity.
  - The anti-seepage lining includes: 1) a 1 mm cementitious crystalline layer on the pit interior, with a 1.5 mm polyurethane membrane at the bottom of waste storage pit; and 2) two layers of SBS modified asphalt membranes with 3mm and 4mm on the exterior of waste storage pit.
  - The permeability coefficient of the linings will be no greater than 1.0×10^{-11} cm/s, ensuring effective prevention of leachate and fire wastewater seepage.

11.4.4 SIGNIFICANCE OF IMPACTS

The impact magnitude is expected to be small through the implementation of the existing control and mitigation measures with the existing controls in place. Most receptors/resources, including local communities, workers, are considered of medium sensitivity and terrestrial flora and fauna are considered of low sensitivity. The significance of impact from leakage and spill of hazardous substances is considered to be **Minor**.

TABLE 11-6 IMPACT ASSESSMENT OF SPILLS AND LEAKS

Impact		**Impact from spills and leaks**				
Impact Nature		**Negative**	Positive		Neutral	
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect		Induced	
		This impact is direct on flora and fauna, livelihood, community health and safety.				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**		Medium		Large
	SPATIAL EFFECTS	**Low**		Medium		High
	The spatial impact is expected to be localized and considered as Low.					
	Duration	Temporary	Short-term	Medium-term	**Long-term**	Permanent
	Frequency	Rare				
	TEMPORAL EFFECTS	Negligible	Low	**Medium**	High	
	Although accidental events can be resolved quickly, the remaining impact will be long-term. The temporal impact is considered as Medium.					
	Likelihood	**Unlikely**		Possible		Likely
CONSEQUENCE		Incidental	Minor	**Moderate**	Major	
		The impact magnitude is determined to be Moderate.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

11.4.5 MITIGATION MEASURES

Planning for Chemical Spill/Leakage Emergency Response

- Provide chemical safety training to relevant employees in order to ensure they are competent in response to oil and chemical spill;
- For storing onsite:
  - Ensure that the products are properly stored on site (e.g., secondary containment, double walled tanks, over filling alarm system) in designated areas (i.e., storage and workshop areas for construction materials, fuels and lubricants);
  - Ensure that the emergency response facilities and equipment for oil spill (i.e., spill kits, Safety Data Sheet ("SDS"), personal protective equipment ("PPE")) are available, adequate and functional at the Project Site;
  - Ensure good inspection for housekeeping conditions of chemical storage areas and integrity of chemical containers, and ensure maintenance procedures to minimize small leaks and spills.
- For transporting of hazardous materials/wastes on public road:
  - Vehicles used for transporting hazardous chemical/oil shall be affixed with relevant hazardous pictograms on both side and the rear of the vehicle. Hazardous chemical/oil shall be packed and labelled properly;
  - Vehicles used for transporting chemical/oil shall be provided with oil spill kit, fire extinguishers, SDS of transported chemical/oil and suitable PPE as per SDS;
  - Chemicals that are likely to react with each other must not be transported in the same vehicle. The driver shall inspect and ensure safety before transport begins.

Response to Chemical and Oil Spillage Emergencies

- If the oil/chemical spillage is within the site's capacity, the ERT shall:
  - Evacuate irrelevant/unauthorized people from the spill area to upwind area;
  - Isolate the source of the spill and ensure that spillage does not flow into the drainage system;
  - Ensure that the contaminated areas are cleaned up as soon as possible by competent persons using absorption materials (either sand or proper absorbent);
  - Keep copies of hazardous substances inventory which are used onsite;
  - Collect the absorption materials, contaminated material/waste and store in sealed containers and properly labelled, and handle in proper containers and treated and disposed as hazardous waste.
- If the oil/chemical spillage is beyond the site's capacity, the ERT shall:
  - Liaise with all relevant external parties involved;
  - Contact the public emergency services such as Police to control the situation;
  - Arrange for immediate remediation of the affected areas, after spillage is brought under controls.

11.4.6 RESIDUAL IMPACTS

With the implementation of the above existing embedded/in place measures, as well as the above-recommended additional mitigation and management measures, it is expected that the residual significance of fire and explosion impacts would be reduced to **Negligible**.

11.5 TRAFFIC AND ON-SITE VEHICLE INCIDENTS

11.5.1 SOURCE OF IMPACT

Traffic and vehicle-related unplanned events may occur during both construction and operation due to the movement of heavy equipment, trucks, cranes, personnel transport vehicles, etc. Potential incident types include collisions, vehicle-pedestrian accidents, rollovers, struck-by incidents, and property damage.

11.5.2 EMBEDDED CONTROLS

According to the *EHS Department Management System for the Operation Phase of* SUS Samarkand Co., Ltd, the following embedded control measures are in place:

- Install clear road traffic signs, warning signs, and directional indicators within the facility.
- Enforce a strict speed limit of ⩽5 km/h inside the plant for loaded trucks; waste-transport vehicles must follow zoned and designated routes.
- All drivers must hold a valid driving license and pass position-specific competency checks.
- Drunk driving, fatigued driving, overloading, speeding, and driving without a license are strictly prohibited.
- Strictly prohibit overloading, unsafe reversing, improper parking, or unauthorized operations.
- Vehicles must undergo required maintenance, servicing, annual inspections, and retirement/disposal procedures.
- Implement the "Three-Inspection System" for all vehicles: pre-operation, during-operation, and post-operation checks.

- PPE requirements: Personnel involved in transport, unloading, and traffic dispatch must wear reflective vests and other required PPE.
- Conduct daily checks, weekly hazard inspections, and monthly coordination inspections on traffic and vehicle management.
- Implement an accident reporting requirements that any traffic accident or near-miss must be reported within 1 hour.

11.5.3 SIGNIFICANCE OF IMPACTS

Considering the existing control measures covering traffic infrastructure, driving regulations, inspection mechanisms and reporting regulations, the likelihood for traffic and on-site vehicle incidents is assessed as Low. While the consequence of impact of unplanned traffic incidents is assessed at Minor considering the possible short-term harm for Project workers. Overall impact significance prior to additional mitigation is therefore assessed as **Minor**.

TABLE 11-7 IMPACT ASSESSMENT OF TRAFFIC AND ON-SITE VEHICLE INCIDENTS

Impact		**Traffic And On-Site Vehicle Incidents**				
Impact Nature		**Negative**	Positive	Neutral		
IMPACT CHARACTERISTICS	**Type**	**Direct**	Indirect	Induced		
		This impact is direct on Project workers				
	Extent	Site	**Local**	Regional	National	International
	Scale	**Small**	Medium	Large		
	SPATIAL EFFECTS	**Low**	Medium	High		
	The spatial impact is expected to be localized and considered as Low.					
	Duration	Temporary	**Short-term**	Medium-term	Long-term	Permanent
	Frequency	Possible but rare				
	TEMPORAL EFFECTS	Negligible	**Low**	Medium	High	
	Accidental events can be resolved quickly. The temporal impact is considered as Low.					
	Likelihood	Unlikely	**Possible**	Likely		
CONSEQUENCE		Incidental	**Minor**	Medium	Large	
		Considering the low level of spatial and temporal effects, the consequence is determined to be Minor.				
IMPACT SIGNIFICANCE		Negligible	Minor	Moderate	Major	

11.5.4 MITIGATION MEASURES

- Establish and implement a construction phase traffic management plan and require EPC contractor to adhere to the construction phase traffic management plan using periodic audits and inspections.
- Conduct mandatory pre-qualification screening for all subcontracted logistics providers (safety history, fatality record).
- Implement strict driver working-hours and fatigue management, including maximum continuous driving time and mandatory rest hours.

11.5.5 RESIDUAL IMPACT

With the implementation of the above existing embedded/in place measures, as well as the above-recommended additional mitigation and management measures, it is expected that the residual significance of traffic incidents would be reduced to **Negligible**.

12. CUMULATIVE IMPACT ASSESSMENT

12.1 METHODOLOGY AND APPROACH

The international lender requirements of IFC PS1 specify that risks and impacts of a Project shall be analyzed in such a Cumulative Impact Assessment (CIA), with respect to cumulative impacts from:

- Other existing Projects or conditions gathered from baseline surveys, review of available published information and stakeholder engagement activities;
- Other future developments (including future stages of the Project itself) that are realistically defined at the time the ESIA is undertaken and for which the sphere of influence of the various Projects or developments may overlap.

Cumulative impacts are defined for this ESIA as impacts which result from the incremental changes caused by the Project together with other presently ongoing, or reasonably foreseeable future planned actions/Projects within the Project Area.

Depending on the type/characteristics of other identified Projects and their specific impacts, the main issues of concern with respect to the CIA can thus include any type of impact that is considered in the ESIA.

12.2 OBJECTIVES AND SCOPE

The objectives of this cumulative impact assessment (CIA) are to:

- Identify other existing and planned Projects that could cumulatively impact the Project area
- Identify the "Valued Environmental and Social Components" (VECs) that could be impacted cumulatively
- Assess the cumulative impacts on VECs, considering the other Projects
- Proposing a Management Framework to avoid or minimize the cumulative impacts

The scope of this CIA is from the perspective of the Project, namely for the construction and operations of the waste-to-energy plant, the substation and the OTL. These Project activities and potential cumulative impacts must be viewed in the wider context of the overall site, namely the future development of nearby projects, if any.

12.3 KEY TERMINOLOGY

The following are definitions for key terms used in the CIA (after IFC, 2013):

- **Cumulative impact**: Impacts that result from the successive, incremental, and/or combined effects of an action, Project, or activity added to other existing, planned, and/or reasonably anticipated actions, Projects, or activities. For practical reasons, the identification, assessment, and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concern and/or concerns of affected communities.
- **CIA trigger projects**: Existing, planned, or reasonably expected future developments, projects and/or activities potentially affecting VECs.

- **External stressors or drivers**: Sources or conditions that could affect or cause physical, biological, or social stress on VECs, such as natural environmental and social drivers, human activities, and external stressors. These can include climate change, population influx, natural disasters, or deforestation, among others.
- **Valued Environmental and Social Components**: VECs that are considered as important by the scientific community and/or potentially affected communities. VECs may include:
  - Physical features, habitats, wildlife populations (e.g., biodiversity, water supply);
  - Ecosystem services (e.g., protection from natural hazards, provision of food);
  - Natural processes (e.g., water and nutrient cycles, microclimate);
  - Social conditions (e.g., community health, economic conditions); and
  - Cultural heritage or cultural resources aspects (e.g., archaeological, historic, traditional sites).

VECs reflect the public and scientific community's "concern" or special interest about environmental, social, cultural, economic, or aesthetic values. VECs are considered the ultimate recipients of cumulative impacts because they tend to be at the ends of ecological pathways.

12.4 ASSESSMENT METHODOLOGY

The evaluation of potential cumulative impacts is highly dependent on the particular locations and activities under review, and therefore each situation will be assessed qualitatively on a case-by-case basis.

The approach to the CIA is undertaken following the *IFC Good Practice Handbook: Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Markets*. In line with the Handbook's guidance, a Rapid Cumulative Impact Assessment approach is considered appropriate for the Project, as it considers the challenges to conducting a CIA in an emerging market, which apply in this case, namely:

- Lack of baseline data related to the other Project developments;
- Uncertainties associated with anticipated developments;
- Limited and emergent, strategic regional, sectoral, or integrated resource planning schemes.

In line with IFC PS 1 guidance notes (GN41) that the assessment should be "*commensurate with the incremental contribution, source, extent, and severity of cumulative impacts anticipated*", this assessment attempts to focus only on the potentially significant cumulative impacts, and where the Project's contribution to the cumulative impact is considered to be significant. In line with the guidance provided in ***Section 2 and 3*** of the IFC handbook, potential mitigation measures are designed to focus on cooperation and information-sharing, in recognition of the limited control and direct influence/ decision-making ability of this private sector sponsor.

The CIA typically adheres to the six-step methodology:

- **Step 1**: Definition of the relevant spatial and temporal boundaries
- **Step 2**: Identification of key VECs and screening/Identification of potentially relevant other Projects in the region
- **Step 3**: Determine present conditions of the VECs

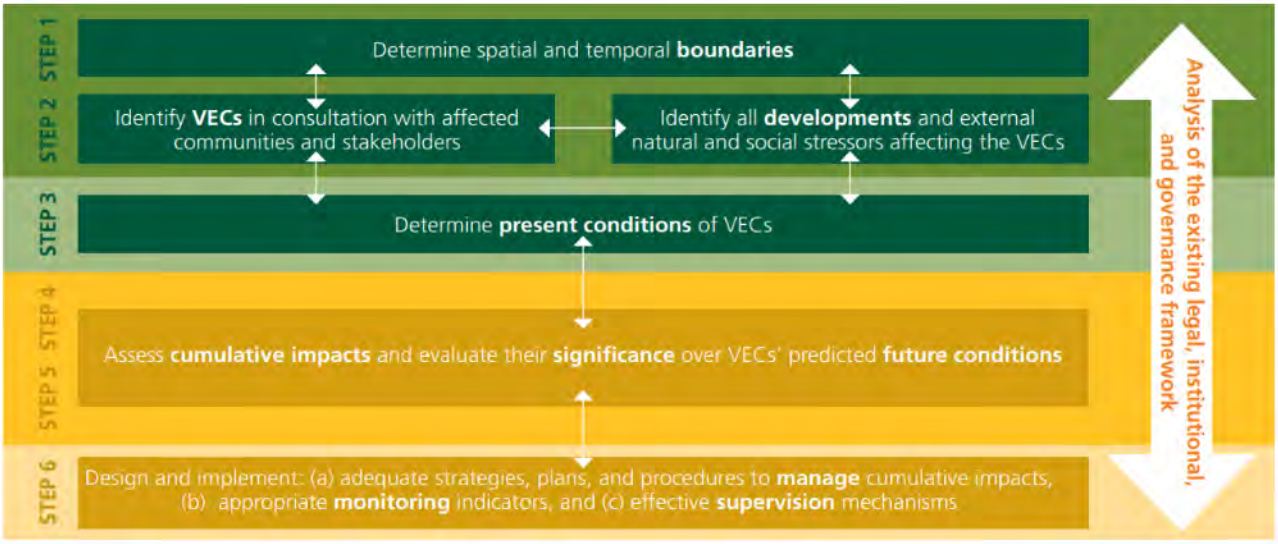
- **Step 4 & 5 & 6**: Assessment of potential cumulative impacts and identification of appropriate mitigation measures

The technical background information presented in this CIA is drawn from the baseline information gathered through the ESIA process, including primary data collection, review of relevant existing scientific sources and regional planning documentation. The key potential cumulative impacts are screened also considering the outcomes of the impacts assessment process.

The CIA also cross-references the stakeholder engagement process and outcomes from discussions and inputs from public and statutory stakeholders isare considered. The scoping engagement discussions have provided inputs regarding the identification of key issues, as applicable to the VEC confirmation.

Information on other potential Projects has frequently been obtained from publicly available sources.

FIGURE 12-1 CUMULATIVE IMPACT ASSESSMENT PROCESS



Source: IFC, 2013

12.5 ASSUMPTIONS AND LIMITATIONS

The following limitations and caveats apply to this CIA:

- Incomplete information about other Projects and/or activities in the WtE plant or water supply system or OTL proximity (e.g., the information which may not yet be available in the public domain or where only short excerpts of survey findings are available);
- Incomplete baseline information for selected VECs;
- Uncertainty with respect to the implementation of future Projects in the wider area.

12.6 IMPACT ASSESSMENT

12.6.1 STEP 1: DEFINITION OF THE RELEVANT SPATIAL AND TEMPORAL BOUNDARIES

Cumulative impacts are contextual and encompass a broad spectrum of impacts at different spatial and temporal scales (IFC, 2013). It is therefore important to establish upfront the spatial and temporal boundaries of the study.

Spatial Boundaries of the CIA

The relevant spatial boundaries for this CIA are essentially the same as the specific AoI defined in ***Section 2*** of this ESIA Report for each relevant topic.

Temporal Boundaries of the CIA

The temporal boundary of the CIA formally encompasses the entire Project life cycle, from construction through long-term operations. Nevertheless, the CIA process is inherently constrained by the ability to reasonably predict future events and trends, including the planning/implementation of other relevant Projects in the region. Therefore, for the purpose of this CIA, consideration is given to the construction phase and, for operations – to the extent feasible for discussion and assessment of cumulative impacts with the other Projects in the Project proximity.

12.6.2 STEP 2: IDENTIFICATION OF VECS AND SCREENING OF OTHER PROJECTS IN THE REGION

VECs were identified through the ESIA process based on the outcomes of the Environmental Impact Assessment and Social Impact Assessment findings as well as any stakeholder and expert consultations.

Importantly, the IFC (2013) states clearly "VECs for which the Project will have no direct or indirect impact do not need to be the subject of CIA". Priority should rather be given to those VECs that are likely to be at the greatest risk from the development's contribution to cumulative impacts.

The ESIA process identified several VECs in the Project area that may be subject to potential impacts from the Project – and other relevant Projects in a cumulative manner. The outcomes of the impact assessments were reviewed to identify VECs that will be impacted by the Project, and further narrowed down by considering those where the Project would be a significant contributor to any cumulative impact realized. These significant impacts are considered to represent the Project's contribution to cumulative impacts. Full details of all receptors and potential impacts are described in the respective ESIA sections.

Relevant VECs to be assessed within the present CIA are therefore considered to be:

- Ambient air quality
- Noise
- Socioeconomic conditions

According to the desktop research, site visit and stakeholder engagement with governmental agencies, local residents, clients, etc., a SMZ Metal Processing Plant (SMZ "SAMARQAND METALLURGIYA ZAVODI) is currently in operation and is located adjacent to the Project (about 500 meter south-east from the Project site as illustrated in ***FIGURE 2-3***).

According to site visits and stakeholder engagements, the SMZ Metal Processing Plant will expand its Cold-rolled and coated steel sheets capacity from 500,000 t/a to 600,000 t/a in 2026. Details on this expansion are not available.

12.6.3 STEP 3: DETERMINE PRESENT CONDITIONS OF THE VECS

The present conditions of the VECs identified are described in the respective baseline sections of this ESIA – refer to the relevant sections for these descriptions.

The contribution of Samarkand city landfill to local ambient air quality is included in the ambient air baseline data. Whether the Samarkand municipal landfill will be closed is not determined now. Section 8.1 presents baseline data for existing pollution sources (including Samarkand city landfill) and assesses the project's contribution to ambient air quality together with existing pollution sources.

The current understanding of baseline conditions has been used to identify and assess the potential cumulative impacts presented below.

12.6.4 STEP 4 & 5 & 6: ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS AND IDENTIFICATION OF APPROPRIATE MITIGATION MEASURES

For each of the activities identified in the preceding Step 2, a qualitative assessment of potential cumulative impacts on the identified VECs is undertaken per the following sequence:

- Brief description of the expected activities and with reference made to respective ESIA sections for further information regarding baseline conditions and other relevant data (if applicable);
- Assessment of key potential types of cumulative impacts on the VECs identified and estimation of significance and magnitude (as compared to the impacts of the Project on its own);
- Description of potential mitigation measures and residual cumulative impacts.

Depending on the specific impact characteristics, it may or may not be feasible to assign a specific significance to the cumulative impacts. Where feasible, the significance criteria are referred to for the corresponding types of impacts in the respective ESIA sections.

From an environmental perspective, future expansion of the SMZ Metal Process Plant may lead to cumulative impacts. These are most likely to arise from air emissions during the construction and operational phases of the expansion, as well as noise disturbances during the construction phase.

From a social perspective, cumulative impacts mainly relate to increased traffic burden, which could affect worker transport, local mobility, and community safety around industrial roads, given the already high traffic volumes associated with the metal plant and the expected increase brought by the Project.

The cumulative social impact from the future expansion of SMZ "SAMARQAND METALLURGIYA ZAVODI" stems from the increase in traffic and logistics pressure around the industrial zone, as well as heightened community sensitivity to multiple large-scale industrial facilities operating in the same area, which may amplify perceptions of environmental and health risks. Detailed engagement and monitoring activities could be found in the Project standalone Stakeholder Engagement Plan (SEP).

12.6.4.1 MITIGATION MEASURES

Mitigation measures set out in ***Chapter 13*** Environmental and Social Management and Monitoring (ESMM) Framework are developed to reduce the significant negative impacts identified during the ESIA Process to a point where they have no adverse effects, and to create or enhance positive impacts such as environmental and social benefits.

The priority in mitigation is to first apply mitigation measures to the source of the potential impact (i.e., to avoid or reduce the magnitude of the potential impact from the associated Project activity). This is then followed by addressing the resultant effect to the resource / receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations are applied to reduce the impact magnitude).

At the Project level, the measures listed in the ESMM framework are considered sufficient to address the impact.

13. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

This Section presents a provisional Environmental and Social Management Plan (ESMP) for the construction, operation and decommissioning of the Project, with the purpose of specifying framework, standards, and controls required to manage and monitor the environmental and social impacts. To achieve this, the ESMP compiles the potential adverse impacts from the planned and unplanned activities as identified in the ESIA and outlines mitigation measures required to reduce the likely negative impacts on the biophysical and social environment.

The ESMP details roles and responsibilities that will be assumed by each relevant entity as leader and/or supporter. The Project Company will have responsibilities for the implementation of the measures outlined in the ESMP, but may delegate responsibility to its contractors and collaborators, where appropriate. In cases where other individuals or organizations have responsibility for mitigation measures, this is clearly indicated within the ESMP.

Capacity building and training requirements are also described within this Chapter, where these relate to specific skills required to deliver the ESMP action in question.

13.1 OBJECTIVES AND PRINCIPLES

The ESMP is essential for successfully implementing the Project's environmental and social performance throughout the life of the Project. Having this ESMP in place ensures a systematic approach to bringing environmental and social considerations into decision-making and day-to-day operations. It establishes a framework for tracking, evaluating and communicating environmental and social performance and helps ensure that environmental risks and liabilities are identified, minimized and managed.

It is, however, important to approach the ESMP as a living document, which will continue to develop during the construction phase to enable continuous improvement of the Project's social and environmental performance.

The core objectives of this ESMP are as follows:

- Ensuring compliance with regulatory authority stipulations and guidelines, which include local, national and international;
- Ensuring that there is sufficient allocation of resources on the Project budget so that the scale of the ESMP related activities is consistent with the significance of Project impacts;
- Verifying environmental and social performance through information on impacts as they occur;
- Periodically updating the ESMP as the Project activities progress;
- Responding to unforeseen events; and
- Providing feedback for continual improvement in environmental performance.

The ESMP was developed attending three major groups of general principles: Principles of Sustainable Development, Principles of Ethics and Quality and Principles of Best Practice.

- Principles of Sustainable Development

- Protection of public health, welfare and safety – activities on site should be contained and will not impact on human health and well-being. The benefits of the project activities should be realized by the communities during all phases.
- Maintenance of ecological processes – natural resources should be conserved or improved and not decreased in value. The resources are managed in such a way that will provide for present and future needs.
- Avoidance, mitigation and management of pollution - existing or possible future contamination of surface, groundwater and soil and air pollution is avoided where possible and mitigated and managed within the standards set. Waste generated will be eliminated, reduced or minimized, reused or recycled, and the residual finally disposed of, if no other option is available.
- Precautionary Principle – in the absence of scientific data confirming a complete evaluation of the risk a cautious approach will be adopted to protect human, animal or plant health, or to protect the environment.

- Principles of Ethics and Quality
  - Consistency with legal and planning context – through all phases of the development of the Project, activities will comply with local, national and international legal and regulatory requirements.
  - ESMP implementation and proactive management – the ESMP is implemented at the start of the activities and aims at continual improvement during all phases of the development.
  - Clear and easily understood reporting – the ESMP should be easily understood, clearly laid out, an accepted documentation style should be used, and all tables, figures and illustrations should be appropriate and necessary.
  - Cost effectiveness – ensure that there is a balance between the financial constraints of achieving a maximum return on investment and the reduction of present and future risks and liabilities.
- Principles of Best Practice
  - Continuous improvement – the Project Proponent should be committed to review and continually improve environmental management, with the objective of improving overall environmental and social performance.
  - Broad level of commitment – commitment is sought from all levels of management as well as the workforce in order for the development and implementation of the ESMP to be successful and effective.
  - Participative process – consultation will and has been undertaken with all Project Affected Persons (PAPs) to seek their input into the environmental and social management of the Project.

13.2 PLANNING

13.2.1 PLAN-DO-CHECK-ACT

The structure of this ESMP is set out according to the Plan, Do, Check, Act (PDCA) process. The PDCA is a well-known management tool that allows for a methodical and ongoing approach to managing environmental and social risks. PDCA is part of international frameworks for quality and environmental management systems including ISO 14001.

Plan

- Define policies and objectives for environmental and social performance;
- Identify environmental and social impacts and risks of the operations;
- Develop mitigations and operational controls to address impacts and risks; and
- Develop a management plan to achieve these objectives.

Do

- Implement management plan; and
- Implement mitigations and operational controls.

Check

- Monitor performance against policies and objectives; and
- Check that mitigations and operational controls are effective.

Act

- Make corrections to plans, mitigations, or controls in response to performance monitoring or out of control events.

13.2.2 IMPACT ASSESSMENT, MITIGATION MEASURES AND PLANNING

13.2.2.1 IMPACT ASSESSMENT

The Project has utilized the impact assessment through the ESIA process as a tool within the planning process to identify key impacts of the Project and associated mitigation and management measures for the construction and operational phases. The Project will continue to use the impact assessment process as a planning tool for any future development activities. The mitigation hierarchy applied in this ESIA will also be applied to the ESMP.

13.2.2.2 ENVIRONMENTAL AND SOCIAL COMMITMENTS

Through the Project development and ESIA process, mitigation measures have been identified to address environmental and social impacts associated with Project activities. The Project Company has made a commitment to implement these measures to ensure or improve its environmental and social performance.

The commitments take the following forms: **Avoidance, Minimization, Management, Monitoring, and Additionally**, with the specific actions intended to address a particular environmental or social issue.

Avoidance

During the planning phases, potential impacts to sensitive resources are identified. Where feasible, locations or processes can be changed during the planning or design phases to avoid impact on these areas.

Minimization

Minimization involves measures to reduce proposed impacts to a resource.

Management

Management commitments include development of plans and procedures for ensuring that measures to protect the environment take place and are of the desired standard of practice. Training is another commitment in this category.

Monitoring

Commitments to monitoring are primarily to ensure the above measures are working properly and delivering the desired (and anticipated) results.

Additionally

Additionally involves actions and contributions which are designed to provide a positive benefit. Examples include assisting with additional domestic water supply to surrounding towns.

13.2.2.3 SUPPORTING ENVIRONMENTAL AND SOCIAL MANAGEMENT PLANS

Following the completion of ESIA studies, the ESMP will outline the supporting management plans that will be developed for each environmental and social topic. These plans will set out how the mitigation measures will be put into practice, monitored, and upheld.

As a contractual requirement, the contractors will be required to demonstrate compliance with their activities against the ESMP. This includes providing resources to ensure compliance of next tier contractors and a process for emergency stop-work orders in response to monitoring triggers. Contractors will be responsible for performing all work:

- In compliance with relevant national and international EHS legislation and regulations, and with other requirements to which the Project subscribes;
- In conformance with the Project ESMP, and related management plans for specific aspects; and
- In accordance with contractual technical and quality specifications.

The Project's ESMP and related documentation will be the main contractual documentation to which the contractor(s) will be bound. Contractors will be required to develop their own management plans which show how they will comply with these environmental and social requirements. In this way, the ESMP will be implemented and controlled using both the Project Company and the contractor management systems. The contractor management systems will therefore:

- Provide the framework that regulates their activities;
- Define responsibilities for expediting, mitigation and monitoring actions detailed in the ESMP; and
- Specify the mechanisms for inspecting and auditing to ensure that the agreed actions are implemented.

Contractors will be required to self-monitor against their plan and compliance with the plan will be routinely monitored by the Project Company directly, or by third parties. Contractors will be required to submit regular reports of monitoring activities, and the Project Company will review these on a regular basis.

Following the completion of ESIA studies, the ESMP will outline the supporting management plans that will be developed for each environmental and social topic. These plans will set out how the mitigation measures will be put into practice, monitored, and upheld.

EHS:

- Waste Management Plan
- Emergency Response Plan, covering common safety and environmental scenarios pertinent to the project sector
- Occupational Health and Safety Management Plan
- Traffic management plan

Social:

- Stakeholder Engagement Plan (including an enhanced Grievance Mechanism)
- Labor Policy
- Child Labor and Forced Labor Prevention Procedure
- Contractor Management Procedure
- Supply Chain Due Diligence Procedure
- Updated Security and Human Rights Policy
- Updated Security Personnel's Code of Conduct, Security Protection Management Procedure
- Worker Grievance Mechanism, as part of the Project-level human resources (HR) policy
- Updated Contractor's Code of Conduct (CoC)
- Community Health and Safety Management Plan
- Gender-Based Violence (GBV)/ Sexual Exploitation and Harassment (SEAH) policy
- Emergency Preparedness and Response Plan
- Workers Accommodation Management Plan
- Local Content Management Plan

13.3 IMPLEMENTATION

13.3.1 ROLES AND RESPONSIBILITIES

The Project Company preliminarily plans to engage the following internal and external roles to implement the ESMP in the ***Table 13-1***.

TABLE 13-1 ROLES AND RESPONSIBILITIES OF THE ESMP

Role	Responsibility
Internal Roles	
General Manager	• Ensure overall compliance with the ESMP. • Allocate sufficient resources for the implementation of ESMP. • Communicate ESMP requirements to all Project stakeholders. • Communicate with relevant government authorities to inquire information and establish transparent and collaborative relationships with local authorities.

General Manager Assistant	• Oversee the implementation of ESMP and monitor environmental, biodiversity and social impacts.
	• Maintain a master list of EHS, OHS and social documents and regularly review and update documents as necessary.
	• Monitor the external stakeholder engagement with local authorities and local communities and handle all preliminary approvals for stakeholder engagements
	• Facilitate communication between the Project and the local communities, and assist the project manager in implementing stakeholder engagement activities, such as negotiations with local governments or organizations
	• Address community concerns and feedback in the context of the ESMP.
	• Provide in-kind livelihood support to vulnerable waste pickers.
	• Follow up with relevant government authorities on
	  ○ The reemployment of the Samarkand City Landfill workers, and contractual conditions of the ten landfill employees;
	  ○ The occurrence of security incidents;
	  ○ The expectation of the Project in terms of human rights protection, and whether authorities would be involved into any issue involving the site;
	  ○ Any communicable disease or other observe outbreak within the workforce;

Role		Responsibility
		○ Information and resources available on vocational training to be provided to waste pickers and available job opportunities; ○ Periodically report and disclose the Project's positive contribution on the local economy and employment. • Update the below: ○ Emergency Response Plan Project's Security and Human Rights Policy ○ Project Security Personnel's Code of Conduct ○ Project's Security Protection Management Procedure ○ A worker Grievance Mechanism applicable to the Project direct workforce ○ SUS EHS Management Procedure for the Construction Phase of the Samarkand Project ○ SUS EHS Management Procedure for the Operational Phase of the Samarkand Project • Develop the below: ○ Community Health and Safety Management Plan (CHSMP) ○ Workers Accommodation Management Plan (WAMP) ○ Labor policy ○ Child Labor and Forced Labor Prevention Procedure ○ Supply Chain Due Diligence Procedure ○ Local Content Management Plan
Associate General Engineer		• Assist the management in providing technical input and internal and external coordination for the early stages of the project for stakeholder engagement. • Implement the Community Health and Safety Management Plan.
General Business Department	HR Manager	• Ensure the Project adheres to labor laws and internal policies, and update policies and management plans as needed.

Role		Responsibility
		• Oversee the hiring process, from job postings and interviews to onboarding new employees of the Project. • Manage workplace issues, resolve conflicts and employee grievances, and ensure a positive work environment. • Develop and coordinate training programs with assistance of other management staff, maintain training records, and conduct regular monitoring and review of training effectiveness. • Maintain a master list of social documents and regularly review and update documents as necessary. • Ensure social inclusion and community development initiatives. • Ensure available employment opportunities are given priority to waste pickers. • Ensure the implementation of o Contractor's Code of Conduct (CoC) o GBV/SEAH policy o Emergency Preparedness and Response Plan o Workers Accommodation Management Plan o Labor policy; o Child Labor and Forced Labor Prevention Procedure; o Project's Security and Human Rights Policy; o Project Security Personnel's Code of Conduct o Project's Security Protection Management Procedure o Local Content Management Plan • Ensure the establishment of and access to an on-site First-aid station. • Ensure the workforce understands and has the access to the GRM. • Ensure the delivery of: o GBV/SEAH training and available resources and services; o Worker Grievance Mechanism for both direct workforce and contracted workforce • Receive, resolve, record and report GBV and SEAH grievances from the workforce

Role		Responsibility

	Purchasing Manager	• Secure potential suppliers by means of necessary measures including pre-qualification, post-qualification, questionnaires, and on-site inspections of projects or factories.
		• Cooperate with the Supply Chain Center to establish and improve a qualified supplier database.
		• Constant Monitor the ongoing performances of suppliers in legal compliance.
		• Ensure the implementation of:
		  ○ Contractor Management Procedure;
		  ○ Supply Chain Due Diligence Procedure

Finance Department		• Allocate sufficient resources for the implementation of ESMP.
EHS Department	EHS Manager	• Develop and update ESMP in line with Project developments and stakeholder feedback. • Monitor and report on ESMP progress to the Project Manager. • Manage biophysical and biodiversity monitoring, with external experts if needed. • Manage and monitor waste, pollutant emissions and pollution control, and biodiversity measures. • Implement health and safety protocols as outlined in the ESMP. • Develop the environmental monitoring and evaluation framework, with external experts if needed. • Manage safety inspections and audits. • Provide EHS training and manage emergency preparedness in a culturally appropriate way. • Evaluate OHS exposure against the internationally published exposure guidelines. • Monitor the contractors and subcontractors to: • Comply with ESMP requirements relevant to their scope of work and address related complaints. • Participate in training and capacity-building activities.

Role		Responsibility

		• Oversee the implementation of environmental aspects of the ESMP, facilitate communication between the Project and local communities.
		• Receive, document and address the grievance with the assistance of other management staff of Project Company.
		• Address GBVH-related complaints in accordance with SEP requirements.
		• Document stakeholder engagement activities throughout the life of the Project.
		• Finalize and update the SEP in line with Project developments and stakeholder feedback when needed.
		• Ensure continuity of supply and services provided to communities
		• Ensure the implementation of the below:
		  ○ Updated SUS EHS Management Procedure for the Construction Phase of the Samarkand Project
		  ○ Updated SUS EHS Management Procedure for the Operational Phase of the Samarkand Project

	Community Liaison Officer
	(concurrently held by other positions)
		• Facilitate communication between the Project and the local communities.
		• Address community complaints and feedback in the context of the SEP.
		• Ensure that job opportunities information is available to local waste pickers.
		• Ensure local communities understand and have access to the GRM.
		• Consult with nearest MFYs on the schedule of noisy construction work.
		• Ensure data disclosure on:
		  ○ Project performance in terms of the intention, process, way, and quota of the use of the local resources;
		  ○ Water and electricity consumption and recycling.

External Roles		

Role	Responsibility
Contractors	• Comply with ESMP requirements relevant to their scope of work, including monitoring the performance of subcontractors to ensure compliance. • Develop and implement a comprehensive EHS training program for own personnel. • Participate in the Project Company's training and capacity-building activities. • Report on their ESMP-related activities and progress. • Support the Project Company's ESMP Coordinator for monitoring work. • Comply with SEP requirements relevant to their scope of work, including monitoring the performance of subcontractors to ensure compliance. • Support the Project Company in resolving complaints related to contractors' activities.
External Consultants and Experts	• Provide technical expertise for specialized ESMP components. • Assist in the development of monitoring and evaluation frameworks.
Government and Regulatory Bodies	• Provide oversight and ensure legal compliance of the ESMP. • Offer guidance on regulatory requirements and updates. • Provide information on available job information and resources for vocational trainings. • Disclose livelihood transition measures for the Mugat waste pickers and legacy issues after the closure of Samarkand City Landfill, if any. • Provide information on the reemployment of the Samarkand City Landfill workers, and contractual conditions for the ten landfill employees. • Provide available GBV support services and resources.

13.3.2 TRAINING AND AWARENESS

13.3.2.1 TRAINING AND COMPETENCY DEVELOPMENT

The Project Company acknowledges the crucial role of training and awareness in achieving successful environmental and social management during the Project. Therefore, comprehensive training programs will be implemented for all personnel whose work may have a significant impact on the environment or

social conditions, regardless of their function or level within the organization. This commitment applies not only to the Project Company personnel but also to all subcontractors engaged in the Project.

13.3.2.2 TRAINING FOCUS

Employee training will focus on the following key areas:

- **Environmental and Social Impact Awareness:** Employees will be trained to identify and understand potential environmental and social impacts that could arise from their activities, including specific attention to social impacts.
- **Legal and Regulatory Compliance:** Training will cover all relevant legal requirements pertaining to environmental and social performance, ensuring employees are aware of their obligations and responsibilities for compliance.
- **ESIA and ESMP Implementation:** Employees will be equipped with the knowledge and skills necessary to adhere to the requirements outlined in the ESIA and ESMP, effectively mitigating potential impacts.
- **Activity-Specific Training:** Specialized training will be provided on essential practices such as waste management, documentation systems, and effective community engagement strategies.
- **Roles and Responsibilities:** Employees will be clearly informed of their individual roles and responsibilities in achieving environmental and social conformance, including change management procedures and emergency response protocols.

13.3.2.3 TRAINING MANAGEMENT AND DELIVERY

Project Company Personnel

The HR Manager will be responsible for the overall coordination of training programs, maintaining employee training records, and conducting regular monitoring and review of training effectiveness. This includes periodic competency verification through observation and discussion with employees. The training will be provided prior to the start of duties.

For personnel responsible for conducting site inspections, training will be delivered by leveraging external resources when necessary. The EHS Manager will coordinate this training prior to facility commissioning. Competency assessments will be conducted upon completion of training, and competent personnel will be eligible to train others.

Contractor Training Programs

Each contractor will be required to develop and implement a comprehensive E&S training program for their personnel, addressing site-specific awareness needs and identifying additional training requirements to maintain competency levels. The training will be provided prior to the start of duties.

The Project Company will approve and audit these programs to ensure adequacy, thoroughness of delivery, and effective verification of competency among all contractor personnel.

Overall, the Project Company is committed to ensuring that all personnel involved in the Project possess the necessary knowledge, skills, and awareness to fulfil their environmental and social responsibilities effectively. Comprehensive training and competency development programs will be central to achieving this goal.

13.3.3 COMMUNICATION

The Project Company will establish and maintain a structured communication and grievance management protocol to ensure effective interaction with regulatory authorities, communities, and other stakeholders. The key elements of this approach are as follows:

- Formal Communication Procedures:

- The Project Company will adhere to formal procedures for communications with regulatory authorities and communities.
- The EHS Manager will be responsible for communicating EHS issues to and from regulatory bodies as required.
- Information from these communications will be relayed by the EHS Manager to contractors to ensure informed operations.

- Regular Meetings and Transparency:
  - Regular meetings will be organized between the Project Company, regulatory agencies, and community representatives.
  - These meetings will focus on reviewing EHS performance, addressing areas of concern, and discussing emerging issues.
  - All dealings will be conducted transparently, providing stakeholders with access to essential personnel and information.
- Grievance Management Procedure:
  - The Grievance Redress Mechanism will be implemented, allowing community members to voice concerns, whether they have damage/injury claims, complaints, or suggestions regarding the Project's implementation.
  - Grievances can be submitted verbally or in writing.
  - Upon receipt, grievances will be logged, evaluated, and resolved appropriately by the project team.
  - If a complaint or claim is deemed valid, necessary steps will be taken to rectify the issue or agree on compensation.
  - The resolution process will be communicated and recorded, ensuring stakeholder awareness.
  - In case of unresolved disputes, an arbitration procedure may be initiated, possibly involving a third-party mediator like a government official.
  - The grievance mechanism is detailed in the Stakeholder Engagement Plan (SEP).

13.3.4 DOCUMENTATION

13.3.4.1 DOCUMENT CONTROL

The Project Company will implement a formal procedure for controlling all E&S documentation, which includes management plans, associated procedures, checklists, forms, and reports. These records will be meticulously maintained onsite and backed up at multiple offsite locations, including secure cloud storage facilities, ensuring their availability in both hard and soft copy formats throughout the Project's lifespan.

Additionally, the document control procedure will outline the methods for official communication of document deliverables, both in hardcopy and electronically. This will encompass requirements for electronic filing, posting, and the assignment of document tracking and control numbers, including revision codes.

The General Manager Assistant will be tasked with maintaining a master list of all relevant E&S documents and ensuring this list is disseminated to appropriate parties. They will also be responsible for notifying affected parties about any changes or revisions to the documents,

issuing updated copies, and confirming that the information is properly communicated within the organization.

Furthermore, contractors associated with the Project will be obliged to establish and describe their systems for maintaining and controlling EHS documentation within their respective EHS plans, ensuring a cohesive and comprehensive approach to EHS documentation management across all entities involved in the Project.

13.3.4.2 OPERATIONAL CONTROL PROCEDURES

The Project Company will implement operational controls for Project activities in pre-construction, construction, and operation phases which will pose significant environmental or socioeconomic risks. These controls should specify procedures, roles, and best practices for impact mitigation. These controls, detailed in the ESMP, will be regularly monitored for compliance and effectiveness, and reviewed to incorporate or reference strategies for avoiding and minimizing impacts.

13.3.5 MANAGEMENT OF CHANGE

The Project Company will adopt a formal change management procedure applicable to all Project activities, anticipating both unplanned and adaptive changes throughout the project lifecycle:

- The procedure aims to assess impacts on personnel health and safety, the environment, the project site, and equipment before implementing changes.
- Key aspects of the procedure include:
  - Ensuring changes have sound technical, safety, environmental, and commercial justifications.
  - Competent personnel reviewing changes and documenting impacts, including in operating procedures and drawings.
  - Identifying and assessing hazards from changes, ensuring no adverse effects on health, safety, or environmental management
  - Communicating changes to personnel, providing necessary training for effective implementation.
  - Assigning responsibility for each change to an appropriate company representative.
- The ESMP will be updated to reflect new information, considering environmental, social, engineering feasibility, and cost factors for any alternatives.

13.3.6 MONITORING AND CORRECTIVE ACTIONS DURING THE PROJECT EXECUTION

The Project Company will implement a comprehensive system for managing E&S performance, divided into five key areas:

- Introduction

  The process encompasses inspections, monitoring, and audits to verify the correct implementation of systems and the effectiveness of mitigation measures, along with corrective actions for out-of-control situations and performance improvement.

- Inspection

Regular EHS inspections, both internal and external, will occur weekly and at least once every six months, with findings reported to the Project Company management.

- Monitoring

  Monitoring by internal and/or external auditors ensures compliance with applicable regulations and evaluates the effectiveness of operational controls. The monitoring shall encompass:

  - Implementation of the ESMP and evaluation of its effectiveness against applicable regulatory requirements and international standards;
  - Development and implementation of all the Management Plan and evaluation of its effectiveness against their respective objectives;
  - Environmental monitoring plan required by national guidelines; and
  - Any changes in Project activities, environmental and social impacts, identification of long-term effects, and cumulative environmental effects that may incur the development and implementation of new control mitigation measures.

- Auditing

  Audits, beyond routine inspections and monitoring, will ensure regulatory compliance, covering contractor self-reporting and assessing the E&S documentation completeness, conformance with monitoring requirements, and efficacy in addressing non-conformances.

- Corrective Action

  The Project Company will implement a formal procedure for tracking and addressing non-compliance and corrective actions, coordinated between the Project Company and its contractors, managed by the ESMP Coordinator.

- Reporting

  The Project Company will report on the project progress, implementation and monitoring of mitigation measures, and corrective actions to lender regularly.

13.4 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Table 13-2 presents the Environmental and Social Management Plan (ESMP) for the Project, detailing various mitigation measures along with responsible entities, implementation timelines, and monitoring indicators. The monitoring indicators proposed in the ESMP only capture the measurable indicators, and do not necessarily include all the recommended practices as some will be detailed in the respective E&S management plans.

The Project Company holds the overall responsibility for implementing these measures during the Project lifecycle. All contractors and subcontractors are required to adhere to the policies and plans outlined in the ESMP.

The Project's design, construction, and operation will align with national regulations and international standards from lending institutions, including EP4 and MIGA Environmental and Social Performance Standards (2013).

TABLE 13-2 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
Air										
A1	Dust in Construction Phase	√		Negligible	Negligible	-	-	-	-	-
A2	Traffic in Construction Phase	√		Negligible	Negligible	-	-	-	-	-
A3	Operation Phase		√	Negligible to Minor	Negligible to Minor	A set of CEMS (Continuous Emission Monitoring System) monitoring system will be installed on both stacks. The monitored parameters include SO_2, NO_x, HCl, CO, CO_2, O_2, H_2O, HF, NH_3, PM, flue gas flow rate, and flue gas temperature;	Section 8.1.5	Monitoring plan Monitoring records	Continuous for CEMS	SUS EHS Manager
						Manual calibration and testing: SO_2, NO_x, HCl, CO, O_2, HF, NH_3, PM, flue gas flow rate, and flue gas temperature, etc.;	Section 8.1.5		Follow the requirements of the CEMS product manual	
						Manual sampling: Hg, Cd+Tl, Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V, TOC and Dioxin;	Section 8.1.5		Semiannually in the first year of	SUS EHS Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
									commercial operation and annually from the second year	
						Manual sampling: SO_2, NO_2, PM, HCl, HF, CO, NH_3, H_2S, Cr^{6+}, As, Pb, Cd, Ni and Hg. The sampling location is no less than 2 downwind locations;	Section 8.1.5		Annually during operation phase	SUS EHS Manager
A4	Operation Phase		✓	Negligible to Minor	Negligible to Minor	A suitably trained person with knowledge of air quality monitoring will manage the stack emission monitoring performance and findings. Monitoring data will be available for third party reviews where necessary and appropriate to do so;	Section 8.1.5		Semiannually in the first year of commercial operation and annually from the second year	SUS EHS Manager
A5	Operation Phase		✓	Negligible to Minor	Negligible to Minor	Conduct regular maintenance and calibration of the CEMS, i.e. on a quarterly basis, in accordance with the equipment manufacturer's guidelines.	Section 8.1.5	Maintenance records	Quarterly	SUS Technology Department Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
A6	Operation Phase		√	Negligible to Minor	Negligible to Minor	To minimize odor generation during waste ageing, waste should be preferably stored in the waste storage pit for not longer than seven days.	Section 8.1.5	Inspection records	Daily inspection	SUS Technology Department Manager
A7	Operation Phase		√	Negligible to Minor	Negligible to Minor	Ensure that at least one incinerator is in operation at all times even under scheduled incinerator maintenance and activate the additional fan as necessary to maintain adequate negative pressure within the waste storage pit, thereby preventing the escape of odorous air. Exhaust air collected by the additional fan shall be treated through an activated carbon adsorption unit prior to discharge to the environment.	Section 8.1.5	Inspection records	Daily inspection under scheduled incinerator maintenance	SUS Technology Department Manager
A8	Operation Phase		√	Negligible to Minor	Negligible to Minor	All air pollution control and treatment facilities shall undergo periodic inspection and maintenance to ensure effective performance.	Section 8.1.5	Inspection records	Weekly inspection	SUS Technology Department Manager
A9	Operation Phase		√	Negligible to Minor	Negligible to Minor	Implement good housekeeping practices to minimise fugitive emissions and control dust and PM within the facility.	Section 8.1.5	Inspection records	Weekly inspection	SUS Technology Department Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
A10	Operation Phase		√	Negligible to Minor	Negligible to Minor	Apply water spraying on access roads as necessary to control dust emissions generated by vehicles transporting waste to the plant.	Section 8.1.5	Inspection records	Weekly inspection	SUS Comprehensive Department Manager
Water										
W1	Impact on Water Quality		√	Negligible	Negligible	Apply groundwater monitoring Se, Sb, Cd, Br, Petroleum and COD to track groundwater quality changes. Shift sprinkling water source in construction phase from groundwater to purchased freshwater to prevent any potential adverse impact.	Section 8.3.4	Monitoring Report Water Supply Agreement during construction phase	Semiannually	SUS EHS Manager
Soil										
S1	Contamination of Soil		√	Minor	Negligible	• Establish, adapt and implement a plan on onsite chemical storage and handling, including designation of appropriate area for chemical storage with seepage-proofing equipment and/or secondary containment, tracking record for chemical storage and use and a system for supervision and monitoring;	Section 8.4.4	Waste Management Plan Emergency Response Plan	Continuous onsite enforcement and monitoring annually	SUS EHS Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• Establish, adapt and implement a **Waste Management Plan**, including designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring; • Establish, adapt and implement an Emergency Response Plan to deal with potential accidental spill; • The anti-seepage system shall be inspected at regular intervals. Any identified damage must be repaired promptly; and • Conduct regular environmental monitoring of onsite soil to identify impact from potential accidental release of hazardous substances.		Monitoring Report		
Noise										
N1	Noise from Construction Activities	✓		Minor	Negligible	• Low-noise equipment will be adopted to control noise from the source; • Position static equipment (e.g., generators) as far as practically possible from sensitive receptors (especially for the north residential area);	Section 8.5.4	Inspection records Records of compliant received	Continuous onsite enforcement	EPC Contractor SUS Engineering Department Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• Use quietest work methods where practicable; • Heavy machinery or high noise level generating equipment (i.e. excavators and crane) should be equipped with acoustic noise filters/ mufflers/ silencers, where appropriate, during use; • Switch off all heavy machinery or high noise level generating equipment when not in operation; • Provide PPE (e.g. earplugs) for on-site workers and ensure the workers are using the PPE appropriately during the construction activities; • Brief site operatives to keep noise to a minimum; • No noisy or high noise activities to be undertaken during nighttime (23:00-6:00) and during weekend without prior approval of the Project Company; • Develop an external Grievance Mechanism to record and respond to complaints in relation to noise issues; • All noise complaints will be recorded, the cause identified and appropriate measures				SUS EHS Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						such as those presented in this table will be implemented to reduce noise in a timely manner; • The frequency of site inspections will be increased when grievance arises; and • All observations and non-conformances to be managed through corrective action tracker and reviewed monthly.				
N2	Noise from Operation Activities		√	Minor	Negligible	• Regular maintenance of all equipment; • Give employees information, instruction and training.	Section 8.5.4	Training records	Training annually	SUS EHS Manager
Waste										
W1	Waste generation and management (Construction phase)	√		Minor	Negligible	• **Construction Waste Management Plan** (CWMP): Develop a CWMP for the construction phase aligned with waste mitigation hierarchy, including prevention, reuse, recycling, recovery and disposal. The CWMP should include explicit requirements and responsibilities for waste generation, collection, transport and disposal; • Only engage with qualified waste transporters and management facilities;	Section 8.6.4	Construction Waste Management Plan Waste Management Log Training records	Continuous onsite enforcement	EPC Contractor SUS Engineering Department Manager SUS EHS Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• Maintain a Waste Inventory: Document and track construction waste generated and transported, categorized by waste types; • Provide Training: Deliver awareness and management training to all personnel involved in waste management; Conduct ongoing housekeeping training for staff on litter prevention and proper waste handling; and • Promote Recycling: Identify and engage vendor companies in nearby regions qualified to recycle specific types of waste generated by the project.				
W2	Waste generation and management (Operation phase)		√	Moderate	Minor	• Use a waste throughput rate that provides sufficient agitation and residence time of the waste in the furnace at sufficiently high temperatures, including any ash burn-out areas, to achieve an ash loss on ignition (LOI) value of below 5 wt. percent (dry basis). • Monitor the construction progress of the disposal vendor for bottom ash. If it fails to commence operation within one year, an alternative qualified disposal vendor should be identified in advance.	Section 8.6.4	Records of TOC value in the ash residue Waste Management Plan Waste Management Log	Continuous onsite enforcement	SUS Operations Department Manager SUS Technology Department Manager SUS EHS Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• Include hazardous waste in the WMP, focusing on the protection of human health and the environment from impacts associated with its generation, storage, handling, transportation, and disposal; • All waste containers, especially the containers for fly ash and bottom ash designated for off-site shipment, should be secured. • The designated bottom ash storage yard shall be constructed with impervious hard-standing surfaces. • Sludge from the water/wastewater treatment facility should be collected regularly. This can be done manually using shovels and buckets or directly pumped out by a third party. Workers must be equipped with appropriate personal protective equipment (PPE), including gloves, masks, boots, and protective clothing, to minimize exposure to sludge during the collection process. • Implement sludge dewatering techniques to reduce moisture content and thereby minimize the potential risk of leachate generation.		Contracts with licensed waste disposal vendor Training and inspection records		

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• Use appropriate containment systems for sludge short-term storage to prevent leachate and odor issues. Ensure that storage containers are designed to minimize risks of spills or leaks. • Labelling and Handling: Mark waste containers clearly with appropriate warning labels that accurately describe their contents and safety precautions. Ensure labels are waterproof, securely attached, and written in Chinese and other required languages (e.g., Uzbekistan) for the workforce; • Document and track hazardous waste generated and transported, categorized by waste types; • Develop and implement an Emergency Response Plan in the event of an accidental release of hazardous waste. • Deliver awareness and management training to all personnel involved in waste management.				
Biodiversity										

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
B1	Site Clearing / Ground Preparation (Construction and operation)	√	√	Negligible	Negligible	• -	-	-	-	SUS EHS Manager
B2	Employment and influx / presence of workforce and contractors (construction)	√		Negligible	Negligible	• -	-	-	-	SUS EHS Manager
Socio-economic										
SE1	Impacts on Livelihood of Community Waste Pickers (i.e, waste pickers from Dustlik MFY, Navruz MFY,		√	Moderate	Minor	• Consider providing in-kind livelihood support to vulnerable waste picker households, such as food baskets/boxes, clothing, blankets, housing utilities subsidies, and other necessary in-kind assistance to alleviate their living pressure. • Collaborate with the local authorities to disclose vocational training information to help waste pickers to complement the vocational transition into other formal or informal employment sectors. Vocational	Section 10.3.2.1	Vocational training records Consultation records with local authorities	Continuous enforcement	Assistant General Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
	and Komalot MFY)					training is recommended to support the diverse needs of vocational skills including language training (Russian and English), business trainings, and technical trainings (e.g., technical machinery operator, repair operator, and other mechanic occupations). • Consult with the local authorities and assist them in promptly providing local scavengers with relevant information about job opportunities (if any), thereby helping them find alternative employment options. • Disclose Project-related employment opportunities to waste pickers and give priority to recruiting them for such positions and comply with Uzbekistan labor laws, particularly for unskilled or semi-skilled roles, to help them secure stable income sources.		Recruitment Disclosure Records		
SE2	Impacts on Livelihood of Mugat Waste Pickers		√	Moderate	Minor	• Engage with the relevant government authorities such as the Waste Management and Circular Economy Development Agency under the Ministry of Ecology, Environmental Protection and Climate Change and Samarkand City Landfill to understand the livelihood transition measures adopted by them for the Mugat waste pickers.	Section 10.3.2.2	Engagement records with authorities	Continuous enforcement	Assistant General Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
SE3	Impacts on Local Agriculture Due To Operation Phase Water Extraction		√	Negligible	Negligible	-	-	-	-	-
SE4	Impacts on Livelihood of Previous Landfill Employees		√	Minor	Negligible	• Follow up with government authorities such as the Regional Department of Waste Management and Circular Economy Development Agency in terms of the reemployment of the Samarkand City Landfill Workers. And coordinate with the Samarkand Regional Waste Landfill Directorate to obtain updated information on the status and contractual conditions of the landfill employees.	Section 10.3.2.4	Engagement records with government and employees	Continuous enforcement	Assistant General Manager
SE5	Impact on Community Health from Construction-Related Environmental Emissions and Disturbances	√		Minor	Negligible	• Implement all mitigation measures illustrated in ***Section 8 Environmental Impact Assessment*** and ensure compliance of environmental monitoring records with the regulatory requirements. • Ensure the accessibility and transparency of the **Grievance Mechanism (GM)** for local communities to voice health concerns related to project activities, ensuring a timely response from project management. • Pay special attention to potential noise impacts on nearby communities. Prior to	Section 10.4.2.1	Grievance Mechanism Grievance Records Disclosure records of environmental	Continuous enforcement	Assistant General Manager EPC contractor

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						any high-noise construction activities, consult with the nearest MFYs (e.g., Navruz, Komalot) to jointly determine the optimal timing for such works. Provide advance notice where necessary to residents and strictly adhere to the agreed construction schedule to minimize disturbance.		monitoring result		
SE6	Impact on Community Health from Operation-Related Environmental Emissions and Disturbances		√	Minor	Negligible	• Implement the mitigation measures on operation phase air emissions in the **Environmental Impact Assessment**. • Develop and implement a **Community Health and Safety Management Plan (CHSMP),** including but not limited to the following measures: ◦ Define procedures for monitoring air-quality risks, managing community exposure, responding to unexpected events of pollution, and coordinating with local authorities. ◦ Publicly disclose air emission monitoring performance through Project information disclosure bulletins, notice boards in mahallas, or online dashboards summarizing air emission monitoring results to maintain trust and transparency where feasible. ◦ Assign roles/responsibilities, reporting lines, and auditing protocols for managing community health and safety and for addressing community health and safety grievances.	Section 10.4.2.2	Community Health and Safety Management Plan Disclosure records of air emission monitoring results Stakeholder Engagement Plan Grievance Mechanism	Continuous enforcement	Assistant General Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• Implement the **Stakeholder Engagement Plan (SEP)** to ensure regular communication with mahalla leaders and households regarding plant performance, monitoring results, and any emerging air-quality concerns. • Maintain an accessible, culturally appropriate **Grievance Mechanism (GM)** allowing community members to report odor, dust, smoke, or health concerns.		Community Consultation Records Grievance records		
SE7	Increased Risks of Communicable Diseases Due to the Presence of Construction Workforce	✓		Minor	Negligible	• Incorporate the following measures into the Project's Community Health and Safety Management Plan (CHSMP): ◦ If workers require diagnostics or treatment for infectious diseases, have them taken directly to a hospital to avoid potential contact with community members' routes and areas. ◦ Incorporate communicable disease-related management measures into the Contractor's **Code of Conduct (CoC)**, including: – Mandate worker participation in awareness sessions on communicable-disease prevention, respectful conduct, personal responsibility, and the consequences of violating CoC rules. – Enforce zero-tolerance for any form of sexual exploitation, transactional behavior, or inappropriate conduct that may increase the risk of	Section 10.4.2.3	Community Health and Safety Management Plan (CHSMP) Workers' health and CoC training records Contractor's CoC	Continuous enforcement	Assistant General Manager EPC contractor

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						STI/STD or other communicable diseases transmission. ◦ Worker accommodation should comply with the principles of Workers' Accommodation: Process and Standards (IFC and EBRD 2009). This includes recommendations about spacing, amenities, and sanitary conditions of accommodation. ◦ Establish an onsite First-aid station and ensure all workers including subcontractors have equal access to it. Provide equipment to prevent communicable diseases such as face masks and sanitizers, along with education materials for the prevention and response of communicable diseases available in the languages (including Uzbek, and Chinese) used by employees and workers onsite. ◦ Inform local and regional health authorities in the event of an observed outbreak within the workforce and coordinate with authorities on response efforts for any potential outbreak. ◦ Coordinate with regional and local health providers on STI and other communicable disease education, prevention, and treatment programs when necessary. ◦ Implement Grievance Mechanism to collect communicable diseases-related grievances and provide timely feedback in accordance with the grievance mechanism.		Engagement records with communities Grievance records on worker's health conditions First-aid station and inspection results on disease prevention equipment Records of disease outbreaks within the workforce and the reporting		

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
								measures taken		
SE8	Increased Risks of Gender-Based Violence Due to the Presence of Construction Workforce	√		Moderate	Minor	• The Project Company shall develop, finalize and disclose a **GBV/SEAH Policy** for the Project and communicate it with both direct workers and contracted workers. The Policy should clearly define GBV/SEAH, define unacceptable conduct and behaviors, specify expected conduct for all workers (including contractors and security personnel), outline reporting and grievance mechanism channels, and specially consequences for violations. The GBV/SEAH Policy should be available in at least Chinese, Uzbek and Tajik. • To uphold its gender/GBVH policy, the Project will build and maintain adequate organizational capacity—through staffing, training, procedures, and resourcing—to ensure effective implementation and compliance throughout the Project lifecycle. • Ensure the commitments set out in the GBV/SEAH Policy are developed into Contractor worker's Code of Conduct. • The GBV/SEAH Policy should be trained to all Project workforce, including both direct workforce and contracted workers, for	Section 10.4.2.4	GBV/SEAH Policy Contractor's CoC Consultation records with communities GBV/SEAH Training records; CoC training records GBV/SEAH Grievance records GBV victim support	Continuous enforcement	SUS HR Manager EPC contractor

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						example during the safety induction program and periodic refresh training when see necessary. The Project Company should record acknowledgement of its GBV/SEAH policy for all workers, including for contracted workers. • Ensure the external Grievance Mechanism and the Worker Grievance Mechanism have the capacity to receive, resolve and record GBV and SEAH grievances. Adequately communicate such mechanisms to all workers as well as to the community, and ensure that support can be provided in Chinese, Uzbek, and Tajik. • Conduct a mapping of existing GBV support services and identify available local resources, such as shelters, counselling, legal assistance, and health services. Through which, the Project can define clear, confidential, and survivor-centered procedures to connect affected individuals with appropriate medical, psychosocial, legal, and protection services. This Project shall then adequately communicate such information to employees through appropriate channels where necessary, and ensure the information is up to date.		service and resource mapping records		

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
SE9	Increased Pressure on Local Utilities and Services During Construction and Operation	√	√	Minor	Negligible	• Improve the Project's information disclosure related to the intention, process, way, and quota of the use of the local resources. It is recommended that consulting with community representatives ahead in terms of potential impacts on the local utilities and resources. • Finalize and implement the GM to collect grievances related to Project's impacts on local water resources and electricity and provide timely feedback. • Disclose data on water and electricity consumption and recycling to local communities in a culturally appropriate manner in Uzbek or Tajik throughout operation phase. • Establish transparent and collaborative relationships with local water authorities. • As part of the **Stakeholder Engagement Plan**, the Project should liaise and engage with community leaders, utility suppliers and relevant auth orities to ensure continuity of supply and services provided to communities.	Section 10.5.2.1	Utility consumption disclosure records Stakeholder Engagement Plan Consultation records with communities Grievance Mechanism Grievance records on utility disruptions	Continuous enforcement	Assistant General Manager EPC contractor
SE10	Positive impact on Local Grid and		√	Positive	Positive	-	-	-	-	-

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
	Entertainment Facilities									
SE11	OHS Risks During Project Construction and Operation	√	√	Major	Moderate	◦ Include IFC EHS Guidelines and relevant Uzbekistan EHS standards into the existing EHS Project EHS management procedures (including the *SUS EHS Management Procedure for the Construction Phase of the Samarkand Project* and the *SUS EHS Management Procedure for the Operation Phase of the Samarkand Project*) to ensure compliance, including but not limited to the following amendments: ◦ Require contractors and subcontractors to meet Project EHS standards through standardized toolbox trainings, PPE kits, on-boarding checklists, periodic audits and other measures. ◦ Include the IFC Waste Management EHS Guidelines (2007), and the IFC EHS Guidelines for Waste Management Facilities (2007) into the existing Project EHS Management Procedures, including standards such as the Threshold Limit Value (TLV®) occupational exposure guidelines and Biological Exposure Indices (BEIs®) published by American Conference of Governmental Industrial Hygienists (ACGIH), the United States National Institute for Occupational Health and Safety (NIOSH), Permissible Exposure Limits (PELs) published by the	Section 10.6.2.1	SUS EHS Management Procedure for the Construction Phase of the Samarkand Project (updated) EHS Department Management Procedure for the Operation Phase of the Samarkand Project (updated) OHS inspection, audit	Continuous enforcement	SUS EHS Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						Occupational Safety and Health Administration of the United States (OSHA), Indicative Occupational Exposure Limit Values published by European Union member states, etc ◦ Establish Multilingual (Uzbek/Chinese) emergency signage and communication materials considering foreign workforce. ◦ Establish effective and inclusive EHS trainings for all workers, use tools such as straightforward multilingual diagrams; daily pre-shift dynamic risk briefings; and near-miss reporting with no-blame protection. ◦ Establish and implement a detailed, Project-specific **Emergency Preparedness and Response Plan** to ensure OHS if any emergencies or unplanned events, for detailed information on emergencies and unplanned events, please refer to ***Section 11 Unplanned Events***.		records and enhancement measures records OHS near miss and incident records Worker's EHS training records Emergency Preparedness and Response Plan		
SE12	Impact on Occupational Health and Living Standards	√	√	Minor	Negligible	• Develop a **Workers Accommodation Management Plan (WAMP)** including following mitigation measures to remedy the OHS risks related to the accommodation conditions of the Project:	Section 10.6.2.2	Workers Accommodation Management Plan	Continuous enforcement	SUS Engineering Department Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
	Through The Provision of Accommodation					◦ Build and maintain the workers accommodations to meet the principles of EBRD/IFC "Workers' Accommodation: Processes and Standards (2009)". ◦ Ensure the standard and requirements of EBRD/IFC "Workers' Accommodation: Processes and Standards (2009)" are adequately implemented through the mechanism of monitoring and onsite auditing of workers' accommodation conditions. ◦ Formalize the worker's grievance mechanism to make sure any concern related to the worker's living conditions can be proposed, responded, and resolved properly		Workers accommodation inspection Records Worker's Grievance Mechanism Grievance Records on accommodation status		SUS EHS Manager
SE13	Contribution to Local Employment and Economy	√	√	Positive	Positive	• (Good to have) A **Local Content Management Plan (LCP)** should be in development to meet the following requirements: ◦ Prioritize the local labor force during the recruitment during the operation phase, particularly for any member from Project affected MFYs. ◦ Ensure a transparent and non-discriminatory hiring process by clearly and widely disclosing recruitment information (e.g. potential vacancies, number of workers required, qualifications, recruitment process and	Section 10.7.2.1	Local Content Management Plan Labor/Purchase needs disclosure records	Continuous enforcement	General Manager Assistant

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						timeline) to the local communities and wider areas in the district through transparent and culturally appropriate communications. ◦ Identify training priorities as early as possible, especially for vocational training and retraining. Develop training plans according to different types of working positions and requirements. Ensure that Project affected Persons will have priority access to vocational training and employment ◦ Prioritize procurement from local businesses and particularly Small and Medium Enterprises (SME) through methods such as package unbundling to invite more SMEs to compete and supply, mapping and maintaining a local procurement database and tracking the progress overtime. • (Good to Have) Periodically report and disclose the Project's positive contribution on the local economy and employment to the local authorities and communities. Build and sustain the cooperative relationship with the local community.		Grievance Records on employment or purchases		
Unplanned Events										
U1	Fire and Explosion	√	√	Minor	Negligible	Planning for Fire and Explosion Emergency Response	Section 11.3.4	Fire and explosion	Continuous onsite enforcement	SUS EHS Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• Ensure that all people working on the Project Site shall receive an induction training on fire safety and emergency response, this induction shall include, but not limited to: ◦ Evacuation procedures from offices and other buildings in event of fire, assembly point procedures; ◦ Actions in the event of site alarm and assembly procedures; and ◦ Selection and operation of firefighting equipment. • Ensure that the flammable substances (i.e. chemicals/oil/diesel) will be controlled/distanced to ignition sources; • Install signs to show flammable areas and no smoking areas; • Establish and follow electricity safety regulations, check and maintain machines periodically. Response to Fire Emergencies • Any person seeing a fire and explosion must first raise the alarm either verbally, blowing of whistle, alarm call point, cell phone or radio call, and immediately report to his supervisor or foreman, who will report to the personnel in the Emergency Contact List; • If it is a small fire, the person(s) who spotted the fire may attempt to use a portable fire extinguisher to control the fire from spreading;		emergency response		

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• If the fire is beyond control or lives are endangered, inform the fire police and emergency evacuation shall be activated. Immediately inform the fire police in case that the fire cannot be controlled internally. All persons and rescue victims to assembly points as soon as possible and provide necessary first aid, if needed; • The person(s) in charge shall report their headcount and any missing personnel and their last known location immediately. Rescue team shall be informed and instructed to organize search and rescue of all reported missing personnel immediately.				
U2	Impact from spills and leaks	√	√	Minor	Negligible	**Planning for Chemical Spill/Leakage Emergency Response** • Provide chemical safety training to relevant employees in order to ensure they are competent in response to oil and chemical spill; • For storing onsite: ◦ Ensure that the products are properly stored on site (e.g., secondary containment, double walled tanks, over filling alarm system) in designated areas (i.e., storage and workshop areas for construction materials, fuels and lubricants);	Section 11.4.4	Emergency response plan Incident records	Continuous onsite enforcement	SUS EHS Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						◦ Ensure that the emergency response facilities and equipment for oil spill (i.e., spill kits, Safety Data Sheet ("SDS"), personal protective equipment ("PPE")) are available, adequate and functional at the Project Site; ◦ Ensure good inspection for housekeeping conditions of chemical storage areas and integrity of chemical containers, and ensure maintenance procedures to minimize small leaks and spills. • For transporting of hazardous materials/wastes on public road: ◦ Vehicles used for transporting hazardous chemical/oil shall be affixed with relevant hazardous pictograms on both side and the rear of the vehicle. Hazardous chemical/oil shall be packed and labelled properly; ◦ Vehicles used for transporting chemical/oil shall be provided with oil spill kit, fire extinguishers, SDS of transported chemical/oil and suitable PPE as per SDS; ◦ Chemicals that are likely to react with each other must not be transported in the same vehicle. The driver shall inspect and ensure safety before transport begins. **Response to Chemical and Oil Spillage Emergencies** • If the oil/chemical spillage is within the site's capacity, the ERT shall:				

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						◦ Evacuate irrelevant/unauthorized people from the spill area; ◦ Isolate the source of the spill and ensure that spillage does not flow into the drainage system; ◦ Ensure that the contaminated areas are cleaned up as soon as possible by competent persons using absorption materials (either sand or proper absorbent); ◦ Keep copies of hazardous substances inventory which are used onsite; ◦ Collect the absorption materials, contaminated material/waste and store in sealed containers and properly labelled, and handle in proper containers and treated and disposed as hazardous waste. • If the oil/chemical spillage is beyond the site's capacity, the ERT shall: ◦ Liaise with all relevant external parties involved; ◦ Contact the public emergency services such as Police to control the situation; ◦ Arrange for immediate remediation of the affected areas, after spillage is brought under controls.				
U3	Traffic	√	√	Minor	Negligible	• Establish and implement a construction phase traffic management plan and: ◦ Require EPC contractor to adhere to the construction phase traffic management plan using periodic audits and inspections.	Section 11.5.4	Traffic management plan	Continuous enforcement	SUS EHS Manager EPC Contractor

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						◦ Require EPC contractors to conduct mandatory pre-qualification screening for all subcontracted logistics providers (safety history, fatality record). ◦ Require EPC contractors to implement strict driver working-hours and fatigue management, including maximum continuous driving time and mandatory rest hour		Traffic incident and near miss records		

Cumulative Impact

C1	Cumulative impacts from surrounding SMZ "SAMARQAND METALLURGIYA ZAVODI".	√	√	-	-	• As listed above in the ESMP.	-	-	-	-

Human Rights

H1	Impacts on Labor and Working Conditions	√	√	Moderate	Low	• A **Labor Policy** should be developed, finalized and disclosed that consolidates all key labor-rights commitments—at a minimum, the prohibition of child labor and forced labor, freedom of association and collective bargaining,	HRIA Section 9.1	Labor Policy Child Labor and Forced	Continuous enforcement	Assistant General Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
	of Project Workers					non-discrimination, and protection against harassment—and ensure that the policy is communicated and trained in languages understood by all direct and contracted workers, including Chinese and Uzbeks. • For prohibiting child labor and forced labor, a **Child Labor and Forced Labor Prevention Procedure** should be developed which includes the following: ◦ Establish a mandatory age-verification protocol when recruiting through multiple ways (e.g., ID check, secondary documentation, and HR record audit). ◦ Develop remediation plan for use in cases where children are unknowingly employed despite the policy and procedures, including: – Immediate removal of any identified child worker from all work activities; – Assessment of the child's individual situation and engagement with parents or guardians; – Enrolment of the child in appropriate education or day-care programs and provision of financial and other necessary support to ensure the child can attend and remain in school until reaching the legal minimum working age; and – Ongoing monitoring and documented follow-up to ensure the child does not re-enter child labor.		Labor Prevention Procedure Contractor Management Procedure Worker's Grievance Mechanism Grievance Records on labor and working conditions Training records of HR, EHS manager, contractors and all workers Contractor		SUS EHS Manager SUS Comprehensive Department Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						◦ Communicate child labor and forced labor policies to the suppliers and contractors to sign binding commitments in prohibiting child labor. ◦ Provide capacity-building trainings for HR, EHS managers and contractors in identifying indicators of forced labor and child labor. • A **Contractor Management Procedure** should be developed to meet the below requirements: ◦ Mandate the training for all contractors and labor-rights awareness sessions for all contracted workers. The training and the labor-rights awareness sessions should introduce the Project labor rights, the Project GBV/SEAH Policy, the Contractor Code of Conduct, the mandates under Uzbek labor laws and ILO convention requirements, with particular attention on forced labor, child labor, occupational health and safety, freedom of association and collective bargaining, and non-discrimination and harassment. ◦ Monitor the labor rights of the contracted workers, with particular focus on prohibition of the use of child labor and forced labor, the voluntary overtime and excessive working hours, delay or deduction of wage, retaining personal belongings and identity documents (e.g., passports, ID card), and different treatment between local workers and		inspection, audit records		

S/N	Impact	Project Phase		Impact Significance				Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation		Post-Mitigation						
								migrant workers. The contractor management Procedure should introduce a monitoring system to periodically review any potential breaches of contractor's labor practice against the Project labor policy. ◦ Ensure all workers (including those of contractors and subcontractors) on the Project site are provided with a written Employee Agreement/Contract in a language is understood by workers. ◦ Cascade down the Project's Grievances Mechanism to all contracted workers. • Formalize the Worker Grievance Mechanism for both direct workforce and contracted workforce.				
H2	Impacts on Worker's Rights along the Project Supply Chain	√	√	Low (construction)	Moderate (Operation)	Negligible (Construction)	Low (Operation)	• Develop and implement a **Supply Chain Due Diligence Procedure** with the following elements: ◦ Supplier screening and entry control: – Conduct background checks to identify any history of environmental, social or human-rights violations. – Exclude candidates with verifiable severe risks from being approved as suppliers. ◦ Risk classification of approved suppliers. Classify suppliers into high-risk and low-risk categories based on industry type, operation location, workforce scale, number/proportion of contracted workers, media coverage of relevant environmental and/or social issues.	HRIA Section 9.2	Supply Chain Due Diligence Procedure Supplier approval screening records Supplier monitoring records	Continuous enforcement	Assistant General Manager SUS EHS Manager SUS Purchasing Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						◦ Different monitoring mechanisms and measures should be adopted regarding different classifications of suppliers: – As for high-risk suppliers: Conduct on-site monitoring or evaluations once or twice per year where feasible including reviewing operational practices, worker protection, labor conditions, and any indicators of non-compliance. – As for low-risk suppliers: Conduct periodic desktop reviews, self-assessment questionnaires, and documentation checks. Maintain ongoing monitoring of any emerging risks through media screening or stakeholder reports. – The Supplier Social Responsibility Assessment Form could be adopted as a guide checklist with assessment requirements tailored to applicable legal provisions in the jurisdictions where suppliers operate. The assessment should at least include prohibition of forced labor, child labor, freedom of association and collective bargaining, anti-discrimination and harassment, and occupational health and safety. ◦ Contractual requirements and capacity building: – Include human-rights clauses and labor-standards requirements in		Training records of suppliers		

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						service contracts or documents such as the Supplier Code of Conduct using reasonable commercial efforts. – (Good to have) Provide suppliers with training on these requirements and expectations to support their compliance capacity.				
H3	Impacts on Community Security Associated with Employment of Security Personnel	√	√	Low	Negligible	• Update the Project's Security and Human Rights Policy with applicable standards (i.e. *the UN Code of Conduct for Law Enforcement Officials, UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials,* and *Voluntary Principles on Security and Human Rights*), finalize with senior management approval and publicly disclosed in both Chinese and Uzbek language. • Update the Project Security Personnel's Code of Conduct with applicable standards (i.e. *Voluntary Principles on Security and Human Rights*), finalize with senior management approval and publicly disclosed in both Chinese and Uzbek language with periodic training provided to the security personnel. • Update, finalize and implement the Project's Grievance Mechanism, and make sure the Stakeholder Engagement Plan and Grievance Mechanism effect through the whole process. • Update, finalize, and implement the Project's Security Protection Management Procedure to operationalize the	HRIA Section 9.3	Updated Project's Security and Human Rights Policy Updated Project Security Personnel's Code of Conduct Updated Project's Security Protection Management Procedure	Continuous enforcement	Assistant General Manager SUS EHS Manager SUS Comprehensive Department Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						commitments in the Project's Security and Human Rights Policy. At minimum, the updated Procedure should: ◦ Introduce safeguard measures requiring the security company to conduct pre-employment vetting for all security personnel, including verification of identity documents, checks for any past use-of-force misconduct, criminal records, or other risk-relevant indicators; ◦ Train all security personnel with the Project Security and Human Rights Policy, the Project Security Personnel's Code of Conduct, and *Voluntary Principles on Security and Human Rights,* with attention paid to the Use of Force and appropriate interactions with workers and communities; ◦ Require the contracted security company to comply with international human-rights protection standards, i.e., *Voluntary Principles on Security and Human Rights*, through explicit contractual obligations; ◦ Formalize engagement protocols with local law-enforcement authorities, ensuring coordination is limited to legally authorized functions and avoids delegation or encouragement of excessive force. ◦ Implement the Stakeholder Engagement Plan (SEP) and ensure that the Project-level Grievance Mechanism (GM) is accessible to workers, community		Updated Project's Grievance Mechanism Grievance records on security-related conflicts Security conflicts incidents and near miss records Security personnel training records Security Company inspection and audit records		

S/N	Impact	Project Phase		Impact Significance				Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation		Post-Mitigation						
								members, and any individuals interacting with security personnel. • Notify local law enforcement authorities immediately, upon the occurrence of security incidents, to enable authoritative response, official investigation, apprehension, and prosecution. • Based on the actual needs of the project and the feasibility of implementation, timely communication and coordination should be carried out with the local law enforcement agencies to set out expectations of the Project, including their alignment with *UN Code of Conduct for Law Enforcement Officials*, *UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials*, and *Voluntary Principles on Security and Human Rights* and whether they will be pulled into an issue involving the site – e.g., responding to a protest.		Government engagement records, meeting minutes		
H4	Impacts on Rightsholder to Participate/ Access to Remedy	√	√	Moderate (for Project workers)	Low (for nearby communities)	Low (for Project workers)	Negligible (for nearby communities)	• Develop a worker Grievance Mechanism applicable to the Project direct workforce (considering the external Grievance Mechanism is responsible for receiving and resolving grievances from contracted workers and any external stakeholders, such as affected communities). The worker Grievance Mechanism shall enable anonymous submission and anti-retaliation mechanisms against any grievance reporting. The worker Grievance	HRIA Section 9.4	Workers Grievance Mechanism Updated Grievance Mechanism	Continuous enforcement	SUS EHS Manager SUS Comprehensive Department Manager

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						Mechanism should also be gender sensitive. • To ensure that the grievance mechanism (GM) is accessible, practical, and transparent, the external GM will be translated into Tajik and English to ensure information is delivered in a culturally appropriate manner and reaches all relevant stakeholder groups, including women and other vulnerable groups. The internal GM will be made available in Uzbek, English, and Chinese to facilitate effective communication across the Project workforce. • • • Implement clear anti-retaliation provision in raising the grievances and concerns. Publicly communicate zero-tolerance for retaliation to all workers and external right-holders. • Integrate gender sensitive design considerations into the grievance mechanism, including confidential and women preferred reporting pathways, and considerations for sexual exploitation and abuse (SEA), and sexual harassment (SH). • Include a clear introduction to the Project's worker grievance mechanism to the workforce during the workforce induction program and Project's Grievance Mechanism to the external rightsholders and community information disclosure		Grievance records Anonymous grievance records Numbers and records of unresolved grievances Numbers and records of SEA/SH grievances Numbers and records of internal and external grievances Project Grievance Mechanism		

S/N	Impact	Project Phase		Impact Significance		Mitigation Measures/Enhancement	Action Source	Monitoring Indicators	Monitoring Frequency	Responsibility Party
		C	O	Pre-Mitigation	Post-Mitigation					
						• especially for the Project's vulnerable groups such as the waste pickers. • The implementation and effectiveness of the grievance mechanism for external rightsholders that is proposed in Stakeholder Engagement Plan (SEP) should be monitored and evaluated according to the monitoring and evaluation framework outlined in SEP.		Disclosure Records Induction program training records		

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SUS Uzbekistan Waste to Energy Project

APPENDIX A Climate Change Risk Assessment

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SUS Uzbekistan Waste to Energy Project

APPENDIX A Climate Change Risk Assessment

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
CAPEX	Capital Expenditure
CCKP	Climate Change Knowledge Portal

Acronyms	Description
CEMS	Continuous Emissions Monitoring System
CH4	Methane
CMIP5 / CMIP6	Coupled Model Intercomparison Project Phases 5 and 6
CO2	Carbon Dioxide
EDI	Electrodeionization
FD	Frost Days
FFDI	Forest Fire Danger Index
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
KPIs	Key Performance Indicators
LOI	Loss on Ignition (for bottom ash)
MCC	Motor Control Center
MSW	Municipal Solid Waste
N2O	Nitrous Oxide
NDC	Nationally Determined Contribution
NDC	Nationally Determined Contribution
OPEX	Operating Expenses
OTL	Overhead Transmission Line
P6 / P8	Impermeability grades
RO	Reverse Osmosis
SNCR	Selective Non-Catalytic Reduction
SSP1 2.6 / SSP5 8.5	Shared Socioeconomic Pathways
TCFD	Task Force on Climate-Related Financial Disclosures
VFD	Variable Frequency Drive
WSDI	Warm Spell Duration Index
WWTP	Wastewater Treatment Plant

1. INTRODUCTION

1.1 BACKGROUND

SUS Environment (hereinafter referred to as "SUS" or the "Client"), a company specializing in waste-to-energy (WtE) and circular economy practices, has been providing integrated municipal solid waste management services globally since 2014. In 2025, SUS invested in a WtE project (hereinafter referred to as "the Project") in Samarkand, Uzbekistan to promote a cleaner environment and to support Uzbekistan's transition to a green economy.

The Project was established under Presidential Decree No. PP-118, dated March 24, 2025, titled "On measures to implement the investment project 'Production of electrical energy by incinerating solid household waste in the Kashkadarya and Samarkand regions.'"

Located 10 km southwest of downtown Samarkand, Uzbekistan, the Project occupies a total area of approximately 9 ha and comprises a WtE plant with a treatment capacity of 1,500 t/d and an annual electricity generation capacity of 371.4 million kWh. The Project also includes a 600m 110-kV transmission line and a 200m 10-kV transmission line for power output and supply. The Project is being developed by a local entity of SUS, "SUS ENVIRONMENT SAMARKAND" FE LLC (the "Project Company").

SUS has appointed ERM (Shanghai) Limited (hereinafter as "ERM") to undertake an Environmental and Social Impact Assessment (ESIA) for the proposed Project in line with the following standards ("Applicable Standards"):

- Uzbekistan laws, regulations, and standards that pertain to environmental and social issues;
- Equator Principles version 4 ("EP4");
- Multilateral Investment Guarantee Agency ("MIGA") Environmental and Social Performance Standards (2013);
- World Bank Group Environmental Health and Safety Guidelines ("WBG EHS Guidelines") including General Guidelines, Guidelines for Waste Management Facilities (2007) and Guidelines for Electric Power Transmission and Distribution (2007).

1.2 PROJECT OVERVIEW AND LOCATION

The Project site is located adjacent to a landfill on an industrial land parcel of 9 ha in Samarkand Region, Samarkand City, Uzbekistan. The Project will use Municipal Solid Waste (MSW) as the main input and is intended to serve the entire Samarkand Region by replacing the part of existing MSW landfills. It is designed to treat approximately 1,500 tons of MSW per day for power generation. The electricity produced will be connected directly to the national grid at the nearby substation via a 600-m overhead transmission line (OTL). Key design properties of the Project are presented in ***TABLE A1-1***.

TABLE A1-1 KEY DESIGN PROPERTIES OF THE PROJECT

Item	Value
Waste treatment capacity	1,500 t/d

Item	Value
Total power generation	371.4 million kWh/a
On-grid power generation	328.3 million kWh/a
Annual operation time	8,000 h/a
Design lower calorific value	8,374 kJ/kg

During the scoping site visit, local people expressed serious concerns about the landfill's operations and waste disposal. Scattered MSW was observed around the existing landfill (***FIGURE A1-1***).

FIGURE A1-1 THE MSW OBSERVED ALONG THE "SAMARKAND HALAQA YO'LI"

Source: ERM Site Visit in January 2026

The power production process includes waste collection, weighing, storage, incineration with heat recovery, power generation, and grid connection (***FIGURE A1-2***). The typical composition of MSW in cities in Uzbekistan is shown in ***TABLE A1-2***.

FIGURE A1-2 OVERALL PRODUCTION PROCESS

TABLE A1-2 TYPICAL COMPOSITION OF MSW IN CITIES, BY WEIGHT %

No.	Waste fractions	Season			
		Winter	Spring	Summer	Autumn
1	Paper	20.5	18.3	18.8	18.1
2	Food waste	35.3	36.8	39.2	42.2
3	Wood	4.7	4.2	3	7.8
4	Metal	5.0	3.9	2.2	2.3
5	Textiles	3.7	3.3	3.9	4.3
6	Leather, rubber	2.0	0.7	0.4	0.4
7	Glass	4.7	4.5	0.3	1.9
8	Stones	6.4	10.5	16.8	8.0
9	Other parts, including polyethylene and other plastics	17.7	17.8	15.4	15.0

The collection and transportation of MSW to the Project site will be managed by the local government. Upon delivery, SUS will conduct a visual inspection of the incoming MSW and will reject any waste that the Project is not technically suitable for incineration. The treatment of rejected waste will be the responsibility of the local government.

The following categories of waste will not be accepted for incineration by the Project:

TABLE A1-3 NON-ACCEPTABLE WASTE

Category (Basis for Exclusion)	Waste Type / Description
Operational & Technical Constraints	Waste that may damage the grate or boiler during the incineration process
	Automobile shredder residue or other waste containing amounts of heavy metals and/or plastic etc.
	Large automobile vehicle parts, engine blocks and transmissions, agricultural and farm machinery and equipment, marine vessels, trailers and other large machinery, equipment, wire and cable.
	Waste containing ashes, metal furniture, spring mattress, refrigerator, concrete rubble or other non-processable waste

Category (Basis for Exclusion)	Waste Type / Description
	Building debris, rock, gravel, other earthen materials or other non-combustible waste
	Large non–combustible objects like pieces of concrete
Hazardous Properties	Sludge from decanting and from breakdown of drilling and grinding emulsion, oil saturated earth
	Waste acid, waste alkaline
	Chlorinated hydrocarbons
	Radioactive waste and explosives
	Explosives such as gun powder, gasoline, thinner, light oil, gas bomb or other explosive refuse and chemicals such as poisons or hazardous chemical substances etc.
	Waste containing sparks, like cigarettes firing
Environmental Compliance Risks	Waste containing pollutant contents unsuitable for incineration
	Paint, lacquer, industrial plastics, adhesives, grease, glucose, PVC containers
Biological & Sanitary Risks	Surgical and pathogenic waste from hospitals
	Offal from slaughterhouses.
	Waste containing micro-organisms, infectious waste without pre-treatment, human or animal body parts coming from hospital or other bio-hazardous wastes

The nearest residential area, Navruz Mahalla, is 650 m to the northeast of the Project. The nearest surface water body is an irrigation canal originating from the Dargom Canal, which is situated 600 meters to the north of the Project. Agricultural land is present in the vicinity of the Project, including a small farmland located to the north of the Project site with an approximate width of 400 m, and a larger tract of farmland located to the west and east of the Project site, with the closest distance of approximately 1.8 km from the Project site.

1.3 PROJECT COMPONENTS

The Project site is divided into three functional zones, including the main production area, the auxiliary production area, and the landscape area.

- The main production area comprises the main workshop, the discharge stack and access ramp. The main workshop includes waste collection hall, waste storage pit, incinerators,

flue gas treatment system, waste heat boilers, turbine, generator, fly ash stabilization system, power distribution unit and stacks.

- The auxiliary production area comprises the pump station, combined production and firefighting water tanks, cooling towers, two tank farms (oil and ammonium), water purification stations, wastewater treatment plants, hazardous waste storage room, storage yard of bottom ash and weighbridge.
- The landscape area comprises the administration building and gatehouse.

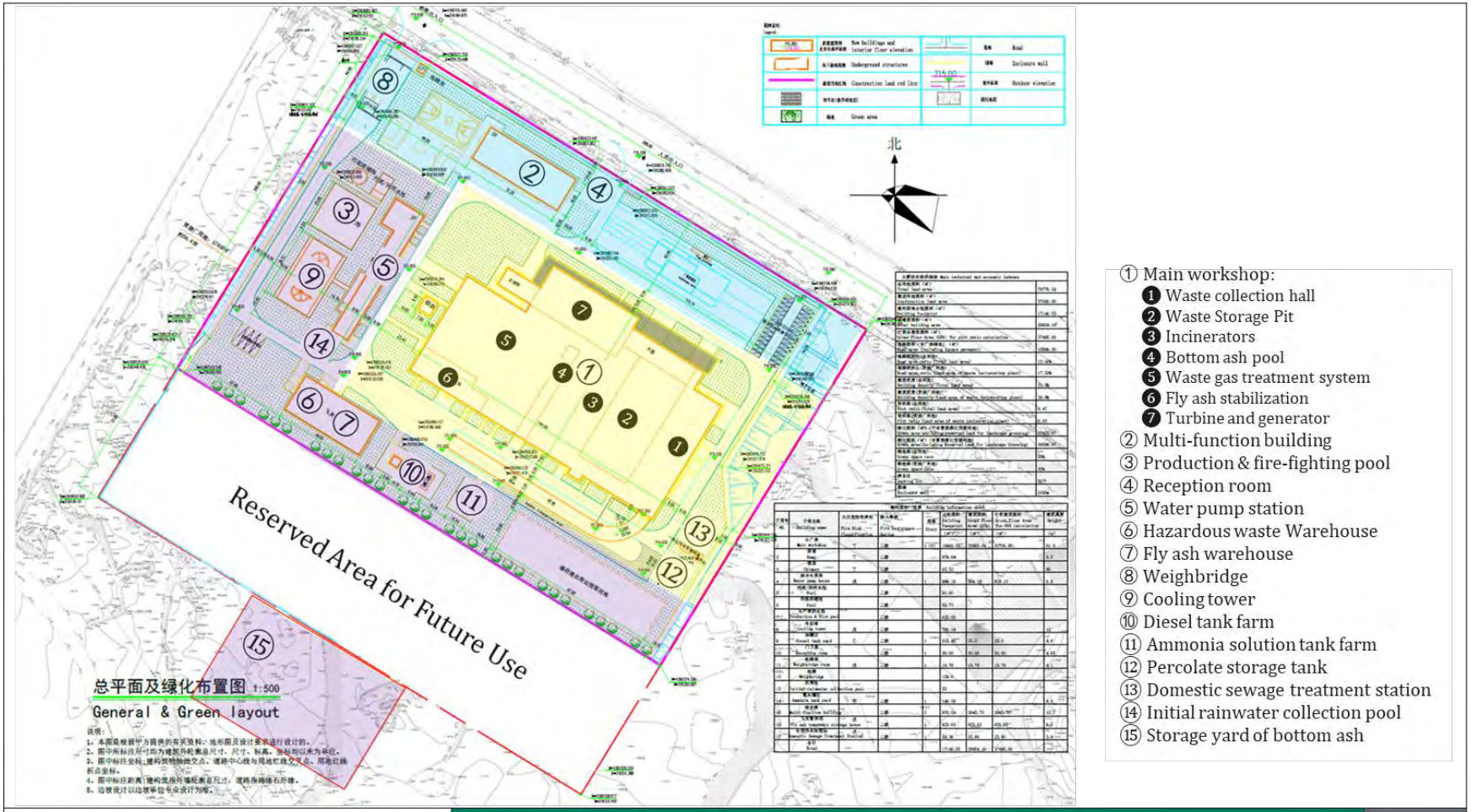
The Project layout is depicted in ***FIGURE A1-3***.

The raw and auxiliary materials to be used for the Project and their consumption are presented in the ***TABLE A1-4.***

TABLE A1-4 CONSUMPTION OF RAW AND AUXILIARY MATERIALS

No.	Material	Consumption
1.	Municipal Solid Waste	500,000 ton/year
2.	Quicklime	7,665 ton/year
3.	Activated Carbon	274 ton/year
4.	Diesel	212 ton/year
5.	Natural Gas	0.244 million m^3/ year
6.	Lubrication Oil	15 ton/year
7.	20% Ammonia solution	1,752 ton/year
8.	Scale Inhibitor	15 ton/year
9.	Chelating Agent	573 ton/year

FIGURE A1-3 LAYOUT OF THE PROJECT



Legend	Project Location			
Main Production Area Auxiliary Production Area Landscape Area	Date: 11 February 2026	Drawn Size: 23x16 cm	SUS Uzbekistan Waste to Energy Project	ERM
	Drawn by: SX	Reviewed by: MD		
	Coordinate System/Source: WGS 1984		Client: SUS Environment	
	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.			

1.3.1 MAIN WORKSHOP

The main workshop includes waste collection hall, waste storage pit, incinerators, bottom ash pool, waste gas treatment system, fly ash stabilization, turbine and generator.

1.3.1.1 WASTE COLLECTION HALL

The waste collection hall is located within the main workshop and serves as the designated area for waste reception. It has dimensions of 67.75 m × 21 m × 16.5 m (L × W × H), with a ground elevation of +8 m.

Waste transport vehicles, after being weighed at the weighbridge, access the waste collection hall via the access ramp. At the collection hall, the vehicles discharge waste onto an unloading platform. This platform is designed with a 2% lateral slope towards the waste storage pit, allowing leachate generated from the waste trucks to be collected and conveyed into the waste pit.

Five air-tight doors are installed to separate the unloading platform from the main hall, effectively preventing odor and dust from escaping into surrounding areas.

1.3.1.2 WASTE STORAGE PIT

Upon reception at the waste collection hall, the waste is transferred to a semi-underground waste storage pit. The pit covers an area of approximately 1,652 m² (28 m × 59 m) and has a total effective storage volume of around 21,476 m³, which corresponds to a maximum storage capacity of approximately 9,664 tons of waste. This is equivalent to around 6.4 days of plant operation at the design capacity.

Within the pit, the waste undergoes mixing, turning, and partially dewatering. During storage, the moisture content of the waste is naturally reduced through drainage. Leachate generated from the waste percolates through drainage openings at the bottom of the pit and is collected in a leachate collection sump located beneath the waste pit at the bottom of pit. The collected leachate is then conveyed to a leachate storage tank for temporary storage before being sent for incineration together with MSW.

Both the waste storage pit and the leachate collection sump are constructed using C40 concrete with impermeability grade P8 and incorporate an integrated anti-seepage layer to ensure hydraulic integrity. The anti-seepage lining includes: 1) a 1 mm cementitious crystalline layer on the pit interior, with a 1.5 mm polyurethane membrane at the bottom of waste storage pit; and 2) two layers of SBS modified asphalt membranes with 3mm and 4mm on the exterior of waste storage pit. The permeability coefficient of the linings will be no greater than 1.0×10^{-11} cm/s, ensuring effective prevention of leachate seepage.

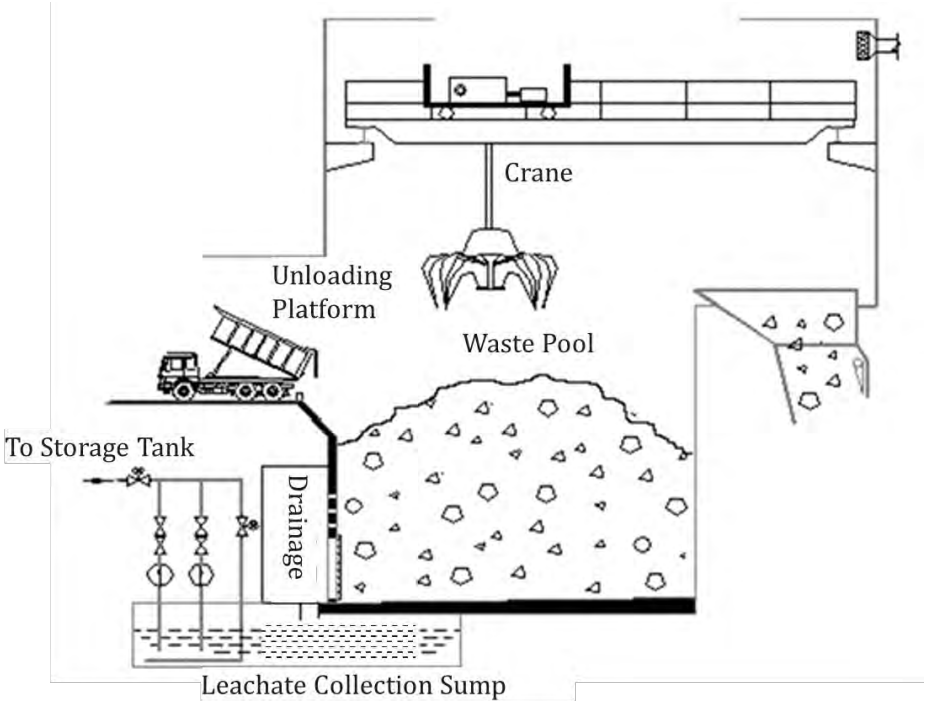
A liquid level monitoring system, together with toxic gas detectors for hydrogen sulfide (H_2S) and ammonia (NH_3), will be installed in the leachate collection sump to provide early warning in the event of abnormal leachate accumulation or leakage.

The waste storage pit is fully enclosed to prevent the uncontrolled release of odorous and potentially hazardous gases generated by the degradation of organic matter, such as hydrogen sulfide (H_2S), ammonia (NH_3), and methane (CH_4), into the ambient environment. The pit is operated under negative pressure, and the extracted gases are directed to the incinerator, where they are utilized as primary combustion air.

The leachate storage tank is located outdoors to the northeast of the main workshop. It is aboveground with a storage capacity of 720 m^3. Drainage ditches are installed around the tank, which are connected to the equalization basin with a capacity of 24 m^3. In addition, leachate transfer pumps are installed near the tank. In the event of an accident or significant leakage, the leachate can be diverted to leachate collection sump and waste storage pit.

Two overhead cranes are installed above the waste pit to handle the waste and feed it continuously into the incinerators.

FIGURE A1-4 THE ILLUSTRATION OF WASTE STORAGE PIT



1.3.1.3 INCINERATORS

The Project is equipped with two incinerators, each with a treatment capacity of approximately 750 tons of waste per day. Each incinerator comprises two main combustion zones, namely a primary combustion zone and a secondary combustion zone.

The secondary combustion zone is operated at a temperature of not less than 850°C, with a residence time of at least 2 seconds, to ensure the effective decomposition of toxic and persistent organic pollutants, including dioxins, furans, and other hydrocarbon compounds.

The flue gas, which contains particulate matter, acid gases (such as nitrogen oxides (NO_x), sulfur oxides (SO_x), hydrogen chloride (HCl) and hydrogen fluoride (HF)), heavy metals, and residual organic compounds, will be treated by the air pollution control system prior to discharge to the atmosphere.

Other components of MSW which have not been combusted are discharged from the bottom of the incinerator chambers and conveyed to a bottom ash remove system. The bottom ash is quenched with water and temporarily stored in the bottom ash yard prior to further utilization.

Diesel fuel and natural gas will be used primarily for initial start-up and to support combustion when the calorific value of the waste is insufficient.

The design capacity for leachate incineration is 4 m^3/h per incinerator.

TABLE A1-5 summarizes main parameters of a typical waste incinerator.

TABLE A1-5 MAIN PARAMETERS OF WASTE INCINERATOR

No.	Parameter	Value
1	Single unit disposal capacity of incinerator	750 tons/day
2	Disposal capacity of incinerator during overload operation	825 tons/day
3	Annual design working hours of incinerator	8,000 h
4	Retention time of flue gas in combustion chamber	≥ 2s
5	Temperature of flue gas at the exit of combustion chamber	850°C
6	Minimum low heat value of waste without auxiliary fuel to ensure stable combustion of waste	8,374 kJ/kg
7	Loss on Ignition (LOI) of Incinerator Bottom Ash	≤ 5%

1.3.1.4 FLUE GAS TREATMENT SYSTEM AND STACKS

The flue gas primarily contains particulate matter, acidic gases (NO_x, SO_2, HCl, HF), heavy metals (e.g., Hg, Pb, Cd), and trace toxic organic compounds such as dioxins (PCDDs) and furans (PCDFs). The project will employ a comprehensive flue-gas treatment system comprising Selective Non-Catalytic Reduction (SNCR) for NOx control, a dry desulfurization process, activated-carbon adsorption for the removal of heavy metals and residual PCDDs/PCDFs, and bag filters for particulate-matter removal.

Following treatment, the flue gas will be discharged via a single 80-meter clustered stack with an outlet measuring 8.2 meters by 7.8 meters. The clustered stack is composed of two individual stacks, each serving an incinerator.

1.3.1.5 WASTE HEAT BOILERS

The flue gas leaving the incineration chambers at approximately 850°C is directed to the boilers for steam generation. The Project is equipped with two boilers, each with a steam generation capacity of 93.4 tons per hour. The boilers produce steam at an average pressure of 13.5 MPa and a temperature of approximately 450°C. After heat exchange within the boilers, the flue gas temperature decreases to around 130°C.

1.3.1.6 TURBINE AND GENERATOR

The generated steam is then conveyed to steam turbine to produce mechanical energy, which is subsequently converted into electricity by the generator.

The Project is equipped with one 50 MW steam turbine and one 50 MW generator, with the generator rated at 10.5 kV. Key parameters of the turbine generators are presented in ***TABLE A1-6.***

TABLE A1-6 KEY PROPERTIES OF THE TURBINE AND GENERATOR

No.	Parameter	Value
1.	Capacity	50 MW
2.	Speed of rotation	5,000/300 rpm
3.	Flow	186.8 h
4.	Power factor	0.8
5.	Voltage	10.5 kV

The steam flow after rotating the turbine will be cooled down and condensed to water at the condensers. The condensed water will then be heated at low pressure before being recirculated back to the boilers.

1.3.1.7 FLY ASH STABILIZATION SYSTEM

The fly ash generated from the incineration process will be collected and temporarily stored in two fly ash silos located within the main workshop. Each silo has a storage capacity of 180 m³, which is equivalent to three to five days of plant operation at design capacity.

The fly ash will then be conveyed to a mixer, where it will be blended with water and a chelating agent to produce a slurry. The chelating agent reacts with the heavy metals in the fly ash to form stable chelates, thereby reducing their toxicity and mobility. Following stabilization, the slurry will be solidified and molded using a solidification molding machine, stored at the temporary storage area, and subsequently transported to the local landfill for final disposal.

The annual quantity of fly ash generated is estimated at 19,162 tons, which increases to approximately 23,489 tons per year after stabilization.

1.3.1.8 POWER DISTRIBUTION UNIT AND TRANSMISSION LINE

The electricity generated by the Project will be transmitted to an existing nearby substation. A power distribution unit is installed within the Project site. One 63 MVA main transformer will step up the voltage from 10.5 kV to 110 kV and facilitate the transfer of electricity to the transmission line. The transmission line is designed as an overhead line with a total length of 0.6 km with four towers, approximately 20 m in height, connecting the project's step-up station to the existing substation. The detailed design of this transmission line is under preparation and will be finalized at the end of March 2026.

1.3.2 AUXILIARY FACILITIES

1.3.2.1 WATER SUPPLY SYSTEM

During the operations, the nearby Dargom Canal will serve as the main water source. A water intake pump will be installed adjacent to the canal. After being extracted from the Dargom Canal, the raw water will be pumped and conveyed to the Project site via a 1 km pipeline. The pipeline alignment is shown in ***Figure 2-3*** in master ESIA report. Both open-cut excavation and pipe-jacking methods will be used for the pipeline installation.

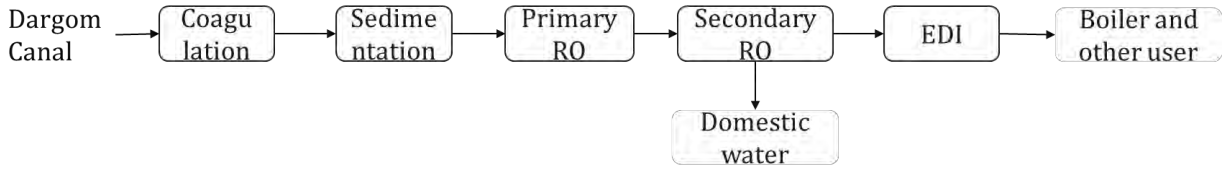
A water extraction permit has been issued by Ministry of Water Resources of the Republic of Uzbekistan, approving a maximum abstraction volume of 1.64 million m³/yr.

The raw water will be treated before being supplied for production and domestic purposes. The Project will be equipped with two water purification stations, each with a treatment capacity of 175 t/h, operating in a one-duty-one-standby configuration. The purification process includes coagulation and sedimentation. A 1,900 m^3 combined production and firefighting water storage tank will be installed.

For boiler use, makeup for steam loss and SNCR etc., the above filtered water will be further treated in two demineralization systems, each with a capacity of 20 m^3/h. The boiler feed water treatment system includes a two-stage reverse osmosis (RO) system followed by an electrodeionization (EDI) process.

Domestic water is extracted from the RO section of the demineralized water treatment system. An 18 m^3 water tank will be installed to store domestic water before distribution. The water tank will be constructed by C30 concrete with a water permeability resistance class of P6.

FIGURE A1-5 KEY PROCESSES OF THE WATER PURIFICATION



1.3.2.2 POWER TRANSMISSION AND TRANSFORMATION SYSTEM

The electricity during the construction phase will be provided by the municipal grid. A 200 m overhead transmission line, approximately 20 m in height, from the municipal substation in the southwest to the site and to the substation in the construction camp have been commissioned.

The project uses 15% of self-generated electricity for normal operations and transforms the remaining 85% to the municipal grid. The substation and transmission line (about 600 m with 4 towers) is a part of the project. The temporary power supply system for construction phase will serve as backup power during operation phase.

1.3.2.3 COOLING TOWERS

Two cooling towers, each with a circulation capacity of 5,550 m³/h, are installed to cool water from the condensers and other auxiliary equipment. The cooling water is circulated within a closed-loop system, while a regular make-up water supply of 3,803 m³/d is required to compensate for evaporative loss, drift, and blowdown.

The inlet temperature of water entering the cooling towers is approximately 41.5 °C, and the cooled water is discharged at around 33 °C. The water tank of cooling tower will be constructed by C30 concrete with a water permeability resistance class of P6.

1.3.2.4 WASTEWATER TREATMENT PLANTS

Domestic water, wastewater from lab, initial rainwater and the floor flushing water will be treated by WWTP 1, with a capacity of 48 m^3/d. The treatment process consists of bar screening, equalization, anoxic treatment, aerobic treatment, ultrafiltration, active carbon filtration and disinfection. The treated effluent will be reused as make-up water for the cooling towers, landscape water and road sprinkling water.

The blowdown water generated by the cooling towers will be treated by WWTP 2, with a capacity of 450 m^3/d. The treatment process consists of equalization, sedimentation, filtration, ultrafiltration, and RO. The treated effluent will be reused as make-up water for the cooling towers, while the concentrated brine will be reused for the bottom ash conveyor quenching.

The receiving tank and other structures of WWTP will be constructed with C40 concrete of impermeability grade P8.

1.3.2.5 TANK FARMS

There are three tank farms within the Project site: one for diesel storage, one for ammonia storage and the other for leachate storage.

Diesel tank

The underground diesel storage area is enclosed by a 416 m³ containment dike and accommodates two 45 m³ diesel tanks. The volume of containment dike is more than 110% of the volume of a single diesel tank. The tanks are fully covered with compacted sand soil for secondary containment and fire protection.

The anti-seepage system comprises the following components, arranged from interior to exterior: 1) 1 mm cementitious crystalline waterproofing layer; 2) 2 mm epoxy resin coat and Fiberglass reinforced plastic; 3) 350 mm structural wall of C40 concrete with impermeability grade P8 ; and 4) 2 mm polyurethane waterproof membrane. The permeability coefficient of the linings will be no greater than 1×10^{-11} cm/s.

Ammonia tank

20% ammonia is stored in a 40 m³ aboveground tank, which is installed within a containment bund measuring 10.6 m × 10.7 m with a height of 1 m. The containment bund provides a total containment capacity of 113.4 m³, sufficient to retain more than 110% of the tank volume.

The containment bund is sealed with a 1.5 mm polyurethane waterproof coating. The permeability coefficient of the linings will be no greater than 1×10^{-11} cm/s.

Ammonia tank is covered by a protective canopy.

Leachate storage tank

The leachate storage tank is located outdoors to the northeast of the main workshop. It is aboveground with a storage capacity of 720 m^3. Drainage ditches are installed around the tank, which are connected to the equalization basin with a capacity of 24 m³. In addition, leachate transfer pumps are installed near the tank. In the event of an accident or significant leakage, the leachate can be diverted to leachate collection sump and waste storage pit.

The containment bund is sealed with a 1.5 mm polyurethane waterproof coating. The permeability coefficient of the linings will be no greater than 1×10^{-11} cm/s.

1.3.2.6 LABORATORY

The Project is equipped with an on-site laboratory responsible for routine analysis of water and steam, municipal waste, fly ash, bottom ash, and flue gas.

Water and steam testing covers raw water, wastewater, demineralized water, with key parameters such as pH, hardness, alkalinity, DO, COD, BOD_5, and SS.

Waste analyses include moisture, volatile compound content, fixed carbon, ash content, calorific value, fly ash content, and bottom ash content including LOI.

Flue gas monitoring covers particulate matter, O_2, CO, CO_2, HCl, SO_2, NOx, temperature, moisture, and flow. Dioxin analysis is conducted by accredited third-party laboratories.

1.4 RESOURCE REQUIREMENT

1.4.1 PROJECT WORKFORCE

Direct Workforce

The Project's construction commenced in July 2025 and is expected to be completed by June 2027. During the construction phase, around 24 direct employees of the Project Company work onsite, including 4 Uzbeks and 20 Chinese nationals. Direct workers will live in camps provided by the Project Company within the Project site. Local Uzbek workers can choose to return home for accommodation. The Project Company provides bus transport to site for workers.

During the operation phase, the number of Project's direct workforce is planned to increase to around 64 direct employees and 20 to 30 contracted workers such as cleaners and security guards. The overall employment strategy will follow a phased transition approach: a higher proportion of Chinese staff will be deployed at the initial stage of operations, with local employees gradually taking over the roles and responsibilities of Chinese staff in the subsequent phases until the localized staffing is fully realized. The organization structure will remain consistent with construction phase including the General Business Department, Finance Department, EHS Department, Production Preparation Department, and Engineering Department. The Project will provide the dormitory and a canteen for the workers.

Regarding the working hours, for the operation phase, the staffing follows the mode of four-shift allocation with three-shift operation for frontline operational staff, with each shift lasting 8 hours; administrative and management personnel shall work a standard 8-hour workday.

Contracted Workforce

The Project will engage an EPC contractor during the construction phase. The peak number of contracted workers during the construction phase is expected to be around 600, with no more than 50% being Chinese nationals and over 50% of the workforce will be Uzbek nationals.

The Project will provide on-site dormitory accommodation for workers by constructing a dedicated construction camp. The total floor area of the workers' residential zone will be 20,000 square meters, which can accommodate approximately 600 people, with 2 to 4 workers sharing one room. No additional transportation will be provided for workers commuting to the construction site. The Project's camp area will also be equipped with amenities, including a retail store, a communal bath, centralized hot water supply, a smoking area, and a coffee break room. The local Uzbek workers can choose to return home for accommodation.

Construction workers will work from 7:00 to 18:00 daily. Workers will typically work 8 hours per day.

Security Personnel

During the construction and operation phase, the Project's security personnel will be provided by the local security companies. During the construction phase, 4 security personnel will be

employed. This number will increase to 6 to 10 security personnel during the operation phase. Security personnel will not carry firearms but will be equipped with shields and rubber batons.

1.4.2 LAND

The Project will occupy state-reserved land of approximately 10 ha. It includes 9 ha to be used for the WtE plant (8 ha) and the Project Bottom Ash Laydown Area (1 ha), both of which will be leased for 30 years from the government. In addition, the Project will also occupy a Project Layout Area of 1 ha for temporary use during the construction phase. According to the confirmation from the Samarkand City Cadastral Department, the 10 ha land has been state-reserved land in the past 10 years with no land users.

In addition, the 600m-long overhead transmission line will build four tower foundations with each occupying 36 m2 of land. The sum of land for tower foundations is 144 m2. The overhead transmission line requires the establishment of servitude with an overall corridor width of approximately 25 m, plus a horizontal safety distance of 10 m measured from the outer edge of each side of the conductors. Within the servitude area, land use shall be controlled, and crop or vegetation height shall be managed to ensure a minimum vertical clearance of 4 m from the conductors, while permanent structures and high-growing vegetation are prohibited. The area of the transmission line is state-reserved unused land.

A pump station will be constructed near the Dargom Canal to supply water for the Project operation phase. An approximately 1km long pipeline will be installed between the pump station and the Project site to convey the required water. Both the pump station location and the pipeline route are situated on state-reserved unused land.

The pipeline will be buried at a depth of not less than 1 meter. During construction, temporary land occupation will be required for trench excavation, pipe laying, backfilling, and subsequent reinstatement of the surface. Once construction is completed and the land is restored, no long-term impacts on land use are expected. The pump station itself will require long-term land leasing for its construction and operation.

The following table shows specific land use of the Project.

TABLE A1-7 PROJECT LAND USE

Land Use Category	Item	Area	Land Use Method	Current Land Use
Long-term Land Lease	WtE Plant	8 ha	Land lease from the government for 30 years	Fenced for Project construction. Unused state-reserved land prior to Project construction.
	Project Bottom Ash Laydown Area	1 ha	Land lease from the government for 30 years	Unused state-reserved land

Land Use Category	Item	Area	Land Use Method	Current Land Use
	Transmission Line Tower Foundation	144 m^2 (0.0144 ha)	TBD	Unused state-reserved land
	Pump water station	54 m^2 (0.0054 ha)	TBD	Unused state-reserved land
Temporary Land Use	Temporary Laydown Area	1 ha	Land lease from the government until 30 days after Project Commercial Operation Date[1]	Unused state-reserved land
	Construction of the water pipeline	Approximately 0.3 ha	TBD	Unused state-reserved land

1.4.3 POWER SUPPLY

Construction phase: The electricity during the construction phase will be provided by the municipal grid. The total electricity consumption during construction phase is 2.62 million kWh.

Operation phase: The Project will use self-generated electricity during the operation phase. No external power supply is needed under normal conditions. The temporary power supply system for construction phase will serve as backup power during operation phase.

The energy required by the Project during the construction and operation is summarized in the table below.

TABLE A1-8 ENERGY CONSUMPTION

Type	Construction	Operation
Electricity	2.62 million kWh during the whole construction phase (from grid)	43.1 million kWh/yr (self-generated)

1.4.4 WATER SUPPLY

Source: During the construction phase water will be sourced from groundwater supply. During the operation phase, the nearby Dargom Canal will be used as water source.

Water Consumption during Construction: 324,000 t during the whole construction phase.

Domestic sewage will be transported by tanker trucks to off-site treatment facilities, where it is treated and discharged. No wastewater will be discharged into Dargom Canal.

[1] In accordance with the Land Lease Agreement relating to 1,500 ton-per-day Waste-to Energy Plant in the Samarkand Region between Waste Management and Circular Economy Development Agency under the Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan as Lessor and "SUS ENVIRONMENT SAMARKAND" FE LLC as Lessee, dated 30 June 2025.

Water Consumption during Operations: The Project expects to consume about 3,311.1 m^3/d, of which 3,279.5 m^3/d is for production use and 31.6 m^3/d is for domestic use, based on the annual average meteorological conditions. The water will be taken from two main sources:

- Surface water from Dargom Canal: about 3,153.8 m^3/d (annual average).
- Recycled water from the water purification stations: about 157.3 m^3/d (annual average).

The water balance during operational phase diagram is shown in the ***FIGURE A1-6.***

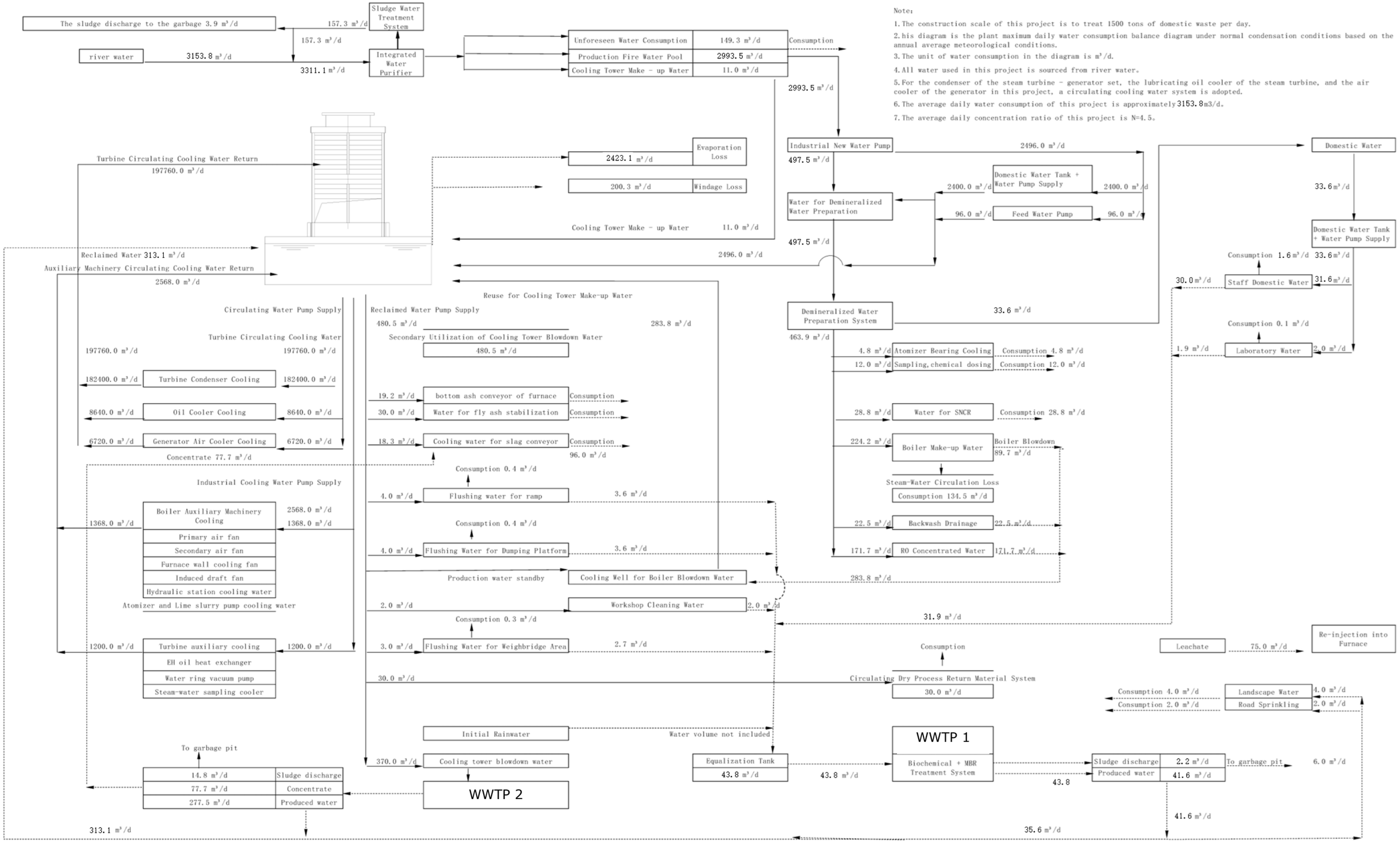
The Project adopts a zero-discharge strategy. Wastewater generated from production or domestic activities will not be discharged into any open water body, onto the ground surface, or into the municipal sewer network. Instead, all wastewater will be treated onsite and subsequently reused.

Cooling water for the turbine condenser, oil cooler, generator and other auxiliary equipment is circulated in the closed loops and is not discharged. The cooling tower is regularly replenished with 5,671.9m^3/d, with a loss of water of 2,623.4 m^3/d. The effluent from cooling tower (370 m^3/d) is treated by WWTP 2 and reused onsite.

Other wastewater sources include domestic sewage, laboratory effluent, boiler blowdown, backwash effluent from the demineralization system and floor-washing water. All of this wastewater stream (43.8 m^3/d) is treated by WWTP 1 and reused onsite.

The reclaimed water is utilized for bottom ash quenching (37.5 m^3/d), fly ash stabilization (30 m^3/d), floor washing (13 m^3/d), and air pollutant control system (30 m^3/d). Any remaining reclaimed water is supplied as makeup water for the cooling tower.

FIGURE A1-6 WATER BALANCE DIAGRAM



1.4.5 PROJECT ACCESS ROAD

The Project will use the local public road "Samarkand Halaqa Yo'Li" as the main access road for the Project's construction and future operation of garbage trucks. Besides the Project site, the road also connects the Samarkand metallurgical plant and local mahallas such as Chilquduk MFY and Yoshlik MFY. The road is a four-lane, two-way cement-paved road, with concrete bollards installed along the median as physical separation. The ***FIGURE A1-7*** shows the access road.

FIGURE A1-7 PROJECT'S ACCESS ROAD

1.5 PROJECT SPECIFICATIONS OF CCRA

The Project is considered eligible for physical CCRA due to the following considerations:

- The Project is likely to be Category B or above. According to publicly available databased, the Project area is likely prone to a number of climate hazards, including landslides, wildfire, extreme heat, and water scarcity.[2]

  As calculated in Section 8.2 (GHG Emissions Assessment) of the ESIA main body, the Project's Scope 1&2 GHG emissions during operation phase are estimated to be 251,616.64 tCO_2e/a, primarily comprising Scope 1 emissions arising from the incineration of MSW.[3] Given that this exceeds the 100,000 tCO_2e/a threshold, a transition risk assessment should be warranted in line with EP4. However, a transition risk scenario analysis and GHG alternatives analysis are not considered necessary considering the specific nature of the Project as an integrated waste management facility and its low exposure to material transition risks and not expected to affect financial viability under plausible decarbonization scenarios:

  - While the Project generates direct emissions from waste combustion, it delivers substantial system-level climate benefits by avoiding methane emissions from landfill

[2] Think Hazard - Samarkand district
[3] The GHG assessment is conducted in accordance with EP4, MIGA performance Standard 3 and IFC Performance Standard 3. Organizational and operational boundaries are defined referring to the GHG Protocol Corporate Accounting and Reporting Standard and the GHG Protocol for Project Accounting.

disposal (596,298 tCO_2e/a), and displacing grid electricity generation (201,012.62 tCO_2e/a). This would result in a net avoided emissions balance of –545,693.98 tCO_2e/year. Although avoided emissions are not considered in determining the applicability of transition risk thresholds, they are highly relevant in assessing exposure to transition-related policy and market risks, as the Project functions as a decarbonization-enabling infrastructure within the regional waste management system.

- The Project's emissions are structurally linked to the treatment of residual MSW, and therefore are not driven by discretionary fuel choice, but by waste composition determined upstream, which means GHG emissions cannot be materially reduced without altering the fundamental waste treatment function. Also, the Project is not directly exposed to typical transition drivers, such as fuel switching or electrification pathways. Alternative waste management options (e.g., sanitary landfill) would result in significantly higher lifecycle emissions, particularly due to methane generation.
- The Project is aligned with Uzbekistan's national waste management and green economy strategies and is expected to support diversion from landfill, contribute to renewable/low-carbon energy supply, and remain consistent with long-term decarbonization pathways. Potential future policy instruments (e.g., carbon pricing or emissions regulation) are therefore unlikely to materially impair the Project's viability and may instead enhance its relative competitiveness compared to higher-emission baseline alternatives.

2. METHODOLOGY

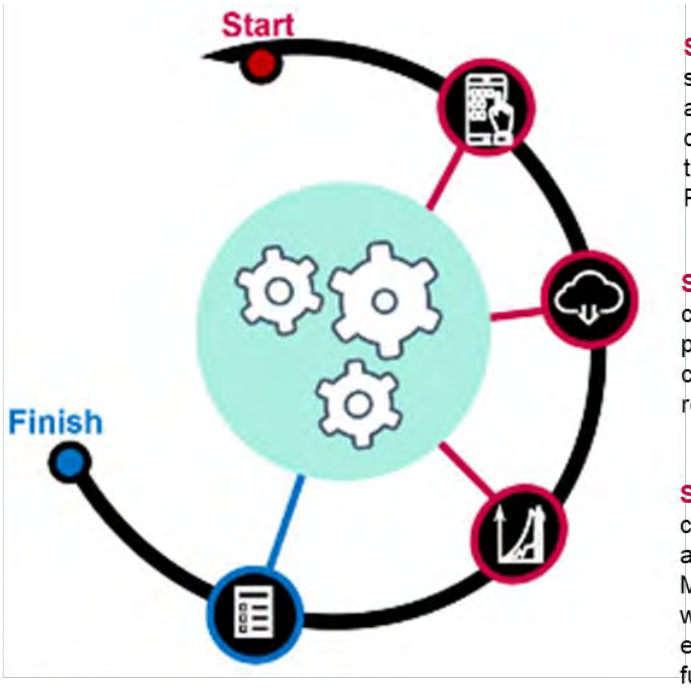
2.1 PHYSICAL CCRA METHODOLOGY

2.1.1 APPROACH FOR THE PHYSICAL CLIMATE HAZARD AND RISK REVIEW

This physical CCRA is conducted through four key steps, as outlined in ***FIGURE A2-1***:

- Steps 1-3 (in red) involve a high-level screening of the Project's construction and operational phases through the collection and analysis of baseline and future projected climate data.
- Step 4 (in blue) involves a risk review of climate hazards as potentially material to the construction and/or operational phases of the Project.

FIGURE A2-1 SUMMARY OF THE FOUR KEY STEPS OF THIS PHYSICAL CCRA



Step 1 - Screening: This includes a high-level screening of the Projects operations and associated facilities against the range of physical climate hazards that are potentially of material risk to the construction and operational phases of the Project.

Step 2 - Climate Data Collection: Climate data is collected for baseline (present-day) and future projected climatic conditions, for all relevant climate hazards (in alignment with TCFD and EP4 recommendations).

Step 3 – Climate Data Trend Analysis: Baseline climate data is analysed to identify the presence and intensity of any hazards within the Project area. Modelled climate data is analysed in combination with the best available literature to identify how each climate hazard is projected to change in the future.

Step 4 - Risk Review: Trends in the climate data are then assessed alongside relevant Project information, provided to ERM by the client, to review the presence and potential materiality of climate risks to the Project. This will also involve the recommendation of next steps regarding any identified material risks and requirement for further, more detailed assessment (if appropriate).

Step 4 involves reviewing the climate data collected for each hazard included in this assessment (***Section 4.4***). This includes analysing baseline and future projected trends for each climate hazard, as well as assessing the potential materiality of any risks present under baseline conditions, and how these risks are projected to change in the future based on key trends identified within the climate data. Each climate hazard will be assessed in relation to the Project using a combination of climate data and qualitative research sourced from industry-leading academic and governmental sources.

2.1.2 RISK SCORE METHODOLOGY

ERM has compiled a set of climate indicators for each physical climate hazard included in this assessment using ERM's Global Climate Database (GCD), supplemented by internationally

recognised public datasets and peer-reviewed scientific literature. A summary of the climate indicators and data sources used is provided in ***0***.

Once the climate data is collected, the trends associated with each variable are assessed for every climate hazard across three time horizons (baseline, 2030s and 2050s), represented by a risk score that is a quantitative number (0 to 10 scale) used to assess the current and projected impacts of climate hazards at Project local or regional level based on the resolution of climate indicator. The Risk score is calculated by multiplying the hazard normalized value (climate data representing hazard, 0 to 1 scale) by the hazard exposure rating (representing vulnerability, 0 to 10 scale). A high-risk score indicates high exposure to a climate hazard, and/or a high relevance of that climate hazard to the asset location.

Definitions of exposure ratings are provided in ***TABLE A2-1*** alongside the corresponding exposure rating multiplier which is used to generate the hazard risk scores. Research into exposure ratings consisted of a review of past projects undertaken by ERM and a range of literature including Sector/asset-type specific climate risk assessments, Company risk assessments, CDP reports, Government guidance and reports, Industry body reports, financial institution guidance, and Scientific papers and news articles on specific events.

TABLE A2-1 EXPOSURE RATINGS DEFINITIONS

Exposure Rating	Exposure Rating Multiplier	Definition
Very High	10	Exposure to Climate hazards is very high. The potential effects on impacted assets may be: long-term, e.g. last for months, or permanent; likely to have a significant impact on the assets' finances; severe due to a fundamental link between the asset's function and the characteristics of the climate hazard; considered more relevant to the asset compared to the impact of other hazards; extensive social and health impact; a large area of environmental impact for months impacting high biodiversity areas; - national or international reputational impact; It is likely that the entirety of the overall asset would be impacted.
High	8	Exposure to Climate hazards is high. The potential effects on impacted assets may be: long term, e.g. to last for months; are likely to have a high financial significance to the operations of those assets; extensive social and health impact; a large area of the environment impacted for months impacting high biodiversity areas; national or international reputational impact;

Exposure Rating	Exposure Rating Multiplier	Definition
		It is likely that a high proportion of the overall asset would be impacted.
Moderate	6	Exposure to Climate Hazards is moderate. The potential effects on impacted assets may be: medium-term, e.g., to last for weeks; are likely to have moderate financial significance to the operations of those assets; minor to medium social and health impact; a moderate area of the environment impacted over weeks impacting low biodiversity areas; local reputational impact; It is likely that a moderate proportion of the overall asset would be impacted.
Low	4	Exposure to Climate hazards is low. The potential effects on impacted assets may be: short-term, e.g., to last for days; are likely not to be financially significant to the operations of those assets; minimal social and health impact; small area of the environment impacted over a short period; limited reputational impact with no media attention; It is likely that a low proportion of the overall asset would be impacted.
Minimal	2	Exposure to Climate Hazards is minimal and there are limited potential effects on assets.
N/A	0	Exposure to Climate Hazards is not relevant and there are no potential effects on assets.

TABLE A2-2 provides an interpretation of risk scores by categorising the risk score value into one of five categories between Minimal and Very High, including the thresholds for the levels of risk. For example, a hazard with a normalized value of 0.7 would have a 'High' category. Assuming an asset had an exposure rating of 2 for that hazard, then the risk score would be 1.4 (0.7 times 2 equals 1.4), which is a 'Low' category.

TABLE A2-2 RISK SCORE CATEGORY THRESHOLDS

	Minimal	Low	Moderate	High	Very High
Hazard Risk Score	0 to 1	1 to 2	2 to 3	3 to 4	4 to 10
Normalized Values	0 to 0.2	0.2 to 0.4	0.4 to 0.6	0.6 to 0.8	0.8 to 1

Risk scores are calculated for both present-day conditions and future projected conditions. The difference between the present and future risk scores is calculated by subtracting the present-day value from the future projected value.

TABLE A2-3 provides an interpretation of the difference by categorizing it into one of six categories between Significant Decrease and Significant Increase, with the thresholds used to identify the magnitude of the level of increase or decrease in each risk score from baseline into the future.

The asset risk score difference thresholds are smaller than the hazard risk score difference thresholds because the asset risk scores are aggregated data. Small changes in aggregated data reflect large changes in the underlying data. For example, if a baseline hazard risk score is 2.0, and the 2050 hazard risk score is 3.5, then the hazard risk score has increased by 1.5 indicating a moderate increase. If a baseline asset risk score is 2.0, and the 2050 asset risk score is 3.5, then the asset risk score increased by 1.5 indicating a significant increase.

In all cases, red indicates an increase in the risk score into the future, with darker red indicating a larger increase. Blue indicates a decrease in the risk score into the future, with darker blue indicating a larger decrease.

TABLE A2-3 THRESHOLDS USED TO IDENTIFY THE MAGNITUDE OF CHANGE IN THE RISK SCORE ACROSS TIME HORIZONS FOR EACH CLIMATE HAZARD

	Significant Decrease	Moderate Decrease	Minimal Decrease	No / Limited Change	Minimal Increase	Moderate Increase	Significant Increase
Risk Score	-2 or below	-1 to -2	-0.25 to -1	-0.25 to 0.25	0.25 to 1	1 to 2	2 or above
Normalized Values	-0.2 or below	-0.1 to -0.2	-0.025 to -0.1	-0.025 to 0.025	0.025 to 0.1	0.1 to 0.2	0.2 or above

2.1.3 RISK REVIEW METHODOLOGY

Following this, ERM undertakes a structured evaluation of the potential risks posed by identified climate hazards to the Project within the Risk Review section. This review provides an overview of potential impacts associated with hazards determined to be material to the Project's operations and assets. The assessment was carried out at the level of key project

equipment rather than at the component level, in order to avoid duplication of findings, given that similar types of equipment are utilized across various facilities.

The analysis draws upon the Project's geographic and environmental context to assess its exposure to these hazards, while vulnerability is evaluated in greater detail with reference to Project design features, applicable engineering standards, and other resilience measures already in place or planned. The resulting Risk Materiality Category presented below reflect the consideration of these vulnerability factors and mitigation measures and therefore represent the residual risk to the Project after accounting for existing and planned controls. See ***TABLE A2-4*** for the range of example risk areas for reference.

TABLE A2-4 DEFINITIONS OF THE POTENTIAL RISK AREAS TO THE PROJECT

Risk area	Definition and extent of the risk area
Main Production Facilities • Incinerators, Boilers and Turbine-Generator System • Flue Gas Treatment System and Stacks • Fly Ash Stabilization and Temporary Storage	• **Extreme heat** can pose challenges to ensure reliable operations and managing equipment in the processing areas. • When **flood water** inundates the workshop, operations are disrupted due to infrastructure damage and/or mechanical failure. • Project efficiency is also vulnerable to **water stress and droughts** condition. • **Wildfire** will lead to disrupting processing activities, posing potential risk to personal health and safety.
Utilities • Water Supply Pump Station and Pipeline • Cooling Towers • Substation and Transmission Line • Wastewater Treatment Plants • Tank Farms	• **Extreme heat** reduces transformer efficiency by causing oil overheating and lowering cable ampacity, which can lead to protective equipment tripping and forced load derating. Prolonged heat stress may also accelerate insulation aging. • **Extreme heat** can make domestic wastewater hotter, which could force plants to shut down during hot days if they fail to keep their discharge temperature below local regulatory thresholds. • **Extreme heat** can overwhelm the cooling system, reduce the cooling capacity and potentially cause thermal stress or failures. • **Heavy rainfall and flooding** can result in water ingress into switchgear and control rooms, causing flashovers, power outages, equipment damage, grid instability and extended downtime for drying and repairing. • **Floodwater infiltration** can damage stored goods and necessitate costly disposal of contaminated materials. • When **flood water** inundates the utilities, operations are disrupted due to wastewater treatment plant damage and/or mechanical failure.
Waste Collection Hall and Waste Storage Pit	• **Extreme rainfall and flooding** may exceed the capacity of the leachate drainage, sump, and storage systems, increasing overflow and contamination risk.

Risk area	Definition and extent of the risk area
	• **Extreme heat** can affect the integrity of concrete structures and waterproof membranes and accelerate organic waste decomposition. • **Higher temperatures** increase generation of odorous and hazardous gases, placing pressure on ventilation systems. • **Windstorms and dust storms** may disturb unloading operations and challenge containment of odors and dust, especially if air-tight doors malfunction. • **Power outages during extreme weather** can interrupt negative-pressure operation, gas extraction, and leachate pumping, raising safety and environmental risks.
Construction and Temporary Maintenances Works	• **Heavy rainfall and storms** can erode temporary works, damage trenches, and destabilize staging areas, delaying construction schedules and increasing safety risks. • **Heavy rainfall and intense runoff** can inundate infrastructure, damage foundations, and overwhelm drainage systems, which require more frequent maintenance and more operation cost. • **Fire Hazards, landslides and extreme wind** may leave maintenance staff exposed to an unsafe environment or even endanger their lives. • **High winds** may topple scaffolding or temporary structures, while heatwaves elevate health risks for workers, reducing productivity and increasing the likelihood of heat-related incidents. • **Dust storms** can impair visibility and damage exposed equipment during construction phases.
Staff Health and Safety	• **Extreme heat, flooding, lightning, and high winds** pose direct risks to worker safety, including heat stress, electrocution, and physical injury. Inadequate emergency systems, such as fire pumps, drainage, and spill containment, during extreme events can hinder timely response and amplify operational impacts. Disruptions to emergency preparedness compromise evacuation procedures, firefighting capability, and continuity of critical production processes during severe weather events.

Risk Materiality Categories representing the residual risk level are assigned to the start (baseline), the near future (2030s) and the far future of the Project operation (2050s). These periods have been selected to identify potential changes in risk levels by the end of operations compared to the baseline, providing insight into how climate-related risks may evolve over time.

TABLE A2-5 RISK MATERIALITY CATEGORIES AND ASSOCIATED DEFINITIONS

Risk Materiality Category		Definition
Not Applicable (N/A)		Impacts with this category may not relate to the Project's context, design, or operational conditions. This means that the identified hazard or risk factor is either not present, or its exposure pathway does not apply to the Project's activities, assets, or location. As such, no material operational, financial, environmental, or social impacts are expected to arise under this category.
Unlikely material		Impacts with this category (such as those related to operational, financial or other types of impacts) are unlikely to be material. This means that, for example, (a) operational impacts could be expected to be short-term, impacting a limited proportion of the overall asset and its operations, or (b) financial impacts would be expected to be minimal relative to the project's overall revenue and/or costs.
Likely material	Low	Impacts in this category (such as those related to operational, financial or other types of impacts) are expected to be of low materiality. This means that, for example, (a) operational impacts, if they occur, would generally be short-term and affect only a small proportion of the asset or its functions, or (b) any associated financial impacts would be small relative to the Project's overall revenue and costs, and are not expected to meaningfully influence overall performance.
	Moderate	Impacts in this category (such as those related to operational, financial or other types of impacts) are expected to be of moderate materiality. This means that, for example, (a) operational impacts, if they occur, would generally be short- to medium-term and affect only a moderate proportion of the asset and its operations, or (b) any associated financial impacts would be moderate relative to the Project's overall revenue and costs, and are not expected to meaningfully influence overall performance.
	High	Impacts associated with this category (such as those related to operational, financial or other types of impacts) are likely to be of high materiality. This means that, for example, (a) operational impacts could be expected to be medium- to long-term, impacting a low to moderate proportion of the overall asset and its operations, or (b) financial impacts would be expected to be moderate to high relative to the Project's overall revenue and/or costs.

Within the 'Next Steps' section ERM will provide high-level recommendations to the Client for any risk areas where the residual risk level is identified as being potentially material in relation to the Project (i.e., any risk area assigned the 'Likely Material' categorization). Such recommendations could identify:

- the potential value in undertaking further assessment of specific climate hazards/risks (which exceed the scope of this assessment), or
- no further assessment is required (e.g., if information supplied by Client suggests that

risks are already being managed effectively).

These recommended next steps are outlined and explained in greater detail in ***TABLE A2-6*** below.

TABLE A2-6 NEXT STEP CATEGORIES AND THEIR ASSOCIATED DEFINITIONS

Next Steps Category	Definition
No further action required	ERM does not identify any further action required by the Client.
Potential value in assessing the risk further	Further assessment of a specific climate hazard/risk item could provide additional value to the Project team. This is typically recommended for risk items classified as 'Likely Material – Low or Moderate'.
High value in assessing the risk further	Further, a detailed assessment of a specific climate hazard/risk item could provide significant additional value to the Project team. This is typically recommended for risk items classified as 'Likely Material – Moderate or High'.

3. THE COMPATIBILITY WITH NATIONAL CLIMATE COMMITMENTS

Uzbekistan signed the Paris Agreement on 19 April 2017. As a signatory to the Agreement, the country has committed to contributing to global efforts that limit global warming to well below 2 °C, with a more ambitious target of 1.5 °C. Uzbekistan submitted its third Nationally Determined Contribution (NDC) in December 2025, for the period up to 2035, which plays a critical role in outlining its strategy for meeting international climate goals.[4] In the 2025 NDC, Uzbekistan updated its target to reduce 50% in specific GHG emissions (emissions' intensity) per unit of gross domestic product by 2035 from 2010 levels, compared to the previous 2021 NDC target of reducing GHG emissions intensity per unit of GDP (carbon intensity of GDP) by 35% by 2030 from 2010 level. This update reflects the country's dedication to decarbonizing its economy and transitioning toward more sustainable practice.[5]

To ensure the fulfilment of its commitments under the Paris Agreement, Uzbekistan has identified priorities for the transition of the economy to a green development path and adopted the Strategy for the Transition of the Republic of Uzbekistan to a Green Economy for 2019-2030 (Resolution of the President of the Republic of Uzbekistan PP-4477 dated 04.10.2019) in 2019. This document outlines a nationwide, multi-sectoral policy framework and a roadmap for Uzbekistan's transition to a green economy in 2030. [6] Relevant key targets and priority areas of this strategy are as follows:

- increasing the production capacity of renewable energy sources to 15 GW and bringing their share in the total volume of electricity production to more than 30 percent;
- **use of solid waste facilities in the form of alternative energy sources.**
- **reducing the volume of solid waste sent for disposal to landfills, creating modern solid waste landfills that meet the requirements of sanitary and environmental standards, as well as taking measures to close and reclaim existing landfills.**
- development of sanitary cleaning infrastructure aimed at ensuring full coverage of the population with services for the collection and removal of solid waste.
- creation of an effective and modern system of solid waste processing.
- improvement of pricing and optimization of tariffs in the field of sanitary cleaning.

According to the preliminary Long-term Low-Carbon Development Strategy, the waste sector is considered one of the priority areas for the implementation of mitigation projects aimed at supporting Uzbekistan's low-carbon transition. In 2022, greenhouse gas (GHG) emissions from Uzbekistan's waste sector reached 10.5 million tCO_2e, representing approximately 5% of national emissions and marking a 1.4-fold increase compared with 2010 levels. The sector is governed by the national Law "On Waste"[7], which establishes controls to prevent adverse impacts on public health and the environment, reduce waste generation, and promote the efficient use of waste in economic activities.

Significant progress has been made in strengthening the national waste management system. Complementing this framework, the 2019–2028 Strategy for Solid Household Waste (SHW)

[4] Nationally Determined Contributions Registry | UNFCCC
[5] Uzbekistan Third NDC.pdf
[6] ПП-4477-сон 04.10.2019. Об утверждении Стратегии по переходу Республики Узбекистан на «зеленую» экономику на период 2019-2030 годов
[7] Law of the Republic of Uzbekistan "On Waste," of 05.04.2002. № 362-II, https://lex.uz/docs/6817352

Management sets key national targets, including achieving 100% population coverage by waste collection and removal services by 2028, and raising solid household waste recycling rates to 60–65%. Under the broader "Uzbekistan-2030" Strategy, the Government has articulated more ambitious goals, including **generating up to 35% of alternative energy from waste incineration and reducing landfill areas by 50%.**

The Project is explicitly recognized in Uzbekistan's 2025 NDC as a key investment that strengthens national infrastructure for the collection, transportation, processing, and disposal of solid household waste. By consuming 500,000 tons of MSW and generating 328.3 GWh of electricity annually, the Project aligns closely with Uzbekistan's renewable-energy development and waste management goals. The Project will play an important role in helping Uzbekistan meet its obligations and goals under the Paris Agreement.

4. PHYSICAL CLIMATE CHANGE RISK ASSESSMENT

This section presents the results of the Physical Climate Change Risk Assessment for the Project. The assessment integrates baseline and projected climate data with Project-specific characteristics to evaluate the potential exposure, vulnerability, and risk associated with relevant physical climate hazards.

The assessment considers both acute hazards (e.g. extreme heat events, extreme rainfall) and chronic hazards (e.g. long-term water stress), across the Project's construction and operational phases and over multiple future time horizons aligned with EP4 requirements.

4.1 OVERVIEW OF CLIMATE DATA, SCENARIOS AND TIME HORIZONS

As mentioned in ***Section 2.1***, the physical CCRA comprises four key steps. Specifically, baseline and future projected climate data for the Project location are collected to support the risk assessment. ERM uses baseline data to understand the current severity of each climate hazard within the Project area, while projections data are used to assess potential changes (if any) in the intensity and/or frequency of individual climate hazards within the Project area, under selected future timeframes and climate scenarios.

4.1.1 BASELINE AND PROJECTIONS DATA

The baseline and projected climate data used in this assessment are compiled from numerous international scientific organizations, including the Intergovernmental Panel for Climate Change (IPCC), the World Resource Institute (WRI), International Best Track Archive for Climate Stewardship (IBTrACS), Fathom, National Aeronautics and Space Administration (NASA), European Space Agency (ESA). A summary of the source of data is provided in ***0***.

The climate data used in this assessment is comprised of a variety of types of climate data including **Modelled and Reanalysis (baseline only) data:**

- **Modelled data** aims to identify, quantify and accurately represent complex physical processes within the climate and can be generated in a variety of formats, depending on the physical process being modelled, based on models of different resolution (e.g., Global Climate Models or Regional Climate Models). Modelled climate data can be used to highlight trends in climatic processes under historic (past), present and future projected climatic conditions. [8]
- **Reanalysis data (baseline only)** describes the reanalysis of previously recorded climate data, either from observational or satellite records. This source of data aims to correct any biases, errors and aspects of physical climatic processes that were previously unidentified within older iterations of data. These corrections can be carried out via the back testing of data against newly observed climatic trends and/or modelled climate data. [9]

4.1.2 CLIMATE SCENARIOS

The IPCC is the United Nations' leading body for assessing the science related to climate change. The IPCC provides periodic Assessment Reports (AR) reviewing the available literature on climate change as well as trends in climatic hazards. Each AR is supported by the findings of the latest models from Coupled Model Intercomparison Project (CMIP). ERM utilizes the newest round of climate data from the IPCC AR6, published in 2021, which marks the most

[8] NOAA (2021), Climate Models. Available at: https://www.climate.gov/maps-data/primer/climate-models
[9] ECMWF (2021), Climate Reanalysis. Available at: https://www.ecmwf.int/en/research/climate-reanalysis

well-rounded set of published climate data (as provided in CMIP6).

The data provided by CMIP6 is seen to improve upon the data provided by CMIP5 by using a greater number of climate model runs and modelling groups. CMIP6 scenario integrates socioeconomic and Representative Concentration Pathways (RCPs) to Shared Socioeconomic Pathways (SSPs), which aim to bridge the gaps between the physical climate and socioeconomic conditions, and to explore the potential future climate response to a broader range of greenhouse gases (GHG), land uses and air pollutants, in comparison to AR5.

Each of the SSPs set out by the IPCC represents scenarios that vary on the basis of future projected greenhouse gas (GHG) emissions and resultant warming over the next century. As GHG's increase, climatic conditions within any given area could also potentially change (e.g. increasing temperatures and/or changes to precipitation regimes). However, the specific changes experienced for any given area can vary, depending on prescribed increase in GHG emissions associated with each SSP and time horizon.

Scenarios are selected on the basis of their appropriateness for any given assessment being undertaken. The technical guidance on physical scenario analysis from the TCFD and other sources advise the inclusion of a selection of scenarios covering a variety of reasonable outcomes. This includes the inclusion of a scenario representative of keeping global average temperatures at 2°C or below by the end of this century, most closely aligned with the Paris Agreement. [10] As a result, ERM has included two SSPs in the assessment: SSP1-2.6 and SSP5-8.5 (see below table for estimated temperature increases and definitions associated with each SSP).

TABLE A4-1 CLIMATE SCENARIOS USED IN THIS PHYSICAL CCRA

Scenario	Definition	Mean annual temperature increase by 2100 compared to pre-industrial averages (1850)
SSP1-2.6	A shift to sustainable development pathways with net zero targets achieved after 2050s.	**+1.8°C** (very likely range of 1.0°C to 1.8°C)
SSP5-8.5	High challenges for adapt (rapid development).	**+4.4°C** (very likely range of 3.3°C to 5.7°C)

4.1.3 TIME HORIZONS

The following table provides an indicative comparison between the time horizons chosen for this physical CCRA and the Project's principal milestones. The adopted timeframe follows WMO standards and standard climate-science practice, the "2030s" and "2050s" refer to 30-year climatological periods (i.e., 2015-2044 or 2035-2064). These periods encompass the Project's full 30-year operational window. Multi-decadal averaging is essential to smooth inter-annual variability and provide robust estimates of long-term climate trends such as extreme heat,

[10] TCFD (2017), Recommendations of the Task Force on Climate-related Financial Disclosures. Available at: https://assets.bbhub.io/company/sites/60/2020/10/FINAL-2017-TCFD-Report-11052018.pdf

wildfire potential, and water stress.

TABLE A4-2 TIME HORIZONS SELECTED FOR INCLUSION WITHIN THIS PHYSICAL CCRA

Time horizon	Justification
Baseline	The construction work of the Project commenced in July 2025 and will be expected to last for approximately 24 months. The Project Company plans to commence operation for 30 years starting from 2027. The baseline data used in this physical CCRA is based on the baseline set by each projection model.
2030s	The near future of the Project's operational phase.
2050s	The far future of the Project operation phase.

4.1.4 HAZARD EXPOSURE RATING

The risk assessment uses risk scores that combine climate data ("hazard" component) and exposure rating based on the Project type ("exposure" and "vulnerability" components) as described in ***Section 2.1.2***. For this assessment, the Project type is "Power: Biomass", as the Project generates electrical energy by incinerating solid household waste. The exposure ratings for this Project type are presented in ***TABLE A4-3***, together with the supporting rationale.

TABLE A4-3 EXPOSURE RATINGS ADOPTED BY THIS ASSESSMENT

Hazard	Exposure Rating	Exposure Rating Multiplier	Rationale
Extreme Heat	High	8	Extreme heat is expected to pose a high risk to the Project's operations. There may be a health and safety risk to site personnel, especially those working outdoors. Decreased working hours or time off may be necessary if conditions are not suitable for working in. This may lead to downtime and disruptions in operations, delaying customer orders and potentially causing reputational damages. There may be an increased energy demand for cooling of indoor areas for personnel which can increase costs.
Flooding	Moderate	6	Flooding is expected to pose a moderate risk to the Project. There may be downtime whilst repairs, maintenance and clearing of floodwater takes place. Flooding may block key site areas and access routes for materials, goods and site personnel. This could lead to downtime and disruptions to operations and scheduled maintenance. This could delay customer orders, potentially causing reputational damages. Flooding may lead to the runoff of liquid waste into water supplies which could impact local communities and cause reputational damages. Flooding can pose a health and safety risk to site personnel. Evacuations and time off may be necessary during a flooding event which may lead to

Hazard	Exposure Rating	Exposure Rating Multiplier	Rationale
			downtime. This can lead to loss of revenue due to decline in productivity and potential reputational impacts.
Extreme Winds & Storms	High	8	Extreme winds and storms are expected to pose a high risk to the Project by causing physical damage to operational infrastructure, including buildings, equipment, power and water supply systems, and vehicles. High wind speeds and intense rainfall can lead to structural failures, inundation of critical facilities, and damage to electrical and mechanical components. Resulting downtime and repair activities may interrupt operations and increase costs. Storm-related flooding and debris can obstruct key site areas and access routes, disrupting material delivery, workforce movement, and scheduled maintenance. Such events may also mobilize liquid waste, increasing the risk of environmental contamination and associated reputational impacts. In addition, extreme winds and storm conditions present health and safety risks to personnel; evacuations or work stoppages may be required, reducing productivity and contributing to operational and financial losses.
Landslides	Low	4	Landslides are expected to pose a low risk to the Project. They can cause direct physical damage to operational infrastructure such as buildings, equipment, power and water supply, vehicles, raw materials and stored products. Landslides can block key site areas and access routes for materials, goods and site personnel. There may be downtime whilst repairs and maintenance take place which can take longer if areas need to be cleared. Landslides could pose a health and safety risk to site personnel. Evacuations and time off may be necessary during a landslide event which can lead to a loss of revenue due to a decline in productivity and potential reputational impacts.
Wildfires	High	8	Wildfires are expected to pose a high risk to the Project. They can cause direct physical damage through direct heat and flame to physical infrastructure and operational equipment and vehicles. Key areas and access routes for materials, goods and site personnel may be blocked by wildfires or debris. This could lead to disruptions in operations and potential downtime. This could delay customer orders, potentially causing reputational damages. Wildfires pose a health and safety risk to site personnel through heat and flame as well as smoke and dust particulates. During wildfire events there may be disruptions operations if conditions are not appropriate to work in. Evacuations of staff from site areas may be necessary which may lead to downtime and

Hazard	Exposure Rating	Exposure Rating Multiplier	Rationale
			loss of revenue. Any outdoor operations may be affected by dust and smoke from fires in the vicinity.
Water Stress and Drought	Very High	10	Water stress and drought are expected to pose a very high risk to the Project. Waste-to-energy operations are often very water intensive. During water stress and drought events there will be less water available so productivity may decrease or there could be a shutdown of operations until water supplies are replenished. This will lead to a loss in revenue and potential reputational impacts. The cost of the water may go up, and facilities may have to find an alternative supply of water e.g. pumping groundwater or reclaimed water. There may be a health and safety risk for site personnel if there is not adequate drinking water supply.

4.2 CCRA LIMITATIONS AND ASSUMPTIONS

This physical CCRA provides a high-level review of the possible risks posed to the Project. As a result, this physical CCRA is generated with the aim of identifying risks and aspects of the Project's design that ERM believes should be assessed further as the Project and its operations progress.

However, several limitations and assumptions accompany this type of approach, which should be recognised when interpreting the results of this assessment. These include:

- ERM has not sought to verify the accuracy of any information provided by the Client (for example design specifications, observational data provided by the Client regarding the areas and the facilities that the ERM team did not visit in person, etc.);
- This assessment uses future projected outputs from Global Climate Models (GCMs). The GCMs data have not been validated for the region where the Project is located;
- This high-level screening exercise should not be considered as sufficiently detailed in its output for use within a lender's credit risk assessment associated with the proposed financing facility; and
- This report will not include an assessment of the potential impact of natural hazards that are not affected by climate change (e.g. earthquakes) on the Project and its operations.

4.3 CLIMATE RISK SCREENING

4.3.1 CLIMATE IN SAMARKAND AND UZBEKISTAN

Uzbekistan is vulnerable to climate change risks, with only moderate resilience and adaptation capacity. According to the Notre Dame Global Adaptation Initiative (ND-GAIN) Index, the country ranked 67th out of 187 economies in 2023, indicating a mid-range level of vulnerability balanced by moderate adaptive readiness.[11] The number of days with temperatures above 40 °C is growing in the country, especially in the Aral Sea region, and there is a higher risk of

[11] Rankings // Notre Dame Global Adaptation Initiative // University of Notre Dame

extreme water shortages and droughts, heat waves, floods, and other climate risks.[12] Satellite data over the past six decades indicate that Uzbekistan's average annual temperature has already risen by 1.6°C, nearly three times the global average of 0.6°C, leading to more frequent droughts.[13]

The World Bank's Climate Change Knowledge Portal (CCKP) characterizes Uzbekistan as having a continental semi-arid climate, with strong seasonal contrasts and increasing pressure on water resources. Climate projections suggest a continued rise in evapotranspiration rates, declining soil moisture, and growing variability in precipitation patterns. These changes are expected to exacerbate existing water stress conditions, particularly in river basins that are already heavily utilized for agricultural irrigation. [14]

At the national level, Uzbekistan's Nationally Determined Contribution (NDC) identifies extreme heat, drought, and water scarcity as the most critical climate-related risks affecting the country. The NDC highlights the increasing vulnerability of water resources due to declining river flows, glacial retreat, and competing demands from agricultural and industrial users. These pressures are particularly relevant to the Zeravshan River basin, within which Samarkand is located.[15]

At the Project level, Samarkand is characterized by a cold semi-arid climate with pronounced continental features, including hot, dry summers and cold winters. Summer temperatures frequently exceed 40°C, while winter temperatures can fall below −20°C. Precipitation is highly seasonal, occurring primarily between October and May, while the summer months are characterized by prolonged dry periods. These baseline climatic conditions indicate that the Project is situated in an environment where temperature extremes and water availability constraints are already significant and are expected to intensify under future climate change.

In alignment with the EP4, the Project has been screened against a comprehensive set of both acute (event-driven) and chronic (slow-onset) climate hazards. This screening integrates baseline climate data with forward-looking projections primarily from the IPCC Atlas, CCKP, Uzbekistan's NDC as well as Copernicus Climate Data Store (CDS) and services managed by European Commission[16] to assess the relevance and materiality of each hazard over the Project lifetime.

4.3.2 POTENTIAL CLIMATE HAZARDS

Baseline climate data indicate that the Project is exposed to a range of physical climate hazards that may affect construction, operations, worker safety, and supporting utilities. Detailed analysis is presented below.

4.3.2.1 TEMPERATURE RELATED CLIMATE HAZARD

Extreme Heat events

The Project is exposed to significant heat-related stress, including a Warm Spell Duration Index (WSDI) of 26.1 days, a maximum recorded temperature of 41.66°C, and approximately 86.5

[12] 4NC_Uzbekistan_ENG_14.10_SEC.pdf
[13] https://www.unep.org/news-and-stories/press-release/climate-change-drives-rising-temperatures-and-severe-drought
[14] Uzbekistan - Country Overview | Climate Change Knowledge Portal
[15] Uzbekistan Third NDC.pdf
[16] https://cds.climate.copernicus.eu/#!/home

days per year with apparent temperatures exceeding 35°C. These conditions demonstrate that extreme heat is a recurring feature of the local climate rather than an isolated phenomenon.

Extreme Cold Events

Cold winters are characteristic of the region with a baseline of 78.9 frost days and a minimum temperature of –20.6 °C. Extreme cold is therefore considered a moderate hazard, with direct operational impact aside from potential localized mechanical stress or reduced worker comfort during winter periods.

As such, extreme heat and cold events represent moderate to high materiality risks. These hazards may lead to increased occupational health risks, reduced labor productivity, decreased efficiency of thermal systems, increased cooling demand, and accelerated equipment degradation.

Mean Temperature

The long-term climate record for Uzbekistan (1991–2020) indicates an annual mean temperature of 14.26 °C, reflecting the country's continental climate. [17]

Against this climatic backdrop, the World Bank CCKP projects sustained temperature increases for Uzbekistan, accompanied by more frequent and prolonged heatwaves. The CMIP6 multi-model ensemble projections for Uzbekistan show a clear upward shift in average surface air temperatures across all SSPs. These projections underscore that Uzbekistan is expected to face persistent and escalating warming regardless of the global emissions pathway, with projected average mean surface air temperature of 16.94°C for 2050s under SSP5-8.5.[18]

Mean temperature shifts are considered slow-onset, broadly uniform, therefore do not create direct operational vulnerabilities beyond those already captured under the extreme heat hazard. **Given this stability and the Project's limited sensitivity to incremental shifts in annual averages, changes in mean temperature are not considered as a material climate hazard. Consequently, this factor has been scoped out from the detailed assessment.**

4.3.2.2 WATER RELATED CLIMATE HAZARD

Extreme Precipitation and Flood Events

Flooding is a natural disaster that occurs when a large amount of water submerges land that is usually dry. In this physical CCRA, flooding is categorized into three main types: extreme rainfall flooding, river flooding, and coastal flooding.

- Extreme rainfall flooding, or pluvial flooding, occurs when an unusually large amount of rain takes place and exceeds the capacity of the drainage system in a short period of time. This type of flooding can happen anywhere, but it is most common in areas that are prone to thunderstorms or tropical storms. Extreme rainfall flooding can be very abrupt and is a dangerous type of flooding that can occur with little or no warning.
- River flooding, or fluvial flooding, occurs when a river overflows its banks. This can be caused by heavy rain, snowmelt, or a combination of both. River flooding can be widespread and can cause significant damage to property and infrastructure.

[17] https://climateknowledgeportal.worldbank.org/country/uzbekistan
[18] https://climateknowledgeportal.worldbank.org/country/uzbekistan

- Coastal flooding occurs when sea levels rise and inundate coastal areas. This type of flooding can be caused by a storm surge, which is a large wave of water that is driven inland by a storm. Coastal & offshore flooding can also be caused by sea level rise, which is the long-term rise in the average sea level caused by climate change. **Coastal flooding has been scoped out of the assessment given the Project is located inland, i.e., the nearest coast is more than 20 km away from the Project** (***FIGURE A1-1***).

Baseline conditions show modelled inundation depth of 1.88 m under a 1-in-500-year flood scenario, with maximum 1-day and 5-day precipitation levels of 55.85 mm and 105.75 mm, respectively. The IPCC AR6 indicates that warming is likely to increase the intensity of heavy precipitation events, even in semi-arid regions, due to increased atmospheric moisture capacity.[19] The CCKP further highlights increasing variability in precipitation patterns across Uzbekistan, including shifts toward more intense rainfall events and greater seasonal variability.[20] **As such, extreme precipitation events are considered a moderate-to-high materiality hazard, particularly in relation to drainage capacity, and localized surface flooding.**

Drought and Water Stress

Water Stress and Drought are screened and assessed by the water stress indicator provided by the World Resource Institute (WRI) which measures the ratio of total water withdrawals to available water supplies. Baseline indicators show that the Project is located in an area of extremely high-water stress, with a Water Stress Index of 1.50 and extended dry periods lasting up to 118 consecutive days. These conditions confirm that water scarcity is already a critical constraint.

In addition, Uzbekistan's NDC identifies drought and water scarcity as key climate risks in the region, driven by rising temperatures, declining snowpack and glacier contributions, and increasing water demand from agriculture and other sectors. The NDC specifically highlights growing pressure on river systems and irrigation networks, particularly in regions such as the Zeravshan basin.

Given the Project's reliance on the Dargom Canal, **drought and water stress are assessed as very high-materiality risks**, with potential implications for water supply reliability, operational continuity, and competition with other users.

Mean Precipitation Change

Uzbekistan's observed climatology (1991–2020) shows a strongly seasonal precipitation pattern, with most rainfall occurring from November to April and very dry conditions through summer. The annual mean precipitation is 213.18 mm/a. In such a regime, modest shifts in mean annual precipitation have limited relevance for water availability during the driest months.[21] CMIP6 projections similarly indicate little variation in annual precipitation across warming scenarios, with only minor changes. This suggests no meaningful upward or downward trend in long-term average precipitation, even under higher emissions.[22] **Given the stable modelled annual totals and the existing seasonal pattern, mean precipitation**

[19] https://www.ipcc.ch/report/ar6/syr/
[20] https://climateknowledgeportal.worldbank.org/country/uzbekistan
[21] https://climateknowledgeportal.worldbank.org/country/uzbekistan
[22] https://interactive-atlas.ipcc.ch/

change is unlikely to represent a material climate hazard for the Project. Consequently, this factor has been scoped out from the detailed assessment.

Sea Level Rise

Sea level rise is not relevant to the Project due to its inland location and is therefore screened out as not material.

4.3.2.3 WIND RELATED CLIMATE HAZARD

Extreme Wind Events

Based on ERA5 10-m gust data from 1940–2026 and interpreted alongside the Beaufort Wind Scale, extreme wind events at the Project site remain operationally relevant while infrequent. [23] [24] Most hourly gusts fall below 15 m/s, corresponding to strong breeze conditions, but gusts between 15–25 m/s (near-gale to strong gale) that could disrupt lifting operations and outdoor work occur annually and can. Gusts near the structural design basis (25–30 m/s under KMK 2.01.07-96, strong gale to violent storm conditions) are extremely rare, less than 0.05% of all recorded hours, but can generate short-duration pressure loads on cladding, large doors, and other non-structural components. Events above 30 m/s (violent storm to hurricane) are statistically negligible but cannot be fully discounted over the multi-decade project life.

While the main steel structures designed to Samarkand's wind-load standards are expected to remain robust, the construction phase is more exposed. Historical data indicates 7–10 hours per year when gusts exceed typical crane shutdown thresholds (18–20 m/s, gale conditions), with a slightly higher likelihood during spring. [25] **These conditions represent low-frequency but high-impact safety risks that require proactive management. Given this pattern of occasional disruptive gusts, the Project should treat extreme wind as a credible hazard.**

Mean Wind Change

Based on the ERA5 grid point data (1991–2020), the Project site is characterized by a relatively moderate and stable wind environment. The statistical distribution of wind speeds at the 10-metre level indicates that the majority of annual hours (approximately 73.8%) experience light to moderate breezes below 2.2 m/s (8 km/h). Specifically, the probability of low wind speeds (< 1.1 m/s) is 14.8%, while the most frequent wind speed category falls within the 1.1–2.2 m/s range, accounting for 59.0% of the total annual hours. Moderate winds between 2.2 and 3.3 m/s represent 18.9% of the climatic profile, whereas higher wind speeds exceeding 3.3 m/s (12 km/h) are infrequent, occurring only 7.3% of the time. Supporting these high-resolution observations, the CMIP6 historical baseline (1991–2020) records a median daily mean near-surface wind speed of 3.3 m/s. The interquartile range (P25–P75) is situated between 2.9 m/s and 4.0 m/s, confirming that the local wind regime is consistently moderate.[26]

Future projections are analyzed using the CMIP6 ensemble, adopting the Global Warming Level (GWL) framework as a policy-relevant dimension of integration. This approach aligns with the warming thresholds of the Paris Agreement, allowing for a standardized assessment of regional

[23] https://weather.metoffice.gov.uk/guides/coast-and-sea/beaufort-scale
[24] https://cds.climate.copernicus.eu/datasets/reanalysis-era5-single-levels-timeseries
[25] https://cds.climate.copernicus.eu/datasets/reanalysis-era5-single-levels-timeseries
[26] https://cds.climate.copernicus.eu/datasets/reanalysis-era5-single-levels-timeseries

change patterns regardless of the specific socio-economic pathway (SSP) timing. Under a GWL 2°C scenario, roughly corresponding to the low-emission SSP1-2.6 pathway, the median annual mean wind speed is projected to remain highly stable at 3.2 m/s. Even under the extreme GWL 4°C scenario, which represents a high-emission trajectory (SSP5-8.5), the median remains at 3.2 m/s. This consistency across significantly different warming levels suggests that the mean wind regime in the West Central Asia (WCA) region is not highly sensitive to global thermal forcing.[27]

A notable feature of the CMIP6 data is the narrowing of the uncertainty range in future scenarios. While the historical baseline (1991–2020) shows a P90 value of 4.7 m/s and a P95 of 4.8 m/s, these values decrease to 4.0 m/s and 4.6 m/s respectively under GWL 2°C, and further to 3.7 m/s and 4.3 m/s under GWL 4°C. [28] This contraction of the upper percentiles indicates a projected reduction in the overall variability and a slight softening of the average wind intensity at the project site. **Consequently, the screening concludes that the risk associated with changes in mean wind speed is minimal. The stability of these figures across the 2°C and 4°C horizons provide high confidence that the project's operational environment, regarding average wind loads, will not be adversely impacted by long-term climate shifts.**

4.3.2.4 SOLID MASS RELATED CLIMATE HAZARD

Extreme Mass Movement

The Rainfall-Induced Landslides Index (number of days with a potential chance of a landslide event) indicates that the landslide risk near the Project area is estimated to be minimal under all assessed time horizons and scenarios.

Given the Project's location on a flat industrial land parcel adjacent to an existing landfill, the risk of rainfall-induced landslides is considered very low, as no natural slopes, escarpments, or elevated terrain are present that could become unstable under intense rainfall. Although an irrigation canal lies approximately 600 m north of the site, the surrounding terrain is flat and lacks slope–water interaction pathways that typically contribute to landslide initiation during heavy precipitation events. **Consequently, rainfall-induced landslides are not considered as a main climate-related risk for this Project under current or projected climate conditions. Consequently, this factor has been scoped out from the detailed assessment.**

Erosion

The implementation of widespread land hardening (paving, concrete surfacing, and compacted internal roads) and planned landscaping/greening across the Project site significantly alters the susceptibility to chronic soil erosion. By sealing the naturally friable Loess-like soils beneath impermeable or stabilized surfaces, the Project effectively eliminates the direct exposure of topsoil to both wind lift (Aeolian erosion) and high-intensity rainfall (Pluvial erosion). This structural transition from open, loose soil to a managed, hardened environment provides a robust barrier against the chronic aridity and intensified precipitation trends projected under GWL 2°C. [29]

[27] Uzbekistan - Country Overview | Climate Change Knowledge Portal
[28] Uzbekistan - Country Overview | Climate Change Knowledge Portal
[29] Uzbekistan - Country Overview | Climate Change Knowledge Portal

Furthermore, the integration of dedicated greening areas serves as a dual-purpose nature-based solution. The root systems of the planned vegetation provide biological reinforcement to the soil structure, while the canopy and ground cover reduce the kinetic energy of raindrops and wind shear at the surface. These green zones, combined with a formal stormwater drainage system typically associated with hardened sites, ensure that runoff is directed and controlled rather than allowing for the formation of erosive gullies. **Given these built-in design safeguards and planned ongoing maintenance of the drainage infrastructure and the health of the vegetation belts, the erosion is screened as Low risk. Consequently, this factor has been scoped out from the detailed assessment.**

4.3.2.5 WILDFIRES

Baseline conditions show a substantial number of fire-permitting days (107 days per year), underscoring the area's inherent exposure to fire-favourable weather even in the absence of significant historical burned area. Although limited vegetation has constrained past fire activity, rising temperatures and increasingly prolonged dry periods projected under future climate scenarios are expected to heighten fire weather indices and significantly elevate ignition risk in the broader landscape. **Given the strong climatic signal, expanding seasonal dryness, and the potential for rapid fire spread under extreme heat and wind conditions, wildfire risk is screened as high.**

4.4 CLIMATE RISK REVIEW

Following the high-level screening presented in the previous section, this section provides a granular assessment of the climate hazards identified as having a moderate-to-high potential impact on the Project. This detailed review integrates a multi-dimensional analysis, synthesized from localized climate baseline data, future projections, and specific Project technical parameters.

The evaluation considers the interplay between evolving climate trends and the Project's current engineering design specifications, management measures and plans. By assessing the adaptive capacity of the planned infrastructure against these physical stressors, this section identifies critical residual risks. Consequently, targeted mitigation and adaptation measures are recommended to ensure the long-term resilience and operational continuity of the Project throughout its intended lifecycle.

4.4.1 EXTREME HEAT

4.4.1.1 CLIMATE DATA AND TRENDS

The baseline WSDI for the Project site is approximately 26.1 days per year. Climate model projections indicate a significant increase in the duration of heat waves under both low- and high-emission scenarios. By the 2030s, WSDI is projected to rise to 55.6 days (SSP1-2.6) and 73.1 days (SSP5-8.5), and by the 2050s to 74.5 days (SSP1-2.6) and 129.1 days (SSP5-8.5). Risk levels are expected to escalate from Moderate (baseline, risk score 2.136) to Very High by 2050s (4.72 under SSP5-8.5).

TABLE A4-4 BASELINE AND PROJECTED EXTREME HEAT CLIMATE DATA

Variable	Baseline	Projections			
		2030s		2050s	
		SSP 1-2.6	SSP 5-8.5	SSP 1-2.6	SSP 5-8.5
Warm Spell Duration Index (WSDI) (days)	26.1	55.6	73.1	74.5	129.1
Risk Score	2.14	3.12	3.60	3.60	4.72
Risk Level	Moderate	High	High	High	Very High

4.4.1.2 RISK REVIEW

The baseline climate conditions at the Project site indicate an average of 86.5 human heat stress days per year, with the highest recorded daily maximum temperature at 41.66 °C. Climate projections show a progressive intensification of heat stress conditions under both low- and high-emission scenarios.

Under SSP1-2.6, human heat stress days are projected to rise significantly to 109 days in the 2030s and 114 days in the 2050s, with the highest daily maximum temperature increasing to 42.46 °C and 42.95 °C, respectively. Under SSP5-8.5, more significant increases are expected, with 110.5 heat stress days in the 2030s and 133 days in the 2050s. Maximum daily temperatures may reach 43.44 °C by the 2030s and 44.75 °C by the 2050s. This pattern indicates that the intensity of extreme heat remains relatively stable, but the duration of high-temperature conditions is expected to increase.

TABLE A4-5 HUMAN HEAT STRESS DAYS AND HIGHEST DAILY MAXIMUM TEMPERATURE

Scenario	Time horizon	Human heat stress days (days)	Highest daily maximum temperature (°C)
Baseline		86.5	41.66
SSP1-2.6	2030s	109	42.46
SSP1-2.6	2050s	114	42.95
SSP5-8.5	2030s	110.5	43.44
SSP5-8.5	2050s	133	44.75

Such conditions could pose significant occupational health risks, including increased exposure to heat stress, dehydration, and fatigue among outdoor workers during construction, operation, and maintenance activities. From an operational perspective, persistent and extreme heat events may affect the performance and reliability of critical electrical equipment such as inverters, transformers, and control systems, while also raise cooling energy demand and reduce the overall efficiency of power generation and transmission.

The Project's main thermal systems operate at temperatures far above any plausible ambient

heat extremes, meaning process integrity is inherently resilient to external heat stress. The incineration line is designed for combustion at ≥ 850 °C with a minimum flue-gas residence time of two seconds, and flue-gas temperatures of approximately 850 °C at furnace exit before being reduced to roughly 130 °C through the waste-heat boilers. Likewise, the steam cycle maintains normal operating conditions of approximately 450 °C. These very high internal operating temperatures provide a substantial buffer against ambient heat fluctuations.

The primary system exposed to ambient heat is the cooling-water circuit, which typically operates between 33 °C (outlet) and 41.5 °C (inlet to cooling towers). The Project's closed-loop cooling configuration materially reduces dependence on external water temperatures and moderate exposure to heatwave-related thermal stress. The availability of make-up water from treated effluent further reduces vulnerability to heat-driven water scarcity. Structural elements, such as C30–C40 concrete, P6–P8 impermeability classes, and multilayer linings for bunded areas—also provide robust performance under high-temperature outdoor conditions, supporting equipment stability.

To avoid heat-related occupational hazards, the Project has a heat-stress prevention and control system that defines departmental responsibilities, requires seasonal inspections, and sets technical, organizational, and health-protection measures for high-temperature work. Key actions include pre-season maintenance of cooling and ventilation systems, insulation and shading of heat-exposed areas, and health checks and training for workers. Cooling equipment is maintained before summer and inspected regularly during operation. The Project also maintains an emergency plan for heat-related occupational hazards, supported by stocked supplies, temperature monitoring, and appropriate protective equipment. Mild cases of heat stress are treated on site through rest and hydration, while severe cases are referred to medical facilities. Continuous monitoring, first-aid capacity, and clear response procedures help safeguard worker health. The Project should continue strengthening preventive measures, including hydration protocols and adjusted work–rest cycles.

A series of potential risks to the Project associated with extreme heat under baseline and future projected climatic conditions are included in the table below.

TABLE A4-6 POTENTIAL RISK AREAS AT THE START AND END OF OPERATIONS ASSOCIATED WITH THE PROJECT FOR THE EXTREME HEAT HAZARD GROUPING

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Main Production Facilities • Incinerators, Boilers and Turbine-Generator System • Flue Gas Treatment	• Turbine Efficiency Loss – OPEX: Turbine output may slightly decrease due to higher condenser back-pressure when	Not Applicable (N/A)	**Moderate**	**High**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
System and Stacks • Fly Ash Stabilization and Temporary Storage	cooling water warms. • Blower Motor Thermal Stress – OPEX: Blower motor overheating can reduce flue-gas flow control performance. • Electrical Equipment Derating – OPEX: Electrical devices often require derating above 40 °C; heat waves may force output reductions or thermal trips. • Control Equipment Overheating – OPEX / CAPEX: Fans, actuators and electronic relays experience shorter lifespan and higher failure probability. • Cabinet Over-Temperature – OPEX / CAPEX: Cabinet internal temperatures may exceed specification limits unless actively cooled. • Heat-Accelerated Degradation – OPEX / CAPEX: Increased dust and heat in waste handling areas can accelerate corrosion, insulation degradation, and false sensor readings.			

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Utilities • Water Supply Pump Station and Pipeline • Cooling Towers • Substation and Transmission Line • Wastewater Treatment Plants • Tank Farms	• Water Supply Pump Station & Pipeline – OPEX / CAPEX: Pumps may run longer and hotter during heat waves due to increased cooling load. Overheating can cause insulation wear, derating, thermal trips, or reduced service life. • Cooling Towers Performance Loss– OPEX / CAPEX: Fan motors, pumps, drift eliminator drives, and control systems of the cooling towers face elevated thermal stress. Heatwaves can reduce cooling efficiency and raise condenser back-pressure, affecting power output. • Electrical Network Derating – OPEX / CAPEX: Transformers require derating above 40 °C, reducing capacity or causing thermal alarms. Overhead conductors experience increased sag, raising clearance/safety concerns.	Not Applicable (N/A)	**Moderate**	**High**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	Switchgear and breakers face contact resistance rises under heat. • Wastewater Treatment Plants - OPEX: Higher feedwater temperature accelerates membrane fouling, raising motor loads. • Tank Farms Equipment Sensitivity – OPEX / CAPEX: Pumps, monitoring equipment, leak-detection systems, and alarms are heat-sensitive.			
Waste Collection Hall and Waste Storage Pit	• Odour & Gas Intensification – OPEX: Increased odour and gas release from freshly delivered MSW. High ambient temperatures accelerate decomposition on the unloading platform, increasing H_2S, NH_3, and general odour emissions, which may challenge the hall's air-tight doors and ventilation performance. • Ventilation System Overload – OPEX / CAPEX: Higher	Not Applicable (N/A)	**Moderate**	**High**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	ventilation load and reduced air-handling efficiency. The negative-pressure system will have to work harder to remove warmer, more contaminated air, increasing fan motor temperature, energy use, and risk of overheating. • Door Seal Deformation – OPEX / CAPEX: Thermal stress on air-tight doors and seals. Prolonged exposure to extreme heat may cause seal deformation, reducing airtightness and increasing odour escape risk. • Leachate Load Increase – OPEX: Increased leachate generation from waste trucks. Hot weather speeds moisture release and accelerates liquid drainage, increasing the load into the leachate collection area and requiring more frequent management.			
Construction and Temporary Maintenances Works	• Concrete Heat Damage – CAPEX: The Project has	**Moderate**	Not Applicable (N/A)	Not Applicable (N/A)

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	extensive C30–C40 concrete works. Extreme heat accelerates surface drying, which may lead to shrinkage cracking, weakened bonding, and reduced long-term impermeability—particularly important for anti-seepage structures such as the leachate tank bunds and WWTP units. • Asphalt & Sealant Aging – CAPEX: Access roads, internal paving, and expansion joints may cure too rapidly, risking premature brittleness, poor adhesion, and shorter maintenance intervals. • Rebar Curing Impacts – CAPEX: High surface temperatures can affect curing uniformity, especially in large-section pours (e.g., waste pit walls), requiring more intensive curing management.			
Staff Health & Safety – OHS	• Heat Stress Risk – OPEX: Personnel may face dehydration, fatigue, or heat exhaustion during	**Moderate**	**Moderate**	**High**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	high-temperature outdoor or heat-source-adjacent work. • Heat-Related Medical Emergencies – OPEX: Prolonged exposure during maintenance or emergency interventions may lead to heat stroke or other severe health effects. • PPE Heat Burden – OPEX: Wearing protective equipment in extreme heat increases physiological heat load. • Productivity Loss – OPEX: Hot conditions may slow maintenance, inspections, or operational tasks. • Emergency Response Constraints – OPEX: Extreme heat can impair personnel's ability to respond quickly to incidents, increasing operational risk.			

4.4.1.3 NEXT STEPS

This section provides an overview of ERM's recommended next steps for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

TABLE A4-7 RECOMMENDED NEXT STEPS FOR EACH RISK AREA IDENTIFIED AS BEING 'LIKELY MATERIAL' WITHIN THE RISK REVIEW SECTION FOR THE EXTREME HEAT HAZARD GROUPING

Extreme Heat		
Risk areas	**Justification**	**Next Steps**
Main Production Facilities	**High value in assessing the risk further**	• Evaluate the capacity and effectiveness of the cooling systems to meet increased demands during high-temperature conditions. Consider alternative cooling technologies and strategies to ensure adequate cooling without putting excessive strain on water resources. • Strengthen thermal management of electrical systems. Add forced ventilation/AC to MCC rooms, control cabinets, and VFD panels; introduce temperature alarms and seasonal preventive maintenance. • Optimize turbine-condenser performance during heatwaves. Implement condenser control, enhance cooling tower staging logic, and schedule condenser cleaning before peak-summer periods. • Enhance monitoring for temperature-related drift. Expand use of online sensors (bearing temp, vibration, cabinet temperature) in fans, pumps, and dosing equipment to predict failures before peak-heat months.
Utilities	**High value in assessing the risk further**	• Upgrade cooling tower resilience. Evaluate higher-efficiency fill packs, drift eliminators, and fan staging; consider temporary fogging/nozzle enhancement options for extreme weeks. • Install advanced monitoring systems for electrical equipment to detect early signs of failures and malfunctions. This will help facilitate proactive maintenance and prevent unexpected disruptions. • Improve thermal robustness of electrical utilities. Apply transformer seasonal derating procedures, add auxiliary cooling fans, and install IR/thermal scanning for busbars and switchgear. • Stabilize water-supply operations under higher demand. Add thermal monitoring to pump motors, confirm N+1 redundancy for peak summer loads, and prepare contingency procedures for increased evaporation losses. • Protect WWTP biological processes. Adjust aeration rates seasonally and enhance membrane cleaning frequency during high-temperature periods.
Waste Collection Hall	**High value in assessing the risk further**	• Increase summer ventilation capacity. Adjust negative-pressure set-points, inspect ducts/fans before

Extreme Heat		
and Waste Storage Pit		summer, and prepare contingency plans for higher H_2S/NH_3 generation under heat. • Enhance gas-monitoring reliability. Increase calibration frequency for H_2S/NH_3 sensors; add spot cooling to gas-monitoring panels and crane cab areas. • Strengthen OHS controls for pit maintenance. Shift non-urgent maintenance to cooler hours; require heat-appropriate PPE and hydration breaks during summer work. • Improve odour and gas-handling preparedness. Stock additional carbon filters/odour suppressants and reinforce worker training on elevated gas-generation risks during heatwaves.
Construction and Temporary Maintenances Works	Potential value in assessing the risk further	• Implement strict summer work-rest cycles. Schedule heavy work (lifting, welding, concrete pours) during early morning/evening; enforce hydration, shaded rest stations, and temperature-triggered work pauses. • Protect material integrity during curing. Use chilled/conditioned water for concrete, curing blankets, fogging/misting, and adjust mix designs for high-temperature conditions. • Increase readiness of construction equipment. Require pre-summer servicing of cranes, generators, pumps, and trucks; add mobile shade structures and mandate routine cool-down periods.
Staff Health & Safety – OHS	**High value in assessing the risk further**	• Implement health and safety protocols to protect plant personnel from the effects of extreme heat. • Provide adequate cooling facilities, encourage frequent hydration, and consider adjusting working hours during periods of intense heat. • Strengthen emergency preparedness. Train first-aid teams for heat-related illnesses, place heat-emergency kits onsite, and rehearse emergency response for heat-stress scenarios.

4.4.2 EXTREME COLD

4.4.2.1 CLIMATE DATA AND TRENDS

Based on climate model projections, the Number of Frost Days for the Project site is expected to experience a decrease from the baseline of 78.9 days to 51.6-57.1 days by the 2050s under both SSP.1-2.6 and SSP5-8.5 scenarios. The risk score is assessed as Low throughout the baseline and assessed scenarios and timeframe.

TABLE A4-8 BASELINE AND PROJECTED EXTREME COLD CLIMATE DATA

Variable	Baseline	Projections			
		2030s		2050s	
		SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
Number of Frost Days (Days)	78.9	62.1	58.5	57.1	51.6
Lowest daily minimum temperature (°C)	-20.6	-22.49	-19.7	-21.95	-19.38
Risk Score	1.86	1.65	1.60	1.58	1.50
Risk Level	Low	Low	Low	Low	Low

4.4.2.2 RISK REVIEW

Climate projections indicate that the number of frost days at the Project site is expected to gradually decline under both low- and high-emission scenarios, while the lowest daily minimum temperature fluctuates between -22.49 and -19.38 °C. Although these conditions are infrequent, they can still impose operational and safety pressures. In particular, very low ambient temperatures may require additional auxiliary fuel to maintain stable system temperatures during startup, shutdown, or low-calorific-value waste periods, increasing winter-season fuel demand. Extreme cold can also heighten OHS risks for outdoor workers, who may require longer warm-up times, additional protective gear, and stricter work-rest cycles to manage hypothermia, frostbite, and reduced dexterity. As such, even with declining frost days overall, the Project must remain prepared for episodic severe cold spells that could drive up energy requirements and place added strain on workforce safety and operational continuity.

The Project has already established a structured set of measures to manage seasonal risks in operations, including those associated with extreme cold. The Operations Department is responsible for developing seasonal operating procedures that include winter-specific safety and technical measures to prevent freezing, ensure safe equipment start-up and shutdown, and guide major and minor maintenance activities. The EHS team complements this by conducting planned, targeted inspections of critical equipment and high-risk work areas, with particular attention to winter vulnerabilities such as freezing, icing, and reduced equipment reliability. Each year in November, the Project undertakes a comprehensive autumn–winter safety inspection, focusing on anti-freeze protection, anti-slip measures on walkways and work platforms, fire-prevention precautions, prevention of small-animal intrusion into equipment rooms, and traffic-safety risks caused by icy conditions. Seasonal safety inspections are organized by the EHS Department and implemented by all departments, ensuring an integrated review of winter preparedness across facilities and systems. In addition, the Project enforces strict weather-related work controls: outdoor high-altitude operations are prohibited during level-6 winds or worse, and any work conducted during frost, snow, or freezing rain must include proper anti-slip and fall-prevention measures, with penalties applied when such requirements are not met. More broadly, construction and operational areas are required to implement winter protection measures, including cold-weather gear for workers, insulation and frost protection for equipment, and surface treatments to prevent slips and falls. Together,

these measures indicate that the Project has already considered and operationalized a systematic approach to managing winter and extreme-cold risks.

TABLE A4-9 POTENTIAL RISK AREAS AT THE START AND END OF OPERATIONS ASSOCIATED WITH THE PROJECT FOR THE EXTREME COLD HAZARD GROUPING

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Main Production Facilities • Incinerators, Boilers and Turbine-Generator System • Flue Gas Treatment System and Stacks • Fly Ash Stabilization and Temporary Storage	• Cold-Start Fuel Demand & Thermal Stress – OPEX: Cold starts increase auxiliary diesel/natural gas consumption, especially when waste calorific value is low in winter. Expansion-contraction due to temperature gradients can stress refractory linings, increasing maintenance frequency. • Flue Gas Treatment System and Stacks Ice Formation – OPEX / CAPEX: Extreme cold increases risk of ice condensation in ducts, causing pressure-drop fluctuations before the baghouse. Bag filters may become brittle in sub-zero conditions, especially during unexpected cold shutdowns. • Boiler Tube Contraction & Steam Instability – OPEX: Thermal contraction of boiler tubes during cold weather increases risk of tube stress during start-up cycles. Very low ambient temperatures	Not Applicable (N/A)	Low	Low

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	may reduce condensate temperature, affecting heat-balance and steam generation stability. • Lubricant Thickening & Startup Instability – OPEX: Cold ambient temperatures increase lubricant viscosity, slowing turbine/generator startup and increasing wear. Condenser cooling performance may spike, causing vacuum instability until systems stabilize. • Fly Ash Stabilization System Freezing of Additive Lines – OPEX / CAPEX: Water and chelating agent lines risk freezing, reducing mixing efficiency and slurry uniformity. Fly ash silos may experience reduced flowability due to cold-induced condensation. Mixer drives and screw conveyors may require longer warm-up periods to prevent mechanical stress.			
Utilities • Water Supply Pump Station and Pipeline • Cooling Towers	• Water Supply System Cold-Temperature Efficiency Loss – OPEX: RO/EDI systems face efficiency drops when influent temperature	Not Applicable (N/A)	Low	Low

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
• Substation and Transmission Line • Wastewater Treatment Plants • Tank Farms	falls, increasing energy demand. • Cooling Towers Icing-Related Structural & Mechanical Stress – OPEX / CAPEX: Freezing of drift eliminators, louvers and fan blades may cause structural deformation or fan imbalance. Cold may cause water-basin icing, disrupting circulation and causing pump cavitation risks. • Icing of Electrical Components – OPEX / CAPEX: Cold can reduce performance of protection relays and backup batteries inside control cabinets. Increased icing risk on outdoor breakers and disconnectors, reducing switching reliability. • Reduced Biological Treatment Efficiency – OPEX: Influent channels and equalization tanks may form ice on exposed surfaces. Biological treatment (anoxic/aerobic) efficiency in WWTP-1 may decrease with colder water, affecting effluent quality. • Tank Farms Viscosity-Related Fuel Delivery Issues – OPEX / CAPEX: Diesel tanks, even underground, may			

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	experience viscosity increases in extreme cold, affecting generator/boiler startup fuel supply. Aboveground ammonia tank faces freezing risks at piping/valves, potentially affecting SNCR dosing continuity.			
Waste Collection Hall and Waste Storage Pit	• Waste Collection Hall Reduced Airtightness – OPEX / CAPEX: Low temperatures may stiffen door seals and mechanical components of the five air-tight doors, reducing airtightness and weakening odor-control efficiency. Cold infiltration may affect negative-pressure stability, increasing energy demand for ventilation fans. Waste from trucks may freeze together when moisture content is high, reducing unloading efficiency. • Waste Storage Pit Freezing of Leachate Sensors - OPEX: Leachate drainage and liquid level sensors in the sump may experience freezing, affecting accurate monitoring and pumping control. Waste moisture may freeze at the	Not Applicable (N/A)	Low	Low

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	surface, reducing mixing/turning efficiency and crane bucket penetration.			
Construction and Temporary Maintenances Works	• Cold-Weather Concrete Risks – CAPEX: Low temperatures slow hydration, increase risk of incomplete curing, and may cause freeze–thaw microcracking in early-age concrete (C30/C40 structural members, lining structures, foundations). • Frozen Ground Impacts on Earthworks – CAPEX: Frozen ground complicates excavation, backfilling, and compaction, increasing settlement risk once thawed and potentially delaying installation of underground utilities (e.g., raw-water pipeline, cable trenches). • Viscosity-Induced Machinery Limitations – CAPEX: Hydraulic systems, cranes, and lifting gear may have sluggish response or startup difficulty due to increased fluid viscosity, affecting hoisting of heavy components such as boilers, stacks, turbines, and tanks.	**Moderate**	Not Applicable (N/A)	Not Applicable (N/A)

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Staff Health & Safety – OHS	• Hypothermia and Frostbite – OPEX: Prolonged exposure during outdoor operations may lead to severe health risks. • Reduced Dexterity – OPEX: Cold temperatures impair fine motor skills, increasing accident risk when handling tools or equipment. • Slips, Trips, and Falls – OPEX: Ice and snow increase physical hazards for workers. • PPE Burden – OPEX: Heavy clothing needed for protection may limit mobility and visibility. • Reduced Productivity – OPEX: Harsh cold slows work pace and increases fatigue. • Emergency Response Limitations – OPEX: Cold weather may impede timely rescue or intervention during incidents.	**High**	**High**	**High**

4.4.2.3 NEXT STEPS

This section provides an overview of ERM's recommended next steps for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

TABLE A4-10 RECOMMENDED NEXT STEPS FOR EACH RISK AREA IDENTIFIED AS BEING 'LIKELY MATERIAL' WITHIN THE RISK REVIEW SECTION FOR THE EXTREME COLD HAZARD GROUPING

Extreme Cold		
Risk areas	**Justification**	**Next Steps**
Main Production Facilities	Potential value in assessing the risk further	• Strengthen winterisation of critical equipment by reviewing insulation, heat-tracing coverage, and cold-start procedures for boilers, turbines, and ancillary systems. • Enhance monitoring of temperature-sensitive components such as FGT ducts, baghouse filters, and additive-supply lines to reduce ice formation risks. • Improve operational readiness by refining cold-start, controlled shutdown, and warm-up sequences to limit thermal shock and equipment stress. • Expand preventive maintenance planning for winter months, focusing on lubrication systems, refractory integrity, and condensate management.
Utilities	Potential value in assessing the risk further	• Reinforce frost protection for exposed water systems, cooling infrastructure, and WWTP components through improved insulation, flow management, and standby heating. • Strengthen electrical system resilience by verifying cold-weather performance of relays, batteries, and outdoor switching equipment. • Enhance safeguard measures against ice accumulation on cooling towers, pipelines, and transmission assets through active monitoring and timely defrosting routines. • Prepare contingency measures for reduced biological treatment efficiency by planning for load adjustments, aeration optimisation, or temporary bypass strategies.
Waste Collection Hall and Waste Storage Pit	Potential value in assessing the risk further	• Improve cold-weather sealing and door-operation performance by inspecting and upgrading airtightness features of hall entrances. • Reinforce leachate management under freezing conditions by enhancing sensor protection, sump heating, and winter pumping protocols. • Strengthen cold-weather waste handling practices by preparing for reduced waste flowability and ice formation in the pit. • Expand ventilation and negative-pressure optimisation measures to maintain system stability during low temperatures.

Extreme Cold		
Construction and Temporary Maintenances Works	**High value in assessing the risk further**	• Integrate cold-weather considerations into construction scheduling by adapting timelines for concrete works, earthworks, and material handling. • Enhance winter preparation for construction sites through improved insulation of curing concrete, frost-protection blankets, and controlled heating when required. • Reinforce machinery readiness by ensuring cold-weather lubrication, hydraulic fluid conditioning, and slow-start protocols for cranes and lifting equipment. • Strengthen contractor winter safety planning, including contingency access routes, housekeeping, and ice-removal arrangements.
Staff Health & Safety – OHS	**High value in assessing the risk further**	• Strengthen winter PPE and worker-protection measures by ensuring availability of insulated gear, anti-slip footwear, and warming stations. • Enhance winter-specific safety procedures covering slips, reduced dexterity, cold-related fatigue, and emergency response limitations. • Improve communication and work-control systems by implementing stricter weather-related stop-work criteria and real-time temperature monitoring. • Expand winter readiness training focused on hypothermia prevention, safe movement on icy surfaces, and early recognition of cold-stress symptoms.

4.4.3 FLOODING

4.4.3.1 CLIMATE DATA AND TRENDS

Extreme Rainfall Flooding

According to the baseline and projected data for Extreme Rainfall Flooding Inundation Depth, the 1-in-500-year event indicates a very high risk of extreme rainfall flooding. However, the variation across different time horizons and emission pathways is minimal.

Under the baseline, the inundation depth is estimated at 0 m, associated with a maximum 1-day precipitation of 55.85 mm. Maximum 1-day precipitation exhibits modest variability, increasing slightly under SSP1-2.6 in both the 2030s (56.83 mm) and 2050s (57.48 mm), while increasing under SSP5-8.5 to 58.89 mm in the 2030s and decreasing to 53.88 mm by the 2050s.

Overall, despite minimal changes in projected inundation depth, the intensification of multi-day extreme rainfall events, particularly under the high-emissions scenario, supports the classification of pluvial flood risk as Very High across all scenarios and timeframes.

TABLE A4-11 BASELINE AND PROJECTED EXTREME RAINFALL FLOODING DATA

Variable	Baseline	Projections			
		2030		2050	
		SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
1-in-500 year pluvial flood inundation depth (m)	1.88	1.94	1.97	2.02	2.18
1-in-500 year maximum 1-day precipitation (mm)	55.85	56.83	58.89	57.48	53.88
Risk Score	6	6	6	6	6
Risk Level	Very High	Very High	Very High	Very High	Very High

This suggests that the Project is at very high risk for short-duration rainfall extremes, but that climate variation has minimal impact on risk levels.

River Flooding

The Project site is located about 600 m from irrigation river of the Dargom Canal (***Figure 1.1***). Model projections confirm that riverine (fluvial) flooding is not a material hazard.

Across all climate scenarios (SSP1-2.6 and SSP5-8.5) and time horizons (2030s and 2050s), the 1-in-500-year river flooding inundation depth remains 0.00 m, with only minor variability in maximum 5-day precipitation. The range is from 105.75 mm in the baseline to 113.5 mm, the lowest, by the 2030s under SSP5-8.5; to 135.45 mm, the highest, by the 2050s under SSP1-2.6. This confirms that no observable trend or increased flood hazard is expected from fluvial sources.

TABLE A4-12 BASELINE AND PROJECTED RIVER FLOODING DATA

Variable	Baseline	Projections			
		2030s		2050s	
		SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
1-in-500-year fluvial flood inundation depth (m)	0	0	0	0	0
1-in-500 year maximum 5-day precipitation (mm)	105.75	113.5	126.32	128.34	135.45
Risk Score	0	0	0	0	0
Risk Level	Minimal	Minimal	Minimal	Minimal	Minimal

4.4.3.2 RISK REVIEW

The Project is located in an alluvial plain, with a relatively open terrain, some undulations, numerous pits and depressions, and a Gobi Desert landscape. The natural ground elevation

ranges from 702 m to 717 m, and the municipal road to the north of the site is at an elevation of approximately 715 m, which is 0.3–0.5 m higher than the average ground level of the Project main entrance gate. Within the Project site, the outdoor ground level is around 715 m, while most building floor elevations (except the guardhouse) are set at 715.3 m, meaning that the substation and air-compressor entry points are elevated by about 0.3 m above the surrounding ground. Although the site is not situated in a riverine floodplain, the presence of these natural depressions, combined with low surface permeability, increases susceptibility to pluvial flooding during short-duration extreme rainfall events.

The Project has incorporated a set of design and operational measures to reduce the risks of contaminated runoff, wastewater overflow, and rainfall-induced pollution during both construction and operation. While these controls do not remove the hazard posed by extreme rainfall or pluvial flooding, they provide an important baseline level of resilience by improving site drainage, limiting infiltration, and ensuring the secure containment and reuse of wastewater and leachate.

A dedicated rain–sewage separation system prevents stormwater from mixing with contaminated flows. The first 15 minutes of rainfall is diverted to a first-flush tank for treatment and reuse, while subsequent clean rainwater is collected in a reuse tank and only discharged when storage capacity is fully utilised. This staged approach reduces pollutant loads and helps maintain controlled drainage during high-intensity rainfall.

The Project also applies robust leachate and wastewater controls to prevent rainfall from mobilising contaminants. All domestic, industrial, and blowdown wastewater is treated and reused on site, and waste-pit leachate is fully collected and incinerated. Double-layer anti-seepage systems, liquid-level monitoring, and dedicated diversion channels further reduce the risk of leakage or overflow during storm events.

During construction, targeted measures ensured clean stormwater management, including buried tanks for collecting concrete curing water and other wastewater, septic systems at the camp, and a prohibition on on-site vehicle washing and maintenance. These controls prevented polluted runoff from entering soil or nearby drainage systems.

To minimise infiltration and direct stormwater away from sensitive areas, the Project installed extensive anti-seepage and surface hardening measures. Impermeable liners and engineered surfaces protect key areas such as waste pits and WWTP facilities, while bund walls sized to 110% of the largest tank and paved internal roads help contain spills and manage runoff.

Finally, the Project includes enhanced stormwater and emergency runoff containment, with dedicated sitewide drainage and additional buffer tanks (320 m^3 first-flush and 122 m^3 reuse). Firefighting wastewater is also routed into controlled storage. These measures improve the Project's ability to manage sudden increases in stormwater and accidental wastewater during extreme rainfall.

Overall, these existing controls strengthen pollution prevention, improve drainage, and reduce the likelihood of contaminated releases, thereby lowering the operational consequences associated with extreme rainfall and site flooding.

TABLE A4-13 POTENTIAL RISK AREAS AT THE START AND END OF OPERATIONS ASSOCIATED WITH THE PROJECT FOR THE EXTREME RAINFALL FLOODING HAZARD GROUPING

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Main Production Facilities • Incinerators, Boilers and Turbine-Generator System • Flue Gas Treatment System and Stacks • Fly Ash Stabilization and Temporary Storage	• Submergence of Ground-Level Equipment – CAPEX/OPEX: Deep flooding may inundate pumps, MCCs, and auxiliary systems even with improved site drainage, causing equipment damage and operational disruptions. • Combustion and Power-Generation Instability – OPEX: Flood-related outages may still interrupt stable operation despite cleaner stormwater flows reducing contamination risks. • Corrosion and Moisture-Related Failures – OPEX: Standing water and high humidity can accelerate corrosion of metallic components, although reduced pollutant load limits residue buildup. • Interruption of Reagent Supply – OPEX: Floodwater may hinder chemical dosing operations, although bunding	Not Applicable (N/A)	**Moderate**	**Moderate**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	decreases contamination. • Structural Stress on Storage Slabs – CAPEX: High water loads may strain slabs, although hardened surfaces help reduce infiltration-related damage.			
Utilities • Water Supply Pump Station and Pipeline • Cooling Towers • Substation and Transmission Line • Wastewater Treatment Plants • Tank Farms	• Pump Motor Inundation – CAPEX: Floodwater may submerge pump units despite cleaner and better-directed stormwater flows. • Pipeline Scour and Exposure – CAPEX: Extreme rainfall may erode soil around buried pipelines, increasing failure risk. • Contamination of Cooling Water – OPEX: Runoff may enter cooling basins, though rain–sewage separation reduces polluted inflow. • Damage to Electrical Components – CAPEX: Motors and VFDs remain at risk if water levels exceed tower foundation elevations. • Heightened Electrical Safety	Not Applicable (N/A)	**Moderate**	**Moderate**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	Risks – OPEX: Saturated soils may cause ground faults and electrocution hazards during storm events. • Hydraulic Overload of Treatment Units – OPEX: Extreme rainfall may exceed WWTP capacity even with additional emergency tanks. • Bund Overtopping During Flooding – CAPEX/OPEX: Excessive rainfall may exceed bund capacity despite 110% design sizing.			
Waste Collection Hall and Waste Storage Pit	• Flooding of Unloading and Reception Areas – OPEX: Deep rainfall may disrupt unloading despite well-designed site drainage. • Waterlogging of Stored Waste – OPEX: Floodwater may reduce waste-handling efficiency even though leachate remains contained. • Damage to Ventilation and Crane Systems – CAPEX/OPEX: Electrical components may fail	Not Applicable (N/A)	Low	Low

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	if exposed to high water levels. • Leachate Management Pressures – OPEX: Pumping systems may reach capacity under extreme rain events.			
Construction and Temporary Maintenances Works	• Erosion of Temporary Works – CAPEX: Excavations and earthworks may be damaged despite hardened access roads. • Deterioration of Stored Materials – CAPEX: Heavy rainfall may damage stockpiled construction materials. • Reduced Concrete Quality – CAPEX: Excessive moisture may affect curing despite wastewater collection controls. • Work Interruptions and Delays – OPEX: Flooding may halt operations even with improved stormwater management.	**Moderate**	Not Applicable (N/A)	Not Applicable (N/A)
Staff Health & Safety – OHS	• Slip, Trip, and Fall Risks – OPEX: Water accumulation increases hazards despite improved surface drainage.	**Moderate**	**Moderate**	**Moderate**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	• Electrical Exposure Hazards – OPEX: Flooded electrical zones remain a major safety risk during intense rainfall. • Restricted Evacuation and Emergency Access – OPEX: Deep flooding may impede safe movement around the facility. • Exposure to Residual Contamination – OPEX: Although contamination is reduced, workers may still encounter polluted water during cleanup.			

4.4.3.3 NEXT STEPS

This section provides an overview of ERM's recommended next steps for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

TABLE A4-14 RECOMMENDED NEXT STEPS FOR EACH RISK AREA IDENTIFIED AS BEING 'LIKELY MATERIAL' WITHIN THE RISK REVIEW SECTION FOR THE EXTREME RAINFALL FLOODING HAZARD GROUPING

Extreme Rainfall Flooding		
Risk areas	**Justification**	**Next Steps**
Main Production Facilities	**High value in assessing the risk further**	• Strengthen protection of low-lying equipment by reviewing opportunities for elevation, sealing, or temporary flood-barrier deployment.

Extreme Rainfall Flooding		
		• Stress-test drainage, pumping, and backup-power systems to confirm they can operate under extreme rainfall scenarios. • Refine controlled shutdown and restart procedures to minimise damage and maintain operational stability during flood events. • Enhance post-flood inspection and recovery protocols for boilers, turbine areas, and flue-gas treatment systems.
Utilities	**High value in assessing the risk further**	• Reinforce flood resilience of pump stations, cooling systems, and substations by assessing critical exposure points across the utility network. • Bolster redundancy plans by validating alternative power, water supply, and cooling arrangements for flood conditions. • Improve erosion and scour protection around pipelines, tower foundations, and drainage corridors. • Prepare contingency access and mobile-utility solutions to maintain operability when fixed infrastructure becomes inundated.
Waste Collection Hall and Waste Storage Pit	Potential value in assessing the risk further	• Strengthen flood barriers and protective measures around the waste pit and unloading areas to limit water ingress. • Review leachate pumping capacity and surge-management arrangements for peak rainfall conditions. • Update operational procedures for crane operators and pit operators to manage temporary disruptions caused by flooding. • Expand dewatering and cleanup readiness to enable rapid, safe recovery once floodwaters recede.
Construction and Temporary Maintenances Works	**High value in assessing the risk further**	• Integrate flood-risk considerations into work planning by avoiding high-risk activities during peak rainfall periods. • Enhance stability of excavations, stockpiles, and temporary structures through additional reinforcement or grading. • Prepare emergency pumping and drainage arrangements to quickly remove accumulated water from work areas. • Strengthen contractor HSE coordination on emergency communication, stop-work triggers, and safe-access protocols during storms.
Staff Health & Safety – OHS	**High value in assessing the risk further**	• Strengthen flood-specific safety procedures covering movement restrictions, electrical isolation, and safe-work boundaries.

Extreme Rainfall Flooding		
		• Improve emergency communication systems and ensure alternative evacuation routes are clearly identified for flood scenarios. • Reinforce training and awareness on slip hazards, electrical risks, and safe conduct in flooded areas. • Enhance availability of suitable PPE and hygiene resources for safe work during and after flood-related incidents.

4.4.4 EXTREME WINDS

4.4.4.1 CLIMATE DATA AND TRENDS

Please Refer to ***Section 4.3.2.3*** for details.

4.4.4.2 RISK REVIEW

The assessment of extreme wind hazards at the Project site is based on high-resolution ERA5 reanalysis data covering 1940 to March 2026, providing an 86-year record of 10-meter wind gusts. This long-term dataset offers a robust basis for understanding the frequency and magnitude of short-duration gusts that are most relevant to construction safety and the performance of non-structural components.[30]

The statistical distribution indicates a generally stable wind climate, with 99.1% of historical gusts below 15 m/s. However, gusts in the 15–25 m/s "cautionary range" occur with a probability of 0.85% and represent a recurring operational risk for high-altitude construction, crane use, and outdoor maintenance activities. Gusts approaching the design basis (25–30 m/s) are rare, appearing in only 0.04% of hourly observations, but they are sufficient to impose short-duration pressure loads on cladding and other exposed secondary systems.

A Generalized Extreme Value analysis places the historical maximum gust of 35.2 m/s as roughly a "1-in-86-year" event. While this exceeds the nominal design pressure under KMK 2.01.07-96, it is treated as an upper-bound stress case for evaluating the resilience of non-structural elements rather than the primary steel structure. The main structural frame is expected to remain robust under all credible wind scenarios. According to CMIP6 data, surface wind speed will decrease by 1% (warming 1.5°C) to 1.7% (warming 4°C) under SSP5-8.5.[31]

Vulnerability is therefore concentrated in construction-phase activities and secondary components. Wind-related downtime, typically triggered at gusts above 18 m/s for crane operations, is expected annually and should be addressed through a formalized wind-response protocol. Localized reinforcement of cladding, roof elements, external ducting, and other pressure-sensitive features is recommended to ensure long-term resilience to rare but plausible peak-gust conditions.

To manage these hazards, the Project applies strict wind-triggered shutdown rules, requiring all lifting, crane, outdoor, and work-at-height activities to stop once wind force reaches Force 6. This early-suspension mechanism is reinforced by requirements to secure cranes, anchor or dismantle temporary facilities, and remove or fasten loose materials to prevent wind-blown

[30] https://cds.climate.copernicus.eu/datasets/reanalysis-era5-single-levels-timeseries
[31] https://interactive-atlas.ipcc.ch/

hazards. Scaffolding and lifting devices undergo additional inspections before and after strong-wind conditions to confirm structural stability.

Wind conditions also heighten fall-from-height risks. Mandatory protections, including correct harness use, guardrails, toe boards, and safety nets, reduce exposure during gusty periods. These engineering controls are complemented by the permit-to-work system, which requires wind-specific briefings and coordination of simultaneous operations to prevent conflicting activities in exposed work zones.

Preventive maintenance and emergency readiness further strengthen resilience. Routine inspections of cranes, scaffolding, temporary structures, and safety devices help identify weaknesses before wind events occur. Emergency procedures outline reporting, response, and evacuation during sudden gusts, supported by periodic drills to maintain workforce preparedness. Continuous training on high-risk operations and adverse-weather hazards ensures that personnel understand wind-related risks and operational halt conditions, with enforcement measures applied for non-compliance.

TABLE A4-15 POTENTIAL RISK AREAS AT THE START AND END OF OPERATIONS ASSOCIATED WITH THE PROJECT FOR THE EXTREME WINDS HAZARD GROUPING

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Main Production Facilities • Incinerators, Boilers and Turbine-Generator System • Flue Gas Treatment System and Stacks • Fly Ash Stabilization and Temporary Storage	• Incinerators, Boilers and Turbine-Generator System Sensitivity – OPEX / CAPEX: Sudden wind gusts may destabilize crane-handled components during maintenance, increasing risk of impact damage to turbine housings or auxiliary systems. • Cladding & Insulation Damage – CAPEX: High winds can loosen insulation panels or protective cladding, reducing thermal efficiency and increasing corrosion risks. • Equipment Misalignment – OPEX / CAPEX: Wind	Not Applicable (N/A)	**Low**	**Low**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	vibration during outdoor maintenance may cause misalignment of conveyor covers or mixer assemblies.			
Utilities • Water Supply Pump Station and Pipeline • Cooling Towers • Substation and Transmission Line • Wastewater Treatment Plants • Tank Farms	• Power/Control Cable Vulnerability – OPEX: Above-ground cabling or junction boxes may be stressed by repeated wind-induced vibration. • Cooling Tower Structural Stress – CAPEX: Lateral wind loads may deform louvers, drift eliminators or fan housings, reducing cooling efficiency. • Conductor Galloping – OPEX: Gusts may cause oscillation of overhead lines, stressing insulators and increasing risk of flashover. • Outdoor Tank Cover Damage – CAPEX: Wind uplift may loosen manhole lids, covers or flexible membranes. • Valve/Instrument Exposure – OPEX: Sensors, gauges and valves on above-ground tanks may be affected by vibration or dust accumulation.	Not Applicable (N/A)	**Low**	**Low**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Waste Collection Hall and Waste Storage Pit	• Waste-Handling Disruption – OPEX: Gusts entering during door operations may affect crane stability, waste loading precision, and ventilation balance. • Ventilation Imbalance – OPEX / CAPEX: Wind pressure may counteract negative-pressure systems, increasing odour escape risk and placing higher load on fans. • Outdoor Leachate Equipment Exposure – OPEX: Wind-driven dust may clog sensors or block drainage channels on leachate tanks and sumps.	Not Applicable (N/A)	**Low**	**Low**
Construction and Temporary Maintenances Works	• Waste-Handling Disruption – OPEX: Gusts entering during door operations may affect crane stability, waste loading precision, and ventilation balance. • Ventilation Imbalance – OPEX / CAPEX: Wind pressure may counteract negative-pressure systems, increasing odour escape risk and placing higher load on fans. • Outdoor Leachate Equipment Exposure	**Moderate**	Not Applicable (N/A)	Not Applicable (N/A)

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	– OPEX: Wind-driven dust may clog sensors or block drainage channels on leachate tanks and sumps.			
Staff Health & Safety – OHS	• Fall-From-Height Risks – OPEX: Gusts can impair worker balance on scaffolds, ladders, or elevated platforms, increasing fall likelihood. • Flying-Object Hazards – OPEX: Wind-blown materials or tools may cause injuries, especially in open-yard or construction areas. • Visibility & Stability Impairment – OPEX: Dust uplift and sudden wind bursts may reduce visibility, hinder safe movement, and increase trip or collision risks.	**Moderate**	**Moderate**	**Moderate**

4.4.4.3 NEXT STEPS

This section provides an overview of ERM's recommended next steps for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

TABLE A4-16 RECOMMENDED NEXT STEPS FOR EACH RISK AREA IDENTIFIED AS BEING 'LIKELY MATERIAL' WITHIN THE RISK REVIEW SECTION FOR THE EXTREME WINDS HAZARD GROUPING

Extreme Wind Events		
Risk areas	**Justification**	**Next Steps**
Main Production Facilities	Potential value in assessing the risk further	• Strengthen resilience of outdoor and elevated equipment by reviewing anchoring, enclosure, and protective measures against gust-related vibration and movement. • Enhance maintenance planning for wind-sensitive components, ensuring timely inspection of stacks, ducting, lifting points, and access platforms. • Refine procedures for controlled shutdown and safe-restart of critical units during adverse weather conditions.
Utilities	Potential value in assessing the risk further	• Review wind exposure across pump stations, cooling towers, substations, and tank farms to identify priority reinforcement needs. • Improve protection of above-ground utilities—e.g., securing cables, shielding sensitive panels, and strengthening support structures. • Enhance contingency arrangements to maintain essential services (power, water, cooling) during wind-related disruptions.
Waste Collection Hall and Waste Storage Pit	Potential value in assessing the risk further	• Strengthen operational controls around door management, negative-pressure systems, and crane operations under windy conditions. • Increase inspection and readiness of ventilation, leachate equipment, and outdoor sensors that are sensitive to dust and gusts. • Review emergency procedures for temporary shutdown, limited operation, or safe evacuation during severe wind events.
Construction and Temporary Maintenances Works	**High value in assessing the risk further**	• Integrate wind-risk considerations into scheduling, avoiding high-risk activities during forecast strong-wind periods. • Reinforce temporary structures and ensure lifting plans account for variable wind loads and stop-work thresholds. • Strengthen contractor coordination on wind-related stop-work triggers, site housekeeping, and stabilization of materials.

Extreme Wind Events		
Staff Health & Safety – OHS	**High value in assessing the risk further**	• Enhance wind-specific safety briefings, ensuring workers understand hazards related to fall risks, flying objects, and reduced visibility. • Improve site-wide emergency communication and ensure alternative safe paths and muster points are identified during wind events. • Reinforce enforcement mechanisms for wind-triggered work suspension, PPE requirements, and safe-work boundaries.

4.4.5 WILDFIRES

4.4.5.1 CLIMATE DATA AND TRENDS

The wildfire risk is measured by the Forest Fire Danger Index (FFDI) under baseline conditions and future time horizons. The FFDI measures the potential fire-permitting climatic conditions at a specific location, which are proportional to daily maximum temperature and wind speed and are inversely proportional to relative humidity. The larger Forest Fire Danger Index implies a higher wildfire risk at the site due to higher temperature under global warming.

Across future scenarios, this risk remains elevated. Under SSP1-2.6, fire-permitting days stay broadly stable through 2050s (108.5 – 119.5 days). Under SSP5-8.5, the number decreases to 103 days in the 2030s and then rises to 136 days by the 2050s, reflecting a longer and more intense fire season. Risk Scores across baseline and all scenarios remain firmly in the "Very High" category. Overall, wildfire represents a credible, high-priority hazard requiring continued monitoring and preparedness for the Project.

TABLE A4-17 BASELINE AND PROJECTED WILDFIRE CLIMATE DATA

Variable	Baseline	Projections			
		2030s		2050s	
		SSP 1-2.6	SSP 5-8.5	SSP 1-2.6	SSP 5-8.5
FFDI (Forest Fire Danger Index) (Number of days with fire-permitting climatic conditions)	107	108.5	103	119.5	136
Risk Score	4.33	4.35	4.24	4.57	4.88
Risk Level	Very High	Very High	Very High	Very High	Very High

4.4.5.2 RISK REVIEW

The Project is located in an area where seasonally hot, dry, and windy conditions can support wildfire spread, even though vegetation around the site is sparse. As a result, the Project's main exposure comes from external wildfire effects, such as smoke intrusion, reduced visibility, airborne embers, and potential grid or road disruptions, rather than from direct flame contact.

Under such conditions, external fires could temporarily affect air-handling performance, worker safety, and access for emergency response.

While the Project does not maintain wildfire-specific systems, it has strong existing fire-safety and emergency-management measures that collectively provide a high level of readiness for external fire threats. Strict ignition-source controls, hot-work permits, smoking prohibitions, and contractor oversight ensure that the Project does not contribute additional ignition sources during high-risk wildfire weather, reducing the likelihood of a combined industrial–wildland event. Regular fire inspections, seasonal patrols, and continuous monitoring of hazardous areas enhance early detection of smoke, heat, or fire-related abnormalities drifting from off-site.

The Project's fire-protection infrastructure, including hydrants, alarms, extinguishers, micro fire stations, trained response teams, and systematic equipment maintenance, strengthens its ability to maintain operational control if wildfire smoke or embers reach the site. Bunded diesel and ammonia tanks, underground fuel storage, and well-contained waste and leachate systems minimize the chance that an external wildfire could trigger secondary hazards on-site. These engineered features also limit ember-related ignition risks around process areas.

Comprehensive emergency-response procedures, clear evacuation routes, defined command structures, and routine drills further enhance resilience. Personnel are trained to act quickly under degraded visibility, high-heat, or smoke-affected conditions scenarios typical during nearby wildfires. This enables the Project to maintain orderly operations, protect staff, and coordinate effectively with off-site firefighting authorities.

TABLE A4-18 POTENTIAL RISK AREAS AT THE START AND END OF OPERATIONS ASSOCIATED WITH THE PROJECT FOR THE WILDFIRES HAZARD GROUPING

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Main Production Facilities • Incinerators, Boilers and Turbine-Generator System • Flue Gas Treatment System and Stacks • Fly Ash Stabilization and Temporary Storage	• Air-Intake & Ventilation Interference – OPEX: Regional fire-permitting weather may worsen smoke and dust infiltration during wildfire-adjacent events, increasing filtration loads on combustion air systems and stressing fans and blowers. • Thermal & Particulate Stress on External Equipment – OPEX/CAPEX: Elevated	Not Applicable (N/A)	**Moderate**	**Moderate**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	fire-weather conditions with strong, dry winds can increase airborne particulates, accelerating fouling of FGT components and corrosion on exposed steel structures. • Storage-Area Vulnerability – OPEX: Fly ash and reagent storage areas, though low-fuel environments, may face temporary access disruptions during smoke or reduced visibility periods associated with regional fire-permitting days.			
Utilities • Water Supply Pump Station and Pipeline • Cooling Towers • Substation and Transmission Line • Wastewater Treatment Plants • Tank Farms	• Power Transmission Sensitivity – OPEX/CAPEX: High-wind, low-humidity conditions may increase conductor vibration and dust accumulation, heightening nuisance trips or flashover risks. • Cooling System Efficiency Impacts – OPEX: Hot, dry fire-weather conditions elevate ambient temperatures and evaporation rates, reducing cooling tower efficiency and raising makeup-water demand during a period already marked by high water stress in Samarkand.	Not Applicable (N/A)	**Moderate**	**Moderate**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	• Tank Farm Safety Constraints – OPEX/CAPEX: Smoke and airborne particulates may impair sensor accuracy, obstruct visual inspections, and reduce onsite visibility, complicating monitoring of ammonia, diesel, and leachate tanks during fire-permitting days.			
Waste Collection Hall and Waste Storage Pit	• Ventilation Load Increase – OPEX: Smoke and dust intrusion during regional fire-weather periods increases negative-pressure system demand, causing higher energy use and operational stress on ventilation equipment. • Odour & Gas Management Complications – OPEX: Lower ambient humidity during intense fire-weather periods can exacerbate H_2S/NH_3 release, straining odor-control systems already challenged by hotter, drier conditions. • Reduced Visibility & Operational Disruption – OPEX: High FFDI conditions (driven by wind and heat) may reduce visibility at	Not Applicable (N/A)	**Moderate**	**Moderate**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	loading/unloading doors, affecting safe crane movements and waste-handling precision.			
Construction and Temporary Maintenances Works	• Worksite Exposure to Wind & Dust – OPEX: Strong, dry winds linked to high FFDI days can impair visibility, increase airborne debris, and raise safety risks for scaffolding, lifting operations, and temporary structures. • Hot-Weather Productivity Impacts – OPEX: Fire-permitting climatic conditions often coincide with extreme heat, increasing heat-stress risks for crews and requiring shorter work cycles and more rest breaks. • Restricted Emergency Access – OPEX: Smoke or haze during high-risk periods can slow emergency response times, complicating evacuations and limiting visibility for ground vehicles on temporary access roads.	**Moderate**	Not Applicable (N/A)	Not Applicable (N/A)
Staff Health & Safety – OHS	• Respiratory & Heat-Stress Risks – OPEX: Combined heat and low-humidity conditions increase risks of dehydration,	**High**	**High**	**High**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	respiratory irritation, and reduced tolerance for PPE. • Visibility-Related Safety Hazards – OPEX: Haze, dust and smoke during wildfire-permitting days can impair visibility across the plant, elevating risks of slips, collisions, and handling errors. • Emergency Preparedness Challenges – OPEX: Elevated fire-weather conditions may constrain response capabilities, as smoke and strong winds complicate muster assembly, crisis communication, and movement across open areas.			

4.4.5.3 NEXT STEPS

This section provides an overview of ERM's recommended next steps for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

TABLE A4-19 RECOMMENDED NEXT STEPS FOR EACH RISK AREA IDENTIFIED AS BEING 'LIKELY MATERIAL' WITHIN THE RISK REVIEW SECTION FOR THE EXTREME WINDS HAZARD GROUPING

Extreme Rainfall Flooding		
Risk areas	**Justification**	**Next Steps**
Main Production Facilities	Potential value in assessing the risk further	• Strengthen preparedness for smoke, ash, and ember intrusion by reviewing ventilation resilience and ensuring critical equipment can operate safely during degraded air-quality conditions. • Establish seasonal readiness checks for key systems (incinerators, FGT units, turbine hall) to confirm stable operation during regional wildfire-weather periods. • Incorporate wildfire-weather alerts (e.g., hot/dry/windy conditions) into operational planning to anticipate potential impacts on process stability and maintenance scheduling.
Utilities	Potential value in assessing the risk further	• Assess the robustness of power, water-supply, and cooling systems under wildfire-related disruptions such as reduced visibility, high winds, or upstream grid instability. • Develop contingency plans for utility operations during regional wildfire events, including standby arrangements and priority protection for critical assets. • Integrate wildfire-weather monitoring into utility maintenance planning to ensure equipment remains reliable during peak fire-risk seasons.
Waste Collection Hall and Waste Storage Pit	Potential value in assessing the risk further	• Review ventilation and odour-control capacities to ensure they can manage higher particulate loads from external wildfire smoke. • Prepare operational adjustments for reduced visibility at doors and unloading areas, focusing on safe crane movements and controlled waste handling. • Strengthen protocols for maintaining negative-pressure balance during wildfire-weather periods when external winds or smoke may affect airflow.
Construction and Temporary Maintenances Works	**High value in assessing the risk further**	• Embed wildfire-weather criteria into work-planning (e.g., wind, smoke, visibility) to guide safe scheduling of lifting, outdoor activities, and temporary structures. • Enhance contractor briefings and site controls during high-risk periods to ensure safe evacuation routes and clear communication in case of nearby fires. • Establish simple, scalable readiness checks for temporary facilities and equipment before periods of sustained heat, dryness, and strong winds.
Staff Health & Safety – OHS	**High value in assessing the risk further**	• Update site-wide OHS procedures to account for smoke exposure, heat stress, and reduced visibility during regional wildfire events. • Reinforce training on wildfire-related situational awareness, safe movement on site, and adherence to shelter-in-place or evacuation instructions. • Ensure emergency communication systems, muster points, and access roads remain functional under wildfire-weather conditions.

4.4.6 WATER STRESS AND DROUGHT

4.4.6.1 CLIMATE DATA AND TRENDS

Water Stress and Drought are assessed by the water stress indicator provided by the World Resource Institute (WRI) which measures the ratio of total water withdrawals to available water supplies under different CMIP6 climate scenarios. According to the baseline and projected data, the Project site is currently exposed to extremely high baseline water stress (>80%), and this condition is projected to persist across all future climate scenarios (SSP1-2.6 and SSP5-8.5) in both the 2030s and 2050s. This suggests a chronic structural vulnerability in water availability that is unlikely to be alleviated even under low-emission pathways.

The risk assessment indicates a Very High level of risk for the Project (score: 10 in the baseline). The number of consecutive dry days that describes hydroclimatic conditions is projected to remain high, fluctuating around the baseline of 118 days. Future scenarios indicate modest variations, with 123.5-141.2 days by the 2030s and 123.5-127.6 days by the 2050s, pointing to the persistence of extended dry periods and seasonal drought stress.

TABLE A4-20 BASELINE AND PROJECTED WATER STRESS AND DROUGHT CLIMATE DATA

Variable	Baseline	Projections			
		2030s		2050s	
		SSP1-2.6	SSP5-8.5	SSP1-2.6	SSP5-8.5
Water Stress (Index)	1.50	1.77	1.63	1.60	1.73
Water Stress (categorical, %)	>80% Extremely High	>80%	>80%	>80%	>80%
		Extremely High	Extremely High	Extremely High	Extremely High
Number of consecutive dry days (days)	118	127.7	141.2	123.5	127.6
Risk Score	10	10	10	10	10
Risk Level	Very High	Very High	Very High	Very High	Very High

4.4.6.2 RISK REVIEW

The Project site in Samarkand City, Samarkand Region is in an area with baseline water stress categorized as Extremely High (>80%). Projections under both SSP1-2.6 and SSP5-8.5 scenarios indicate that water stress is expected to remain Extremely High through the 2030s and 2050s. The number of consecutive dry days is projected to fluctuate slightly (123.5–141.2 days), reflecting persistent arid conditions.

The national water context indicates that per capita domestic water use in Uzbekistan is approximately 1527.62 m^3/year. Water resources in the country are predominantly allocated to agricultural irrigation, which accounts for 90% of total water withdrawal. [32] Along the Zarafshan River— the main water source for Samarkand Region—about 60.6% of available water is

[32] https://documents1.worldbank.org/curated/en/099062424121035288/pdf/P170030-356bad97-a463-43e5-9ce8-fc808f542aeb.pdf

diverted for irrigation in the Samarkand and Navoi regions.[33] Overall water volume of Zarafshan River entering Uzbekistan has been decreasing, with the average maximum flow declining by 15.9%, from 138 m³/s (1980–1989) to 116 m³/s (2010–2016). Water-supply reliability issues are also documented, including intermittent supply to multi-story residential buildings.[34]

The Project sources its operational water primarily from the Dargom Canal, where raw water is abstracted via a dedicated intake pump and conveyed approximately 1 km to the site through a pipeline for treatment and use across plant systems. A government-issued permit authorizes a maximum annual abstraction of 1.64 million m³ from the canal.

Given the high baseline and projected water stress, the risk to the Project is assessed as Very High, because the Project relies on a surface-water source (the Dargom Canal) located in a region already experiencing chronic water scarcity, declining river inflows, and competing agricultural withdrawals. Baseline water stress in the Samarkand Region is classified as Extremely High (>80%), and future projections under both SSP1-2.6 and SSP5-8.5 confirm that this condition will persist across the 2030s and 2050s.

The Project operates under a zero-discharge strategy, treating all wastewater onsite and recycling it back into processes such as cooling tower makeup, ash handling, and floor washing, thereby minimizing dependence on external water sources. The cooling system operates on a closed-loop basis, minimizing evaporative losses and allowing treated blowdown water to be recycled. Additionally, only 3,153.8 m³/day of water is abstracted from the Dargom Canal—equivalent to 0.04% of the canal's flow—ensuring that project withdrawals remain negligible relative to available water resources. These mitigation measures are expected to reduce operational disruption, but overall water stress remains a key operational consideration given the arid climate and extremely high baseline water stress.

TABLE A4-21 POTENTIAL RISK AREAS AT THE START AND END OF OPERATIONS ASSOCIATED WITH THE PROJECT FOR THE WATER STRESS AND DROUGHT HAZARD GROUPING

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
Main Production Facilities • Incinerators, Boilers and Turbine-Generator System	• Leachate Co-incineration Disruption – OPEX: Insufficient water supply may disrupt leachate co-incineration capacity, reducing waste handling flexibility. Water shortages could affect	Not Applicable (N/A)	**High**	**High**

[33] https://cawater-info.net/zeravshan/pdf/opp-et-al.pdf
[34] https://thedocs.worldbank.org/en/doc/765401574230281802-0080022019/related/087Yusupov7Imp7ly0in0Samarkand0city.pdf

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
• Flue Gas Treatment System and Stacks • Fly Ash Stabilization and Temporary Storage	diesel/gas auxiliary feed systems that rely on water-based cooling or sealing systems. • Reagent Preparation Constraints – OPEX: Water-stress constraints may limit availability for ammonia dissolution, lime system cleaning, or reagent preparation. Greater particulate load during dry seasons may increase baghouse differential pressure and cleaning requirements. • Steam-Generation Instability – OPEX / CAPEX: Boiler feedwater treatment relies on RO/EDI; reduced water intake may compromise steam-generation stability. Water scarcity may force prioritization between boiler makeup needs and other plant water demands. • Cooling-Water Supply Constraints – OPEX: Reduced cooling-water supply may cause condenser performance decline, lowering power-generation efficiency. Stress on closed-loop cooling may require operational curtailment during peak drought periods. • Fly Ash Stabilization System Challenges – OPEX: Water shortages			

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	may hinder stable slurry formation and increase solids handling risks. • Boiler Feedwater Reduction – OPEX / CAPEX: Boiler feedwater treatment relies on RO/EDI; reduced water intake may compromise steam-generation stability. Water scarcity may force prioritization between boiler makeup needs and other plant water demands.			
Utilities • Water Supply Pump Station and Pipeline • Cooling Towers • Substation and Transmission Line • Wastewater Treatment Plants • Tank Farms	• Water Supply System Vulnerability – OPEX / CAPEX: Extremely high regional water stress increases risk of reduced Dargom Canal flow, threatening reliable abstraction. Pumping systems may experience operational interruptions if intake levels fall below minimum abstraction depth. Competing agricultural withdrawals during extended dry periods may further constrain supply. • Cooling Towers Stress – OPEX / CAPEX: Reduced inflow may compromise circulation volume, raising condenser temperatures. Increased evaporation during long dry periods exacerbates water demand, stressing	Not Applicable (N/A)	**High**	**High**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	the closed-loop system. Lower water availability may reduce capacity for drift control and blowdown recycling, affecting system chemistry. • Wastewater Treatment Plants Instability – OPEX: Reduced inflow from process streams during constrained operations may affect biological stability of WWTP 1. Insufficient cooling-tower blowdown (due to reduced water availability) may lower WWTP 2 influent, affecting RO recovery. • Tank Farms Safety Readiness – OPEX: Water shortages may affect bund-cleaning, safety rinsing, and spill-response readiness.			
Waste Collection Hall and Waste Storage Pit	• Reduced Hygiene & Odour Control – OPEX: Water scarcity may limit floor-washing, dust suppression, and leachate management activities, reducing hygiene and increasing odor concerns. Reduced water availability may constrain cleaning cycles for unloading platforms during peak dry months. Prolonged dry conditions increase reliance on mechanical	Not Applicable (N/A)	**High**	**High**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	ventilation to manage odors, raising operational energy demand. • Waste Storage Pit Challenges – OPEX: Extended dry periods may reduce natural drainage/dewatering rates, increasing leachate concentration and treatment load. High water stress may limit availability of makeup water for leachate dilution, complicating pumping and incineration processes. Reduced canal flow may affect emergency replenishment needs in case of abnormal leachate accumulation.			
Construction and Temporary Maintenances Works	• Water-Dependent Construction Delays – CAPEX: Limited water availability may disrupt concrete works, curing, dust suppression, and soil compaction, leading to delays, reduced structural quality, and higher rework needs. • Insufficient Water for Equipment Testing – OPEX / CAPEX: Water scarcity during extended dry periods can constrain equipment cleaning, flushing, and hydrostatic testing,	**Moderate**	Not Applicable (N/A)	Not Applicable (N/A)

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	increasing the risk of mechanical failure or non-compliance with commissioning requirements. • Dust-Control Limitations – OPEX: High dust levels during prolonged dry conditions intensify the need for water-based dust suppression, which may become insufficient due to withdrawal constraints, creating safety risks and reducing visibility on site.			
Staff Health & Safety – OHS	• Dust-Exposure Health Risks – OPEX: Persistent dry conditions elevate dust exposure, increasing risks of respiratory irritation and requiring more frequent cleaning and PPE—yet water shortages may limit effective dust control. • Reduced Hygiene & Sanitation – OPEX: Constraints on water availability may reduce sanitation and hygiene standards in administrative and worker areas, increasing health risks during long dry periods. • Heightened Heat Stress – OPEX: Worker heat stress may worsen when	**High**	**High**	**High**

Risk area	Description of potential risks and materiality in relation to risk area	Risk materiality category and time-period		
		Construction phase (Baseline)	Early operation phase (2030s)	Late operation phase (2050s)
	cooling systems or evaporative cooling rely on limited water availability, affecting productivity and safety during high-temperature/dry conditions. • Reduced Emergency Readiness – OPEX: Reduced water for emergency response systems (e.g., eyewash/ safety showers, fire-suppression readiness) may decrease the effectiveness of OHS controls during incidents.			

4.4.6.3 NEXT STEPS

This section provides an overview of ERM's recommended next steps for all risk areas that have been identified within the 'Risk review' section as being 'Likely Material'. The recommended next steps within this section are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.

TABLE A4-22 RECOMMENDED NEXT STEPS FOR EACH RISK AREA IDENTIFIED AS BEING 'LIKELY MATERIAL' WITHIN THE RISK REVIEW SECTION FOR THE WATER STRESS AND DROUGHT HAZARD GROUPING

Wildfires		
Risk areas	**Justification**	**Next Steps**
Main Production Facilities	**High value in assessing the risk further**	• Strengthen long-term resource planning and monitoring, especially for water-intensive systems (boilers, cooling, flue-gas treatment). • Develop or refresh contingency operating modes for periods of water scarcity (e.g., staged load reduction, prioritization of critical units).

Wildfires		
		• Conduct periodic reviews of process-water balance to identify efficiency gains and opportunities for further recycling. • Integrate water-stress considerations into preventive maintenance and equipment-upgrade plans.
Utilities	**High value in assessing the risk further**	• Enhance raw-water supply resilience by improving intake screening, monitoring, and early-warning systems for low-flow conditions. • Evaluate opportunities to expand industrial water reuse within utilities (e.g., cooling-tower blowdown recovery, filter backwash reuse). • Assess system-wide water-efficiency measures across pumps, RO/EDI units, and cooling towers. • Review readiness of backup or alternative water-supply arrangements, if feasible within regulatory limits.
Waste Collection Hall and Waste Storage Pit	**High value in assessing the risk further**	• Review leachate-management strategies to ensure stable operations under extended dry periods, including buffer storage needs. • Assess opportunities to reduce water use in cleaning and odor control, including mechanical or low-water methods. • Strengthen monitoring of waste moisture and pit operating conditions during prolonged drought. • Ensure pit ventilation, gas management, and crane operations remain fully functional during water-restricted periods.
Construction and Temporary Maintenances Works	Potential value in assessing the risk further	• Integrate water-stress scenarios into construction planning, including scheduling of water-intensive works and dust-control strategies. • Strengthen requirements for efficient water use on site, including recycling where feasible. • Ensure temporary worker facilities maintain adequate sanitation and hygiene during dry periods. • Include water-stress considerations in temporary pump, pipeline, and curing-system design.
Staff Health & Safety – OHS	**High value in assessing the risk further**	• Update OHS procedures to account for high-dust conditions and limited water availability for suppression. • Ensure adequate potable water and cooling for staff during extended dry and hot periods. • Reinforce readiness of safety showers, eyewash stations, and fire-response systems, verifying they remain functional under water-stress constraints.

Wildfires		
		• Increase monitoring and training on dry-season respiratory protection and heat-stress management.

4.5 SUMMARIES AND CONCLUSIONS

There are a range of climate hazards present within close proximity to the Project's area, posing a range of potential risks with varying degrees of materiality. The materiality of the risks identified vary depending on the climate hazard and time-period selected. This assessment identifies five main hazard groupings that pose the largest number of material risks to the Project, including: **extreme heat, flooding, extreme winds, wildfires, and water stress.**

Following on from the risk review conducted by ERM, a series of recommended next steps have been outlined for each hazard grouping. This includes the identification of risk areas which ERM identifies potential value in the further mitigation measures. Most notably, including:

- **Extreme heat:** Regularly assess and upgrade facilities and equipment to enhance heat resilience, including cooling systems for sensitive equipment, thermal protection for critical machinery, and integrated water–energy management, to maintain operational efficiency under rising temperatures.
- **Flooding:** Incorporate climate projections into periodic reviews of drainage and flood-protection systems. Where needed, strengthen flood-resistant design features for critical infrastructure, such as elevated electrical equipment, waterproof pits, retaining structures, and on-site water management systems.
- **Extreme winds:** Reinforce the Project's preparedness for wind-related disruptions by reviewing anchoring, enclosure, and protection of wind-sensitive equipment (e.g., cladding, cooling-tower components, overhead utilities). Strengthen wind-triggered operational controls, inspection routines, and maintenance procedures for cranes, scaffolding, and temporary structures, ensuring safe operations during gust events.
- **Wildfires:** Enhance smoke and particulate resilience across ventilation, air-handling, and monitoring systems. Integrate wildfire-weather alerts into operational planning, reinforce emergency-response readiness, and ensure safe-work protocols during reduced visibility, high-heat, and high-wind conditions associated with wildfire-permitting days.

In addition, to achieve Uzbekistan's adaptation priorities to water stress risk, a series of recommended next steps have also been provided for **water stress** of concerns:

- A comprehensive water usage audit to identify areas where water consumption can be reduced in production and supporting processes, including cooling systems, chemical handling, and cleaning operations, etc., and establish water balance for the Project
- Introduce appropriate water-saving technologies, such as precision sprinklers, low-flow systems, and dry cooling methods, depending on the Project's actual situation.
- Implement real-time water usage monitoring systems across all production processes to track consumption patterns and identify areas for further optimization.
- Regular review and update of assessment: Regularly review and update (e.g., every three to five years if no significant changes occur) the risk level of water stress and drought

based on the latest climate data during the Project operation phase and implement appropriate mitigation measures accordingly.

5. CLIMATE CHANGE RISK MANAGEMENT PLAN

This section presents a Climate Change Risk Management Plan (CCRMP). Through this CCRMP the Project aims to:

- Identification of climate change risks: Identify the climate change risks that the project or organization faces. This includes both the risks of climate change, such as sea level rise and extreme weather events, and the transition risks, such as changes in government policy and market prices.
- Assessment of climate change risks: Assess the likelihood and potential impact of each identified risk on Project assets, utilities, operational continuity, worker safety, environmental performance, and long-term financial resilience.
- Mitigation of climate change risks: Develop mitigation measures to reduce the risks. This could involve measures such as adapting the Project or organization to climate change or reducing the Project's or SUS's GHG emissions.
- Monitoring and reporting: Monitor and report on the climate change risk management plan. This will help to ensure that the plan is effective and that it is being implemented as intended.

5.1 DEFINED ROLES AND RESPONSIBILITIES

Below is a defined set of roles and responsibilities within the CCRMP, which aims to ensure a coordinated and proactive approach to identify, assess, mitigate, and monitor climate change risks for SUS. Each role contributes to the overall resilience and sustainability of the Project in the face of climate-related challenges.

TABLE A5-1 ROLES AND RESPONSIBILITIES

Roles	Responsibilities
Chief Risk Officer (CRO)	Oversees the development and implementation of the Climate Change Risk Management Plan for the Project. Works with the executive team, department heads, and external experts to identify, assess, and monitor climate-related risks and their potential impacts on Project operations. Ensures that climate-risk strategies and procedures align with SUS's overall risk-management framework and corporate objectives.
Environmental Compliance Manager	Ensures the Project maintains full compliance with environmental and climate-related regulatory requirements. Monitors emissions, oversees reporting to authorities, and implements measures that reduce the facility's carbon footprint. Collaborates with regulators, auditors, and external stakeholders to uphold compliance and support continuous improvement.
Operations Manager	Identifies operational risks linked to climate change and ensures that equipment and processes operate efficiently under evolving climatic conditions. Works closely with the CRO and Maintenance teams to enhance energy efficiency, minimize GHG emissions, and integrate climate-resilience measures into day-to-day operations.
Maintenance Supervisor	Ensures all equipment and systems essential to the Project are properly maintained and operating efficiently. Conducts routine inspections, manages repairs, and addresses issues that may increase emissions or reduce operational performance.

Roles	Responsibilities
	Coordinates with the Operations Manager and escalates climate-related maintenance risks to the CRO.
Climate Risk Analyst	Conducts ongoing assessments of physical and transition climate risks affecting the Project. Uses climate data, modelling tools, and regulatory tracking to analyse potential impacts from extreme weather, water stress, and policy changes. Provides regular insights and analytical reports to support CRO decision-making.
Regulatory Affairs Specialist	Monitors climate-related regulations and standards at the national and international levels to ensure the Project remains compliant. Anticipates regulatory changes that may affect operations or reporting obligations and works with authorities, industry bodies, and legal advisors to align Project practices with evolving requirements.
Stakeholder Engagement Coordinator	Maintains transparent communication with stakeholders, including local communities, government agencies, and environmental groups. Shares updates on climate-risk management activities, addresses concerns, and gathers feedback to strengthen the Project's climate strategies and community trust.
Emergency Response Team	Supports safe and coordinated responses to climate-related emergencies such as extreme heat, flooding, or high-wind events. Responsible for implementing emergency procedures, safeguarding personnel, and protecting key assets, while collaborating closely with local authorities when needed.
Employee	All SUS employees will receive training on climate-related risks and their role in implementing the CCRMP. Staff are expected to follow climate-resilience procedures and support mitigation and adaptation efforts in their daily work.
External Experts and Consultants	Provide specialized technical assessments, modelling support, and independent reviews to strengthen the Project's climate-risk management practices and ensure alignment with international standards.
Board of Directors	Oversees implementation of the CCRMP and receives regular updates on climate performance, material risks, and the effectiveness of mitigation measures at the Project level.
Internal and External Auditors	Conduct periodic reviews to evaluate the effectiveness of climate-risk management processes and ensure compliance with applicable regulatory requirements and international good practice.

5.2 GHG STRATEGY AND POLICIES, MANAGEMENT APPROACH AND PROCEDURES

5.2.1 GHG REDUCTION STRATEGY

SUS's GHG reduction strategy is grounded in operational efficiency, continuous improvement, and alignment with Uzbekistan's national climate policy objectives. The Company will prioritize investment in advanced low-carbon technologies, energy-efficient equipment, and preventive maintenance programs to enhance the overall efficiency of plant operations and reduce emissions intensity over time.

In parallel, the strategy reflects the broader social and community context in which the Project operates. Effective GHG reduction and climate resilience depend on strong workforce engagement, local capacity building, and alignment with community expectations on environmental performance. Awareness-raising, internal training, and proactive stakeholder communication will support the implementation of GHG-reduction measures and help build a shared understanding of the Project's climate-action objectives.

5.2.2 POLICIES

SUS will pursue GHG reduction in line with Uzbekistan's NDC and relevant national climate and energy-transition policies. For any residual emissions that cannot be technically or economically eliminated, SUS will seek to balance these through credible carbon-removal or offset initiatives—such as reforestation or other nature-based solutions—prioritizing projects that deliver co-benefits for local communities and ecosystems.

SUS will comply with all applicable national and international requirements related to GHG emissions, reporting, and reduction, and will closely monitor policy developments to ensure continued compliance and alignment with evolving climate ambitions.

In addition, SUS will regularly disclose its GHG emissions, reduction measures, and progress toward carbon-neutrality targets to relevant authorities and stakeholders. This reporting will serve not only as a compliance mechanism but also as a means to enhance transparency, accountability, and trust among local communities, regulators, and other stakeholders, supporting broader social acceptance of the Project's climate actions.

5.2.3 MANAGEMENT APPROACH AND PROCEDURES

SUS will adopt the following management approach and procedures to mitigate climate change risks and contribute to a sustainable, low-carbon future. These measures will be regularly reviewed and updated to ensure alignment with the latest developments in climate science, regulatory requirements, and good international industry practice. The management framework will also consider broader social and policy factors that influence the effectiveness and long-term resilience of GHG reduction efforts.

- Emissions Inventory: SUS will establish and maintain a comprehensive GHG emissions inventory, documenting emissions sources, quantities, and emission factors, in line with recognized international standards.
- Emissions Reduction Targets: SUS will set short-term and long-term emissions reduction targets consistent with its carbon neutrality commitment and national climate goals. Progress toward these targets will be regularly monitored, reported, and communicated internally and externally to support transparency and stakeholder confidence.
- Risk Assessment: SUS will conduct ongoing climate risk assessments, considering physical, regulatory, operational, and social risks associated with GHG emissions and climate change. This includes assessing how policy changes, community expectations, and broader societal transitions toward low-carbon development may affect Project performance and resilience. The outcomes of these assessments will inform both mitigation and adaptation strategies.
- Mitigation Measures: Based on the outcomes of climate risk assessments, SUS will implement a range of mitigation measures to reduce GHG emissions, including energy efficiency improvements, integration of renewable energy sources, and the adoption of

emissions capture or abatement technologies where feasible. Mitigation measures will be prioritized in line with regulatory requirements, technological feasibility, and potential co-benefits for local environmental quality and climate resilience.

- Employee Training: SUS will provide regular training and awareness programs for employees on GHG emissions management, climate change risks, and the importance of emissions reduction. These programs aim to strengthen internal capacity, promote responsible operational practices, and support a culture of environmental accountability, thereby enhancing the effectiveness of GHG reduction measures at the operational level.
- Emergency Response: Procedures will be established and periodically updated to respond to climate-related emergencies, such as extreme weather events. Emergency preparedness and response measures will prioritize the safety of personnel, continuity of operations, and protection of Project infrastructure, while also considering potential impacts on surrounding communities and coordination with relevant local authorities.
- Stakeholder Engagement: SUS will engage with local communities, environmental organizations, government agencies, and other relevant stakeholders to gather feedback, address concerns, and collaborate on climate-related initiatives. Stakeholder engagement will support the integration of community perspectives and policy expectations into GHG management and climate resilience planning and contribute to building social acceptance and trust in the Project's climate actions.
- Continuous Improvement: SUS is committed to the continuous improvement of its GHG management approach. Strategies, policies, and procedures will be reviewed on a regular basis to reflect changes in regulatory frameworks, technological developments, climate science, and stakeholder expectations, ensuring that the Project remains responsive to evolving policy and social contexts.
- Investment in Innovation: SUS will invest in research, development, and deployment of innovative technologies and practices that contribute to GHG reduction and sustainable energy production. Innovation efforts will be aligned with national decarbonization pathways and, where feasible, support broader low-carbon development objectives and local capacity building.

TABLE A5-2 RISK RESPONSES METHODOLOGY

Risk Response	Details
Mitigation	Mitigation involves taking actions to reduce or eliminate the root causes of climate change risks. • Identify Emission Sources: First, identify sources of greenhouse gas (GHG) emissions within the organization's operations. This may include emissions from energy consumption, transportation, manufacturing processes, and more. • Implement Energy Efficiency Measures: Implement energy-efficient technologies and practices to reduce GHG emissions. This can involve upgrading equipment, optimizing processes, and adopting renewable energy sources. • Carbon Offsetting: Consider investing in carbon offset projects to balance emissions that cannot be eliminated. This may involve supporting reforestation, renewable energy projects, or methane capture initiatives.

Risk Response	Details
	• Sustainable Supply Chain: Work with suppliers to reduce the carbon footprint of the supply chain. Encourage sustainable practices among suppliers and assess their own emissions. • Employee Engagement: Engage employees in sustainability initiatives. Encourage behaviour changes, promote energy conservation, and create a culture of environmental responsibility.
Transfer	Risk transfer involves shifting the financial burden of climate change risks to external parties, such as insurance providers or subcontractors. • Insurance: Purchase insurance policies that cover climate-related risks, including extreme weather events, property damage, and business interruptions. Ensure that the insurance adequately addresses climate change scenarios. • Contractual Agreements: When entering into contracts with suppliers, subcontractors, or partners, include clauses that allocate climate-related risks and responsibilities. This may include liability for climate-induced damages or delays. • Third-Party Services: Consider outsourcing climate risk assessments and adaptation planning to specialise consultants who can provide expertise in assessing and managing these risks.
Acceptance	Acceptance acknowledges that some level of climate change risk may be unavoidable or too costly to mitigate or transfer. • Risk Tolerance Assessment: Evaluate the organization's risk tolerance and its ability to absorb certain climate-related risks without compromising its core operations. • Scenario Planning: Develop contingency plans and scenario analyses to prepare for potential climate-related disruptions. Identify critical functions that can endure disruptions and prioritize them. • Resilience Building: Invest in infrastructure and operational resilience measures to withstand climate impacts, such as flood defences, backup power systems, and disaster recovery plans.
Control	Control involves actively managing and monitoring climate change risks through a systematic approach. • Risk Assessment: Continuously assess climate risks by monitoring climate data, conducting vulnerability assessments, and tracking changes in regulations and industry standards. • Adaptation Strategies: Develop and implement climate adaptation strategies that align with identified risks. These may include flood-proofing facilities, diversifying suppliers, and ensuring redundancy in critical systems. • Regular Audits: Conduct regular audits to ensure that mitigation and adaptation measures are effective and up-to-date. Make necessary adjustments as climate risks evolve. • Reporting and Disclosure: Communicate climate change risks and actions taken to stakeholders, including investors, regulators, and the public. Transparency builds trust and can attract investment.

Risk Response	Details
	• Staff Training: Provide training to staff on climate change risks and response procedures. Ensure that the workforce is knowledgeable and prepared to respond effectively.

5.3 MONITORING METRICS AND APPROACH TO SUPPORT IMPLEMENTATION

To effectively manage climate change risks and ensure the successful execution of its GHG reduction strategy, SUS will implement a robust monitoring and metrics system, which encompass key performance indicators (KPIs), data collection processes, reporting mechanisms, and continuous improvement strategies.

5.3.1 KEY PERFORMANCE INDICATORS (KPIS)

To ensure the Project's alignment with international best practices (e.g., IFC Performance Standards and the GHG Protocol) and its long-term resilience to the local region, SUS will implement the following KPI framework:

- GHG Emissions: SUS will monitor the **GHG emissions**, measured in CO_2e consistent with the GHG Protocol will be maintained. Key parameters, including stack emissions and auxiliary fuel intensity, will be monitored via Continuous Emissions Monitoring Systems (CEMS). Tracking emissions will help SUS evaluate the efficiency of the Project operations over time.
- Emissions Reduction Targets: Progress toward SUS's emissions reduction targets will be established and closely monitored. This includes tracking **carbon intensity per electricity generated** against baseline data and assessing its performance relative to interim and long-term reduction goals.
- Energy Efficiency: Measuring the overall energy efficiency of the Project, including factors such as **power consumption** and **water intensity**, will be a fundamental KPI.
- Carbon Neutrality Progress: To achieve carbon neutrality in line with local and international laws and regulations, SUS will track progress in balancing emissions with carbon removal projects and offsets, by **total GHG emissions**.
- Operational Resilience: KPIs related to the resilience of SUS's operations to climate-related risks, such as **training sessions, drills**, **infrastructure reliability index**, **vegetation survival rate**, will be established and monitored.

5.3.2 DATA COLLECTION AND REPORTING

- Emissions Data: SUS will implement a robust emissions data collection process, leverage continuous emissions monitoring systems (CEMS), regular site inspections, and data management tools. This data will be analysed and reported regularly.
- Energy Efficiency Data: Data related to energy consumption, heat rates, and overall efficiency will be collected and analysed to identify opportunities for improvement.
- Renewable Energy Integration Data: The contribution of renewable energy sources to the energy mix will be monitored and integrated to reporting.
- Carbon Neutrality Tracking: SUS will maintain records of carbon removal projects, offsets, and emissions to assess progress toward carbon neutrality.

- Climate Risk Data: Climate risk assessments will involve collecting and analysing data related to physical, regulatory, and operational risks.

5.3.3 REPORTING MECHANISMS

Reporting mechanisms of SUS's climate change risk management performances are planned to consist of the following three programs:

- Internal Reporting: Regular internal reporting will facilitate communication among relevant departments and teams, ensuring alignment with climate goals and mitigation efforts.
- Regulatory Reporting: SUS will adhere to all regulatory reporting requirements related to GHG emissions, climate risk assessments, and adaptation measures.
- Stakeholder Communication: Engaging with stakeholders, including local communities, government agencies, and environmental organizations, will involve transparent reporting of our GHG reduction progress and climate risk management efforts.

5.3.4 CONTINUOUS IMPROVEMENT

SUS is committed to a culture of continuous improvement in its climate change risk management efforts. This includes:

- Regular Review: SUS will periodically review its monitoring metrics and adjust them to reflect changing circumstances and best practices in GHG management.
- Feedback Mechanisms: Encouraging feedback from employees, stakeholders, and experts to identify areas for improvement and innovation.
- Innovation and Research: Investing in research and development to explore new technologies and strategies for GHG reduction and climate resilience.
- Adaptive Strategies: Being prepared to adapt our Climate Change Risk Management Plan in response to emerging risks and opportunities.
- Training and Awareness: Providing training and awareness programs to empower employees to contribute to SUS's climate goals.

5.4 PROJECT-SPECIFIC SET OF MITIGATION MEASURES

SUS will implement a targeted set of mitigation measures tailored to the Project's operational profile and the climate risks identified in the CCRA. These measures aim to reduce GHG emissions, improve energy and water efficiency, and strengthen resilience to extreme heat, flooding, water stress, extreme winds, and wildfires.

- Thermal and Process Efficiency Optimization. Improve waste-to-energy conversion efficiency by optimising combustion control, maintaining high boiler heat-exchange efficiency, and ensuring regular inspection and cleaning of waste-heat boilers, air-preheaters, and turbine-condenser systems. Preventive maintenance will minimise energy losses and reduce auxiliary fuel demand during heatwaves or cold starts.
- Energy-Efficiency Measures Across Plant Systems. Implement energy-efficient technologies such as LED lighting, VFD-controlled motors for pumps and fans, and improved insulation for steam, condensate, and flue-gas ducts. Conduct periodic energy audits to identify additional opportunities to reduce auxiliary power demand, particularly during high-temperature periods when cooling loads increase.

- Cooling-System and Water-Use Efficiency Improvements. Enhance the performance of the closed-loop cooling system by optimising cooling-tower operation, improving drift eliminators, and refining condenser cleaning schedules. Maintain high recovery rates in RO/EDI systems and expand internal water reuse to reduce pressure on the Dargom Canal during prolonged dry periods.
- Robust Monitoring and Reporting Systems. Strengthen emissions monitoring through the CEMS platform and periodic third-party verification. Track key operational metrics (e.g., auxiliary fuel use, cooling-water consumption, leachate co-incineration performance) to support early detection of inefficiencies and drive continuous improvement in GHG-management practices.
- Climate-Resilient Infrastructure and Operating Procedures. Integrate climate resilience into the design and operation of the Project, including:
  - flood-proofing vulnerable equipment through elevation, sealing, and improved drainage;
  - heat-resilient ventilation and electrical-equipment cooling;
  - wind-resistant anchoring of outdoor structures and panels;
  - enhanced fire-prevention and smoke-intrusion controls during high-FFDI periods.
- Employee Training and Engagement. Deliver targeted training on climate-related risks (heat stress, flood response, wind safety), energy-efficient operations, and emissions-reduction practices. Reinforce staff awareness of water-saving requirements during high-stress periods and promote participation in internal sustainability initiatives.
- Operational Research and Performance Improvement. Allocate resources to evaluate opportunities for efficiency gains across key systems, such as flue-gas treatment optimisation, ash-handling process enhancements, and improvements to leachate-incineration stability. Pilot tests and small-scale trials will be used to validate operational upgrades before wider deployment.
- Stakeholder and Institutional Collaboration. Maintain active communication with local communities, regulators, and environmental organisations to incorporate feedback on climate-risk management and water-use practices. Collaboration with national agencies will help align the Project with Uzbekistan’s broader low-carbon transition and waste-management policy goals.
- Regular Review and Adaptive Management. Periodically review and update mitigation measures to reflect changes in climate projections, regulatory expectations, operational performance, and technological developments. Lessons learned during construction and early operations will be incorporated into long-term climate-resilience planning.

5.5 REPORTING

SUS is dedicated to fostering transparency, accountability, and active engagement with the internal and external stakeholders regarding climate change risk management efforts. SUS recognizes the importance of providing clear and accessible information to stakeholders, including regulatory bodies, communities, investors, and the public, with the commitment to reporting embodied by the following principles:

- Emissions Disclosure: SUS commits to providing comprehensive, accurate, and up-to-date information on SUS’s greenhouse gas (GHG) emissions. This includes regular reporting of emissions data, broken down by emission source, fuel type, and operational phase. SUS’s

emissions reports will align with international reporting standards and frameworks, ensuring consistency and comparability.

- Climate Resilience Reporting: SUS will communicate its strategies and actions to enhance climate resilience. This will include information on risk assessments, adaptation measures, and progress in building climate-resilient infrastructure.
- Mitigation Progress: SUS will report on the progress and impact of its mitigation measures aimed at reducing GHG emissions. This includes updates on energy efficiency improvements, renewable energy integration, and any carbon capture and storage (CCS) initiatives.
- Stakeholder Engagement: SUS commits to engaging with stakeholders to gather input, share information, and address concerns related to its climate risk management efforts. SUS will actively seek feedback from local communities, environmental organizations, and regulatory authorities.
- Compliance and Regulatory Reporting: SUS will comply with all relevant climate-related regulations and reporting requirements. SUS's commitment includes timely and accurate submissions to regulatory bodies and authorities.
- Accessibility: SUS's public reports will be easily accessible to all stakeholders. SUS will utilize digital platforms, its Company's website, and other channels to ensure broad access to information.
- Periodic Updates: SUS will provide regular updates on its climate change risk management progress. This will enable stakeholders to track SUS's achievements, identify areas for improvement, and gauge its alignment with global climate goals.
- Engagement Forums: SUS will host engagement forums and public consultations to facilitate dialogue with communities and stakeholders. These forums will serve as platforms for discussing climate-related matters and addressing concerns.
- Continuous Improvement: SUS commits to continuously improving its reporting practices. Feedback from stakeholders will be valued and considered in refining SUS's reporting processes and content.

SUS's reporting commitments reflect its dedication to transparency and responsible corporate citizenship. By openly sharing information on SUS's climate change risk management activities, SUS aims to build trust, foster collaboration, and contribute to a sustainable and resilient future. SUS will ensure that its stakeholders are well-informed about SUS's efforts to address climate change risks and seize opportunities for a low-carbon future.

APPENDIX A-1 DEFINITIONS OF ALL CLIMATE HAZARDS INCLUDED WITHIN THIS ASSESSMENT

Climate Hazard	Definition	Climate Indicator Used to Represent that Climate Hazard
Extreme Heat	Extreme heat is defined as a period of time when temperatures are much hotter and/or more humid than long-term averages. Because some places are hotter than others, this depends on what's considered average for a particular location at that time of year (WMO, 2021).	**Warm Spell Duration Index (WSDI)**: The annual number of days contributing to unusually warm events where six or more consecutive days experience a maximum temperature (TX) of greater than the 90th percentile of the historical averages for that time of year. ***Baseline & Projections:*** - ***Baseline period***: 1985-2014 - ***Unit:*** Days - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
		Highest Daily Maximum Temperature: The annual maximum daily temperature (the absolute maximum temperature projected at any time across a year). ***Baseline & Projections:*** - ***Baseline period***: 1985-2014 - ***Unit:*** Celsius ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
		Number of Heat Stress Days: Number of days when the apparent temperature is above 35°C. Apparent temperature measures how heat is perceived by humans, accounting for air temperature, humidity, and wind speed. ***Baseline & Projections:*** - ***Baseline period***: 1985-2014 - ***Unit:*** Days ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
Extreme Cold	Extreme cold is defined as a period of time when temperatures are much colder than long-term averages. Because some places are colder than others, this depends on what's considered average for a particular location at that time of year (WMO, 2021).	**Number of Frost Days (FD):** The number of days when minimum temperatures (TN) are below or equal to 0°C. This indicator can be used to assess a location's exposure to low temperatures and risk from frost formation. ***Baseline & Projections:*** - ***Baseline period***: 1985-2014 - ***Unit:*** Annual

Climate Hazard	Definition	Climate Indicator Used to Represent that Climate Hazard
		- ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
		Lowest Daily Minimum Temperature: The annual minimum daily temperature low (the absolute minimum temperature projected at any time across a year). ***Baseline & Projections:*** - ***Baseline period****:* 1985-2014 - ***Unit:*** Celsius ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
Riverine Flooding	Riverine flooding can occur over a wide range of river and catchment systems. Floods in river valleys occur mostly on flood plains or wash lands as a result of flow exceeding the capacity of the stream channels and spilling over the natural banks or artificial embankments (WMO, 2011). High levels of rainfall and increased flow velocity often contribute to river flooding events.	**Fluvial flooding inundation depth:** The maximum inundation depth associated with a 1-in-500-yr undefended fluvial flood event within a 150m radius of the site. ***Baseline & Projections:*** - ***Baseline year****:* 2020 - ***Unit:*** Metres - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
Extreme Rainfall Flooding	Extreme rainfall flooding occurs where high-intensity rainfall exceeds the capacity of the drainage systems. Intense rainfall over the urban area may cause flooding of streets and property in low-lying areas, in old waterways, underpasses and depressions in highways. Often such flooding is exacerbated by debris that clogs inlets to pipes and channels, or outlets of retention basins (WMO,	**Pluvial flooding inundation depth:** The maximum inundation depth associated with a 1-in-500-yr defended pluvial flood event within a 150m radius of the site. ***Baseline & Projections:*** - ***Baseline period****:* 2020 - ***Unit:*** Metres - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)

Climate Hazard	Definition	Climate Indicator Used to Represent that Climate Hazard
	2011).	**1-in-500-year maximum 1-day precipitation:** The maximum amount of rainfall to fall across 1 day, associated with a 1-in-500-year return period. ***Baseline & Projections:*** ***Baseline period**:* 2020 - ***Unit:*** Millimetres - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
		1-in-500-year maximum 5-day precipitation: The maximum amount of rainfall to fall across 5 days, associated with a 1-in-500-year return period. ***Baseline & Projections:*** ***Baseline period**:* 2020 - ***Unit:*** Millimetres - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
Coastal Flooding	In coastal areas, storm surges caused by tropical cyclones, tsunamis or rivers swollen by exceptionally high tides can cause coastal flooding. Storm surges and high winds coinciding with high tides are the most frequent cause of this type of flooding. The surge itself is the result of the raising of sea levels due to low atmospheric pressure (WMO, 2011).	**Coastal flooding inundation depth:** The maximum inundation depth associated with a 1-in-500-yr defended coastal flood event within a 150m radius of the site. ***Baseline & Projections:*** - ***Baseline year:*** 2020 - ***Unit:*** Metres - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
Wind Gust	The maximum instantaneous wind speed recorded at the standard reference height of 10 meters above ground level. A wind gust is a sudden, brief increase in wind speed, typically measured as a 3-second average peak within a specific observation period (WMO, 2011). It is the primary meteorological factor for assessing transient wind loads on building structures and operational safety.	**Wind Gust:** The maximum instantaneous wind speed recorded at the standard reference height of 10 meters above ground level, typically measured as a 3-second average peak within in an hour. ***Baseline & Projections:*** - ***Baseline period**:* 1940-2026 (ERA5 Reanalysis) - ***Unit:*** m/s
Rainfall-	Landslides are local events and usually	**Rainfall-Induced Landslide Index**

Climate Hazard	Definition	Climate Indicator Used to Represent that Climate Hazard
Induced Landslides	unexpected. They occur when earthquake, heavy rain, rapid snow, ice melt or an overflowing crater lake loosens vulnerable parts of the landscape on steep slopes, resulting in large amounts of earth, rock, sand or mud flowing swiftly down slope. Hillsides or mountain sides that are bare or have had their vegetation cover degraded through clearance or by forest or brush fires may be especially at risk. They can reach speeds of over 50 km/h and can bury, crush or carry away people, objects and buildings (WMO, 2021). The Climate Impact Platform focuses on assessing the risk of climate driven landslides, i.e., extreme rainfall.	**(RILI):** The annual number of days with a potential chance of a rainfall-induced landslide event. This index is developed using antecedent rainfall index (weighted summation of daily rainfall amounts) and landslide susceptibility (based on slope, faults, geology, forest loss, and road networks). ***Baseline & Projections:*** - ***Baseline period:*** 1985-2014 - ***Unit:*** Days - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
Wildfires	A wildfire is categorized as such by any unplanned and/or uncontrolled vegetation fire, including management-ignited vegetation fires that exceed the restrictions in the fire plan and require suppression actions (UN, 2021).	**Historical Maximum burned area:** The historical maximum area that has been burned by any fire type within a 30 km^2 area. ***Baseline & Projections:*** - ***Baseline period:*** 1989-2018 - ***Unit:*** Square Kilometres (km^2) - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
		Forest Fire Danger Index (FFDI): The annual number of days characterised by climatic conditions conducive to wildfires. This index is based on the McArthur Forest Fire Danger Index (FFDI; widely used in Australia for several decades; McArthur (1967)) and combines a record of dryness, based on rainfall and evapotranspiration rate, with meteorological variables for wind speed, temperature, and humidity. ***Baseline & Projections:*** - ***Baseline period:*** 1985-2014 - ***Unit:*** Number of days with fire-permitting climatic conditions ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)
Water Stress	Water stress is typically defined by	**Water Stress Index:** Water stress

Climate Hazard	Definition	Climate Indicator Used to Represent that Climate Hazard
& Drought	water availability and use. Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use (EEA, no date). Drought is a prolonged dry period in the natural climate cycle that can occur anywhere in the world. It is a slow-onset phenomenon caused by a lack of rainfall (WMO, 2021).	measures the ratio of total water withdrawals to available renewable surface and groundwater supplies. Water withdrawals include domestic, industrial, irrigation, and livestock consumptive and non-consumptive uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. ***Baseline & Projections:*** - ***Baseline period:*** 1960-2014 - ***Unit:*** Categorical - ***Future time horizons***: 2030s (2015-2044), 2050s (2035-2064)

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APPENDIX B Stakeholder Engagement Plan

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APPENDIX B Stakeholder Engagement Plan

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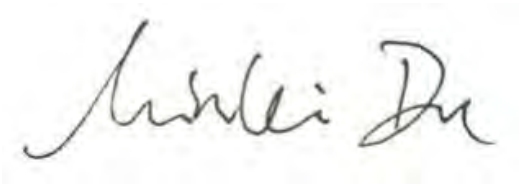

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
AIDs	Acquired Immunodeficiency Syndrome
AoI	Area of Influence
CHS	Community Health Safety
CSOs	Civil Society Organizations
CLO	Community Liaison Officer
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction
EP4	Equator Principles (Version 4)
ERM	ERM (Shanghai) Limited
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FGDs	Focus Group Discussions

Acronyms	Description
GBV/GBVH	Gender-based Violence/ Gender-Based Violence and Harassment
GM	Grievance Mechanism
GIIP	Good International Industry Practice
HIV	Human Immunodeficiency Virus
ICP	Informed Consultation and Participation
IFC	International Finance Corporation
KIIs	Key Informant Interviews
KPI	Key Performance Indicator
MIGA	Multilateral Investment Guarantee Agency
NGOs	Non-governmental Organizations
OGMs	operational-level Grievance Mechanisms
OHS	Occupational Health and Safety
PSs	Performance Standards
SEAH	Sexual Exploitation, Abuse, and Harassment
SEE	State Environmental Expertise
SEP	Stakeholder Engagement Plan
STI	Sexually Transmitted Infections
UNGPs	United Nations Guiding Principles
WBG	World Bank Group

1. INTRODUCTION

This Stakeholder Engagement Plan (SEP) provides a summary of the stakeholder engagement activities undertaken during the Project Environment and Social Impact Assessment ("ESIA") process. This includes a description of the stakeholder mapping, the consultation undertaken during the ESIA, and an overview of the key issues raised by stakeholders during the ESIA phase, as well as an outline of stakeholder engagement activities that should be undertaken in future by the Project Owner during Project construction and operation phases.

1.1 OVERVIEW

SUS Environment (hereinafter as "SUS", "Project Owner" or the "Client") is a company which specializes in waste-to-energy (WtE) and circular economy practices. Since 2014, SUS has provided integrated municipal solid waste management services to numerous cities worldwide.

In 2025, SUS invested in a WtE project (hereinafter as "the Project") in Samarkand, Uzbekistan, to promote a cleaner environment and improve public health for future generations, as well as to support Uzbekistan's transition to a green economy. It is the only WtE project officially designated as a "city landmark" in Uzbekistan.

Located 10 km southwest of downtown Samarkand, Uzbekistan, the Project occupies a total area of approximately 8 ha and comprises of a WtE plant with a treatment capacity of 1,500 t/d and an annual electricity generation capacity of 371.4 million kWh. The Project also includes a 600m 110-kV transmission line and a 300m 10-kV transmission line for power output and supply, respectively. The Project is being developed by a local entity of SUS, "SUS ENVIRONMENT SAMARKAND" FE LLC (the "Project Company").

1.2 OBJECTIVES AND SCOPE OF THE STAKEHOLDER ENGAGEMENT PLAN

The SEP is designed with the aim of providing a platform for consultation and information sharing with all Project stakeholders on the environmental and social impacts throughout all phases of its development. The purpose of this SEP is to ensure a consistent, representative, and culturally appropriate approach to engagement with interested and potentially affected stakeholders in the context of developing and operating the Project.

The specific objectives for stakeholder engagement are to:

- Identify stakeholders and communities potentially affected by the proposed Project;
- Introduce the Project to relevant stakeholders, and inform relevant stakeholders about the Project, including the planned and current Project activities;
- Engage with the potentially affected communities, groups and individuals to understand their views, concerns and perceptions, including potential impacts and appropriate mitigation measures;
- Inform the type and scope of stakeholder engagement undertaken throughout the Environmental and Social Impact Assessment (ESIA) process and the planned Project activities;
- Comply with the local engagement requirements as well as the MIGA Environmental and Social Performance Standards (PSs) and EP4 requirements; and
- Establish and implement an effective Grievance Mechanism for the impacted communities.

The SEP is applicable to the entire Project cycle. The SEP is a living document and will be updated throughout the course of the Project life based on the emerging needs and patterns.

1.3 STRUCTURE OF THE SEP

Following this introduction chapter, the remainder of the SEP is organized as follows:

- Chapter 2 Applicable Standards and Requirements. It outlines key host country legislation, international guidelines regarding stakeholder engagement, and Good International Industry Practice (GIIP), as well as SUS's Management Procedure that the Project needs to follow.
- Chapter 3 Stakeholder Identification and Mapping. It identifies the Project stakeholders and their interests and influence.
- Chapter 4 Stakeholder Engagement Overview. It sets out consultation activities conducted by the Project to date and planned engagement activities to be undertaken.
- Chapter 5 Stakeholder Engagement Plan. It provides a description of proposed stakeholder engagement activities, including a timetable showing when these activities should occur.
- Chapter 6 Grievance Mechanism. It provides details of the Grievance Mechanism.
- Chapter 7 Monitoring and Reporting. It describes monitoring and reporting measures to ensure success of the SEP.
- Chapter 8 Roles and Responsibilities. It assigns responsibilities of implementing this SEP to the department or personnels responsible.

1.4 LIMITATIONS

Direct engagement with the Mugat waste pickers has been prohibited by both the local authorities and the Samarkand City Landfill. Accordingly, a detailed stakeholder engagement strategy will be developed once access to and direct engagement with the Mugat waste pickers are permitted, to ensure the approach is appropriate and well-informed.

2. APPLICABLE STANDARDS AND REQUIREMENTS

Stakeholder engagement for the Project will comply with Uzbekistan national legislative requirements, SUS corporate policy on communication and stakeholder engagement, and international best practices, where feasible.

This chapter details the legal, regulatory, and company requirements pertaining to stakeholder engagement. It further outlines the standards for good international practices in stakeholder engagement which have informed the development of this document.

2.1 NATIONAL LEGISLATION

Relevant national and local legal requirements in terms of stakeholder engagement is summarised in below ***Table B2-1***.

TABLE B2-1 STAKEHOLDER ENGAGEMENT LAWS AND REGULATIONS

Laws and Regulations	Relevance to the Project
Constitution of the Republic of Uzbekistan (1992, amened in2023)	Article 40 states that everyone shall have the right, both individually and collectively, to submit applications, proposals, and to lodge complaints with competent state bodies and organizations, citizens' self-governing bodies, officials and public representatives. Such applications, proposals and complaints shall be considered in accordance with the procedure and within the time limit specified by law.
Law on Environmental Expertise, Environmental Impact Assessment and Strategic Environmental Assessment (2025)	Article 5 establishes that environmental assessment must be conducted in an open and transparent manner, enable public participation, and guarantee free and reliable access to relevant information
	Article 39 establishes that public hearings are mandatory for projects that may have a significant impact on the environment. It specifies that these hearings must be organized before the materials are submitted for the State Environmental Expertise (SEE).
	Article 40 mandates that a short summary of the project must be made available to local communities before the public stakeholder hearing takes place and the results of the discussions must be documented.
	Article 41 requires that the results of public hearing, including all received suggestions and objections, be published and formally considered by the State Environmental Expertise.
Law on Environmental Protection (1992, amended in 2024)	Article 12 states that citizens have the right to request and receive information on the state of natural environment and measures taken for its protection.

Laws and Regulations	Relevance to the Project
Law on Appeals of Individuals and Legal Entities (2014)	Article 3 regulates national-level formal grievance procedures for individuals and legal entities, whether submitted in written, oral, or electronic form.
	Article 10 sets fixed response timelines. General applications or complaints must be considered within 15 days of receipt; while the period for complex cases can be extended to one month, with notification to the applicant.
	Article 15 establishes appeal mechanisms for unsatisfactory decisions.
Law on Environmental Expertise (2024)	Article 40 mandates the investor to organize public hearings prior to the state environmental assessment, or Environmental Impact Assessment (EIA).
Urban Planning Code (2021)	Article 10 states that citizens and public associations have the right to reliable and timely information about the state of the environment and to participate in the discussion and adoption of decisions on urban planning activities.

2.2 INTERNATIONAL STANDARDS

In addition to national standards, the Project is committed to the international standards below.

2.2.1 MIGA PERFORMANCE STANDARDS ON ENVIRONMENTAL AND SOCIAL SUSTAINABILITY

MIGA's Performance Standards on Environmental and Social Sustainability, effective on October 1, 2013, provides guidance on how to manage environmental and social risks of a project. These eight standards provide comprehensive guidance for identifying, assessing, and mitigating risks and impacts throughout the project lifecycle, and include clear requirements for stakeholder engagement and disclosure. They serve as a key framework for planning and implementing engagement activities in alignment with sustainable development objectives.

MIGA's Performance Standards require clients to engage with Affected Communities through meaningful consultation and informed participation, scaled to the nature and magnitude of project risks and impacts. ***Table B2-2*** outlines the main requirements for consultation and informed participation under Performance Standard 1, the umbrella standard on the *Assessment and Management of Environmental and Social Risks and Impacts*.

TABLE B2-2 INTERNATIONAL REQUIREMENTS FOR PUBLIC CONSULTATION AND INFORMED PARTICIPATION

Aim	Build strong, constructive, and responsive relationships with stakeholders to manage environmental and social risks and impacts effectively.

	Ensure Affected Communities are informed and can participate in decisions that affect them.
Who to consult	Affected Communities (those directly impacted by the project).
	Disadvantaged or vulnerable groups within these communities.
	Other stakeholders with an interest in the project (e.g., authorities, NGOs).
When to consult	Early in the process of identifying environmental and social risks and impacts.
	Continuously throughout the project lifecycle as risks and impacts arise.
	At key stages: planning, implementation, monitoring, and when material changes occur.
What to consult	Purpose, nature, and scale of the project.
	Duration of activities.
	Potential risks and impacts on communities.
	Proposed mitigation measures.
How to consult	Provide prior disclosure of relevant, transparent, and accessible information.
	Use culturally appropriate language and formats.
	Feed into decision making process including proposed mitigation, benefit sharing and opportunities.
	Be responsive to stakeholder concerns and grievances.
	Ensure inclusivity (men, women, vulnerable groups).
	Avoid manipulation, coercion, or intimidation.
	Document the process and outcomes.
	For significant impacts: conduct Informed Consultation and Participation (ICP), ensuring iterative dialogue and incorporation of community views.

* Where engagement relies substantially upon a community /association representative, the client will aim to ensure that the views of affected communities are communicated, and that the results of consultation are communicated back to the community/ association.

MIGA Performance Standard 1 requires special attention to disadvantaged or vulnerable groups during stakeholder engagement. These include individuals or groups who, due to factors such as gender, age, ethnicity, physical or mental disability, poverty, or social status, may be more adversely affected by project impacts or have limited ability to access project benefits. The engagement process must therefore incorporate differentiated measures to ensure these groups can participate effectively and are not disproportionately impacted, while enabling them to share in development opportunities.

2.2.2 EQUATOR PRINCIPLES

The Project will also follow the guidance of the Equator Principles Version 4 (EP4), which references the social and environmental sustainability policies and guidelines of the IFC and on

the World Bank Group (WBG) Environmental Health, and Safety Guidelines (EHS Guidelines). The EP4 emphasizes that lenders will seek to ensure that the Project is developed in a manner that is socially responsible and reflects sound environmental practices. The EPs were updated in 2020 (known as EP4). Principle 5 (Stakeholder Engagement) and Principle 6 (Grievance Mechanism) are relevant to stakeholder engagement.

Principle 5 specifies that:

- All category A and B projects must demonstrate effective stakeholder engagement as "an ongoing process in a structured and culturally appropriate manner with affected communities, workers, and, where relevant, other stakeholders"[1];
- Projects with potentially significant adverse impacts on affected communities must conduct an Informed Consultation and Participation process, which must be free from "external manipulation, interference, coercion and intimidation"[2]. This implies the client should tailor consultations based on:
    - The risks and impacts of the Project;
    - The Project's phase of development;
    - The language preferences of the affected communities;
    - Affected communities' decision-making processes; and
    - The needs of disadvantaged and vulnerable groups.
- In accordance with the risks and impacts of the Project, the Proponent should make the appropriate assessment documentation available, and inform stakeholders about environment and social risks as well as adverse impacts to affected communities and relevant stakeholders early in the process, on an ongoing basis and in a culturally appropriate manner; and
- The Proponent must take into account and document all results of engagement processes, including actions agreed upon during consultations.

Meanwhile, Principle 6 specifies:

- All category A and, as appropriate, category B projects are required to establish effective Grievance Mechanisms designed to receive and facilitate resolution of concerns and grievances about the project's environmental and social (E&S) performance;
- Grievance Mechanisms should be to scale with the risks and impacts of the Project and affected communities and workers should be informed during the stakeholder engagement process; and
- They should be designed to resolve concerns promptly, use understandable and transparent consultative process, be culturally appropriate, readily accessible and at no cost, as well as guarantee no retribution to the party that originated the issue of concern.

[1] Equator Principles 4 (2020), Principle 5.

[2] Ibid.

2.3 GOOD INTERNATIONAL INDUSTRY PRACTICES (GIIP)

2.3.1 STAKEHOLDER ENGAGEMENT

The IFC's Stakeholder Engagement Good Practice Handbook[3] lays out good international industry practices for stakeholder engagement. It defines stakeholder engagement as a broad, inclusive, and continuous process between a company and those potentially impacted that encompasses a range of activities and approaches and spans the entire life of a project. The Handbook highlights the importance of engaging early on, proactively building relationships with stakeholder before problems arise, adopting a long-term view, tailoring the process to fit project needs and managing stakeholder engagement as a business function with clear objectives, timetable, budget and allocation of responsibilities.

Further guidance on good international industry practice is found in the Environmental and Social Management System Implementation Handbook (2015)[4], which outlines the nature of stakeholder engagement recommended for different steps of the Environmental and Social Impact Assessment process and gives specific guidance on public consultations, participatory techniques and stakeholder analysis, qualitative and quantitative methods, team composition, and reporting to stakeholders.

2.3.2 GRIEVANCE MECHANISM

The IFC Good Practice Note on Addressing Grievance from Project-Affected Communities (2009)[5] provides guidance on key principles of a good Grievance Mechanism, process steps to implement such mechanisms, and resources needed to manage a Grievance Mechanism. It details good practice processes for such mechanisms, including grievance receipt and recording, registration of grievances, keeping track of grievances, complaints assessments and results, preliminary response, and final response.

The IFC Good Practice Note on Addressing Grievances from Project-Affected Communities (2009) highlights the importance of accessible, transparent, and timely grievance resolution.

Table B2-3 outlines best practices for Grievance Mechanism according to the IFC Good Practice Note.

TABLE B2-3 SUMMARY OF IFC GOOD PRACTICE NOTE FOR GRIEVANCE MECHANISM

Best Practice	Implementation
Clear Grievance Channels	Establish multiple, easy-to-access grievance submission methods

[3] Stakeholder Engagement: A Good Practice Handbook for Companies doing Business in Emerging Markets & Subsequent Case Studies (2007). Available at: https://www.ifc.org/wps/wcm/connect/affbc005-2569-4e58-9962-280c483baa12/IFC_StakeholderEngagement.pdf?MOD=AJPERES&CVID=jkD13-p [Accessed in December 2021]

[4] IFC Environmental and Social Management System Implementation Handbook – General (2015). Available at: https://www.ifc.org/wps/wcm/connect/4c41260d-1ba8-4d10-a77d-f762d60a1380/ESMS+Handbook+General+v2.1.pdf?MOD=AJPERES&CVID=nzhmupn [Accessed in December 2021]

[5] IFC Good Practice Note on Addressing Grievance from Project-Affected Communities - A Guidance for Projects and Companies on Designing Grievance Mechanisms (2009). Available at: https://www.scribd.com/fullscreen/21356198?access_key=key-d387qdvel3wbc9nnmxk [Accessed in December 2021]

Best Practice	Implementation
Timely Response	Acknowledge complaints within 5 working days and resolve urgent issues within 30 days.
Confidentiality and Protection	Ensure complainants face no retaliation for raising concerns
Monitor and improve	Regular evaluate grievance resolution effectiveness and refine process accordingly

United Nation Guiding Principles (UNGPs) define operational-level Grievance Mechanisms (OGMs) as being "accessible directly to individuals and communities that may be adversely impacted by a business enterprise." The UNGPs list the key principles of any system to provide remedy, summarized in ***Table B2-4***.

TABLE B2-4 UNGP EFFECTIVENESS DEFINITION

No.	Effectiveness Principle	UNGP Definition
1.	Legitimate	Enabling trust from the stakeholder groups for whose use they are intended, and being accountable for the fair conduct of grievance processes;
2.	Accessible	Being known to all stakeholder groups for whose use they are intended, and providing adequate assistance for those who may face particular barriers to access
3.	Predictable	Providing a clear and known procedure with an indicative time frame for each stage, and clarity on the types of process and outcome available and means of monitoring implementation
4.	Equitable	Seeking to ensure that aggrieved parties have reasonable access to sources of information, advice and expertise necessary to engage in a grievance process on fair, informed and respectful terms
5.	Transparent	Keeping parties to a grievance informed about its progress, and providing sufficient information about the mechanism's performance to build confidence in its effectiveness and meet any public interest at stake
6.	Rights-compatible	Ensuring that outcomes and remedies accord with internationally recognized human rights
7.	Source of continuous learning	Drawing on relevant measures to identify lessons for improving the mechanism and preventing future grievances and harms
8.	Based on engagement and dialogue	Consulting the stakeholder groups for whose use they are intended on their design and performance, and focusing on dialogue as the means to address and resolve grievances

2.3.3 RETALIATION AGAINST PROJECT AFFECTED STAKEHOLDERS

The IFC's *Good Practice Note for the Private Sector: Addressing the Risks of Retaliation Against Project Stakeholders* offers essential guidance for private sector entities. It emphasizes the significance of preventing retaliation against project stakeholders who voice concerns, raise grievances, or participate in monitoring activities. The note provides detailed strategies and approaches to identify, assess, and manage retaliation risks. It covers aspects such as establishing clear policies against retaliation, promoting a culture that encourages open communication, and ensuring effective channels for stakeholders to report incidents without fear. Additionally, it outlines the importance of conducting regular reviews and taking corrective actions to strengthen the protection of stakeholders from retaliation.

TABLE B2-5 SUMMARY OF IFC *GOOD PRACTICE NOTE FOR THE PRIVATE SECTOR: ADDRESSING THE RISKS OF RETALIATION AGAINST PROJECT STAKEHOLDERS*

Best Practice	Implementation
Clear Anti-Retaliation Policies	Develop and publish comprehensive policies explicitly prohibiting retaliation against stakeholders.
Safe Reporting Channels	Set up multiple confidential and easily accessible ways for stakeholders to report suspected retaliation.
Training and Awareness	Provide regular training to employees on anti-retaliation policies and the importance of protecting stakeholders.
Investigation and Remedy	Promptly investigate all reports of retaliation, take appropriate disciplinary actions against perpetrators, and offer remedies to affected stakeholders.
Monitoring and Review	Continuously monitor the effectiveness of anti-retaliation measures and regularly review and update policies and procedures based on feedback and emerging risks.

2.4 SUS MANAGEMENT PROCEDURE

SUS ENVIRONMENT SAMARKAND FE LLC has formulated a *Stakeholder Engagement Plan and Grievance Mechanism Management Procedure ("The Procedure")*. The Procedure outlines its scope of application, relevant responsibilities, guiding principles, stakeholder engagement methods, and grievance handling processes (i.e., the Grievance Mechanism, GM).

The grievance mechanism (GM) accepts concerns related to project construction, such as noise, environmental pollution, delayed payments, and wage protection for migrant workers. All grievances submitted through any channel are acknowledged and responded to within seven (7) working days. The grievance-handling department screens submissions within three (3) working days to confirm whether the submitted grievances fall within scope and whether materials are complete; complainants are informed of acceptance or rejection. Once a grievance is accepted, an investigation team is formed within five (5) working days to conduct a factual, objective assessment through document review, site inspections, interviews, and evidence collection. The investigation process ensures that both the complainant and the subject of the complaint are heard. In addition, the team will prepare an investigation report with recommended actions within five (5) working days. The grievance-handling department then issues a resolution within three (3) working days and provides feedback to the

complainant through appropriate channels. A dedicated gap analysis and suggested improvement in GM is provided in Chapter 6.

This Stakeholder Engagement Plan (SEP, this document) builds upon and elaborates on the existing *Stakeholder Engagement Plan and Grievance Mechanism Management Procedure*, with engagement design and measures that align with international standards.

3. STAKEHOLDER IDENTIFICATION AND MAPPING

The objective of stakeholder identification is to establish which organizations and individuals may be directly or indirectly affected (positively and negatively) by, or have an interest in, the Project. Stakeholder identification is an on-going process, involving regular review and the updating of the stakeholder register as the Project proceeds. The following sections will provide an overview of stakeholder groups that were identified for the purpose of ESIA development and consultation. A stakeholder mapping exercise is undertaken to identify key stakeholder groups and organizations.

3.1 STAKEHOLDER IDENTIFICATION

According to MIGA PS1, stakeholder identified for inclusion in engagement activities must meet at least one of the following criteria:

- Have an interest in the Project.
- Would potentially be impacted by or have an influence on the Project (negatively or positively); and/or and
- Could provide commentary on issues and concerns related to the Project.

The mapping exercise draws on the work experience of the consultants (ERM and BIK, ERM's local partner), including knowledge and understanding of the local context and recommendations from other stakeholders.

Table B3-1 presents an overview of the main stakeholder groups of relevance to the Project as per engagement conducted during the ESIA Field Survey.

TABLE B3-1 STAKEHOLDER CATEGORY LIST

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
National government and agencies	Ministry of Ecology, Environmental Protection and Climate Change	(71) 207-07-70 (71) 207-11-07	100043, Bunyodkor ave, Chilanzar district, Tashkent.	Ministry of Ecology of Uzbekistan is responsible for developing and implementing state policies on nature conservation, rational use of natural resources, and climate change. The Project EIA approval and transmission line construction are issued and approved by the Ministry of Ecology of Uzbekistan.	High	High
	Ministry of Employment and Poverty Reduction	(71) 203-01-30 (71) 200-06-00	100100, 8 Nukus Street, Mirobod District, Tashkent.	Ministry of Employment and Poverty Reduction formulates national policies on employment, labor market development. vocational skills programs, and poverty reduction. These mandates are relevant to the Project's labor recruitment strategy and the design of livelihood-related measures for vulnerable groups.	High	Low
	Ministry of Energy	(71) 231-81-18	100047, 21 Istiqbol Street, Tashkent.	Ministry of Energy of Uzbekistan regulates the production, transmission, distribution, and consumption of electric and thermal energy, coal, oil, and gas. It formulates Law on	High	Low

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				Renewable Energy that the Project should follow.		
	Ministry of Construction and Housing and Communal Services	(71) 210-11-04	111900, 14 Babur Street, Yukorichirchik district, Tashkent	Ministry of Construction and Housing and Communal Services is responsible for enforcing the Law on Drinking Water Supply and Wastewater Discharge and Urban Planning Code that the Project needs to follow.	High	Low
	Ministry of Health	(71) 203-15-19	100011, 4 Navoi Street, Tashkent.	Ministry of Health is responsible for preserving the health of all citizens and it formulates and enforces national public-health, disease-prevention, sanitary-epidemiological, and health-facility standards. These mandates are relevant to the Project with respect to community health and safety, occupational health requirements for the workforce and its emergency medical preparedness.	High	Low
	Ministry of Transport	(71) 241-72-01 (71) 202-05-00	100128, 3 Zulfiyahonima Street, Tashkent.	Ministry of Transport is responsible for the development and implementation in the field of metropolitan transport, among others. One of its core functions is to develop transport and	High	Low

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				road management and transport safety investigations. During the construction phase and operation phase, the Project will rely heavily on public road networks and generate heavy-vehicle movements, which would interact with national road grid.		
	Ministry of Culture	(55) 502-33-77 (55) 502-33-75	100519, 107b, Amir Temur Street, Tashkent.	Ministry of Culture is responsible for formulating and enforcing national policies on culture, art, and the protection of tangible and intangible cultural heritage. Its mandate on preserving and enhancing national cultural and spiritual heritage requires the Project to ensure that no cultural heritage sites are adversely impacted by Project activities.	Low	Low
	Ministry of Water Resources	(71) 202-47-48 (71) 202-47-00	100187, Building 11, Karasu 4th Street, Mirzo-Ulugbek District, Tashkent.	Ministry of Water Resources is responsible for enforcing the Code of Water that aims to achieve and maintain sustainable water supply for the population, economic sectors and ecological systems. Updates on water-resources legislation, such as requirements for abstracting water or industrial water usage may affect the	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				construction and operation of the Project. It authorizes the permit for special use of water of special consumption of water to the Project.		
	National Agency for Social Protection	(71) 202-06-00	17 Amir Temur Avenue, Mirobod District, Tashkent.	National Agency for Social Protection is mandated to coordinate and deliver comprehensive and integrated social-protection services nationwide, including social assistance, disability assessment and services, protection of vulnerable groups. During Project construction and operation, the Project may involve and engage with vulnerable groups. This requires the alignment with the implementation of social protection and provision of social services of National Agency for Social Protection.	High	Low
	Waste Management and Circular Economy Development Agency	(71) 207-32-23	7A Bunyodkor Street, Chilanzar District, Tashkent.	The Waste Management and Circular Economy Development Agency is established under the Ministry of Ecology, Environmental Protection and Climate Change. It is responsible for organizing the collection, transportation, and disposal of waste across the country, as well as	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	**Contact Details**	**Address**			
				implementing systemic reforms in the field of waste management. These mandates align with the Project's reliance on regulated waste flows, making it an institution the Project must coordinate with. The Project also rents land from the Waste Management and Circular Economy Development Agency.		
Regional Government Bodies	Samarkand Regional Government Hotline: 0 (366) 230-42-70			Regional Government is responsible for the implementation of legislation, development plans and policies at the regional level. Local Government may also have a role in issuing permits and processing applications associated with the Project.		
	Department of Ecology, Environmental Protection, and Climate Change	(66) 229-37-77	27, Gagarina street, Samarkand City	The Regional Department of Ecology, Environmental Protection, and Climate Change conducts mandatory site verification and inspections and is responsible for the oversight of local public hearings.	High	High
	Department of Construction and Housing and Communal Services	(66) 232-09-41	1B, Kuksaroy Square, Samarkand City.	The Regional Department of Construction and Housing and Communal Services oversees the regional implementation of construction-sector regulations and standards, supervises building	High	Low

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				permitting and compliance inspections and coordinates housing and communal utilities planning at regional level. The Project and its auxiliary facilities must comply with regional construction controls and inspection regimes.		
	Department of Employment and Poverty Reduction	(66) 233-23-96 (66) 233-04-57	1A, Ko'k-Saroy Square, Samarkand.	The Regional Department of Employment and Poverty Reduction is responsible for implementing national labor-market and poverty-reduction policies at the regional level. It influences the availability of labor markets, and the coordination of training or employment initiatives linked to major investments in the region. Any revisions to regional employment policies or poverty-reduction policies may influence the Project's recruitment and the design of livelihood restoration measures.	High	High
	Zarafshan Irrigation Systems Basin Department	(78) 210-08-93	70, Gargarin Street, Samarkand City.	Zarafshan Irrigation Systems Basin Department is the regional office of water resources ministry. It is responsible for water resources	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				management, including allocation and monitoring of irrigation water. The Project abstracts water from the Dargom Canal, which is part of the irrigation infrastructure under the Department's jurisdiction.		
	Department of Transport	(66) 233-71-12	140108, house 69, Amir Temur Street, Samarkand City.	The Samarkand Regional Department of Transport oversees the regional implementation of national transport policies and standards, including planning and regulation of road transport, and traffic safety management. The construction phase and operation phase will generate heavy-vehicle movements and utilize nearby road connections. Updates to regional transport regime, such as traffic management requirements on oversize or overweight vehicles, will affect the Project's logistics planning.	High	Low
	Department of Culture	(91) 558-39-16	140100, 1 house, Kok-Saroy Square, Samarkand City.	The Samarkand Regional Department of Culture is responsible for implementing national culture and cultural-heritage policies at the regional level, such as coordinating on the protection and management of	Low	Low

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				tangible and intangible cultural heritage at regional level. Its function is relevant to the Project in relation to ensuring that any unforeseen cultural heritage within Project's AoI is identified and protected.		
	Department of Health	(66) 234-99-36	94 Mirzo Ulugbek Steet, Samarkand.	The Samarkand Regional Department of Health is responsible for implementing national health and sanitary policies at the regional level, including oversight of healthcare facilities, disease surveillance, environmental health monitoring, and emergency medical preparedness. The Project's construction and operation may generate risks on community health and safety, and on occupational health and safety from including air-quality impacts, noise, dust, potential odor emissions and others. The department may need to allocate additional staff to supervise or inspect the construction and operation of the Project.	High	Low

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
	Samarkand Regional Department, National Agency for Social Protection Regional Office	(66) 240-81-63	174 Rudakiy Street, Samarkand City.	The Samarkand Regional Office of the National Agency for Social Protection implements national social-protection policies at the regional level, including administration of social assistance programs for low-income households, disability assessment and benefits, social services for vulnerable groups. During stakeholder engagement activities, the Project would need to identify and support vulnerable groups and follow the assistance protocols to mitigate livelihood impacts to those who are most affected.	High	Low
	Regional Department of Waste Management and Circular Economy Development Agency	(55) 706-96-68	140157, 1, Kuksoroy Street, Samarkand.	The Regional Department of the Waste Management and Circular Economy Development Agency is responsible for the implementation of national policies on waste management, recycling, and circular-economy development at the regional level. It coordinates activities in the field of waste management and waste disposal facilities. It operates the Samarkand Landfill which will be closed after the operation of the Project.	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	**Contact Details**	**Address**			
District-level Government Bodies	General hotline for Samarkand City: (66) 233-20-90; Inquiry email: info@samshahar.uz			**The District Administration** is responsible, in general, for: promoting the economic and social development of the District, the quality of life of citizens, basic public services such as education, health, culture, sports, recreation and tourism, water and energy supply, basic sanitation and waste management, as well as the road network, the energy network and public lighting, building maintenance and wastewater management, civic and community education of citizens, social welfare services, parking, traffic and public transport.		
	City Mayor Office	(0366) 235-01-80;	140129, 59, Abdurahmon Jamiy street, Samarkand City.	The Samarkand City Mayor's Office (Hokimiyat) is the primary local government authority responsible for municipal governance, urban development, service coordination, and oversight of public infrastructure at the city level. The design and development of the Project need to coordinate on land-use decisions, transportation system, and align with local urban development priorities.	High	High
	Department for Ecology and Climate Change	N/A	N/A	The Samarkand City Department for Ecology and Climate Change is responsible for the protection of nature and air quality in the city. It acts as the immediate local field office and	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				conducts and presents in the Project's public hearing.		
	Department of Sanitary-Epidemiological Well-being and Public Health	(99) 455-83-83	83, Mirzo Ulugbek Street, Samarkand City.	The Department of Sanitary-Epidemiological Well-being and Public Health in Samarkand City is responsible for public-health surveillance, enforcement of sanitary and epidemiological norms, environmental-health monitoring, and oversight of disease prevention at the city level. During the construction and operation phase of the Project, public health risks may be induced, such as air emissions, dust, noise, odor and others. This requires close collaboration between the Project and the Department.	High	High
	Samarkand City Environmental and Ecological Protection Inspection	(98) 142-17-71	N/A	Samarkand City Environmental and Ecological Protection Inspection is responsible for monitoring and enforcing compliance with environmental protection requirements at the city level, including oversight of air emissions, waste management practices, dust and noise control. The construction and operation of the	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				Project need to align with local environmental regulations and city-level ecological standards.		
	Samarkand City Culture Department	(90) 250-66-33	N/A	The Culture Department of the City of Samarkand is responsible for the protection, management, and oversight of tangible and intangible cultural heritage within the city, including local cultural sites, historical assets and cultural events. The Project needs to work closely with the Department to ensure that Project activities do not cause adverse impacts on the city's cultural heritage.	Low	Low
	Samarkand City Architecture and Construction Department	(66) 233-15-33	59, Aburahmon Djami Street Samarkand City.	The Samarkand City Architecture and Construction Department is responsible for architecture, urban planning and construction oversight in the project area. It operates within the national system of construction and urban development administration. The Project's layout needs to align with the architectural and construction standards.	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
	Samarkand City Department for Poverty Reduction and Employment Support	(90) 276-44-37	N/A	The Samarkand City Department for Poverty Reduction and Employment Support is responsible for implementing city-level programs on poverty reduction and employment services. The Project may collaborate with the Department on local hiring process and the identification of alternative employment.	High	High
	Cadastral Agency Samarkand City Department	(97) 399-94-44	N/A	The Cadastral Agency Samarkand City Department is responsible for maintaining the official land cadaster within the city, including registration of land plots and parcel boundary demarcation. For the Project, the Department may confirm land parcel boundaries and their legal land status.	Low	Low
Affected Communities	• Dustlik Mahalla • Navruz Mahalla • Sakhovat Mahalla • Urta Turkman Mahalla • Yoshlik Mahalla • Komalot Mahalla			Local mahallas face impacts of the Project such as noise, odor, and air emissions etc. Informational updates, community meetings, potential employment activities and access to the grievance mechanism should be accessible to community members.	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
Public Infrastructure and Services	International cemetery	N/A	JVX3+P2, Samarkand, Samarqand Region, Uzbekistan	The international cemetery is 500 meters away from the Project. Although it is not expected to experience direct physical impacts, it may be indirectly affected by construction-related activities such as increased traffic or temporary noise disturbances from vehicle movements or site works occurring nearby that could affect the dignity of the space.	Low	Low
	Markaziy chiqindixona (Samarkand City Landfill)	N/A	JVR7+QGJ, Samarkand, Samarqand Region, Uzbekistan	The Samarkand Landfill is around 400 meters away from the Project and is expected to be closed after the Project goes into operation.	Low	High
	City Clinical Hospital No.1	(91) 540-96-69	101 Mavze street Nurafshon, kimyogarlar Shaharchasi 29, Smarkand	This hospital is not located within the Project's AoI and is not expected to be affected by environmental impact. It serves as a primary medical source for Project workforce according to the Project Owner. Therefore, it is likely to experience the impacts from labor influx.	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
	Zarmed Hospital	(55) 702-10-63	140100, 16 Isayev Street, Samarkand City.	This hospital is not located within the Project's AoI and is not expected to be affected by environmental impact. It serves as a primary medical source for Project workforce according to the Project Owner. Therefore, it is likely to experience the impacts from labor influx.	High	High
	Tankviy Baza (military base)	N/A	JVG2+CQ5, Samarkand City.	It is located around 1.8 kilometers away from the Project and may experience indirect impacts such as increased traffic or noise during construction. Coordination may be required to ensure that Project activities do not interfere with military access, mobility, or security protocols.	Low	Low
	Military school	N/A	MV54+H3, Samarkand City.	It is located around 1.5 kilometers away from the Project and may be affected by air emissions from the Project operation.	Low	High
	Gas station	N/A	JVW3+MX, Samarkand City.	It is around 300 meters away from the Project and may experience noise and air emissions from Project construction and operation.	Low	Low

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
	Joint-stock company «National Electric Grid of Uzbekistan» Samarkand Branch	N/A	N/A	This company has been established as part of the Ministry of Energy, with its main activities including the operation and development of the main electric networks of the country, and the supply of electricity through the main electric networks. The Samarkand Branch Office is responsible for the operation and development of the main electric networks and electricity supply at the regional level. the Project will need to collaborate with the company on transmission line construction.	High	High
	Samarkand Regional Electric Networks Enterprise	(66) 233-03-42	151 Gagarina ko'chasi, Samarkand City.	The company will supply electricity to the Project during its construction phase.	High	High
	Hudugaz Samarkand LTD	(66) 239-78-11 (66) 239-78-27	15, Buyuk Ipak Yuli Street, Samarkand City.	The company manages gas network at the city and district level in Samarkand, together with the installation of gas supply networks, service and operation. It will supply gas to the Project if needed.	High	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
Nearby farms	Dilshod Agro Meros	N/A	JVR8+GV, Samarkand City.	This is a farm that produces orchard crops and seasonal vegetable. It is around 400 meters away from the Project and it may experience potential exposure to dust emissions and air pollutants, possible irrigation water availability and noise disturbance, all of which may pose an impact on its agricultural production.	Low	High
	Shoxrux Ferma	N/A	JVG8+3JG, Samarkand City.	This is a crop and vegetable farm. It is around 2 kilometers away from the Project and may experience potential exposure to dust emissions and air pollutants.	Low	High
	Orchard	N/A	MV38+66, Samarkand City.	It is around 1 kilometer away from the Project and may be affected by the Project's dust emissions and air pollutants.	Low	High
	Ooo "Dargom Parranda Fayz" Zone №5	(88) 913-72-82 (97) 317-77-73	JRRM+JQ, Samarkand City.	It is a poultry farm that is around 1.8 kilometers from the Project, and it may experience potential exposure to dust emissions and air pollutants, and noise disturbance, all of which could	Low	High

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				adversely affect its poultry production and corporate reputation.		
	Samarkand Eco Green Products L.L.C	(91) 545-46-56	Komalot Hall, Pastdargom District, Samarkand City.	This is an agricultural organization that is around 1.5 kilometers away from the Project. It may be indirectly affected by dust, air emissions, noise, and traffic disturbances during construction and operation.	Low	High
Nearby Companies	Taychan	N/A	MR5Q+JFJ Samarkand	This is a metal scrap dealer that is around 2 kilometers away from the Project. Apart from being affected by air and dust emissions from the Project, the metal scrap it collects may decrease after the landfill is closed.	Low	Low
	Absolut	(91) 525-10-01	Bus stop, Rural area, Samarkand City.	This is a toilet paper factory that is around 2 kilometers away from the Project and may experience noise, dust and air emissions.	Low	Low
	SMZ "SAMARQAND METALLURGIYA ZAVODI"	(99) 529-00-03	140100, массив, Samarkand City.	This is a steel manufacturer that is around 500 meters away. It may experience noise, dust and air emissions as well as traffic disturbance from the Project activities.	Low	Low

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
Contractors/ Subcontractors	Shandong Zijian Construction Group Co., Ltd.	86-0533-228-3667	53 Xingyuan E Rd, Zhangdian District, Zibo, Shandong, China, 255021.	Shandong Zijian is the Engineering, Procurement and Construction contractor (EPC) of the Project. It will be responsible for the design, procurement, and construction of the project.	High	High
Vulnerable Groups	• Women-headed households • People with disabilities • Low-income household[6] • The elderly[7] • People receiving social assistance[8] • Waste pickers[9]			Vulnerable or disadvantaged groups may be affected by the Project through their physical disability, social or economic standing, limited education, and/or lack of employment opportunities.	High	High
Project-related Company	Marrakand Obod	(66) 237-17-15	135 Firdavsi Street, Samarkand City.	This company is responsible for organizing waste collection services, vehicle operation, maintenance, and scheduling across the service area. It will be the	Low	Low

[6] Refers to those whose consumer spending less than UZS 669,000 per person per month.

[7] Refers to those who are 60 and above.

[8] *Moddiy yordam* — material (financial) assistance provided by the state to low-income or vulnerable groups of the population, including: Low-income families officially recognized as needing support; Elderly people without guardianship; Persons with disabilities; Single parents with children.

[9] Refers to those who work informally at the Samarkand City Landfill to collect and sell waste as the primary or supplementary livelihood. The waste pickers include community waste pickers and Mugat waste pickers.

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
				municipal solid waste supplier for the Project.		
NGO/ CSO	Zarafshan River Basin Protection			The Dargom Canal, where the Project abstract water from, is a critical hydraulic structure in the Zarafshan River Basin of Uzbekistan. The Zarafshan River Basin Protection focuses on improving the environmental situation and water-saving in the region.	Low	Low
	Global voices[10]			This is an international NGO that focuses on human rights. It publishes an article on local's concerns on grievance reprisals, transparency of the deals, public disclosure, and public health.	Low	Low
	Sabr			This NGO locates Samarkand and works on improving the socio-economic situations of the vulnerable groups.	Low	Low

[10] https://globalvoices.org/2015/10/24/can-uzbekistan-solve -its-waste-problem-with-chinese-incineration-plants/

Category	Stakeholder and Contact Details			Connection to the Project	Influence	Interest
	Organization/ Name	Contact Details	Address			
	Istiqbolli avlod			This NGO focuses on human dignity with a branch office in Samarkand.	Low	Low

3.2 STAKEHOLDER MAPPING

The following matrix ***(Figure B3-1)*** is used to map the stakeholders. The Stakeholder Matrix is a dynamic tool that should be periodically updated as and when interest and (or) influences of each stakeholder change over the Project implementation period. Depending on the level of interest and influence of the stakeholder, it is placed into one of the four quadrants. Each group of stakeholders requires different engagement strategies. This is a preliminary mapping and can be updated as the Project progresses into later stages of stakeholder engagement.

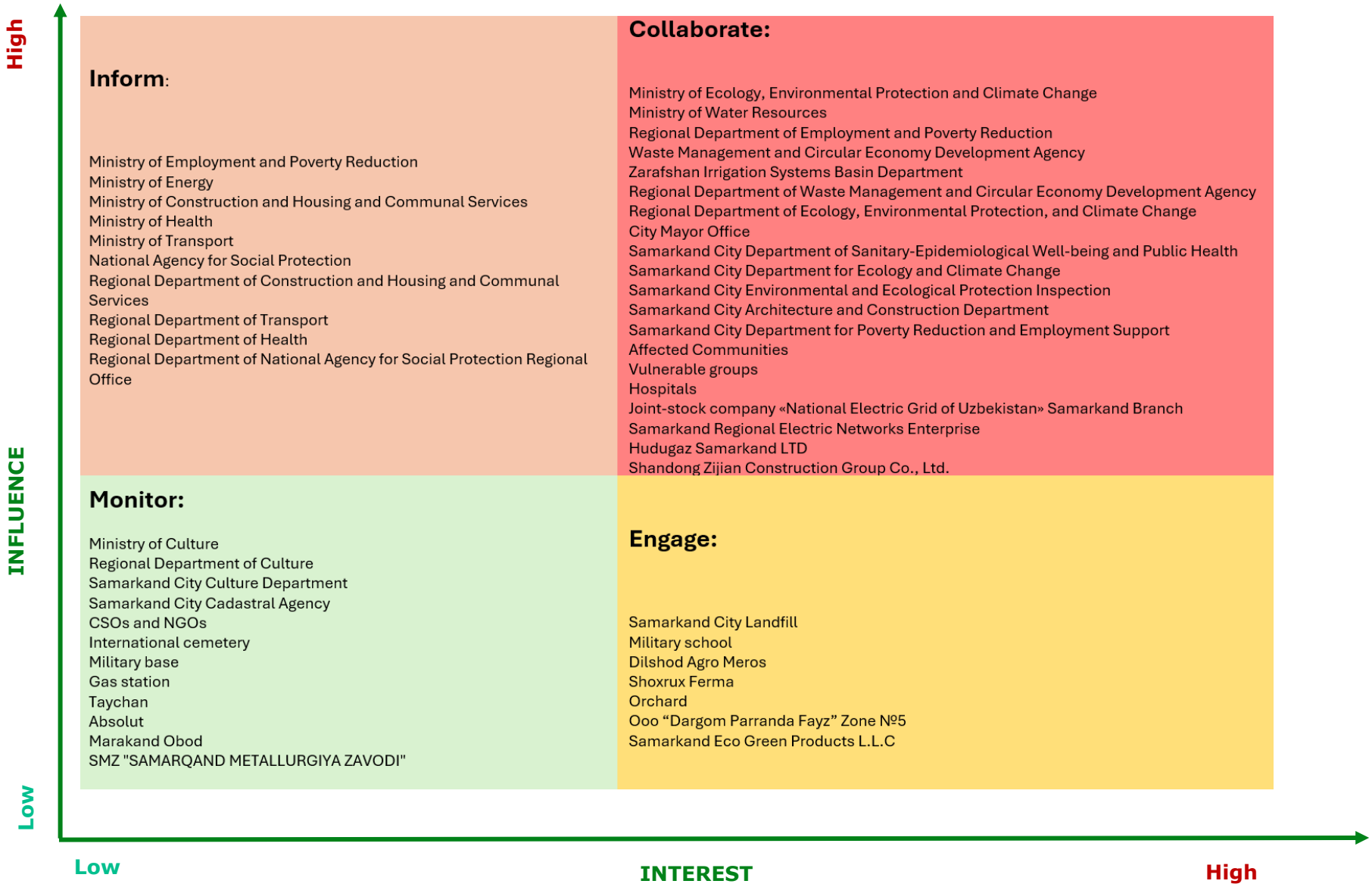
Key stakeholders will be then categorised and analysed according to their influence and interest in the Project and classified into four (4) groups to determine management actions: Informing, Collaborating, Monitoring and Engaging.

Depending on the results of the mapping, engagement strategies will be suggested specifically to each group. This includes:

- Collaborate / manage closely (high influence/high interest): The stakeholders should be managed closely. This includes regular engagement and consultation;
- Inform / Keep satisfied (high influence/low interest): The stakeholders should be engaged and consulted on issues of interest;
- Engage / Keep informed (low influence/high interest): The stakeholders should be kept informed and should be consulted on key interest areas; and
- Monitor (low influence/low interest): The stakeholders should be monitored and kept informed about the Project (e.g., through factsheets and media notifications).

At this stage, ERM envisages that the stakeholders most likely to be impacted or to be most influential in terms of the successful delivery of the Project are:

FIGURE B3-1 PROJECT STAKEHOLDER MAPPING



4. PREVIOUS STAKEHOLDER ENGAGEMENT OVERVIEW

4.1 LOCAL EIA CONSULTATION

As mandated by Article 39 of the *Law on Environmental Assessment, Environmental Impact Assessment and Strategic Environmental Assessment* (2025), all projects that may have a significant impact on the environment are required to conduct a public hearing. The purpose of the stakeholder engagement was to engage with key stakeholders and local community stakeholders and to collect concerns and feedback related to the Project.

During public hearing held on April 29 2025 for EIA, representatives of relevant authorities and stakeholders presented information on the Project background, scope, and environmental commitments. The Deputy Mayor of Samarkand introduced the national context of waste management and the legal basis for the Project, and provided information on the Project capacity, municipal solid waste supply arrangements, and electricity purchaser during operation. The Samarkand City Department for Ecology and Climate Change explained the public hearing procedures in accordance with applicable legal requirements, while the SUS representative presented the Project location, siting, and the company's commitments to control emissions, waste, noise, dust, gas, and wastewater in compliance with environmental and sanitary regulations under the supervision of relevant sanitary authorities. In addition, the Navruz chairperson expressed support for the project, noting that the company's activities will contribute to the development of the community, and resolutions from Navruz residents were presented during the hearing.

4.2 SCOPING STAGE CONSULTATION

During the scoping stage, stakeholder engagement activities were supported through the preparation and distribution of a Project flyer to provide stakeholders with accessible information on the Project (See ***Appendix B-4*** Project Flyer). In addition, a standardized cover statement introducing the Project and the purpose of stakeholder engagement was incorporated into the interview materials to ensure stakeholders were adequately informed prior to consultations.

The purpose of the stakeholder engagement was to engage key stakeholders to collect concerns and feedback on the Project (See ***Appendix B-5*** Interview Question List Cover Page). During scoping stage, engagement activities were held with government authorities, nearby farms and companies, and mahallas. Overall, stakeholders show a largely supportive attitude toward the Project, noting expected improvements in waste management, environmental conditions, and employment. Some stakeholders expressed cautious concerns, mainly about air emissions, traffic, and gas supply. This highlights a need for clear communication and appropriate mitigation measures. Brief interviews were conducted with waste pickers working on site to obtain a preliminary understanding of their circumstances.

Below table provides a summary of engagement results during scoping stage.

TABLE B4-1 SCOPING STAGE ENGAGEMENT SUMMARY

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
13 January 2026	Local Communities	Community Profiling	Navurz Mahalla	*Concerns:* • There may be potential environmental impacts, such as emissions, odors, waste handling, and possible effects on air quality. These impacts were considered as potential and manageable. *Expectations:* • The Project would improve local social infrastructure, landscaping and enhance living conditions; • The Project would boost employment which should be prioritized in local hiring; • The Project would address existing problems with waste collection and disposal and enhance waste management capacities and bring a cleaner environment; • The Project would create opportunities for selling locally produced goods and services related to the Project; • Stakeholders noted the need for the Project to provide social support and assistance, particularly in addressing local social needs; • It was suggested to maintain transparent communication and prompt response to complaints through an effective grievance mechanism; • The Project would improve the reliability and quality of electricity supply.
			Yoshlik Mahalla	
14 January 2026			Dustlik Mahalla	
			Shakovat Mahalla	
			Urta Turkman Mahalla	
9 February 2026			Komalot Mahalla	
13 January 2026		Focus Group Discussions	General public	*Concerns:* • The respondents expressed concerns related to gas supply, specifically its potential decrease due to the Project's potential gas consumption.

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
				Expectations: • The Project could provide social support to the local community; • It was suggested to establish regular communication and cooperation between the Project representatives and the community.
12 January 2026	Government Authorities	Key Informant Interviews	Department of Ecology, Environmental Protection, And Climate Change	*Concerns:* • It was noted that the issue of dioxin emissions from WtE projects remained under consideration; • Air emissions from incineration may impact public health, if not properly handled; • The construction and operation of the Project plant may increase traffic volumes due to the additional Project-related vehicles, which could affect the existing traffic flow during peak traffic time. *Expectations:* • It was suggested to ensure compliance with allowable emission thresholds for dioxins and other hazardous pollutants and considering prevailing wind directions to minimize exposure risks to nearby communities; • The Project operation would contribute to improved environmental cleanliness and increase public awareness and responsibility regarding compliance with environmental norms and waste management requirements;
			Samarkand City Khokimiyat	
			Employment and Poverty Reduction Department of Samarkand City	
			Department of Health of Samarkand City	
			Department of Architecture and Construction of Samarkand Region/City	
9 February 2026			The Cadastre Department	

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
				• The Project would contribute to the creation of new jobs and support the growth of household incomes in the city; • The Project would help to improve the city's social infrastructure; • The Project would enhance the systematic management and treatment of municipal solid waste, thereby reducing uncontrolled disposal, minimizing odor generation, and mitigating associated public health risks. • It was suggested to comply with health and sanitary requirements, conduct regular health awareness and information sessions, and implement vaccination measures in accordance with national health regulations; • It was suggested to arrange waste transportation and other Project-related heavy vehicle movements during off-peak/night hours, specifically between 22:00 and 08:00; • It is recommended that the Project implement traffic safety and mitigation measures, including the installation of pedestrian crossings, traffic lights, street lighting, and roadside greenery (tree planting); • It was suggested to organize regular information and consultation sessions with local communities in accessible and neutral venues; • It was recommended to apply modern emission control technologies and conduct strict environmental monitoring
12 January 2026	Nearby farm		Ooo "Dargom Parranda Fayz" Zone №5	<u>*Concerns:*</u> • Air emissions could potentially be directed toward the farm, depending on the wind directions and the operation of the Project;

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
				• The construction and operation of the Project may affect its reputation and product sales, mainly due to public perceptions associated with waste incineration. *Expectations:* • It was suggested to provide clear information, technical explanations, and transparency regarding emission controls and environmental safeguards.
12 January 2026	Nearby company		SMZ "SAMARQAND METALLURGIYA ZAVODI"	*Concerns:* • The Project may cause cumulative air quality impacts, depending on its operational characteristics and emission controls. • Project construction and operation may increase road congestion and potentially contribute to indirect air emissions and noise from vehicles. *Expectations:* • It is considered necessary and beneficial, particularly in terms of environmental improvement and better waste management; • It was understood that SMZ will expand its cold-rolled and coated steel sheets capacity. However, details of its expansion remain unknown as the request to its local EIA has been denied; • It was emphasized to install effective air filtration and emission control systems to protect workers' health.
13 January 2026	Waste pickers	Brief On-Site Interview	Waste pickers	Interviews focused on understanding the demographic profile, livelihood practices, and working conditions of waste pickers to inform ESIA stage engagement. Waste pickers did not raise specific concerns or express views on the Project at this stage.

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
14 January 2026	Government Authorities		Head of Samarkand City Landfill	Interview focused on understanding overall landfill operations and the dynamics of informal waste picking activities from both community waste pickers and Mugat waste pickers. From the discussion, a general insight was gathered into waste management and the landfill operation. Additionally, the request to interview Mugat waste pickers was denied. No specific concerns or views on the Project were raised during the interview.

4.3 ESIA STAGE CONSULTATION

The purpose of undertaking stakeholder consultation at ESIA stage is to ensure that project impacts are accurately identified, understood, and addressed through meaningful community and institutional input. It allows stakeholders to share local knowledge, express concerns and expectations, and contribute to refining project design and mitigation measures. Consultation at this stage strengthens transparency and trust, helps identify vulnerable or disproportionately affected groups, and supports early risk management.

Similar to scoping stage, project flyers were distributed to stakeholders during FGDs and KIIs to disseminate Project information with a standardized cover statement to present the purpose of the engagement.

ERM together with its local partner BIK conducted the site visit for the ESIA stage consultation in February 2026 with a breakdown of consultation results provided in below table.

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
8 February 2026	Nearby Company	Key Informant Interview (KII)	Taychan	No concerns nor expectations were raised during the interview.
	Nearby farm		Dilshod Agro	*Concerns:* • The Project may potentially affect soil fertility, if dust emissions and air pollutants are not properly controlled; • The Project may affect irrigation water availability if abstracting from the canal, especially in dry seasons; • Potential noise during operational phase from machinery, transport or daily operation. *Expectations:* • Tree planting was recommended as a preventive measure.
9 February 2026	Public Infrastructure		Hospitals: • Zarmed Hospital • City Clinical Hospital No.1	*Concerns:* • There may be potential technogenic illness or an increase in seasonal diseases if environmental and sanitary standards are not properly maintained; • Possible release of carbon monoxide and other harmful emissions into the atmosphere; • Language barrier in case of foreign worker's medical treatment. *Expectations:* • Modern filtration system was recommended to protect public health; • It was recommended to provide a translator or an interpreter to assist medical treatment of foreign workers.

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
	Government Authorities		Samarkand City Cadastral Agency	The interview focused on clarifying land use status and planning relevant to the Project, particularly for the water pipeline/pump areas and the electricity transmission line area. It helped establish the institutional perspective on land administration, the existing land use framework, and the agency's understanding of the land categories relevant to the Project's key infrastructure components. No concerns or expectations were raised during the interview.
7 February 2026 7-9 February 2026	Local communities	Focus Group Discussions (FGDs)	Dustlik Mahalla • Women • Youth	*Concerns:* • Participants expressed concerns related to environmental issues, particularly potential impacts on air quality; • It was highlighted that the Project should not negatively affect the environment or public health. Particular attention was given to potential air pollution and the need for compliance with environmental standards. *Expectations:* • The Project would create employment opportunities, improve road conditions, and help address electricity supply issues, as well as help to reduce the amount of accumulated waste; • The Project would help to improve overall socio-economic conditions in the mahalla; • The Project would create additional employment opportunities for women and youth; • It was recommended to initiate training courses on women's professional skills and qualifications; • It was suggested to build a sports hall; • It was highlighted to follow strict emission control and apply modern filtration technologies to prevent negative effects on public health and the environment.
9 February 2026			Komalot Mahalla • Women • Youth	*Concerns:* • It was emphasized to prevent unpleasant odors and environmental pollution during construction and operation; • The Project would cause potential impacts on the atmosphere, and that air emissions could affect environmental quality and public health;

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
				Expectations: • The Project would bring more job opportunities for the youth; • It was suggested to follow strict emission control and apply effective filtration systems to prevent air pollution; • It was suggested to build a polyclinic to enhance access to healthcare services, a kindergarten near or within the school area, and a sports playground.
7 February 2026			Navruz Mahalla • Women • Youth	*Concerns:* • The Project would cause potential noise pollution during the operational phase and impact nearby living conditions; • Participants were concerned about the presence and effectiveness of air filtration systems. *Expectations:* • The Project would help to improve sanitation conditions and reduce accumulated waste, and enhance regional development by generating stable electricity; • It was recommended to prioritize employment opportunities for local youth, including both permanent positions and temporary jobs during operation; • It was suggested to build textile workshop, a sports ground/stadium and to help upgrade transformers.
9 February 2026			Sakhovat Mahalla • Farmer • Youth	*Concerns:* • The Project would improve overall sanitary conditions, which could have a positive effect on nearby agricultural land; • The Project should not deteriorate air quality or overall environmental conditions in the area.

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
				Expectations: • The Project would create more job for the local residents; • It was highlighted that the Project comply with environmental standards, maintain transparency in its operations, and ensure ongoing communication with the local community to promptly address potential issues; • The Project would improve overall sanitary conditions, which could have a positive effect on nearby agricultural land; • It was suggested to build a green buffe zone consisted of trees to control the spread of dust and potential emission, as well as improve the local microclimate; • It was suggested to install effective filtration systems to prevent negative impacts on the environment and nearby agricultural land; • It was suggested to build a sports hall and develop recreational areas along the Dargom Canal.
7 February 2026			Urta Turkman Mahalla • Women • Youth	*Concerns:* • Participants expressed concerns about the potential environmental impact of the Project and emphasized the importance of ensuring it does not negatively affect the environment or public health; • There may be noise pollution during the operational phase; • Participants expressed concerns about potential chemical emissions and highlighted the need to strictly control and minimize harmful emissions protect public health and the environment. *Expectations:* • The Project would create employment opportunities for women and youth; • The Project would contribute to socio-economic development and infrastructure improvement; • It was suggested to build a kindergarten and a shuttle bus for workers to ensure safe and convenient transportation to and from the workplace.

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
7-9 February 2026		Household Survey (a total 104 households were interviewed)	General Community Households (93 households were interviewed under this category)	*Concerns:* • There may be air emissions and related health risks; • The Project may impact domestic or irrigation water resources from its water consumption; • There may be unpleasant odors; • The Project may produce solid waste issues during construction; • There may be a loss of vegetation or degradation of the greenery; • There may be potential noise pollution during construction and operation; • The Project may cause traffic disruption or increase vehicle movement; • Participants also expressed safety concerns linked to possible accidents, spread of disease or conflicts from labor influx, and loss of income. *Expectations:* • The project would boost employment, especially for women and youth; • The Project would help infrastructure development and enhance sanitation and public health conditions; • The Project may contribute to the growth of tourism; • It was recommended to install effective and advanced filtration system.
			Community waste pickers (11 households were interviewed under this category)	*Concerns:* • The Project may cause air emission which could impact public health; • The Project would cause loss of income and vegetation cover; • There may be unpleasant odors and noise pollution during construction or operation; • There may be impact on domestic or irrigation water resource from the Project's water consumption. *Expectations:* • The Project would boost employment and enhance infrastructure development;

Date	Stakeholder Type	Activities	Stakeholder Involved	Key Concerns and Expectation Raised
				• There would be improvement of sanitation conditions and public health.

5. STAKEHOLDER ENGAGEMENT PLAN

5.1 STAKEHOLDER ENGAGEMENT PRINCIPLES

Interaction with stakeholders in terms of establishing and constantly maintaining constructive relationships throughout the Project implementation is important. Interaction with stakeholders includes a wide range of activities and approaches, from information exchange to consultation and engagement.

In its activities, the Project is guided by good international practices, including the following principles which are to be implemented commensurately to the Project context:

- Providing meaningful information in a format and language that is understandable to the relevant stakeholder(s) and responsive to their needs.
- Providing information prior to consultation and decision-making.
- Respect for local traditions, languages, timelines and decision-making procedures.
- Two-way dialogue allows both sides to exchange views and information, listen to the other side, communicate their problems and collaborate for a solution.
- Providing for a wide range of opinions, including opportunities for women, vulnerable people and / or minorities to speak out.
- Free of intimidation and coercion.
- Ensure cultural appropriateness through special care given to the form and manner in which information is communicated; and
- Adopting Right-based approach into grievance protocols and engagements.

5.2 STAKEHOLDER ENGAGEMENT STRATEGIES

To secure and maintain its social license to operate, the Project will adopt a transparent, inclusive, and proactive approach to stakeholder engagement throughout its construction and operational phases. The Project acknowledges that long-term success depends not only on regulatory compliance, but also on building mutual trust and constructive relationships with affected communities, local authorities, and other relevant stakeholders.

The Project's stakeholder engagement strategy is designed to ensure that all parties with an interest in or potentially affected by the Project are regularly informed, consulted, and engaged in a culturally appropriate and accessible manner. This includes establishing two-way communication mechanisms and addressing concerns and grievances in a timely and responsive way.

5.2.1 CONSTRUCTION STAGE ENGAGEMENT

Stakeholder engagement will be carried out during this stage with nearby communities, vulnerable groups and other interested parties of the Project on an on-going basis.

The main objectives of stakeholder engagement at this stage is to:

- Disclosure of the final ESIA;
- Grievance redressing and monitoring activities;

- Disclosure of Project workforce / labor management to include local workforce requirement and recruitment process;
- Provision of information on the construction activities i.e., schedule / progress to the nearest affected communities in advance; and
- Regular coordination and reporting related to the implementation of environmental and social management and monitoring plan.

Table B5-1 presents the summary of proposed stakeholder engagement plan during the construction phase of the Project.

TABLE B5-1 CONSTRUCTION STAGE STAKEHOLDER ENGAGEMENT

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
Affected communities • Dustlik Mahalla • Navruz Mahalla • Sakhovat Mahalla • Urta Turkman Mahalla • Yoshlik Mahalla • Komalot Mahalla **Vulnerable groups** • Women-headed households • Low-income people • People with Disabilities • People receiving social assistance • The elderly • Waste pickers	• Disclose draft ESIA and NTS(non-technical summary), including potential environmental, health and social impacts and the proposed mitigation measures, in particular potential impact to community health and safety and socio-culture, and the draft ESIA will be disclosed upon finalization and the duration for disclosure as well as the channels for publication will be agreed between SUS and the Lenders; • Inform Project's commitment to environmental and social management and monitoring; • Inform of risks of Community Health Safety (CHS) due to labor influx and Gender-based violence (GBV) prevention policy; • Share information related to construction activities, including but not limited to potential impacts on the local utilities and resources; type and duration of work; transportation arrangements and road accessibility; number of workers involved employment and procurement opportunities; • Share information related to risk and safety regarding: ◦ Traffic safety; ◦ STIs, including HIV/AIDS; • Disclose, discuss Project's grievance mechanism, and redress the grievances received from stakeholders, inform	*Approach:* • Consultation • Collaboration; and • Information Dissemination. *Tools:* • Public meetings; • Focus Group Discussion (FGD) and (or) one-on-one meeting; • Emails; • Risk and awareness trainings; • Posters or bulletins; • Social media; and • Project Grievance Mechanism.	SUS	Quarterly during construction phase. Disclose draft ESIA for 120 days For • Samarkand Regional Electric Networks Enterprise, • Joint-stock company «National Electric Grid of Uzbekistan» Samarkand Branch, • Marakand Obod, and • Hududgaz Samarqand, engage upon request. For NGO representatives, engage only when necessary.

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
	women about the Project's gender policy and its grievance mechanism in simple visuals, infographics or flowcharts; • Engage nearest MFYs (e.g., Navruz mahalla, Komalot mahalla) to determine the optimal timing and schedule for construction works with noise. • Disclose the intention, process, way, and quota of the use of the local resources and consult local communities about the potential impacts on the local utilities and resources; • Provide advance notice to residents and strictly adhere to the agreed construction schedule to minimize disturbance. **<u>For waste pickers at general level</u>**: • General disclosure of the Project ESIA and ESMP will involve dissemination of information on the Project impact, the livelihood restoration measures and rational behind the livelihood restoration measures to mahalla heads, and Samarkand City Kykohimiats and all other stakeholders. • Focus Groups with the waste pickers, including the sample waste pickers that were present for the household-level surveys.			
Public infrastructure and services • International cemetery • School • Samarkand City Landfill	• Disclose the intention, process, way, and quota of the use of the local resources and consult local communities about the potential impacts on the local utilities and resources;			

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
• Hospitals • Military base • Gas station • Samarkand Regional Electric Networks Enterprise • Joint-stock company «National Electric Grid of Uzbekistan» Samarkand Branch • Hududgaz Samarqand • Marakand Obod	• Inform Project's commitment to environmental and social management and monitoring; • Share information on construction activities that may affect access, safety, or service continuity; • Coordinate on traffic management, emergency response and possible interfaces; • Share information related to construction activities, including but not limited to type of work; duration of work; transportation arrangements and road accessibility; and number of workers involved employment and procurement opportunities; • Disclose, discuss Project's grievance mechanism, and redress the grievances received from stakeholders.			
Nearby farms • Dilshod Agro Meros • Shoxrux Ferma • Orchard • Ooo "Dargom Parranda Fayz" Zone №5 • Samarkand Eco Green Products L.L.C	• Disclose draft ESIA and NTS(non-technical summary), including potential environmental, health and social impacts and the proposed mitigation measures, in particular potential impact to community health and safety and socio-culture, and the draft ESIA will be disclosed upon finalization and the duration for disclosure as well as the channels for publication will be agreed between SUS and the LendersShare information on construction activities that may affect access, safety, or service continuity, including construction traffic schedules, movement of heavy traffic, temporary utilities disruption, and activities generating dust and noise;			

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
	• Disclose, discuss Project's grievance mechanism, and redress the grievances received from stakeholders; • Inform Project's commitment to environmental and social management and monitoring.			
Nearby companies • Taychan • Absolut • SMZ "SAMARQAND METALLURGIYA ZAVODI"	• Disclose draft ESIA and NTS(non-technical summary), including potential environmental, health and social impacts and the proposed mitigation measures, in particular potential impact to community health and safety and socio-culture, and the draft ESIA will be disclosed upon finalization and the duration for disclosure as well as the channels for publication will be agreed between SUS and the Lenders; • Share information on construction activities that may affect access, safety, or service continuity, including construction traffic schedules, movement of heavy traffic, temporary utilities disruption, and activities generating dust and noise; • Disclose, discuss Project's grievance mechanism, and redress the grievances received from stakeholders; • Inform Project's commitment to environmental and social management and monitoring.			

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
NGOs and CSOs • Zarafshan River Basin Protection • Global voices • Sabr • Istiqbolli avlod	• Disclose draft ESIA and NTS(non-technical summary), including potential environmental, health and social impacts and the proposed mitigation measures, in particular potential impact to community health and safety and socio-culture, and the draft ESIA will be disclosed upon finalization and the duration for disclosure as well as the channels for publication will be agreed between SUS and the Lenders; • Disclose, discuss Project's grievance mechanism, and redress the grievances received from stakeholders.			
Government bodies • Ministry of Ecology, Environmental Protection and Climate Change; • Ministry of Employment and Poverty Reduction; • Ministry of Energy; • Ministry of Construction and Housing and Communal Services; • Ministry of Health; • Ministry of Transport; • Ministry of Culture • Ministry of Water Resources; • National Agency for Social Protection; • Waste Management and Circular Economy Development Agency;	• Disclose draft ESIA and NTS(non-technical summary), including potential environmental, health and social impacts and the proposed mitigation measures, in particular potential impact to community health and safety and socio-culture, and the draft ESIA will be disclosed upon finalization and the duration for disclosure as well as the channels for publication will be agreed between SUS and the Lenders; • Provide information on construction activities per request (including but not limited to construction activities and durations, transportation schedule, number of workers involved, contractor office location and accommodation arrangements, water and electricity consumption data) and ensure compliance with regulatory requirements;	*Approach:* • Consultation • Collaboration; and • Information Dissemination. *Tools:* • Face-to-Face Meetings; • Letters; and • Emails.		

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
• Samarkand Regional Department of Ecology, Environmental Protection, and Climate Change • Samarkand Regional Department of Construction and Housing and Communal Services; • Samarkand Regional Department of Employment and Poverty Reduction; • Zarafshan Irrigation Systems Basin Department; • Samarkand Department of Transport; • Samarkand Regional Department of Health; • Samarkand Regional Department of Culture; • Samarkand Regional Department of National Agency for Social Protection; • Samarkand Regional Department of Waste Management and Circular Economy Development Agency; • Samarkand City Mayor Office; • Samarkand City Department for Ecology and Climate Change • Samarkand City Department of Sanitary-Epidemiological Well-being and Public Health; • Samarkand City Environmental and Ecological Protection Inspection; • Samarkand City Culture Department;	• Consult local authorities to ensure that information about available job opportunities is disclosed to local waste pickers in a timely and accessible manner; • Coordinate with relevant government authorities to provide tailored support and vocational training information for waste pickers; • Engage with relevant authorities to identify and provide available GBV support services and resources; • Report to local health government if any communicable disease spread is identified; • Inform relevant authorities of the details of grievance procedures and responsibilities, collaborate with relevant authorities to implement Grievance Mechanism in the case of appeal escalation.			

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
• Samarkand City Architecture and Construction Department; • Samarkand City Department for Poverty Reduction and Employment Support; • Samarkand City Cadastral Agency Department.				
Labor, Contractors and Other Labor Agencies	• Inform Project's commitment to environmental and social management and monitoring, including policies related to labor protection; • Inform Project GBV/SEAH Policy for all workers and provide corresponding training programs on gender topics to all workers, and inform all employees all available support services and resources related to GBV; • Consult workforce on concerns and views related to their working conditions and living conditions, particularly for those who reside in Project-provided worker camp; • Disclose, discuss, update and implement worker Grievance Mechanism and provide relevant periodic trainings; • Provide OHS training, including but not limited to toolbox talks and briefings on daily tasks, quality standards, and health and safety protocols to protect workers from potential hazards.	*Approach:* • Consultation • Collaboration • Information Dissemination *Tools:* • Face to Face meetings • Project Grievance Mechanism • Emails; • Social Meida; • Training programs including but not limited to occupational health and safety, labor rights, code of conduct, emergency response to occupational injuries; • Posters; and • Letters		

5.2.2 OPERATION STAGE ENGAGEMENT

Continuous stakeholder engagement will be carried out during this stage. To ensure adequate informed participation throughout the Project lifetime, relevant Project information shall be made available on the Project Company's website.

Table B5-2 presents a summary of the proposed stakeholder engagement during the operation phase of the Project.

TABLE B5-2 OPERATION STAGE STAKEHOLDER ENGAGEMENT

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
Affected communities • Dustlik Mahalla • Navruz Mahalla • Sakhovat Mahalla • Urta Turkman Mahalla • Yoshlik Mahalla • Komalot Mahalla	• Share final ESIA, NTS and any updates on Project developments or changes during operation; • Disclose, discuss, update and implement the Project Grievance Mechanism; • Engage with communities to collect residents' concern over the Project's impact during operation phase and provide timely feedback; • Disclose project performance on emission control, including but not limited to dust, odor and other gaseous pollutants; • Inform Project's commitment to environmental and social management; • Share recruitment plan and inform Project's commitment to prioritize local hiring; involve local leaders in recruitment; and disclose to the communities that the Project recruitment process will be transparent, independent, objective, free of conflict of interest and inclusive of local communities • Disclose data on water and electricity consumption and recycling to local communities and collect their concerns in this regard; • Periodically report and disclose the Project's positive contribution on the local economy and employment to communities.	*Approach:* • Consultation • Collaboration; and • Information Dissemination. *Tools:* • Open Day Visits; • Public meeting; Focus Group Discussion (FGD) and (or) One-on-one meeting; • Flyers and posters; • Social media; • Online websites; • Recreational infrastructure; • Project Grievance Mechanism.	SUS	Annually during operational phase; The duration of the final ESIA disclosure shall be established upon mutual agreement between SUS and the Lenders; For • Samarkand Regional Electric Networks Enterprise, • Joint-stock company «National Electric Grid of Uzbekistan» Samarkand Branch, and • Marakand Obod, and • Hudugaz Samarkand LTD, engage before operations starts;

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
Public infrastructure and services • International cemetery • Schools • Hospitals • Military base • Gas station • Samarkand Regional Electric Networks Enterprise • Joint-stock company «National Electric Grid of Uzbekistan» Samarkand Branch • Hudugaz Samarkand LTD • Marakand Obod	• Share final ESIA, NTS and any new Project developments or changes during operation; • Disclose, discuss, update and implement the Project Grievance Mechanism; • Collect concerns over the Project's impact during operation phase and provide timely feedback; • Inform Project's commitment to environmental and social management and monitoring.			For NGO and CSO representatives, engage with them only when necessary.
Vulnerable groups • Women-headed households • Low-income people • People with Disabilities • People receiving social assistance • The elderly • Waste pickers	• Share final ESIA, NTS and any new Project developments or changes during operation; • Disclose, discuss, update and implement the Project Grievance Mechanism, together with its procedures and responsibilities with understandable communication materials, accessible formats and inclusive channels; conduct periodic surveys and participatory evaluation to monitor the effectiveness of GM • Engage with communities to collect residents' concern over the Project's impact during operation phase and provide timely feedback; • Inform Project's commitment to environmental and social management and monitoring;			

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
	• Carry out separate discussion sessions on impacts from Project operation for vulnerable groups to ensure safe and open dialogue.			
Nearby farms • Dilshod Agro Meros • Shoxrux Ferma • Orchard • Ooo "Dargom Parranda Fayz" Zone №5 • Samarkand Eco Green Products L.L.C	• Share final ESIA, NTS and any new Project developments or changes during operation; • Disclose, discuss, update and implement the Project Grievance Mechanism; • Collect the owners' concern over the Project's impact during operation phase and provide timely feedback; • Inform Project's commitment to environmental and social management and monitoring; • Establish transparent and collaborative relationships with major water users.			
Nearby companies • Taychan • Absolut • SMZ "SAMARQAND METALLURGIYA ZAVODI"	• Share final ESIA, NTS and any new Project developments or changes during operation; • Disclose, discuss, update and implement the Project Grievance Mechanism; • Collect nearby companies' concerns over the Project's impact during operation phase and provide timely feedback; • Inform Project's commitment to environmental and social management and monitoring.			

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
NGO and CSO representatives • Zarafshan River Basin Protection • Global voices • Sabr • Istiqbolli avlod	• Share final ESIA, NTS and any new Project developments or changes during operation • Disclose, discuss, update and implement the Project Grievance Mechanism; • Inform Project's commitment to environmental and social management and monitoring.			
Government bodies • Ministry of Ecology, Environmental Protection and Climate Change; • Ministry of Employment and Poverty Reduction; • Ministry of Energy; • Ministry of Construction and Housing and Communal Services; • Ministry of Health; • Ministry of Transport; • Ministry of Culture • Ministry of Water Resources; • National Agency for Social Protection; • Waste Management and Circular Economy Development Agency; • Samarkand Regional Department of Ecology, Environmental Protection, and Climate Change; • Samarkand Regional Department of Construction and Housing and Communal Services; • Samarkand Regional Department of Employment and Poverty Reduction;	• Share final ESIA, NTS and any new Project developments or changes during operation; • Consult on concerns and views related to Project's environmental and social impacts. • Ensure compliance with regulatory requirements; • Disclose, discuss, update and implement the Project Grievance Mechanism; • Inform relevant authorities of the details of grievance procedures and responsibilities, collaborate with relevant authorities to implement Grievance Mechanism in the case of appeal escalation; • Collaborate with relevant authorities to ensure the continuity of water, electricity supply and services provided to mahallas; • Coordinate with the Samarkand Regional Waste Landfill Directorate to obtain updated information on current landfill employees, and follow up with government authorities such as the Regional	*Approach:* • Consultation • Collaboration; and • Information Dissemination. *Tools:* • Face-to-Face Meetings; • Site Inspections		Throughout the operation phase as required. The duration of the final ESIA disclosure shall be established upon mutual agreement between SUS and the Lenders;

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
• Zarafshan Irrigation Systems Basin Department; • Samarkand Department of Transport; • Samarkand Regional Department of Health; • Samarkand Regional Department of Culture; • Samarkand Regional Department of National Agency for Social Protection; • Samarkand Regional Department of Waste Management and Circular Economy Development Agency; • Samarkand City Mayor Office; • Samarkand City Department for Ecology and Climate Change; • Samarkand City Department of Sanitary-Epidemiological Well-being and Public Health; • Samarkand City Environmental and Ecological Protection Inspection; • Samarkand City Culture Department; • Samarkand City Architecture and Construction Department; • Samarkand City Department for Poverty Reduction and Employment Support; • Samarkand City Cadastral Agency Department.	Department of Waste Management and Circular Economy Development Agency in terms of the reemployment of the Samarkand City Landfill Workers and ensure transparent communication with employees and relevant government authorities to ensure smooth and faire transition; • Coordinate with relevant government authorities to provide tailored support and vocational training information for waste pickers; • Consult local authorities to ensure that information about available job opportunities is disclosed to local waste pickers in a timely and accessible manner; • Engage with the relevant government authorities to understand the livelihood transition measures for the Mugat waste pickers and legacy issues, if any, after the closure of Samarkand City Landfill; • Periodically report and disclose the Project's positive contribution on the local economy and employment to relevant government authorities.			
Labor, contractors and other labor agencies	• Inform Project's commitment to environmental and social	*Approach:*		

Stakeholder	Purpose of Engagement	Approach / Tools	Responsibility	Timeline
	management and monitoring, including policies related to labor protection and provide relevant periodic awareness trainings; • Inform Project's commitment to prioritize local workforce; • Update and implement worker Grievance Mechanism; • Inform workers about the on-site medical teams and provide training related to emergency plan in case of occupational injuries; • Provide OHS training, including but not limited to toolbox talks and briefings on daily tasks, quality standards, and health and safety protocols to protect workers from potential hazards.	• Consultation • Collaboration • Information Dissemination <u>*Tools:*</u> • Training programs including but not limited to occupational health and safety, labor rights, code of conduct, emergency response to occupational injuries; • Project Grievance Mechanism • Emails; • Social Meida; • Posters; and • Letters		

6. GRIEVANCE MECHANISM

Under MIGA Performance Standard 1, it requires that the Project establish a Grievance Mechanism designed to receive and resolve concerns and grievances from Affected Communities and other stakeholders promptly through a process that is transparent, culturally appropriate, and easily accessible at no cost and without fear of retribution. This mechanism should be scaled to the level of risks and adverse impacts associated with the project and must not restrict access to judicial or administrative remedies. It should be communicated to Affected Communities during stakeholder engagement to ensure they are aware of how to raise issues and seek resolution.

6.1 PURPOSE OF GRIEVANCE MECHANISM

Identifying and responding to grievances supports the development of positive relationships between the Project proponent and the communities, and other stakeholders. According to the IFC Performance Standards (2012) and MIGA Performance Standards (2013), a Grievance Mechanism should seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate and readily accessible, and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies.

BOX 1 KEY COMPONENTS OF AN EFFECTIVE GRIEVANCE MECHANISM

Simple and Culturally appropriate Process: It should be convenient to submit complaints. There should be several appropriate channels through which community stakeholders can submit complaints free of charge, and without retribution to the party that originated the issue or concern.

Simple Internal Procedure: A simple and consistent procedure is required to record grievances, identify those responsible for addressing them and ensure that they are resolved.

Staff Arrangements: Roles & responsibilities in the grievance management process to be defined and agreed.

Training: The launch or modification of the grievance management process should include internal induction and/or training for operational staff and a Community Representative.

A Set Timeframe: The grievance process should set a timeframe within which complainants can expect acknowledgement of receipt of grievance and a response and/or resolution of grievance.

Sign Off: Actions planned to resolve grievances considered to be of significant concern by the Grievance Officer should be signed off by a member of the senior management, suitably qualified to assess the effectiveness of the response.

System of Response: A clear system of response is required to identify who should respond to the complainant and how. Response to the complainant should be provided in a timely and transparent manner.

Appeal process: An appeal process with the involvement of third parties should be in place in case the complaint is not resolved to satisfaction of the party originating the grievance.

Disclosure: The Grievance Mechanism should be clearly and widely disclosed to affected communities.

Access to Legal Remedies: The mechanism should not impede access to judicial or administrative systems.

Monitoring Effectiveness: Mechanisms should be set in place for monitoring the effectiveness with which complaints are being recorded and resolved.

The Grievance Mechanism is designed to identify and manage issues throughout the entire Project lifecycle. Prior to the start of construction, the Grievance Mechanism should be fully established with a representative being appointed as the point of contact to address concerns.

Grievances may range from minor concerns to serious or long-term issues. They can be raised by individuals, groups, communities, organizations, or any other parties affected, or potentially affected, by the Project's social or environmental impacts. Such grievances may include specific complaints regarding harm or damage, concerns about Project activities, perceived incidents or impacts, or requests for additional information or clarification. All complainants must have an unrestricted right to submit their concerns freely and without fear of retaliation. Ensuring timely redress and resolution of grievances is essential for the effective and successful implementation of the Project.

From the commencement of construction, the Project has established and publicly disclosed a Grievance Mechanism to ensure that stakeholders have accessible and transparent channels to raise concerns related to project activities. The established GM has some gaps against international standards, and a gap analysis has been carried out and summarized in ***Appendix***

B-3. The below sections elaborate on how the existing GM will be strengthened to an enhanced GM.

6.1.1 OBJECTIVES OF ENHANCED GRIEVANCE MECHANISM

The enhanced Grievance Mechanism aims to address the gaps identified in the existing system and establish a more accessible, transparent, and inclusive platform for receiving, assessing, and resolving concerns raised by different categories of stakeholders. The key objectives of the enhanced GM are as follows:

- **Strengthen the Scope of Eligibility of the Grievance Mechanism**

This is to enhance the scope of eligibility and ensure all eligible groups understand their right to submit grievances and the types of issues that fall within the mechanism. This would improve transparency, reduce ambiguity, and ensure the GM can be applied consistently and compliantly across all stakeholder categories.

- **Integrate Gender-Responsive and Inclusive Approaches**

This is to ensure equitable participation and full inclusion of all stakeholders, by incorporating gender-sensitive procedures that enable women and other potentially underrepresented groups to safely and effectively access the Grievance Mechanism. This includes providing multiple culturally appropriate intake options, ensuring confidentiality, and establishing dedicated pathways for handling sensitive cases such as gender-based violence (GBV) and sexual exploitation, abuse, and harassment (SEAH).

- **Ensure Confidential, Anonymous, and Non-Retaliatory Reporting**

This is to introduce clear provisions that allow for anonymous submissions and to establish explicit anti-retaliation protections for all complainants. The enhanced GM will strengthen confidentiality measures, provide safe reporting channels, and clearly communicate that no individual will face adverse consequences for submitting a complaint or participating in the grievance process.

- **Introduce Culturally Appropriate, Transparent, and Predictable Procedures**

This is to ensure that the Grievance Mechanism is culturally appropriate, easily understood, and accessible to all community members. This includes designing procedures that reflect local norms, languages, and communication preferences.
The enhanced mechanism will also define clear escalation pathways, service standards, and decision-making procedures to ensure predictable and transparent resolution of grievances.

6.1.2 GRIEVANCE MECHANISM PROCESSES AND PROCEDURES

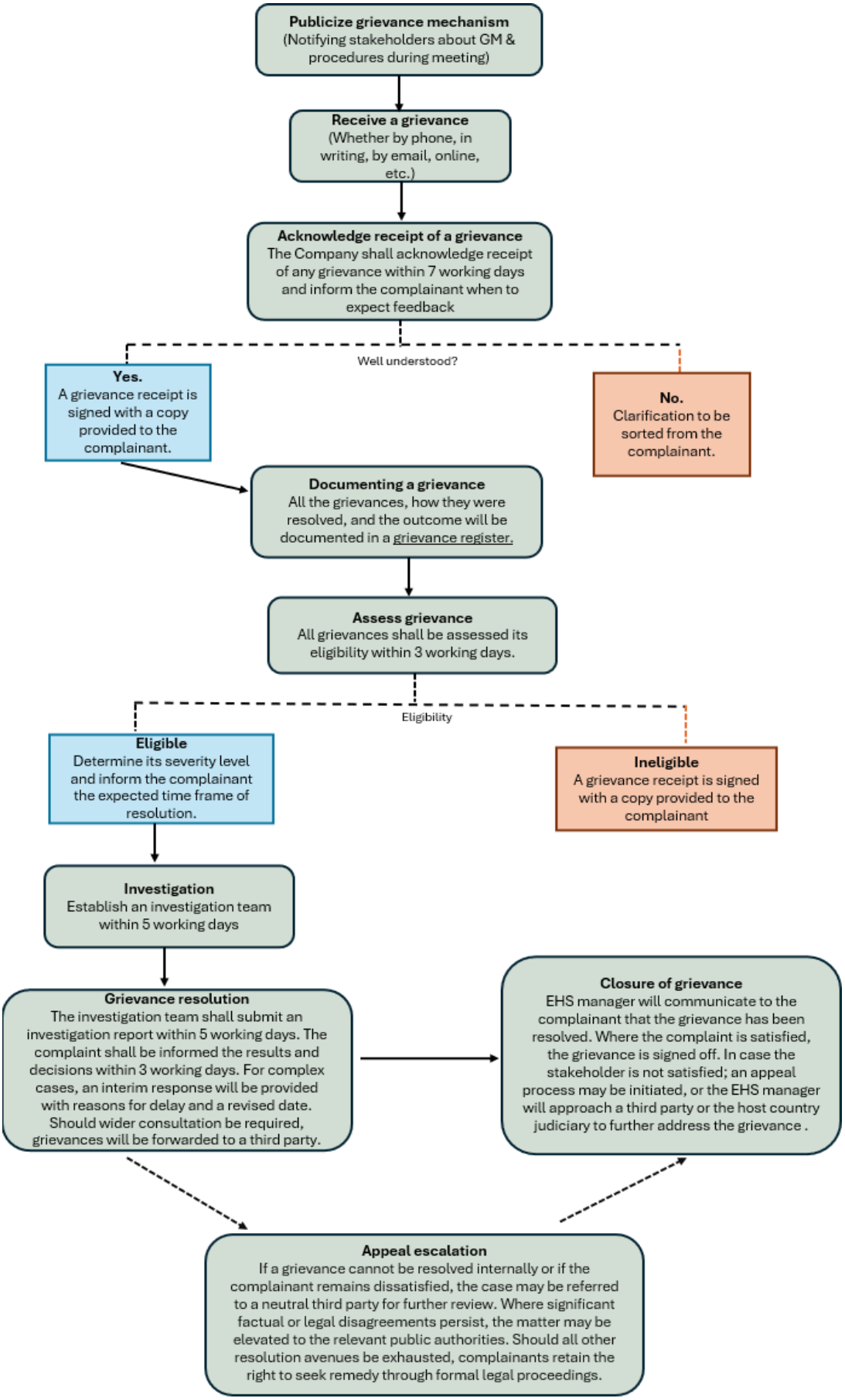
A clear, robust, and credible Grievance Mechanism (GM) is essential to systematically address and resolve complaints before they escalate and create operational or reputational risks for the Project. When effectively implemented, a GM also builds stronger stakeholder relationships and enhances mutual trust between the Project and relevant stakeholders. To improve transparency and usability, it is recommended that the updated scope of eligibility be displayed alongside the grievance process flow.

In order to ensure broad and inclusive access to the Grievance Mechanism, it is open to all individuals and entities affected by Project activities. Eligible users include: i) direct workers employed by the Project Company; ii) contracted and subcontracted workers from EPC; iii) local community members and external stakeholders; iv) suppliers and nearby companies. Eligible grievances include: i) environmental and social impacts from construction activities; ii)

community health, safety, and disturbance concerns related to the Project; and iii) labor-related and working-conditions-related issues raised by direct, contracted and subcontracted workers.

Grievance Mechanism also outlines the approach to accepting, assessing, resolving and monitoring grievances from stakeholders regarding the Project. ***Figure B6-1*** summarizes the grievance process flow.

FIGURE B6-1 GRIEVANCE PROCESS FLOW



Step 1: Publicising the Grievance Mechanism

To ensure that the grievance mechanism (GM) is accessible, practical, and transparent, the external GM will be displayed in Uzbek, Tajik and English and Chinese to ensure information is delivered in a culturally appropriate manner and reaches all relevant stakeholder groups, including women and other vulnerable groups. The internal GM will be made available in Uzbek, English, and Chinese to facilitate effective communication across the Project workforce.

Various methods will be used to raise awareness about the Grievance Mechanism and procedures. During all meetings with external stakeholders, they will be notified of the existence of the Grievance Mechanism and grievance procedures. In addition, a factsheet outlining the process of registering and resolving grievances will be circulated / presented. During these meetings, SUS will ensure that stakeholders are made aware that procedures are in place to protect complainants from any form of retaliation.

Step 2: Receiving a grievance

Grievances can be submitted in writing, telephonically or presented verbally in any language to Youjie Zhao (+998930037688, zhaoyoujie@shsus.com). In addition, grievances can be submitted anonymously different channels, for example, a Grievance Box. The Grievance Box could be placed at optimal locations, like the Information Office where CCTV/cameras are NOT installed.

Step 3: Acknowledging receipt of a grievance

The Project shall acknowledge receipt of any grievance within seven (7) working days from the date it was submitted and shall inform the complainant about the timeframe in which a response can be expected. If the grievance is not well understood or if additional information is required, clarification will be sought from the complainant.

A Grievance Receipt Form shall be signed with a copy provided to the complainant.

Step 4: Documenting a grievance

All grievances received (whether eligible or ineligible) will be documented in a Grievance Register, along with Project response and the final outcome of the grievance. This should include documentation of how the grievance has been resolved.

A Grievance Register template is provided in ***Appendix B-2.***

The Project will ensure that all staff and contractors understand the grievance process and are ready to receive feedback. The Project shall highlight that there will be no costs or retribution associated with lodging grievances.

EHS manager will log, document and track all grievances received. Grievances shall be assigned with a case number, and records of communication or consultation shall all be securely stored within the Grievance Register. The Register shall be monitored regularly for recurring grievances so that appropriate mitigation can be developed.

Step 5: Assess and investigate grievance

Upon receiving the grievance submission, the EHS department shall, within three (3) working days, conduct a preliminary review with the following steps:

- Capture as much information as possible from the person who received the complaint, as well as from the complainant;

- Undertake a site visit, if required, to clarify the parties and issues involved. Gather the views of other stakeholders including Project employees, if necessary, and identify initial options for settlement that parties have considered;
- Determine whether the grievance is eligible based on the below criteria:
  - Eligible grievances include any issues that are directly or indirectly related to the Project and that fall within the scope of the GM;
  - Ineligible complaints may refer to issues that are clearly not related to the Project or its contractors' activities, whose issues fall outside the scope of the GM or where other community procedures would be more appropriate to address the grievance;
- If the grievance is deemed ineligible, it can be rejected, however, a full explanation must be given to the complainant and recorded in the Grievance Register;
- If the grievance is eligible, determine its severity level using the significance criteria (***Table b6-1***). This will determine whether the grievance can be resolved immediately or require further investigation and whether senior management will need to be informed of the grievance;
- If the grievance concerns physical damage (e.g. crop, house, community asset, etc.), take a photograph of the damage and record the exact location as accurately as possible;
- Inform the complainant of the expected timeframe for resolution of the grievance; and
- Enter the findings of the investigation in the Project Grievance Form (***Appendix B-1***).

The Project will aim resolve any grievances within 23 days from date of receipt. This timeframe can be extended to 60 days for more complex grievances (e.g., level 4 grievances), if required. Any extension will be communicated to the complainant, along with continued engagement throughout the process.

TABLE B6-1 SIGNIFICANCE RATING CRITERIA

Significance Level	Type of Grievance	Responsibility
Level 1	A grievance that is isolated or 'one-off' and essentially local in nature and restricted to one complainant. Note: Some one-off grievances may be significant enough to be assessed as a Level 4 grievance e.g., when a national or international law is violated (see Level 4 below).	EHS Manager
Level 2	A grievance that affects the broader local community or region, has occurred repeatedly, and is considered likely to disrupt Project operations or generate negative attention from local media or other local stakeholders.	Associate General Engineer
Level 3	A grievance that is widespread and repeated or has resulted in long-term damage and/or has led to negative comments from local media or is judged to have the potential to generate negative media and local stakeholder comments (e.g. damage to a sacred site).	Assistant General Manager

Significance Level	Type of Grievance	Responsibility
Level 4	A one-off complaint, or one which is widespread or repeated and, **in addition,** has resulted in a serious breach of the Project policies, Uzbekistan or International Law and/or has led to negative national/international media attention, or is judged to have the potential to generate negative comment from the media or other key stakeholders (e.g. failure to pay compensation where appropriate, e.g. resettlement).	General Manager

Step 6: Grievance resolution

All grievances will be dealt with on a case-by-case basis. The approach adopted will seek to facilitate dialogue with complainants and community members to jointly identify and select measures for grievance settlement. This will help to increase ownership of solutions and to mitigate perceptions that resolutions unfairly benefit the Project Company.

Upon confirming the eligibility of a grievance, an investigation team will be established within five (5) working days to review and verify the reported case(s). The team may conduct its work through reviewing documents, field visits, interviewing relevant personnel, and collecting evidence, to ensure that the investigation results are objective, factual, and accurate. During the investigation process, the team shall ensure that both the complainant and the respondent are able to fully express their statements and explanations, so as to safeguard the legitimate rights and interests of both parties. An Incident Investigation Report will be completed within five (5) working days (considered good practice). During the five (5) working days of dialogue or investigation, the E&S staff will coordinate conflict resolution activities necessary to contain and resolve any actual or potential conflicts arising from the reported grievance. Based on the Incident Investigation Report, the EHS department shall inform the decisions to the complaints.

If the case is complex and the stated resolution timeframe cannot be met, an interim response will be provided (oral or written) that informs the stakeholder of the delay, explains the reasons, and offers a revised date for next steps.

Where possible, grievances will be addressed directly by the Project Company. The resolution proposal shall be respectful and considerable, including a substantiating rationale for the decision and any data used in reaching it. If wider consultation is necessary, grievances will be forwarded to a third party. This third party should be neutral, well-respected, and agreed upon by both the Project Company and the affected parties. These may include public defenders, legal advisors, local or international NGOs, or technical experts. In cases where further arbitration is necessary, appropriate government involvement will be requested.

Aggrieved parties retain the legal right to pursue their grievance through the courts if complaints or disputes over facts and data cannot be resolved. The Project Company should cooperate with arbitrators or courts and work toward achieving the best possible solution with the complainant.

Step 7: Closure of grievance

The EHS manager, with the help of SUS's interpreter, will communicate to the complainant(s) that the grievance has been resolved. In instances where the stakeholder is not satisfied with actions taken, the grievance will either:

- Be escalated to the Project Company senior management and a decision will be taken either to implement supplementary actions or to consider initiating an appeal process; or
- The EHS manager will approach a neutral or third party to assist in mediating and resolving the grievance; or
- The E&S personnel will approach the judiciary in Uzbekistan to further address the grievance.

Following this process, the EHS manager will communicate that actions implemented have resolved the grievance.

The staff member who signs off on the closure of the grievance should have sufficient knowledge about the topic to provide assurance.

Once sign-off has occurred, this should be recorded in the Grievance Register (***Appendix B-2***).

6.2 UNIDENTIFIABLE GRIEVANCE

A Complainant is entitled to make Grievances in an unidentifiable manner (e.g., anonymously), though he or she is encouraged to identify himself/herself to allow for a more thorough investigation and to ensure adequate protection of the Complaint. For any grievance made in an anonymous manner, the grievance will be recorded in the Grievance Log. However, the Complainant will not be informed or reported on the acknowledgment or investigation of the grievance. The unidentified complainant shall be advised that if the information he or she provides is insufficient to investigate the grievance, or if information essential to initiating or effectively conducting the investigation cannot be obtained for any other reason, the investigation may be closed without findings.

6.3 CONFIDENTIALITY AND ANTI-RETAILIATION

The Grievance Mechanism prohibits retaliation against those who raise complaints or report legal or Project's policy violations. Protecting confidentiality is paramount and includes:

- Restricting access to complainants' identities to the Community Liaison Officer (CLO) and/or the person invited by CLO to assist in the investigation of the grievance, as they may contact the complainants or the person concerned which has material information about the facts of the Complaint; and
- Securing complainants' personal details in a manner by locking them in the Grievance Log and only accessible by CLO.

Retaliation risks shall be monitored and contact details shall be kept confidential where there is a significant risk of retaliation. Any threats or retaliatory actions will be reported to the senior management of SUS and treated as violations of SUS's Code of Conduct, and the person is subject to disciplinary measures in accordance with relevant laws, regulations and relevant company regulations.

6.4 GENDER-BASED VIOLENCE CONSIDERATIONS

Key considerations to adapt this GM to include the reporting GBV grievances include:

- Enabling all reporting channels with GBV-sensitive considerations, including confidentiality and ethical reporting of GBV incidents.
- Enabling next step actions for identifying GBV victims, including mapping the available GBV response services such as health care, psychological support, security and legal services as appropriate and referral mechanisms for use by survivors in project locations.
- Provide regular training for the Project Owner workforce on GBV and GRM.
- Provide regular information sharing with the local communities on the applicability of the GRM, with particular emphasis on its availability of addressing any project-related GBV concerns.
- As part of the Project's GBVH-sensitive Grievance Mechanism, SUS will coordinate and find local available support services, such as access to shelters, health services, and counselling. These services will be provided to GBV survivors in a confidential and culturally appropriate manner.

7. MONITORING AND REPORTING

The Project will implement a data management and monitoring process as part of the overall monitoring of commitments, grievances, and performance to assess the effectiveness of this SEP and associated engagement activities.

7.1 MONITORING AND EVALUATION

The SEP will be monitored and evaluated by the Project regularly using the indicators recommended by international good practice (e.g., IFC Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets (2007)).

Suggested monitoring and evaluation activities are outlined below:

- Monitor the grievance register in terms of response times to address complaints logged as well as the recurrence of complaints over time.
- Review whether the stakeholder database is maintained and regularly updated.
- Monitor whether records of all engagement activities are recorded and stored (electronic or hard copies) and that the stakeholder engagement log is maintained and up to date.
- Review /audit the implementation of the SEP.
- Develop and assess performance in terms of Key Performance Indicators (KPIs), such as:
  - Number of engagement activities facilitated by stakeholder group and engagement type;
  - Number of attendees at stakeholder engagement activities (expected vs actual);
  - Frequency of information disclosure;
  - Number of grievances received per annum;
  - Number of grievances unresolved;
  - Time taken to resolve grievances;
  - Number of satisfied responses from complainants;
  - Number of stakeholders with knowledge of the grievance process and whether they use it; and
  - Overall perceptions of the Project and company.
- The Project (and in particular the Community Liaison Officer) should ensure that the SEP be updated annually based on outcomes of monitoring exercise.

7.2 REPORTING

All engagement activities throughout the life of the Project will be documented and appropriately stored to track and refer to records when required and ensure delivery of commitments made to stakeholders.

The following stakeholder engagement records and documentation will be used:

- **Meeting Template.** It is used to collect full meeting minutes to be captured within the stakeholder Engagement Log. It shall capture the date and time of every meeting, the attendees (disaggregated by gender), topics of discussion, any photos taken and any decisions or commitments made. This information will be entered into the Stakeholder Engagement Log within 48 hours of each engagement.
- **Stakeholder Engagement Log.** All engagements with stakeholders should be recorded using information from the meeting template to provide high-level tracking of engagements taken to date. Where detailed information on a specific engagement is required, the Stakeholder Engagement Log may be cross-referenced with archived meeting templates.
- **Grievance Register (*Appendix B-2*).** All grievances received will be recorded in a Grievance Log / Register in order to document progress in resolving them, to identify patterns, avoid recurrent problems and improve the Project's overall social performance. Grievances are to be addressed as per the requirements included in the Grievance Management Procedure.

In addition, the SEP should be periodically reviewed, revised and updated during Project implementation in order to ensure that the information presented herein is consistent and is the most recent, and effective in relation to the Project context and specific stages of development.

8. ROLES AND RESPONSIBILITIES

Effective implementation of the SEP requires clear roles, responsibilities, and adequate resources. Stakeholder engagement will be integrated into the Project's overall management structure and treated as a core business function.

TABLE B8-1 KEY ROLES AND RESPONSIBILITIES

Role	Responsibility
Internal Roles	
General manager	• Ensure overall compliance with the SEP; • Allocate sufficient resources for the implementation of the SEP; • Oversee the implementation SEP.
Assistant General manager	• Handle all preliminary approvals for stakeholder engagements • Assist the project manager in implementing stakeholder engagement activities, such as negotiations with local governments or organizations
Associate general engineer	• Assist the management in providing technical input and internal and external coordination for the early stages of the project for stakeholder engagement.
EHS manager	• Responsible for the overall implementation of SEP; • Finalize and update the SEP in line with Project developments and stakeholder feedback; • Monitor and report on SEP implementation progress to the Project management; • Monitor the contractors and subcontractors to comply with SEP requirements and address related complaints; • Facilitate communication between the Project and the local communities; • Receive, document and address the grievance with the assistance of other management staff of Project Company; • Address GBVH-related complaints in accordance with SEP requirements; and • Document stakeholder engagement activities throughout the life of the Project.
Community Liaison Officer	• Facilitate communication between the Project and the local communities; • Ensure local communities understand and have access to the GRM; and • Address community complaints and feedback in the context of the SEP.
External Roles	
Contractors	• Comply with SEP requirements relevant to their scope of work, including monitoring the performance of subcontractors to ensure compliance. • Support the Project Company in resolving complaints related to contractors' activities; and • Report on their SEP-related activities and progress.

The Project will ensure that all personnel involved in stakeholder engagement are adequately trained and resourced. A dedicated budget will be allocated for SEP implementation, including community meetings, communication materials, grievance redress, and monitoring activities.

APPENDIX B-1 PROJECT GRIEVANCE FORM

Grievance Registration	
Registration Number: _____	Documenting Date (D/M/Y): _____
Grievant Name (can be anonymous): _____	
Grievant Telephone Number and/or Email: _____	
Staff Name: _____	
Description of Grievance:	

Confirmed by: _____

(Signed by the grievant of the staff, if anonymous)

Validity of the Grievance:	Valid, within the scope	Yes ( )	No ( )
	If invalid, state reasons and the date of communications to the grievant		

Grievance Registration		
Grievance Level Assessment: _____ (***Routine**: processing can be completed within one week; **medium**: processing time of more than one week; **major**: processing difficulty, need to be reported to the general manager)*	Reported to the General Manager	Yes ( ) Date: _____ No ( )

Suggested Resolution and Response

Resolution Measures	Estimated Completion Time	Completion Date (D/M/Y)	Responsible Department	Signature

Details of alternative resolution measures, e.g. compensation

Follow-up and Conclusion

Grievant Feedback:	Staff Feedback:
_____ __ _____ __ _____ __	_____ _ _____ __ _____ __

Grievance Registration		
_____	_____	
Closed Grievance: Yes ( ) No ( )	Signature:	Date:
If unclosed within in a month from the receipt date, please resubmit with a new registration number	New Grievance Registration Number: _____	

APPENDIX B-2 PROJECT GRIEVANCE REGISTER TEMPLATE

No.	Date	Phone Number	Community	Typology (Information Request, Suggestion or Claim)	Type (Not admissible, Low, Medium, High)	Responsible Person	Delivery date for resolution	Response	Open/ Closed	Closing Date	Closed and Satisfied (Yes/No)	If no, why not?

APPENDIX B-3 EXISTING GRIEVANCE MECHANISM AND GAP ANALYSIS

From the commencement of construction, the Project has established and publicly disclosed a Grievance Mechanism to ensure that stakeholders have accessible and transparent channels to raise concerns related to project activities. The grievance channel has been publicized via suggestion boxes installed at both the Project main gate and the entrance to the worker accommodation. Multiple accessible channels are provided for submitting grievances or reports, including a complaint box, hotline, and email.

These channels accept concerns related to project construction, including but not limited to: construction noise, environmental pollution, delays in payments, and migrant workers' wages protection. All grievances received through any channel will be acknowledged and responded to within seven (7) working days.

In the existing GM, the grievance handling procedures are listed as below:

Step 1: Receipt and Screening

Upon receiving grievance materials, the grievance-handling department will review all submissions within three (3) working days to determine:

- Whether the grievance falls within the scope of this mechanism; and
- Whether the submitted materials are complete.

If the grievance is accepted, the complainant will be informed accordingly. If the grievance falls outside the mechanism's scope, the complainant will be notified and provided with an explanation.

Step 2: Investigation

Once a grievance is accepted, responsible department will establish a grievance investigation team within five (5) working days. The investigation team may adopt various methods including document review, site inspections, interviews with relevant parties, and evidence collection to ensure an objective, factual, and accurate assessment.

Throughout the investigation process, the team will hear statements from both the complainant and the subject of the complaint, ensuring that the rights and perspectives of all parties.

Step 3: Resolution and Feedback

After completing the investigation, the investigation team will prepare an investigation report and propose recommendations for grievance resolution within five (5) working days. Based on this report, the grievance-handling department will make a resolution decision within three (3) working days and provide feedback to the complainant through the appropriate communication channel.

Based on the information provided above, a gap analysis on the current GM against international standards has been conducted and six gaps are identified and listed below.

- **Lack of Separate Grievance Mechanisms**

The current Grievance Mechanism does not distinguish between an external mechanism for affected communities (IFC PS1) and an internal mechanism for direct and contracted workers (IFC PS2). The Project has opted for a unified GM accessible to local community members, government authorities, NGOs, industrial associations, Project investors, contractors, supervision units, suppliers, and nearby companies. While a single GM is acceptable, it requires a clearly defined Scope of Eligibility and explicit procedures for handling worker grievances. At present, the existing mechanism does not clearly articulate these elements, creating a potential limitation for compliance with IFC PS1 and PS2. Strengthening the scope of the GM to clarify eligible users and grievance categories would address this gap.

- **Lack of Gender Considerations**

The current Grievance Mechanism does not adequately account for gender dynamics, which may limit women's ability to safely and effectively raise concerns. The absence of gender-sensitive procedures, such as culturally appropriate intake options for women, channels for confidential or anonymous submission, and protocols for handling highly sensitive cases such as gender-based violence (GBV) and sexual exploitation, abuse and harassment (SEAH), may deter women from reporting incidents. This gap reduces the inclusiveness of the mechanism and undermines equitable access for all rightsholders.

- **Lack of Anonym Protection and Retaliation Prevention**

The existing Grievance Mechanism does not provide clear options for anonymous submission nor incorporate explicit safeguards against retaliation. The absence of confidential reporting channels may discourage both workers and external stakeholders from raising concerns, particularly where there is fear of reprisal or social pressure. Likewise, without a formally articulated anti-retaliation policy, stakeholders lack assurance that their participation in the grievance process will not result in adverse consequences. No mature procedures are in place for the escalation of the complaints or grievances either. These gaps would undermine the accessibility and credibility of the mechanism and may limit stakeholders' willingness to voice their concerns.

- **Lack of Culturally Appropriate Approach and Escalation Channels**

The existing Grievance Mechanism does not clearly define its procedures in a culturally appropriate approach that is tailored to the local context. For example, the current GM is provided in Chinese only while the local residents speak Uzbek and Tajik. These gaps may reduce the inclusiveness of the grievance process and may hinder meaningful participation.

- **Lack of Recording and Monitoring System**

The current Grievance Mechanism does not include a structured system for recording and monitoring grievances, which limits the Project's ability to track issues, evaluate its performance, and understand concerns raised by affected communities. Establishing such a system would enhance Project management and support the maintenance of its social license to operate.

- **Lack of Oral/In-person Submission Channel**

All grievance mechanisms should incorporate oral submission channels, including in-person reporting to designated Community Liaison Officers (CLOs) to ensure accessibility for individuals unable to read and write.

The Enhanced Grievance Mechanism, in response to the gaps identified above, aims to address the gaps identified in the existing system and establish a more accessible, transparent, and

inclusive platform for receiving, assessing, and resolving concerns raised by different categories of stakeholders. The key objectives of the enhanced GM are as follows:

- **Strengthen the Scope of Eligibility of the Grievance Mechanism**

This is to enhance the scope of eligibility and ensure all eligible groups understand their right to submit grievances and the types of issues that fall within the mechanism. This would improve transparency, reduce ambiguity, and ensure the GM can be applied consistently and compliantly across all stakeholder categories.

- **Integrate Gender-Responsive and Inclusive Approaches**

This is to ensure equitable participation and full inclusion of all stakeholders, by incorporating gender-sensitive procedures that enable women and other potentially underrepresented groups to safely and effectively access the Grievance Mechanism. This includes providing multiple culturally appropriate intake options, ensuring confidentiality, and establishing dedicated pathways for handling sensitive cases such as gender-based violence (GBV) and sexual exploitation, abuse, and harassment (SEAH).

- **Ensure Confidential, Anonymous, and Non-Retaliatory Reporting**

This is to introduce clear provisions that allow for anonymous submissions and to establish explicit anti-retaliation protections for all complainants. The enhanced GM will strengthen confidentiality measures, provide safe reporting channels, and clearly communicate that no individual will face adverse consequences for submitting a complaint or participating in the grievance process.

- **Introduce Culturally Appropriate, Transparent, and Predictable Procedures**

This it to ensure that the Grievance Mechanism is culturally appropriate, easily understood, and accessible to all community members. This includes designing procedures that reflect local norms, languages, and communication preferences.
The enhanced mechanism will also define clear escalation pathways, service standards, and decision-making procedures to ensure predictable and transparent resolution of grievances.

APPENDIX B-4 PROJECT FLYER

ERM
Environmental Resources Management

Shaping a Sustainable Future

SUS Samarkand Waste-to-Energy (WtE) Plant Project

Samarkand City, Samarkand Region, Uzbekistan

ABOUT THE PROJECT

SUS Environment (SUS) is planning to develop a Waste-to-Energy (WtE) Plant in the west of Samarkand City, Samarkand region. The WtE Plant plans to process 1,500 tons of domestic waste from Samarkand Region per day.

Waste-to-Energy plant is an advanced technology that turns domestic waste into electricity through combustion and heat recovery processes.

Why WtE?

Compared to the current landfill approach, the WtE plant upgrades Samarkand Region's waste disposal capacity with clear benefits:

- Land savings (no landfill space needed),
- Secondary pollution risks prevention (vs. landfill leakage), and
- Full resource utilization (waste-to-energy conversion).

SUS ENVIRONMENT

SUS is committed to respecting the surrounding communities and environment.
Please rest assured that all information received through consultation will be treated with the utmost confidentiality – SUS intends to use the outcomes of this field consultation work to enhance its management of any issues that may be identified.
SUS is dedicated to seeking continuous, meaningful engagement with its stakeholder, including you and your community, with the aim of building and solidifying a respectful and trustworthy relationship with everyone involved.

How will the Project manage environmental and social impacts?

SUS has commissioned a third-party sustainability consultancy, **ERM**, to prepare an Environmental and Social Impact Assessment (ESIA) aligned with international standards. ESIA will analyze the Project's environmental and social risks and impacts, developing strategies to avoid and mitigate negative impacts while enhance positive benefits.

1

Who is SUS ?

As global concerns about protecting the environment and combating climate change continue to rise, SUS ENVIRONMENT stands as a premier provider of comprehensive environmental services including waste-to-energy (WtE) over 300 projects all overall the world including Central Asia, South America, Africa, and Southeast Asia.

2

What are the Project components ?

The WtE plant will comprise two mechanical grate furnace with the boiler, each with a capacity of 750 tons per day, and will be equipped with one 50 MW condensing steam turbine generator set and one generator rated at 50 MW.

3

What is the Project schedule ?

The Project is currently under construction, with completion scheduled within two years. Plant operation is projected to commence in 2027.

4

What negative impacts might waste-to-energy (WtE) facilities have on the local environment ?

Potential environmental and social impacts include air emissions, noise and vibration, community health and safety, transportation and traffic safety, as well as occupational health and safety, among others. Notably, no material impacts on surface or groundwater are expected, since wastewater produced by the WtE plant will be reused internally.

5

What measures will the Project adopt to protect the environment?

The Project will follow the recommendations from EIA and ESIA in terms of both identified environmental and social risks and impacts, including but not limited to mitigation measures related to air emission, noise, waste disposal, unplanned events, community health and safety, transportation and traffic risks, etc.

6

How will the Project source its water and electricity?

The Project will source its industrial and domestic water from the Dargom River, plus a portion from reused wastewater.

As for electricity, the Plant will supply electricity to the local grid while keeping its own internal power system for operations and emergency backup.

7

If I have advice or concern about the Project, how can we reach SUS?

Your comments and suggestions regarding the project are highly appreciated. You can provide feedback or direct your questions regarding the Project to: +998 88-768-80-00.

8

Will the WtE plant hire local people? How many local jobs will the Project create? How can I get a job with SUS?

With high-level of automation, the WtE plant is not a labor-intensive facility. But SUS will give priority to local hiring.

O'rta Turkman mahalla
Saxovat mahalla
Kimyogarlar village
Dargom Canal
Samarkand Metallurgical Plant
Legend
WtE Plant Boundary
Project Location
Date: 06 January 2026
Drawn Size: 16x11 cm
Uzbekistan SUS WtE ESIA
Drawn by: XY
Reviewed by: BY
Client: SUS
Coordinate System/Source: WGS 1984
This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
ERM

ERM
Atrof-muhit resurslarini boshqarish

Barqaror kelajakni shakllantirish

SUS Samarqand chiqindilardan energiya ishlab chiqarish (WtE) zavodi loyihasi

Samarqand shahri, Samarqand viloyati, O'zbekiston

LOYIHA HAQIDA

SUS Environment (SUS) Samarqand viloyatining Samarqand shahri g'arbida chiqindilardan energiya (WtE) zavodini qurishni rejalashtirmoqda. WtE zavodi kuniga Samarqand viloyatidan 1 500 tonna maishiy chiqindini qayta ishlashni rejalashtirmoqda.

Chiqindilardan energiya ishlab chiqarish zavodi — bu ilg'or texnologiya bo'lib, maishiy chiqindilarni yonish va issiqlikni tiklash jarayonlari orqali elektr

SUS ENVIRONMENT

SUS atrofdagi jamoalar va atrof-muhitga hurmat bilan yondashishga sodiq. Iltimos, maslahatlashuv orqali olingan barcha ma'lumotlar eng yuqori darajada maxfiy saqlanishiga ishonch hosil qiling – SUS ushbu maydondagi maslahatlashuv ishining natijalarini aniqlangan muammolarni boshqarishni yaxshilash uchun foydalanishni rejalashtirmoqda. SUS o'z manfaatdor tomonlari, jumladan siz va sizning jamoangiz bilan uzluksiz, mazmunli muloqotni izlashga sodiq bo'lib, barcha ishtirokchilar bilan hurmatli va ishonchli munosabatlarni o'rnatish va mustahkamlashni maqsad qiladi.

Nega WtE?

Joriy chiqindilarni poligonga yotqizish usuliga nisbatan, WtE zavodi Samarkand viloyatining chiqindilarni utilizatsiya qilish quvvatini quyidagi aniq afzalliklar bilan oshiradi:

- Yer tejash (chiqindilar poligoni uchun joy kerak emas),
- Ikkinchi darajali ifloslanish xavfini oldini olish (landfill oqimiga nisbatan), va
- Resurslardan to'liq foydalanish (chiqindilarni energiyaga aylantirish).

Loyiha atrof-muhit va ijtimoiy ta'sirlarni qanday boshqaradi?

SUS xalqaro standartlarga muvofiq Atrof-muhit va ijtimoiy ta'sirlarni baholash (ESIA) hujjatini tayyorlash uchun mustaqil barqarorlik bo'yicha konsultatsiya firmasi **ERMni** jalb qilgan. ESIA loyihaning atrof-muhit va ijtimoiy xavf va ta'sirlarini tahlil qiladi, salbiy ta'sirlarni oldini olish va kamaytirish, ijobiy foydalarni esa oshirish bo'yicha strategiyalarni ishlab chiqadi

bir

SUS kim?

Atrof-muhitni muhofaza qilish va iqlim o'zgarishiga qarshi kurashish bo'yicha global tashvishlar ortib borayotgan bir paytda, SUS ENVIRONMENT Markaziy Osiyo, Janubiy Amerika, Afrika va Janubi-Sharqiy Osiyoni o'z ichiga olgan dunyo bo'ylab 300 dan ortiq loyihani amalga oshirgan chiqindilardan energiya (WtE) olish bo'yicha keng qamrovli atrof-muhit xizmatlarini taqdim etuvchi yetakchi provayder hisoblanadi.

2

Loyihaning tarkibiy qismlari qaysilar?

WtE zavodi kuniga 750 tonna quvvatga ega ikkita mexanik panjara pech va ularning boilerlaridan iborat bo'lib, bitta 50 MVt kondensatsion bug' turbogenerator to'plami va bitta 50 MVt quvvatli generator bilan jihozlanadi.

3

Loyihaning jadvalini qanday?

Loyihaning hozirgi holati qurilish bosqichida bo'lib, yakunlanishi ikki yil ichida rejalashtirilgan. Zavodning ishga tushirilishi 2027 yilda kutilmoqda.

4

Chiqindilardan energiya (WtE) inshootlari mahalliy atrof-muhitga qanday salbiy ta'sir ko'rsatishi mumkin?

Potentsial atrof-muhit va ijtimoiy ta'sirlarga havo chiqindilari, shovqin va tebranish, jamoat salomatligi va xavfsizligi, transport va yo'l harakati xavfsizligi, shuningdek mehnat muhofazasi va xavfsizlik kiradi. Qayd etish joizki, yuzaki yoki yerosti suvlari ustida hech qanday sezilarli ta'sir kutilmaydi, chunki WtE inshootidan chiqqan oqova suvlar ichki aylanishda qayta ishlatiladi.

5

Loyiha atrof-muhitni muhofaza qilish uchun qanday choralar ko'radi?

Loyiha aniqlangan atrof-muhit va ijtimoiy xavf va ta'sirlar bo'yicha EIA va ESIA tavsiyalariga amal qiladi, jumladan, lekin ular bilan cheklanmay, havo chiqindilari, shovqin, chiqindilarni utilizatsiya qilish, rejalashtirilmagan hodisalar, jamoat salomatligi va xavfsizligi, transport va yo'l harakati xavflari bo'yicha yumshatish choralari.

6

Loyiha o'z suv va elektr energiyasini qayerdan oladi?

Loyiha sanoat va maishiy suvni Dargom daryosidan hamda qayta ishlangan oqova suvlari hisobidan oladi. Elektr energiyasiga kelsak, Zavod mahalliy tarmoqqa elektr ta'minotini amalga oshiradi va operatsiyalar hamda favqulodda zaxira uchun o'z ichki quvvat tizimini saqlab qoladi.

7

Agar loyiha bo'yicha maslahat yoki tashvishim bo'lsa, SUS bilan qanday bog'lanishimiz mumkin?

Loyiha bo'yicha fikr-mulohazalaringiz va takliflaringiz katta qadrlanadi. Loyiha bo'yicha fikr-mulohazalaringizni bildirish yoki savollaringizni quyidagi manzilga yo'naltirishingiz mumkin: +998 88-768-80-00.

8

WtE zavodi mahalliy aholini ishga oladimi? Loyiha qancha mahalliy ish o'rinlari yaratadi? SUSda qanday qilib ishga joylashish mumkin?

Yuqori darajadagi avtomatlashtirish tufayli WtE zavodi mehnatga kam talab qiladigan ob'ekt hisoblanadi. Ammo SUS mahalliy ishga qabul qilishga ustuvorlik beradi.

Afsonaviy	Loyiha joylashuvi		
	Sana: 06 yanvar 2026	Chizilgan o'lcham: 16x11 sm	O'zbekiston SUS WtE ESIA
	Chizgan: XY	Ko'rib chiqqan: BY	
WtE inshooti chegarasi	Kordinatalar tizimi/Manba: WGS 1984		Mijoz: SUS
	Ushbu rasm uchinchi tomon ma'lumotlariga yoki ERM tomonidan tasdiqlanmagan ma'lumotlarga asoslangan bo'lishi mumkin va u miqyosga mos kelmasligi mumkin. Agar alohida kelishuv bo'lmasa, ushbu rasm faqat yo'riqnoma maqsadida taqdim etilgan bo'lib, ERM uning aniqligini kafolatlamaydi.		

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APPENDIX B-5 INTERVIEW QUESTION LIST COVER PAGE

Focus group discussion – General Public

Facilitator's Guide This focus group discussion should be a cross-section of Mahalla Citizens' Assembly. Please introduce yourself and reconfirm that they are participating in a meeting about the Project and that they understand the work carried out by ERM/BIK. Please also make it clear that the information gathered is intended to help identify potential impacts of the project. Specifically, this focus group discussion seeks to understand:

- *social status,*
- *health and security problems,*
- *understanding opinions on the Project*

Name(s) of interviewer	
Location	
Date and time	
Number of participants	
Name of participants	

No.	Questions	Answers

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SUS Uzbekistan Waste to Energy Project

APPENDIX C Air Dispersion Modelling Settings and Contour Figures

PREPARED FOR

SUS Environment

DATE

6/17/2026

REFERENCE

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AUTHOR	Miao Xue
CLIENT NAME	SUS Environment

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				ERM APPROVAL TO ISSUE		
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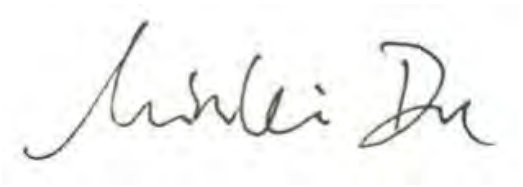
SUS Uzbekistan Waste to Energy Project

APPENDIX C Air Dispersion Modelling Settings and Contour Figures

0811636



Minlei Du
Partner

ERM (Shanghai) Limited
Suite 2005A, Litong Plaza, No. 1350 Sichuan North Road,
Shanghai, Hongkou District, China

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1 AIR DISPERSION MODELLING SETTINGS

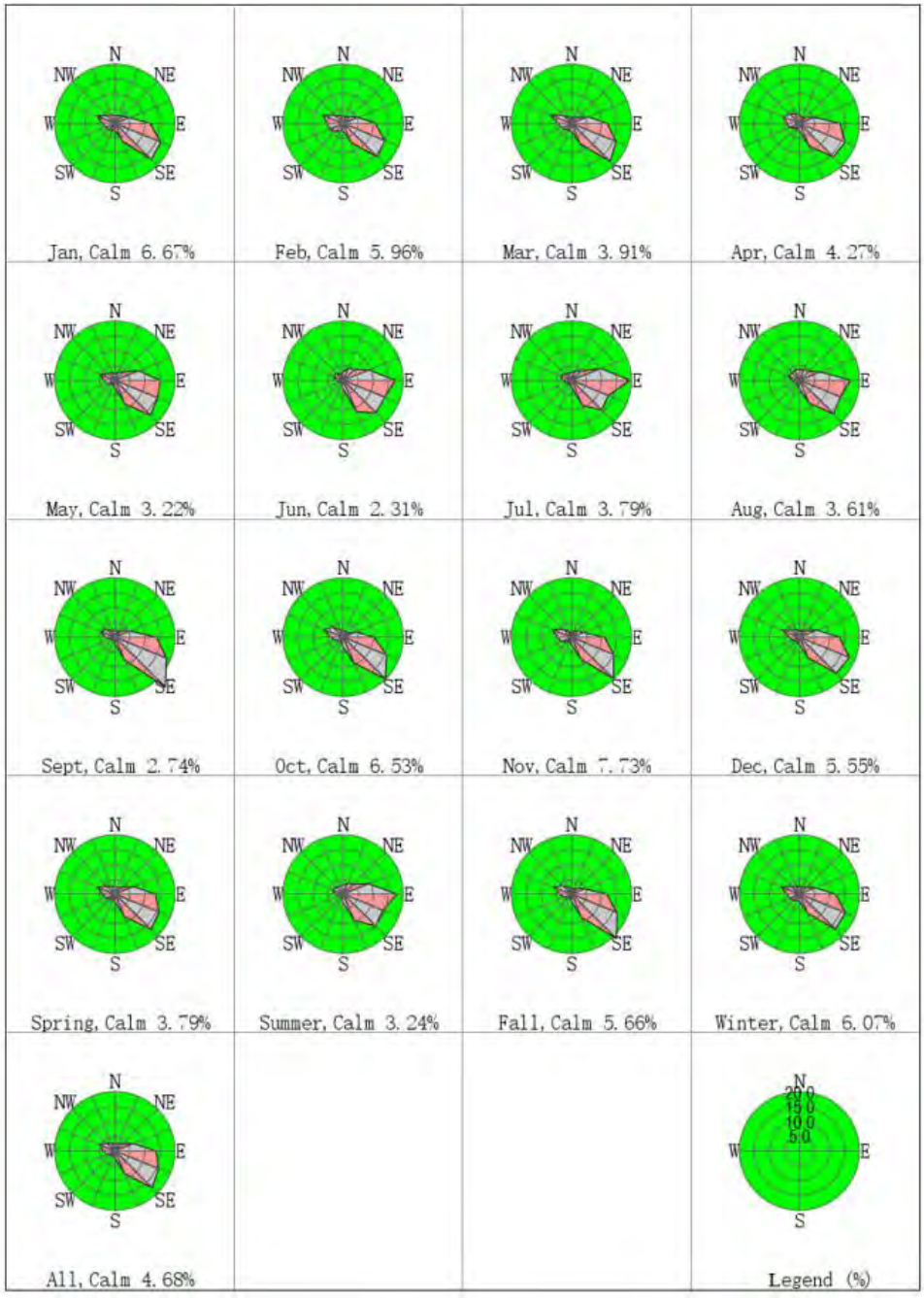
Details of the dispersion model setup is summarized below:

TABLE C1-1 AIR DISPERSION MODELLING SETTINGS

Item	Method
Dispersion Model	AERMOD model version 23132[1] AERMOD is a state-of-the-art detailed dispersion model that can be used to represent complex multiple emission sources and predict air quality at receptor locations considering meteorology. AERMOD is the USEPA preferred near-field dispersion model and is widely recognized for use in this type of application, explicitly referred to in the WBG EHS guideline for air emissions and ambient air quality[2].
Emission Source	Emission sources are modelled as point sources characterized by location, release height, stack inside diameter, gas exit velocity, gas exit temperature, and substance emission rate. The emission sources are modelled as continuous releases for 8760 hours.
Receptor Grid	Dispersion modelling is completed using a 20km * 20km nested grid as follows: Grid 1 extending to 1 km with 50 m spacing; Grid 2 extending to 2.5 km with 100 m spacing; Grid 3 extending to 5 km with 200 m spacing; and Grid 4 extending to 10 km with 300 m spacing.
Meteorology	Meteorological data representative of the Project location is crucial for supporting the modelling assessment. A 5-year meteorological data set (2020 to 2024) from the closest observing station of Samarkand (13 km distance to the Project) is used as input data to AERMET, the meteorological pre-processor of AERMOD. Surface Characteristics are as follows: Albedo: 0.225625 Bowen: 1.40625 Ro: 0.3 m (270-180 °Urban); 0.1 m (180-270 °Cultivated Land)

[1] The United States Environmental Protection Agency (USEPA) Support Center for Regulatory Atmospheric Modelling (SCRAM) [Online] Available at: https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

[2] World Bank Group (WBG) Environmental, Health, and Safety Guidelines for Air Emissions and Ambient Air Quality (2007) [Online] Available at: https://www.ifc.org/content/dam/ifc/doc/2023/ifc-general-ehs-guidelines.pdf

Item	Method
	
Terrain	Hills, mountains, and valleys can affect dispersion by directing the plume. Shuttle Radar Topographic Mission (SRTM) data at a resolution of 90 m to inform the AERMOD terrain pre-processor AERMAP. AERMAP provides information on a) the base elevation of each receptor defined in the model; and b) the terrain height that has the most significant influence on dispersion for each receptor, otherwise known as the hill height scale. Both the base elevation and hill height scale are incorporated into AERMOD.
Building	When airflow passes over buildings, a phenomenon known as building downwash occurs where the air is entrained in the lee of the building and drawn down to ground level. This effect can bring the plume from a stack or group of stacks down to ground level quicker than would otherwise be the case, increasing the ground level concentration relative to a case where there are no buildings. Details of the modelled site emission sources are presented below:

<table>
<tr><th>Item</th><th>Method</th></tr>
<tr><td></td><td>
<table>
<tr><th>No.</th><th>Height (m)</th></tr>
<tr><td>ST1</td><td>80</td></tr>
<tr><td>ST2</td><td>80</td></tr>
<tr><td>ST3</td><td>22</td></tr>
</table>
</td></tr>
<tr><td>NO_x to NO_2</td><td>The NO_x to NO_2 conversion is referenced to Environment Agency for England, as cited by IFC[3]. The approach suggests a 35% conversion rate of NO_2 to NO_x for short-term ground level concentrations and a 70% conversion rate for long-term average (i.e. annual) ground level concentrations.</td></tr>
</table>

[3] Department for Environment, Food and Rural Affairs (DEFRA) Environmental permitting: air dispersion modelling reports: https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports

2 AIR DISPERSION CONTOUR FIGURES

FIGURE C-1 CONTOUR OF 1H AVERAGE NO_2 RESULT-PROJECT CONTRIBUTION

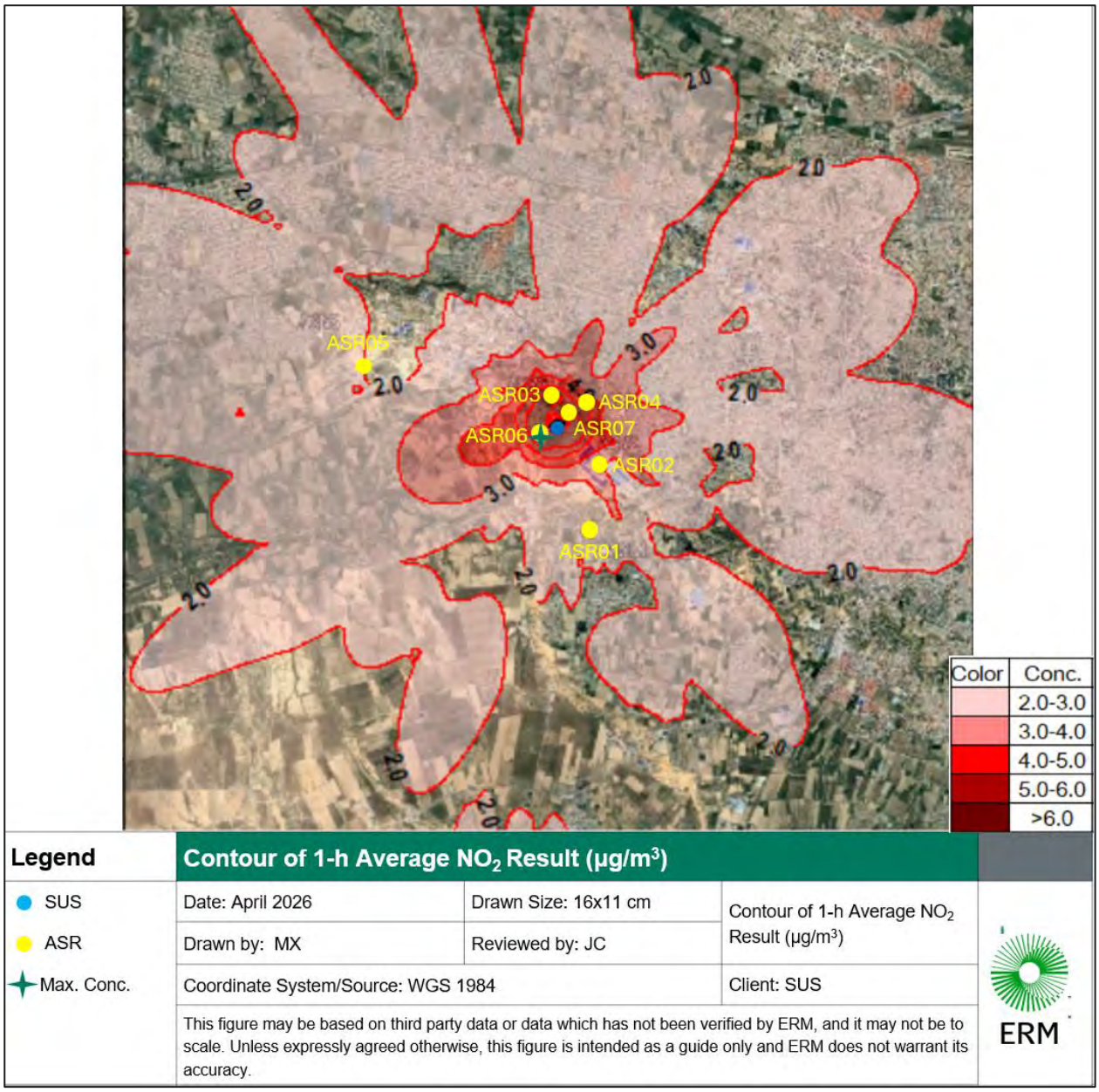


FIGURE C-2 CONTOUR OF 24H AVERAGE NO_2 RESULT-PROJECT CONTRIBUTION

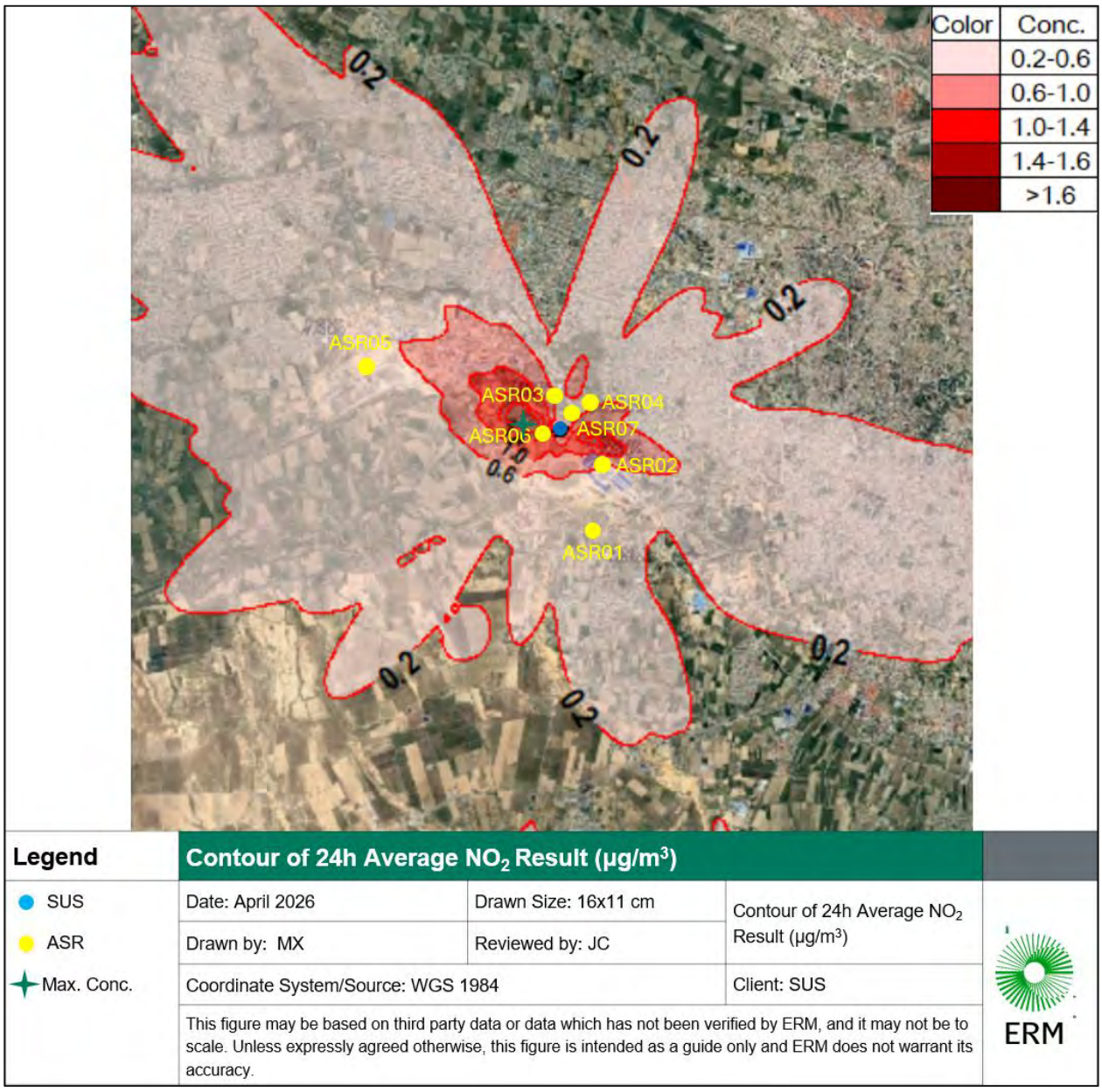


FIGURE C-3 CONTOUR OF ANNUAL AVERAGE NO_2 RESULT-PROJECT CONTRIBUTION

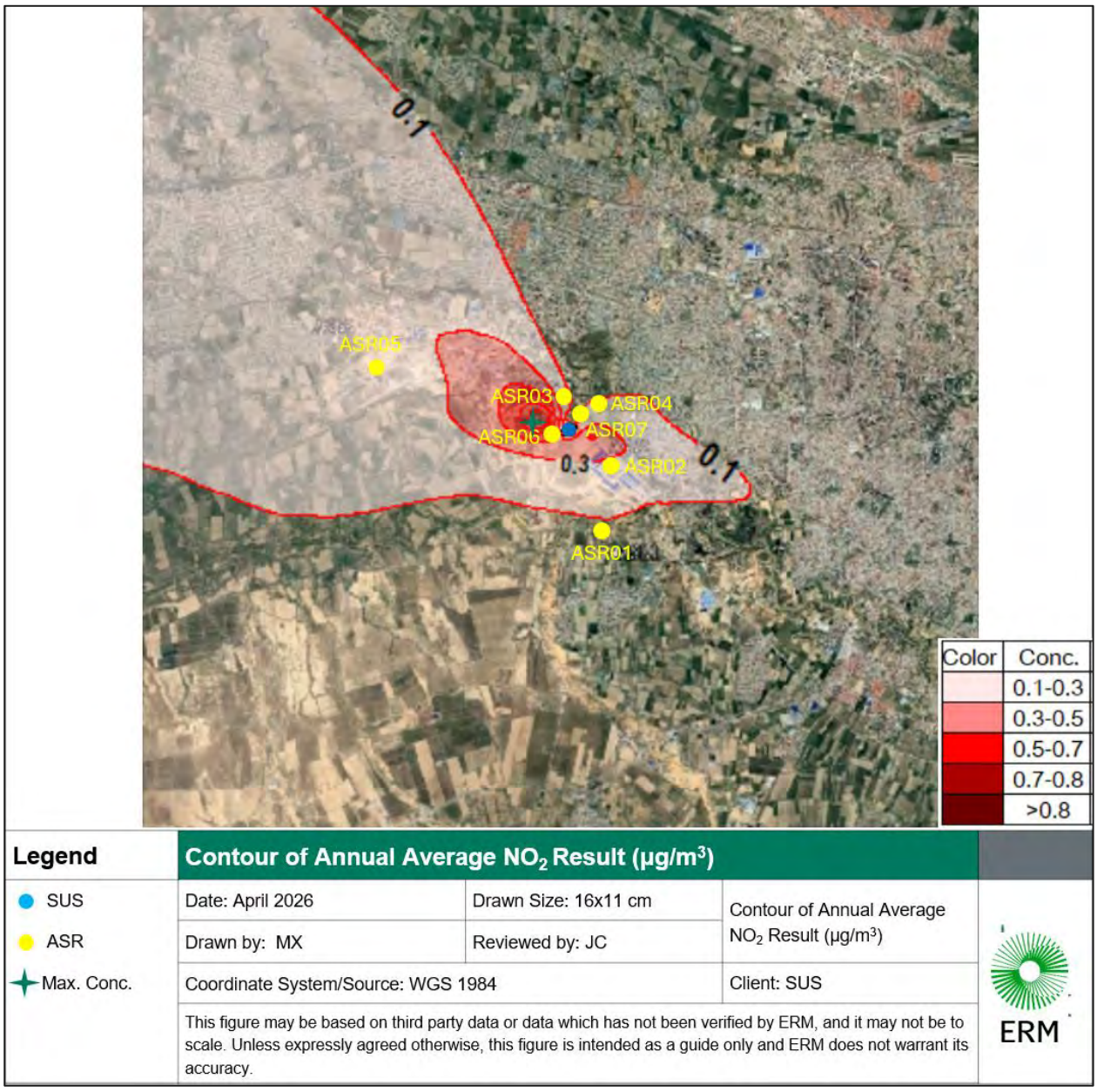


FIGURE C-4 CONTOUR OF 1H AVERAGE SO_2 RESULT-PROJECT CONTRIBUTION

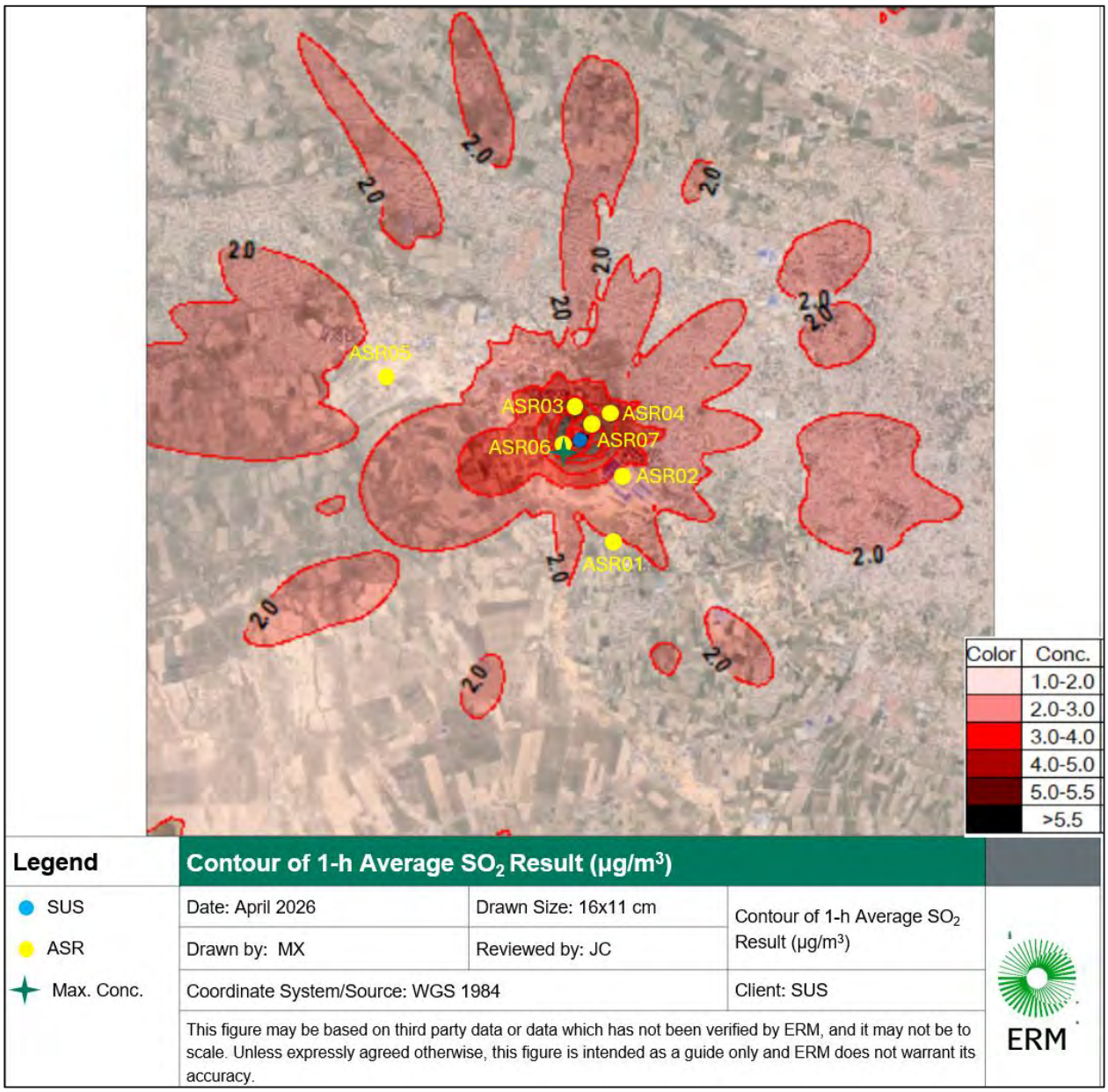


FIGURE C-5 CONTOUR OF 24H AVERAGE SO_2 RESULT-PROJECT CONTRIBUTION

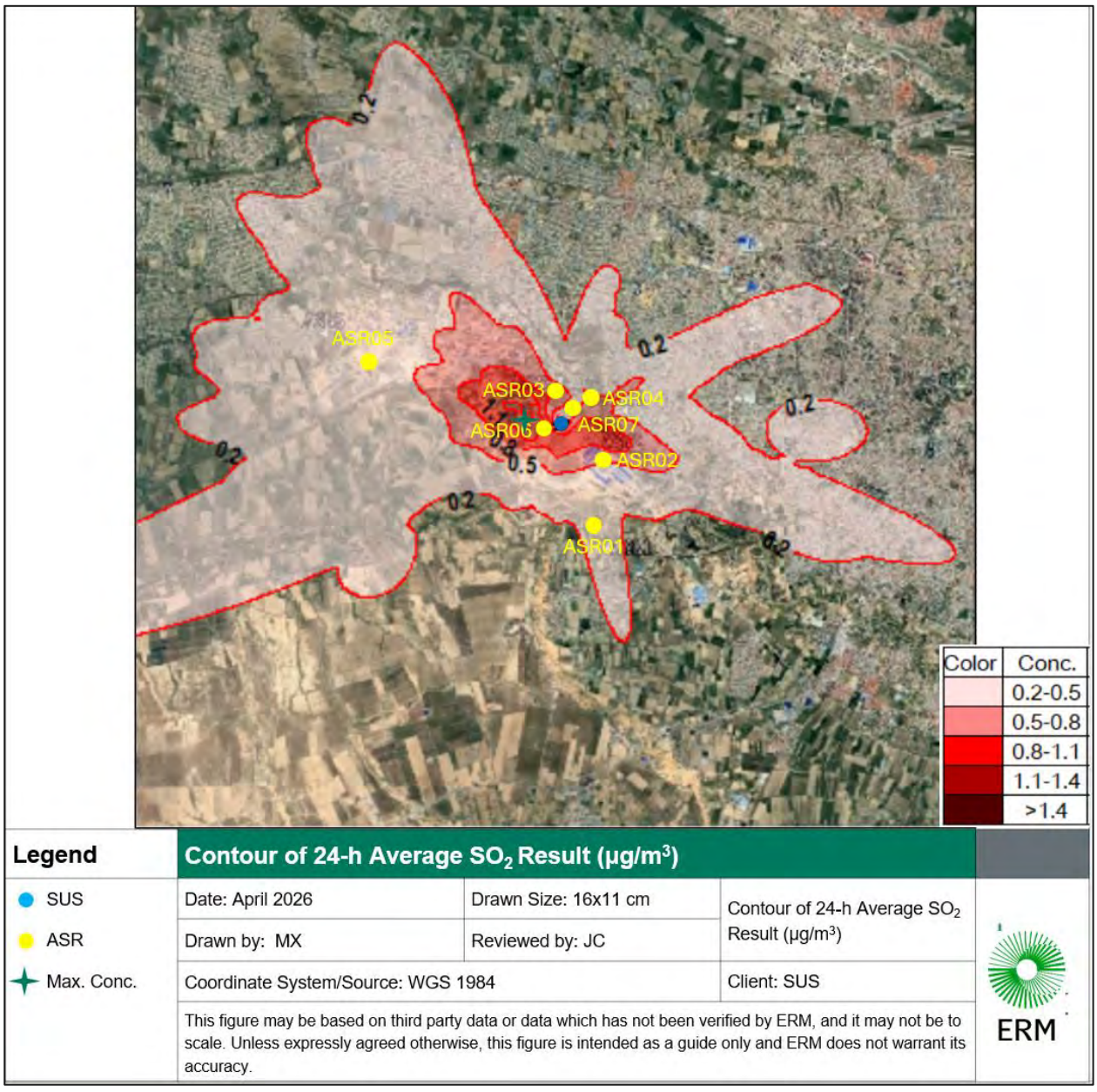


FIGURE C-6 CONTOUR OF 1H AVERAGE PM RESULT-PROJECT CONTRIBUTION

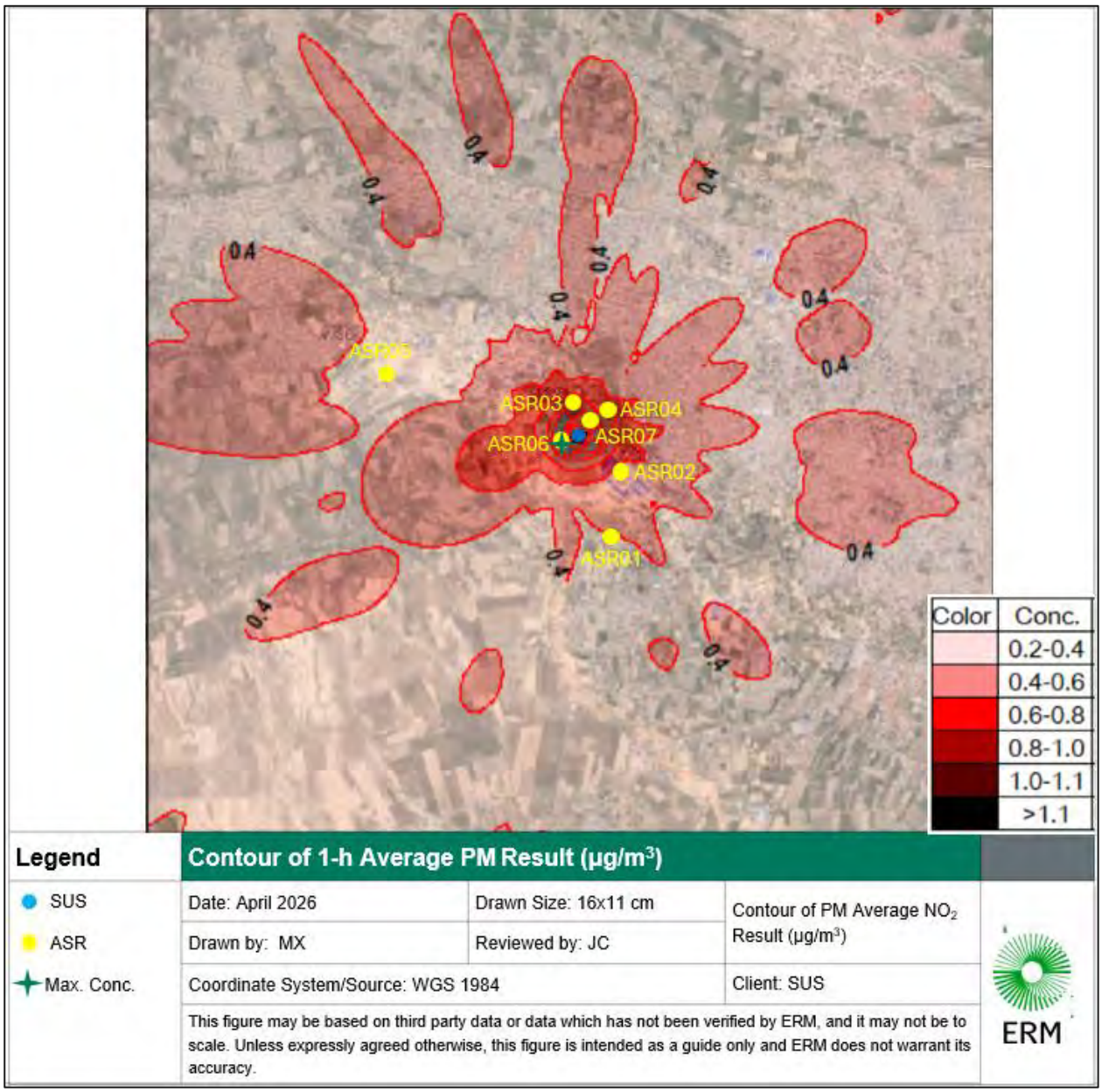
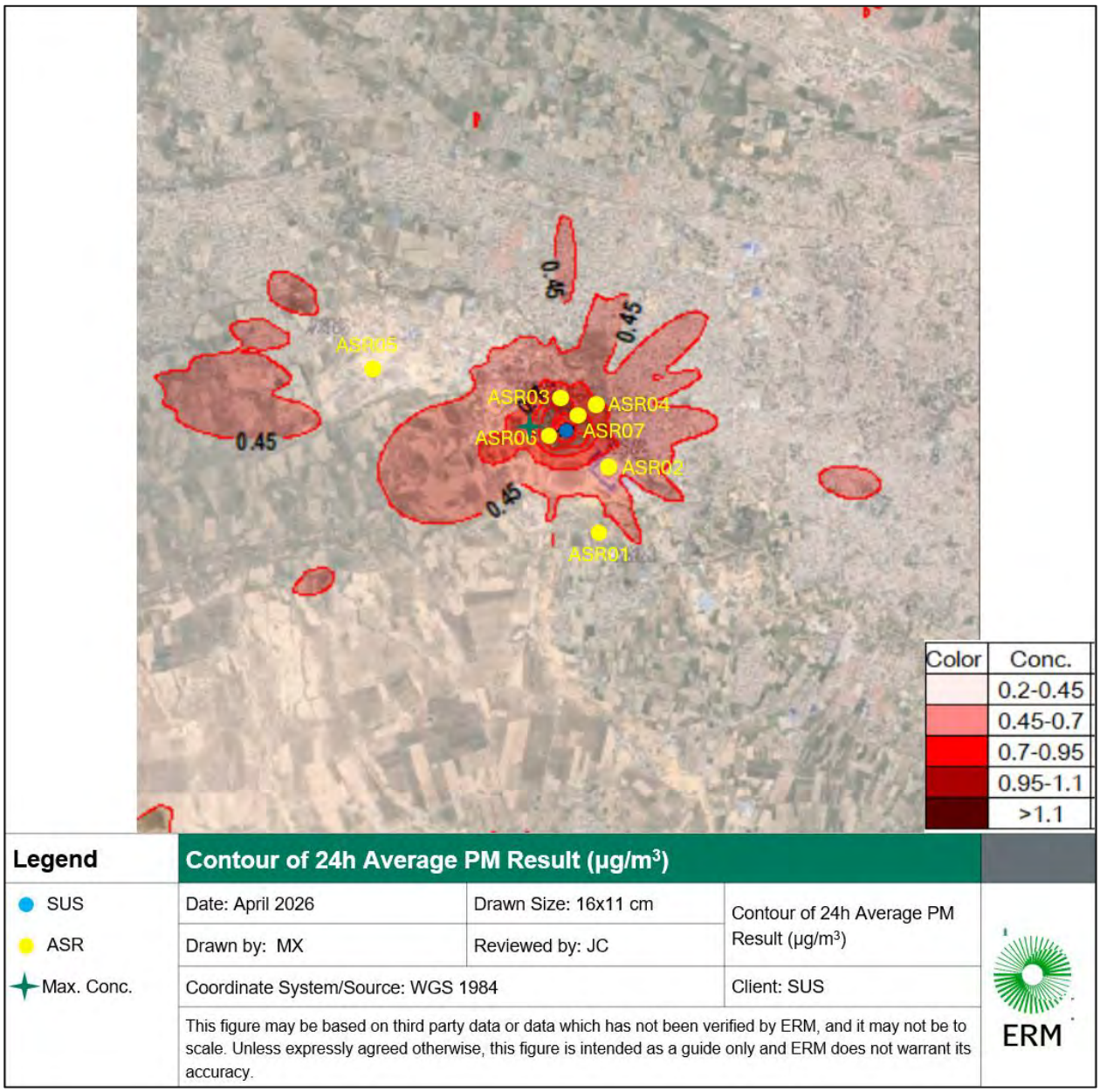


FIGURE C-7 CONTOUR OF 24H AVERAGE PM RESULT-PROJECT CONTRIBUTION



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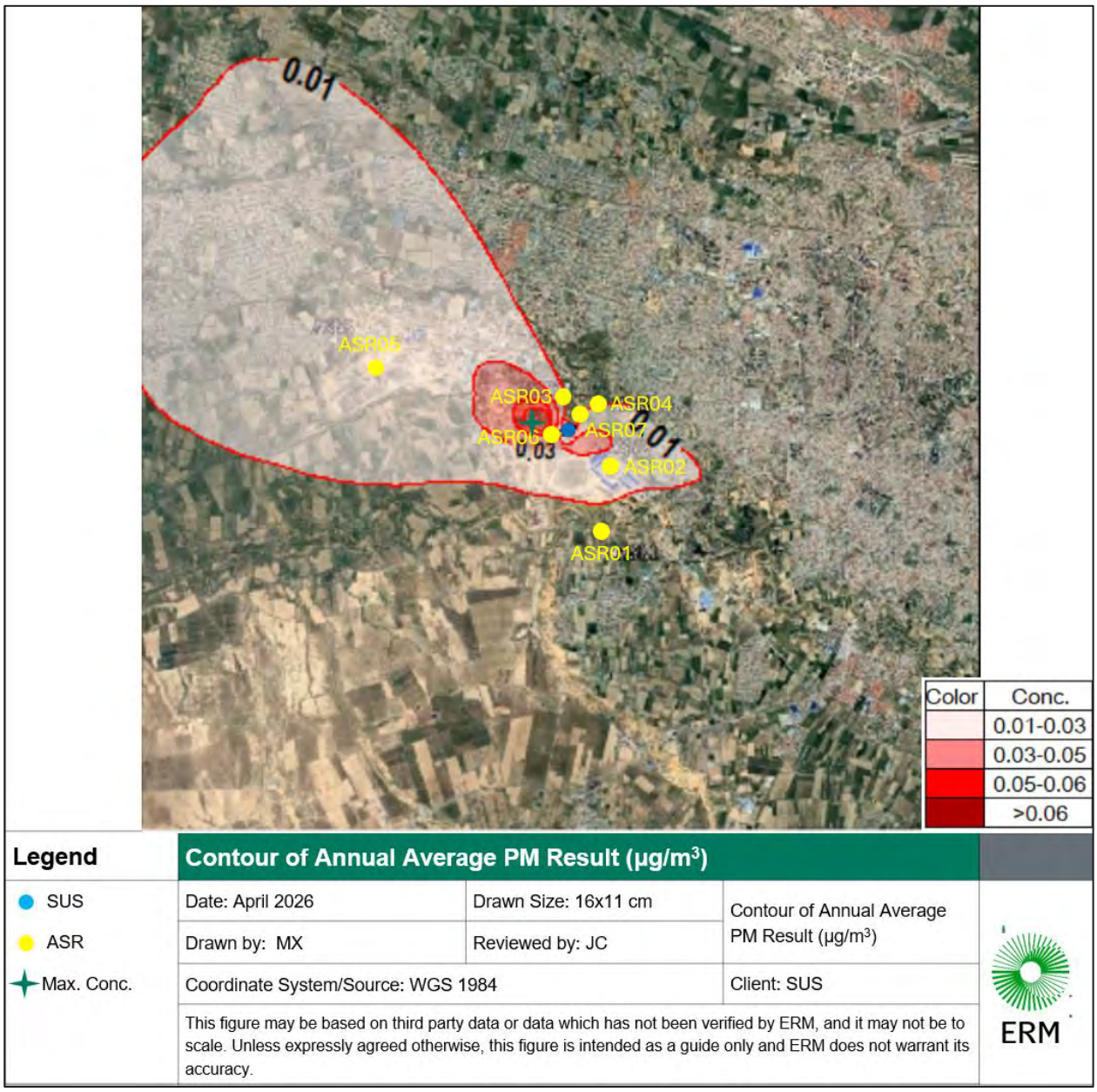
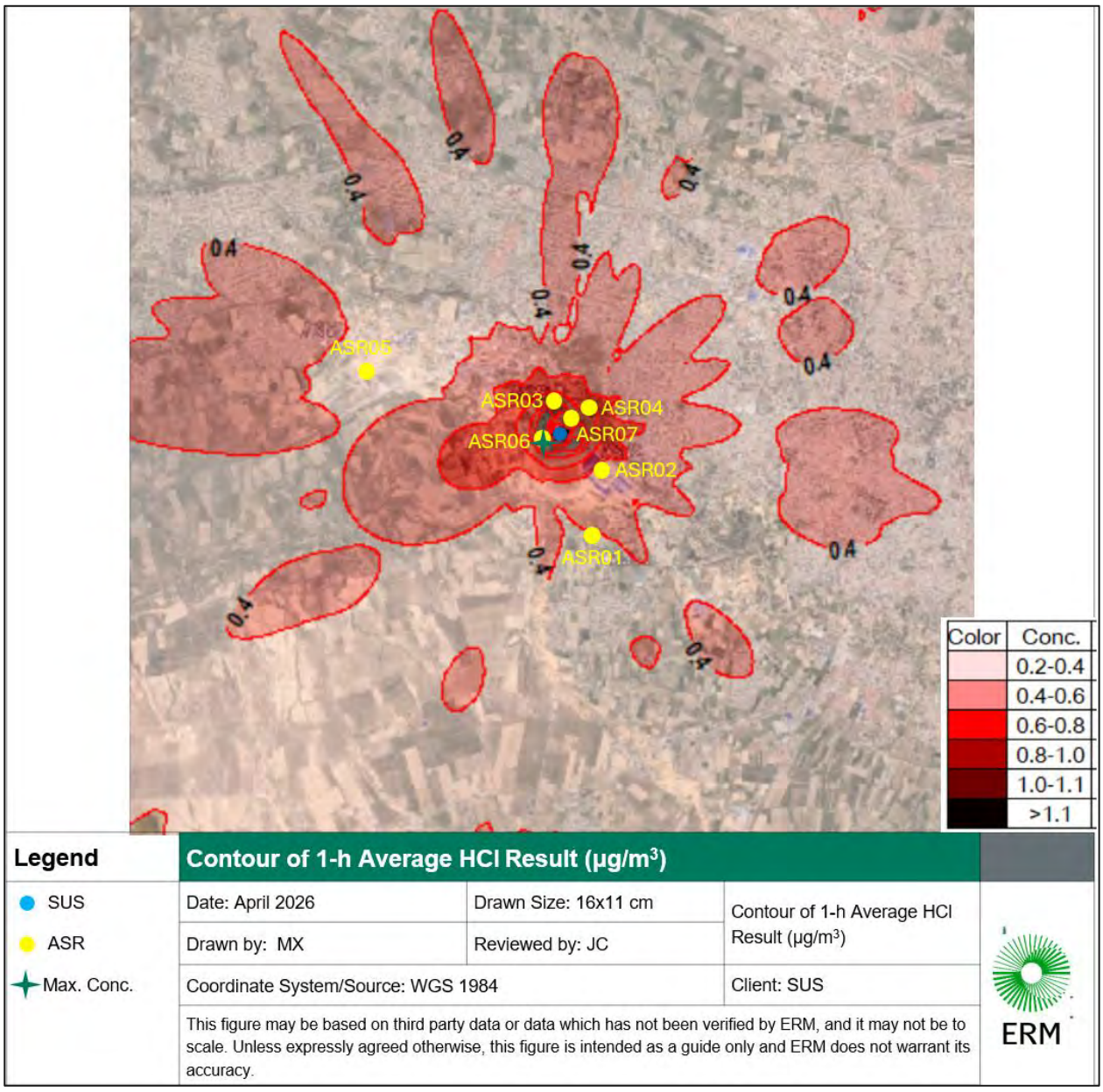


FIGURE C-9 CONTOUR OF 1H AVERAGE HCL RESULT-PROJECT CONTRIBUTION



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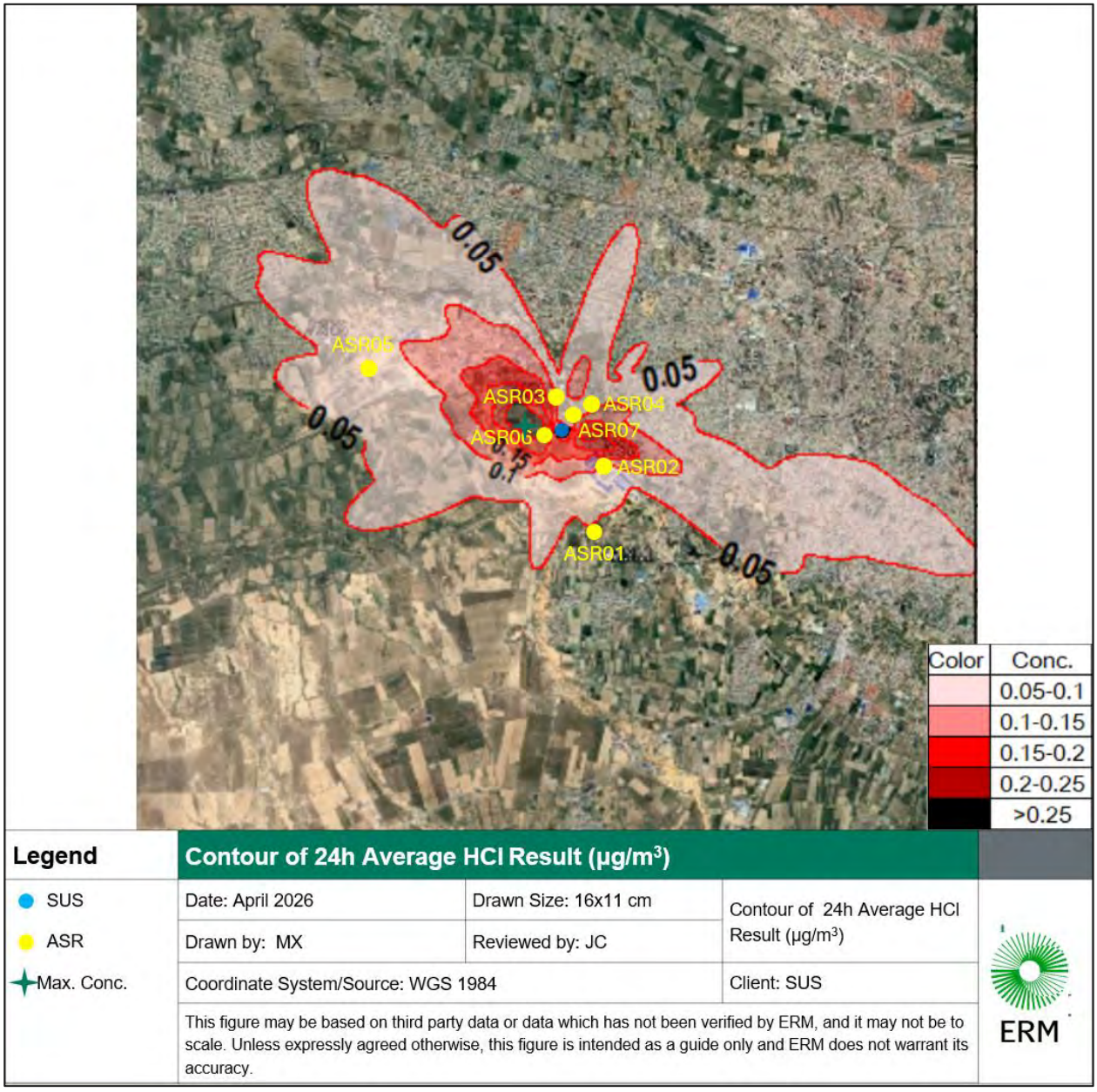


FIGURE C-11 CONTOUR OF ANNUAL AVERAGE HCL RESULT-PROJECT CONTRIBUTION

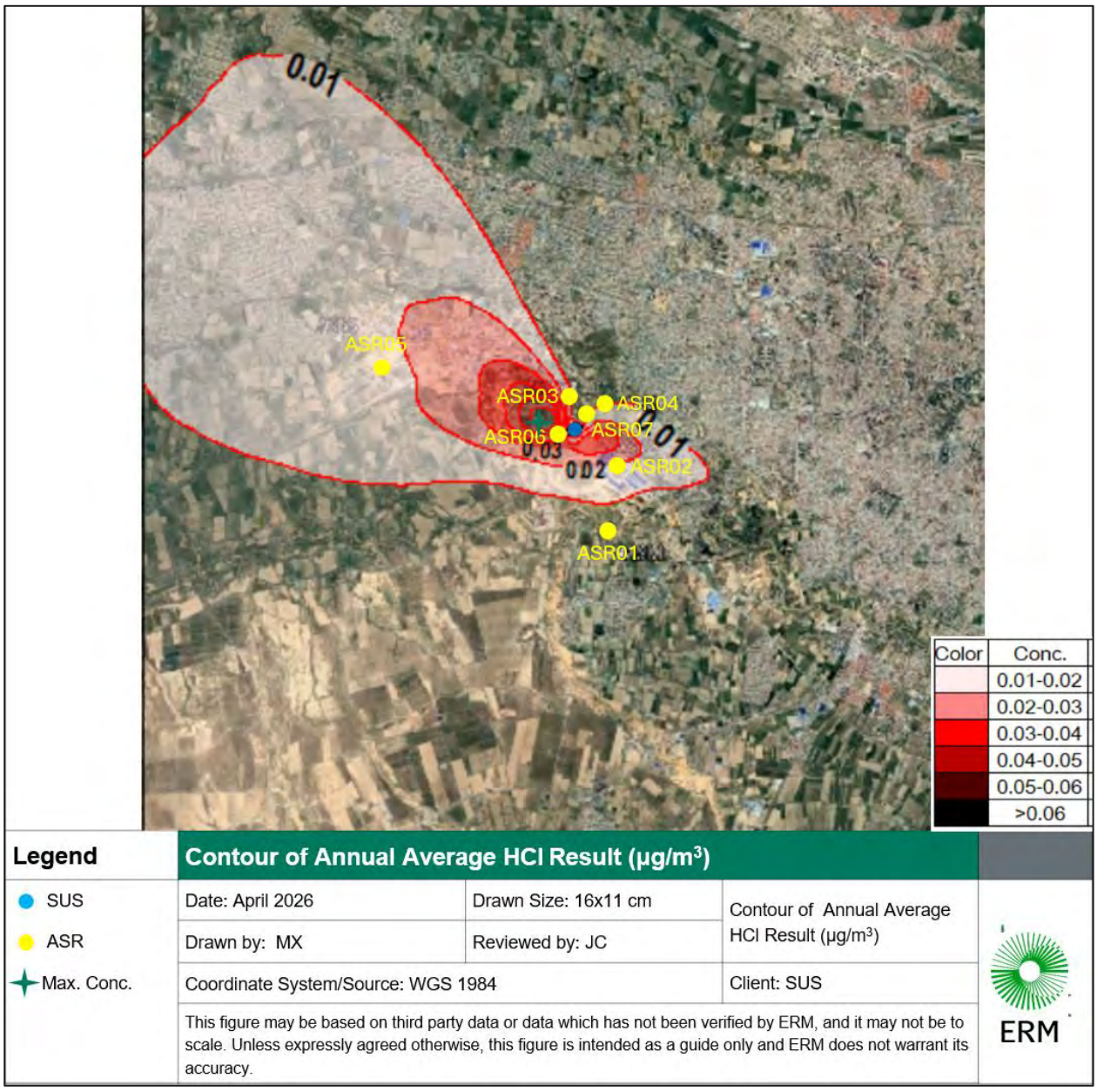


FIGURE C-12 CONTOUR OF 1H AVERAGE HF RESULT-PROJECT CONTRIBUTION

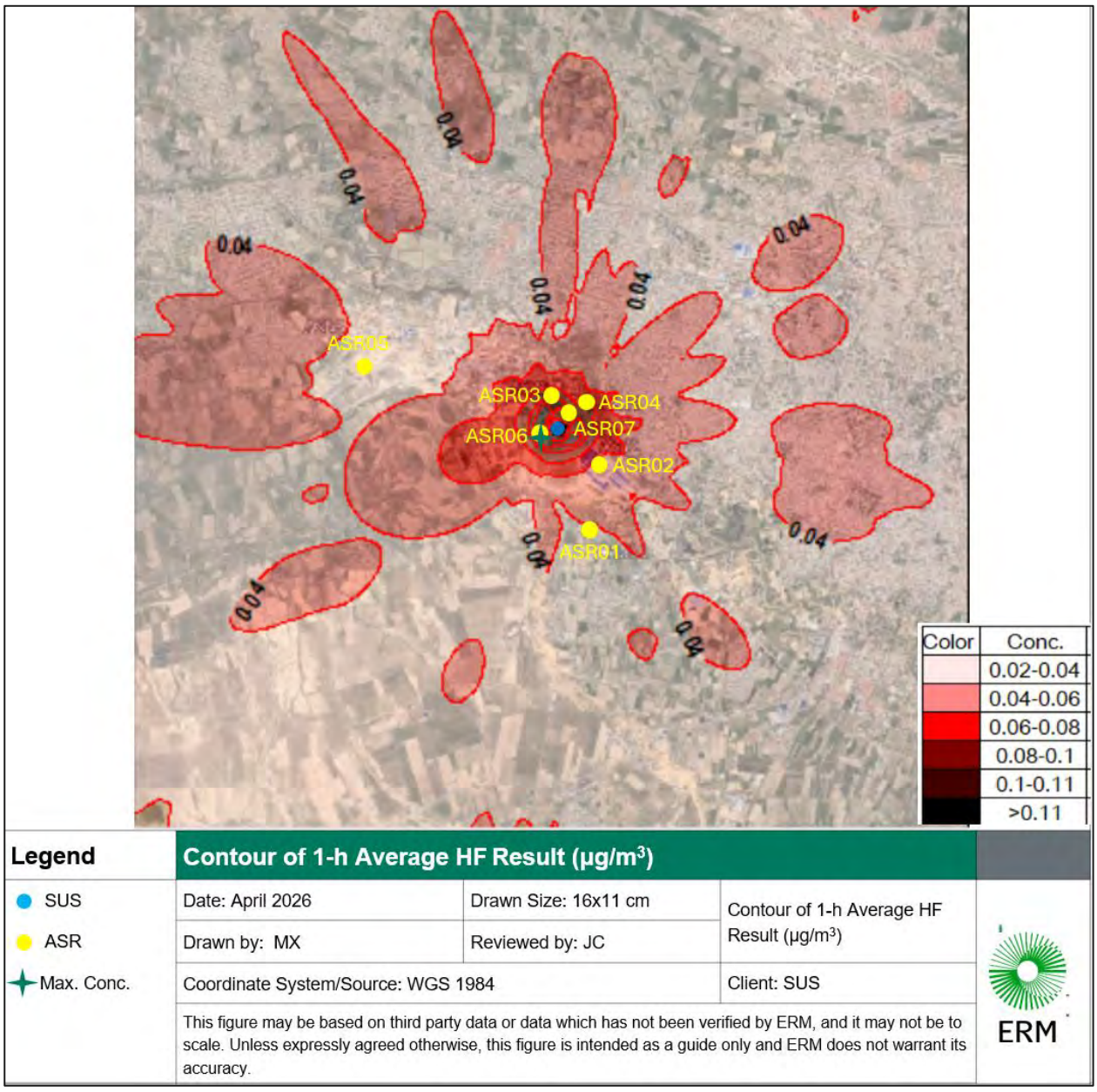
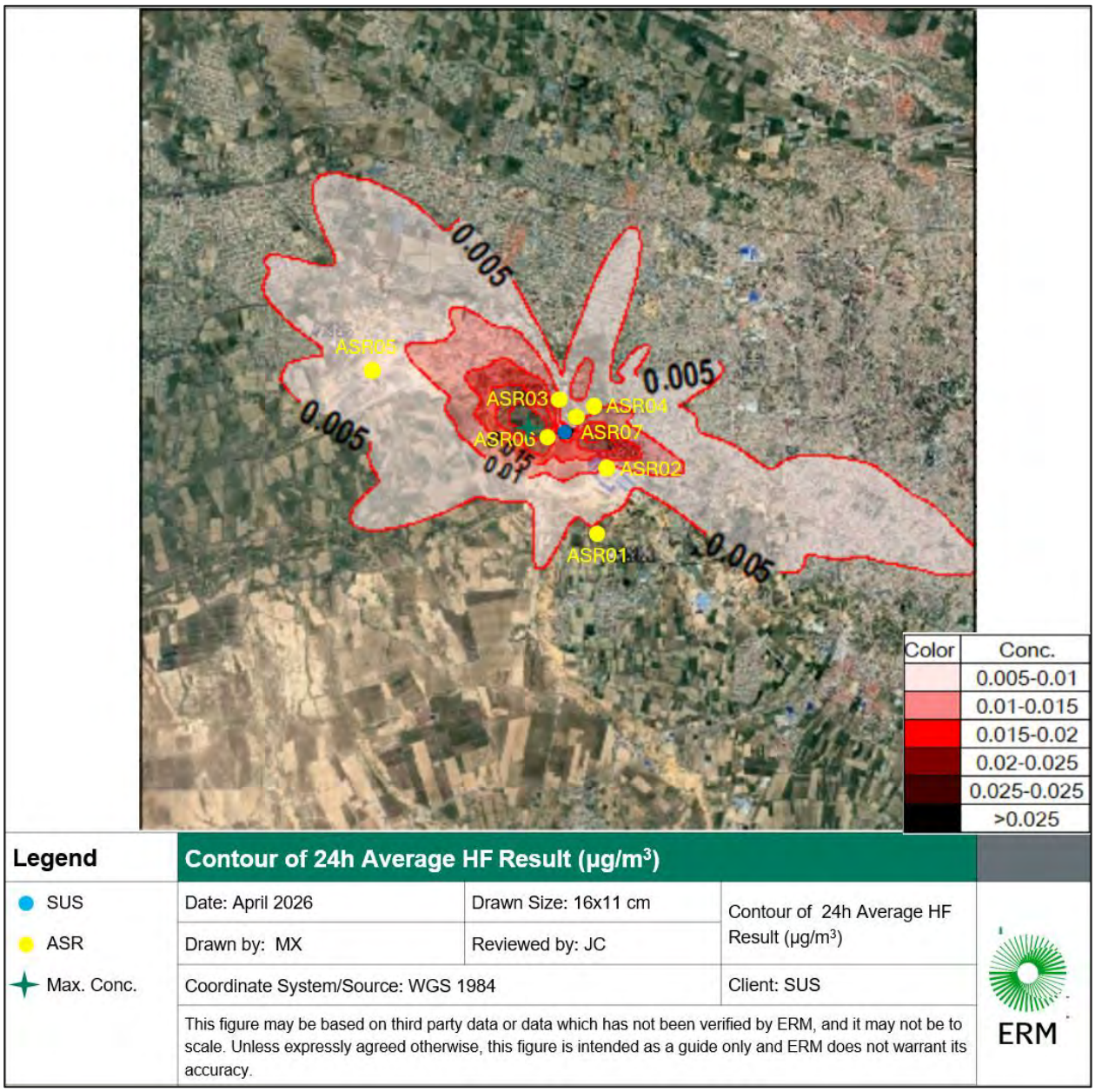


FIGURE C-13 CONTOUR OF 24H AVERAGE HF RESULT-PROJECT CONTRIBUTION



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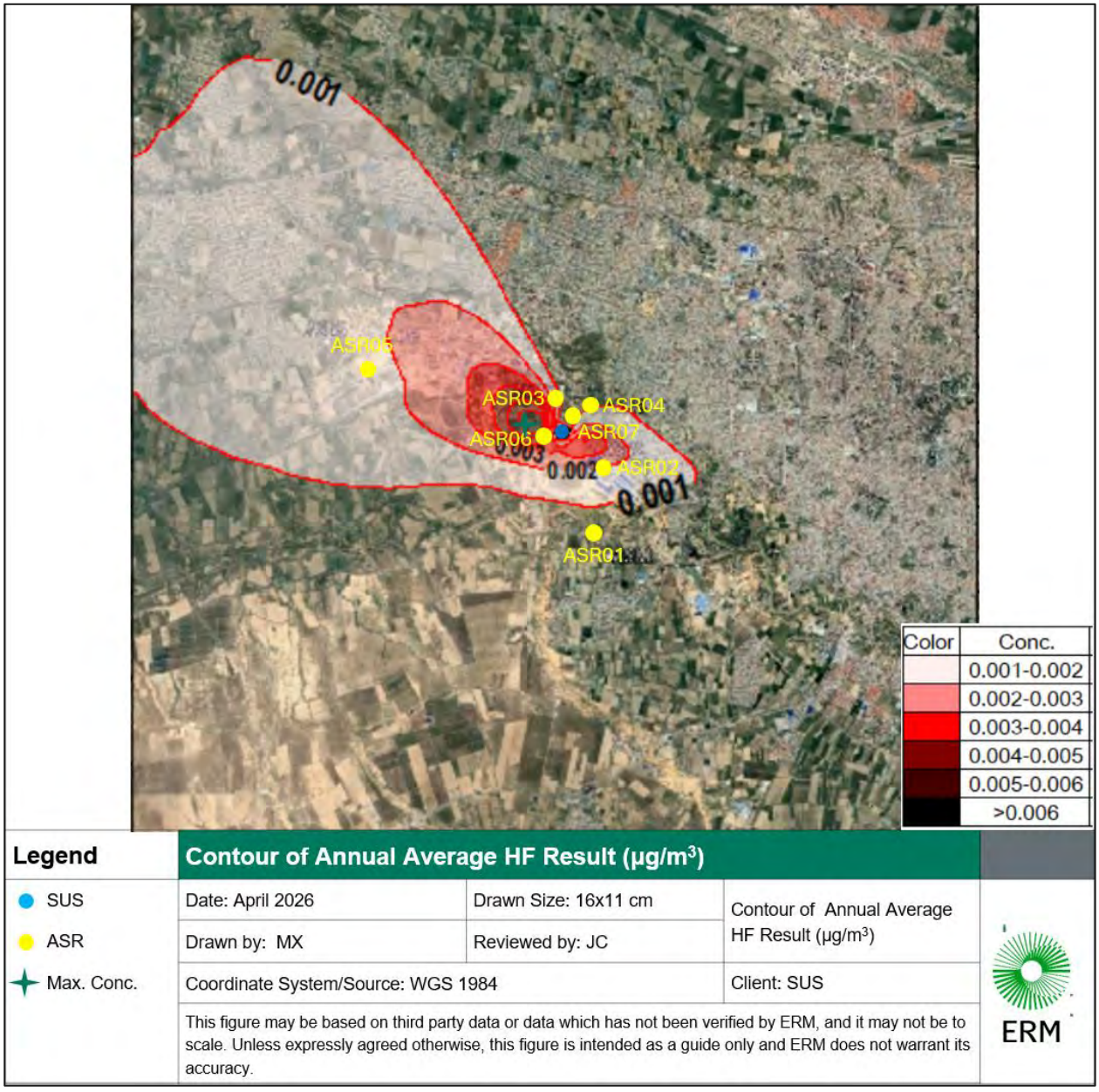
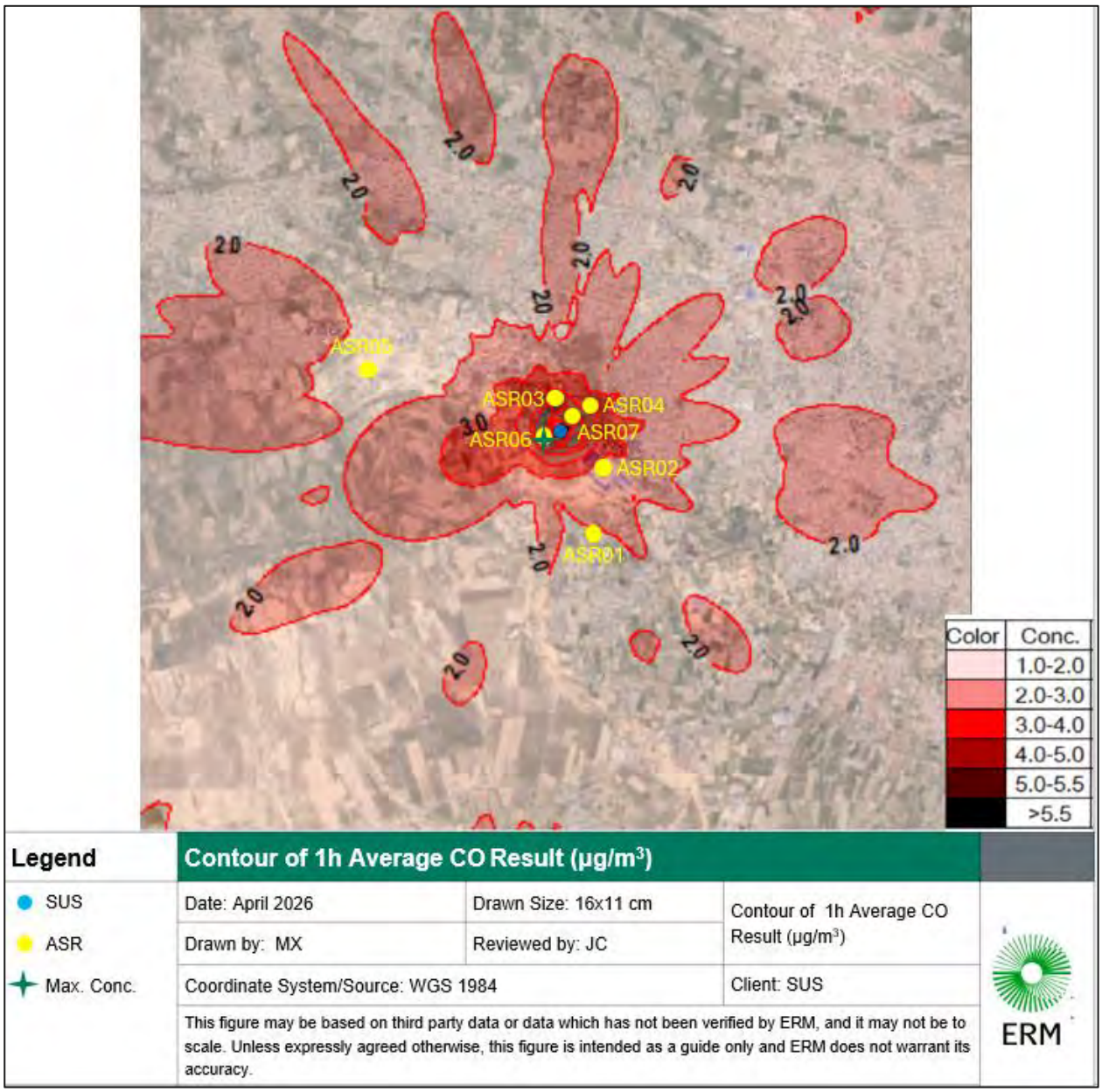


FIGURE C-15 CONTOUR OF 1H AVERAGE CO RESULT-PROJECT CONTRIBUTION



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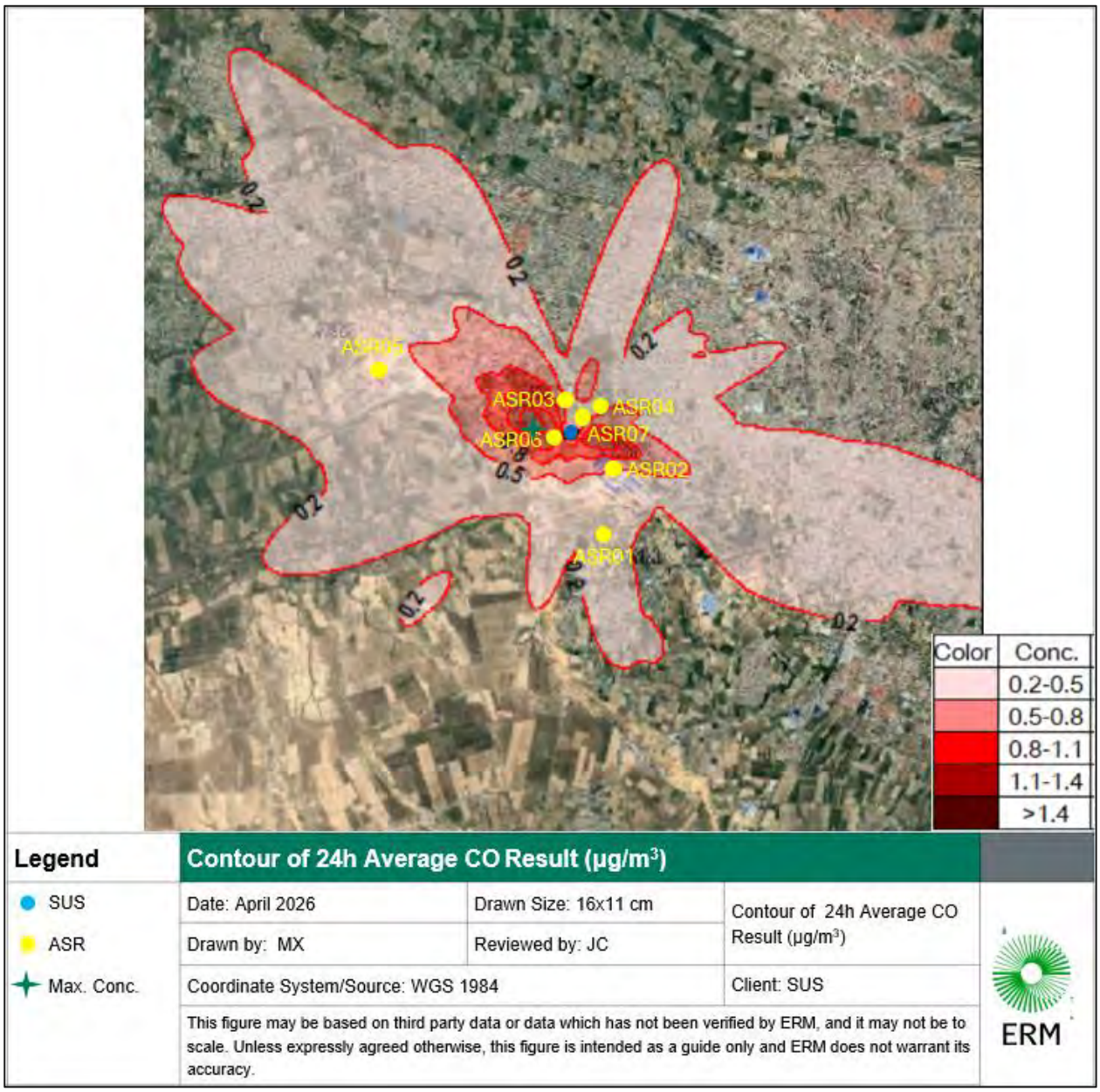


FIGURE C-17 CONTOUR OF Annual AVERAGE CO RESULT-PROJECT CONTRIBUTION

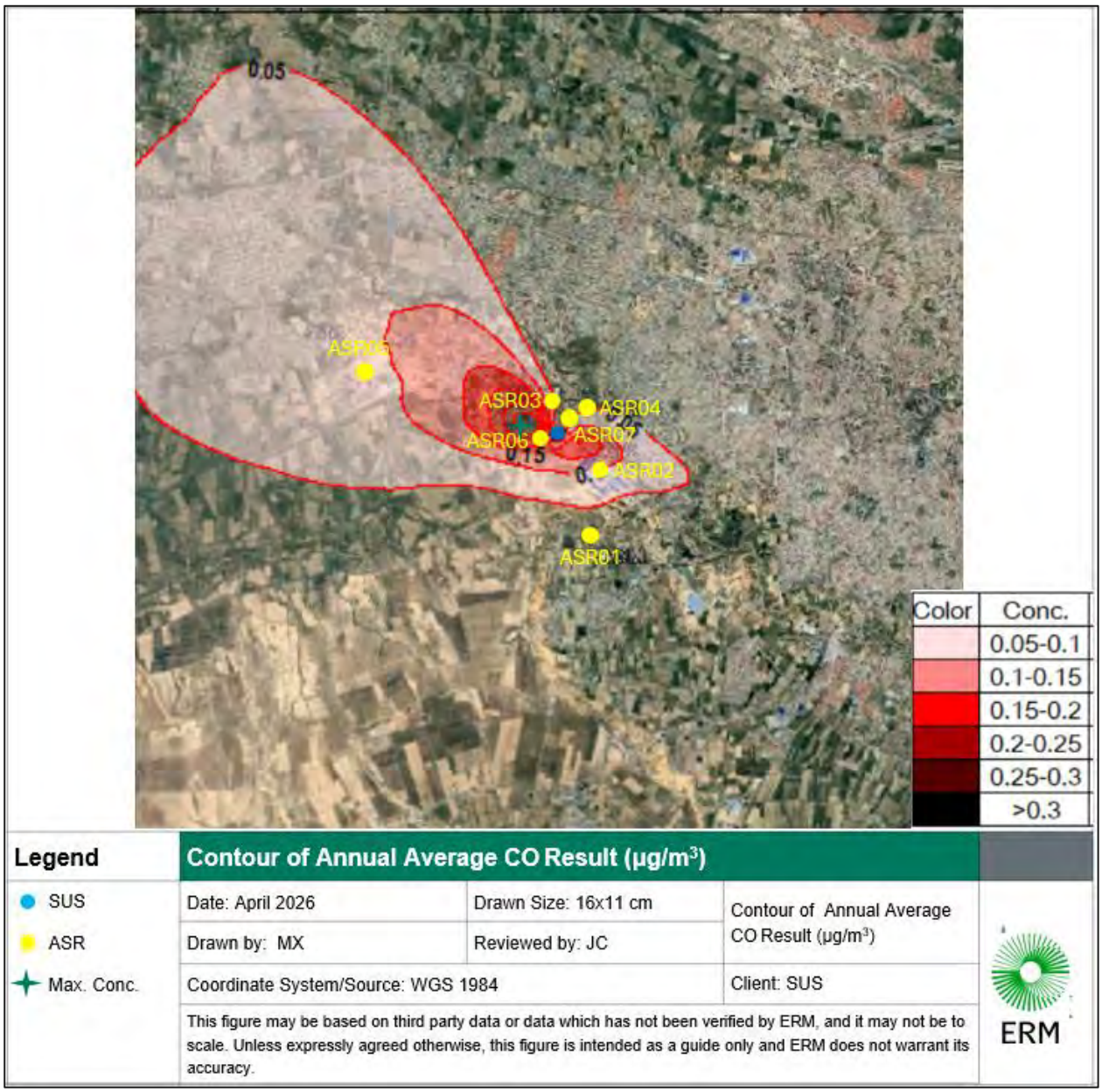


FIGURE C-18 CONTOUR OF 1H AVERAGE NH_3 RESULT-PROJECT CONTRIBUTION

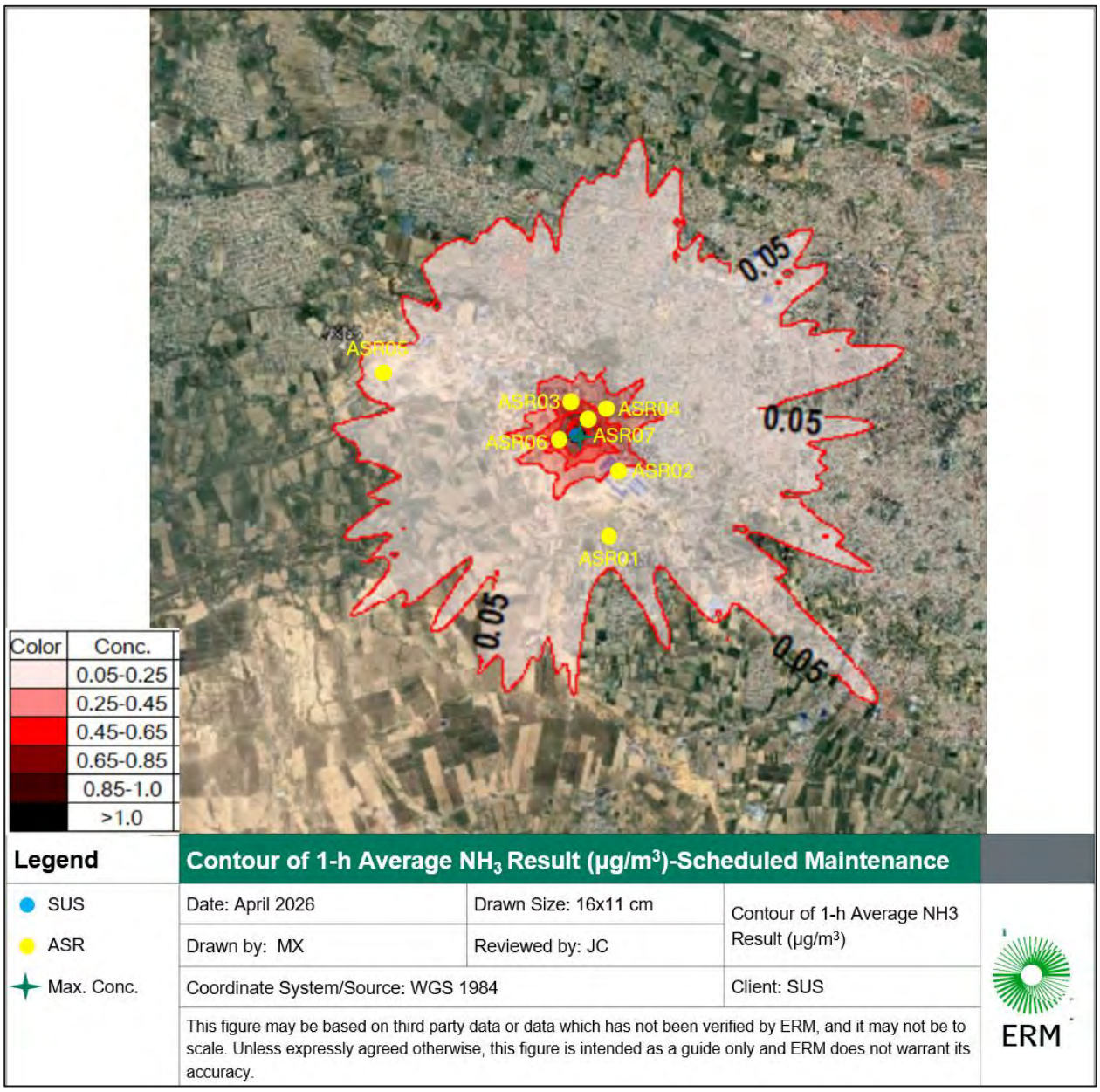


FIGURE C-19 CONTOUR OF 24H AVERAGE NH_3 RESULT-PROJECT CONTRIBUTION

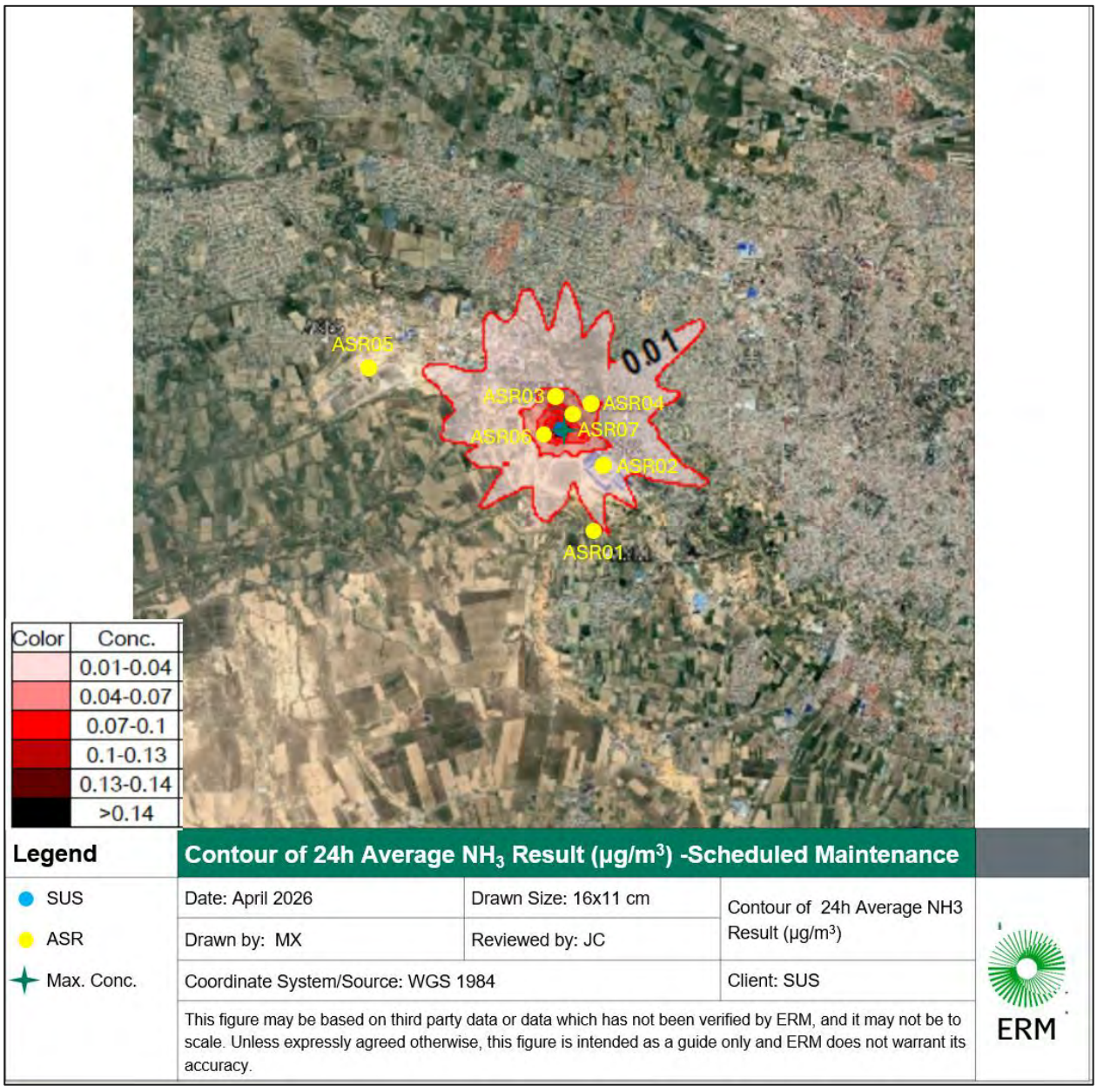


FIGURE C-20 CONTOUR OF ANNUAL AVERAGE NH_3 RESULT-PROJECT CONTRIBUTION

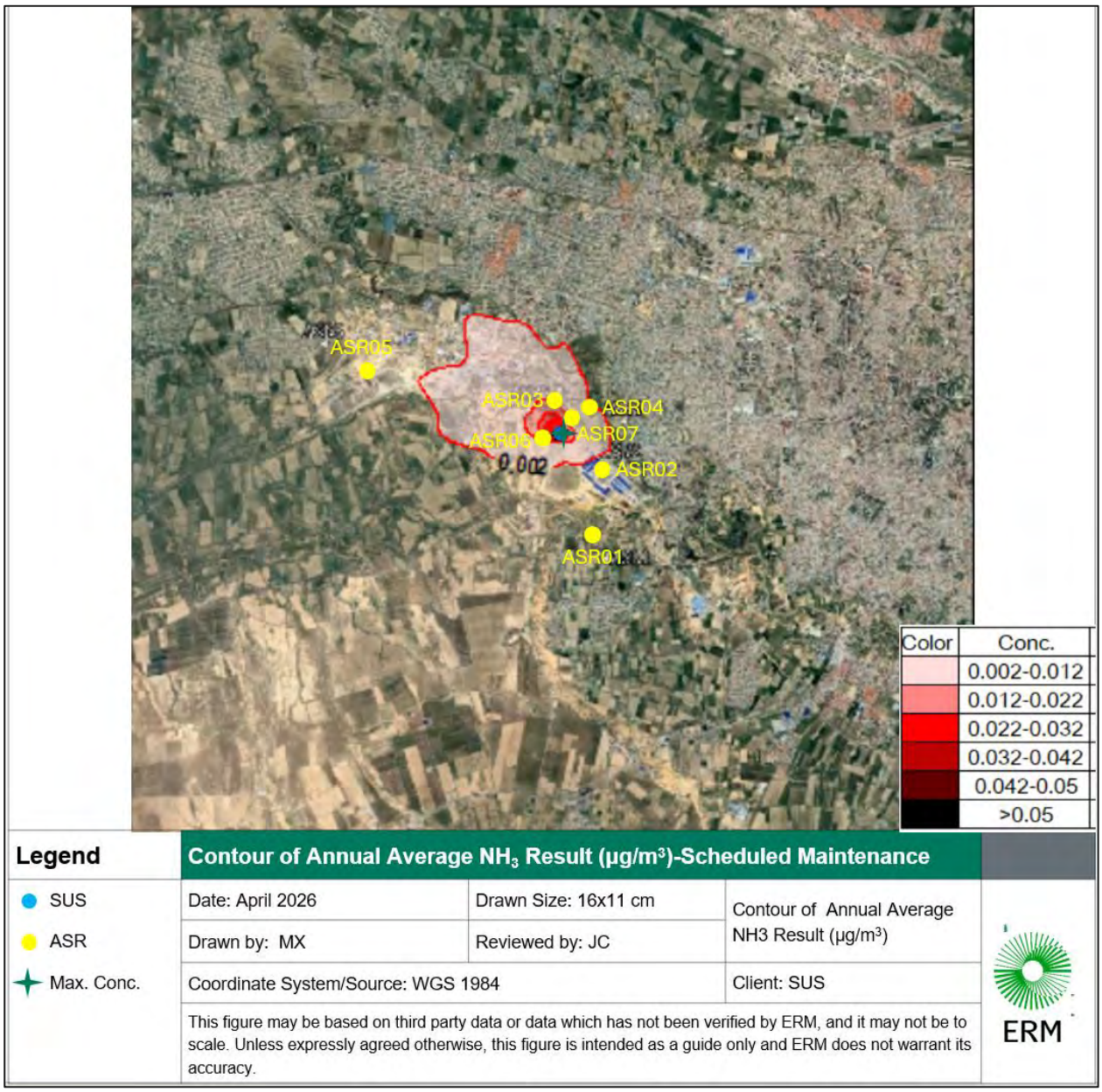
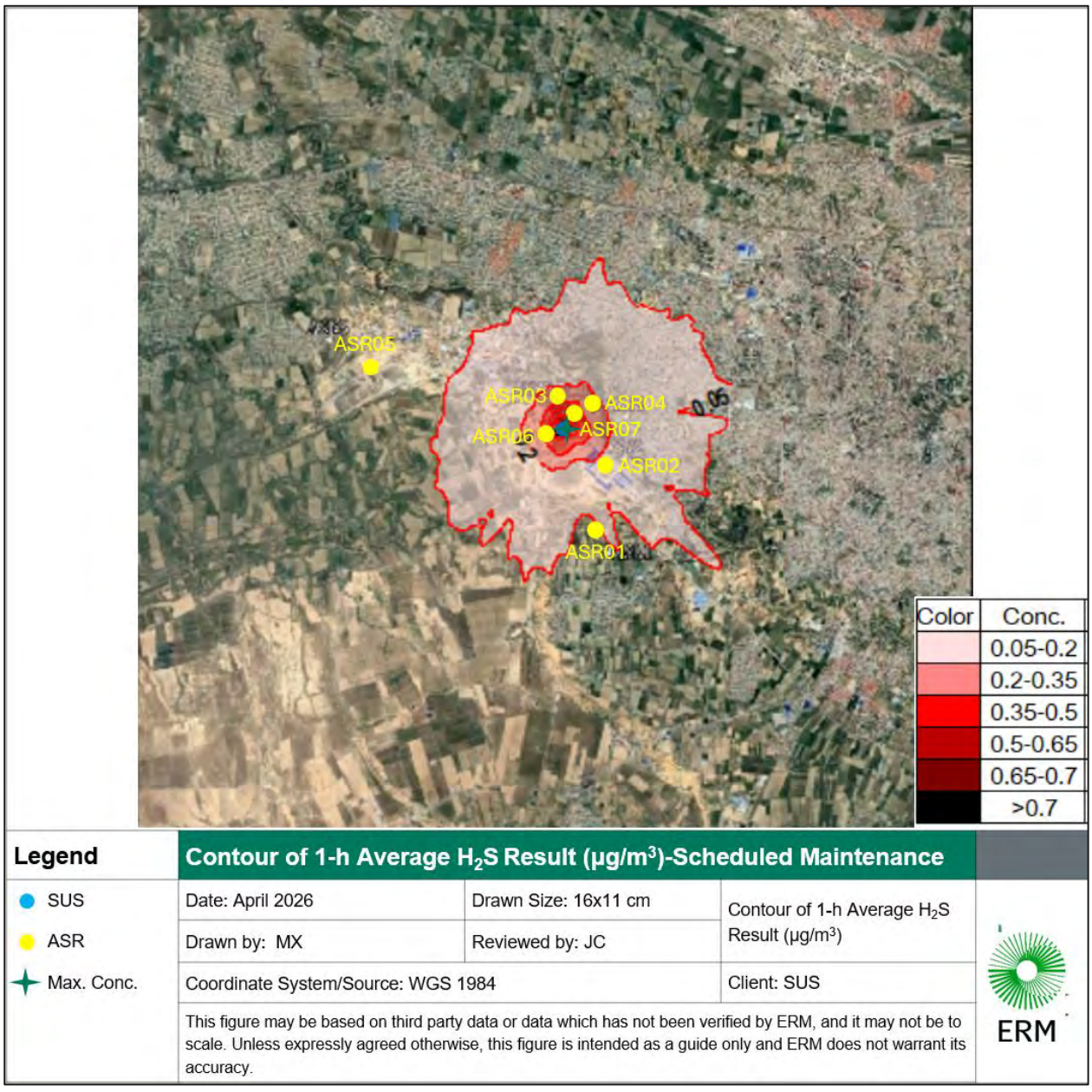


FIGURE C-21 CONTOUR OF 1H AVERAGE H_2S RESULT-PROJECT CONTRIBUTION



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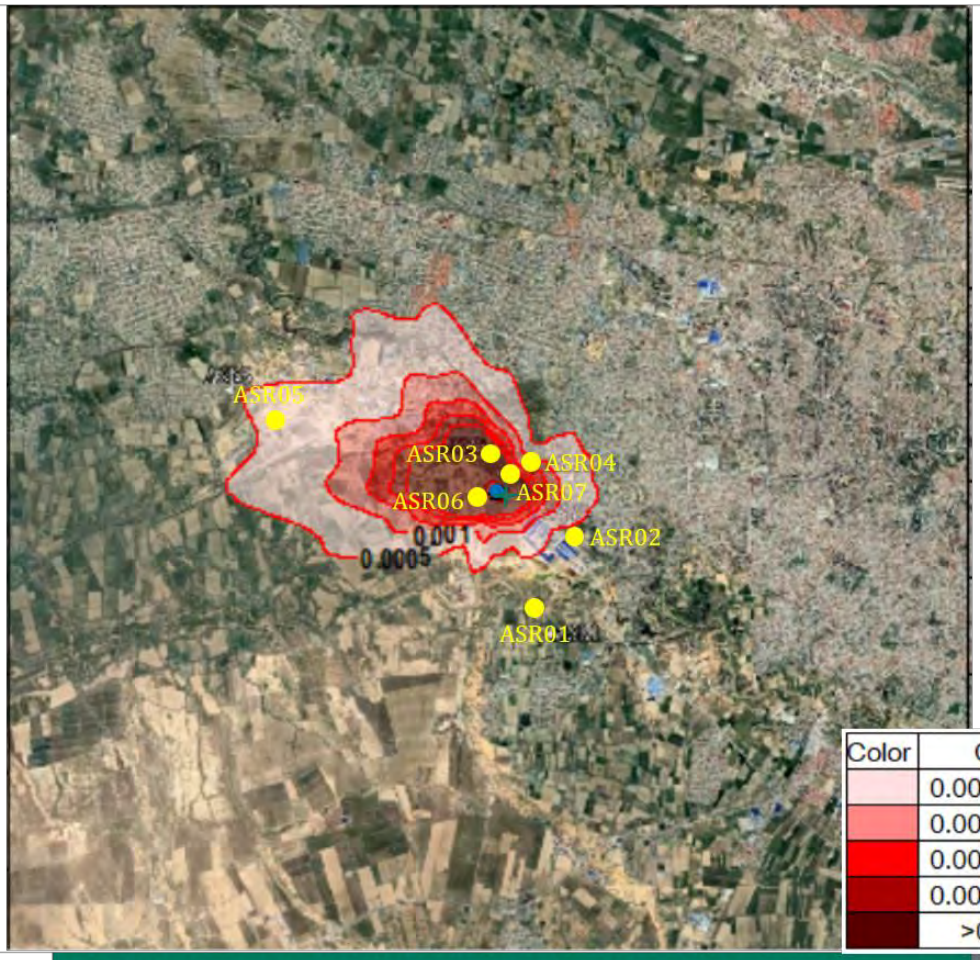


Legend	Contour of 24-h Average H_2S Result (µg/m³)		
SUS	Date: April 2026	Drawn Size: 16x11 cm	Contour of 23-h Average H_2S Result (µg/m³)
ASR	Drawn by: MX	Reviewed by: JC	
Max. Conc.	Coordinate System/Source: WGS 1984		Client: SUS
	This figure may be based on third party data or data which has not been verified by ERM, and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

FIGURE C-23 CONTOUR OF 1H AVERAGE PB RESULT-PROJECT CONTRIBUTION

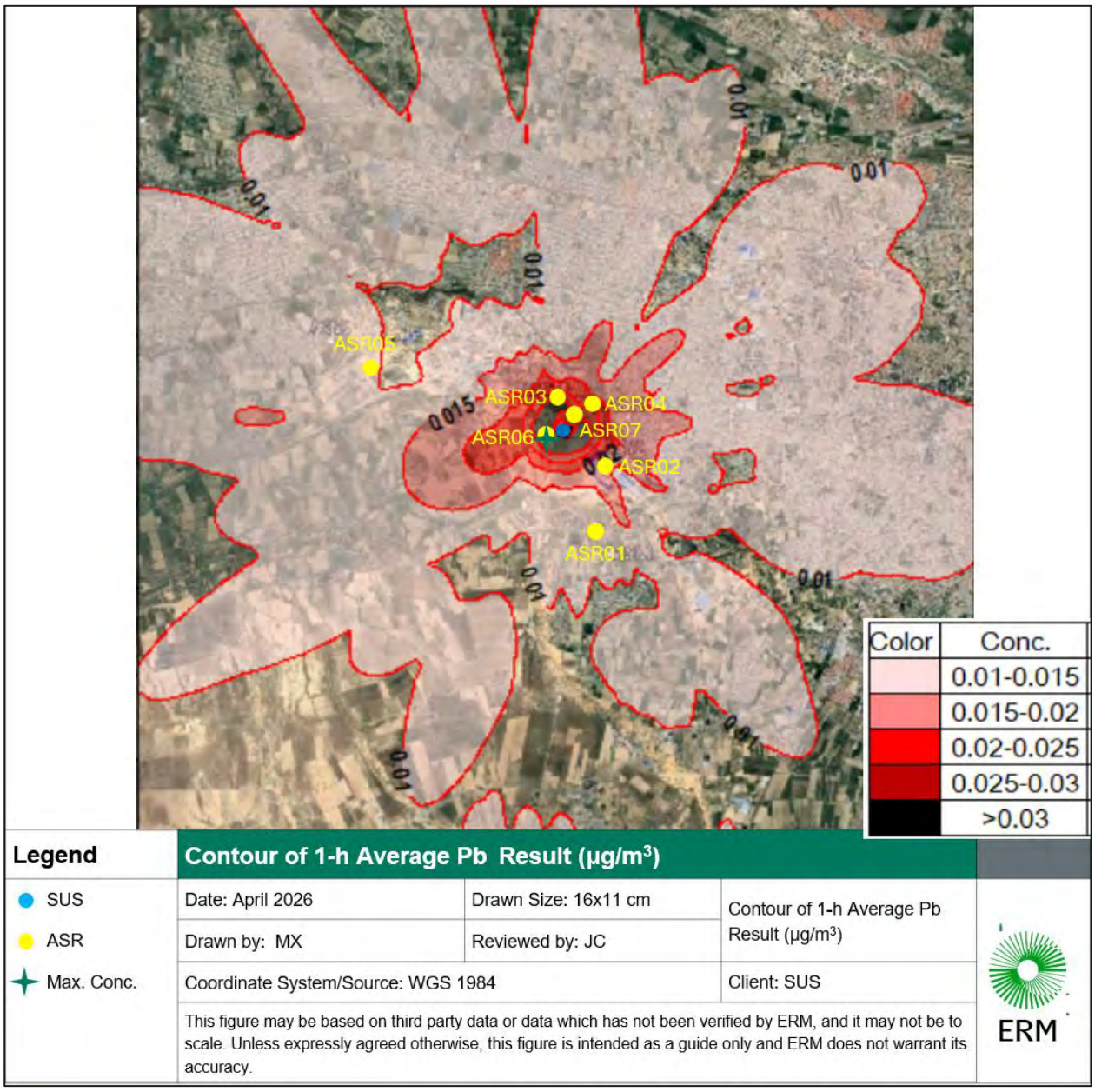


FIGURE C-24 CONTOUR OF 24H AVERAGE PB RESULT-PROJECT CONTRIBUTION

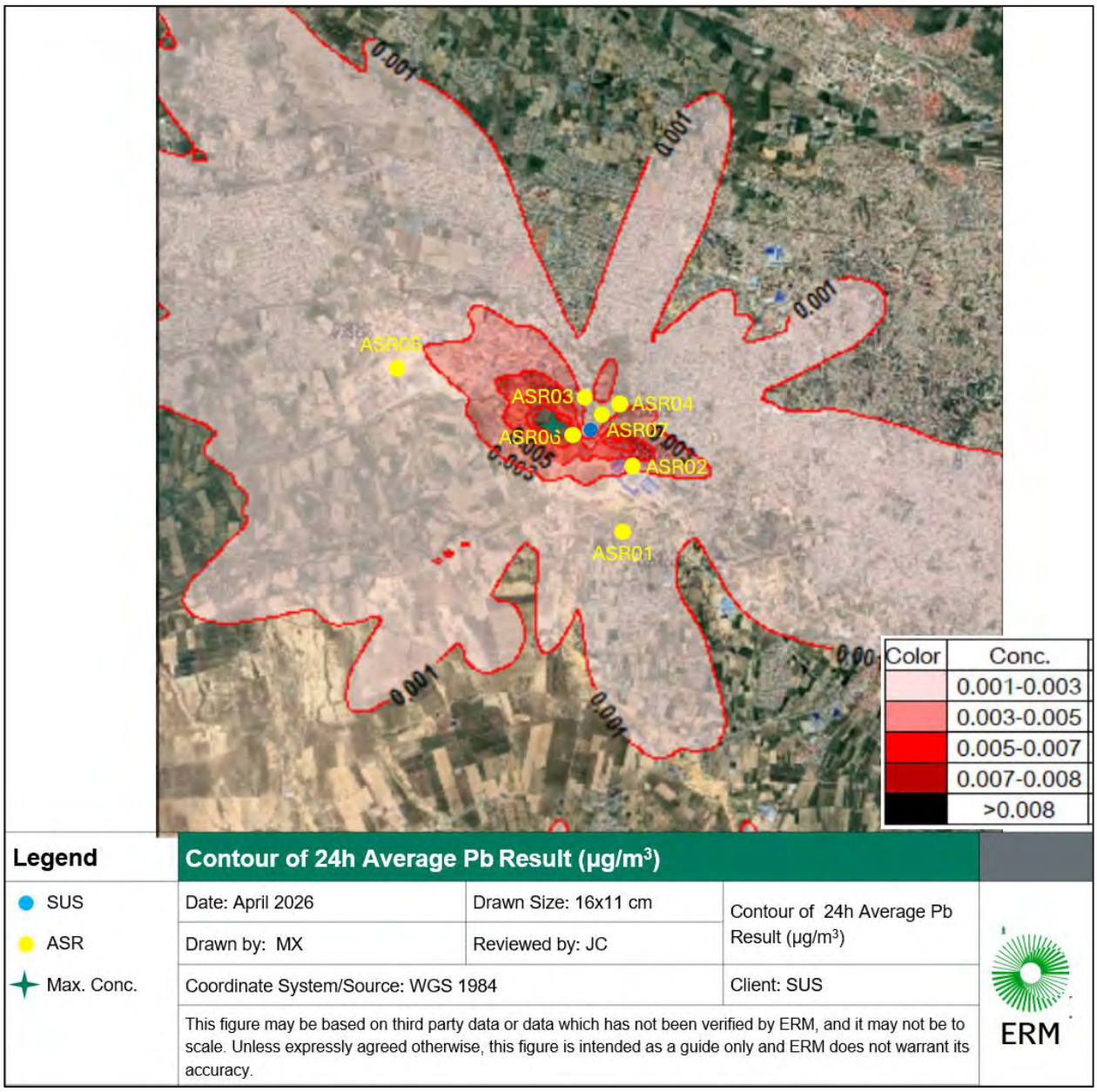


FIGURE C-25 CONTOUR OF ANNUAL AVERAGE PB RESULT-PROJECT CONTRIBUTION

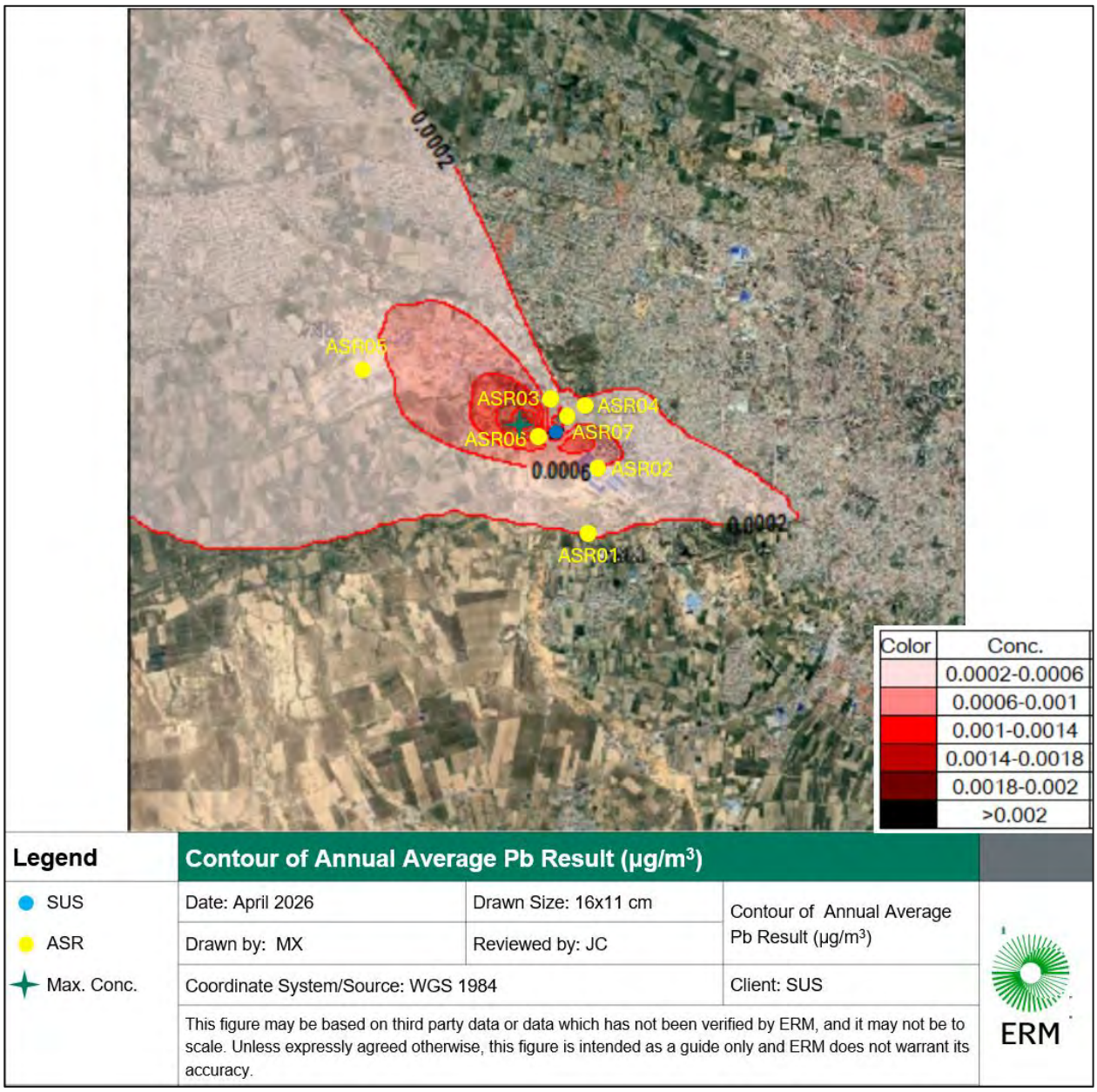
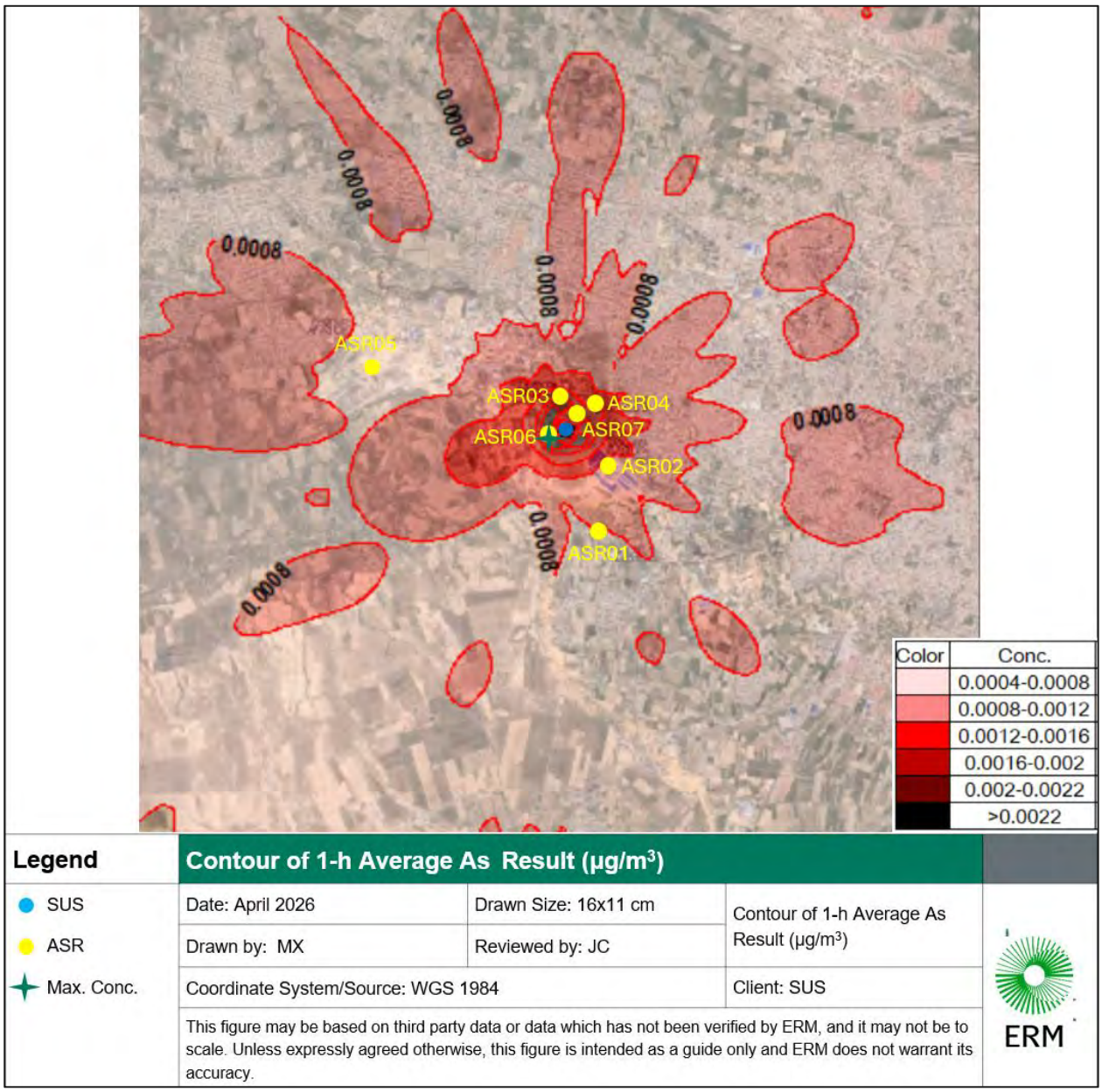


FIGURE C-26 CONTOUR OF 1H AVERAGE AS RESULT-PROJECT CONTRIBUTION



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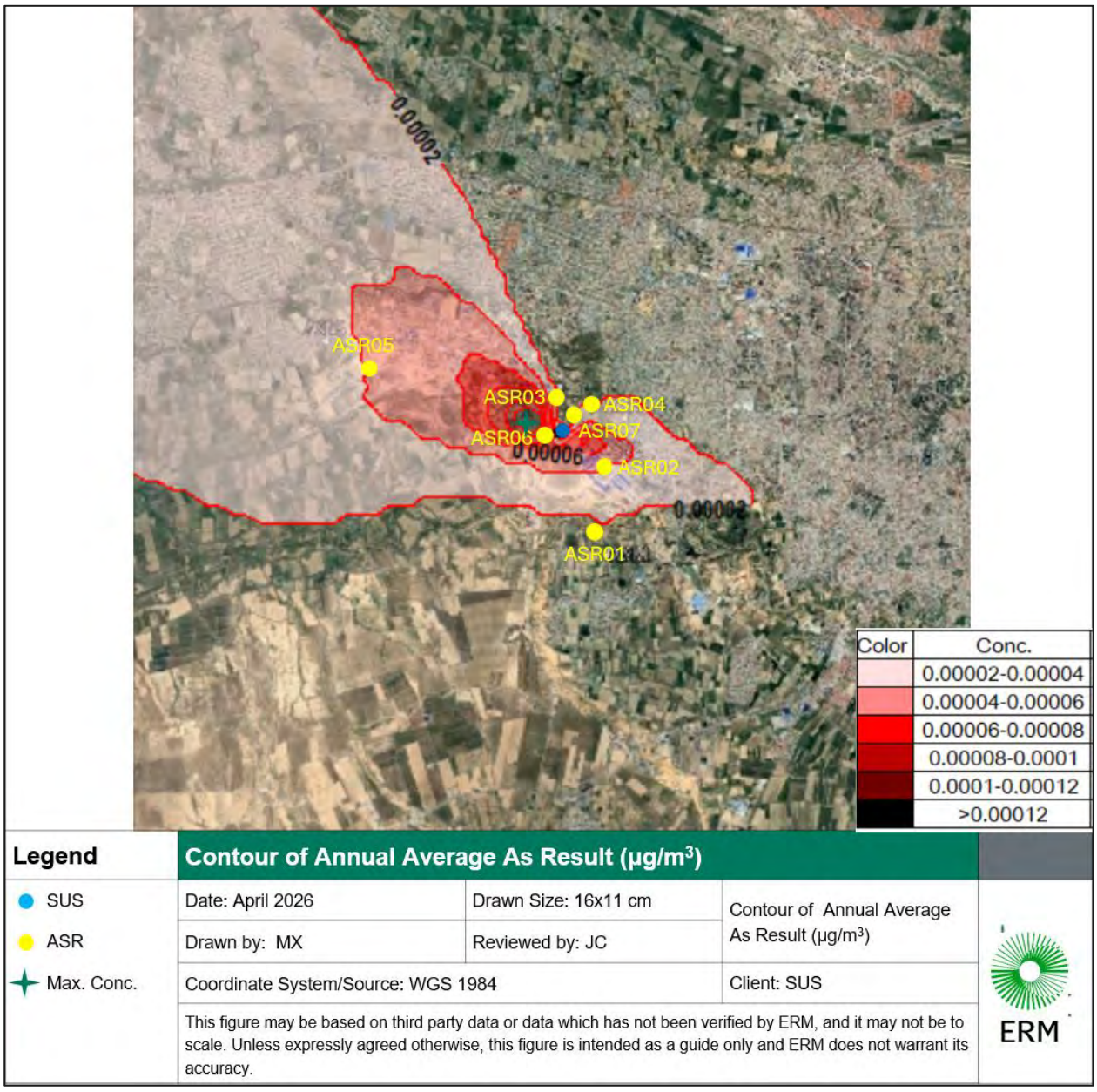

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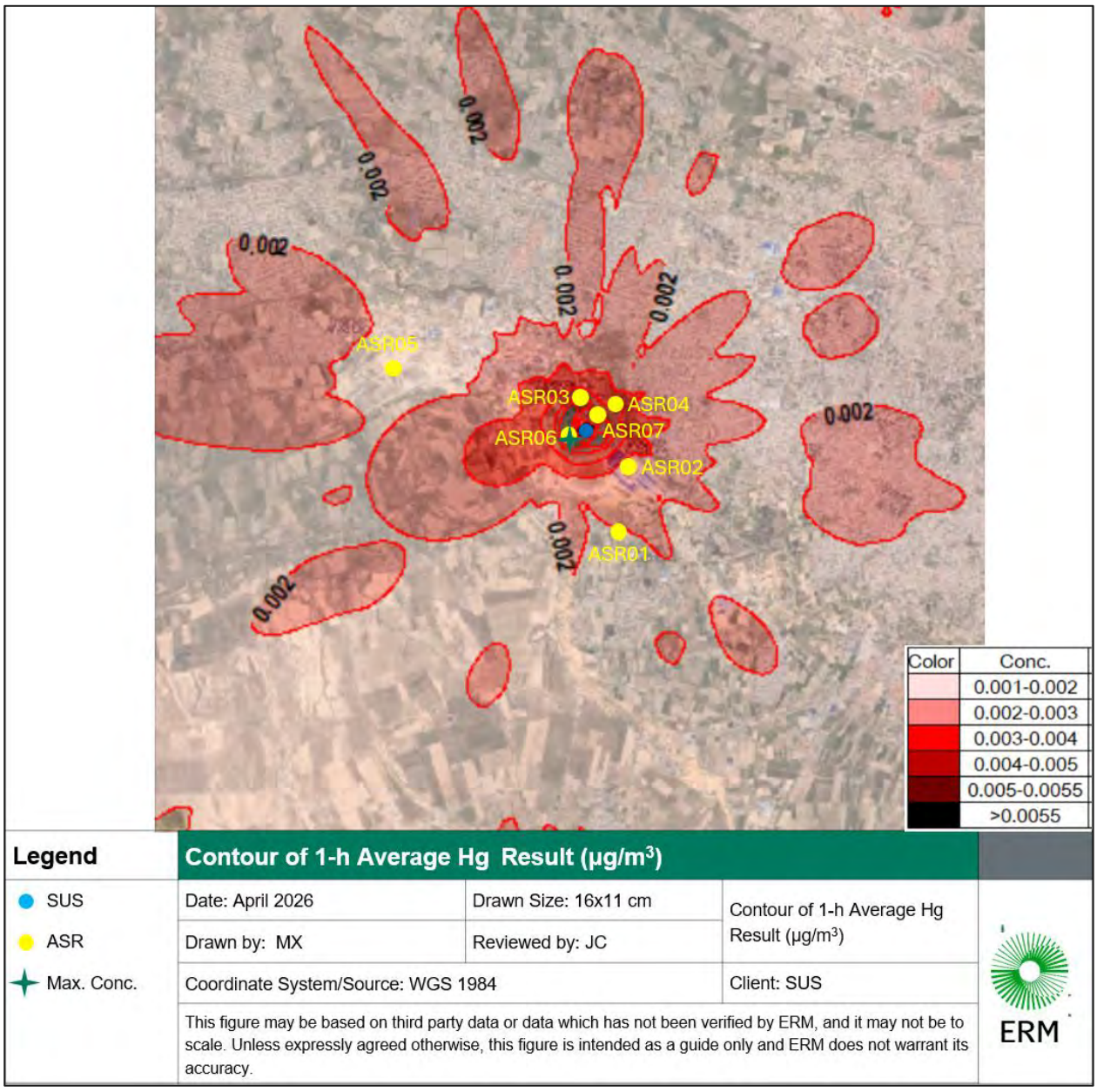

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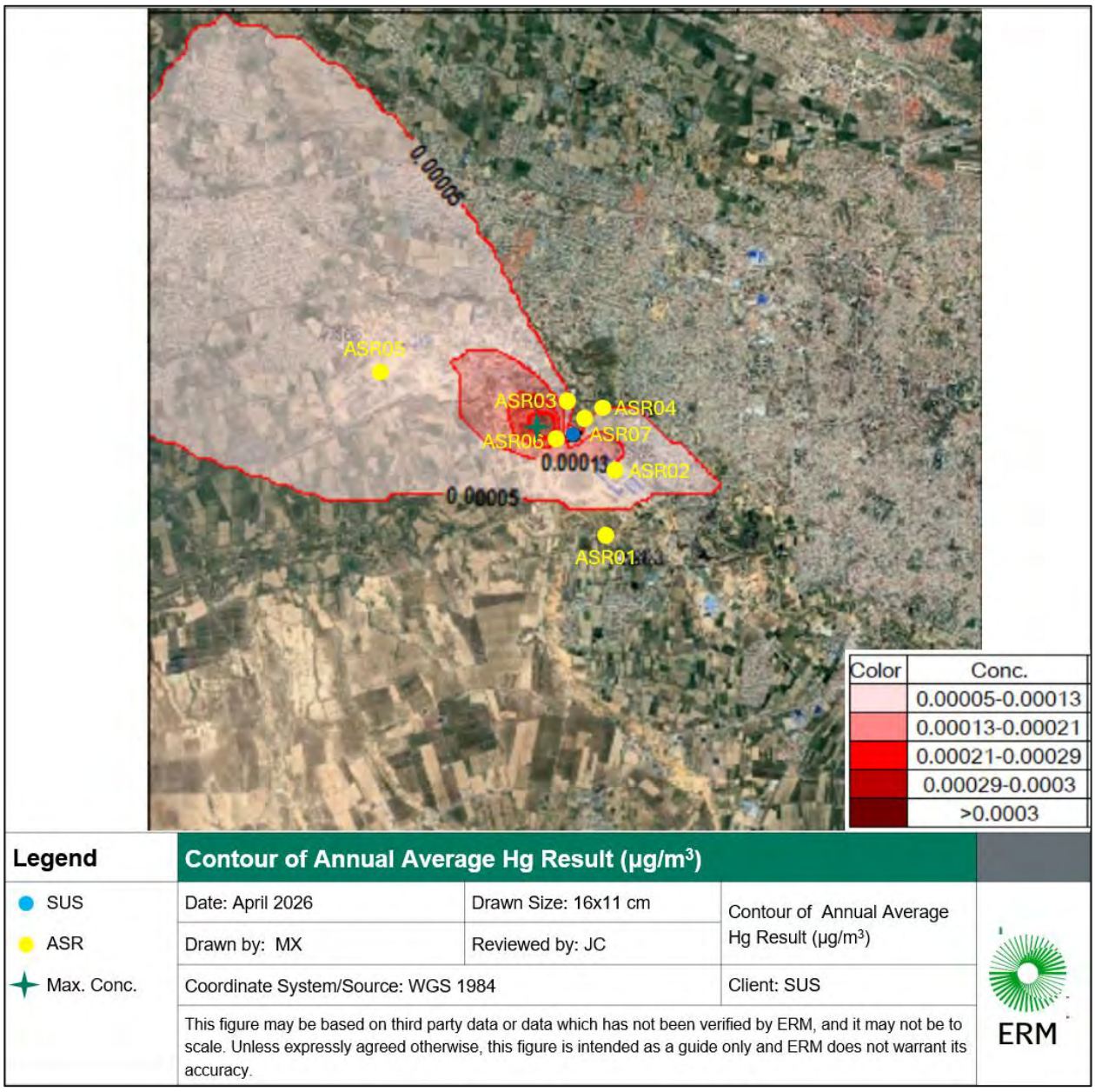

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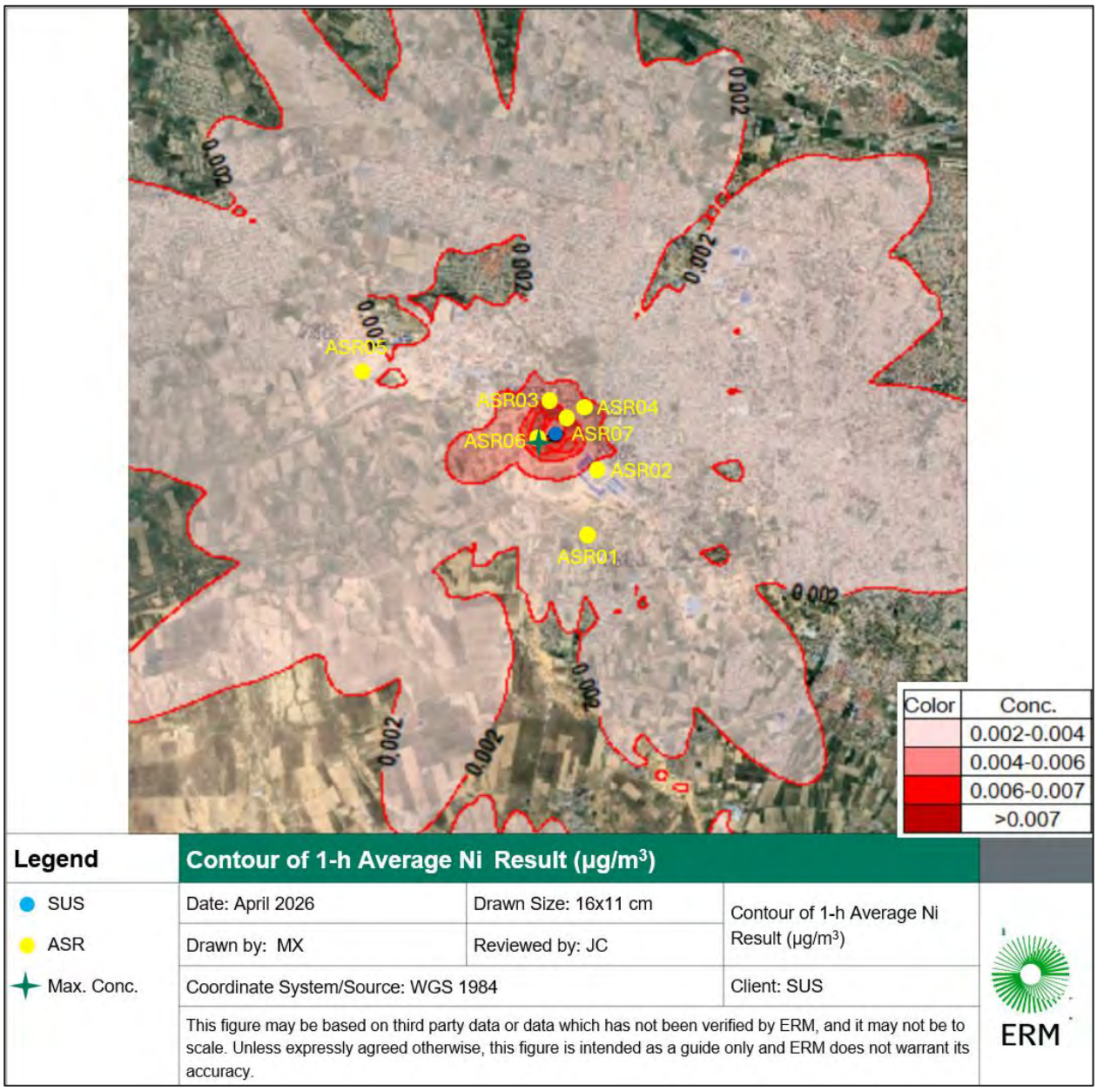

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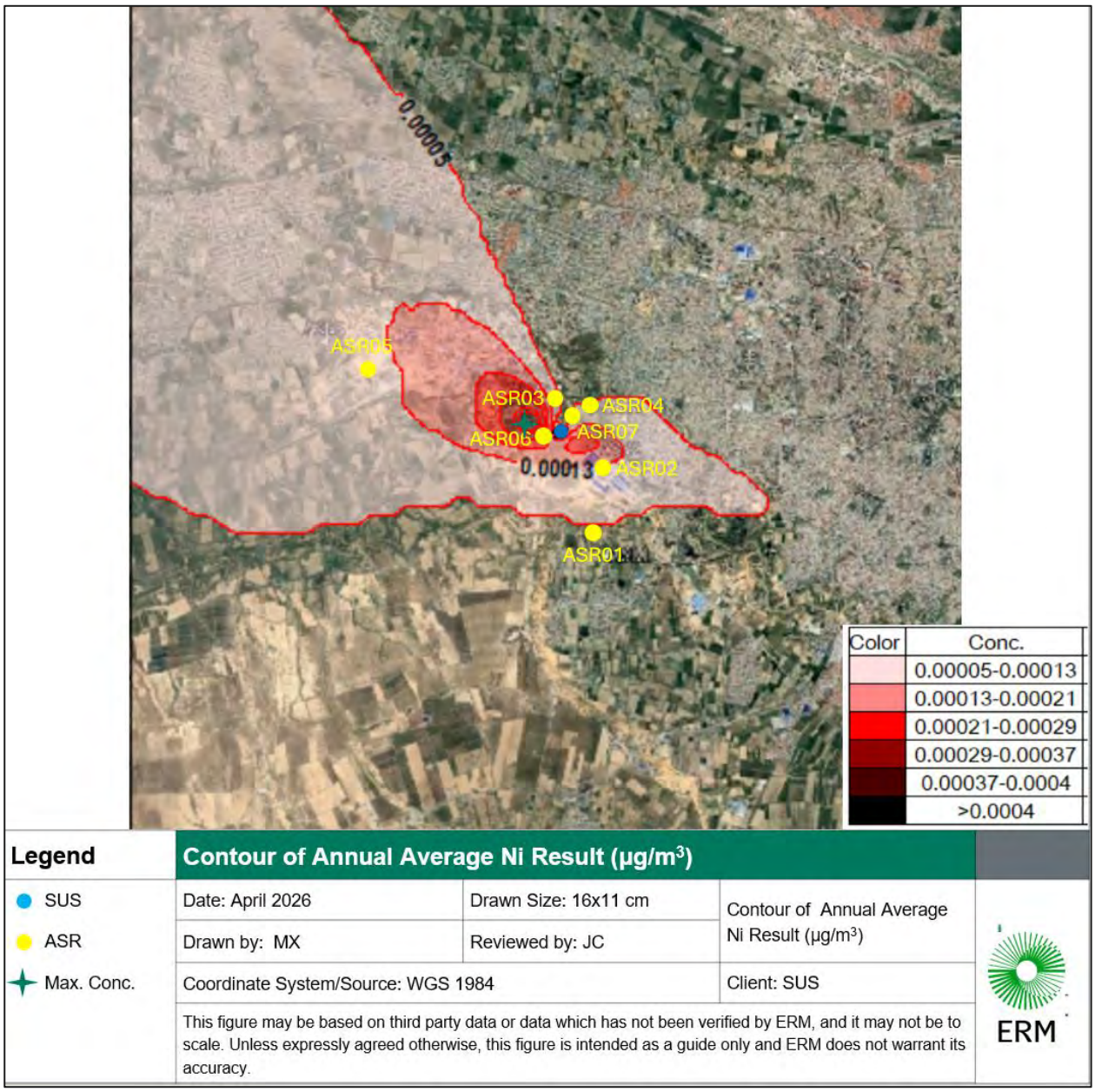


FIGURE C-32 CONTOUR OF 1H AVERAGE MN RESULT-PROJECT CONTRIBUTION

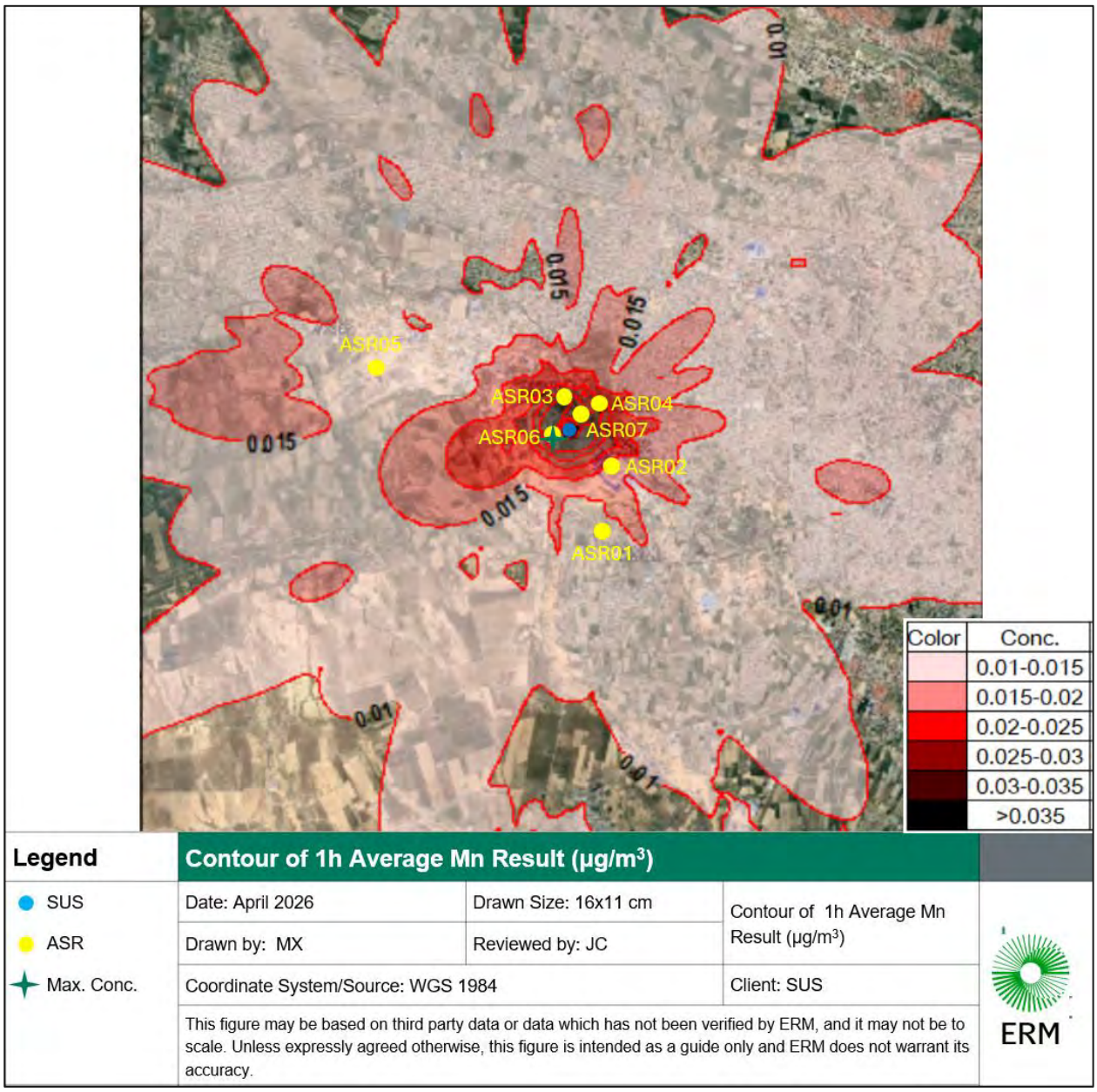
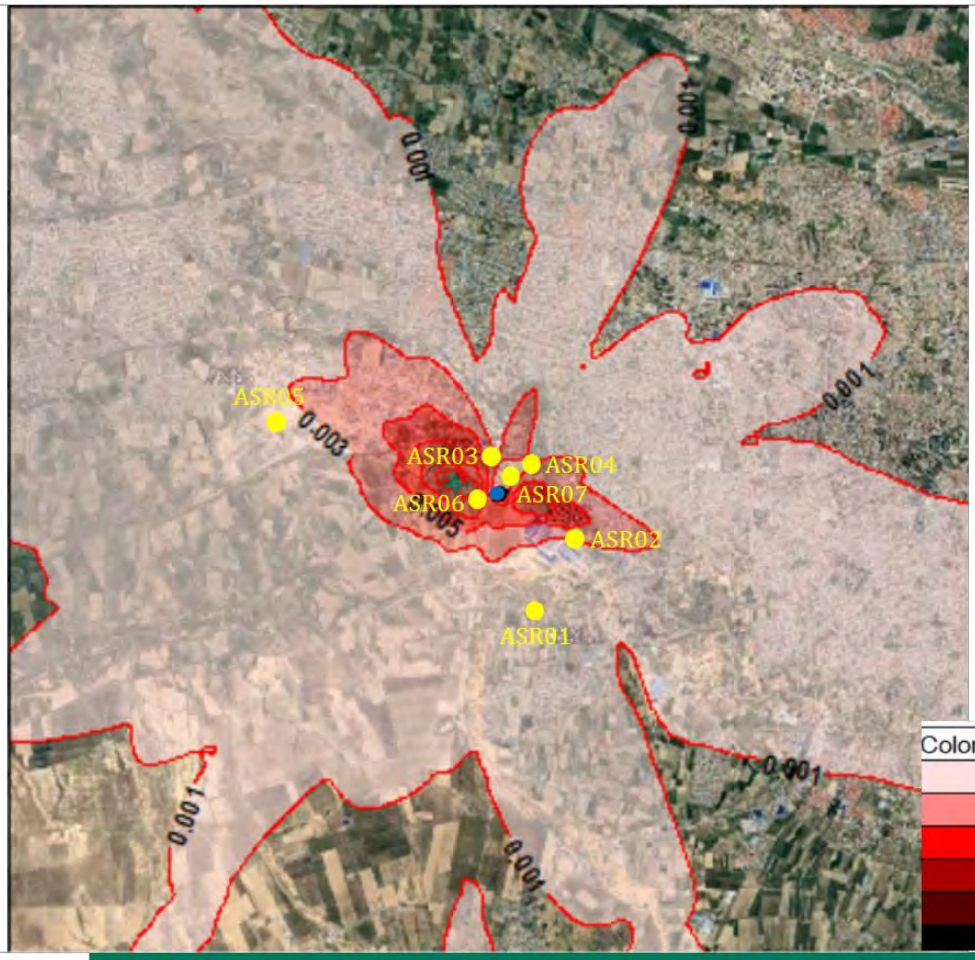


FIGURE C-33 CONTOUR OF 24-HOUR AVERAGE MN RESULT-PROJECT CONTRIBUTION



Legend	Contour of 24h Average Mn Result (µg/m³)		
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ASR	Drawn by: MX	Reviewed by: JC	
Max. Conc.	Coordinate System/Source: WGS 1984		Client: SUS
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FIGURE C-34 CONTOUR OF ANNUAL AVERAGE MN RESULT-PROJECT CONTRIBUTION

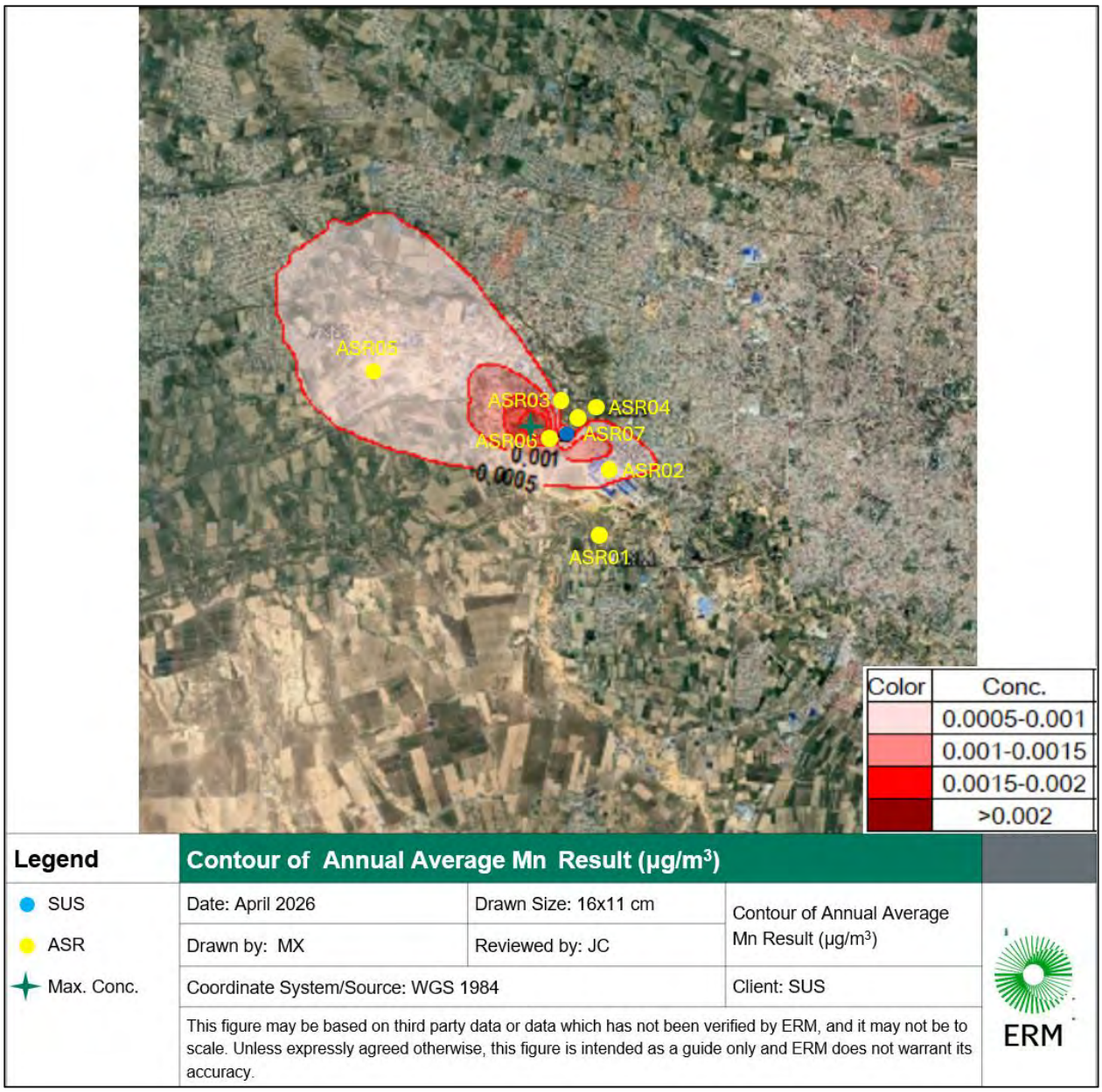
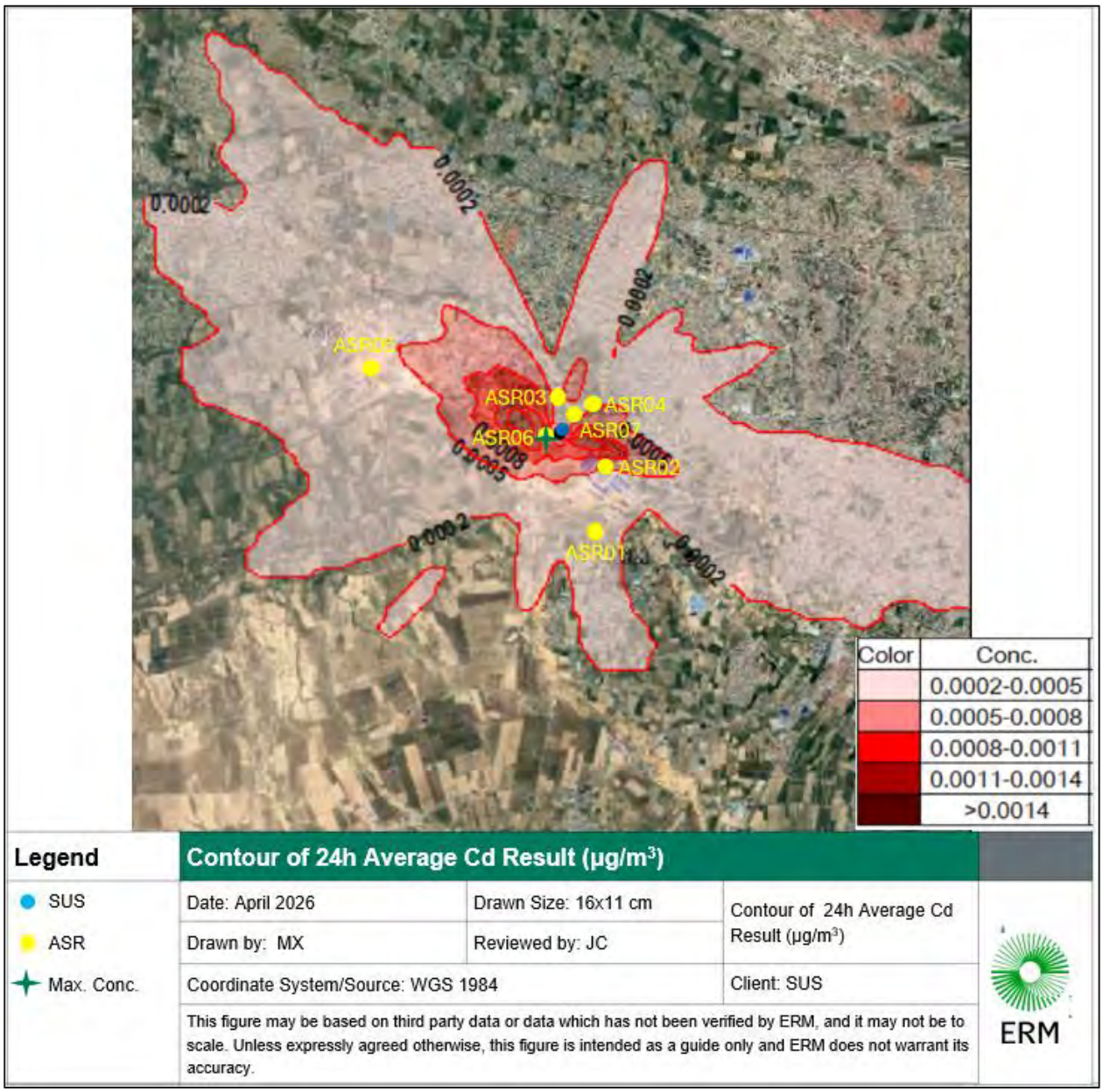


FIGURE C-35 CONTOUR OF 24H AVERAGE CD RESULT-PROJECT CONTRIBUTION



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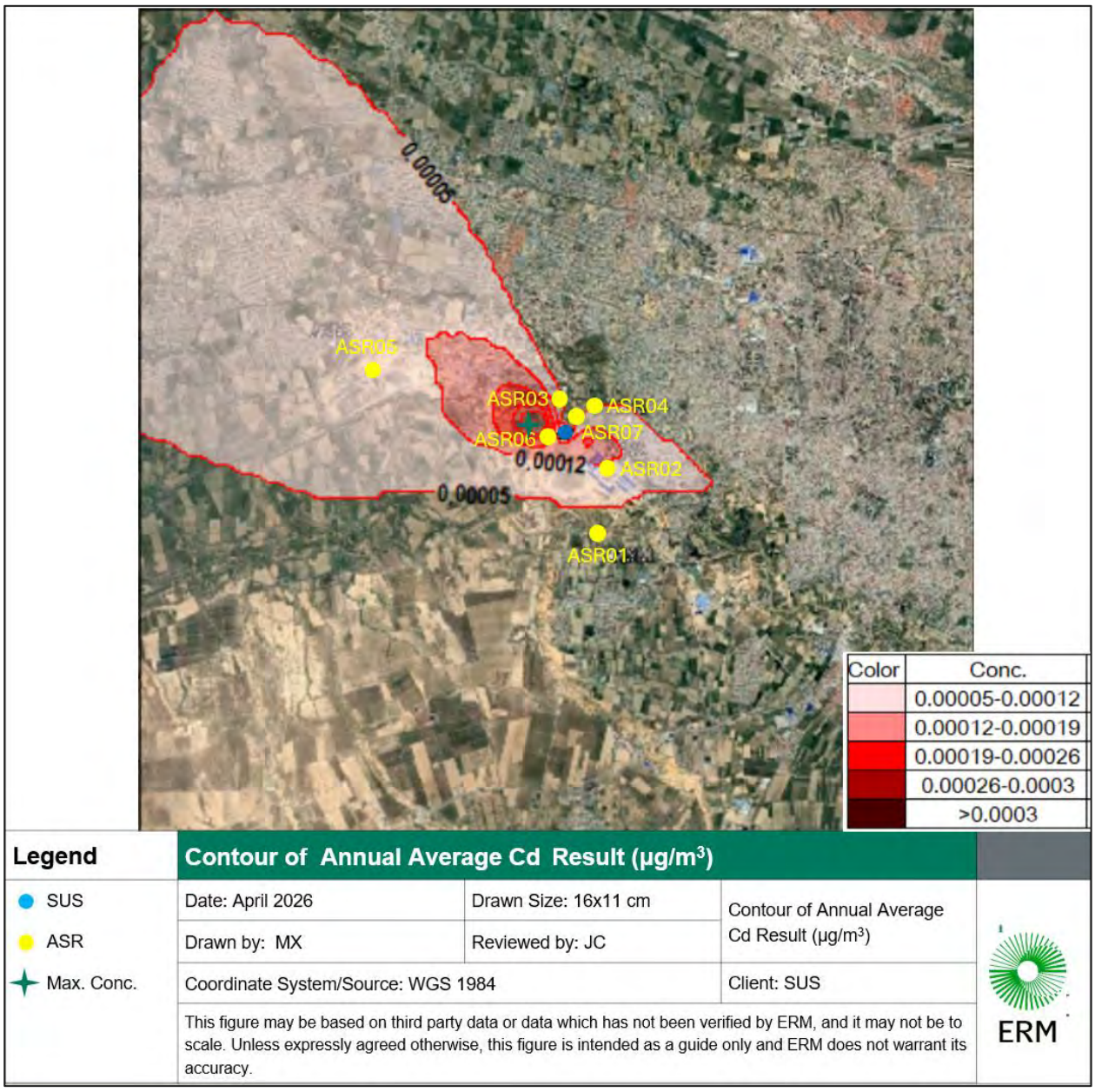


FIGURE C-37 CONTOUR OF 24H AVERAGE CR RESULT-PROJECT CONTRIBUTION

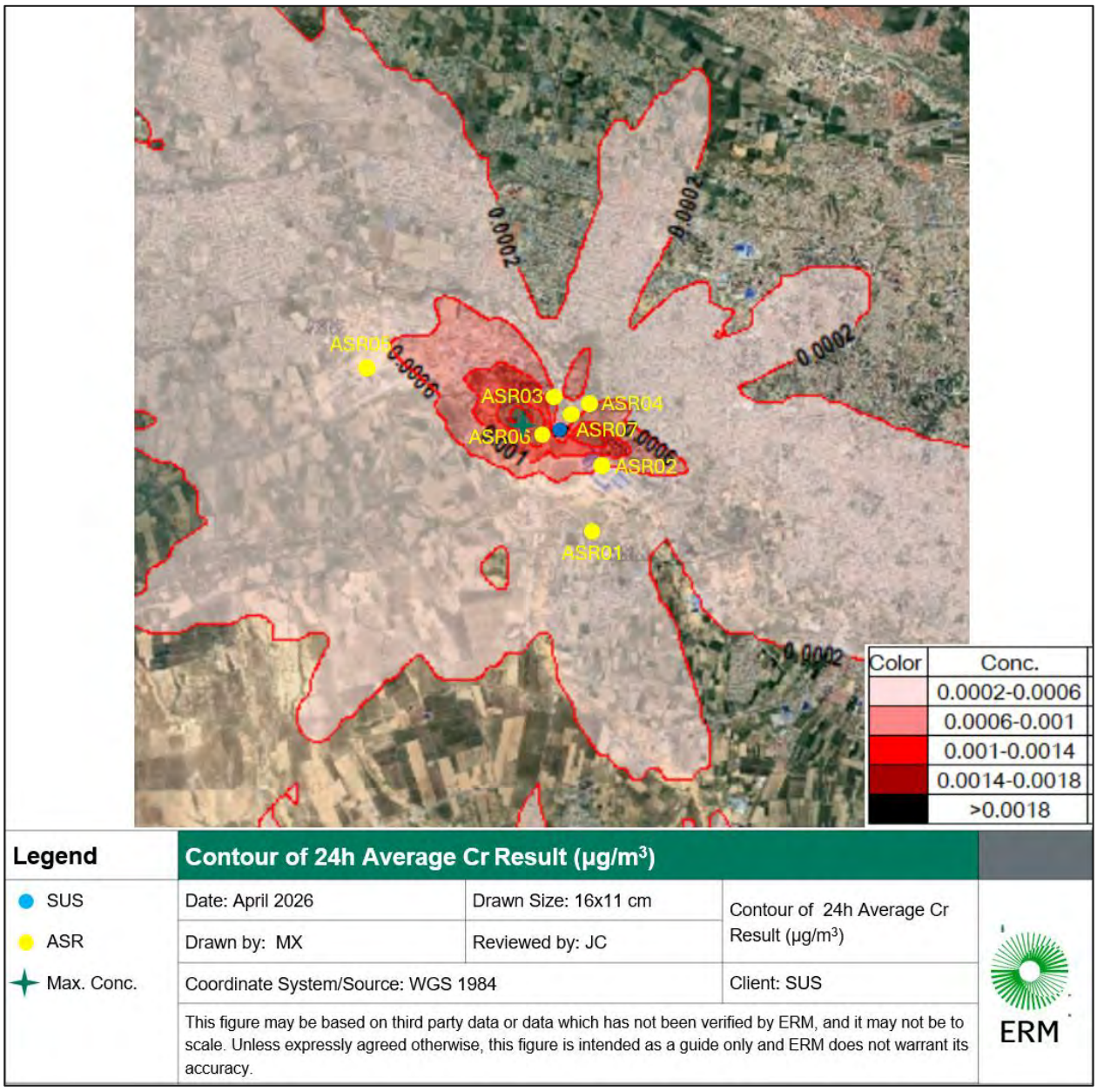


FIGURE C-38 CONTOUR OF ANNUAL AVERAGE CR RESULT-PROJECT CONTRIBUTION

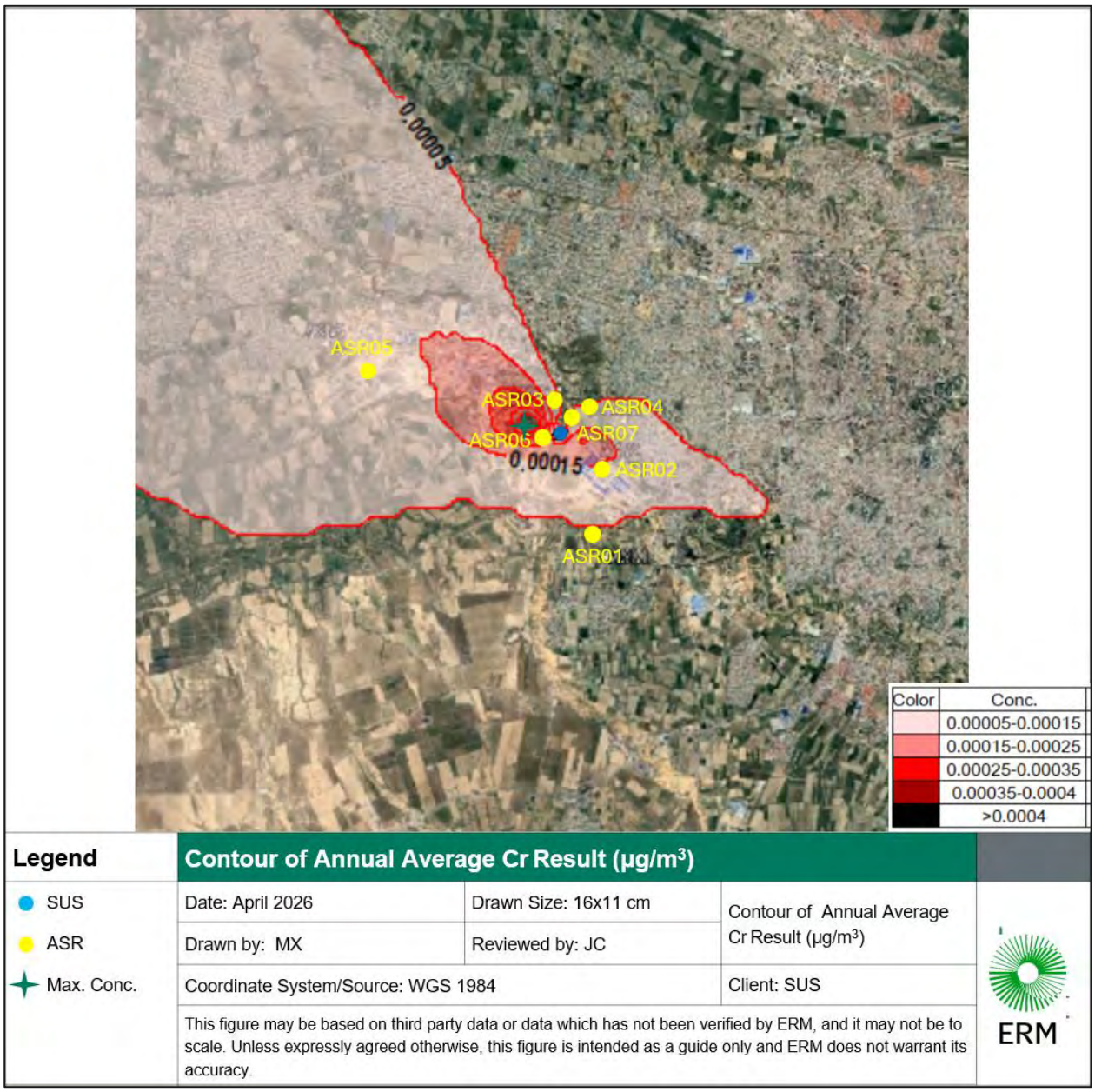


FIGURE C-39 CONTOUR OF 1H AVERAGE CR6+ RESULT-PROJECT CONTRIBUTION

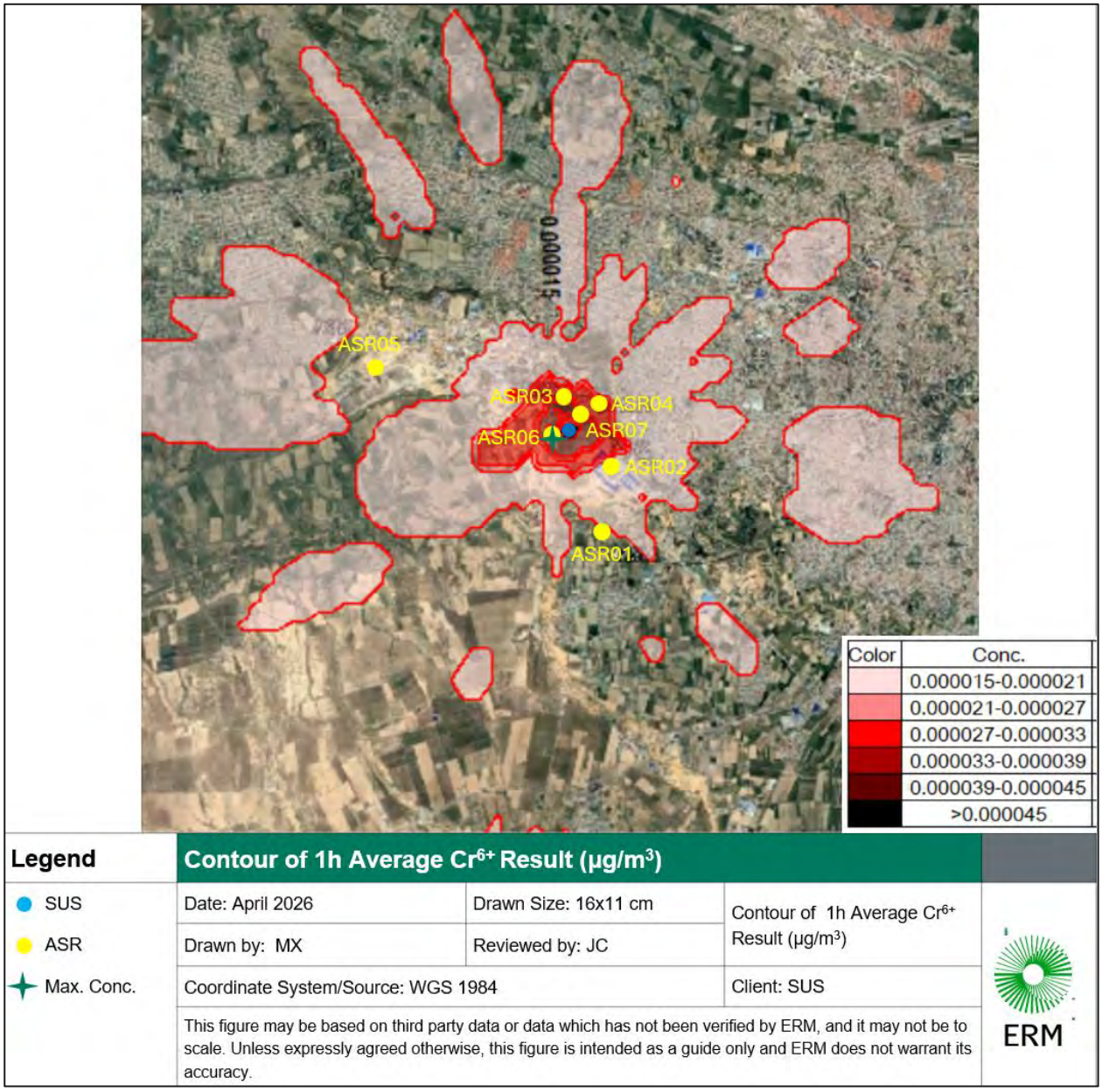


FIGURE C-40 CONTOUR OF ANNUAL AVERAGE CR6+ RESULT-PROJECT CONTRIBUTION

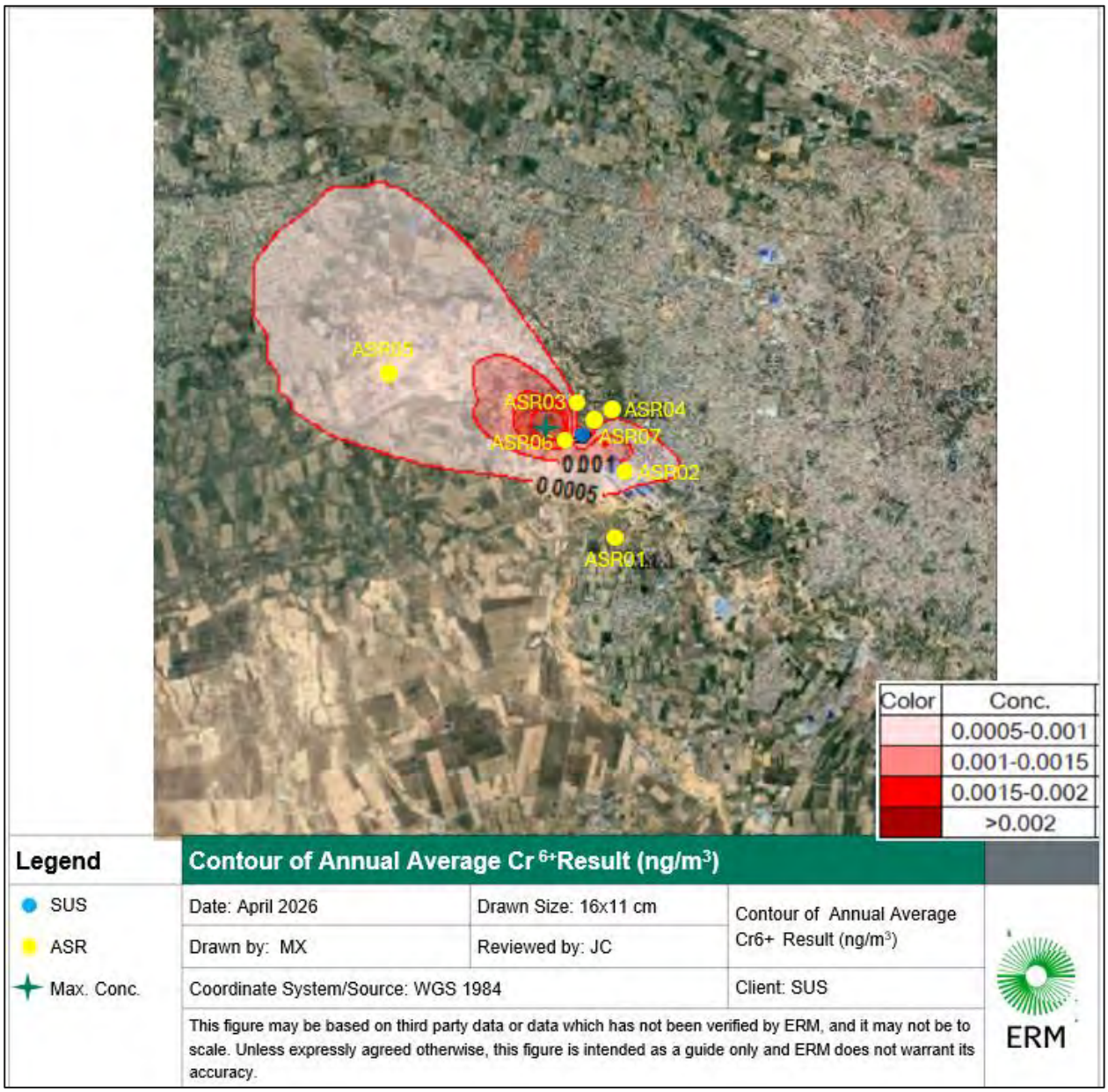
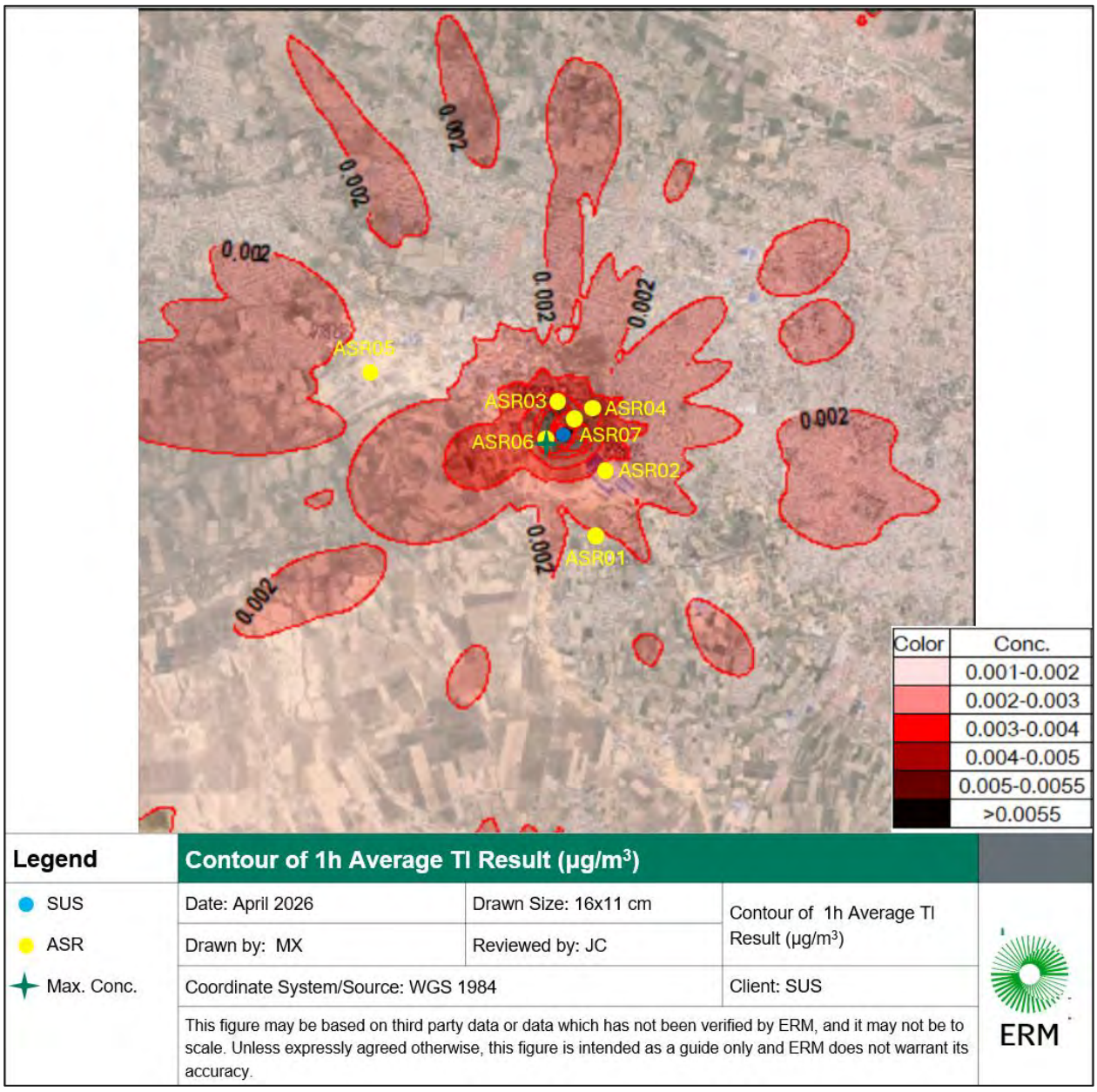


FIGURE C-41 CONTOUR OF 1H AVERAGE TL RESULT-PROJECT CONTRIBUTION



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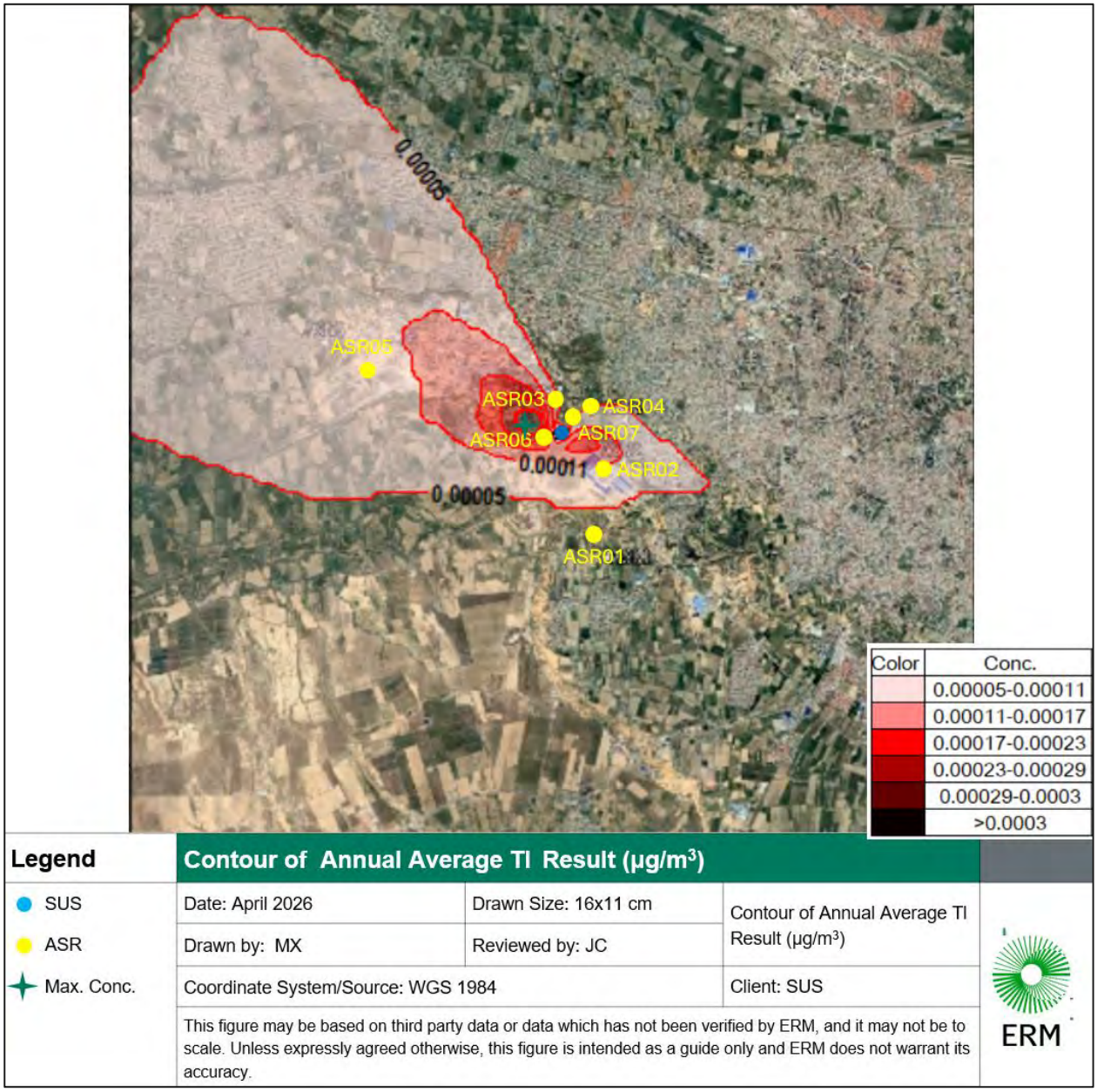
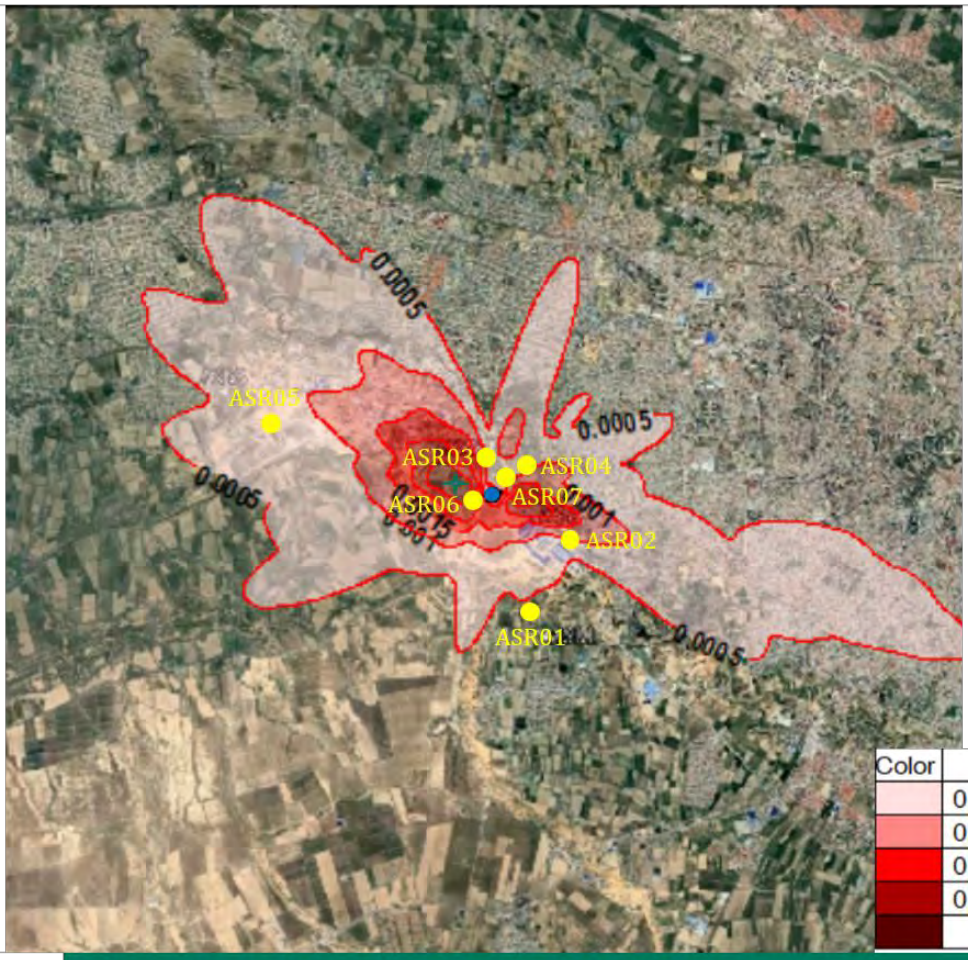


FIGURE C-43 CONTOUR OF 24-HOUR AVERAGE DIOXIN RESULT-PROJECT CONTRIBUTION



Legend	Contour of 24-h Average Dioxin Result (pg TEQ /m³)			
SUS	Date: April 2026	Drawn Size: 16x11 cm	Contour of 24-h Average Dioxin Result (pg TEQ /m³)	ERM
ASR	Drawn by: MX	Reviewed by: JC		
Max. Conc.	Coordinate System/Source: WGS 1984		Client: SUS	
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FIGURE C-44 CONTOUR OF ANNUAL AVERAGE DIOXIN RESULT-PROJECT CONTRIBUTION

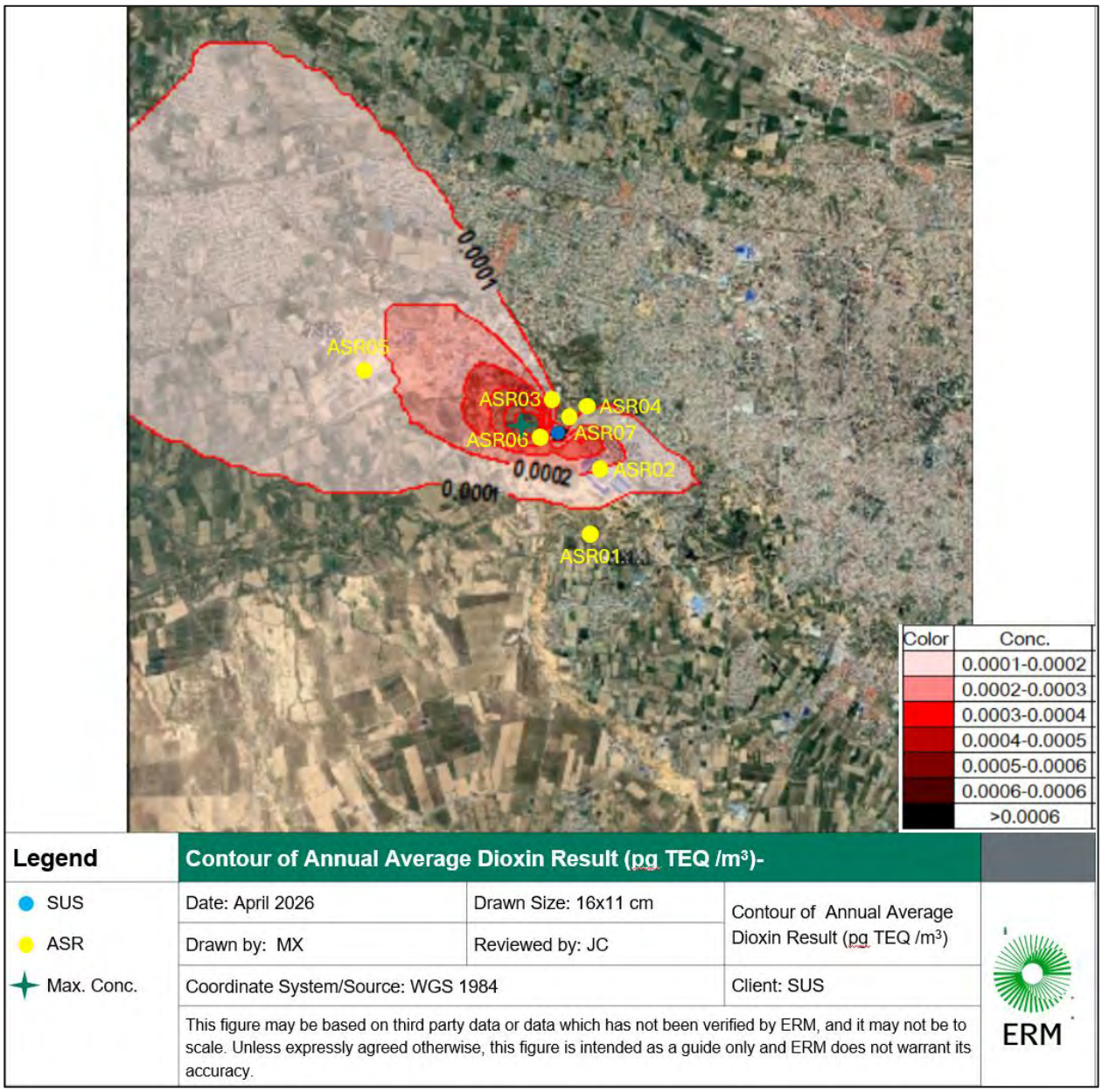
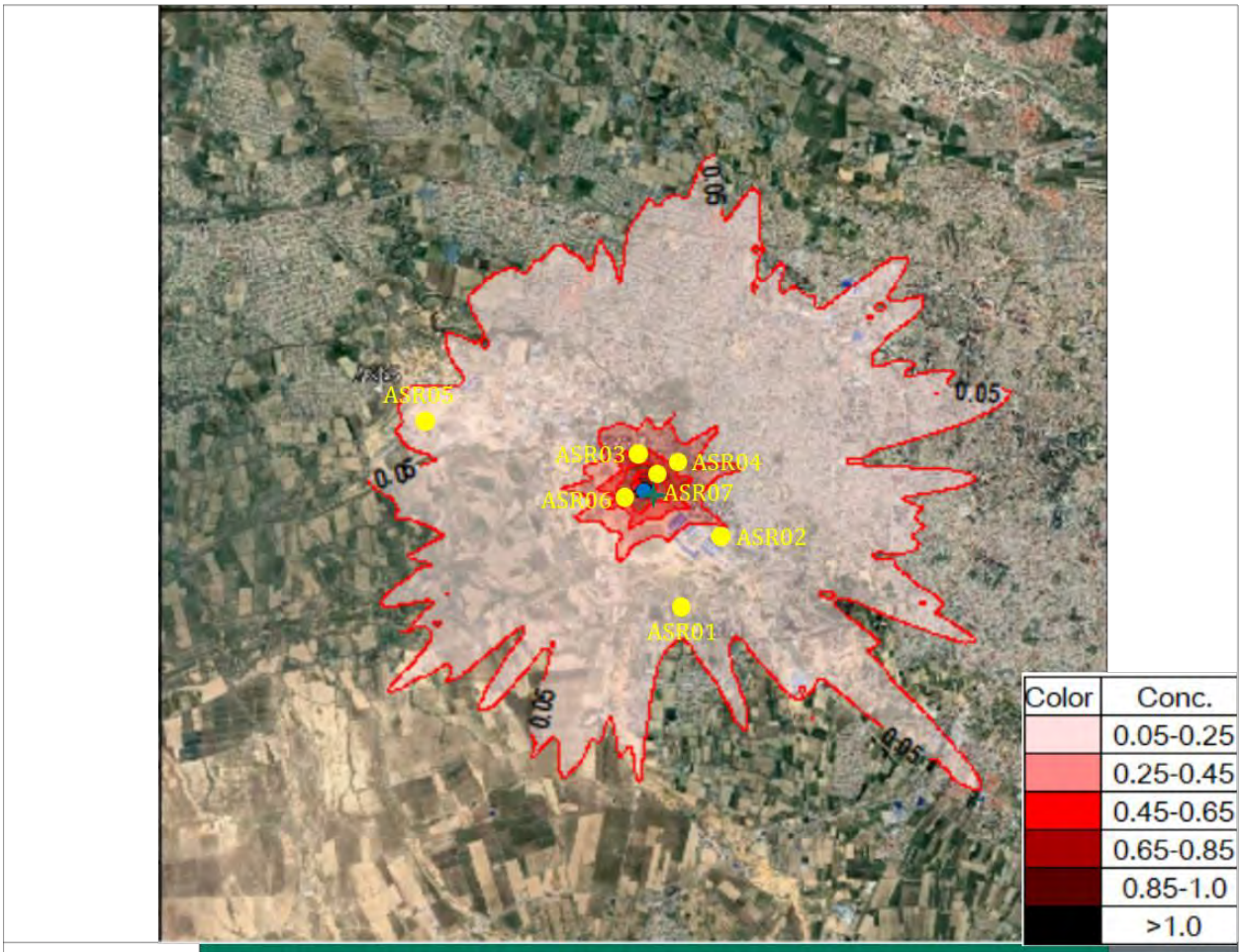
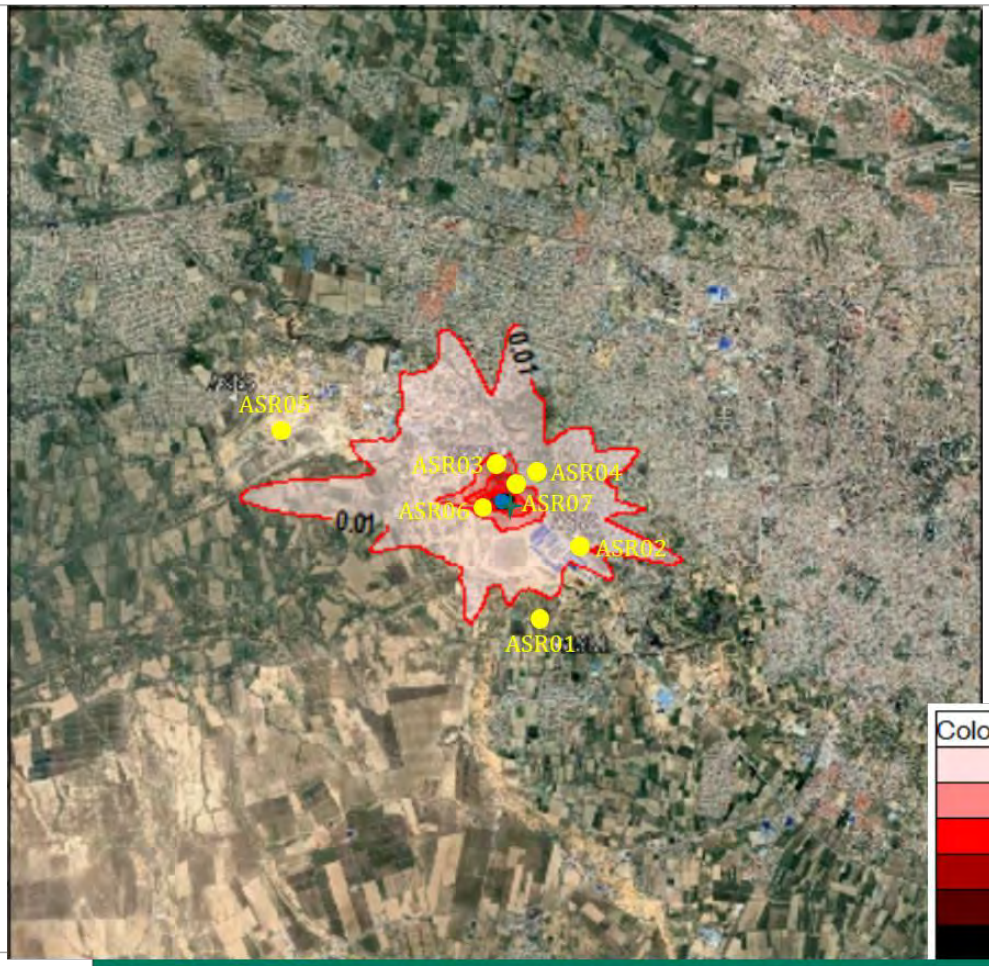


FIGURE C-45 CONTOUR OF 1H AVERAGE NH_3 RESULT-PROJECT CONTRIBUTION (MAINTENANCE SCENARIO)



Legend	Contour of 1-h Average NH_3 Result (µg/m³)– Scheduled Maintenance			
SUS	Date: April 2026	Drawn Size: 16x11 cm	Contour of 1-h Average NH3 Result (µg/m³)	ERM
ASR	Drawn by: MX	Reviewed by: JC		
Max. Conc.	Coordinate System/Source: WGS 1984		Client: SUS	
	This figure may be based on third party data or data which has not been verified by ERM, and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.			

FIGURE C-46 CONTOUR OF 24H AVERAGE NH_3 RESULT-PROJECT CONTRIBUTION (MAINTENANCE SCENARIO)



Legend	Contour of Annual 24-h NH_3 Result (µg/m³) – Scheduled Maintenance		
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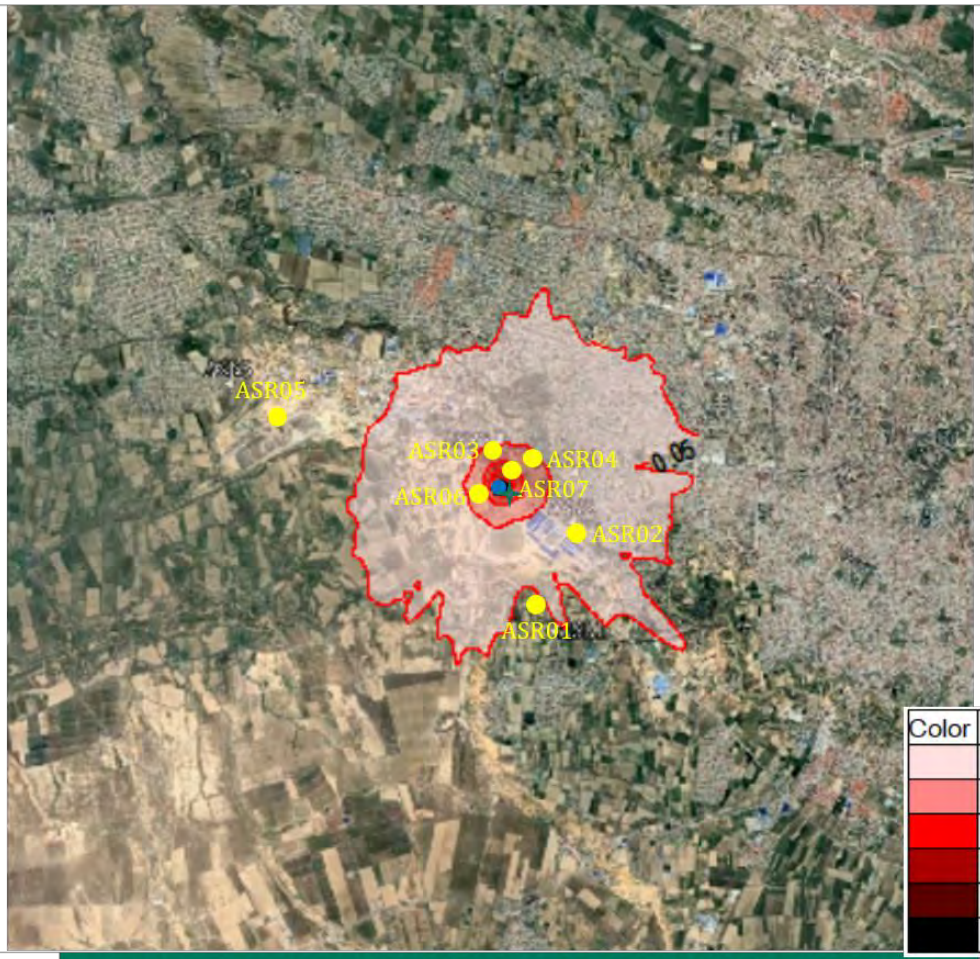
ASR	Drawn by: MX	Reviewed by: JC	
Max. Conc.	Coordinate System/Source: WGS 1984		Client: SUS
	This figure may be based on third party data or data which has not been verified by ERM, and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.		

FIGURE C-47 CONTOUR OF 1H AVERAGE H_2S RESULT-PROJECT CONTRIBUTION (MAINTENANCE SCENARIO)



Legend	Contour of 1-h Average H_2S Result (µg/m³) – Scheduled Maintenance			
SUS	Date: April 2026	Drawn Size: 16x11 cm	Contour of 1-h Average H_2S Result (µg/m³)	ERM
ASR	Drawn by: MX	Reviewed by: JC		
Max. Conc.	Coordinate System/Source: WGS 1984		Client: SUS	
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SUS Uzbekistan Waste to Energy Project

APPENDIX D Critical Habitat Screening

PREPARED FOR

SUS Environment

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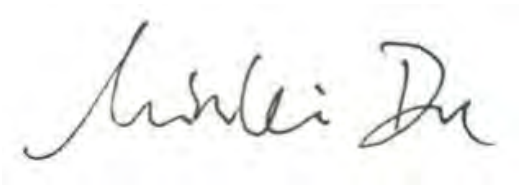
APPENDIX D Critical Habitat Screening

0811636



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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
AoI	Area of Influence
CHA	Critical Habitat Assessment
CR	Critically Endangered
EAAA	Ecologically Appropriate Area of Analysis
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EN	Endangered
EPC	Engineering, Procurement and Construction
EP4	Equator Principles (Version 4)
ERM	ERM (Shanghai) Limited
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GN	Guidance Note
IBAT	Integrated Biodiversity Assessment Tool
ICP	Informed Consultation and Participation
IFC	International Finance Corporation

Acronyms	Description
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
PSs	Performance Standards
VU	Vulnerable

1 CRITICAL HABITAT ASSESSMENT APPROACH

1.1 OVERVIEW OF CRITICAL HABITAT ASSESSMENT METHOD

Critical Habitats are areas that include at least one or more of the five high biodiversity value criteria[1] defined in the IFC PS6 and elaborated in the associated IFC PS6 Guidance Note (2019) paragraphs GN69 to 97 (see ***Table D1-1*** for details on the CH criteria). Critical Habitats are not limited to pristine natural areas and may include modified and natural habitats that support high biodiversity values. i.e. Critical Habitats can be a subset of both modified habitats and natural habitats. It is important to determine whether a project affects Critical Habitat to assist the project planning and the mitigation requirements. The approach to carrying out this critical habitat assessment (CHA) is outlined below.

1.1.1 INITIAL LITERATURE REVIEW AND CH SCREENING

A desktop review of available literature and secondary data was conducted to obtain an initial understanding of the biodiversity values with potential occurrence in Project AoI. This was carried out using the following key data sources:

- Online databases on protected and internationally recognised areas of biodiversity importance, including the Key Biodiversity Area Partnership, Important Bird and Biodiversity Area Factsheets by BirdLife, Alliance for Zero Extinction Sites, United Nations Educational, Scientific, and Cultural Organization's World Heritage Site, and Protected Planet by the United Nations Environment Programme World Conservation Monitoring Centre.
- Online databases on species, including the IUCN Red List of Threatened Species version 2026-2 ("IUCN" or "IUCN Red List"), Global Biodiversity Information Facility, iNaturalist; BirdLife DataZone, eBird, Avibase, and FishBase.
- Site-specific Integrated Biodiversity Assessment Tool report generated for the Project;
- Information made available by the client; and
- Publicly available data and scientific literature.

This review constituted the initial CH screening practices. The Project-specific IBAT report was used to identify species with high biodiversity values that may exist within a 50 km radius from the Project site and that could potentially meet the thresholds for CH criteria 1, 2, and 3. In addition, the review of available data (as listed above) was used to identify additional ecological sensitivities and develop the checklist of potential species of conservation significance. The Critical Habitat (CH) screening applied a precautionary approach in cases where there was uncertainty about whether a species met the CH criteria thresholds.

The IBAT report showed the possible existence of at least 460 terrestrial, aquatic (freshwater), and marine species within a 50 km radius of the Project, among which the CH screening considered 252 are potential CH candidate species (i.e. could potentially meet the thresholds for CH criteria 1-3), including:

- Five (5) mammals, 230 birds, one (1) reptile, seven (7) insects, seven (7) ray-finned fishes, and two (2) plants.

[1] GN53. IFC Guidance Note (2019) of PS6 (2012).

- 70 species from marine habitats (of which 70 are birds), 143 from freshwater habitats (of which 131 are birds), and 245 from terrestrial habitats (of which 230 are birds). Various species use more than one ecosystem type.

1.1.2 CRITICAL HABITAT DETERMINATION

The Critical Habitat Assessment is based on the five criteria and their thresholds, as defined by IFC PS6 and Guidance Note 6, and shown in ***Table D1-1***, where the qualifying requirements for Criteria 1 to 4 (i.e., thresholds) are indicated, while details of the likely qualifying interests for criterion 5 are defined based on research and expert opinion. ERM specialists have reviewed and analyzed the data collected during the first two steps outlined above to determine whether the Project is situated within any Critical Habitat and, if present, for which specific high biodiversity values.

If any one of the criteria are met for the ecologically appropriate area of analysis (EAAA), it will be considered Critical Habitat irrespective of failing to meet any other criteria, i.e. each criterion is applied separately and not in combination, meaning that the scores are not cumulative. Equally, more than one criterion may be applicable (e.g., an endangered species that is also endemic or range-restricted). Critical habitat Criteria 1-3 are based on the criteria and thresholds also used in the IUCN Key Biodiversity Area (KBA) Standard.[2]

Table D1-1 Thresholds for Critical Habitat

High Biodiversity Value / Criteria	Thresholds
Criterion 1: Critically Endangered (CR)/Endangered (EN) species	(a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (⩾ 0.5% of the global population AND ⩾ 5 reproductive units of a CR or EN species). (b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds in (a). (c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.
Criterion 2: Habitat of significant importance to endemic and/or restricted-range species	(a) Areas that regularly hold ⩾ 10% of the global population size AND ⩾ 10 reproductive units of a species.
Criterion 3: Habitat supporting globally significant concentrations of migratory species and/or congregatory species	(a) Areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1% of the global population of a migratory or congregatory species at any point of the species' lifecycle. (b) Areas that predictably support ≥ 10% of the global population of a species during periods of environmental stress.
Criterion 4: Highly threatened and/or unique ecosystems	(a) Areas representing ≥ 5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.

[2] IUCN, "A Global Standard for the Identification of Key Biodiversity Areas", 2016. Available at: https://portals.iucn.org/library/node/46259.

High Biodiversity Value / Criteria	Thresholds
	(b) Other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.
Criterion 5: Areas associated with key evolutionary processes	No set quantitative thresholds and determined on a case-by-case basis. Examples of spatial features associated with evolutionary processes include landscapes with high spatial *heterogeneity* are a driving force in speciation; *Connectivity* between habitats (for example, biological corridors) ensures species migration and gene flow, which is especially important in fragmented habitats and for the conservation of metapopulations.

Source: IFC Guidance Note 6, updated 27 June 2019.

Note:

Endemic/Restricted-range Species = Defined as: (i) terrestrial vertebrates and plants with an Extent of Occurrence (EOO) of less than 50,000 km2; (ii) marine species with an EOO of less than 100,000 km2; and (iii) coastal, riverine, and other aquatic species in habitats that do not exceed 200 km width at any point (for example, rivers) and with a global range of less than or equal to 500 km linear geographic span (i.e., the distance between occupied locations furthest apart).

Migratory species = Any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem).

Congregatory Species = Species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis.

Reproductive Unit = The minimum number and combination of mature individuals necessary to meet the thresholds for a successful reproductive event at a site Examples of five reproductive units include five pairs, five reproducing females in one harem, and five reproductive individuals of a plant species.

1.2 ECOLOGICALLY APPROPRIATE AREA OF ANALYSIS

A review of the regional ecosystems and biodiversity was undertaken related to the Project's potential Area of Influence (AoI) as part of the ESIA's Biodiversity Baseline in ***Chapter 7.7***. This information is used to define the Ecologically Appropriate Area(s) of Analysis (EAAA) for the Project and to assess potential interactions between the Project and possible Critical Habitat. The EAAA is used as the area of analysis to assess applicability of the critical habitat criteria and thresholds to determine critical habitat for the species and/or ecosystems concerned. Delineating an EAAA requires consideration of:

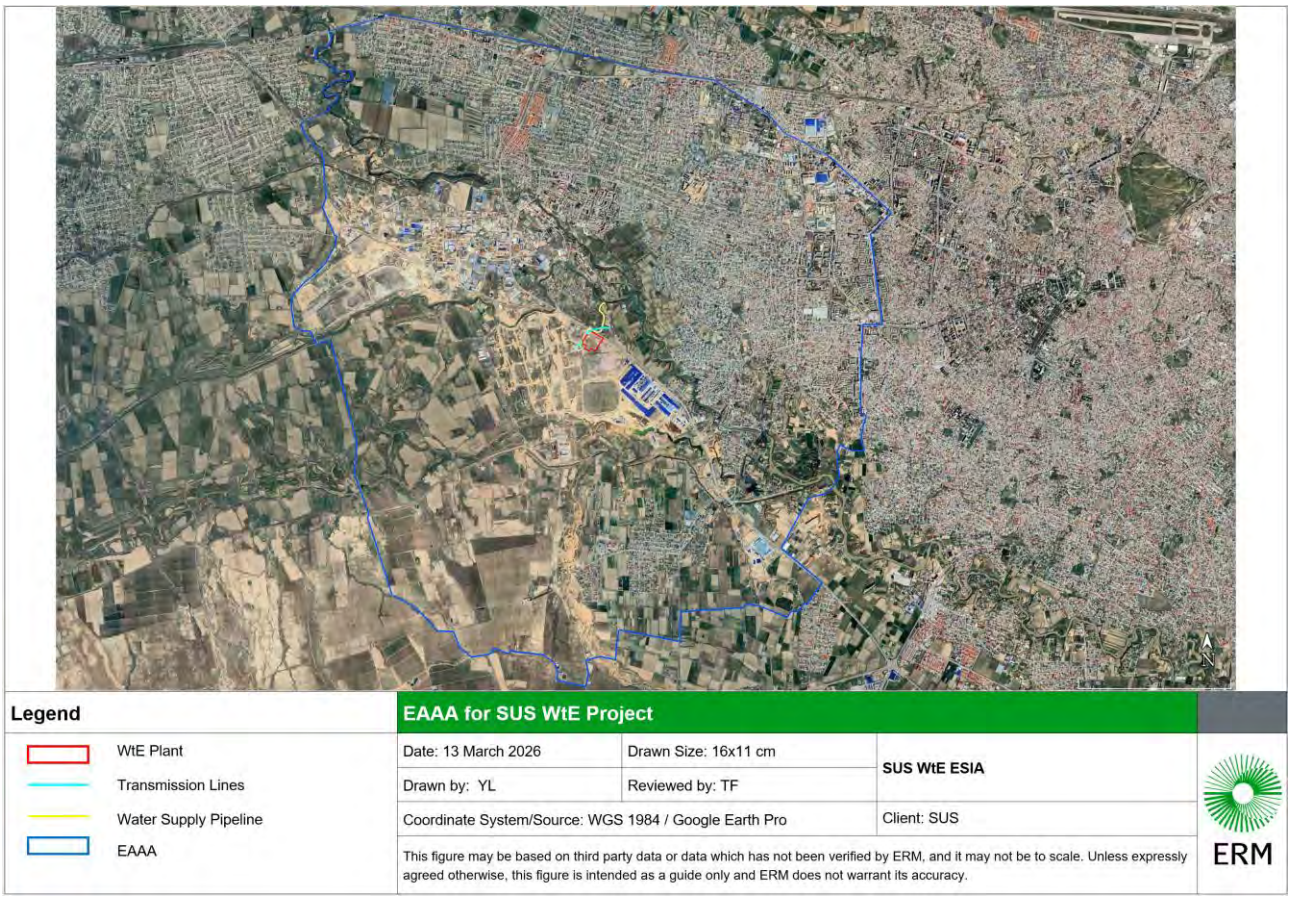
- The likely geographic area or extent of anticipated Project activities and potential impacts;
- The full extent of ecosystems and associated biodiversity that might be affected; and
- Any additional areas that have a functional role in supporting those ecosystems or their associated biodiversity (e.g. the functional limits of relevant river catchments or watersheds).

The spatial scope should also be ecologically determined and defined, encompassing wider distributions of potentially affected biodiversity features, species, and the ecological patterns, processes, and functions that are necessary for maintaining them throughout this distribution. EAAA typically extend well beyond a project's anticipated physical footprint and may extend beyond the Project's Biodiversity Area of Influence (AoI), which is defined as 3 km radius from the Project boundaries. However, since most habitats near the Project site have been heavily modified in past decades, EAAA of this Project is defined as a 5 km strip on either side of the

Project route and extends to the edge of the same land cover, bounded by railways, major roads, canals, and cropland ridges. As mapped in ***Figure D1-1***, the EAAA, with approximately 10,996 ha, is delineated to cover the surrounding modified land cover, including landfill sites, cropland, barren land and built areas. As described in the ***Section 7.7 Biological Environment***, these areas have undergone long-term human alteration, resulting in low ecological functionality and limited habitat permeability, further fragmented by roads, canals, railways and other liner infrastructure. Given the absence of natural habitats or functional ecological corridors beyond this extent, extending the boundary to the outer edge of these homogeneous, human-modified surfaces provides a realistic and feasible ecological extent for the EAAA.

The EAAA determined for this CHA has been taken into account for the ecology of priority species/species groups as well as pronounced landscape features that may tend to bound populations.[3] Based on the land cover classification by remote sensing and site visit, no natural terrestrial habitat such as a forest patch was cut through by the Project area. Hence no natural habitat will be fragmented by the road.

Figure D1-1 EAAA for the Poject



[3] IFC GN6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (2019), Para GN59.

2 CRITICAL HABITAT ASSESSMENT OF SPECIES

Analysis of the Project's EAAA demonstrates that CH Criterion 5 is not applicable for this Project as areas associated with key evolutionary processes are not considered to be present and are therefore not discussed further.

The desk-based Critical Habitat (CH) screening applied a precautionary approach when there was uncertainty about whether a species met the CH criteria 1-3, and as stated previously, 252 species were considered as potential CH candidates based on the desktop CH screening. Further examination of available information for each species as part of the CHA, included consideration of their ecology and the habitat required to support each, and was used to screen out additional species.

Among all potential CH candidates, 246 of them are considered to meet the CH criteria 3. After further research, potential CH candidates whose distribution and geographic ranges did not overlap with the Project's EAAA are screened out from the list. As for the rest of migrating species, especially birds, their habitats near Project site have been subject to numerous human disturbances, attributable in particular to the prolonged use of the area as a landfill. They may occasionally fly through Project's EAAA, but the area is not expected to function as a stopover or regular habitat for them. Instead, they are more likely to use water sources and river valley (tugai forests) located farther from the Project, where habitat is more extensive and continuous and with more food resources, and where levels of human disturbance are lower. Thus, if the species only met the CH criteria 3, they are not considered for further Critical Habitat Assessment (e.g. Paddyfield Warbler (*Acrocephalus agricola*), LC).

Only one (1) species, *Dzihunia ilan* (LC), is considered as endemic species, which meets the CH criteria 2. However, it is excluded from further consideration, because it is a fish species and the aquatic habitat within the Project's EAAA is limited to a very narrow canal. Moreover, the presence of dams both upstream and downstream substantially reduces habitat connectivity. As a result, the Project's EAAA is not considered capable of supporting this species as suitable habitat.

Eight (8) species meet the CH criteria 1 as a potential CH candidate. Since most of the habitat near Project site consists of landfills, agricultural lands, and resident areas. The Project's EAAA has experienced significant human disturbance and is not capable of breeding and feeding purpose for some species. Three species who are not suitable for artificial habitats[4] are excluded from further Critical Habitat Assessment: steppe eagle (*Aquila nipalensis*), great knot (*Calidris tenuirostris*), and Pallas's fish-eagle (*Haliaeetus leucoryphus*). Additionally, although the white-headed duck (*Oxyura leucocephala*) is considered to use certain human-modified habitats, these are typically limited to modified aquatic or marine environments, such as large wetlands and waterbodies. Since no such habitat is present within the Project's EAAA, the species is considered unlikely to occur there and is therefore excluded from further analyses.

In total, four species identified from the CH screening were considered candidate species for taking forward in this full Critical Habitat Assessment, and all of them are avifauna.

[4] Source from IUCN Red List

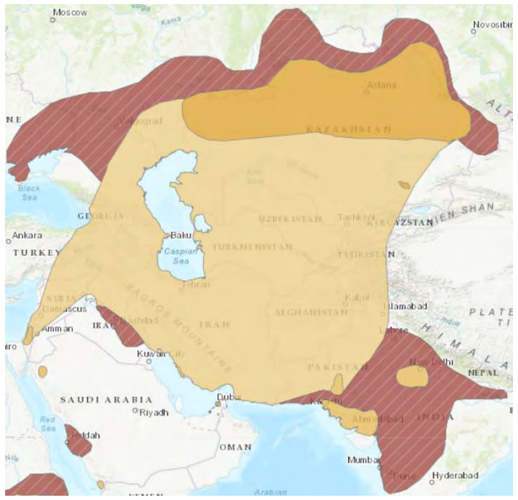
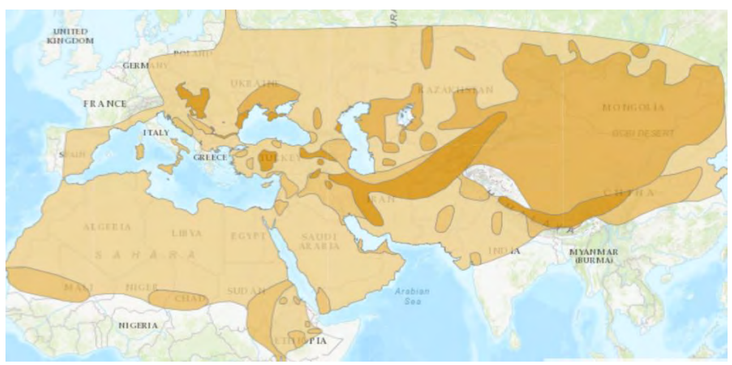
2.1 CRITICAL HABITAT SPECIES ANALYSED

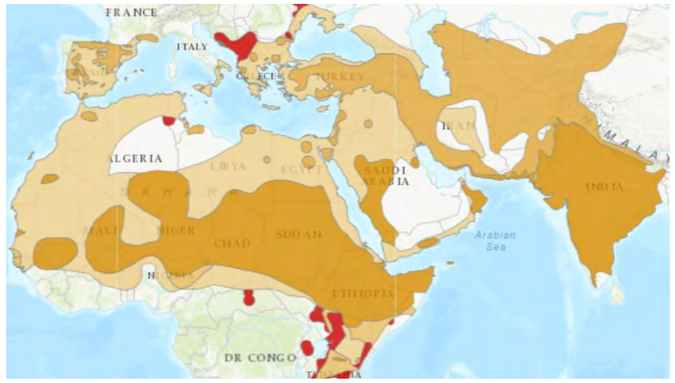
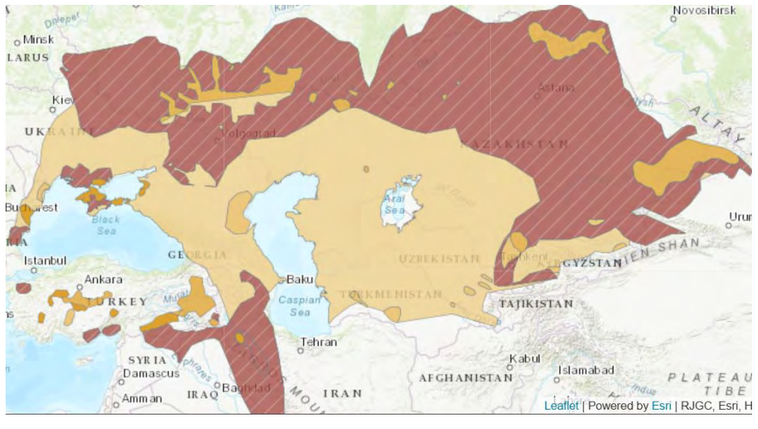
Further investigation is conducted to establish whether these candidates fulfil the CH criteria in this section. Of all species and biodiversity values assessed, all four species are considered as CH candidate species but do not meet the Critical Habitat values for this Project's EAAA.

- **Sociable Lapwing (*Vanellus gregarius*)** - a CR migratory bird, departs the wintering grounds in March or early April, arriving on its breeding range from mid-April.
- **Saker Falcon (*Falco cherrug*)** - an EN bird, are sedentary, part-migratory or fully migratory, largely depending on the extent to which food supply in breeding areas disappears in winter.
- **Egyptian Vulture (*Neophron percnopterus*)** - an EN migratory bird, with a broad diet including carrion, tortoises, organic waste, insects, young vertebrates, eggs and even faeces.
- **Great Bustard (*Otis tarda*)** - an EN migratory bird, exhibits highly variable migratory behaviors across populations and gathers in large wintering flocks in Central Asia.

The following table (***Table D2-1***) present detailed assessments conducted for all biodiversity values that were ultimately determined to not meet any of the five CH criteria as defined by IFC PS6.

Table D2-1 Critical Habitat Assessment

No.	***Scientific Name*** **Common Name**	IUCN	C1	C2	C3	Overall Species Information	CH Rationale	Qualified Species
1	Sociable Lapwing (*Vanellus gregarious*)	CR	✓	-	✓	The sociable lapwing was classified as Critically Endangered by the IUCN Red List in 2004 after previously being assessed as VU since 1994. The 2019 assessment maintains CR status as its population has undergone a very rapid reduction, for reasons that are poorly understood but are likely to be at least partly due to hunting along the migration flyway.  It breeds mainly in the transition zones between *Stipa* and *Artemisia* grassland steppes where bare saline areas occur near water-bodies. It uses dry wasteland, cultivated, ploughed and stubble fields. On migration it uses mainly sandy plains with short grass, dry meadows, fallow land and cultivated fields. It feeds chiefly on insects including Orthoptera, Coleoptera, and moth larvae, but also takes arachnids and frequently small amounts of plant matter including grains, leaves and flowers.	The Project's EAAA does not offer significant area of such habitat with grassland to support large-scale breeding or congregation for sociable lapwing. Additionally, sociable lapwing is widely distributed in central Asia, and thus, the proportion of EAAA relative to EOO is very small. It is therefore considered that the Project's EAAA would not support ≥ 0.5% of the global population and ≥ 5 reproductive units regularly or periodically. **The sociable lapwing does not meet the thresholds for Critical Habitat under Criterion 1.** The Project's EAAA is also currently not considered to sustain ≥ 1% of the global population and ≥ 10% during periods of environmental stress. Therefore, **the sociable lapwing does not meet the thresholds for Critical Habitat under Criterion 3**	No
2	Saker Falcon (*Falco cherrug*)	EN	✓	-	✓	The saker falcon was classified as Endangered by the IUCN Red List in 2012 after initially being assessed as EN in 2004, and later changed to VU in 2010. The 2021 assessment maintains EN status as population trend analyses indicate that it may be undergoing a very rapid decline resulting from a range of anthropogenic pressures, including electrocution on power lines, unsustainable capture for the falconry trade, habitat degradation, and the impacts of agrochemicals. The rate of decline appears to be particularly severe across the species' Central Asian breeding grounds.  The species is adapted to open landscapes, hunting close to the ground across desert margins, semi-deserts, steppes, agricultural areas, and arid montane zones. In wetter areas or urban environments, it shifts from rodents to birds, including domestic pigeons. Its distribution includes both resident and migratory populations, with migratory birds wintering in East Africa, southern Europe, and southern Asia. A significant portion of the global population, around 25–50%, winters on the Qinghai–Tibetan Plateau. Migrants typically leave breeding grounds in September–October and return between February and May.	Though the human settlements may provide suitable habitat for saker falcon, the Project's EAAA is negligible (<0.01%) compared to the species' EOO (19,100,000 km^2), which cover large area of Asia, Africa and Europe. It is therefore considered that the Project's EAAA would not support ≥ 0.5% of the global population and ≥ 5 reproductive units regularly or periodically. **The saker falcon does not meet the thresholds for Critical Habitat under Criterion 1.** The Project's EAAA is also currently not considered to sustain ≥ 1% of the global population and ≥ 10% during periods of environmental stress. Therefore, **the saker falcon does not meet the thresholds for Critical Habitat under Criterion 3**	No

No.	***Scientific Name*** **Common Name**	IUCN	C1	C2	C3	Overall Species Information	CH Rationale	Qualified Species
3	Egyptian Vulture (*Neophron percnopterus*)	EN	✓	-	✓	The Egyptian vulture was classified as Endangered by the IUCN Red List in 2007 after previously being assessed as LC since 2004. The 2021 assessment maintains the EN status as a recent and extremely rapid population decline in India, presumably resulting from poisoning by the veterinary drug diclofenac, combined with severe long-term declines in Europe and West Africa, plus continuing declines through much of the rest of its African range.  This species typically nests on ledges or in caves on cliffs, crags and rocky outcrops, but occasionally also in large trees, buildings (mainly in India), electricity pylons and exceptionally on the ground. It forages in lowland and montane regions over open, often arid, country, and also scavenges at human settlements. It has.	The Project's EAAA does not offer significant area of such habitat with cliffs, crags and rocky outcrops to support large-scale breeding or congregation for Egyptian vulture in the EAAA. Additionally, the Project's EAAA is negligible (<0.01%) compared to the species' EOO (50,100,000 km^2), which cover large area of Asia, Africa and Europe. It is therefore considered that the Project's EAAA would not support ≥ 0.5% of the global population and ≥ 5 reproductive units regularly or periodically. **The Egyptian vulture does not meet the thresholds for Critical Habitat under Criterion 1.** The Project's EAAA is also currently not considered to sustain ≥ 1% of the global population and ≥ 10% during periods of environmental stress. Therefore, **the Egyptian vulture does not meet the thresholds for Critical Habitat under Criterion 3**	No
4	Great Bustard (*Otis tarda*)	EN	✓	-	✓	The great bustard was classified as Endangered by the IUCN Red List in 2023 after previously being assessed as VU since 1994. The 2023 assessment classifies the EN status as it has suffered rapid population reductions across most of its range owing to the loss, degradation and fragmentation of its habitat due to agricultural intensification and industrial expansion (including energy development), with climate change exacerbating these effects through increased frequency of extreme weather events and wildfires. In addition, illegal killing, elevated predation rates and disturbance are contributing to declines, with increased access to and division of the species' habitats by expanded and upgraded road networks compounding these threats.  This species was originally mainly associated with Eurasian steppe, but it has acclimated to agricultural landscapes, and can now be found in open, flat or somewhat rolling landscapes, usually with short sward height and a mixture of preferably low-intensity farmland activities and crops (cereals, vineyards, fodder plants, as well as fallow fields, pastureland and steppic grassland). In Asia, it can also be found in *Artemisia* and *Stipa* steppes, mountain foothills and in semi-desert habitats. Nest sites are selected in grassland, fallow or cereal fields in areas of low patch-type diversity, far from human infrastructure, and with good horizontal visibility.	The Project's EAAA does not offer significant area of such habitat with steppes to support large-scale breeding or congregation for great bustard in the EAAA. Additionally, the Project's EAAA is negligible (<0.01%) compared to the species' EOO (14,400,000 km^2), which cover large area of Asia and Europe. It is therefore considered that the Project's EAAA would not support ≥ 0.5% of the global population and ≥ 5 reproductive units regularly or periodically. **The great bustard does not meet the thresholds for Critical Habitat under Criterion 1.** The Project's EAAA is also currently not considered to sustain ≥ 1% of the global population and ≥ 10% during periods of environmental stress. Therefore, **the great bustard does not meet the thresholds for Critical Habitat under Criterion 3**	No

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SUS Uzbekistan Waste to Energy Project

Appendix E Human Right Impact Assessment

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SUS Uzbekistan Waste to Energy Project

Appendix E Human Right Impact Assessment

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
AoI	Area of Influence
CAT	Convention against Torture
CBA	Collective bargaining agreements
CCIU	Chamber of Commerce and Industry of Uzbekistan
CEDAW	Convention on the Elimination of all Forms of Discrimination against Women
CEU	Confederation of Employers of Uzbekistan
CGA	Country Gender Assessment
CLO	Community Liaison Officer
CoC	Code of Conduct
CPI	Corruption Perception Index
CRC	Convention on the Rights of the Child
CRPD	Convention on the Rights of Persons with Disabilities
EP4	Equator Principles 4
EPC	Engineering, Procurement and Construction
ESIA	Environment and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EHS	Environment, Health and Safety
FGDs	Focus Group Discussions
FTUU	Federation of Trade Unions of Uzbekistan
GBV	Gender-Based Violence
GM	Grievance Mechanism
GNI	Gross National Income
GPG	Gender-Pay-Gap
GPS	Global Positioning System

Acronyms	Description
HDI	Human Development Index
HR	Human Rights
HRIA	Human Rights Impact Assessment
ICCPR	International Covenant on Civil and Political Rights
ICERD	International Convention of all Forms of Racial Discrimination
ICESCR	International Covenant on Economics, Social and Cultural Rights
IFC	International Finance Corporation
IFC PS	International Finance Corporation Performance Standards
ILO	International Labor Organization
KIIs	Key Information Interviews
LRI	Labor Rights Index
MSW	Municipal Solid Waste
MIGA	Multilateral Investment Guarantee Agency
MFY	Mahalla fuqarolar yig'ini
NGOs	Non-Governmental Organizations
OHS	Occupational Health and Safety
OTL	Overhead Transmission Line
PCDDs	Polychlorinated Dibenzo-p-dioxins
PCDFs	Polychlorinated Dibenzofurans
PS	IFC Performance Standard
SEP	Stakeholder Engagement Plan
SIA	Social Impact Assessment
SEAH/SEA/SH	Sexual Exploitation, Abuse and Harassment
SNCR	Selective Non-Catalytic Reduction
TIP	Trafficking in Persons
UDHR	Universal Declaration of Human Rights
UN	United Nations
UNGPs	Guiding Principles on Business and Human Rights
UNHCR	United Nations High Commissioner for Refugees
UPR	Universal Periodic Review
UZS	Uzbekistani sum
VPSHR	Voluntary Principles on Security and Human Rights
WtE	Waste-to-Energy
WWTP	Wastewater Treatment Plant

1. OVERVIEW

1.1 INTRODUCTION

SUS Environment (hereinafter as "SUS" or the "Client"), a company specializing in waste-to-energy (WtE) and circular economy practices, has been providing integrated municipal solid waste management services globally since 2014. In 2025, SUS invested in a WtE project (hereinafter as "the Project") in Samarkand, Uzbekistan to promote a cleaner environment and to support Uzbekistan's transition to a green economy.

ERM (Shanghai) Limited ("ERM") has been engaged by the Client to undertake an Environment and Social Impact Assessment ("ESIA") for the Project. And this accompanying Human Rights Impact Assessment (HRIA) has been developed to meet human rights due diligence requirements under applicable lender standards. This document aims to assess the risks of actual or potential adverse human rights impacts in line with the UNGPs and recommend additional management measures or safeguards are required to mitigate potential human rights risks associated with the development of the Project.

The focus of this assessment is on the rights set out in and protected by the International Bill of Human Rights and the principles concerning fundamental rights set out in the International Labor Organization's Declaration on Fundamental Principles and Rights at Work, which is required by United Nations Guiding Principles on Business and Human Rights (UNGPs).

1.2 OBJECTIVES

The objectives of this HRIA are to:

- Provide an overview of the Project's human rights operating context;
- Provide a high-level screening of potential human rights risks and potential impacts associated with the Project's operations; and
- Provide strategic recommendations to address gaps in the management of human rights risks.

1.3 LIMITATIONS

The findings presented in this HRIA are accurate and complete only to the extent that the information provided to ERM was itself accurate and complete. ERM did not seek to independently validate the information that was provided by the Client, stakeholders engaged or sourced from publicly available sources.

This HRIA seeks to identify potential human rights risks. While it provides an overview of relevant local regulatory framework, it is not intended to serve as a comprehensive legal review.

it is also noted that the Project information pertaining to the labor and working conditions of the Project's workforce and workers in the Project's supply chain is not yet clear, as the Project is in the early stage of developing its human resources management framework and associated management documents.

Direct engagement with Mugat waste pickers has been prohibited by both the local authorities and the Samarkand City Landfill. Consequently, available information relies on secondary sources and discussions with the Landfill director.

1.4 DOCUMENT STRUCTURE

The remainder of the HRIA report is structured as follows:

- Section 2: Project Description
- Section 3: Applicable International Standards for Undertaking HRIA
- Section 4: Approach and Methodology
- Section 5: Uzbekistan Human Rights Framework
- Section 6: Human Rights Baseline
- Section 7: Human Rights Issues Screening and Scoping
- Section 8: Human Rights Impact Assessment
- Section 9: Management of Human Rights Risks
- Section 10: Monitoring and Reporting
- Appendix A: Potential Human Rights Impacts and Their Relevance to the UDHR Articles

2. PROJECT DESCRIPTION

2.1 PROJECT LOCATION

The proposed Project site is located on an industrial land parcel of 8 ha in Samarkand City, Samarkand Region, Uzbekistan. The Project will use Municipal Solid Waste (MSW) as the main input and is designed to treat approximately 1,500 tons of MSW per day, and provide an annual electricity generation capacity of 371.4 million kWh. The electricity produced will be connected directly to the national grid at the nearby substation via a 600-m 110-kV overhead transmission line (OTL) and 300m 10-kV transmission line for power output and supply, respectively.

To align with ESIA, Social Area of Influence (AoI) refers to all households, communities, and population groups that may experience direct or indirect social or community health impacts from a Project. This social AoI in this HRIA refers to nearby communities that might be exposed to potential human rights risks associated with Project's activities. It identifies who may be exposed to changes in terms of health, safety, livelihoods, natural resources, and other human rights. In line with EP4 and the UNGPs, social AoI is the basis for identifying vulnerable groups, assessing human rights risks, and determining the participation in and/or access to remedy mechanisms.

Beyond the defined social AoI, the HRIA also extends its scope along the full value chain to identify rightsholders who may face potential or actual human rights risks even outside the Project's immediate geographic area including project workers, workers in the Project's supply chain, residents along supply route, or even customers and consumers. The detailed identification of rightsholder should refer to ***Section 7.1***.

Given the geographical scope of the Project and the scale of potential social impacts, a radius of 2 kilometers around the Project site has been adopted, which includes six Mahallas (i.e., MFY), namely Dustlik MFY, Komalot MFY, Navruz MFY, Sakhovat MFY, Urta Turkman MFY and Yoshlik MFY.

The location of the Project is shown in ***Figure E2-1*** below. The nearby residential areas to the Project are shown in ***Table E2-1***.

FIGURE E2-1 PROJECT LOCATION

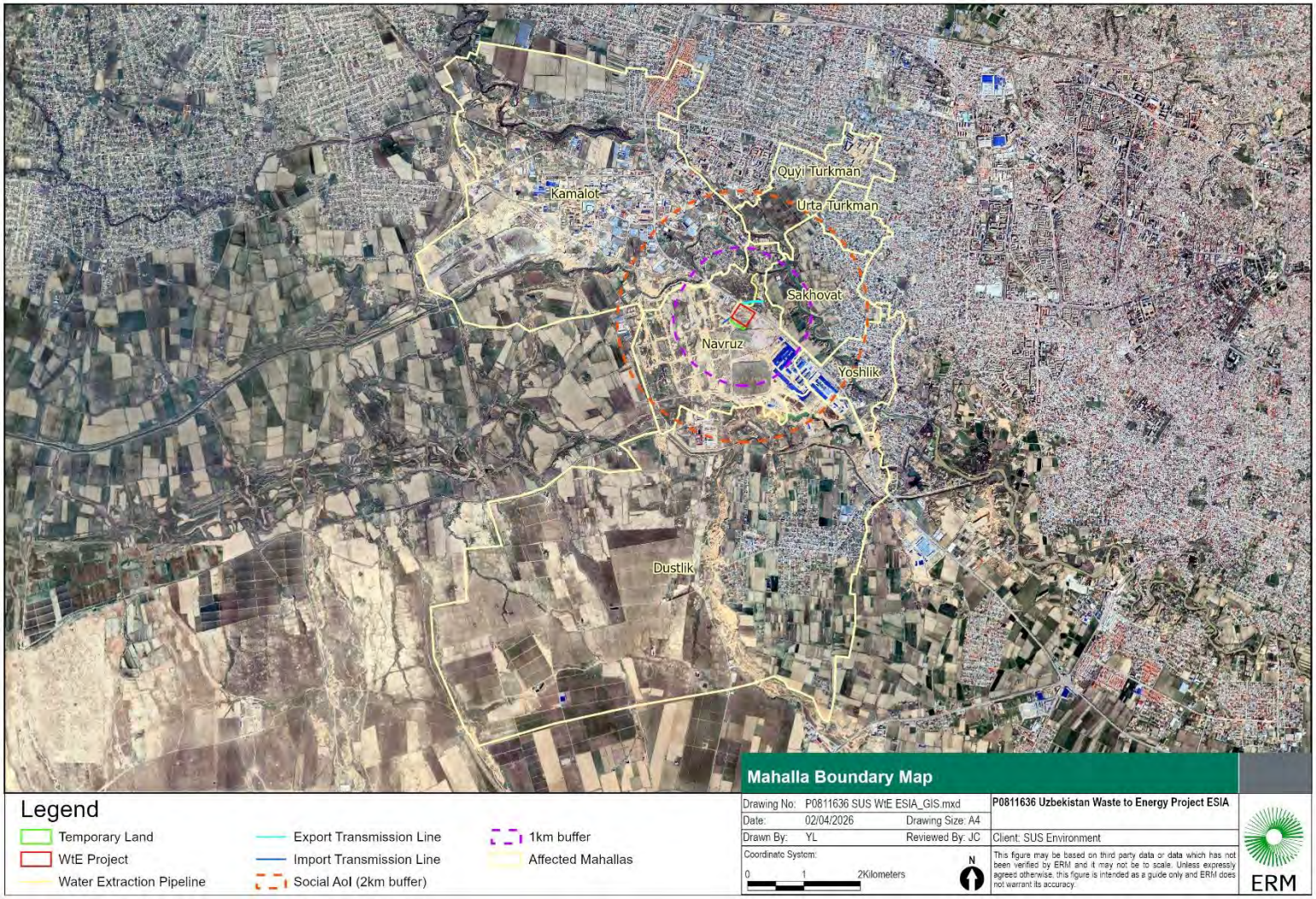


TABLE E2-1 NEAREST RESIDENTIAL AREAS OF THE PROJECT

Region	City	Village (mahalla)[1]	Distance from the Project (km)[2]
Samarkand	Samarkand City	Navruz	/ [3]
		Yoshlik	2.3
	Pastdargom District	Komalot	1.2
	Samarkand District	Sakhovat	1.5
		Urta Turkman	2.5
		Dustlik	4

Source: ERM Scoping Stage in February 2026

2.2 PROJECT COMPONENTS

The Project site is divided into three functional zones, including the main production area, the auxiliary production area, and the landscape area.

- The main production area comprises the main workshop, the stack (chimney) and access ramp. The main workshop includes waste collection hall, waste storage pit, incinerators, flue gas treatment system, waste heat boilers, turbine, generator, fly ash stabilization system, power distribution unit and stacks.
- The auxiliary production area comprises the pump station, combined production and firefighting water tanks, cooling towers, two tank farms (oil and ammonium), water purification stations, wastewater treatment plants, hazardous waste storage room, storage yard of bottom ash and weighbridge.
- The landscape area comprises the administration building and gatehouse.

The following ***Table E2-2*** summarized project components including the Main Workshop and auxiliary facilities.

TABLE E2-2 PROJECT COMPONENTS

Project Components	Sub-components	Description
Main Workshop	Waste Collection Hall	The waste collection hall is located within the main workshop and serves as the designated area for waste

[1] A Mahalla is a neighborhood-level organization that manages local affairs, acting as a bridge between the residents and the local government in Uzbekistan. It is also known as "MFY".
[2] This is center-to-center distance. While some distances extend beyond 2 km and may appear outside the defined social Area of Influence (AoI), the peripheral zones of these settlements still fall within the Area of Influence for social impacts due to potential indirect and induced effects.
[3] The Project is located within Navruz Mahalla.

Project Components	Sub-components	Description
		reception. It has dimensions of 67.75 m × 21 m × 16.5 m (L × W × H), with a ground elevation of +8 m.
	Waste Storage Pit	Upon reception at the waste collection hall, the waste is transferred to a semi-underground waste storage pit. The pit covers an area of approximately 1,652 m² (28 m × 59 m) and has a total effective storage volume of around 21,476 m³, which corresponds to a maximum storage capacity of approximately 9,664 tons of waste. This is equivalent to around 6.4 days of plant operation at the design capacity.
	Incinerators	The Project is equipped with two incinerators, each with a treatment capacity of approximately 750 tons of waste per day. Each incinerator comprises two main combustion zones, namely a primary combustion zone and a secondary combustion zone.
	Flue Gas Treatment System and Stacks	The flue gas primarily contains particulate matter, acidic gases (NO_x, SO_2, HCl, HF), heavy metals (e.g., Hg, Pb, Cd), and trace toxic organic compounds such as dioxins (PCDDs) and furans (PCDFs). The project will employ a comprehensive flue-gas treatment system comprising Selective Non-Catalytic Reduction (SNCR) for NOx control, a dry desulfurization process, activated-carbon adsorption for the removal of heavy metals and residual PCDDs/PCDFs, and bag filters for particulate-matter removal.
	Waste Heat Boilers	The flue gas leaving the incineration chambers at approximately 850°C is directed to the boilers for steam generation. The Project is equipped with two boilers, each with a steam generation capacity of 93.4 tons per hour.
	Turbine and Generator	The generated steam is then conveyed to steam turbine to produce mechanical energy, which is subsequently converted electricity by the generator.
	Fly ash stabilization system	The fly ash generated from the incineration process will be collected and temporarily stored in two fly ash silos located within the main workshop. Each silo has a storage capacity of 180 m³, which is equivalent to three to five days of plant operation at design capacity.

Project Components	Sub-components	Description
	Power distribution unit and transmission line	The electricity generated by the Project will be transmitted to an existing substation nearby. A power distribution unit is installed within the Project site.
Auxiliary Facilities	Water Supply System	During the operation phase, the nearby Dargom Canal will serve as the water source. A water intake pump will be installed adjacent to the canal. After being extracted from the Dargom Canal, the raw water will be pumped and conveyed to the Project site via a 700 m pipeline.
	Cooling Towers	Two cooling towers, each with a circulation capacity of 5,000 m^3/h, are installed to cool water from the condensers and other auxiliary equipment. Over 99% of the cooling water is circulated within a closed-loop system, while a regular make-up water supply of 2,617.1 m^3/d is required to compensate for evaporative loss, drift, and blowdown.
	Wastewater Treatment Plants	Domestic water, wastewater from lab, initial rainwater and the floor flushing water will be treated WWTP (Wastewater Treatment Plant), with a capacity of 30 m^3/d. The treatment process consists of bar screening, equalization, anoxic treatment, aerobic treatment, ultrafiltration, active carbon filtration and disinfection. The treated effluent will be reused as make-up water for the cooling towers and greening water.
	Tank farms	There are two tank farms within the Project site: one for diesel storage and the other for ammonium storage.
	Laboratory	The Project is equipped with an on-site laboratory responsible for routine analysis of water and steam, municipal waste, fly ash, bottom ash, and flue gas.

2.3 PROJECT ACTIVITIES

2.3.1 CONSTRUCTION PHASE

The construction phase primarily includes the following activities:

- Land acquisition/lease
- Transportation of construction materials
- Clearance of the Project area and site formation
- Construction of WtE Plant, transmission line, water supply system
- Presence of workforce (residing in the temporary worker camps)

- Presence of security personnel
- Procurement of goods and services
- General utility supply

2.3.2 OPERATION PHASE

The Project Company plans to commence operation for 30 years starting from 2027. The planned and potential unplanned events that could give rise to environmental and social impacts are as follows:

- Transportation of chemicals and waste
- Presence and operation of WtE Plant (excluding transmission Line, water supply system)
- Presence and operation of Transmission Line
- Presence of Workforce
- Presence of security personnel
- Procurement of goods or services
- General utility supply (including water supply system)

Potential unplanned events include:

- Fire and explosion
- Spill and leak of chemicals (including on-site and during transportation)
- Traffic accidents

2.4 WORKFORCE REQUIREMENTS

Direct Workforce

The Project's construction commenced in July 2025 and is expected to end in June 2027. During the construction phase, the peak number of the direct workforce in Project company can reach 64 people, while the average scale in this phase is around 20-40 people including 4 Uzbeks.

During the operation phase, the number of Project's direct workforce is around 60-100 people. The overall employment strategy will follow a phased transition approach: a relatively higher proportion of Chinese staff will be deployed at the initial stage of operations, with local employees gradually taking over the roles and responsibilities of Chinese staff in the subsequent phases until the localized staffing is fully realized. The organization structure will remain consistent with construction phase including the General Business Department, Finance Department, EHS (Environment, Health and Safety) Department, Production Preparation Department, and Engineering Department. The Project will provide the dormitory and canteen with the workers.

Regarding the working hours, for the operation phase, the staffing follows the mode of four-shift allocation with three-shift operation for frontline operational staff, with each shift lasting 8 hours; administrative and management personnel shall work on a day-shift system with the same 8-hour single shift standard. In terms of construction during non-regular hours, construction works may be carried out at night and on statutory holidays when necessary.

Contracted Workforce

The Project will employ an EPC contractor to recruit construction workers. The peak number of contracted workers during the construction phase is expected to be around 400, with no more than 50% being Chinese nationals. Over 50% of the workforce will be Uzbek nationals.

The Project will provide on-site dormitory accommodation for workers by constructing a dedicated construction camp. The total floor area of the workers' residential zone will be 20,000 square meters, which can accommodate approximately 400 people, with 2 to 4 workers sharing one room. No additional transportation will be provided for workers commuting to the construction site. The Project's camp area will also be equipped with a variety of amenities, including a retail store, a communal bath, centralized hot water supply, a smoking area, and a coffee break room.

Regarding the working hours, construction workers during the construction phase will work from 7:00 to 18:00 daily.

Security Personnel

During the construction and operation phase, the Project's security personnel will be provided by local security companies. During the construction phase, the number of security personnel is expected to be 4 individuals. This number will likely increase to 6 to 10 during the operation phase. Security personnel will not be provided with guns or other firearms but will be equipped with security items such as shields and rubber batons.

2.5 MAIN CONTRACTORS AND SUPPLIERS

At the time of preparing the HRIA, SUS has confirmed the EPC is Shandong Zijian Construction Group Co., Ltd. Based on information gathered from government authorities, municipal solid waste management is implemented through a centralized system, operated by designated responsible organizations. Waste is collected from residential areas and economic entities according to an approved schedule and transported by specialized vehicles to landfill sites or waste treatment facilities. Marakand Obod is contracted by the government for collecting municipal solid waste and relevant transportation services. Considering no direct contractual relation between Marakand Obod and the Project, the supply of waste is scoped out of this assessment.

3. APPLICABLE INTERNATIONAL STANDARDS FOR UNDERTAKING HRIA

Table E3-1 below is a summary of applicable international standards and guidelines for undertaking the HRIA.

TABLE E3-1 APPLICABLE INTERNATIONAL STANDARDS AND GUIDELINES

Standards/Guidelines	Applicable provisions
Equator Principles (EP) 4 (2020)	Principle 2: Environmental and Social Assessment For Category A and, as appropriate, Category B Projects[4], the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialized studies may also need to be undertaken. The client is expected to include assessments of potential adverse human rights impacts risks as part of the ESIA or other assessment. The client should refer to the UNGPs (Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework), particularly paragraphs 17–21, when assessing human rights risks and impacts.
Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework (UNGPs, 2011)	Paragraphs 17-21 of the UNGPs introduces the responsibility of business enterprises to respect human rights. In order to identify, prevent, mitigate and account for how they address their adverse human rights impacts, business enterprises should carry out human rights due diligence. The process should include assessing actual and potential human rights impacts, integrating and acting upon the findings, tracking responses, and communicating how impacts are addressed.
The International Finance Corporation Performance Standards (IFC PS) (2012) and Multilateral Investment Guarantee Agency Performance Standards on Environmental and Social Sustainability (MIGA 2013)	Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts suggests complementing the environmental and social risk and impact identification process with specific human rights assessment in limited high-risk circumstances. It requires business to respect human rights, which means to avoid infringing on the human rights of others and address adverse human rights impacts business may cause or contribute to. Each of the Performance Standards has elements related to human rights dimensions that a project may face in the course of its operations. Due diligence against these Performance Standards will enable the client to address many relevant human rights issues in its project. For example, Performance Standard 2: Labor and Working Conditions defines certain requirements on labor issues, including Working Conditions and Terms of Employment, Worker's Organizations, Non-discrimination and Equal Opportunity, Retrenchment, Grievance

[4] According to Principle 1: Review and Categorization of EP4, Projects of Category A are those with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented, while Category B Projects are those with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures.

Standards/Guidelines	Applicable provisions
	Mechanism, Child Labor, Forced Labor, and Occupational health and Safety. This standard applies to workers directly engaged by the client, workers engaged through third parties, as well as workers engaged by the client's primary suppliers. In addition, one of the objectives of Performance Standard 4: Community Health, Safety, and Security is to ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the affected communities.
ILO Declaration on Fundamental Principles and Rights at Work (2022)	The ILO Governing Body had initially identified eight "fundamental" Conventions, covering subjects that were considered to be fundamental principles and rights at work: freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labor; the effective abolition of child labor; and the elimination of discrimination in respect of employment and occupation. The eleven fundamental instruments are: • Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87); • Right to Organize and Collective Bargaining Convention, 1949 (No. 98); • Forced Labor Convention, 1930 (No. 29); • Abolition of Forced Labor Convention, 1957 (No. 105); • Minimum Age Convention, 1973 (No. 138); • Worst Forms of Child Labor Convention, 1999 (No. 182); • Equal Remuneration Convention, 1951 (No. 100); • Discrimination (Employment and Occupation) Convention, 1958 (No. 111); • Occupational Safety and Health Convention, 1981 (No. 155); and • Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187).

4. APPROACH AND METHODOLOGY

This HRIA seeks to assess the potential salient human rights risks associated with the Project. To identify the salient human rights issues, a four-step process has been employed with details given below. The assessment process has been informed by the guidance set out in the United Nations Guiding Principles on Business and Human Rights (UNGPs), which is the globally recognized framework that defines the responsibilities for business as they relate to human rights.

4.1 STEP 1 – SCREENING

Step 1 is a screening process. The focus is on identifying the rightsholders that may experience impacts as a result of the Project, and the potential human rights impacts that may be experienced by the identified rightsholders.

This involves a desktop review of documents provided by the Project Company as well as the applicable human rights framework, including existing policies, laws and international standards and guidelines. During this step, stakeholder mapping and stakeholder engagement activities are also leveraged to identify the relevant rightsholders.

The results of the screening have been used to inform preparation of the human right baseline (Step 2) as well as the assessment of potential risks (Step 3).

4.2 STEP 2 – HUMAN RIGHTS BASELINE

Step 2 involves the development of a baseline, which provided an understanding of the local human rights context, as well as a starting point from which to assess potential human rights risks. The focus was on gathering data required to understand Project-specific human rights issues. To ensure overall human rights conditions of the Project area can be fully grasped, following data collection methods were adopted:

4.2.1 DESKTOP RESEARCH

A desktop review is undertaken of relevant information, including publications from relevant government agencies, academic institutions, credible research sources and non-governmental organizations (NGOs). Pertinent information includes the authorized indices and indicators used to assess Uzbekistan’s broader human rights context, along with topic-specific data covering areas such as child labor, forced labor, occupational health and safety, access to remedy, the waste-to-energy value chain, gender-based violence, and gender equality.

The UNGPs suggest conducting consultations with potentially affected groups and other relevant stakeholders. To prepare for this HRIA report, country-level and local-level information baseline data are collected to delineate the human rights baseline conditions in order to assess the potential human rights risks and impacts associated with the Project.

4.2.2 KEY INFORMANT INTERVIEW (KII)

During the scoping stage visit (12 Jan to 15 Jan 2026), ERM and its local partner BIK organized and led Key Informant Interviews (KII) with city-level and regional-level government authorities (including Waste Landfill Directorate of Samarkand City, Head of Ecology and Environment Protection Department of Samarkand City, Deputy of Samarkand City Government, Lead Specialist of Health Department of Samarkand City, Chief Specialist of the Architecture Department, Head of Cadastral Department of Samarkand City, Specialist of the

Cultural and Tourism Department of Samarkand Region) to obtain an overview of socio-economic background and disclose Project information and gather feedback about the Project.

Moreover, KIIs were conducted with Project social sensitive receptors, including the directors of nearby farms, the director of the Samarkand City Landfill, and the director metal processing plant to understand their baseline conditions and concerns.

During the ESIA stage visit (7 Feb to 9 Feb 2026), KIIs were conducted to gather local perspectives on potential Project impacts. These included two KIIs with the local hospitals that the Project intends to use as healthcare providers, and one KII with a farm owner located near the site to understand views on potential impacts on agricultural production. A KII was also held with the Samarkand City Cadastral Agency to verify the land use status of the Project's linear infrastructure (i.e., electricity transmission line and water pipeline and the pump). Another KII with a local metal scrap dealer who regularly purchases metal waste from community waste pickers was conducted to assess possible economic impacts on the scrap dealer as well as on community waste pickers.

4.2.3 COMMUNITY PROFILING

During the scoping site visit, ERM, together with local partner BIK, conducted community profiling activities through meetings with various community representatives and heads of MFYs to develop an understanding of the socioeconomic context of the six MFYs in the Social AoI (including Dustlik, Komalot, Navruz, Sakhovat, Urta Turkman, and Yoshlik), specifically to obtain information of the community profile with respect to demographics, economy (including livelihoods), employment and income, land use and ownership, infrastructure and public services, traffic and transport, education and skills, informal waste-pickers, health, safety and security, human rights, cultural heritage and vulnerable groups. The meeting with MFY head also sought feedback about the Project and recommendations.

4.2.4 FOCUS GROUP DISCUSSIONS (FGD)

During scoping stage, a public FGD with local villagers was conducted to understand local socio-economic status and the perceptions of the Project.

FGDs were conducted with 5 waste pickers whose livelihood mainly depends on waste collecting in Samarkand City Landfill to understand their socioeconomic status and concerns of the Project as the Samarkand City Landfill will be closed after the operation of the Project, in line with government policies for waste sector reform.

During ESIA phase, FGDs with local women, youth and farmers were conducted to solicit women and youth's concerns and expectations of the Project, and the Project impact on local farming activities.

4.2.5 HOUSEHOLD SURVEY

A moderate sample size was selected to collect household-level demographic information, land use and livelihoods, income and expenditure, access to education and health care, infrastructure, housing conditions and human rights, and to identify vulnerable groups in nearest residential areas of the Project within the six MFYs of the Social AoI. A total of 104 socio-economic household surveys (including 11 with waste pickers) were conducted in the six mahallas, namely Navruz MFY, Komalot MFY, Yoshlik MFY, Urta Turka MFY and Sakhovat MFY, covering a total survey population of 104 households and 314 household members, through

questionnaires administered to individual households between 7 February and 9 February 2026. By way of limitation, not all questions were effectively answered by respondents, resulting in varying numbers of responses for each question (e.g., when asking about the income of respondents and their family members), this is potentially because the respondent was not willing to disclose the information.

4.2.6 FIELD OBSERVATION

ERM conducted the scoping visit in January 2026 to observe the socio-economic conditions, livelihoods and infrastructure in the Project area. The ESIA visit was conducted in February 2026 to gather in-depth information and baseline conditions. GPS locations and photographs of sensitive receptors were taken during both visits.

During the socio-economic baseline study and engagements with relevant rightsholders, consultation activities and raised human concerns were summarized in ***Table E7-3*** also shed light on the local baseline conditions. In designing the engagement program, consideration was given to ensuring the approach was respectful manner. Further details on the principles that underpinned the approach employed are outlined in ***Box E4-1***.

BOX E4-1 ENSURING RIGHTS-RESPECTFUL ENGAGEMENT WITH RIGHTSHOLDERS AND STAKEHOLDERS

To ensure that engagement processes uphold human rights, they are to be conducted in accordance with the following principles and considerations:

Transparency

All interviewees are provided details at to which organization the consultation is for as well as the purpose of the consultation, and the nature of the relationship between the HRIA practitioner and the Project. No engagement is conducted if the HRIA practitioner's objectivity is questioned by rightsholders due to the nature of the relationship with the Client.

Voluntary

The HRIA practitioners are to obtain consent of rightsholders prior to participation. Participation should be voluntary and based on sufficient information being provided in advance on the HRIA process. Participants are allowed to withdraw at any time.

Confidentiality and Privacy

Consultation begins with an emphasis on the confidential nature of the interviews to all interviewees who participate in KII session or FGDs. The third-party interviewers do not seek to identify any personal information and identity of the interviewees to the extent possible that do not influence the impact assessment. No workers' identity will be mentioned when communicating findings. All interviewees are also requested to keep the interview content confidential. Reporting will not disclose personal details of the interviewees or information that may assist in the identification of individuals. No other observer is allowed to attend the consultations.

Safety and non-retaliation

HRIA practitioners take all reasonable measures to uphold the "do no harm" principle. All consultations will stop if the rightsholders express that they do not feel safe. It is essential that rightsholder participation does not present any risk of retribution or reprisal.

Respectful Communication

Communication is conducted in a culturally appropriate meaningful manner. Local traditions and customs are respected, and participants are allowed to end the interview if requested for their time are respected. Participants are kept informed on the outcomes of the process if they request so.

Accessibility and inclusiveness

All communication materials are prepared, and the engagement itself is conducted in a way that promotes access and inclusiveness of different groups - including foreign workers, women, etc. The choice of timing, location, format, language, and media are carefully considered to ensure that literacy limitations do not become a barrier.

4.3 Step 3 – Impact Assessment

The human rights baseline, developed as part of Step 2, is used as a starting point to evaluate the potential human rights risks (or changes) that may result from the Project. The focus is on those risks considered as salient. The HRIA primarily focuses on the rights set out in and protected by the International Bill of Human Rights and relevant International Labor Organization (ILO) conventions.

In line with the United Nations Guiding Principles (UNGPs), the human rights risks have been assessed according to their severity. The severity of potential human rights risks is assessed based on scale, scope, irremediability, and likelihood of the impact occurring as defined in ***Table E4-1***.

TABLE E4-1 PARAMETERS FOR EVALUATING THE OVERALL IMPACT SEVERITY

Parameter		Description	Ratings
Severity	Scale	Seriousness of actual or potential impact for the affected rightsholders. This includes the perspectives of the engaged stakeholders and the consideration of their vulnerability.	Low/Medium/High
	Scope	The extent of the impact or the number of people that are (or potentially are) affected.	
	Irremediability	Degree to which remedy could restore a victim to the same or equivalent position before the harm.	
Likelihood	Likelihood	Probability of a human rights impact occurring. This takes into consideration factors such as the local operating context (including peer company performances), extent to which human rights are protected, past human rights issues violations, and existing management measures/embedded control.	Unlikely/Likely/High likely

The matrix depicted in ***Table E4-2*** is used to assign a classification for each potential risk identified.

TABLE E4-2 OVERALL IMPACT SEVERITY CLASSIFICATION

Severity	**Likelihood**		
	Unlikely	**Likely**	**Highly likely**
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	Medium	High

When assessing human rights risks, a precautionary principle has been applied. Accordingly, where there is uncertainty, this has been reflected to ensure sufficient management measures are put in place. As the Project evolves, this uncertainty may change; when this occurs,

relevant risks shall be reviewed and amended accordingly. The impact assessment is outlined in ***Section 8***.

4.4 STEP 4 – MANAGEMENT MEASURES

Step 4 involves identifying management measures or additional work required to assist in mitigating potential human rights impacts identified and evaluated in Step 3. The level of management measures is determined by salient human rights impacts based on its severity classification, e.g., impacts with a higher severity or greater likelihood of occurrence require a greater level of management. These are outlined in ***Section 9***.

5. UZBEKISTAN HUMAN RIGHTS FRAMEWORK

The human rights framework is important, as the overall level of respect for human rights in a country often shapes the practices and behaviors that emerge within a Project setting. As outlined by the UNGPs, it is the state's duty to protect human rights, whilst it is the responsibility of businesses to respect human rights through identification, prevention, and mitigation of human rights issues within their operations.

Applicable standards for human rights impact assessment as required by UNGPs begin with the International Bill of Human Rights and the ILO Declaration on Fundamental Principles and Rights at Work. An analysis has been conducted to assess Uzbekistan's commitments to international human rights standards, the associated national legal frameworks, and current implementation status. Breakdown tables outlining Uzbekistan's alignment with UN human rights conventions and its ratification and implementation of ILO Fundamental Conventions have been included in ***Appendix B Overview of Uzbekistan's Human Rights Framework***.

6. HUMAN RIGHTS BASELINE

6.1 UZBEKISTAN GENERAL HUMAN RIGHTS CONTEXT

Globally recognized indices can be used to assess the state or nature of a country's human rights risks. The following indices provide an indication of the human rights situation within Uzbekistan, and are summarized as follows:

- **Labor Rights Index (LRI):** According to the Labor Rights Index which covers 145 economies and is structured around the working life span of a worker, Uzbekistan received a score of 82 out of 100 on the 2024 Labor Rights Index, slightly below the regional average of 83 for Caucasus and Central Aisa[5]. Recent legislative reforms in 2022 improved the perceptions of worker's rights including over three weeks of paid annual leave, removal of employment restrictions for women, enhanced union formation and collective bargaining rights[6]. Key indicators include high scores in decent working hours, maternity protections, and workplace safety, but lower performance in fair wages and freedom of association.
- **Corruption Perception Index (CPI):** According to the Corruption Perception Index 2024, published in 2025, Uzbekistan received a score of 32, ranking 121st among 180 countries in the index. The score is based on a scale from 0 ("highly corrupt") to 100 ("very clean"), where the country ranked first is perceived to have the most honest public sector[7]. The score of Uzbekistan is below the average score of 35 among Eastern European and Central Asian countries. Uzbekistan's score has improved every year between 2013 and 2023, from 17 to 33, before declining one point in 2024[8].
- **Trafficking in Persons (TIP) Report:** According to the "2025 Trafficking in Persons Report: Uzbekistan", Uzbekistan is categorized as Tier 2 country. This means The Government of Uzbekistan does not fully meet the minimum standards for the elimination of trafficking set by U.S. Department of State but is making significant efforts to do so.[9] These efforts included passing a law to include human trafficking as a form of child exploitation and increased investigations and convictions involving reported trafficking crimes. The government increased the number of trafficking victims identified and assisted, including through NGO partnerships, and increased the overall funds allocated for victim protection and assistance. The government established new guidance to enable the Labor Inspectorate to conduct unannounced inspections. However, the government did not meet the minimum standards in several key areas. While the national government continued to enforce a ban on forced labor in the cotton harvest, some local officials allegedly continued to create pressures to meet production targets[10].
- **Human Development Index (HDI):** The HDI is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living. Uzbekistan's HDI value for 2023 is

[5] Uzbekistan. (2024). Labor Rights Index. https://laborrightsindex.org/trade-union-indicator/uzbekistan
[6] Ibid.
[7] Corruption in Uzbekistan. (n.d.). In Wikipedia. Retrieved January 13, 2026, from https://en.wikipedia.org/wiki/Corruption_in_Uzbekistan.
[8] Transparency International. (2024, April 7). CPI 2023 for Eastern Europe & Central Asia: Autocracy & weak justice systems enabling widespread corruption. Transparency.org. Retrieved from https://www.transparency.org/
[9] U.S. Department of State. (2025). 2025 Trafficking in Persons Report: Uzbekistan. Retrieved from https://www.state.gov/reports/2025-trafficking-in-persons-report/uzbekistan/
[10] Ibid.

0.740— which puts the country in the High human development category—positioning it at 107 out of 193 countries and territories[11]. Between 2000 and 2023, Uzbekistan's HDI value changed from 0.603 to 0.740, a change of 22.7%. Between 2000 and 2023, Uzbekistan's life expectancy at birth changed by 6.9 years, expected years of schooling changed by 1.9 years and mean years of schooling changed by 1.8 years. Uzbekistan's GNI per capita changed by about 225% between 2000 and 2023.

- **Free House Ranking:** A non-government organization, Freedom House, has assessed the political rights and civil liberties in 210 countries and territories. Uzbekistan scored 12 out of 100 (100 represent top score) in 2024 and was classified as "Not free".
- **Universal Periodic Review (UPR):** Established in 2006, the UPR is a UN Human Rights Council peer-review process. The UPR considers the human rights record of each UN Member State every five years. The UPR is led by Member States, which differs from the UN human rights treaty body reviews that are led by committees of experts and focus on specific treaties. Uzbekistan's fourth cycle UPR took place in November 2023, where Uzbekistan received 234 recommendations, of which it accepted 219 (an increase of 10 % compared to the third cycle, which took place in 2018).

6.2 LABOR PRACTICES

Based on the data of household survey, 39 out of 104 households (37.5%) reported that Labor Code was followed for employment in the mahallas. It is reported that trade union works actively to protect legal rights of workers. Nevertheless, 29 households (27.9%) expressed a negative view regarding the compliance of labor code in the local communities. The remaining 36 respondents (34.6%) have no clear thoughts on the compliance of local labor law and activities of labor unions. This indicates extra attention should paid to resolve labor conflicts and incidents in local communities.

6.2.1 CHILD LABOR

Under the Labor Code of Uzbekistan, the minimum age for employment is generally set at 16 years. It is also permissible from age 15 years with parental or guardian consent, but only for light work that does not harm the child's health, development, or interfere with schooling. Children under 18 years of age are banned from hazardous work, night shifts, and other forms of employment that could be detrimental to their health and development.

In 2021, Uzbekistan made significant advancements in combating the worst forms of child labor by amending laws to increase penalties for forced and child labor and criminalizing violations. Labor inspectors conducted 27,471 inspections, identifying 19,967 labor violations, including six child labor cases, resulting in four fines and the removal of 31 children from child labor situations. Despite progress, 4.3% (244,095) of children aged 5-14 were engaged in labor, mainly in agriculture and public work. Challenges remain in NGO registration and enforcement gaps.[12]

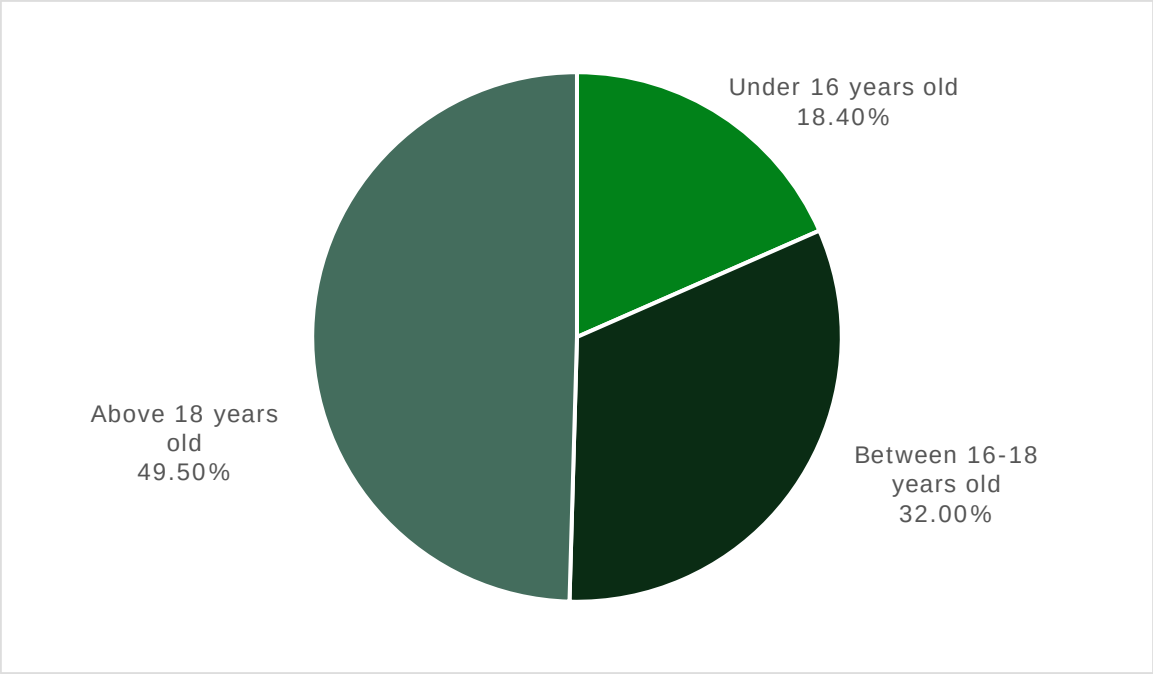
There is no clear evidence of child labor being prevalent in the Project area. Community profiling results from the six affected MFYs show that children typically start their first job at around 15 by being engaged in households, such as caring for animals and herding, instead of

[11] United Nations Development Programme. (n.d.). Human Development Data Center: Uzbekistan. Retrieved January 13, 2026, from https://hdr.undp.org/data-center/specific-country-data#/countries/UZB
[12] U.S. Department of Labor. (n.d.). 2021 Findings on the Worst Forms of Child Labor: Uzbekistan. https://www.dol.gov/sites/dolgov/files/ILAB/child_labor_reports/tda2021/uzbekistan.pdf

participating in formal or informal employment. This is consistent with the household survey, in which approximately 81.7% of respondents reported obtaining their first job at or after age 16. A small number of respondents (19) indicated having worked before age 16 in activities such as construction work, craftsmanship, furniture making, or waste picking. However, these cases appear isolated and do not suggest a systemic issue. Overall, while child labor is not considered a significant concern in the Project area, sporadic cases of income-generating work by children under 16 cannot be fully ruled out.

The following ***Figure E6-1*** shows the distribution of age of first job among population in the household survey:

FIGURE E6-1 DISTRIBUTION OF AGE OF FIRST JOB



Source: Household Survey

Correspondingly, the household survey indicates that the majority of respondents believe work typically starts at or above 16 years old. Only three respondents reported a minimum age below 16. This further supports the assessment that child labor is not prevalent in the Project area. While occasional cases of children engaging in income-generating activities may occur, these do not constitute a systemic pattern.

6.2.2 FORCED LABOR

According to the Global Slavery Index 2023, an estimated 7.4 in every thousand people were in modern slavery in Uzbekistan at any point in 2021. In other words, 249,000 people experienced forced labor or forced marriage in Uzbekistan in 2021. Uzbekistan ranks 48th globally and 21st within Europe and Central Asia[13]. Uzbekistan has more severe vulnerability to modern slavery compared to the regional average in the following dimensions: governance issues, lack of basic needs, inequality, and disfranchised groups. Simultaneously, the government of Uzbekistan scored 46 out of 100 in their response to modern slavery. Of the five areas of response assessed (milestones), the government has taken most action on

[13] Walk Free Foundation. (2023). Global Slavery Index 2023: Country snapshot – Uzbekistan. Retrieved from https://cdn.walkfree.org/content/uploads/2023/09/29084828/GSI-Snapshot-Uzbekistan.pdf

addressing the risk of modern slavery and the least action on addressing risk in government and business supply chains.

Recently, Uzbekistan has made progress in addressing forced labor in 2021. The government passed legislative reforms that increased penalties for forced labor and criminalized repeat offenses, in which Article 148(2) states that all forms of "administrative forced labor" are illegal and criminalized after amendment[14].

International watchdogs and organizations, including the International Labor Organization (ILO), confirmed that systematic state-imposed forced labor has been significantly improved[15]. However, forced labor still occurs in sectors like silk production, construction, and public works. Gaps in enforcement remain, as inspectors are often hesitant to conduct unannounced inspections, especially in private enterprises[16]. Obstacles to the registration of NGOs and the limited participation of civil society have hindered the comprehensive monitoring of forced labor in various sections[17].

6.2.3 OCCUPATIONAL HEALTH AND SAFETY (OHS)

In Uzbekistan, occupational health and safety (OHS) is governed by the Ministry of Employment and Labor regulations, which establishes and enforces safety standards in consultation with trade unions. The legal framework mandates health and safety regulations across all sectors, and the State Labor Inspectors are responsible for identifying violations and imposing administrative penalties such as fines.

State Labor Inspectors regularly conduct workplace safety inspections and actively identify OHS violations. However, despite these laws and efforts, enforcement remains inconsistent. Reports indicate that some workers in hazardous industries lack necessary protective clothing and safety equipment[18], raising concerns about workplace safety. Although workers have the legal right to refuse hazardous work without risking their employment, this protection is not always effectively implemented[19]. Yet, labor protections seldom extend to informal workers, who are more vulnerable to unsafe working conditions[20]. Further efforts are required to strengthen enforcement and ensure compliance with safety regulations to protect OHS across all sectors.

Based on ILO's latest reported workplace safety data in Uzbekistan 2024, nearly 4 out of 100,000 employees experienced fatal occupational injuries. Ten out of 100,000 employees experienced non-fatal occupational injuries[21]. This figure further shows ongoing occupational safety challenges and concerns across key industries. Similarly, according to *The Caspian Post*

[14] Ibid.
[15] 2021 Third-Party monitoring of child labor and forced labor during the cotton harvest in Uzbekistan. (2019). In *International Labor Organization*. https://www.ilo.org/resource/news/uzbek-cotton-free-systemic-child-labor-and-forced-labor
[16] Uzbekistan - United States Department of State. (2024, June 24). United States Department of State. https://www.state.gov/reports/2024-trafficking-in-persons-report/uzbekistan
[17] Ibid.
[18] U.S. Department of State. (n.d). 2024 Country Reports on Human Rights Practices: Uzbekistan. Uzbekistan - United States Department of State
[19] Inconsult. (2024, May 23). Problems of labor protection in Uzbekistan. https://inconsult.uz/publications/view/problems-of-labor-protection-in-uzbekistan.
[20] UNDP. (2025, October 13). Informal Employment in Uzbekistan. Retrieved from: Informal Employment in Uzbekistan | United Nations Development Programme
[21] International Labor Organization. (n.d.-a). Uzbekistan – ILOSTAT. Retrieved January 13, 2026, from https://ilostat.ilo.org/data/country-profiles/uzb/.

reporting via Uzbek Media[22], a total of 849 occupational accidents were recorded nationwide in 2025 at enterprises and organizations. Of these, 50 incidents involved multiple victims, 583 resulted in serious injuries, and 216 ended in fatalities. The construction sector accounted for the highest number of accidents, with 234 cases, reflecting the elevated risks associated with large-scale building projects. It was followed by light industry with 47 incidents and the transport sector with 37 cases[23].

In 2025, The Cabinet of Ministers of Uzbekistan has adopted Resolution No.,819 which approves a set of new regulations governing occupational safety and health[24]. The resolution establishes comprehensive requirements covering employee training, safety briefings, development of OSH instructions, and the appointment of occupational safety representatives. However, despite these regulatory improvements, challenges remain in translating strengthened requirements into consistent on-the-ground practice. Effectiveness of enforcement in industries with hazardous and harmful production factors, a high risk of employment accidents and occupational diseases is of particular concern[25]. It is important to further improve the legal and technical framework of labor inspection and increase the level of financing and improve the financing mechanisms for OHS measures.

6.2.4 FREEDOM OF ASSOCIATION AND THE RIGHT TO COLLECTIVE BARGAINING

While the law formally allows workers to form and join independent trade unions and engage in collective bargaining, in practice, no independent labor unions operate in Uzbekistan.[26] Established in 1990s, the FTUU is the largest trade union in the country and includes 14 sectoral trade union organizations across all the major economic sectors, with over 6 million individual members.

The Confederation of Employers of Uzbekistan (CEU) is a young employer's organization, created in November 2018 by several employers' and business membership organizations, of which the largest is the Chamber of Commerce and Industry of Uzbekistan (CCIU). It plays an important role in social dialogue as an independent organization representing the business sector and employers.

The Federation of Trade Unions of Uzbekistan (FTUU) is the sole national trade union center in Uzbekistan. It functions as a government-aligned body and is primarily funded through member dues, with additional resources from employer contributions for labor protection measures and state budget allocations for OHS initiatives. The FTUU facilitates social protection through collective agreements, resolves individual workers grievances, and provides

[22] Caspian Post. (2026, January 12). Uzbekistan sees over 200 fatal workplace accidents in 2025. Retrieved from https://caspianpost.com/uzbekistan/uzbekistan-sees-over-200-fatal-workplace-accidents-in-2025
[23] Ibid.
[24] Pravsky Consulting. (2026, February 1). Uzbekistan updates rules on organizing occupational health and safety service in an organisation. https://www.pravsky.com/uzbekistan-updates-rules-organizing-occupational-health-and-safety-service-organisation
[25] International Labor Organization. (2025, December 15). Uzbekistan strengthens labor inspection and occupational safety and health. https://www.ilo.org/resource/news/uzbekistan-strengthens-labour-inspection-and-occupational-safety-and-health.
[26] U.S. Department of State. (n.d). 2024 Country Reports on Human Rights Practices: Uzbekistan. Uzbekistan - United States Department of State

targeted support for people with disabilities. [27] Although the law prohibits anti-union discrimination and interference in attempts to establish alternative unions, it is reported that workers still fear repression if they attempt to establish alternative unions. [28]

According to *Annual Report 2025: An Industry and Compliance Review* issued by ILO and IFC, several violations were found in the freedom of association and collective bargaining cluster in Uzbekistan, which covers 17 issues related to these fundamental rights[29]. The most common area of non-compliance found in this area relates to workplace collective bargaining agreements (CBAs). Factories are found, in the report, non-compliant with CBAs if provisions in the agreement are less favorable for workers than those provided for in law; if the employer fails to acquaint workers with the collective agreement; or if the employer fails to implement provisions in the collective agreement. Three of the nine factories were found non-compliant in the area of union operations due to automatically deducting union dues from workers without their prior knowledge and written consent. Related, in two instances factories were found non-compliant in requiring workers to join a union.

6.2.5 DISCRIMINATION AND HARASSMENT

Discrimination and harassment in Uzbekistan remain a concern, despite legal protections. The law provides for equal rights regardless of gender, ethnicity, or other characteristics, but enforcement is inconsistent.

Women face societal and cultural barriers that hinder their equal access to employment and leadership positions, and domestic violence remains prevalent despite recent legal forms criminalizing it. According to the ILO work indicators, gender pay gap still exists for 27.3% between men and women[30]. In April 2023, Uzbekistan adopted a new law amending Uzbekistan's Criminal and Administrative codes that offers better protection for women and girls from abuse as well as strengthened measures to address child abuse. Women's rights are still worth attention and further development.

LGBTQI+ individuals face discrimination and harassment, including arbitrary arrests, blackmail, and physical violence. Their access to justice is further limited by the criminalization of same-sex relations between men under Article 120 of the Penal Code[31], which punishes consensual sexual relations between two men with imprisonment of up to three years. Uzbek police and courts have been reported to rely on conclusions of forced and examinations in prosecutions of gay men for consensual same-sex relations.[32] Such exams are a form of violence and torture, according to World Health Organization.

[27] https://grokipedia.com/page/federation_of_trade_unions_of_uzbekistan
[28] U.S. Department of State. (n.d.). 2024 Country Reports on Human Rights Practices: Uzbekistan. Uzbekistan - United States Department of State
[29] Better Work Uzbekistan. (2025, June 4). Better Work Uzbekistan annual report 2025: An industry and compliance review. International Labor Organization & International Finance Corporation. https://betterwork.org/wp-content/uploads/Better-Work-Uzbekistan-Annual-Report-2025_En.pdf
[30] International Labor Organization. (n.d.). Uzbekistan country profile. ILOSTAT. Retrieved January 13, 2026, from https://ilostat.ilo.org/data/country-profiles/uzb/.
[31] Ibid.
[32] Human Rights Watch. (n.d.). World Report 2024: Uzbekistan. https://www.hrw.org/world-report/2024/country-chapters/uzbekistan

Members of ethnic and religious minority groups rarely make complaints about societal violence or discrimination, and people with disabilities encounter social stigma and limited access to public services and equal employment opportunities[33].

6.3 VULNERABLE GROUPS

After the scoping and baseline study, several groups were identified as vulnerable groups within the surveyed communities as they would be more susceptible to the negative impacts and risks that the Project would entail or at the more disadvantaged. Vulnerable groups include:

- The Elderly (person aged 60+ years)
- Disabled
- Women-headed household
- Low-income Household (Consumer spending less than 669,000 UZS per person per month)
- People receiving social assistance[34]
- Waste pickers from nearby communities
- Mugat Waste Pickers[35]

Based on the household survey, approximately 26% of household population is identified as vulnerable. Specifically, according to the community profiling, the vulnerable population proportion of each MFYs is 20% in Dustlik, 12% in Komalot, 18% in Navruz, 13% in Sakhovat, 21% in Urta Turkman, and 22% in Yoshlik. Among six categories of vulnerable groups, the elderly are usually the dominant type of vulnerability in each MFY. Besides, disabled and female-headed household are also two other vulnerabilities within the social AoI. Waste pickers were dentified in two MFYs, i.e., Komalot and Navruz, within the social household survey. These two MFYs are the main source where local waste pickers are located. Other sporadic waste pickers also were identified from other MFYs (i.e. Dustlik) during the site visit.

The number of Mugat waste pickers is estimated to range from around 60 to more than 100 individuals.

The detailed distribution of vulnerable groups in each MFY can refer to ***Table E7-2*** in Chapter 7.

[33] U.S. Department of State. (n.d.). 2023 Country Reports on Human Rights Practices: Uzbekistan. Uzbekistan - United States Department of State
[34] This refers to "Moddiy yordam" — material (financial) assistance provided by the state to low-income or vulnerable groups of the population in Uzbekistan. The following group can receive social assistance required by law including: low-income families, elderly people without guardianship, persons with disabilities, and single parents with children.
[35] The Mugat (also called Luli, Jughi, or Multani) are a traditionally itinerant community in Central Asia whose origins trace back to the northern Indian subcontinent, forming part of the broader Dom/Domari Indo-Aryan diaspora.

6.4 GENDER EQUALITY AND GENDER BASED VIOLENCE (GBV)

6.4.1 GENDER EQUALITY AND GBV IN UZBEKISTAN

The World Bank's Uzbekistan Country Gender Assessment Report (CGA) highlights Uzbekistan's significant progress on gender equality since 2017[36]. Notable advancements include ensuring equal pay and removing job restrictions for women in the Labor Code adopted in 2022. According to the ILO, the mean wages of women has stably grown for three years from 2019 to 2022[37]. Additionally, amendments introduced to the Criminal Code in 2023 established criminal penalties for domestic violence.

Women's access to education and health services has notably improved. For example, tertiary education enrollment saw significant growth, with men tripling to 29% and women quadrupling to 27.4% between 2017 and 2022[38]. Efforts to provide equitable healthcare have reduced infant and maternal deaths over the past three decades, with infant mortality dropping from 34.6 deaths per 1,000 live births in 1990 to 9.2 in 2021[39].

Despite improvements in legislation and human capital, gender disparities in labor market outcomes persist. In 2021, female labor force participation lagged behind men by 28 percentage points (ppt), far higher than the average for the Europe and Central Asia region excluding high-income countries (19 ppt). Young women face higher unemployment rates (15.5% vs 10% for males) and the share of young women who were not in employment, education, or training (NEET) reached 42%, compared to 8.8% for males. Additionally, wage gender gaps are significant, with women earning 34% less than men, exceeding the global average of 20%.[40]

Low pay and employment rates among women directly hinder economic growth and exacerbate poverty in Uzbekistan. If women participated in the country's economy on par with men, the national income in Uzbekistan would rise by 29%[41]. By closing the gender wage gap, where women earn 34% less than men on average, would lift over 700,000 people out of poverty[42]. However, entrenched gender norms, where women are primarily responsible for caregiving and household duties, impede progress towards gender equality and inclusive economic growth. According to the ILO, the raw Gender-Pay-Gap (GPG) notably stayed above 25% between 2018 and 2022. It shows that, in 2022, the GPG was equal to 31.7 per cent when estimated using mean wages, and it was equal to 35.7 per cent when using median wages[43]. That is, for every Uzbekistani sum (UZS) earned by men, women earn in between 64.3 and 68.3 cents, depending on whether the GPG is computed at the mean or at the median of the wage distribution[44]. This reflects entrenched social norms limiting women's economic participation in constraining achieving gender equality.

[36] World Bank. (2024, June 17). World Bank country gender assessment report: Uzbekistan. The World Bank. https://www.worldbank.org/en/country/uzbekistan/publication/country-gender-assessment-2024.
[37] International Labor Organization. (2025, March). *The gender pay gap in Uzbekistan: Recent trends and policy implications* (ISBN 978-92-2-041818-5). International Labor Organization.
[38] World Bank. (2024, June 17). World Bank country gender assessment report: Uzbekistan. The World Bank. https://www.worldbank.org/en/country/uzbekistan/publication/country-gender-assessment-2024.
[39] Ibid.
[40] Ibid.
[41] Ibid.
[42] Ibid.
[43] International Labor Organization. (2025, March). *The gender pay gap in Uzbekistan: Recent trends and policy implications* (ISBN 978-92-2-041818-5). International Labor Organization.
[44] Ibid.

According to a news agency, in the first half of 2025, 48,303 cases of harassment and violence against women were registered in Uzbekistan, which is 121% more than the same period last year.[45] Gender-based violence (GBV) in Uzbekistan is prevalent, with around 40,000 annual cases reported, predominantly domestic (85% occurring at home), while global statics show one in three women experience GBV[46]. In 2018, 185 women (age 15-49) reported abuse by intimate partners, and 108 women reported sexual violence by non-partners[47]. In 2022, 87% of protection orders were filed against family members, predominantly husbands[48]. In the first seven months of 2023, there were 21,871 women applying for protection orders, and 84.7% of them required protection from family members such as from the husband and mother-in-law[49]. Deep-seated social taboos and pressures to prioritize family unity over personal safety drive victims to endure abuse, while a lack of specialized services and law enforcement approaches often encourage reconciliation with abusers. This culture of silence is exacerbated by societal demands to avoid public shame[50]. Uzbekistan's has implemented recent legislative efforts, like the 2023 law criminalizing domestic violence[51].

6.4.2 GENDER EQUALITY AND GBV IN THE PROJECT AREA

According to the community profiling with ix affected MFYs, it is concluded that gender roles and labor patterns are generally traditional, and the situations observed in each mahalla are largely similar. Men are reportedly primarily engaged in sectors of construction works, manual and technical works, agriculture and livestock farming, welding, drivers, maintenance works, with diverse sources. On the other side, women primarily participated in tailoring and sewing, cooking works, and catering services, which is more home-based and small-scale economic activities. A significant proportion of women are housewives, primarily responsible for household management, childcare, and family care.

Unlike women, men usually have higher chance to be employed in the formal economics and get engaged in full-time income-generating activities. FGDs results with local women indicate that women are more often engaged in informal or temporary work, whereas men generally have more stable employment and receive monthly salaries. In this case, men are usually perceived as the main income earner of the family. Only a smaller proportion of women are engaged in income-generating activities, mainly home-based work such as sewing or small-scale economic activities. Besides, some women expressed their wish for more childcare

[45] YuzNews. (2025, August 13). More than 48,000 cases of harassment and violence against women have been registered in Uzbekistan in six months
[46] World Bank Group. (2024). World Bank Country Gender Assessment Report: Uzbekistan. In World Bank. https://www.worldbank.org/en/country/uzbekistan/publication/country-gender-assessment-2024#:~:text=Additionally%2C%20wage%20gender%20gaps%20are,the%20global%20average%20of%2020%25.
[47] SeitzWilliam, H. T. (2024). Uzbekistan - Country Gender Assessment 2024. World Bank. https://documents.worldbank.org/en/publication/documentsreports/documentdetail/099052824010093257/p1756961bcc2a50811a9d21c373fd390418.
[48] Ibid.
[49] UNDP. (2024, December 3). Why Legal Aid Provision Needs to be Gender-sensitive: Case of Uzbekistan. Why Legal Aid Provision Needs to be Gender-sensitive: Case of Uzbekistan | United Nations Development Programme
[50] International Partnership for Human Rights. (2022, February 14). Uzbekistan: Failure to Protect Women from Domestic Violence (CEDAW submission). Uzbekistan: Failure to Protect Women from Domestic Violence (CEDAW submission) - IPHR
[51] World Bank Group. (2024). World Bank Country Gender Assessment Report: Uzbekistan. In World Bank. https://www.worldbank.org/en/country/uzbekistan/publication/country-gender-assessment-2024#:~:text=Additionally%2C%20wage%20gender%20gaps%20are,the%20global%20average%20of%2020%25.

centers and kindergartens to be built in the communities. This reflects that the dilemma of time poverty that local women face, which constrains their time, energy, and opportunities to engage in formal and higher paying jobs and reinforces the existing gender gaps. This reflects the limited availability of formal employment opportunities for women. The situation is further constrained by the lack of accessible kindergarten facilities in the MFY, which reduces women's ability to balance work and childcare responsibilities.

Nevertheless, despite the existing discrepancies of nature of employment, women's contribution to household income and livelihood security is substantial. For instance, in the MFY of Urta Turkman, where approximately 80% of households operate household greenhouses, women actively support greenhouse activities, including planting, harvesting, sorting, and preparation of products, in addition to performing household duties and childcare. While women's participation in formal employment is limited, their contribution to family-based agricultural activities is significant.

Regarding public and political life in the communities, women's FGD results show that women hold leadership positions in community meetings. Women have relatively equal opportunities in making community decisions. They are able to attend meetings, take part in discussions, and engage in community initiatives on an equal basis with men. In particular, women serve as kindergarten directors and deputies, participating in local decision-making processes. Besides, women actively participate in community decision-making through entrepreneurship and involvement in social structures as a significant number of business initiatives originate from women. Thus, no significant obstacles to women's public participation are identified locally.

According to the community profiling, no Gender-based violence case was reported among the affected communities. The household survey, however, reported a case of domestic violence where a divorced woman experienced domestic violence and was left without housing.

This is generally consistent with feedback from the FGDs, where participants noted that there were no known incidents of violence, harassment, or significant safety concerns affecting women and girls in the mahallas. The overall environment in the community is calm and safe.

6.5 LIVELIHOODS AND ECONOMIC ACTIVITIES

Regarding employment, 86,400 people were unemployed in the Samarkand Region, among which 10,600 people were unemployed in Samarkand City. The regional employment rate in 2024 was 64.8%, slightly lower than the national employment rate at 68%. Based on the statistics from the Samarkand City Statistics Department, Samarkand City exhibited a service- and industry-oriented economic profile in 2025. Specifically, the city's total industrial output reached UZS 70,217.0 billion (USD 5.76 billion), up by 9.3% from the implied 2024 level, compared with 12.0% growth at the regional aggregate.

Within the social AoI, according to the result of community profiling, the main economic activities in the surveyed communities include agriculture, livestock raising, service sector, government employment and industrial manufacturing. Across the surveyed MFYs, employment patterns show substantial variation, reflecting differing socioeconomic compositions. Dustlik MFY and Navruz MFY exhibit relatively balanced labor structures, with 13–24% of the working population in public jobs and 13–29% in private employment, alongside sizeable self-employment shares (36% and 18%, respectively). Komalot MFY, Sakhovat MFY, Urta Turkman MFY, and Yoshlik MFY show the highest concentration of formal sector work—public sector employment ranges from 22% to 56%, complemented by 24–38%

private sector employment. Unemployment rate in the surveyed area is consistently low at 1–2%, indicating high levels of economic participation despite the varying balance between formal and informal work.

6.6 COMMUNITY HEALTH AND SAFETY

According to community profiling results, medical services are predominantly primary-care oriented and spatially uneven, prompting routine reliance on nearby urban facilities for specialized care. Overall, accessibility to first-contact care is therefore good to moderate but specialist/inpatient access requires 4–9 km travel, creating potential barriers for the elderly, persons with disabilities, and low-income households. Quality and continuity of care for chronic conditions (notably hypertension and diabetes) remain a shared concern, with recurring reports of seasonal influenza across MFYs and condition-specific mentions (e.g., prostate-related diseases, jaundice/hepatitis, bone-related conditions) that would benefit from stronger referral pathways and diagnostics.

Based on community profiling results, no mahalla heads identify any prevailing security or crime problems, and no specific GBV concerns were raised. Day-to-day safety is therefore perceived as stable/low-risk from a community perspective. Similarly, youth across the investigated communities perceive their environment as stable, low-risk, and generally safe, with no major safety threats, criminal activity, or GBV-related issues reported. Correspondingly, based on the household survey, no respondents reported any case of violence and abuses including domestic violence, violence against children, cases of rape, physical/verbal harassment against women, forced labor and human trafficking — with the sole exception of one report of violence against women. No crime cases and illegal activities were reported within the household survey either, which indicates safety and security within the social AoI area is relatively good and stable.

6.7 VALUE CHAIN

Uzbekistan has made significant progress in addressing its supply chain labor issues, having eliminated systematic, state-imposed forced labor and child labor in its crucial cotton industry[52]. It is, however, fraught with human rights concerns that impact workers, local communities, and the environment. Many workers in supply chain, especially subcontracted laborers, face wage exploitation, precarious contracts, and hazardous workplace conditions, with reports of excessive overtime, withholden wages, and inadequate safety measures[53].

6.8 CONFLICT AND SECURITY

In Uzbekistan, the National Guard, police, and military are central to maintaining national security and public order. The National Guard, an independent entity with the Armed Forces, is headquartered in Tashkent and comprises approximately 30,000 personnels[54]. Its

[52] International Labor Organization. (2022, March 1). Uzbek cotton is free from systemic child labor and forced labor. International Labor Organization.https://www.ilo.org/resource/news/uzbek-cotton-free-systemic-child-labor-and-forced-labor.
[53] UK Government. (2024, October 31). Uzbekistan: Country of concern. GOV.UK. https://www.gov.uk/government/publications/uzbekistan-country-of-concern/uzbekistan-country-of-concern.
[54] Kunu.Uz. (2025, January 9). *Uzbekistan's military capabilities: A comprehensive review of strengths and resources*. Kun.uz. https://kun.uz/en/news/2025/01/09/uzbekistans-military-capabilities-a-comprehensive-review-of-strengths-and-resources

responsibilities include ensuring public order, safeguarding diplomatic missions, and protecting vital facilities[55].

The police force operates under the Ministry of Internal Affairs, focusing on law enforcement and internal security. However, concerns have been raised regarding the use of force. Sources from Human Rights Watch indicate that during interrogations, police have employed physical abuse, such as beating, and psychological coercion to mistreatment under the current legal framework.

In recent years, there have been incidents involving the use of force by security services. For instance, during the July 2022 protests in Karakalpakstan, security forces reportedly used unjustifiable lethal force to disperse protests, resulting in 21 casualties and 274 injuries[56].

Similarly, *Uzbekistan 2023 Human Rights Reports*, issued by the U.S. Embassy, reports that two Border Guards used lethal force to kill two men in the Vodil district of the Fergana region. According to an official press release, the two guards were compelled to use lethal force after a drunken, unruly crowd protesting the detention of the two men failed to respond to their warning shots[57]. However, Ozodlik and activists reported the two men were held down and shot in the back of the head after they protested the Border Guards' demand of payment to avoid arrest for narcotics the Border Guards allegedly planted in their vehicles.

6.9 ACCESS TO REMEDY

Uzbekistan has established a Commissioner for Human Rights (Ombudsman) under the Oliy Majlis (Supreme Assembly) to oversee and protect human rights within the country. The Ombudsman operates independently from state authorities and officials and reports directly to the Oliy Majlis. The Commissioner is elected by both the Legislative Chamber and the Senate for a five-year term, ensuring accountability in monitoring human rights practices.

Key Responsibilities of the Ombudsman, as defined by Law on the Authorized Person of the Oliy Majlis for Human Rights (Ombudsman), are as follows:

- **Monitoring Human Rights Compliance**: The Ombudsman supervises the enforcement of human rights laws and ensures Uzbekistan adheres to its international human rights obligations.
- **Handling Public Complaints**: Citizen can submit complaints or reports about human rights violations directly to the Ombudsman's office. The Ombudsman is mandated to investigate these complaints and take appropriate actions to address issues.
- **Promoting Human Rights Awareness**: The Ombudsman is also responsible for raising public awareness and promoting education on human rights issues throughout the country.

In addition to the Ombudsman, Uzbekistan has established the Commissioner for Children's Rights, aimed at protecting and promoting children's rights. The office is established in 2019, followed by the formation of the National Commission on Children's Issues and regional

[55] Ibid.
[56] International Society for Human Rights. (2025, April 17). Uzbekistan: The Republic of Karakalpakstan and the 2022 Unrest. https://ishr.org/uzbekistan-the-republic-of-karakalpakstan-and-the-2022-unrest/
[57] United States Department of State. (2024). Uzbekistan 2023 human rights report. U.S. Embassy in Uzbekistan. https://uz.usembassy.gov/wp-content/uploads/sites/78/528267_UZBEKISTAN-2023-HUMAN-RIGHTS-REPORT.pdf.

commissions in 2021, further strengthening the country's human rights infrastructure for minors.

These institutions provide essential basis for citizens to report human rights violations and contribute to the ongoing development and enforcement of human right standards in Uzbekistan.

As for labor disputes and resolution, Uzbekistan poses challenges within the realm of employment relations, often arising from conflicts between employees and employers. These disputes can appear in various forms, including issues related to unfair dismissal[58], wage discrepancies[59], and unsatisfactory working conditions[60]. The Labor Code clearly states that protection of labor rights which is performed by supervision bodies and control of compliance should also consider the employment disputes that apply to everyone[61].

An important government agency involved in labor disputes resolution is the State/local labor inspectorates[62]. These agencies operate at regional and municipal levels and are tasked with monitoring labor conditions and addressing disputes before they escalate. Local labor inspectorates serve as the first point of contact for employees and employers facing conflicts. They are responsible for conducting investigations into reported issues, advising both parties on the legal framework governing labor relations, and facilitating dialogue aimed at resolving disputes. This proactive approach helps to mitigate tensions and promote a collaborative atmosphere within the workplace.

Mediation has emerged as a vital alternative mechanism for resolving labor disputes in Uzbekistan[63]. This process serves as a collaborative method, where a neutral third party, known as a mediator, facilitates discussions between conflicting parties to achieve a mutually agreeable resolution. Initiating mediation typically begins when one party requests mediation assistance, often prompted by unresolved issues that may escalate if not addressed promptly. Once both parties agree to engage in mediation, a suitable mediator is selected, who possesses the skills to navigate the complexities of labor disputes.

According to Focus Group Discussions with local affected communities, community members can submit their grievances to the MFY leaders through both oral and written means. This is the primary local grievance mechanism for local people to raise concern. Specifically, a presentative responsible for receiving and addressing complaints is also designated for each MFY. If grievance cannot be resolved at the MFY level, it could be escalated to the city municipal administration for further review and resolution. It is reported that grievances at the MFY level are addressed in a timely and effective manner. There are no concerns of retaliation for the grievance raising.

[58] Generis Global Legal Services. (2024, December 1). Understanding labor dispute resolution mechanisms in Uzbekistan. https://generisonline.com/understanding-labor-dispute-resolution-mechanisms-in-uzbekistan/
[59] ILO. (2025, March 7). The Gender Pay Gap in Uzbekistan: Recent Trends and Policy Implications. The Gender Pay Gap in Uzbekistan: Recent Trends and Policy Implications | International Labour Organization
[60] Better Work. (2025, June 4). Better Work Uzbekistan Annual Report 2025: An industry and compliance review. Better Work Uzbekistan Annual Report 2025: An industry and compliance review - Better Work
[61] Labor Code of the Republic of Uzbekistan (1995). (2020, July). Warnath Group. https://www.warnathgroup.com/wp-content/uploads/2020/07/1995-Labor-code.pdf
[62] Understanding labor dispute resolution mechanisms in Uzbekistan. (2024, December 1). Generis Online. https://generisonline.com/understanding-labor-dispute-resolution-mechanisms-in-uzbekistan/
[63] Ibid.

According to the household survey results, only 37.5% of overall informants reported that grievance mechanism exists. Approximately 29.8% respondents indicated that there is no effective grievance mechanism serving for the resolution of local grievances. Other respondents have no idea about the existence and efficiency of the local grievance mechanism. It is also worth noting that as for the waste pickers at nearby landfill, only 3 out of 11 respondents indicated that they were informed of the existence of local grievance mechanism.

It is concluded that although local grievance mechanisms do exist, it is less well known to the broader public. This result also aligns with the fact that only 12.5% of overall respondents indicated that they raised the complaints to the local grievance mechanism. Thus, the existence of local grievance mechanism is insufficiently communicated and remains poorly understood by the wider community members. The survey results also show that most respondents reported that they do not have a need to resort to the formal grievance mechanism to resolve issues in their daily life. This explains why the existence of local grievance mechanism seems so marginal in their perception and well known to the public.

For the respondents who are aware of the existence of local grievance mechanism, the access of local grievance mechanism is well structured. Approximately 97.4% (38 out of 39) respondents indicated the access is either excellent, satisfactory, or good. Only one respondent answered “unsatisfactory”. The perception towards the efficiency of local grievance mechanism in resolving the complaints is also generally favorable. When asked about the “confidence in grievance resolution”, 30.7% respondents answered with “very confident” and 47.1% respondents answered with “somewhat confident”. Only 22.1% of overall respondents reported “slightly confident”.

Besides, the Project-level Grievance Mechanism for local communities and Project’s contracted workforce has been developed to define clear and predictable processes for how grievances or complaints get addressed. The grievance mechanism encompasses a monitoring process to ensure that any grievance handling is conducted in a fair, impartial, and timely manner.

7. HUMAN RIGHTS ISSUES SCREENING AND SCOPING

7.1 RIGHTSHOLDERS

The assessment looks at how rightsholders may be impacted by the Project. Based on ***Section 2***, the following rightsholders have been identified:

- **Nearby communities of the Project** including Dustlik, Navruz, Sakhovat, Komalot, Yoshlik, and Urta Turkman.

Details of the population demographics in these six MFYs are captured at the following ***Table E7-1***.

TABLE E7-1 DEMOGRAPHIC INFORMATION OF THE AFFECTED MFYS

Mahalla (MFY)	Male	Female	Population (people)
Dustlik	1,582	1,549	3,131
Navruz	1,255	1,193	2,448
Sakhovat	2,244	2,031	4,275
Komalot	3,064	2,964	6,028
Yoshlik	1,335	1,327	2,662
Urta Turkman	2,252	1,850	4,102
Total	13,626	12,502	26,128

Source: community profiling in Feb 2026

Vulnerable groups living in the nearby communities of the Project include the Elderly (aged 60+ years), the disabled, female-headed household, low-income Household (Consumer spending less than 669,000 UZS per person per month), people receiving social assistance, and waste pickers (including community waste pickers and Mugat waste pickers).

Table E7-2 presents the number of vulnerable households in the survey area based on the community profiling results and engagement with waste pickers.

TABLE E7-2 VULNERABLE GROUPS IN THE SURVEY AREA

Category / MFY	The Elderly	Disabled	Women-headed household	Low-income household	People receiving social assistance	Waste picker[64]	Proportion
Dustlik	462	83	30	25	24	1	19.96%

[64] The specific number of distributions of waste picker in each MFY is not available.

Category / MFY	The Elderly	Disabled	Women-headed household	Low-income household	People receiving social assistance	Waste picker[64]	Proportion
Komalot	630	32	18	38	12	Approximately 10	12.11%
Navruz	312	29	58	37	5	Approximately 20-30	18.01%
Sakhovat	364	92	40	26	46	NA	13.28%
Urta Turkman	785	49	15	5	7	NA	20.98%
Yoshlik	371	43	95	23	43	NA	21.60%

Source: community profiling and interview with waste pickers in Jan 2026

Other than mahalla residents, the number of Mugat waste pickers is estimated to range from around 60 to more than 100.

- **The Project workforce**

  This group of rightsholders refers to the Project workforce that will be engaged during the construction and operational phases, including direct employees (24 direct workers in construction phase and 64 in the operation phase), and contracted workers (the peak of contracted worker is 400 in the construction phase and no EPC contracted worker during the operation phase) engaged by the EPC contractor and subcontractors employed to construct and support the Project. The most vulnerable of these workers tend to be migrant workers, due to potential issues linked to matters such as their lack of official documentation, reduced bargaining power, and/ or language barriers.

- **The workforce involved in the wider Project supply chain**

  This group of rightsholders refers to the workforce in the Project's supply chain, including those engaged in raw material sourcing.

- **Employees of the Samarkand City Landfill**

  This group pf rightsholders refers to 10 formally engaged landfill workers who might lose their employment due to the closure of the landfill.

7.2 ENGAGEMENT AND CONSULTATION

To support the HRIA, targeted consultations with rightsholders and relevant stakeholders were undertaken from 12 to 15 Jan 2026 and from 7 to 9 Feb 2026. The key takeaways from the consultations are summarized in ***Table E7-3.***

TABLE E7-3 OVERVIEW OF HUMAN RIGHTS CONCERNS AND ISSUES RAISED DURING THE SITE VISIT

Categories	Agent	Date	Engagement Activities	Key Human Rights Concern
Rightsholders	Affected Communities	13 January	Focus Group Discussion (FGD)	• Concerns over potential environmental impacts such as air emissions, odors, and noise.
		7 February to 9 February	Focus Group Discussions (FGD)	• The Project may generate environmental impacts, particularly on the air quality, public health, and noise levels. • There may be unpleasant odor and pollution from construction and operation. • Residents may have limited employment opportunities from the Project. • The Project may impact on public health.
		7 February to 9 February	Household Survey	• The Project may generate environmental impacts, particularly on induced water scarcity, air quality, public health, and noise levels. • There may be unpleasant odors, pollution, and poor solid waste management from construction and operation. • The Project might provide limited employment opportunities for local communities. • The Project may impact on public health. • Some residents expressed concerns about vegetation cover lost, traffic disruption, loss of income and spread of diseases due to labor influx.
		21 January to 9 February	Community Profiling	• Relatively traditional gender structure and dynamics in the Social AoI area, which would impede the equal occupational opportunities and full engagement of women in the formal work sectors. • Primary healthcare is limited in local areas.

Categories	Agent	Date	Engagement Activities	Key Human Rights Concern
				• Water and sanitation access is unevenly distributed among MFYs.
Other Stakeholders	Public Authorities	12 to 15 January	Key Informant Interviews (KII)	• No particular concern.
	Poultry Farm	12 January	Key Informant Interviews (KII)	• Concerns about the air emissions from waste combustion and possible impact on confidence of agriculture produces due to public perceptions of waste-to-energy incineration. • Concerns about the cumulative air quality impacts. • Concerns about occupational health and safety.
	Scrap Dealing Company	8 February	Key Informant Interview (KII)	• No particular concern.
	Local Hospitals	8 February	Key Informant Interview (KII)	• There may be potential technogenic illness or an increase in seasonal diseases if environmental and sanitary standards are not properly maintained. • Possible release of carbon monoxide and other harmful emissions into the atmosphere. • Language barrier in case of foreign worker's medical treatment.
	Fruit Farm	8 February	Key Informant Interview (KII)	• The Project may affect soil fertility, if dust emissions and air pollutants are not properly controlled. • The Project may affect irrigation water availability if abstracting from the canal, especially in dry seasons.

Categories	Agent	Date	Engagement Activities	Key Human Rights Concern
				• Potential noise during operational phase from machinery, transport or daily operation.

Source: ERM ESIA Scoping and Social Baseline Study in 2026

7.3 SCOPING RESULTS

The scoping process considered the potential human rights risks and impacts associated with the Project activities during both the construction and operation phases. As this is a supplementary HRIA to the ESIA, and as such there is overlap between the HRIA and the social impacts assessed in the ESIA Chapter 10 Social Impact Assessment ("SIA"). Thus, where there is overlap, the respective impacts have not been reevaluated in this HRIA to avoid duplicative assessment. The scoping process is presented in Appendix A and the scoping results indicated the following potential impacts to be assessed in this HRIA:

In this HRIA, there are four elements being assessed: i) impacts on labor and working conditions; ii) impacts on worker's rights along the Project's supply chain; iii) impacts on community security associated with security personnel employed; and iv) the inability of rightsholders to participated and/or access remedy. A detailed assessment of these elements is presented in ***Section 8 Human Rights Impact Assessment***.

8. HUMAN RIGHTS IMPACT ASSESSMENT

8.1.1 IMPACTS ON LABOR AND WORKING CONDITIONS OF PROJECT WORKERS

8.1.1.1 BASELINE CONTEXT

The Labor Code of the Republic of Uzbekistan (2023), along with the Law on Guarantees of Equal Rights and Opportunities for Women and Men (2019), the Law on employment of the Population (2018), the Law on Guarantee of Children's Rights (2008), etc., prohibits child labor, forced labor and discrimination. These law outlines workers' rights related to renumeration, social security, working hours, rest, paid holidays and the right to join and form trade unions and other organizations representing the interests of workers, including the right to collective bargaining. Local laws also mandate that workers be provided with safe and hygiene working conditions.

Baseline data in ***Section 6.2*** indicates occasional violations of the labor code in Uzbekistan, including instances of child labor and forced labor. Common violations by private-sector employers include issues with wages, overtime, and sub-standard health and safety conditions.[65] Additionally, there are no independent labor unions in the country other than Federation of Trade Unions of Uzbekistan (FTUU).

Based on the data from the household survey, 37.5% of overall respondents confirmed that labor code is strictly followed in the community. It is said that trade union works actively to protect legal rights of workers. Nevertheless, approximately 27.8% of informants expressed the negative view the compliance of labor code in the local communities. 34.6% of overall respondents have no clear thoughts on the compliance of local labor law and activities of labor unions. Overall, it is worth giving extra attention to the solving of labor conflicts and incidents in local communities.

8.1.1.2 PROJECT DETAILS

During construction, the Project will engage construction workers through an EPC (Engineering, Procurement, and Construction) contractor. According to the current work plan, it is estimated that around 400 construction workers (estimated with more than half are Uzbeks) will be engaged at the peak. The Project Company will provide accommodation for non-local construction workers on site as well.

During the operation phase, the facility will require 60-100 employees. Accommodation will be provided in site area for the employees hired by the Project Company. Approximately 6-10 security personnel will be engaged during operational phase, who will be drawn from the private company by the Project Company.

8.1.1.3 ASSESSMENT

The Project will hire direct employees, construction workers and security personnel during the construction and operational phases. Without appropriate safeguards, the Project may potentially contribute, knowingly or unknowingly, to a violation of workers' rights, in particular the rights outlined by the core ILO Conventions.

[65] U.S. Department of State. (n.d.). Uzbekistan 2024 Human Rights Report. Uzbekistan - United States Department of State

Though SUS has established some human resource management procedures including Employee Onboarding and Offboarding and Labor Contract Management System (Q/SUS 24701-2024), Values-Based Assessment and Management Measures (Trial) (Q/SUS 22401-2024), Job Qualification Management System (Q/SUS 24304—2025), Regulations on the Disclosure and Avoidance of Conflicts of Interest Regarding Employee Relatives and Employee Attendance (Q/SUS 24707—2024), and Leave Management Regulations (Q/SUS 24708.2—2025), it lacks clear requirements on prohibition of forced labor and child labor for both direct workers and contracted workers. The Project company lacks established procedures to effectively verify age when hiring, which is hard to detect the existence of Child Labor. For the Project's Contracted Worker Code of Conduct, no complete monitoring system and other job performance measurements were well established in terms of labor and working conditions. Neither requirement on worker's training is clearly proposed at current stage.

There is also a lack of clear provision on freedom of association and collective bargaining for both direct workers and contracted workers. There is no clear policy allowing workers to participate in collective bargaining. No policy that is related to prohibiting discrimination and harassment is proposed at this stage. Besides, the existing manpower plan and distribution of corporate management positions do not reflect the gender composition of the workforce, which may create structural risks that induce gender-biased practices in both hiring and remuneration decisions. It is also worth noting the Project only provided its series of above labor management procedures in Chinese. There is still a gap in that all policies are clearly translated, communicated and understandable to all workers (including local and migrant workers) in a culturally appropriate way.

The existing Contractor EHS Management System has overall requirements on contracted workers' occupational health and safety with corresponding monitoring settings. Nevertheless, it lacks specific regulations and monitoring on terms of employment provided to the contracted workers, including payroll records, time sheets, and pay slips.

These policy gaps might cause management absence, which can further induce potential violations of workers' rights may include:

- Potential employment of children or forced or bonded labor. This risk is often higher for vulnerable groups, including migrant workers who cannot speak or read the local language (e.g., workers from China) and may be exacerbated by the adoption of employment agencies or labor brokers;
- Accidents, injuries or other health and safety risks, which can arise from hostile or unsafe working conditions, such as excessive overtime and insufficient rest;
- Potential for discriminatory practices to occur in the hiring process and in decisions regarding remuneration;
- Potential for discrimination against workers that join unions (or other similar organizations) or take part in collective bargaining. Vulnerability due to the lack of collective bargaining and union representation, which means workers may lack a crucial mechanism to negotiate fair wages/safe conditions, challenge exploitation, or address disputes effectively.
- Inappropriate or delayed payments to workers especially for the contracted workers;

- Risks of violence and sexual harassment and exploitation among workers; and

The affected rightsholders for these impacts are the Project workforce, which includes workers directly employed by the Project, as well as third-party workers engaged by contractors and subcontractors. The workers may experience tangible infringement on the access to basic, just and favorable conditions of work, equal pay for equal work, just and favorable remuneration, and to form or join labor unions.

The impact on workers can be serious and irremediable, in particular for migrant workers with their vulnerability. Therefore, the severity of the potential impact on workers is assessed as **High**.

Considering the potential violations of labor rights in the country and the absence of mitigation measures in place, the likelihood of impacts on labor and working conditions of Project workers is assessed as **Likely**.

Overall, the impact rank is considered **Medium**.

Impact	Phase	Rightsholders	Severity	Likelihood	Impact Rank
Impact on Labor and Working Conditions of the Project workers	Construction	Project workers	High	Likely	Medium
	Operation	Project workers	High	Likely	Medium

8.1.2 IMPACTS ON WORKERS' RIGHTS ALONG THE PROJECT'S SUPPLY CHAIN

8.1.2.1 BASELINE CONTEXT

While no Uzbekistan-specific WtE supply-chain risks are documented, general challenges include wider labor vulnerabilities in supply chains. Despite progress in eliminating state-imposed child and forced labor, subcontracted workers in various sectors continue to face risks such as wage exploitation, insecure contracts, excessive overtime, delayed payment, and inadequate safety conditions.

8.1.2.2 PROJECT DETAILS

Currently, the Project Company has a Procurement Manual for the early-stage procurement and Supplier Social Responsibility Assessment Form for the supplier evaluation. Procurement Manual only defines the basic procurement procedures and organizational labor division of the procurement, with an absence of specific mapping and identification of human rights performance risks of suppliers. There is no integrated set of procurement safeguards measures in the Project's Procurement Manual to address key labor and human-rights risks, including the prohibition of child and forced labor, requirements on occupational health and safety, freedom of association and collective bargaining, or anti-discrimination and harassment. The Supplier Social Responsibility Assessment Form covers relatively thorough social performance topics including child labor, forced labor, Occupational Health and Safety (OHS), freedom of association and collective bargaining. However, this form was developed in accordance with Chinese regulations (e.g., checklist requirements related to working hours, overtime

arrangements, and overtime compensation) and therefore cannot be applied to overseas projects.

8.1.2.3 ASSESSMENT

The exact number of affected people remains unclear at this stage. A lack of effective safeguards measures might result in potential impacts, including problems related to labor and working conditions in the supply chain (such as excessive working hours, insufficient labor protection, wage arrears, and discrimination in employment). In a worst-case scenario, these issues could result in significant adverse impacts on workers' physical and mental health, including the potential for long-term or irreversible harm.

The severity of infringement on workers' rights in the supply chain, including issues such as lack of a safe working environment, unreasonable working hours, and non-compliance with minimum wage standards, is considered **Medium**. This is especially severe if child labor or forced labor are involved such as the inappropriate labor appointment of children as drivers and helpers.

The specialized incineration and energy-recovery equipment sector is generally not regarded as a high-risk supply chain industry[66]. Accordingly, during the construction phase, the Likelihood is considered **Unlikely**.

The Project's current supply chain management requires further improvement. Without proper management or oversight in place, the likelihood of workers' right violation along the supply chain can be **Likely.**

Overall, the impact rank is considered **Low** during construction phase and **Medium** during operational phase.

Impact	Phase	Rightsholders	Severity	Likelihood	Impact Rank
Impacts On Workers' Rights Along the Project's Supply Chain	Construction	Workers along Supply chain	Medium	Unlikely	Low
Impacts On Workers' Rights Along the Project's Supply Chain	Operation	Workers along Supply Chain	Medium	Likely	Medium

[66] Sustainalytics. (2023). *The state of ESG risk across industries: Three key takeaways from our annual industry reports*.
Retrieved from https://www.sustainalytics.com/esg-research/resource/investors-esg-blog/the-state-of-esg-risk-across-industries--three-key-takeaways-from-our-annual-industry-reports

8.1.3 IMPACTS ON COMMUNITY SECURITY ASSOCIATED WITH EMPLOYMENT OF SECURITY PERSONNEL

8.1.3.1 BASELINE CONTEXT

The Law of the National Guard of the Republic of Uzbekistan (2020) stipulates that the National Guard must operate with respect for citizens' rights, freedoms and legitimate interests. Individuals with criminal records may be ineligible for hire, and those who violate official disciplines or commit misdemeanors that tarnish the National Guard can face dismissal's honor may be dismissed. The use of physical force and firearms by the National Guard is regulated by the Law and is permitted only in specific cases and manners prescribed by the Law, such as to suppress crimes with an emphasis on minimizing harm. Additionally, personnel authorized to use physical force and firearms must undergo special training.

Baseline information in ***Section 6.8*** presents lethal incidents related to security issues that National Guard involved in. Several significant incidents have been identified as unjustifiable fatal use of force to disperse protests. Nevertheless, the National Guard will not be directly involved in the Project's security activities.

8.1.3.2 PROJECT DETAILS

During the construction and operation phase, the Project's security personnel will be provided by the local security companies. During the construction phase, 4 security personnel will be employed. This number will likely increase to 6 to 10 during the operation phase. Security personnel will not be provided with guns or other firearms but will be equipped with security equipment such as shields and rubber batons.

Security and Human Rights Policy, Security Protection Procedure and Code of Conduct of Security Personnel have all been drafted and put into place by the Project company as Project commenced to construct. They have regulated detailing roles and responsibilities, human rights safeguards, operational security norms, and mechanisms for supervision, accountability, and remedy of the security personnel throughout the project lifecycle. The Contractor EHS Management System also defined the general training that security personnel will undertake.

8.1.3.3 ASSESSMENT

During the construction phase and operation phase, the Project will engage a private security company, which will provide less than 10 security guards for each phase for the Project. The scale of security personnel is relatively small compared to Project's workforce and population of surrounding communities. Existing policy, procedures, and measures on security personnel strictly restrict the direct use of violent force. Both Project's Security and Human Rights Policy and Code of Conduct of Security Personnel has regulated that it is strictly prohibited to use police gear or security equipment without authorization. In exceptional situations where such equipment must be used, the established procedures and permission requirements must be strictly followed to prevent any adverse consequences arising from improper use. Besides, any form of beating, tying up, threatening, or other excessive actions is strictly prohibited for the security personnel.

Nevertheless, the Project's Security and Human Rights Policy does not explicitly reference or commit the Project Owner or contracted security personnel to the Voluntary Principles on

Security and Human Rights (VPSHR)—the globally accepted framework for managing security operations in high-risk contexts and a key benchmark within international development-finance requirements[67]. The document also remains in draft form, without senior-management approval, official issuance, or formal disclosure, meaning it currently lacks enforceability and cannot serve as an operational security-and-human-rights policy. Furthermore, the draft does not establish specific performance standards, due-diligence requirements, or accountability mechanisms to govern private security providers, nor does it define mandatory training, monitoring, or reporting obligations consistent with VPSHR expectations.

Without proper management measures in place, the private security company could employ poorly trained security workers who may inflict excessive force on community members in the event of inappropriate behaviors including excessive force.

Affected rightsholders for this impact are nearby communities. Security forces may cause injury of community members in conflict situations, which can be serious and irremediable. Since physical harm caused in a potential conflict between security personnel and local residents is potentially irreversible; the severity is assessed **Medium**.

According to the baseline study, the safety and security of the social AoI area is relatively good and stable. No crime, illegal activities, or violent incidents are reported by the local communities. Besides, both Project company and local community have grievance mechanisms to handle the dissatisfaction and complaints from the local communities regarding the security personnel. Local communities also have relatively positive perception and attitudes towards the construction and operation of the Project. No severe appeal and concerns of the Project, particularly in relation to the deployment of security personnel, have been raised during the stakeholder engagement process. Thus, the likelihood is assessed as **Unlikely.**

Therefore, the overall impact of Project's security personnel arrangement on the local community's safety and security is evaluated as **Low**.

Impact	Phase	Rightsholders	Severity	Likelihood	Impact Rank
Impact on community safety associated with employment of security personnel	Construction	Nearby communities including vulnerable groups	Medium	Unlikely	Low
	Operation	Nearby communities including vulnerable groups	Medium	Unlikely	Low

[67] Voluntary Principles Initiative. (2023). Voluntary Principles on Security and Human Rights. https://www.voluntaryprinciples.org/wp-content/uploads/2023/10/Voluntary-Principles_ENGLISH.pdf

8.1.4 INABILITY OF RIGHTSHOLDERS TO PARTICIPATE AND/OR ACCESS REMEDY

8.1.4.1 BASELINE CONTEXT

Uzbekistan has established a Commissioner for Human Rights (Ombudsman) under the Oliy Majlis (Supreme Assembly) to oversee and protect human rights within the country. The Ombudsman operates independently from state authorities and officials and reports directly to the Oliy Majlis. The Commissioner is elected by both the Legislative Chamber and the Senate for a five-year term, ensuring accountability in monitoring human rights practices.

According to Focus Group Discussion with local affected communities, community members can submit their grievances to the MFY leaders through both oral and written means. This is the primary mechanism for local people to raise concern. Specifically, A presentative responsible for receiving and addressing complaints is also designated for each MFY. If grievance cannot be resolved at the MFY level, it could be escalated to the city municipal administration for further review and resolution. It is reported that grievances at the MFY level are addressed in a timely and effective manner. There are no concerns of retaliation for the grievance raising. Besides, one Project-level Grievance Mechanism for both local communities and Project's contracted workforce has been developed.

8.1.4.2 PROJECT DETAILS

The Project has prepared a Stakeholder Engagement Plan (SEP) and a Grievance Mechanism for engaging external stakeholders and receiving and resolving external grievances. The Project SEP has identified stakeholders including government authorities, affected communities, vulnerable groups, civil society and interest groups, neighboring companies, local schools and medical institutions. The stakeholders are analyzed, and engagement strategies are planned for each identified stakeholder to encourage participation in decision making of the Project.

The Project-level Grievance Mechanism for local communities and Project's contracted workforce has been developed to define clear and predictable processes for how grievances or complaints get addressed. The grievance mechanism encompasses a monitoring process to ensure that any grievance handling is conducted in a fair, impartial, and timely manner.

8.1.4.3 ASSESSMENT

Rightsholders have the right to be consulted, and to provide input on the activities that may impact them. To effectively exercise this right, rightsholders require sufficient project information prior to consultation to enable them to provide informed feedback. In addition, rightsholders (both communities and workers) have the right to have access to remedy, particularly in instances where their rights can or have been violated. Exercising the right often requires a grievance mechanism, to facilitate this process.

The project company has established only one overall Grievance Mechanism to tackle grievances from contracted workers, suppliers, and external stakeholders including local communities and local authorities. This Grievance Mechanism Management System does not sufficiently distinguish between External Grievance Mechanism for the external stakeholders and Internal Grievance Mechanism for the contracted workers. According to the IFC PS (2012)

and MIGA PS (2013), Grievance Mechanism for the external communication including the local communities has been regulated by the PS 1 "Assessment and Management of Environmental and Social Risks and Impacts", while the Grievance Mechanism for the internal workers is defined by PS 2 "Labor and Working Conditions" with different requirements. Besides, there is no sperate Grievance Mechanism clearly proposed by the Project Company for its direct workforce. This lack of access to remedy will constrain the rightsholders' ability to raise concerns and complaints and get solved.

The existing Grievance Mechanism also needs further improvement to meet the requirements of IFC Good Practice on "Addressing Grievances from Project-Affected Communities" and Grievances Mechanism for Project's workforces in PS2. No culturally appropriate approaches tailored to the local context of the Grievance Mechanism are clearly defined. Besides, approach to anonymous submission of grievance is not provided, while this gap might impede the Project's workers and wider external stakeholders to be protected from harm associated with retribution. There is also an absence of the anti-retaliation safeguards on raising the complaints. No mature procedures are in place for the escalation of the complaints or grievances either.

Gender dynamics are not considered in the Grievance Mechanism. Grievances for highly sensitive cases, such as gender-based violence (GBV) and Sexual exploitation, abuse and harassment (SEAH), if not handled properly, will adversely impede the rightsholder's access to remedy.

Thus, these gaps in existing grievance mechanism could constrain rightsholders' freedom of opinion, expression, and access to information, affecting their capacity to exercise the right to provide opinions on the activities that may impact them.

The severity for all rightsholders in terms of lacking access to remedy is **Medium**. Given the existence of public grievance mechanisms such as the governance of mahallas and ombudsman mechanism as well as the existing Project Grievance Mechanism, the Likelihood of potential risks to access to remedy for nearby communities is assessed as **Unlikely**. Given the absence of worker Grievance Mechanism of the Project, Project direct workers are **Likely** to experience risks to access to remedy during the Project's construction and operation phase.

Impact	Phase	Rightsholders	Severity	Likelihood	Impact Rank
Inability to Participate and/or Access Remedy	Construction	Project workers	Medium	Likely	Medium
		Nearby communities including vulnerable groups		Unlikely	**Low**
	Operation	Project workers		Likely	Medium
		Nearby communities including		Unlikely	**Low**

Impact	Phase	Rightsholders	Severity	Likelihood	Impact Rank
		vulnerable groups			

9. MANAGEMENT OF HUMAN RIGHTS RISKS AND IMPACTS

The impact assessment (refer to ***Section 8***) identified the need for additional management measures in order to fill gaps in Project policies and processes, and/or reduce the human rights risks to, and impacts on, rightsholders. Accordingly, the following section summarizes the impact rank, gaps of existing management Measures and proposed additional mitigation measures.

9.1 MANAGEMENT OF LABOR AND WORKING CONDITIONS

Based on the previous impact assessment in ***Section 8.1.1***, the Project's labor and working condition risks can be identified as follows:

Risk/Impact	Phase	Impact Rank	Existing Management Measures	Responsible Parties
Impacts on Labor and Working Conditions of Project Workers	Construction	Medium	EHS Management Procedure for the Operation and Construction Phase Contractor EHS Management System Contracted Worker Code of Conduct	EHS Manager HR Department
	Operation	Medium		

In accordance with the identified labor rights risks at the current workplace, the following measures can be proposed to develop a more comprehensive and solid management system of the Project's workforce and avoid infringement of labor rights:

- Develop, finalize, and publicly disclose a **Labor Policy** that consolidates all key labor-rights commitments—at a minimum, the prohibition of child labor and forced labor, freedom of association and collective bargaining, non-discrimination, and protection against harassment—and ensure that the policy is communicated and trained in languages understood by all direct and contracted workers, including Chinese, Uzbeks, and Tajik.
- For prohibiting child labor and forced labor, a **Child Labor and Forced Labor Prevention Procedure** should be developed and include the following:
  - Establish a mandatory age-verification protocol when recruiting through multiple ways (e.g., ID check, secondary documentation, and HR record audit).
  - Develop remediation plan for use in cases where children are unknowingly employed despite the policy and procedures, including:
    - Immediate removal of any identified child worker from all work activities;
    - Assessment of the child's individual situation and engagement with parents or guardians;
    - Enrolment of the child in appropriate education or day-care programs and provision of financial and other necessary support to ensure the child can attend and remain in school until reaching the legal minimum working age; and

    - Ongoing monitoring and documented follow-up to ensure the child does not re-enter child labor.
  - Communicate child labor and forced labor policies to the suppliers and contractors to sign binding commitments in prohibiting child labor.
  - Provide capacity-building trainings for HR, EHS managers, and contractors in identifying indicators of forced labor and child labor.

- Develop and implement a **Contractor Management Procedure** that:
  - Mandate the training for all contractors and labor-rights awareness sessions for all contracted workers. The training and the labor-rights awareness sessions should introduce the Project labor rights, the Project GBV/SEAH Policy, the Contractor Code of Conduct, the mandates under Uzbek labor laws and ILO convention requirements, with particular attention on forced labor, child labor, occupational health and safety, freedom of association and collective bargaining, and non-discrimination and harassment.
  - Monitor the labor rights of the contracted workers, with particular focus on prohibition of the use of child labor and forced labor, the voluntary overtime and excessive working hours, delay or deduction of wage, retaining personal belongings and identity documents (e.g., passports, ID card), and different treatment between local workers and migrant workers. The contractor management Procedure should introduce a monitoring system to periodically review any potential breaches of contractor's labor practice against the Project labor policy.
  - Ensure all workers (including those of contractors and subcontractors) on the Project site are provided with a written Employee Agreement/Contract in a language is understood by workers.
  - Cascade down the Project's Grievances Mechanism to all contracted workers.
- Formalize the Worker Grievance Mechanism for both direct workforce and contracted workforce. Specific details can be found in ***Section 9.4***.

9.2 MANAGEMENT OF PROJECT'S SUPPLY CHAIN

Based on the previous impact assessment in ***Section 8.1.2***, the Project's supply chain risks can be identified as follows:

Risk/Impact	Phase	Impact Rank	Existing Management Measures	Responsible Parties
Impacts on Worker's Rights along the Project Supply Chain	Construction Phase	Low	• Procurement Manual • Supplier Social Responsibility Assessment Form	EHS Department, Purchasing Manager
	Operation Phase	Medium		

In accordance with the identified human rights risks in supply chain, the following mitigation measures are proposed to develop a more comprehensive and solid management system of the Project's supply chain:

- Develop and implement a **Supply Chain Due Diligence Procedure** with the following elements:
  - Supplier screening and entry control:
    - Conduct background checks to identify any history of environmental, social or human-rights violations.
    - Exclude candidates with verifiable severe risks from being approved as suppliers.
  - Risk classification of approved suppliers. Classify suppliers into high-risk and low-risk categories based on industry type, operation location, workforce scale, number/proportion of contracted workers, media coverage of relevant environmental and/or social issues.
  - Different monitoring mechanisms and measures should be adopted regarding different classifications of suppliers:
    - As for high-risk suppliers: Conduct on-site monitoring or evaluations once or twice per year where feasible including reviewing operational practices, worker protection, labor conditions, and any indicators of non-compliance.
    - As for low-risk suppliers: Conduct periodic desktop reviews, self-assessment questionnaires, and documentation checks. Maintain ongoing monitoring of any emerging risks through media screening or stakeholder reports.
    - The Supplier Social Responsibility Assessment Form could be adopted as a guide checklist with assessment requirements tailored to applicable legal provisions in the jurisdictions where suppliers operate. The assessment should at least include prohibition of forced labor, child labor, freedom of association and collective bargaining, anti-discrimination and harassment, and occupational health and safety.
  - Contractual requirements and capacity building:
    - Include human-rights clauses and labor-standards requirements in service contracts or in the Supplier Code of Conduct using reasonable commercial efforts.
    - (Good to have) Provide suppliers with training on these requirements and expectations to support their compliance capacity.

9.3 MANAGEMENT OF COMMUNITY SECURITY ASSOCIATED WITH SECURITY PERSONNEL

Based on the impact assessment in ***Section 8.1.3***, the Project's security personnel's impact on community security can be identified as follows:

Risk/Impact	Phase	Impact Rank	Existing Management Measures	Responsible Parties
Impacts on Community Security Associated with Employment of Security Personnel	Both construction and operation phase	Low	Project's security and human right policy Code of conduct of security personnel Grievance Mechanism	EHS manager, HR Department

In accordance with the identified human rights risks in Project's security personnel, the following mitigation measures can be proposed to develop more solid management of project's security personnel:

- Update the Project's Security and Human Rights Policy with applicable standards (i.e. the *UN Code of Conduct for Law Enforcement Officials*, *UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials*, and *Voluntary Principles on Security and Human Rights*), finalize with senior management approval and publicly disclosed in both Chinese and Uzbek language.
- Update the Project Security Personnel's Code of Conduct with applicable standards (i.e. *Voluntary Principles on Security and Human Rights*), finalize with senior management approval and publicly disclosed in both Chinese and Uzbek language with periodic training provided to the security personnel.
- Update, finalize and implement the Project's Grievance Mechanism, details can be found in ***Section 9.4***. And Make sure the Stakeholder Engagement Plan and Grievance Mechanism effect through the whole process.
- Update, finalize, and implement the Project's Security Protection Management Procedure to operationalize the commitments in the Project's Security and Human Rights Policy. At minimum, the updated Procedure should:
    - Introduce safeguard measures requiring the security company to conduct pre-employment vetting for all security personnel, including verification of identity documents, checks for any past use-of-force misconduct, criminal records, or other risk-relevant indicators;
    - Train all security personnel with the Project Security and Human Rights Policy, the Project Security Personnel's Code of Conduct, and *Voluntary Principles on Security and Human Rights,* with attention paid to the Use of Force and appropriate interactions with workers and communities;

  - Require the contracted security company to comply with international human-rights protection standards, i.e., *Voluntary Principles on Security and Human Rights*, through explicit contractual obligations;
  - Formalize engagement protocols with local law-enforcement authorities, ensuring coordination is limited to legally authorized functions and avoids delegation or encouragement of excessive force.
  - Implement the Stakeholder Engagement Plan (SEP) and ensure that the Project-level Grievance Mechanism (GM) is accessible to workers, community members, and any individuals interacting with security personnel.
- Notify local law enforcement authorities immediately, upon the occurrence of security incidents, to enable authoritative response, official investigation, apprehension, and prosecution.
- Engage with local law enforcement to set out expectations of the Project, including their alignment with *UN Code of Conduct for Law Enforcement Officials*, *UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials*, and *Voluntary Principles on Security and Human Rights* and whether they will be pulled into an issue involving the site – e.g., responding to a protest.

9.4 MANAGEMENT OF PROJECT'S GRIEVANCE MECHANISM

Based on the previous impact assessment in ***Section 8.1.4***, the Project's impact on rightsholder in accessing and participating remedy can be identified as follows:

Risk/Impact	Phase	Impact Rank	Existing Management Measures	Responsible Parties
Impact on Rightsholder to Participate/ Access to Remedy	Construction	Medium (for Project workers)	External Grievance Mechanism	HR Department EHS Manager
		Low (for nearby communities)		
	Operation	Medium (for Project workers)		
		Low (for nearby communities)		

In accordance with the identified human rights risks in rightsholders' in accessing remedy, the following mitigation measures can be proposed to develop a more comprehensive and differentiated grievance mechanism for both internal workers and external communities:

- Develop a worker Grievance Mechanism applicable to the Project direct workforce (considering the external Grievance Mechanism is responsible for receiving and resolving grievances from contracted workers and any external stakeholders, such as affected communities). The worker Grievance Mechanism shall enable anonymous submission and anti-retaliation mechanisms against any grievance reporting. The worker Grievance Mechanism should also be gender sensitive.
- To ensure that the grievance mechanism (GM) is accessible, practical, and transparent, the external GM will be translated into Tajik and English to ensure information is delivered in a culturally appropriate manner and reaches all relevant stakeholder groups, including women and other vulnerable groups. The internal GM will be made available in Uzbek, English, and Chinese to facilitate effective communication across the Project workforce.
- Implement clear anti-retaliation provision in raising the grievances and concerns. Publicly communicate zero-tolerance for retaliation to all workers and external right-holders.
- Integrate gender sensitive design considerations into the grievance mechanism, including confidential and women preferred reporting pathways, and considerations for sexual exploitation and abuse (SEA), and sexual harassment (SH).

- Include a clear introduction to the Project's worker grievance mechanism to the workforce during the workforce induction program and Project's Grievance Mechanism to the external rightsholders and community information disclosure especially for the Project's vulnerable groups such as the waste pickers.
- The implementation and effectiveness of the grievance mechanism for external rightsholders that is proposed in Stakeholder Engagement Plan (SEP) should be monitored and evaluated according to the monitoring and evaluation framework outlined in SEP.

10. MONITORING AND REPORTING

The outcomes of the impact assessment and proposed management measures are compiled in the Human Rights Management Plan (refer to ***Table E10-1***). The Human Rights Management Plan also outlines monitoring and review requirements.

As the HRIA provides an assessment of potential impacts at a point in time, it is important that the HRIA is updated, under the following conditions:

- If there are changes to the Project activities and/or footprint; and
- In accordance with changes to regulatory requirements.

10.1 REPORTING AND ACCESS TO REMEDY

Any human rights-related incidents and issues should be reported to the Project General Manager. This should involve recording the details of the incident or issue and corrective actions taken. Rightsholders should be consulted and advised of the proposed corrective actions.

10.2 PROPOSED MONITORING AND OVERSIGHT

The human rights risks and impacts and the corresponding management measures should be monitored and evaluated throughout the life of the Project. The objectives of monitoring are to:

- Verify the predicted risks and issues;
- Verify that the management measures are being implemented as planned;
- Assess the effectiveness of the management measures;
- Correct and re-align measures that have been proven to not be working or effective; and
- Provide data for any necessary internal reporting.
- Monitoring should be a continuous process of data collection and review. The review of information collected should be used to help identify issues of concern early and inform opportunities for improvement. As part of the Project's internal reporting systems, any human rights related incidents and issues should be reported. Reporting should record details of the incident or issue, a description of the non-compliance, engagement activities, any corrective actions taken, and the outcomes for the rights holders. Due to the increasing pressure on organizations to manage their potential human rights risks and impacts, further reporting may be required by external parties, including government agencies and lenders. This should be monitored to ensure the Project remains compliant with reporting requirements.

TABLE E10-1 MONITORING INDICATORS

Category/ Indicator	Variables
Input Indicator	▪ Project funds allocated; ▪ Linkage of mitigation measures to other studies/ESMP ▪ Update of relevant Policies/Procedures and management systems;

Category/ Indicator	Variables
	▪ Update of Stakeholder Engagement and Grievance Management Process ▪ Implementation of supplier screening and monitoring
Process Indicators	▪ Training across SUS direct and contracted workers ▪ Information disclosure to stakeholders and rightsholders ▪ Proactive and confidential process to make the grievance mechanism accessible for coverage of any human rights issues; ▪ Mechanism made accessible to third party workers and local communities (including informed consultation and participation measures incorporated, basis stakeholder insights) ▪ Number of human rights issues identified during Project activities which include but not limited to labor and working conditions, community health and security; ▪ Implementation of relevant policies and management procedures.
Output Indicators	▪ Number of grievances/human rights issues related to labor, working conditions, community health and security raised during Project activities; ▪ Timeline for response and remedy ▪ Monitoring of remedy
Impact Indicators	▪ Number of grievances/human rights issues related to labor, working conditions, community health and security (during project activities) addressed; ▪ Corrective actions taken.

APPENDIX E-1 POTENTIAL HUMAN RIGHTS IMPACTS AND THEIR RELEVANCE TO THE UDHR ARTICLES

TABLE E10-1 Identified Human Rights at Risks

Impacts	Rightsholders	Human Rights at Risk	Construction Phase and Justification	Operation Phase and Justification
Potential impacts on labor and working conditions of Project workers	The workforce directly employed by the Project, contracted workers and subcontracted workers that construct and support the operation of Project	UDHR Article 3: Right to Life Article 4: Right not to be subjected to slavery, servitude or forced labor Article 7: Right to equality before the law, equal protection of the law Article 8: Right to access effective remedies Article 13: Right to Freedom of Movement Article 20: Right to freedom of Association Article 22: Right to social security and insurance Article 23: Right to Work Article 24: Right to Rest and Leisure Article 25: Right to Adequate Standard of Living	Scope-in and will assess in this HRIA	Scope-in and will assess in this HRIA
Potential impacts on workers' rights along the Project's supply chain	The workforce involved in the wider Project supply chain	UDHR Article 3: Right to Life Article 4: Right not to be subjected to slavery, servitude or forced labor Article 7: Right to equality before the law, equal protection of the law Article 8: Right to access effective remedies Article 13: Right to Freedom of	Scope-in and will assess in this HRIA	Scope-in and will assess in this HRIA

Impacts	Rightsholders	Human Rights at Risk	Construction Phase and Justification	Operation Phase and Justification
		Movement Article 20: Right to freedom of Association Article 22: Right to social security and insurance Article 23: Right to Work Article 24: Right to Rest and Leisure Article 25: Right to Adequate Standard of Living		
Potential impacts on community safety associated with employment of security personnel	The residents residing in nearby communities	UDHR Article 3: Right to Life Article 5: Freedom from Torture Article 9: Right to free from arbitrary arrest, detention or exile	Scope-in and will assess in this HRIA	Scope-in and will assess in this HRIA
Potential inability of rightsholders to participate and/or access remedy	The residents residing in nearby communities, the workforce directly employed by the Project, contracted workers and subcontracted workers that construct and support the operation of Project	UDHR Article 19: Freedom of Opinion and Expression Article 20: Freedom of Assembly and Association	Scope-in and will assess in this HRIA	Scope-in and will assess in this HRIA
Potential impacts of the loss of livelihoods among nearby waste pickers and former landfill workers resulting from the potential closure of the Samarkand	Waste pickers whose livelihood depends on Samarkand City Landfill	UDHR Article 23: Right to Work Article 25: Right to Adequate Standard of Living	Will not assess in this HRIA as	Will not assess in this HRIA as

Impacts	Rightsholders	Human Rights at Risk	Construction Phase and Justification	Operation Phase and Justification
City Landfill in line with the country's broader waste sector transition strategy	and workers in Samarkand City Landfill	Article 17: Right to property	already assessed in SIA Section 10.3	already assessed in SIA Section 10.3
Potential impacts on health and safety of nearby MFYs from the Project environmental emissions and disturbance (e.g., air emission, odor, noise)	Local communities	UDHR Article 3: Right to life, liberty and security of person Article 25: Right to a standard of living adequate for health and well-being	Will not assess in this HRIA as already assessed in SIA Section 10.4	Will not assess in this HRIA as already assessed in SIA Section 10.4
Potential impacts on public infrastructure, utilities and services	Local communities	CESCR Gen Comment 14: Right to the highest attainable standard of health Gen Comment 15: Right to water UDHR Article 25: Right to health and health services Article 13: Right to freedom of movement (if roads are damaged)	Will not assess in this HRIA as already assessed in SIA Section 10.5	Will not assess in this HRIA as already assessed in SIA Section 10.5
Potential Impacts on the health and safety of the Project workforce due to the Project construction and	Project workforce	ICESCR Article 7: Right to the enjoyment of just and favorable conditions of work	Will not assess in this HRIA as	Will not assess in this HRIA as

Impacts	Rightsholders	Human Rights at Risk	Construction Phase and Justification	Operation Phase and Justification
operation activities (Occupational Health and Safety risks)		UDHR Article 23: Right to work, equal pay and participation in a trade union Article 24: Right to safe and healthy working conditions ICCPR Article 6: Right to life Article 9: Right to liberty and security of person	already assessed in SIA Section 10.6	already assessed in SIA Section 10.6
Potential Impacts on Project workers' occupational health and living standards through the provision of accommodation	Project workforce	UDHR Article 2: Principle of Non-discrimination Article 25: Right to a standard of living adequate for health and well-being ICESCR Article 12: Right to the enjoyment of highest attainable standard of physical and mental health	Will not assess in this HRIA as already assessed in SIA Section 10.6	Will not assess in this HRIA as already assessed in SIA Section 10.6
Increased risks of gender-based violence due to the presence of construction workforce	Project workforce Local communities	UDHR Article 3: Right to life, liberty and security of person	For GBV within local communities, it will not be	For GBV within local communities, it will not be

Impacts	Rightsholders	Human Rights at Risk	Construction Phase and Justification	Operation Phase and Justification
		ICCPR Article 7: Freedom from Torture on Cruel, Inhuman or Degrading Treatment ICESR Article 12: Right to the enjoyment of highest attainable standard of physical and mental health	assessed in this HRIA as already assessed in SIA Section 10.4.	assessed in this HRIA as already assessed in SIA Section 10.4.
Potential damage or destruction to known or unknown cultural heritage sites and values	NA	ICESCR: Article 15: Right to "take part in cultural life" UDHR: Article 27: Right to participate in the cultural life of the community ICCPR: Article 27: Right of ethnic, religious, or linguistic minorities to enjoy their own culture, which is deeply tied to their specific cultural heritage.	Scope-out because there are not known tangible cultural heritage and intangible cultural heritage resources present in the Project area based on desktop research and stakeholder engagement. The Project has previously enquired with the local government and local communities about the planned land use areas and understands impacts on cultural heritage are unlikely.	
Potential adverse impacts on indigenous peoples	NA	ICCPR: Article 27: Right to enjoy their own culture, to profess and practice their own religion, or to use their	Scope-out because there are no Indigenous Peoples	

Impacts	Rightsholders	Human Rights at Risk	Construction Phase and Justification	Operation Phase and Justification
		own language ICESCR: Article 1: Right of self-determination Article 15: Right to take part in cultural life	identified in the Project area of influence.	
Potential pressure added to the local medical infrastructure due to the Project induced labor influx	Local communities Project workforce	ICESCR: Article 12: Right to the enjoyment of the highest attainable standard of physical and mental health ICCPR: Article 6: Right to Life	Scope-out because interviews with these hospitals concerned sufficient capacity to accommodate the Project workforce	
Potential impacts on local land users (including economic or physical displacement) due to the Project's land use	NA	ICESCR Article 6: Right to the opportunity to gain his living by work which he freely chooses or accepts Article 11: Right to an adequate standard of living, including housing, and right to the continuous improvement of living conditions	Scope-out because the Project occupies state-owned land formally leased from the Waste Management and Circular Economy Development Agency, and the Cadastral Agency and local communities confirmed no private users, occupants, or livelihood activities exist in Project site, nor were there any legacy issues.	

Impacts	Rightsholders	Human Rights at Risk	Construction Phase and Justification	Operation Phase and Justification
Potential impacts on local traffic and road safety due to the increase of traffic volume entailed by the Project	Local communities Nearby companies and farms	ICESCR: Article 12: Right to health UDHR: Article 13: Freedom of movement Article 8: Right to remedy	Scope-out because minimum increase of traffic during operation and limited increase of traffic occurs on existing public roads with adequate capacity, and neither government authorities nor mahallas expressed concerns related to potential traffic impacts and road safety	

Combining the ESIA scoping results and HRIA scoping result, the following ***Table E1-2*** outlines the most common risks identified under EP4 Human Rights Guidance, grouped by the specific human rights they impact. [68]

[68] Equator Principles Association. (2020). Human rights assessment [PDF]. https://equator-principles.com/app/uploads/Human_Rights_Assessment_Sept2020.pdf.

TABLE E1-2 EQUATOR PRINCIPLES GUIDED HUMAN RIGHTS RISKS

Rights Category	Human Rights Issue	Affected Rightsholders		Assessment
		Risks to workers	Risks to affected community members	
Labor	Child Labor	✓		Assessed in Section 8.1.1 and Section 8.1.2
	Forced Labor (Modern Slavery/Human Trafficking)	✓		Assessed in Section 8.8.1 and Section 8.1.2
	Occupational Health and Safety	✓		Assessed in ESIA
	Collective bargaining and Freedom of Association	✓		Assessed in Section 8.8.1
	Grievance Mechanism and Remedy	✓	✓	Assessed in Section 8.1.4
	No-discrimination	✓		Assessed in Section 8.1.1

Rights Category	Human Rights Issue	Affected Rightsholders		Assessment
		Risks to workers	Risks to affected community members	
	Wages (pay equity, standard of living)	✓		Assessed in Section 8.1.1
	Working hours	✓		Assessed in Section 8.1.1
	Accommodation conditions	✓		Assessed in ESIA
Economic, Social and Cultural	Right to education	✓	✓	Right of workers to education is highly related to child labor, which is assessed in Section 8.1.1 Scope out-Right of community member to education is scoped out as Project will not cause limiting access to education facilities through its construction and operation phase
	Right to health	✓	✓	Assessed in ESIA (Including the OHS and Project's impacts on community health, safety, and security) Assessed in Section 8.1.3

Rights Category	Human Rights Issue	Affected Rightsholders		Assessment
		Risks to workers	Risks to affected community members	
	Right to participate in the cultural life of the communities		✓	Scope out-No cultural heritage has been identified within the social AoI.
	Social insurance	✓		Scope out
	Right to Water	✓	✓	Assessed in ESIA
Group Rights	Children's Rights	✓		Assessed in Section 8.1.1
	Disability Rights	✓	✓	Assessed in ESIA as the disabled is listed as one of vulnerable groups of the Project
	Indigenous People		✓	Scope out-No indigenous people was identified within the Project social AoI
	Migrant Rights	✓		Assessed in Section 8.1.1
	Women's Rights	✓	✓	Assessed in ESIA

APPENDIX E-2 OVERVIEW OF UZBEKISTAN'S HUMAN RIGHTS FRAMEWORK

TABLE E0-1 UN HUMAN RIGHTS CONVENTIONS AND UZBEKISTAN REGULATIONS

UN Human Rights Conventions	Brief Summary	Time of Signature / Ratification	Associated Implementation Laws and Rules	Implementation Status
Convention against Torture and Other Cruel Inhuman or Degrading Treatment or Punishment (CAT)	The CAT aims to prevent torture and other acts of cruel, inhuman, or degrading treatment or punishment around the world. Most of the provisions of the CAT deal with the obligations of the States parties. These obligations include State parties shall take effective legislative, administrative, judicial or other measures to prevent acts of torture, and prohibition against torture shall be absolute and shall be upheld also in a state of war and in other exceptional circumstances.	28.09.1995	Uzbekistan has integrated the prohibition of torture into its Criminal Code. Oversight by Ombudsman and law enforcement agencies.	Despite legal provisions, reports of torture and ill-treatment especially during interrogations, continue to emerge[69]. This may introduce potential risks related to the influence of project security personnel on community safety.
International Covenant on Civil and Political Rights (ICCPR)	The CCPR is a multilateral treaty that commits nations to respect the civil and political rights of individuals, including the right to life, freedom of religion, freedom of speech, freedom of assembly, electoral rights and rights to due process and a fair trial.	28.09.1995	These rights are enshrined in the Constitution, and the 1997 Ombudsman Act provides a frame for addressing violations, which is the Law "On the Authorized Person of the Oliy Majls for Human Rights (Ombudsman)".	Restrictions on media freedom and limitations on peaceful assembly persist[70]. This may introduce potential risks related to the freedom of associations and collective bargaining for the Project workforce.

[69] Mihra Rittmann, M. (2023, October 18). Uzbekistan should investigate claims of Ill-Treatment, torture. *Human Rights Watch*. https://www.hrw.org/news/2023/10/18/uzbekistan-should-investigate-claims-ill-treatment-torture
[70] Freedom House. (2023). Uzbekistan. In *Freedom House*. https://freedomhouse.org/country/uzbekistan/freedom-net/2023

UN Human Rights Conventions	Brief Summary	Time of Signature / Ratification	Associated Implementation Laws and Rules	Implementation Status
Second Optional Protocol to the International Covenant on Civil and Political Rights aiming to the abolition of the death penalty (ICCPR-OP2-DP)	A treaty that supplements to the CCPR to abolish the death penalty.	23.12.2008	Constitutional reforms formally abolished the death penalty (2023).	No major gaps of implementation identified.
Convention on the Elimination of All Forms of Discrimination against Women (CEDAW)	The convention requires all signatories to take steps to eliminate discrimination against women in political and public life. In relation to political life, women have the right to: • vote in all elections and public referenda and to be eligible for election to all publicly elected bodies. • participate in the formulation of government policy and the implementation thereof and to hold public office and perform all public functions at all levels of government; and • participate in non-governmental	19.07.1995	The Law on Guarantees of Equal Rights and Opportunities for Women and Men (2019). National legislation specially addressing gender-based violence (GBV) includes: The Law on the Protection of Women from Harassment and Abuse (2019). The Resolution of the Cabinet of Ministers On the measures to improve the system of protection of women from oppression and violence (2020); and The Law on Introducing Amendments and Additions to	Legal framework exists, but enforcement is inconsistent[71]. Gender-Based Violence (GBV) and workplace discrimination against women remain prevalent. While the adopted law introduced progressive amendments to the national framework, barriers including the tendency to downplay the seriousness of GBV crimes persist that hinder the effective enforcement of the GBV legislation[72].

[71] Solod, D. (209 C.E.). In Uzbekistan, women's rights are changing - but not fast enough. openDemocracy. https://www.opendemocracy.net/en/odr/uzbekistan-gender-ineaulity-violence-en/
[72] Ibid.

UN Human Rights Conventions	Brief Summary	Time of Signature / Ratification	Associated Implementation Laws and Rules	Implementation Status
	organizations and associations concerned with the public and political life of the country. In addition, Article 2 (f) mandates governments to take all appropriate measures, including legislation, to modify or abolish existing laws, regulations, customs and practices which constitute discrimination against women.		Certain Legislative Acts of the Republic of Uzbekistan in Connection with Further Improvement of the System of Reliable Protection of the Rights, Freedoms and Legitimate Interests of Women and Children (2023).	
International Convention on the Elimination of All Forms of Racial Discrimination (ICERD)	The principal international human rights instrument defining and prohibiting racial discrimination in all sectors of private and public life.	28.09.1995	Criminal penalties existed for inflammatory statements against ethnic groups.	Despite legal provisions, no government programs existed to mitigate societal, racial, and ethnic biases[73].
International Covenant on Economic, Social and Cultural Rights (ICESCR)	The ICESCR treaty commits its parties to work toward the granting of economic, social, and cultural rights to all individuals including those living in Non-Self-Governing and Trust Territories.	28.09.1995	Social Welfare and Labor Laws aligned with ICESCR's provisions	Despite legal provisions, challenges remain in ensuring equitable access to healthcare, education, and social services, particularly in rural areas[74].
Convention on the Rights of the Child	The CRC is an international human rights treaty which sets out the civil, political,	29.07.1994	Child Protection Laws and the Optional Protocol to the	Significant progress has been made in reducing child labor, but child

[73] Uzbekistan - United States Department of State. (2024, June 24). United States Department of State. https://www.state.gov/reports/2024-trafficking-in-persons-report/uzbekistan
[74] Peyrouse, S., Central Asia Program, IERES, George Washington University, & International Partnership for Human Rights (IPHR). (2021). *Reforming healthcare in Uzbekistan: What role for the international community?* https://www.iphronline.org/wp-content/uploads/2020/12/UZB-report-3.12-1.pdf

UN Human Rights Conventions	Brief Summary	Time of Signature / Ratification	Associated Implementation Laws and Rules	Implementation Status
(CRC)	economic, social, health and cultural rights of children.		Convention on Rights of the Child on the sale of children (CRC-OP-SC) (2008)	labor persists in informal sectors such as agriculture and family business[75].
Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict (CRC-OP-AC)	A treaty that supplements the CRC on the Rights of the Child on the involvement of children in armed conflict.	23.12.2008	The Law on Military Service (1992) establishes that Uzbekistan does not allow individuals under the age of 18 to serve in the military.	The law is effectively enforced. No child soldier cases have been reported in Uzbekistan[76].
Optional Protocol to the Convention on the Rights of the Child on the sale of children child prostitution and child pornography (CRC-OP-SC)	A treaty that supplements the CRC on the Rights of the Child on the sale of children child prostitution and child pornography.	23.12.2008	Criminal Code criminalizes the sales of children, child prostitution and child pornography. Law on Protection of Women and Children against Violence (2009) provides measures to protect children from trafficking, sexual exploitation, and abuse.	Public awareness of laws related to child protection is still relatively low. More effort is needed to educate communities about their rights, the danger of exploitation, and how to access support services[77].
Convention on the	The CRPD is intended to protect the	27.02.2009 /	The Law on Social Protection of	Despite legal provisions, enforcement

[75] Uzbek cotton is free from systemic child labor and forced labor. (2022, March 1). International Labor Organization. https://www.ilo.org/resource/news/uzbek-cotton-free-systemic-child-labor-and-forced-labor
[76] Refworld - UNHCR's Global Law and Policy Database. (2008). *Child Soldiers Global Report 2008 - Uzbekistan*. Refworld. https://www.refworld.org/reference/annualreport/cscoal/2008/en/59638
[77] Situation Analysis on children and adolescents in Uzbekistan launched. (2024). Uzbekistan. https://uzbekistan.un.org/en/280784-situation-analysis-children-and-adolescents-uzbekistan-launched#:~:text=Uzbekistan%20has%20made%20significant%20strides,the%20signature%20of%20the%20President.

UN Human Rights Conventions	Brief Summary	Time of Signature / Ratification	Associated Implementation Laws and Rules	Implementation Status
Rights of Persons with Disabilities (CRPD)	rights and dignity of persons with disabilities.	28.06.2021	Persons with Disabilities	Mechanisms are weak[78].

TABLE E0-2 ILO FOUNDAMENTAL UNCONVENTIONS IN RELATION TO UZBEKSITAN LAW

Convention	Brief Summary	Time of Signature / Ratification	**Associated Implementation Laws and Rules**	**Implementation Status**
C029 –Forced Labor Convention, 1930 (No. 29)	This convention undertakes to suppress the use of forced or compulsory labor in all its forms within the shortest possible period. For the purposes of this Convention the term forced or compulsory labor shall mean all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.	13.07.1992 / in force	Labor Code (Article 3) provides basic principles of legal regulations on individual employment relationships and directly related public relations, including freedom of work and prohibition of forced labor. Labor Code (Article 5) clearly states that forced labor is forbidden	Enforcement has improved, but the enforcement mechanism is still developing, and labor inspections are limited especially in informal sectors and rural areas[79].
C087 –Freedom of Association and	Workers and employers, without distinction whatsoever, shall have	12.12.2016 / in force	The Labor Code (Article 37) enables the right to voluntarily	Administrative barriers and state influence on the independent formation of unions

[78] UNDP (July 5,2024). Analysis of the state system in Uzbekistan to promote an integrated approach in employment and welfare services delivery for persons with disabilities.Retrieved from: Analysis of the state system in Uzbekistan to promote an integrated approach in employment and welfare services delivery for persons with disabilities | United Nations Development Programme
[79] Uzbekistan - United States Department of State. (2024, June 24). United States Department of State. https://www.state.gov/reports/2024-trafficking-in-persons-report/uzbekistan

Convention	Brief Summary	Time of Signature / Ratification	**Associated Implementation Laws and Rules**	**Implementation Status**
Protection of the Right to Organize Convention, 1948 (No. 87)	the right to establish and, subject only to the rules of the concerned, to join organizations of their own choosing without previous authorization Workers' and employers' organizations shall have the right to draw up their constitutions and rules, to elect their representatives in full freedom, to administration and activities and to formulate their programs. Public authorities shall refrain from any interference which would restrict this right or impede the lawful exercise thereof.		enter labor unions or other associations of workers.	persists[80].
C098 –Right to Organize and Collective Bargaining Convention, 1949 (No. 98)	Workers shall enjoy adequate protection against acts of anti-union discrimination in respect of their employment. Protection from the employment of a worker subject to the condition that he shall not join a union or shall relinquish trade union membership	13.07.1992 / in force	The 2014 Law on Trade Unions regulates the formation, operation, and activities of trade unions in Uzbekistan, aiming to ensure worker's right to form unions, join them freely, and participate in collective bargaining exist.	Collective bargaining is underutilized, many private sector workers lack representation[81]. While the law guarantees the right to organize and engage in collective bargaining, union independence is limited and there have been reports of government interference in union activities[82].

[80] Ibid.
[81] Ibid.
[82] Ibid.

Convention	Brief Summary	Time of Signature / Ratification	**Associated Implementation Laws and Rules**	**Implementation Status**
	and cause the dismissal of or otherwise prejudice a worker by reason of union membership or because of participation in union activities outside working hours or, with the consent of the employer, within working hours.			
C100 –Equal Remuneration Convention, 1951 (No. 100)	Ensure the application to all workers of the principle of equal remuneration for men and women workers for work of equal value.	13.07.1992 / in force	The Labor Code (Article 153) guarantees equal pay for men and women for work of equal value. The Law on Guarantees of Equal Rights and Opportunities for Women and Men (2019) ensures gender equality in wages and employment conditions.	Enforcement is inconsistent, and a gender wage gap persists, particularly in rural areas and informal sectors[83].
C105 –Abolition of Forced Labor Convention, 1957 (No. 105)	Abolition of forced labor.	15.12.1997 / in force	The Criminal Code of Uzbekistan (Article 135) prohibits human trafficking and the use of forced labor, and is punishable by imprisonment.	Forced labor has dropped sharply due to targeted reforms and ILO-led monitoring[84].

[83] World Bank Group. (2024). World Bank Country Gender Assessment Report: Uzbekistan. In *World Bank*. https://www.worldbank.org/en/country/uzbekistan/publication/country-gender-assessment-2024#:~:text=Additionally%2C%20wage%20gender%20gaps%20are,the%20global%20average%20of%2020%25.
[84] Uzbek cotton is free from systemic child and forced labor. (2022, March 1). International Labor Organization. https://www.ilo.org/resource/news/uzbek-cotton-free-systemic-child-labour-and-forced-labour

Convention	Brief Summary	Time of Signature / Ratification	**Associated Implementation Laws and Rules**	**Implementation Status**
			The Labor Code (Articles 7 and 8) explicitly bans forced labor, including under coercion as a means of punishment.	
C111 – Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	Any distinction, exclusion or preference made on the basis of race, color, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation. Such other distinction, exclusion or preference which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation as may be determined by the Member concerned after consultation with representative employers' and workers' organizations, where such exist, and with other appropriate bodies.	13.07.1992 / in force	The Labor Code (Article 6) prohibits discrimination in employment based on race, gender, religion, or other personal characteristics. The Law on Employment of the Population (2018) includes anti-discrimination provisions to promote equal access to employment opportunities.	Anti-discrimination measures are being strengthened through legislative updates, but enforcement and capacity-building still need improvement[85].

[85] Muradova, S., Seitz, W., & Poverty and Equity Global Practice. (2021). Gender Discrimination in Hiring: Evidence from an Audit Experiment in Uzbekistan. In Policy Research Working Paper (No. 9784).

Convention	Brief Summary	Time of Signature / Ratification	**Associated Implementation Laws and Rules**	**Implementation Status**
C138 –Minimum Age Convention, 1973 (No. 138) Minimum age specified: 15 years	Each Member for which this Convention is in force undertakes to pursue a national policy designed to ensure the effective abolition of child labor and to raise progressively the minimum age for admission to employment or work to a level consistent with the fullest physical and mental development of young persons.	06.03.2009 / in force	The Labor Code of the Republic Uzbekistan sets the minimum working age (generally 16 years of age, with certain expectations for those 15 years old if work is light and does not interfere with education). Law "On Guarantees of the Right of the Child" 2008 emphasizes the State's duty to protect children from any form of exploitation, including child labor. Law" On Education" mandates compulsory general secondary education, indirectly curtailing child labor by ensuring children remain in school until at least 9th grade (around age 15).	Significant progress has been made in reducing child labor, informal child labor remains an issue, especially in family-based agriculture[86].
C155-Occupational Safety and Health	Each Member which ratifies this Convention shall list, in the first report on the application of the Convention submitted under Article	19.12.2009/ Not in force The Convention	Not yet available.	Not yet available.

[86] Uzbekistan - United States Department of State. (2024, June 24). United States Department of State. https://www.state.gov/reports/2024-trafficking-in-persons-report/uzbekistan

Convention	Brief Summary	Time of Signature / Ratification	**Associated Implementation Laws and Rules**	**Implementation Status**
Convention, 1981, (No.155)	22 of the Constitution of the International Labor Organization, any branches which may have been excluded in pursuance of paragraph 2 of this Article, giving the reasons for such exclusion and describing the measures taken to give adequate protection to workers in excluded branches, and shall indicate in subsequent reports any progress towards wider application	will enter into force for Uzbekistan on 19 December 2025		
C182 –Worst Forms of Child Labor Convention, 1999 (No. 182)	Each Member which ratifies this Convention shall take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labor as a matter of urgency.	24.06.2008 / in force	The Labor Code (Article 77) sets the minimum age for employment of 16 years of age, with expectations for certain light work for individuals aged 15 years, provided it does not harm their health or interfere with their education Laws on the Rights of the Child prohibit child labor in hazardous work and align with international	The worst forms of child labor have decreased significantly with near elimination of systematic child labor[87]. Despite substantial progress, continued efforts, monitoring, and international cooperation remain essential to fully align with the ILO standards and to address remaining gaps in law and on-the-ground practices[88].

[87] Ibid.
[88] Uzbek cotton is free from systemic child and forced labor. (2022, March 1). International Labor Organization. https://www.ilo.org/resource/news/uzbek-cotton-free-systemic-child-labour-and-forced-labour

Convention	Brief Summary	Time of Signature / Ratification	**Associated Implementation Laws and Rules**	**Implementation Status**
			child protection standards.	
C187 – Promotional Framework for Occupational Safety and Health Convention, 2006 (No. 187)	Each Member which ratifies this Convention shall develop, implement, and continuously improve national policies and programs; it calls for the involvement of governments, employers, and workers in establishing safety standards, promoting risk assessment, and ensuring workplace safety, ultimately aiming to reduce work-related injuries and illnesses through a proactive, integrated approach to occupational safety and health (OSH).	14.09.2021 / in force	The Law on Occupational Safety and Health (1993) mandates workplace safety standards and employer responsibilities to ensure safe working conditions Over 30 articles of the Labor Code are directly linked with issues of occupational safety and health, such as: Article 212 ensures safe and labor conditions, Articles 116,117, and 118 regulates working hours in hazardous occupations for workers performing special work and workers under 18.	Occupational safety and health standards are inconsistently applied, particularly in hazardous industries like construction and manufacturing[89].

[89] Uzbekistan ratifies the Promotional Framework for Occupational Safety and Health Convention. (2021, September 14). International Labor Organization. https://www.ilo.org/resource/news/uzbekistan-ratifies-promotional-framework-occupational-safety-and-health

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