

MINISTRY OF WATER AND ENERGY ETHIOPIA FLOOD MANAGEMENT PROJECT

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) FOR

- 1. Construction of Pedestrian Crossing Structure at Haruka, Dulecha, Gelealo, and Gewane woredas in the Middle Awash River Basin**
- 2. Construction of River off-take structures at Gewane and Gelealo Woredas in Middle Awash River Basin**
- 3. Construction of Pedestrian Crossing Structure in Assayita and Afambo in the Lower Awash River Basin**
- 4. Construction of River off-take structures at Assayita and Afambo woredas in Lower Awash River Basin**

May, 2026

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ETHIOPIA FLOOD MANAGEMENT
PROJECT**

**ENVIRONMENTAL AND SOCIAL
MANAGEMENT PLAN (ESMP)**

**Construction of Pedestrian Crossing Structure at
Haruka, Dulecha, Gelealo, and Gewane woredas
in the Middle Awash River Basin**

EFMP Safeguard Team

May, 2026

Executive Summary

This Environmental and Social Management Plan (ESMP) supports the construction of eight pedestrian bridges in Haruka, Dulecha, Gelealo, and Gewane woredas in Ethiopia's Middle Awash Basin. The semi-arid region, prone to recurrent flooding, relies on agro-pastoral livelihoods and the Awash River for water and agriculture. Recent dredging improved flood control but disrupted traditional crossings, limiting access to services and livelihoods.

The project, led by the Ministry of Water and Energy with World Bank support, aims to restore connectivity and enhance community resilience. The ESMP ensures environmentally sustainable and socially inclusive implementation, aligned with national regulations and World Bank standards.

Key activities include bridge construction, access path development, and installation of safety features. Potential impacts—such as vegetation loss, soil erosion, water pollution, and temporary livelihood disruptions—will be mitigated through measures like careful site selection, erosion control, waste management, and safety protocols.

A cluster approach is adopted due to the interconnected nature of the project areas, enabling efficient management of cumulative impacts. Institutional roles are clearly defined among project units, contractors, and authorities.

Overall, the project is expected to improve mobility, safety, and livelihoods while supporting climate-resilient development, provided the ESMP is effectively implemented.

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1. Project Background and Context

The Middle Awash Basin, part of the larger Awash River system in Ethiopia's Rift Valley, is a lowland semi-arid region characterized by pastoralism, irrigated agriculture, and recurrent flooding. It encompasses several woredas (districts), including Haruka, Dulecha, Gelealo, and Gewane. While these areas share broadly similar environmental and socio-economic conditions, each also exhibits distinct local characteristics.

Haruka Woreda is located along the Middle Awash River corridor within the basin's floodplain system. The area is influenced by tributaries such as the Kesem and Kebena rivers, which contribute to seasonal flooding. Livelihoods are predominantly agro-pastoral, combining livestock rearing with irrigated crop production, including onion and other cash crops. Due to its proximity to Awash River water resources, Haruka is increasingly integrated into irrigation schemes. However, the woreda is highly exposed to recurrent flooding, which affects settlements and agricultural activities, while limitations in water management and infrastructure constrain productivity.

Dulecha Woreda, situated in the Afar Region and bordered by the Awash River to the east, lies at elevations ranging from approximately 800 to 1,100 meters above sea level. The area includes notable volcanic features such as Mount Dofen. It has a sparse population, largely composed of pastoralists whose livelihoods depend primarily on livestock, with limited irrigated agriculture practiced near riverbanks. Located within a floodplain, Dulecha is highly vulnerable to flooding from the Awash River. Historical flood events have displaced communities and damaged farmland. The woreda also faces challenges related to limited access to water supply and basic infrastructure.

Gelealo Woreda is situated downstream within the Middle Awash system and is hydrologically linked with neighboring areas such as Gewane and Amibara. Its economy is primarily agro-pastoral, with increasing reliance on irrigation-based agriculture, particularly horticulture such as onion production. The woreda has benefited from development interventions, including river dredging and flood control measures. It is characterized by a lowland semi-arid climate, with high temperatures and low rainfall typical of the Afar Depression. Despite these developments,

Gelealo remains prone to flooding due to its proximity to the Awash River and flat topography. The area requires enhanced flood protection, expansion of irrigation infrastructure, and improved market access.

Gewane Woreda, also located in the Afar Region and partly bounded by the Awash River, features a diverse landscape that includes lowland swamps, volcanic mountains such as Mount Ayalu, and protected areas like Yangudi Rassa National Park. Livelihoods are mixed, encompassing pastoralism, agro-pastoralism, and small urban-based activities, with a strong reliance on riverine grazing lands and seasonal wetlands. Gewane is also of global paleoanthropological significance due to archaeological sites such as Aramis, where important hominid remains have been discovered. However, the woreda faces several challenges, including flooding, limited water access, and inadequate infrastructure and services.

In conclusion, Haruka, Dulecha, Gelealo, and Gewane woredas form a hydrologically interconnected and socio-economically similar cluster within the Middle Awash Basin. Their development is closely tied to the dynamics of the Awash River, which provides both opportunities—such as irrigation and fertile floodplains—and risks, including recurrent flooding and environmental stress. A comprehensive understanding of the region requires integrating its physical geography, hydrology, and pastoral-agricultural systems, which together define its overall character.

Across the basin, recurrent flooding poses major risks to settlements, agriculture, and mobility, despite the river's importance for water and fertile land. In preparation for the 2025 rainy season, emergency River dredging improved flow capacity and reduced flood risk but disrupted traditional crossing points, limiting access to services, markets, and grazing areas.

To address these challenges, the Ministry of Water and Energy and the World Bank, under the Ethiopian Flood Management Project, have proposed constructing pedestrian crossing structures at key locations. To ensure these interventions are environmentally and socially responsible, an Environmental and Social Management Plan (ESMP) has been developed to identify potential impacts and define mitigation, monitoring, and implementation measures.

1.1.Integration of ESMP with Design and procurement & contract documents

The ESMP prepared by the PMU safeguard team was shared with the design consultant to ensure that the proposed mitigation measures were adequately reflected in the engineering estimates and tender documents. Accordingly, the environmental and social management costs were incorporated into the Bill of Quantities (BoQ) and procurement documents. The design consultant and PMU verified that the environmental and social mitigation measures were properly integrated into the engineering design, technical specifications, and cost estimates. In addition, the ESMP requirements, obligations, and associated budget provisions were clearly incorporated into the bidding documents and contractual clauses for contractors. During the procurement process, bidders will also be evaluated based on their capacity to implement the ESMP requirements, including the availability of qualified personnel, proposed methodology, and compliance arrangements.

2. Objective of the ESMP

The overall objective of the Environmental and Social Management Plan (ESMP) is to ensure that the proposed pedestrian crossing structures in the Middle Awash Basin are planned, constructed, and operated in a manner that is environmentally sustainable and socially inclusive, while minimizing adverse impacts and enhancing positive outcomes for local communities.

Specifically, the ESMP aims to:

- Identify, avoid, and minimize potential negative impacts on the fragile semi-arid floodplain ecosystem of the Middle Awash Basin, including impacts on river hydrology, soil stability, vegetation, and local biodiversity.
- Ensure that the design and construction of crossing structures do not exacerbate flooding conditions in Haruka, Dulecha, Gelealo, and Gewane woredas, and support safe and sustainable water flow within the Awash River system.
- Restore and improve safe pedestrian access disrupted by river dredging and seasonal flooding, ensuring continued connectivity to markets, services, grazing lands, and social facilities.

- Safeguard agro-pastoral and pastoral livelihoods by minimizing disruptions to irrigation systems, grazing routes, and agricultural activities, while enhancing resilience of local communities to flood-related risks.
- Address potential social issues such as land use conflicts, temporary access restrictions, labor influx impacts, and community health and safety risks during construction and operation phases.
- Ensure meaningful consultation and participation of affected communities, local authorities, and relevant stakeholders throughout project planning and implementation, with attention to vulnerable groups.
- Align project implementation with national environmental regulations and relevant World Bank Environmental and Social Framework (ESF) standards.
- Define clear monitoring indicators and institutional responsibilities to track environmental and social performance, enabling timely corrective actions where necessary.
- Contribute to integrated flood management and sustainable development in the basin by supporting infrastructure that balances flood control, mobility, and environmental protection.

3. Project Description

The proposed project involves the construction of pedestrian crossing structures along the Awash River in the Middle Awash Basin, with particular focus on Haruka, Dulecha, Gelealo, and Gewane woredas. This intervention is part of ongoing efforts under the Ethiopian Flood Management Project (EFMP) led by the Ministry of Water and Energy (MoWE), in collaboration with World Bank, to address flood risks while improving community resilience and connectivity. The pedestrian crossing structures are designed by competent design consultant **KIM FC Water Works Consultancy Plc.** and **ABEK Business Group.**

3.1. Design Considerations

The bridge axis is selected based on the assumption that the site will optimally serve the local population and satisfy the following conditions:

- Proximity to the traditional crossing point
- Adequate space for bridge foundations
- Minimum required freeboard
- Acceptable level difference between the two riverbanks
- Compliance with general design requirements
- Stable bank and slope conditions
- Favorable river flow and hydraulic conditions
- Shortest possible span

In response, the construction of pedestrian crossing structures has been identified as a priority intervention to restore and enhance safe, reliable, and climate-resilient connectivity across the river. These structures are intended to provide safe and durable crossing points that are resilient to seasonal flooding and changing hydrological conditions. Key project activities will include:

- Site clearing and preparation at designated crossing locations
- Construction of bridge foundations and abutments adapted to local hydrological and geotechnical conditions
- Installation of steel bridge superstructures to ensure durability and structural integrity
- Construction of approach paths to facilitate access for pedestrians and livestock

- Installation of safety features, including railings and protective elements
- Implementation of finishing works, including protective coatings and drainage systems to enhance longevity and reduce maintenance needs

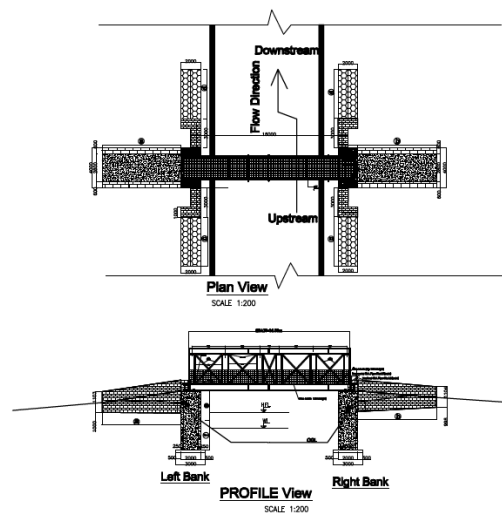


Figure 1 Plan and profile view of proposed pedestrian crossings

While the project is expected to generate significant social and economic benefits, including improved mobility, reduced travel risks, and enhanced resilience to climate variability, it may also lead to localized environmental and social impacts during both the construction and operation phases. These impacts may include temporary land disturbance, vegetation clearance, restricted access during construction, and potential safety risks if not properly managed.

Accordingly, this Environmental and Social Management Plan (ESMP) has been developed to guide the planning and implementation of the project in a manner that avoids, minimizes, and mitigates adverse impacts, while maximizing long-term benefits for local communities and the surrounding environment.

3.2. Approach roads/trucks and other Ancillary Facilities

No new approach roads or tracks to the crossing structures will be constructed. The crossing structures are designed to facilitate the safe movement of pedestrians, livestock, motorbikes, animal-drawn carts, and light vehicles (Bajajs). Existing footpaths and

tracks will be utilized, with only minor surface repairs and clearance works undertaken where necessary. Accordingly, no significant environmental and social (E&S) risks or impacts are anticipated in relation to the existing footpath approach roads/tracks.

There will be no construction camps or temporary storage areas established for the pedestrian crossing construction. Due to the presence of nearby villages, the contractor will establish the construction camp in the nearest town. Construction materials required for the pedestrian crossing, including steel and stones, will be transported directly to the designated construction locations and unloaded as needed. Therefore, no separate material storage sites will be required.

The middle Awash sections exhibit wider river channels with higher and more pronounced banks, necessitating longer bridge spans. At the Amibara site, in particular, preliminary measurements indicate a required span of greater than 44 m to safely and efficiently accommodate the river width and flow characteristics.

3.3.Sitting of Crossing Bridges

Consultations with community elders and clan leaders were undertaken to support the identification and mapping of Potential River crossing locations in line with World Bank Environmental and Social Standard 7 (ESS7). These consultations were essential for integrating local knowledge systems into the planning process, particularly in the Afar pastoral context where land use is governed by mobility, seasonal resource availability, and customary institutions rather than fixed land ownership.

Through participatory mapping exercises, elders and clan representatives provided detailed information on how proposed pedestrian bridge locations intersect with or may potentially disrupt key traditional use areas. These included established Afar pastoral mobility corridors, seasonal grazing routes used during wet and dry seasons, and critical communal water access points such as wells, rivers, and seasonal ponds. The discussions also captured inter-clan territorial arrangements and negotiated access systems that regulate the use of shared rangelands and migration pathways.

This locally derived spatial information was then used to analyze the potential impacts of pedestrian crossing structures. The analysis focused on identifying whether proposed bridge sites would facilitate or hinder livestock movement, alter seasonal migration patterns, restrict access to essential water and grazing resources, or affect the integrity of customary land-use governance systems. Particular attention was given to whether infrastructure placement could fragment mobility corridors, concentrate livestock movement at limited crossing points, or create pressure on already sensitive resource areas.

In accordance with ESS7 requirements, this participatory and spatially informed approach ensured that the design and siting of crossing structures incorporated the perspectives and priorities of affected pastoral communities. It also helped to minimize the risk of unintended adverse impacts on livelihoods, while promoting solutions that respect traditional governance structures, maintain mobility systems, and support equitable access to shared natural resources.

4. Rationale for a Cluster ESMP for Haruka, Dulecha, Gelealo, and Gewane River Crossings

4.1. Justification

A consolidated Environmental and Social Management Plan (ESMP) is proposed for pedestrian crossings in Haruka, Dulecha, Gelealo, and Gewane due to their interconnected setting in the Middle Awash Basin and the uniform nature of the interventions.

The woredas are hydrologically linked within the Awash River floodplain, meaning environmental impacts such as flooding, sediment movement, and ecosystem changes are interconnected and better managed at basin level. The proposed structures are also similar in design and construction, allowing standardized mitigation measures and monitoring across all sites.

Additionally, the areas share comparable semi-arid environmental conditions and socio-economic characteristics dominated by agro-pastoral livelihoods and reliance on river resources, leading to similar risks such as flooding and access disruption.

A grouped ESMP improves efficiency by reducing duplication in assessments, consultations, and reporting, while enabling coordinated implementation and better resource use. It also supports assessment of cumulative impacts, which are important in a basin already affected by flooding, land degradation, and infrastructure constraints.

Finally, this approach aligns with the World Bank ESF and national regulations by promoting integrated, landscape-level planning, ensuring more consistent and sustainable management of environmental and social risks across the Middle Awash Basin.

4.2. Location of Proposed Crossing Structures

The proposed subprojects comprise a network of eight (8) pedestrian crossing structures located along the Awash River corridor, distributed between Haruka, Dulecha, Gelealo, and Gewane

woredas. The eight proposed bridge locations—Amibara (Harka and Dulecha), Higub, Adengeli, Gefirem, Kodayi, Werafita, Egilie, and Gelelie Dura—are distributed along a clear longitudinal river corridor, with elevations gradually declining from approximately 740 m to 567 m above sea level. The coordinates are provided in table 1 below.

Table 1 List of Bridges

PID	Kebele	Woreda	East	North	Elevation
1	Amibara	Harka and Dulecha	629,221.92	1,031,284.66	740.7
2	Higub		627,318.84	1,040,745.03	732.91
3	Adengeli		642,494.48	1,060,293.05	723.69
4	Gefirem	Gelalo	663,279.16	1,102,326.33	576.35
5	Kodayi		670,755.77	1,108,804.43	569.02
8	Werafita	Gewane	676,245.14	1,116,893.85	567.45
7	Egilie		674,189.91	1,119,067.24	567.35
6	Gelelie Dura		671,077.74	1,123,818.81	567.34

5. Legal and Institutional Framework

The ESMP shall consider applicable National and World Bank Laws & standards. National Frameworks to be reviewed and considered includes;

- Environmental Impact Assessment Proclamation No. 299/2002
- Environmental Pollution Control Proclamation No. 300/2002
- Water Resources Management Proclamation No. 197/2000
- Labor Proclamation No. 1156/2019
- Regional Environmental Authority guidelines (Afar Region, if available)

World Bank Environmental and Social Standards including;

- ESS1: Assessment and Management of E&S Risks
- ESS2: Labor and Working Conditions
- ESS3: Resource Efficiency and Pollution Prevention
- ESS4: Community Health and Safety

- ESS5: Land Acquisition and Resettlement (if applicable)
- ESS6: Biodiversity Conservation
- ESS7: ESS7: Indigenous Peoples
- ESS8: Cultural Heritage
- ESS10: Stakeholder Engagement

In addition, the IFC Environmental, Health and Safety (EHS) Guidelines need to be considered for implementation of safety measures.

6. Description of Environmental and Social Baseline Conditions of Haruka, Dulecha, Gelealo, and Gewane Woredas

6.1. Physical Environment

The project area, covering Haruka, Dulecha, Gelealo, and Gewane woredas, lies within the Middle Awash Basin of Ethiopia's Rift Valley. The region is characterized by a lowland semi-arid to arid climate, with high temperatures throughout the year and low, highly variable rainfall. Annual rainfall is generally limited and erratic, often concentrated in short rainy seasons, while evapotranspiration rates are high, contributing to moisture deficits.

Topographically, the area consists mainly of flat to gently sloping floodplains associated with the Awash River, interspersed with volcanic features such as Mount Dofen and Mount Ayalu. Elevation gradually decreases downstream—from approximately 700–1,100 meters above sea level in upstream areas (Haruka and Dulecha) to around 560–600 meters in downstream areas (Gelealo and Gewane). This gradient influences river flow velocity, flood dynamics, and sediment deposition patterns.

The Awash River and its tributaries (including the Kesem and Kebena rivers) dominate the hydrology of the basin. The river exhibits strong seasonal variability, with high flows during the rainy season often resulting in overbank flooding. Floodplains are periodically inundated, creating fertile alluvial soils but also posing significant risks to settlements and infrastructure.

Soils in the area are primarily alluvial and sandy-loam types, which are moderately fertile but highly susceptible to erosion, sedimentation, and waterlogging during floods. In some areas, salinity and soil degradation are emerging concerns due to irrigation practices and poor drainage.

6.1.1. Soil Conditions

The soils in Haruka, Dulecha, Gelealo, and Gewane woredas are predominantly alluvial and sandy-loam types formed through sediment deposition from the Awash River and its tributaries. These soils are moderately fertile and support agriculture and vegetation growth, particularly within the floodplain areas. However, they are highly vulnerable to environmental challenges such as erosion, sedimentation, waterlogging, and seasonal flooding due to the flat to gently sloping terrain and recurring overbank inundation.

The sandy-loam soils are generally loose to moderately compact with moderate bearing capacity, making them suitable for light to medium infrastructure development, including pedestrian crossing structures. Nevertheless, seasonal flooding and high sediment deposition may undermine foundations through scouring and soil instability if appropriate protection measures are not implemented. Waterlogging during rainy periods can further reduce soil strength and compromise structural stability. In addition, localized soil salinity and degradation associated with irrigation practices, poor drainage, high evaporation, and arid to semi-arid climatic conditions may weaken subgrade conditions and accelerate material deterioration.

Accordingly, the design and construction of pedestrian crossing structures in the project area should incorporate flood-resistant and erosion-control measures, stabilized or deep foundations, effective drainage systems, scour protection around structural supports, and durable construction materials suitable for saline and semi-arid environments.

6.2. Biological Environment

The project area is characterized by a fragile semi-arid ecosystem dominated by Acacia-Commiphora bushland, shrubland, and scattered grasslands, with relatively denser vegetation occurring along riverbanks and seasonal wetlands where moisture availability is higher. The Awash River corridor supports important riverine and floodplain ecosystems that provide critical

habitat for wildlife, maintain biodiversity values, and serve as essential dry-season grazing resources for pastoral and agro-pastoral communities. Parts of Gewane Woreda are located within or near Yangudi Rassa National Park, a protected area of high ecological significance known for its wildlife resources, including endemic and threatened fauna. Although the proposed pedestrian crossing sites are largely located outside strictly protected zones, indirect impacts on wildlife movement, habitat connectivity, riparian vegetation, and seasonal wetland ecosystems may occur if construction and operational activities are not properly managed.

In accordance with ESS6 of the World Bank Environmental and Social Framework, the proposed pedestrian crossing structures are therefore considered to have Moderate to Substantial biodiversity sensitivity due to their location within the Awash River floodplain ecosystem and proximity to ecologically sensitive habitats associated with Yangudi Rassa National Park. Potential environmental risks include localized vegetation clearance, disturbance to riparian ecosystems, soil erosion and sedimentation, alteration of riverbank conditions, disruption of natural floodplain functions, and temporary disturbance to wildlife movement and habitat connectivity. The ecosystem is particularly sensitive because of its slow natural regeneration rates and existing environmental pressures such as overgrazing, land degradation, and recurrent flood-related disturbances.

However, the project is relatively small-scale in nature and does not involve major habitat conversion, significant ancillary infrastructure, construction camps at crossing sites, or new access roads. Existing footpaths and tracks will largely be utilized, thereby reducing the extent of habitat disturbance and fragmentation. To ensure compliance with ESS6 and minimize biodiversity-related impacts, the project will implement the mitigation hierarchy through avoidance of sensitive habitats where feasible, minimization of vegetation clearance, protection of riparian buffer areas, erosion and sediment control measures, pollution prevention, restoration and re-vegetation of disturbed areas using native species, and regular environmental monitoring during construction and operation phases. Construction activities will also be managed to minimize disturbance to wildlife and seasonal grazing patterns, particularly in areas influenced by Yangudi Rassa National Park. With effective implementation of these biodiversity management and monitoring measures, adverse impacts are expected to remain localized, temporary, reversible, and manageable.

6.3. Socio-Economic Environment

6.3.1. Population and Livelihoods

The population across Haruka, Dulecha, Gelealo, and Gewane woredas is predominantly rural, with communities largely engaged in pastoral and agro-pastoral livelihoods. Livestock rearing—particularly cattle, goats, sheep, and camels—is the primary economic activity, supplemented by small-scale irrigated agriculture along riverbanks.

Crop production includes cash crops such as onions and vegetables, especially in areas with access to irrigation schemes. Livelihood systems are closely tied to seasonal mobility, with pastoralists moving livestock in search of pasture and water.

6.3.2. Settlement Patterns

Settlements are typically scattered and semi-permanent, reflecting the mobility of pastoral communities. Villages are often located near water sources, including rivers and seasonal streams, which increase their exposure to flooding risks.

6.3.4. Infrastructure and Services

Infrastructure in the project area is limited and unevenly distributed. Access to basic services such as potable water, health facilities, education, and markets is constrained, particularly in remote kebeles. Transportation networks are underdeveloped, and river crossings are often informal or seasonal, becoming impassable during floods.

Recent river dredging activities have improved flood conveyance but have also disrupted traditional crossing routes, further limiting access to essential services and economic opportunities.

6.4 Social Dynamics and Vulnerability

Communities in the project area exhibit strong traditional social structures and customary resource management systems particularly related to grazing land and water use. However,

competition over scarce resources—especially during drought or flood periods—can lead to localized conflicts.

The population includes vulnerable groups, such as women, children, elderly and pastoral households with limited assets. These groups are disproportionately affected by flooding, displacement, and restricted mobility.

Gender roles are well defined, with women often responsible for household tasks such as water collection and caregiving, making them particularly affected by reduced access to safe crossing points and services.

6.5 Flood Risk and Climate Variability

Flooding is a defining environmental and social challenge across all four woredas. Seasonal river overflow frequently damages crops, disrupts mobility, displaces households, and affects access to markets and services. The flat topography and limited drainage infrastructure exacerbate flood impacts.

Climate variability, including increasing frequency and intensity of extreme weather events, is likely to worsen existing vulnerabilities. Both floods and droughts affect livelihood stability, food security, and resilience of local communities.

In summary, these baseline conditions underscore the importance of carefully planning and implementing the proposed pedestrian crossing structures to ensure they enhance connectivity and resilience while minimizing environmental and social risks.

7. Potential Environmental and Social Impacts

7.1. Pre-construction Phase

7.1.1. Environmental Impact

- a) Disturbance to river hydrology and flood patterns**

If crossing sites are selected without detailed hydrological analysis, the structures may interfere with the natural flow regime of the Awash River. Even small changes in alignment or elevation can influence how water spreads across the floodplain, potentially increasing flood depth or duration in nearby areas. This could worsen existing flooding problems in downstream or adjacent communities.

b) Encroachment on sensitive ecosystems

Poorly chosen locations may overlap with ecologically important zones such as riverine vegetation belts, wetlands, or wildlife movement corridors. In areas influenced by Yangudi Rassa National Park, this could disrupt habitat connectivity, affecting species that rely on seasonal access to water and grazing areas.

c) Increased long-term erosion risk due to poor design

If soil conditions, slope, and sediment transport are not adequately considered during design, the structures could later contribute to bank instability. This may lead to progressive erosion around bridge abutments, requiring costly repairs and causing environmental degradation over time.

7.1.2. Social Impacts

d) Land use conflict

The identification of sites for bridge foundations and access paths may overlap with communal grazing lands or traditional routes used by pastoralists. Since land in these areas is often governed by customary systems rather than formal titles, disagreements may arise between communities, clans, or local authorities regarding land allocation.

e) Restricted or altered access to resources (planning stage)

Even before construction begins, the designation of project areas can create uncertainty or early restrictions on how land is used. This may affect access to riverbanks, water points, or grazing areas that communities depend on.

f) Exclusion of vulnerable groups

If consultations are limited or dominated by local elites, the needs of women, elderly people, and poorer households may not be adequately reflected in design decisions. This could result in crossings being located in places that are less accessible or safe for these groups.

7.2. Construction Phase Impacts

7.2.1. Environmental Impacts

a) Vegetation clearance and habitat disturbance

Site preparation will require clearing shrubs, grasses, and riverine vegetation. In a semi-arid ecosystem where vegetation regenerates slowly, this can lead to long-lasting habitat loss, particularly for species that depend on riparian zones.

b) Soil erosion and sedimentation

Excavation for bridge foundations and movement of heavy equipment can loosen soil, especially in sandy and alluvial areas. During rainfall or flooding, this loose soil may be washed into the river, increasing sediment loads and affecting water quality and aquatic habitats.

c) River morphology disturbance

Construction of the river crossings will temporarily modify riverbanks through excavation and related works, disrupting their natural stability. This disturbance can increase sediment runoff into the Awash River, elevating sediment loads—particularly during high flows—and potentially degrading water quality and affecting aquatic habitats.

d) Water pollution

Construction activities carry risks of contaminating the river through accidental spills of fuel, oil, or chemicals, as well as improper disposal of construction waste. This can degrade water quality for both human use and livestock.

e) Dust and air pollution

Movement of machinery and transport of construction materials will generate dust and disturb surface soils, while excavation and earthworks in dry conditions will further increase airborne

dust levels. These activities can reduce air quality, affect visibility, and cause nuisance to nearby communities and workers.

f) Air and noise pollution

Dust generated from site clearing, transportation, and construction activities can affect air quality, while machinery noise can disturb both communities and wildlife. These impacts are typically temporary but may be significant near settlements.

g) Disturbance to wildlife

Increased human presence, noise, and habitat disruption may cause wildlife to temporarily move away from the area. This is particularly relevant near ecologically sensitive zones and migration routes.

7.2.2. Social Impact

g) Temporary restriction of movement

Construction sites may block or limit access to traditional crossing points, forcing communities to take longer or more dangerous routes. This can disrupt daily activities, including access to markets, schools, and health services.

h) Disruption of Livelihoods

Pastoralists may find it difficult to move livestock across the river, while farmers may experience reduced access to irrigated fields. These disruptions can affect income, food security, and overall livelihood stability.

h) Health and Community & Worker safety risks

Construction sites pose physical hazards, including open excavations, moving machinery, and increased traffic. Without proper safety measures, both workers and local residents are at risk of accidents. In addition, activities near the river crossing sites may pose drowning or other water-related risks, particularly in areas with open water and unstable riverbanks.

i) Labor influx impacts

The arrival of outside workers may increase demand for local resources such as water and food, potentially leading to competition with host communities. Cultural differences may also create tension, and there is a risk of social issues such as gender-based violence if not properly managed.

j) Disproportionate effects on vulnerable groups

Women, children, and elderly individuals may face greater difficulties during construction due to reduced mobility and increased safety risks. For example, women responsible for water collection may have to travel longer distances.

7.3. Operation Phase Impacts

Once the pedestrian river crossing structures are completed and operational, the project is expected to generate largely positive long-term environmental and social outcomes by improving connectivity and resilience. However, several residual and operational-phase impacts may still occur and require proper management.

7.2.1. Environmental Impacts

a) Riverbank erosion and scour risks

The presence of bridge abutments and approach structures may alter local flow dynamics of the Awash River over time. This can lead to localized scouring around foundations and gradual riverbank erosion, particularly during peak flood events. Without regular monitoring and maintenance, these processes may affect structural stability and surrounding habitats.

b) Hydrological and sediment transport changes

Although the structures are designed to minimize obstruction, they may still slightly influence sediment deposition patterns and local flow velocity. This could lead to minor changes in channel morphology near crossing points over time, especially in this dynamic floodplain environment.

c) Maintenance-related environmental disturbance

Routine maintenance activities (e.g., repainting steel components, clearing debris, and minor repairs) may generate small amounts of waste, noise, and localized disturbance. If not properly managed, improper disposal of maintenance waste could lead to localized pollution.

d) Indirect pressure on riparian areas

Improved accessibility may increase human and livestock movement near riverbanks. This could place additional pressure on already fragile riparian vegetation, particularly through grazing, trampling, and fuel wood collection.

7.2.2 Social Impacts

a) Improved mobility and access (positive impact)

The most significant positive impact of the operation phase is improved and safer year-round mobility for communities and livestock. The crossings will enhance access to schools, health facilities, markets, and administrative services, reducing travel time and associated risks during flooding periods.

b) Enhanced livelihood resilience

Improved connectivity will strengthen pastoral and agro-pastoral livelihoods by facilitating livestock movement between grazing areas, improving access to veterinary services and markets, and supporting small-scale trade and economic integration.

c) Traffic and safety risks (bridge usage phase)

Although pedestrian bridges are generally low-risk infrastructure, improper use (e.g., overcrowding, livestock-pedestrian conflicts, or use during extreme flood events) may pose safety hazards. Children and vulnerable groups may also be at risk if safety awareness is not adequately promoted.

d) Equity and access concerns

If crossing points are not evenly distributed or if access paths are not well maintained, some communities may perceive unequal benefit distribution. Seasonal changes in river flow may also temporarily limit usability of certain crossings.

e) Increased movement-related social interactions

Improved crossings may increase interaction between previously separated communities, which is generally positive but may also require strengthened local conflict management mechanisms in case of disputes over resources or crossing use.

8. Mitigation and Management Measures

8.1. Pre-Construction Phase

Impact Area/Activities	Likely Impacts	Mitigation Measures	Frequency of Mitigation	Responsibility	Monitoring Indicators	Estimated Budget
Design and planning	Inappropriate site selection, weak soil foundation problem, land slide, wetland/sensitive ecological area leading to avoidable environmental/social impacts	Proper site investigation and planning, geotechnical & hydrological studies, Conduct detailed hydrological, geotechnical, and environmental assessments; micro-siting to avoid sensitive habitats and erosion hotspots; apply “avoidance first” principle	Once-off during design stage with reviews at key design milestones	PMU/Design consultant	Approved design/site selection report; ESMP clearance	PMU budget; design consultant budget
Sensitive habitats and areas near Yangudi Rassa National Park	Disturbance to protected/sensitive ecosystems and wildlife habitats	Conduct site-specific biodiversity screening and ecological baseline verification; micro-site crossings to avoid wetlands, riparian buffers, wildlife corridors, and protected or near-protected areas; coordinate with environmental and wildlife authorities	Once before construction At each proposed crossing location	MoWE/PMU, Design Consultant, Regional Environmental Authority	Approved screening reports; evidence of avoidance of sensitive areas	PMU budget; design consultant budget
Stakeholder engagement	Community Complaints /grievances; lack of awareness	Conduct meaningful consultations/awareness/training; disclose ESMP; include pastoralists and vulnerable groups	Continuous throughout pre-construction phase (at	MoWE, PMU, ABDO	Consultation records; functioning GRM,	MoWE/PMU budget; ABDO budget

			key milestones)			
Temporary access restriction	As the approach roads are existing footpaths, no construction camp and significant storage area required, only temporary restriction of access exists	Ensure fair and immediate consultation and documentation for temporary access restriction	As required during pre-construction phase	MoWE, ABDO	Minute of consultation	Local government Budget
Community Livestock access	Disruption of mobility during construction (anticipated); Livestock movement interference	<ul style="list-style-type: none"> • Community consultation during planning • Develop temporary crossings/ access plan (rope crossings, detours, boat crossings if needed); Include livestock ramps/underpasses in design (ramp should be design with proper side support and basement • Consider migration periods in work planning 	During planning phase with validation before construction	Contractor, MoWE/ABDO; Design Engineer / Contractor	Meeting records, consultation reports, Approved access continuity plan; Design compliance	Design consultant budget; contractor cost
Contractor mobilization	Labor risks, GBV/SEA risks	Prepare LMP; enforce workers' Code of Conduct; GBV Action Plan, awareness training, establish GRM before work start	Prior to mobilization and continuously enforced throughout mobilization period	PMU / Contractor	Approved LMP; Signed CoC; functional GRM	contractor cost

Cultural chance finds	Damage to unknown heritage sites	<ul style="list-style-type: none"> • Develop stop-work procedure • Include Chance Find Procedure (CFP) in contracts • Cultural heritage screening • Inform authorities protocol 	Once-off before procurement , with continuous application if triggered	Contractor, PMU	Procedure included in contract	Part of contract; local government/ABDO budget
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8.2. Construction Phase

Impact Area/Activities	Likely Impacts	Mitigation Measures	Frequency of Mitigation	Responsibility	Monitoring Indicators	Estimated Budget
Vegetation & Habitat	Loss of riparian vegetation and habitat disturbance	Limit clearing to footprint; demarcate no-go zones; retain mature native vegetation where feasible; prohibit unnecessary tree cutting; restore vegetation with native species	Daily supervision; restoration at completion	Contractor, Supervising engineer	Area cleared vs. approved limit; re-vegetation success; Vegetation condition	Contractor cost
Soil & Erosion (Riverbanks and floodplain stability)	Soil erosion and sedimentation into Awash River	Use silt fences, sandbags, sediment traps; phased excavation; stabilize exposed soil; bank protection works where needed	Daily during earthworks; weekly inspection	Contractor	Sediment control measures/structures in place; reduced erosion signs; turbidity levels	Contractor cost

Water Quality	Pollution from oil, fuel, cement wash	Provide bunded fuel storage; prohibit waste discharge into river; designate washout areas	Daily monitoring near water; weekly inspection	Contractor	No visible pollution; spill records	Contractor cost
River Morphology	Disturbance to riverbanks and flow	Avoid in-river works during high flows; minimize excavation footprint; apply bank protection	Weekly and after heavy rainfall events	Contractor	Stable riverbanks; reduced scouring incidents	Contractor cost
Air Quality	Dust emissions and air pollution	Water spraying; covering trucks; maintain equipment	Daily (especially in dry conditions)	Contractor	Dust levels; complaint records	Contractor cost
Noise & Vibration	Disturbance to communities and wildlife	Restrict working hours to day time; maintain equipment; use low-noise machinery	Daily monitoring; weekly checks	Contractor	Noise level monitoring; complaints	Contractor cost
Mobility Access	Temporary disruption of crossings	Provide temporary crossings; phased construction; advance community notice	Continuous throughout construction period	Contractor, MoWE	Functioning temporary access points	Contractor cost; MoWE/PMU supervision cost
Wildlife movement and habitat	Temporary disturbance to wildlife	Avoid high-sensitivity areas; restrict nighttime	Continuous throughout construction	Contractor	Wildlife disturbance reports;	Contractor cost

connectivity	movement corridors	works; minimize noise and lighting; maintain natural movement corridors where possible	period		compliance with work-hour restrictions	
Sensitive habitats and areas near Yangudi Rassa National Park	Disturbance to protected/sensitive ecosystems and wildlife habitats	Conduct site-specific biodiversity screening and ecological baseline verification; micro-site crossings to avoid wetlands, riparian buffers, wildlife corridors, and protected or near-protected areas; coordinate with environmental and wildlife authorities	Once before construction At each proposed crossing location	MoWE/PMU, Design Consultant, Regional Environmental Authority	Approved screening reports; evidence of avoidance of sensitive areas	PMU budget; design consultant budget
Livelihoods	Disruption of livestock movement and grazing access	Maintain livestock corridors; schedule works to avoid peak movement times	Continuous with weekly coordination	Contractor, Local Leaders	No blocked grazing routes	Contractor cost and coordinated with local authorities
OHS Risks	Injuries to	PPE	Daily	Contractor	Incident reports;	Contractor

	workers	enforcement; safety training; first aid provision; hazard signage	supervision; monthly training		PPE compliance rate	cost
Community Safety	Accidents involving public	Fence construction sites; traffic management plan; safety awareness	Daily supervision; weekly audits	Contractor	Number of incidents; safety audits	Contractor cost
GBV & SEA Risks		Workers' Code of Conduct; awareness training; confidential reporting mechanism		Contractor/Supervising engineer	Training attendance records; grievance logs	
Labor Influx	Social conflict, resource pressure	Code of conduct; local hiring; worker camp management	Continuous; monthly review	Contractor	GRM records; compliance reports	Contractor cost
Waste Management	Improper disposal of waste	Segregate waste; safe disposal at approved sites	Daily collection; weekly monitoring	Contractor	Waste disposal logs	Contractor cost

8.3. Operation Phase

Impact Area/Activities	Likely Impacts	Mitigation Measures	Frequency of Mitigation	Responsibility	Monitoring Indicators	Estimated Budget
Structural Integrity	Scour and Long-term erosion around bridge	Periodic inspection; Install erosion	Quarterly and after flood	MoWE, AWBD, Design	Structural stability;	MoWE / Local

	foundations/abutments	protection (riprap/gabions) protection; Re-vegetation; post-flood maintenance	events	consultant/engineer	Erosion rates, visual inspection reports, stability of riprap/gabions, vegetation cover assessments	Authority maintenance budget
River Morphology	Gradual channel changes near structures	Monitor sedimentation and flow changes; apply corrective protection works	Bi-annual and after major floods	MoWE	Morphology monitoring reports	MoWE operational budget
Environmental Protection	Waste accumulation and pollution	Install waste bins; community awareness campaigns	Weekly cleaning; monthly awareness	Local Authorities	Cleanliness of crossing areas	Local government budget
Vegetation Clearance	Pressure on riparian vegetation from	Maintain buffer zones; enforce grazing controls	Quarterly monitoring	Local Authorities, Communities	Vegetation condition surveys	AWBD; Local EPA and Community
Community Safety	Unsafe bridge use during floods or overcrowding	Install warning signage; restrict access during extreme flows	Continuous with seasonal focus	Local Authorities	Safety signage installed; incident reports	AWBD; Local government Budget
Livelihoods	Improved mobility (positive impact)	Maintain access roads and approaches; integrate crossings into service networks	Annual review	Local Authorities	Usage rates; reduced travel time	Local authority / regional government budget
Monitoring	Lack of adaptive	Conduct periodic	Quarterly	MoWE	Monitoring	MoWE

	management	environmental and social monitoring	reporting		reports submitted	operational budget
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8.4. Decommission Phase

Impact Area/Activities	Likely Impacts	Mitigation Measures	Frequency of Mitigation	Responsibility	Monitoring Indicators	Estimated Budget
Close out	Risks and impacts associated with river off take structures sites closeout; Worker exit issues	Number of outstanding E&S issues (Target: 0). Waste and excess materials at the canal areas (Target: none). Rehabilitated, reinstated, and revegetated areas. Site clearance issued by the local and regulatory bodies. Provide notice; settle payments; GRM active	Continuously during the monitoring period; End of contract	MoWE/PMU/ABDO; Contractor	Percentage of E&S corrective action plans implemented on time; Worker grievances resolved	Government budget, contractor retention budget

9. Monitoring Plan

Impact Area/Activities	Likely Impacts	Mitigation Measures	Method	Frequency	Responsibility	Monitoring Indicators	Estimated Budget
Site selection & design	Impacts on sensitive areas, poor foundation	Geotechnical & hydrological studies; micro-siting; avoid sensitive habitats	Document review	Once	PMU / Design Consultant	Approved ESMP-integrated design;	PMU/MoWE; design consultant budget

	design					clearance reports	
Stakeholder engagement	Community dissatisfaction, lack of awareness	Meaningful consultations; disclosure of ESMP; inclusive participation	Meetings & records review	Continuous	MoWE / PMU / ABDO	Consultation records; functional GRM	PMU/ABDO
Community access and Livelihood	Disruption of livestock movement routes	Design access continuity plan; include livestock ramps; schedule around migration	Plan review	Once before works	Contractor / Engineer / PMU	Approved access plan; design compliance	Contractor Cost
Vegetation clearing & soil erosion	Limit clearing; silt control; re-vegetation	Minimize vegetation clearing; Protect and stabilize exposed soil; Slope stabilization; Maintain buffer zones	Site inspection	Daily/weekly	Contractor	Area cleared; sediment control in place; $\geq 80\%$ of Survival rate of planted species;	Contractor Cost
Noise exposure	Disturbance to wildlife and nearby community	Restrict noisy activities to daytime; maintain equipment	Portable sound meter	Weekly	Contractor / Engineer /EPA	≤ 85 dB(A) over 8 hours	Contractor Cost
River morphology	Monitor sediment and flow changes	Monitor river morphology; corrective works	Technical survey	Bi-annual	MoWE	Morphology reports	PMU/MoWE; Supervision consultant budget
Structural safety	Scour, erosion, damage	Periodic inspection; riprap protection; vegetation stabilization	Engineering inspection	Quarterly + post-flood	MoWE / ABDO	Structural integrity; erosion condition	MoWE/ABDO recurrent maintenance budget; Contractor Cost
Waste accumulation	Litter at crossings	Waste bins; awareness campaigns	Inspection	Monthly	Local government/ ABDO	Cleanliness status; 100% segregated and disposed at	Contractor Cost; local government

						approved sites	
Noise and dust emission	Disturbance to nearby communities and workers	Water spraying for dust control; restrict noisy works to daytime; maintain equipment; provide PPE to workers	Monitoring and GRM records	Weekly/monthly	PMU/Local EPA	Community complaints / decibel checks; Visual observation	Contractor cost; PMU monitoring budget; government budget
GBV & SEA Risks	Increased vulnerability of women and girls; Community conflict and social tension; Weak grievance and accountability systems	Mandatory Code of Conduct (CoC) for all workers; GBV/SEA awareness training for workers and communities; Community-based reporting mechanisms; Inclusion of women in project committees and consultations	Monitoring GBV compliance	Daily/Weekly	Contractor; oversight by Supervising Engineer	100 % workforce trained	Contractor Cost

Note: All project activities shall comply with applicable Ethiopian environmental legislation, the World Bank Environmental and Social Framework (ESF), the IFC/WBG General Environmental, Health and Safety Guidelines, and sector-specific Construction EHS Guidelines. Monitoring results exceeding the established threshold values shall trigger corrective actions, incident reporting, and implementation of adaptive mitigation measures under the supervision of the PMU and Supervising Engineer.

9. Institutional Responsibilities

The implementation of the Environmental and Social Management Plan (ESMP) is guided by clearly defined institutional responsibilities and coordinated arrangements among key stakeholders. The Project Implementing Unit (PIU) holds overall responsibility for overseeing ESMP implementation, including consolidating reports and ensuring compliance with World Bank requirements. Day-to-day execution of ESMP measures is carried out by the Contractor, who is directly responsible for integrating environmental and social safeguards into routine project activities.

To ensure compliance and accountability, the Supervision Engineer (or Supervision Consultant) plays a critical role in monitoring implementation progress and verifying that all ESMP requirements are met on the ground. This includes regular inspections, documentation, and corrective guidance where necessary. In parallel, the Regional Environmental Authority provides independent regulatory oversight, ensuring that the project adheres to national environmental laws and standards.

Together, these institutions form a coordinated framework that supports effective ESMP implementation, monitoring, and enforcement throughout the project lifecycle.

10. Capacity Building

The effectiveness of Environmental and Social Management Plan (ESMP) measures largely depends on the understanding and commitment of personnel involved in project implementation. In many cases, ESMP measures fail because workers and supervisors on the ground lack adequate awareness or technical knowledge of environmental and social requirements.

Contractors, being directly responsible for executing project activities, play a critical role in ensuring compliance with ESMP provisions. Failure to adhere to these requirements can result in adverse impacts such as environmental pollution, land degradation, occupational hazards, and conflicts with local communities.

Capacity building through targeted training is therefore essential to ensure that all relevant stakeholders clearly understand:

- The environmental and social risks associated with the project
- The importance of implementing mitigation measures
- Their specific roles and responsibilities in ESMP compliance

Accordingly, the following training programs shall be conducted:

- **Environmental and Social Management Training for Contractors:**

To enhance contractors' understanding of ESMP requirements, mitigation measures, monitoring procedures, and reporting obligations.

- **Community Awareness on Road and Bridge Safety:**

To educate local communities on potential risks related to construction activities and promote safe practices around project sites.

- **Occupational Health and Safety (OHS) and Emergency Response Training:**

To equip workers and supervisors with the knowledge and skills necessary to prevent workplace accidents and effectively respond to emergencies.

11. Conclusion

The proposed pedestrian river crossings in Haruka, Dulecha, Gelealo, and Gewane woredas will significantly improve mobility, safety, and access to essential services for pastoral and agro-pastoral communities in the Lower Awash Valley. The project responds to disruptions caused by river dynamics and flood management interventions and is expected to strengthen livelihood resilience and local connectivity.

However, the area is environmentally and socially sensitive, with risks including vegetation loss, soil erosion, temporary access restrictions, and safety concerns during construction and operation. The ESMP provides measures to avoid, minimize, and manage these impacts through appropriate mitigation actions, monitoring, and stakeholder engagement.

With effective implementation in line with national regulations and World Bank standards, the project will deliver strong social and economic benefits while ensuring environmental protection and sustainable development in the project area.

**MINISTRY OF WATER AND ENERGY
ETHIOPIA FLOOD MANAGEMENT
PROJECT**

**Environmental and Social Management Plan
(ESMP)**

**For construction of River off-take structures
at Gewane and Gelealo Woredas in Middle
Awash River Basin**

EFMP Safeguard

May, 2026

Executive Summary

The Environmental and Social Management Plan (ESMP) was prepared for the proposed irrigation off-take structures under the Ethiopian Flood Management Project (EFMP) in Gewane and Gelealo Woredas, Afar Region. The intervention follows emergency river dredging works undertaken to reduce flood risks before the 2025 rainy season, which unintentionally limited community access to river water for irrigation and livestock. In response, the Ministry of Water and Energy (MoWE), in consultation with local communities and the World Bank, proposed controlled irrigation outlets to restore sustainable water access.

The project includes small-scale irrigation infrastructure such as intake structures, lined canals, flow control systems, drainage facilities, and solar-powered pumps where needed. Environmental assessments indicate that the planned water abstraction will have minimal downstream impact.

This ESMP provides a framework for managing environmental and social risks during construction and operation in line with Ethiopian regulations and the World Bank Environmental and Social Framework (ESF). Key environmental risks include soil erosion, sedimentation, water quality impacts, vegetation disturbance, and potential salinity or waterlogging. Social risks include temporary land acquisition, competition over water use, labor and community health and safety concerns, and risks related to GBV/SEA.

Mitigation measures include maintaining environmental flows, erosion and waste management, rehabilitation of disturbed areas, occupational health and safety procedures, stakeholder engagement, grievance redress mechanisms, and participatory water allocation systems. The Ministry of Water and Energy PMU, contractors, supervision engineers, and regional authorities will oversee implementation and monitoring.

Overall, the project is classified as having Moderate Environmental and Social Risk under the World Bank ESF, as impacts are expected to be site-specific, manageable, and reversible with proper mitigation measures in place.

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1. Introduction

River dredging activities implemented as a fast-track intervention prior to the 2025 rainy season have helped reduce flood risks in the Middle Awash Basin. However, these activities have also restricted community access to river water for traditional irrigation practices. This has prompted discussions among local communities, the Ministry of Water and Energy (MoWE), and the World Bank to identify practical and sustainable solutions.

In response, the Ministry, through the Ethiopian Flood Management Project (EFMP), has identified specific sections along the Awash River where controlled outlets can be constructed to restore community access to irrigation water. Based on the proposed interventions, this Environmental and Social Management Plan (ESMP) has been developed.

The ESMP outlines mitigation measures, monitoring mechanisms, and institutional responsibilities to manage potential environmental and social risks associated with the construction of irrigation off-take structures in the Middle Awash Basin. The plan has been prepared in compliance with Ethiopian environmental regulations and the World Bank's Environmental and Social Framework (ESF), particularly the relevant Environmental and Social Standards (ESS1–ESS10).

2. Objectives of the ESMP

The Environmental and Social Management Plan (ESMP) is designed to guide the implementation of project activities in a manner that is environmentally sustainable and socially responsible. It establishes practical measures to identify, assess, and manage potential environmental and social risks and impacts throughout the project lifecycle.

The ESMP aims to:

- Prevent or minimize environmental degradation
- Protect local communities, livelihoods, and cultural resources
- Ensure compliance with Ethiopian environmental regulations and World Bank ESF

- Provide a framework for monitoring, reporting, and corrective actions

3. Project Description of Irrigation Outlet

This project aims to develop a water management network that will increase agricultural productivity and maximize water use efficiencies in the floodplains of the Middle and Lower Awash Basin. The project will consist of a series of irrigation outlet, flow control devices, and drainage systems to support these structures. The engineering design will consider site-specific topography so that systems located on the steeper slopes of the rivers will use solar powered pumps, while those on flatter land will use conventional gravity fed systems.

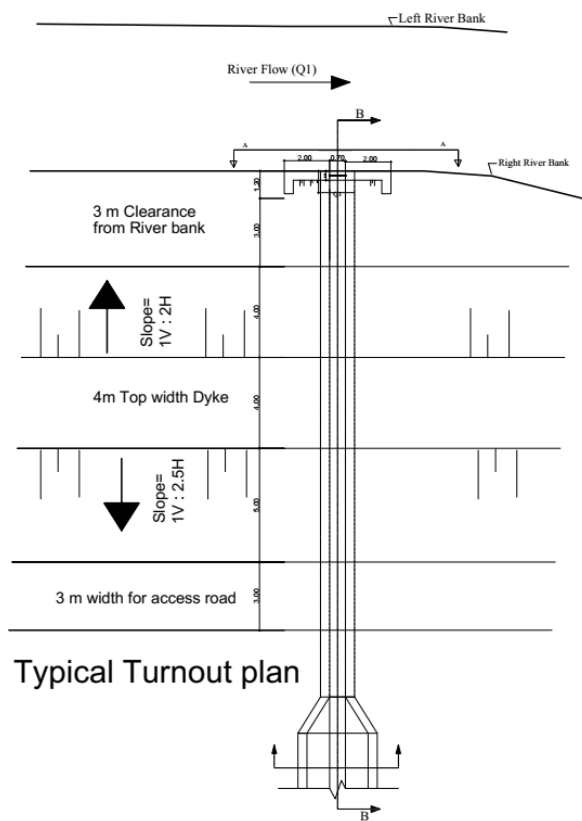


Figure 1 Typical turn out plan

The canal is Masonry canal type covered with slab, 45 m length and follows the existing traditional irrigation waterway. The characteristics of the structure include:

• The systems are also engineered to remain resilient under unexpected hydrological variations and heavy sediment loads. A central objective of the design is to minimize environmental impacts, including soil salinity, waterlogging of agricultural land, and negative downstream consequences. The project adopts an integrated, sustainable, and holistic approach to the management of the region’s critical water resources by combining irrigation infrastructure with flood protection measures and dedicated livestock watering facilities.

- The systems are also engineered to remain resilient under unexpected hydrological variations and heavy sediment loads. A central objective of the design is to minimize environmental impacts, including soil salinity, waterlogging of agricultural land, and negative downstream consequences. The project adopts an integrated, sustainable, and holistic approach to the management of the region’s critical water resources by combining irrigation infrastructure with flood protection measures and dedicated livestock watering facilities.

The canal is Masonry canal type covered

The design considers, for the planning purpose of irrigation turn out, estimates of water requirements by FAO (Critchley & Siegert, 1991) for common crops is considered. Considering the location of the sites (the area is arid to semi-arid with high evapotranspiration and low rainfall, necessitating almost constant irrigation), the average of the maximum values in the range of the crop water requirements for the crops listed out in Table 1 has been considered for the estimation of the crop water requirement and hence the discharge of the turnouts.

Table 1 Approximate values of seasonal crop water needs (Critchley & Siegert, 1991)

Crop	Crop water need (mm/total growing period)
Beans	300–500
Citrus	900–1200
Cotton	700–1300
Groundnut	500–700
Maize	500–800
Sorghum/Millet	450–650
Soybean	450–700
Sunflower	600–1000

Hence, the average seasonal crop water requirement considered is 744mm and a turnout is designed to irrigate 60 ha of land, considering management, operations and cost of the turnout structures.

Key activities include:

- River intake construction
- Canal excavation and lining
- Installation of gates and control structures
- Temporary access roads and construction camps
- Operation and maintenance arrangements

For the design of irrigation turnouts, the following important considerations were taken

- Required discharge (Q) to irrigate the intended command area
- River water level
- Gravitation flow and available head
- Buried rectangular channel in the dyke

The type of turnout considered is open channel turnout with upstream gate control system. The average head difference between the adjacent land and the water level determined to be 0.33m and it shows the viability of the gravity irrigation on those sites by directly diverting the river water to the irrigable areas. The intake level has been fixed 0.8m below the observed water surface levels or 0.7m below the OGL of the adjacent land (land lying about 15-30m distance from the river banks). Hence size of the turnout is 0.8m by 0.7m. The water from the turnout is discharged into a lined masonry rectangular canal that passes in the dike embankment and exits into a trapezoidal earthen canal.

Hence, the hydraulics of this has been designed as shown below to correspond to the hydraulic conditions of the turnout stated above.

Hydraulic parameters of the canal leading from the turnout

- Canal cross-section: Trapezoidal
- Bottom Width (m) = 0.7000
- Side Slopes (z:1) = 1.0000, 1.0000
- Slope (%) = 0.1000
- N-Value = 0.025
- Q (m³/s) = 0.2000
- Depth of flow (m) = 0.4
- Freeboard=0.3m
- Flow Velocity (m/s) = 0.5
- Total Depth (m) = 0.70

To stop floating and submerged debris (logs, branches, aquatic vegetation, plastic, etc.) from entering the conveyance system, trash racks have to be placed at the mouth of the turnout intake. Steel bars of thickness 10 mm are recommended. The bars have to be placed with a spacing of 100 mm.

For some reaches of the river course, especially in the middle reach of the river, gravity system tapping of the river water using turnouts to irrigate the adjacent land is not possible. Solar pumped irrigation system with the following specifications is recommended for such instances.

Required pump capacity: is 0.1 m³/s (flow), and 6 m head. Select solar-powered Horizontal centrifugal pump with 10–11 kW power; 74–92 kWh daily energy; 22–25 kWp PV array; 45 panels (550 W) PV array; and solar VFD (15 kW recommended) controllers.

3.2. Environmental Flow

Studies conducted in the Awash Basin indicate that environmental (low-flow) conditions in the Middle and Lower Awash River commonly range between 10 and 25 m³/s, depending on location and season. Environmental flow assessments reported:

- approximately 16.4 m³/s near the Awash Compensation reach (weir/dam), a hydraulic structure located in the Middle Awash Basin; and
- approximately 24.2 m³/s near Tendaho in the Lower Awash Basin.

The proposed irrigation turnout is designed to irrigate 60 ha of land with a diversion discharge of 0.20 m³/s. Considering the representative minimum environmental flow of 16.4 m³/s for the Awash River, the proportion of river flow diverted for irrigation is calculated as follows:

$$\left(\frac{0.2}{16.4}\right) \times 100 = 1.22\%$$

Therefore, the irrigation diversion represents approximately 1.2% of the minimum environmental flow of the Awash River, indicating that the proposed abstraction is relatively small compared to the river's low-flow condition.

3.3. Construction Methodology

The technical specifications encompass all major construction components required for the project, including excavation and earthworks, fill and compaction, reinforced and plain concrete works, reinforcement steel, stone masonry, plastering, gabion protection works, installation of irrigation gates, and the fabrication and erection of structural steel components. These specifications establish the required standards for material quality, workmanship, and construction procedures to ensure the durability, structural integrity, safety, and long-term

performance of the proposed steel pedestrian bridges, irrigation turnouts, and cattle trough facilities.

The specifications are prepared in accordance with recognized national and international engineering standards, including ASTM, AASHTO, and other applicable codes and guidelines. Particular attention is given to the quality of structural steel materials, corrosion protection through galvanization, proper fabrication and welding techniques, concrete quality assurance and control, and the correct installation of hydraulic and structural elements. Compliance with these requirements is intended to ensure reliable performance, serviceability, and sustainability of the completed works under the expected operational and environmental conditions.

These technical specifications shall serve as a comprehensive guideline for contractors during project execution and shall form an integral part of the bidding, contract, and construction documentation for the implementation of the proposed project works.

4. Rationale for Similar ESMP and Sub-project Location

4.1. Justification

The proposed irrigation off-intake structures are located at multiple sites within the Middle Awash Sub-Basin in the Afar Region, particularly in areas with high demand for irrigation water. Although geographically dispersed, these sites share similar biophysical, topographic, and environmental conditions. Furthermore, the proposed structures have common design characteristics, construction methodologies, and comparable anticipated environmental and social impacts.

Given these similarities, the preparation of a clustered Environmental and Social Management Plan (ESMP) is both practical and efficient. This approach enables a standardized assessment of potential impacts, the development of harmonized mitigation measures, and coordinated implementation and monitoring arrangements, while still allowing for the incorporation of site-specific considerations where necessary.

4.2. Location

The proposed irrigation intake structures are located in Gewane and Gelealo woredas within the Upper Awash Sub-Basin in the Oromia Region, particularly in areas with a high demand for irrigation water. The detail GPS Locations and specific kebeles are given in the table below.

Table 2 Location of Irrigation turnouts at Gelalo and Gewane Woredas

No	Northing	Easting	Woreda	Kebele
1	40.49861294	9.96404520	Gelealo	Asboliy
2	40.49861294	9.96404520	Gelealo	Debel /Beida
3	40.49709030	9.96744450	Gelealo	Debel /Beida
4	40.50214410	9.96748740	Gelealo	Debel /Beida
5	40.54224720	10.20813620	Gewane	Asboliy
6	40.54448620	10.21129110	Gewane	Asboliy
7	40.54485010	10.21459280	Gewane	Asboliy
8	40.54425670	10.21745100	Gewane	Asboliy
9	40.54837070	10.23382940	Gewane	Asboliy
10	40.54194320	10.22276750	Gewane	Asboliy
11	40.54196450	10.22455440	Gewane	Asboliy
12	40.54373580	10.23029900	Gewane	Asboliy
13	40.54666660	10.23152810	Gewane	Asboliy
14	40.53822950	10.18841590	Gewane	Asboliy Aweke Camp
15	40.53998120	10.18679230	Gewane	Asboliy Aweke Camp
16	40.54008160	10.18445340	Gewane	Asboliy Aweke Camp
17	40.53946220	10.18178960	Gewane	Asboliy Aweke Camp

5. Policy, Legal, and Institutional Framework

The ESMP shall consider applicable National and World Bank Laws & standards

National Frameworks to be reviewed and considered includes;

- Environmental Impact Assessment Proclamation No. 299/2002
- Environmental Pollution Control Proclamation No. 300/2002
- Water Resources Management Proclamation No. 197/2000
- Labor Proclamation No. 1156/2019
- Regional Environmental Authority guidelines (Afar Region, if available)

World Bank Environmental and Social Standards including;

- **ESS1:** Assessment and Management of E&S Risks
- **ESS2:** Labor and Working Conditions
- **ESS3:** Resource Efficiency and Pollution Prevention
- **ESS4:** Community Health and Safety
- **ESS5:** Land Acquisition and Resettlement (if applicable)
- **ESS6:** Biodiversity Conservation
- **ESS7:** ESS7: Indigenous Peoples
- **ESS8:** Cultural Heritage
- **ESS10:** Stakeholder Engagement

In addition, the IFC Environmental, Health and Safety (EHS) Guidelines need to be considered for implementation of safety measures.

6. Description of the Environment and Social Settings

The baseline conditions of the project area indicate that the Middle Awash River Basin is environmentally fragile and socially sensitive, with several existing vulnerabilities that influence how the irrigation off-take project should be planned and managed. The Middle Awash valley is environmentally fragile due to its semi-arid climate, high susceptibility to degradation (soil salinity, bush encroachment), and pollution from upstream industries. It is socially sensitive because it supports vulnerable pastoralist communities whose livelihoods are threatened by water scarcity, agricultural expansion, and invasive species.

The Middle Awash basin is characterized by intense irrigation activities. Most of the irrigation activities are conducted by off taking the river water along its course. However; the irrigation practices are largely unregulated, and often accompanied by improperly planned irrigation

activities that utilize significant amounts of river water with disorganized expansion and frequently involving informal canal breaches. From the field observations, most of the existing turnouts are small sized to irrigate the underlying command area.

6.1. Physical Environment

6.1.1. Water Resources

Irrigation in the Gewane and Gelealo areas relies primarily on nearby rivers, particularly the Awash River, as well as seasonal flows. However, water availability is highly variable and often affected by upstream abstraction. The system is therefore vulnerable to water scarcity. In addition, irrigation infrastructure is challenged by sedimentation in canals and turnouts, which reduces conveyance efficiency and requires regular maintenance.

6.1.2. Seasonal flooding and sediment-laden flows

The river system is characterized by seasonal flooding combined with high sediment loads, which reflects strong hydrological variability between dry and rainy seasons. This creates inherent risks of bank instability and sediment deposition, particularly in areas where construction activities may disturb natural flow patterns. The river system is already under natural stress from seasonal variability and sedimentation, making it vulnerable to additional hydrological disruption.

6.1.3. High erosion potential during rainy seasons

The landscape has high erosion potential during rainy seasons, meaning that soil disturbance from construction could easily accelerate land degradation and sediment transport into the river system.

6.1.4. Climate

The project sites are located within the semi-arid to arid climate zone of the Afar lowlands. This region is characterized by high temperatures (often exceeding 30–40°C), limited and erratic

rainfall, and frequent drought conditions. These factors contribute to high evapotranspiration rates and place significant pressure on already scarce water resources.

6.1.5. Soil and Land use

Soils at the project sites are predominantly alluvial and sandy loam, with localized clay deposits in floodplain areas. Key constraints include salinity and alkalinity, which are common in irrigated arid environments, as well as soil erosion in exposed locations. Land use in the area is characterized by small-scale irrigated agriculture alongside pastoral and agro-pastoral systems.

The development or rehabilitation of irrigation turnouts in this context may have important environmental and social implications. Environmentally, improved water diversion can enhance irrigation reliability but may also increase the risk of soil salinization and alkalinity if drainage systems are insufficient. There is also a potential for waterlogging in low-lying floodplain areas and reduced downstream flows, which could affect aquatic habitats and ecological functions dependent on natural flow regimes. Conversely, well-designed and managed turnouts can improve water use efficiency and support more sustainable land and soil management.

6.2. Biological Environment

6.2.1. Vegetation and Biodiversity

Natural vegetation in the area is generally sparse, dominated by Acacia shrubs and dry grasslands. Environmental concerns include overgrazing and deforestation of woodlands. Wildlife is limited but consists of species adapted to arid ecosystems.

The project area also supports riverine vegetation and wetland ecosystems, which are sensitive habitats dependent on stable and continuous water flows. These ecosystems provide important ecological functions, including riverbank stabilization, habitat provision, and water filtration. Because wetlands and riverine systems rely on consistent water availability, they are particularly vulnerable to changes in water abstraction.

6.2.2. Fish species and aquatic ecosystems

The River also supports aquatic biodiversity, including fish species, which may be vulnerable to changes in flow regime, sedimentation, and water quality. Overall, the biological baseline indicates a functioning but ecologically sensitive river ecosystem that could be easily disrupted by construction and water abstraction activities if not carefully managed.

6.3. Social Environment

6.3.1. Settlement Patterns

Areas such as Asboliy and Debel/Beida kebeles comprise both permanent villages and temporary pastoral camps. Settlements are predominantly rural and dispersed, often located near water sources and irrigation schemes. The population is mainly composed of pastoral and agro-pastoral communities, whose livelihoods are mobility-based and heavily dependent on natural resources, particularly river water for domestic use, livestock watering, and small-scale irrigation.

This dependence increases the risk of user conflict if water allocation is altered. The settlement pattern also includes temporary encampments, reflecting mobility associated with pastoralism and resource availability. Because water is central to livelihoods in the region, there is already a high dependency on the Awash River, creating potential competition and conflict over water use.

In addition, the presence of communal grazing areas and livestock migration corridors indicates that land and resource use is shared and non-fixed, requiring careful planning to avoid disruption to existing livelihood systems.

6.3.2. Population and Livelihoods

Communities in Gewane and Gelealo are predominantly pastoralist and agro-pastoralist. Their main livelihoods include livestock rearing (goats, cattle, and camels) and small-scale irrigated agriculture, both of which are highly dependent on natural resources, particularly water. A key

feature of the baseline context is the presence of livestock migration routes and communal grazing lands, which are essential for seasonal mobility and access to resources.

6.3.3. Potential Social Risks around Turnouts

Poorly located or undersized turnouts may lead to: Conflicts among users, reduced irrigation efficiency and Unequal benefit distribution. Temporary pastoral camps indicate: presence of mobile populations, increasing pressure on water points.

In summary, the baseline conditions show that the Awash River Basin project area is a highly dynamic and sensitive socio-ecological system. It is characterized by water variability, erosion-prone landforms, ecologically important riverine habitats, and communities whose livelihoods depend directly on the river and surrounding rangelands. These baseline issues establish a context where careful management of water abstraction, land disturbance, and community interaction is essential to avoid exacerbating existing environmental stress and social vulnerability. The overall setting reflects a resource-scarce and climate-sensitive environment, where even small changes in water availability or land access can have significant social and ecological consequences.

7. Potential Impacts

The construction and operation of irrigation off-take structures along the Middle Awash River Basin is expected to generate a range of environmental and social impacts across the pre-construction, construction, and operational phases. While the project is designed to improve agricultural water supply, it also introduces risks related to hydrology, ecosystems, land use, and community livelihoods.

7.1. Environmental Impacts

i. Hydrology and Water Resources

One of the most significant environmental concerns is the potential alteration of river flow regimes due to water abstraction for irrigation. If not properly managed, this may lead to reduced downstream water availability, particularly during dry seasons when flows are already low. This can also increase pressure on existing water users and ecological systems dependent on minimum flow conditions. The operation of off takes can also influence the equity of water distribution within irrigation schemes. Farms located near the head of the canal system frequently receive more reliable and larger volumes of water, while tail-end users may suffer from inadequate supply. Such unequal distribution can create conflicts among water users and reduce the overall efficiency and productivity of the irrigation scheme.

In many cases, excessive or poorly managed irrigation diversions contribute to waterlogging and soil salinity. Continuous application of irrigation water without adequate drainage raises groundwater levels and causes salts to accumulate in the root zone. Over time, this degrades soil fertility and reduces agricultural productivity, particularly in arid and semi-arid regions.

Construction activities near the river may further disturb natural flow patterns, especially during intake installation, leading to temporary diversion of flows and localized hydrological disruption.

ii. Soil Erosion and Sedimentation

Excavation, canal construction, and riverbank disturbance are likely to increase soil erosion and sediment runoff, particularly in an area already identified as erosion-prone. This can result in sedimentation of the river channel, reduced water quality, and potential blockage or inefficiency of water conveyance structures.

Without proper erosion control, these impacts may extend downstream, affecting both aquatic habitats and irrigation performance.

iii. Water Quality Degradation

Construction activities may introduce pollutants into the river system, including sediments, fuel, oils, and construction waste. Accidental spills or improper handling of chemicals can lead to

localized water contamination, affecting both ecological systems and communities relying on the river for drinking water and livestock.

iv. Biodiversity and Ecosystems

The project may result in loss or disturbance of riverine vegetation and wetland habitats, particularly in areas cleared for construction or access roads. These habitats are important for stabilizing riverbanks and supporting biodiversity.

Aquatic ecosystems, including fish populations, may also be affected due to changes in flow regime, increased turbidity, and habitat disruption. This could reduce species abundance and ecological balance in affected river sections.

v. Waste and Material Impacts

Construction and operation activities will generate solid and liquid waste, including excavated spoil, construction debris, and maintenance waste. If not properly managed, these may contribute to soil and water contamination or create localized pollution hotspots.

7.2. Social Impacts

i. Land Use and Access Impacts

As indicated in the project description, the proposed canal will be a masonry-lined canal covered with concrete slabs, extending for approximately 45 meters in length. The canal alignment follows the existing traditional irrigation waterway currently used by the local community and will be constructed within the established route. Consequently, the project is not expected to require significant new land acquisition or permanent physical displacement of households and assets. By utilizing the existing irrigation corridor, the project minimizes disturbances to surrounding land uses and reduces the potential for adverse environmental and social impacts commonly associated with the development of new canal alignments.

Although large-scale resettlement and displacement are not anticipated, some localized and temporary impacts may occur during the construction phase. These may include temporary restriction of access to communal grazing areas, water access points, livestock movement routes, and other community pathways frequently used by pastoralists and agro-pastoral communities. Minor temporary disturbances to agricultural activities and mobility patterns may also arise due to excavation works, material handling, and construction traffic within the project area.

To minimize such impacts, construction activities will be carefully planned and implemented in consultation with local communities and relevant stakeholders. Appropriate mitigation measures, including maintaining temporary access routes, scheduling construction works to avoid peak agricultural and livestock movement periods, and restoring disturbed areas immediately after construction, will be applied to reduce inconvenience to local users.

The project will be implemented through continuous consultation and close coordination with clan leaders of the Afar community, irrigation users, Water User Associations (WUAs), local administrations, and other relevant stakeholders throughout the construction process. Community members and project beneficiaries will be actively involved during site preparation, construction scheduling, and operational planning to ensure that local concerns, traditional water-use practices, and community priorities are adequately incorporated into project implementation.

This participatory and inclusive approach will help strengthen community ownership of the project, enhance transparency and cooperation among stakeholders, minimize potential conflicts related to water access and construction activities, and support the long-term sustainable management and operation of the irrigation off-take structure. Furthermore, regular communication and grievance-handling mechanisms will be established to ensure that any community concerns arising during construction and operation are promptly addressed in a fair and culturally appropriate manner.

ii. Livelihood Impacts and Water Competition

Because local communities depend heavily on the Awash River for livestock watering, domestic use, and small-scale irrigation, the project may lead to increased competition over water

resources. Reduced downstream flows or altered distribution patterns could create tensions among upstream and downstream users.

While the project aims to improve irrigation supply, uneven water allocation could still result in perceived or actual inequities in access.

iii. Labor Influx and Community Disruption

Construction activities are likely to bring in external workers, which may lead to social interaction challenges, including pressure on local services and increased risk of social conflict, gender-based violence (GBV), and sexual exploitation and abuse (SEA) if not properly managed.

The presence of non-local workers can also contribute to cultural and behavioral tensions within nearby communities.

iv. Occupational Health and Safety (OHS)

Construction and maintenance activities involve risks such as injuries from machinery, excavation accidents, and exposure to dust and noise. Without proper safety measures, workers may face significant occupational hazards.

Community members may also be exposed to risks from construction zones, including vehicle movement, open excavations, and restricted access areas.

v. Community Health and Safety

The project may create safety hazards for nearby communities, particularly children and livestock, due to open canals, excavation pits, and construction traffic. There is also a potential risk of water-related accidents such as drowning once canals and structures are operational.

vi. Social Conflict and Grievances

Given the dependence on shared water resources, there is a risk of community grievances and conflicts over water allocation, access restrictions, and construction disturbances. If not

effectively managed, these grievances may escalate into broader social tensions between user groups.

7.3. Overall Impact Summary

In summary, the project is expected to generate **moderate environmental impacts** mainly related to water abstraction, erosion, sedimentation, and ecosystem disturbance, as well as **moderate social impacts** linked to water resource competition, livelihood dependence, labor influx, and community safety risks.

However, most of these impacts are **manageable through the ESMP mitigation measures**, particularly environmental flow management, erosion control; waste management, strong stakeholder engagement, and effective grievance redress mechanisms.

7.3.1. Justification for risk classification

The proposed construction of irrigation off-take structures in Gewane and Gelealo Woredas of the Middle Awash Basin is classified as having Moderate Environmental and Social Risk under the World Bank Environmental and Social Framework (ESF).

The classification is justified by the nature, scale, location, and reversibility of the anticipated environmental and social impacts, as well as the availability of feasible mitigation measures and institutional arrangements for effective risk management.

The proposed activities consist primarily of small- to medium-scale civil works involving river intake construction, canal excavation and lining, installation of flow control structures, temporary access roads, and limited ancillary facilities. The project does not involve large dams, major river diversion infrastructure, hazardous industrial activities, or extensive land acquisition. Most impacts are site-specific, temporary, localized, and reversible through standard mitigation measures.

The project area is environmentally sensitive due to its semi-arid climate, erosion-prone soils, seasonal flooding patterns, and ecologically important riverine habitats associated with the

Awash River system. Key environmental risks include localized alteration of river flow regimes, downstream water stress, soil erosion, sedimentation, temporary water quality degradation from construction activities, vegetation disturbance, and impacts on aquatic ecosystems. There is also a potential risk of soil salinity and waterlogging if irrigation water management is not properly controlled. However, these impacts are not expected to be significant, irreversible, or cumulative at a large scale because the intervention involves relatively small abstraction structures with controlled discharge capacities and incorporates environmental flow considerations into the design.

Social risks are similarly assessed as moderate. Communities in the project area are predominantly pastoral and agro-pastoral populations that rely heavily on shared water resources, grazing land, and seasonal mobility. Potential impacts include temporary restriction of access to communal resources, localized conflicts over water allocation, labor influx-related risks, occupational health and safety concerns, and community safety risks associated with construction activities and open canals. Risks related to gender-based violence (GBV), sexual exploitation and abuse (SEA), and social tensions associated with non-local labor are recognized but are expected to remain manageable due to the limited workforce size and short-term nature of construction activities.

The project does not currently anticipate significant physical displacement or large-scale economic displacement. Any minor land acquisition or temporary access restrictions will be managed through applicable land donation or resettlement procedures consistent with ESS5 requirements where applicable.

The Moderate Risk classification is further supported by the presence of a comprehensive ESMP that includes:

- ♣ Mitigation measures for all identified environmental and social impacts;
- ♣ Environmental flow management and water allocation controls;
- ♣ Erosion and sediment control measures;
- ♣ Occupational and community health and safety provisions;
- ♣ Labor management procedures and Codes of Conduct;

- ♣ GBV/SEA prevention measures;
- ♣ Stakeholder engagement and grievance redress mechanisms;
- ♣ Biodiversity protection and vegetation restoration measures; and
- ♣ Detailed monitoring, reporting, and institutional responsibilities

Institutional capacity for implementation is considered adequate. The Project Management Unit (PMU), contractors, supervision engineers, regional environmental authorities, and water management institutions have defined responsibilities for implementation and monitoring of environmental and social measures throughout the project lifecycle.

Overall, the anticipated adverse environmental and social impacts are expected to be predictable, site-specific, temporary, and manageable using known mitigation measures and good international industry practice. Therefore, the subproject is appropriately classified as Moderate Risk under the World Bank ESF.

A. Pre-Construction Phase ESMP Matrix

Activity	Potential E&S Impact	Mitigation / Enhancement Measures	Monitoring Indicators	Frequency of Mitigation	Responsibility	Budget Estimate
Site selection & design	Increased downstream water stress; poor siting affects ecosystem;	Ensure intake design maintains environmental flow; confirm abstraction permits; avoid wetlands & sensitive habitats	Approved ESMP; hydrological study completed	Once-off during design stage, with review prior to final approval	PMU/ Design Consultant	Part of contract
Turn out design and placement	Conflicts among users due to poorly located or undersized turnouts	Design turnouts based on peak demand; ensure equitable spacing along canals; involve stakeholders in layout planning	Functionality of turnouts; user satisfaction; reduction in disputes	Irrigation Authority / Engineers / WUAs		Part of contract
Land acquisition	Loss of land; Temporary restriction of access	Follow land Donation or resettlement procedure (if required/ applicable); ensure fair consultation and documentation	Evidence of land donation and resettlement procedures and measures accordingly if required /applicable, signed land agreements;	As required during pre-construction phase (until land acquisition is completed)	PMU	Part of contract

			consultation records			
Sensitive habitats and areas near Yangudi Rassa National Park	Disturbance to protected/sensitive ecosystems and wildlife habitats	Conduct site-specific biodiversity screening and ecological baseline verification; micro-site crossings to avoid wetlands, riparian buffers, wildlife corridors, and protected or near-protected areas; coordinate with environmental and wildlife authorities	Once before construction At each proposed crossing location	MoWE/PMU, Design Consultant, Regional Environmental Authority	Approved screening reports; evidence of avoidance of sensitive areas	PMU budget; design consultant budget
Contractor mobilization	Labor risks, GBV/SEA risks	Prepare LMP; enforce workers' Code of Conduct; GBV Action Plan, awareness training, establish GRM before work start	Approved LMP; Signed CoC; functional GRM	Prior to mobilization and continuously enforced throughout mobilization period	PMU / Contractor	Part of contract
Stakeholder engagement	Community Complaints /grievances; lack of awareness	Conduct meaningful consultations/training; disclose ESMP; include pastoralists and vulnerable groups	Consultation minutes; attendance sheets	Continuous throughout pre-construction phase (at key milestones)	PMU	Part of contract
Cultural heritage	Damage to unknown sites	Include Chance Find Procedure (CFP) in contracts	CFP include in contract	Once-off before procurement, with continuous	PMU	Part of contract

screening			documents	application if triggered		
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B. Construction Phase ESMP Matrix

B1. Environmental Impacts and Management

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Frequency of Mitigation	Responsibility	Budget Estimated
River intake construction	Bank erosion, sedimentation	Use cofferdams; riprap, gabions and bio-engineering measures; restrict works to dry season, stabilize slopes immediately	Visible erosion control structures in place	Weekly	Contractor	Part of contract
Excavation & canal works	Dust, noise, spoil	Water spraying; noise control; proper spoil management; disposal spill; stabilize exposed soil; limit work hours	Dust levels; noise complaints	Weekly	Contractor	Part of contract
Fuel & chemical handling	Water pollution	Designated/bounded fuel storage areas; spill kits on site; no refueling near river prevention plan, train workers	Spill incidents recorded	Continuous	Contractor	Part of contract
Vegetation clearing	Habitat loss	Minimize/Limit clearing; mark no go zones; replant/re-vegetate disturbed areas	Area re-vegetated/restored	Monthly	Contractor	Part of contract

Waste generation	Soil & water contamination	Waste segregation; approved disposal sites; no dumping near river	Waste disposal logs	Weekly	Contractor	Part of contract
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B2. Social Impacts and Management

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Frequency of Mitigation	Responsibility	Budget Estimated
Workforce deployment	Occupational risks	Provide PPE; toolbox talks; enforce OHS Plan; first aid availability	Accident records; PPE compliance	Continuous	Contractor	Part of contract
Labor influx	Social conflict, GBV/SEA	Prioritize local hiring; enforce CoC; GBV awareness training; referral system	Training records; complaints received	Monthly	Contractor	Part of contract
Community access	Restricted access, accidents	Fence hazardous areas, install warning signs; implement traffic management plan	Incident reports	Weekly	Contractor	Part of contract
Water abstraction	Resource conflicts (e.g. downstream users)	Ensure equitable allocation; coordination with water user/committees; Stakeholder consultation	Complaints logged	Monthly	PMU/Contractor	Part of contract
Grievance handling	Unresolved complaints	Functional GRM; timely response	GRM reports	Monthly	PMU	Part of contract

C. Operation & Maintenance Phase ESMP Matrix

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Frequency of Mitigation	Responsibility	Budget Estimated
Operation of off-take/water abstraction/water allocation efficiency	Reduced irrigation efficiency/reduced downstream flows/and unequal benefit distribution	Install flow control structures (gates, measuring devices); Maintain environmental flow; use calibrated outlets; upgrade adjustable systems; Monitor river discharge; regulate abstraction;	Water delivery efficiency; Flow measurement records	Quarterly	MoWE/ABDO/Operators	Government O&M budget (MoWE/ABDO); may also include water user service fees for monitoring and regulation
Canal operation/maintenance	Sediment accumulation/disposal impacts	Routine desilting; Proper disposal of sediments at approved sites	Maintenance logs/Disposal records	As needed	MoWE/ABDO	Routine O&M budget (MoWE/ABDO); supplemented by irrigation service fees / WUA contributions for desilting activities
Social equality in water access/use	Upstream and downstream inequality and water use conflicts	Establish Water User Associations; implement transparent allocation system/schedules; participatory decision making	Compliance with water schedules; number of conflicts reported /grievance records	Monthly	WUAs/Local government/MoWE/ABDO	Institutional/administrative budget (MoWE/ABDO)
Worker	Injury during	OHS procedures/plan; PPE;	Accident records	Continuous	O&M Agency	Government

safety	maintenance	safety training				operational budget
Community safety/Open canals	Drowning risks	Install fencing; Warning signage; community awareness campaign	Safety measures in place/reports	Quarterly	MoWE/ABDO	Project O&M budget (MoWE/ABDO); local administration/community outreach budgets
Infrastructure durability	Damage to canals and turn outs from misuse or overuse	Use durable materials; standardize construction; schedule maintenance and inspections	Structural integrity; maintenance records		Engineering Unit/Local technicians	Project O&M budget (MoWE/ABDO);
Health Risks	Standing water in poorly maintained systems may become breeding grounds for disease vectors	Ensure proper drainage and regular cleaning of canals and drains; avoid prolonged stagnant water; conduct community awareness on vector-borne diseases; coordinate with local health offices for vector control measures	Presence of stagnant water; incidence of vector-borne diseases; maintenance and drainage records	Monthly / During routine maintenance	MoWE/ABDO/Local Health Offices/WUAs	Government O&M budget (MoWE/ABDO); public health and community awareness budgets

D. Decommission Phase

Activity	Potential	Mitigation Measures	Monitoring	Frequency	Monitoring	Monitoring
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	Impact		Indicators		Responsibility	Cost
Closeout Period	Risks and impacts associated with river off take structures sites closeout	Number of outstanding E&S issues (Target: 0). Waste and excess materials at the canal areas (Target: none). Rehabilitated, reinstated, and revegetated areas. Site clearance issued by the local and regulatory bodies.	Continuously during the monitoring period	Continuously during the monitoring period	PMU at MoWE Supervising firm Regulatory bodies	Part of EFMP budget Part of supervising firm's contract (if any) Part of regulatory bodies'

E. Integrated ESMP Monitoring Plan (All Phases)

	Activity		Indicator	Method	Frequency	Responsibility	Monitoring Budget
Pre-Construction	Site selection & design	Poor site selection leading to flooding, erosion, or environmental degradation	Approved ESMP, hydrological study in place	Document review	Once before approval	PMU / Design Consultant	Part of the contract budget
	Risk of potential land acquisition	Loss of land/assets and livelihood impacts to affected persons	Signed agreements, consultation records	Field verification, document review	As required	PMU	Part of local/woreda governments budget
	Contractor mobilization	Labor risks, worker misconduct, and weak grievance handling	LMP approved, CoC signed, GRM functional	Checklist verification	Before mobilization + follow-up	PMU	Part of the contract budget
	Stakeholder engagement	Community dissatisfaction due to inadequate consultation and information disclosure	Consultation minutes, attendance	Meeting records	Continuous	PMU	Part of the contract budget Part of local/woreda governments budget
	Cultural heritage	Damage to undiscovered cultural or archaeological	Chance Find Procedure included	Contract review	Once	PMU	Part of the contract budget

		resources					
Construction (Environmental)	River intake works	Soil erosion, sedimentation, and disturbance of river ecology	Erosion control structures in place	Site inspection	Weekly	Contractor / PMU	Part of the contract budget
	Excavation & canal works	Dust emission, noise pollution, and disturbance to nearby communities	Dust levels, noise complaints	Observation, community feedback	Weekly	Contractor	Part of the contract budget
	Fuel handling	Soil and water contamination from fuel or oil spills	Spill incidents	Incident logs, inspection	Continuous	Contractor	Part of the contract budget
	Vegetation clearing	Loss of vegetation cover, habitat disturbance, and land degradation	Area restored; ; ≥80% of Survival rate of planted species;	Site measurement	Monthly	Contractor	Part of the contract budget
	Waste management	Improper waste disposal causing pollution and public health risks	Waste logs, disposal records	Logbook review	Weekly	Contractor	Part of the contract budget Part local government
	Noise and dust exposure	Disturbance to wildlife and nearby communities & workers	Community complaints ; Visual observation; Restrict	Monitoring and GRM records; Portable sound meter	Weekly	Contractor / Engineer /EPA	Contractor Cost; PMU monitoring budget

			noisy activities to daytime; Water spraying for dust control; maintain equipment; ≤85 dB(A) over 8 hours; provide PPE to workers				
Construction (Social)	Workforce safety	Occupational injuries and accidents to workers	PPE use, accident records	Inspection, logs	Continuous	Contractor	Part of the contract budget
	Labor influx / GBV	Increased risk of social conflict, GBV, SEA/SH, and communicable diseases	Complaints, training records; 100 % workforce trained	Monitoring GBV compliance; GRM review	Monthly	Contractor / PMU	Part of the contract budget
	Community safety	Accidents, injuries, and restricted access affecting local communities	Incident reports	Field checks	Weekly	Contractor	Part of EFMP budget Part of supervising firm's contract Part of regulatory bodies'
	Water abstraction conflicts	Conflict among users due to reduced downstream water access	Complaints logged	GRM review	Monthly	PMU	Part of EFMP budget Part of supervising firm's contract Part of regulatory bodies'

	Grievance mechanism	Unresolved complaints and reduced stakeholder trust	Resolution time, number of cases	GRM database	Monthly	PMU	Part of the contract budget Part of EFMP budget Part of supervising firm's
Operation & Maintenance	Water abstraction	Reduced river flow and downstream water availability	River flow records	Flow measurement tools	Quarterly	MoWE / ABDO	Part of EFMP budget Part of Local government
	Canal maintenance	Canal blockage, reduced efficiency, and localized flooding	Desilting logs	Maintenance records	As needed	MoWE / ABDO	Part of EFMP budget Part of Local government
	Water use conflicts	Disputes among water users and communities	Complaint records	GRM review	Monthly	MoWE / ABDO	Part of EFMP budget Part of Local government
	Worker safety	Occupational accidents during operation and maintenance activities	Incident records	Safety audits	Continuous	O&M Agency	Part of EFMP budget Part of Local government
	Community safety	Injury risks from open canals, structures, or unsafe access points	Fencing, signage	Field inspection	Quarterly	MoWE / ABDO	Part of EFMP budget Part of Local government Regulatory body

Note: All project activities shall comply with applicable Ethiopian environmental legislation, the World Bank Environmental and Social Framework (ESF), the IFC/WBG General Environmental, Health and Safety Guidelines, and sector-specific Construction EHS Guidelines. Monitoring results exceeding the established threshold values shall trigger corrective actions, incident reporting, and implementation of adaptive mitigation measures under the supervision of the PMU and Supervising Engineer.

8. Institutional Arrangements

The implementation of the Environmental and Social Management Plan (ESMP) is guided by clearly defined institutional responsibilities and coordinated arrangements among key stakeholders. The Project Implementing Unit (PIU) holds overall responsibility for overseeing ESMP implementation, including consolidating reports and ensuring compliance with World Bank requirements. Day-to-day execution of ESMP measures is carried out by the Contractor, who is directly responsible for integrating environmental and social safeguards into routine project activities.

To ensure compliance and accountability, the Supervision Engineer (or Supervision Consultant) plays a critical role in monitoring implementation progress and verifying that all ESMP requirements are met on the ground. This includes regular inspections, documentation, and corrective guidance where necessary. In parallel, the Regional Environmental Authority provides independent regulatory oversight, ensuring that the project adheres to national environmental laws and standards.

Together, these institutions form a coordinated framework that supports effective ESMP implementation, monitoring, and enforcement throughout the project lifecycle.

9. Conclusion

The implementation of this ESMP will ensure that environmental and social risks associated with the irrigation off-take structures are effectively managed, and that project benefits are achieved in a sustainable and socially inclusive manner in compliance with World Bank requirements.

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**MINISTRY OF WATER AND ENERGY
ETHIOPIA FLOOD MANAGEMENT
PROJECT**

**ENVIRONMENTAL AND SOCIAL
MANAGEMENT PLAN (ESMP)**

**Construction of Pedestrian Crossing
Structure in Assayita and Afambo in the
Lower Awash River Basin**

EFMP Safeguard Team

May, 2026

Executive Summary

The proposed project involves the construction of eight pedestrian river crossing structures along the Awash River in Afambo and Assaita woredas within Ethiopia's Lower Awash Valley. The area is a low-lying, arid, and drought-prone floodplain where pastoral and agro-pastoral communities depend heavily on livestock mobility and access to the river for livelihoods, water, and social services. Recent flood management interventions, including river dredging, have altered river morphology and disrupted traditional crossing points, significantly restricting mobility and access to essential services.

To address these challenges, the Ethiopian Flood Management Project (EFMP), led by the Ministry of Water and Energy (MoWE), has prioritized the construction of pedestrian crossings to restore safe and reliable connectivity. The project includes bridges, abutments, approach paths, and safety features designed to withstand seasonal flooding and climate variability while improving access for both people and livestock.

Given the similar environmental, hydrological, and socio-economic conditions across all sites, a cluster Environmental and Social Management Plan (ESMP) has been developed to guide implementation. The ESMP ensures compliance with Ethiopian environmental legislation and the World Bank Environmental and Social Framework (ESF), while providing a harmonized approach to risk management across all eight locations.

Baseline conditions show a highly sensitive floodplain environment characterized by fragile soils, sparse vegetation, seasonal flooding, and limited biodiversity, alongside strong dependence of local communities on mobility corridors and communal grazing lands. Key environmental risks include vegetation loss, soil erosion, sedimentation, water pollution, and disturbance to river morphology. Social risks include temporary disruption of mobility and livelihoods, occupational and community safety hazards, and potential labor-related and access conflicts during construction.

Operational impacts are expected to be largely positive, including improved year-round mobility, reduced travel risks, enhanced access to services, and strengthened livelihood resilience. However, residual risks such as scour, riverbank erosion, and increased pressure on riparian resources will require ongoing monitoring and maintenance.

The ESMP outlines mitigation measures across all project phases, including controlled vegetation clearance, erosion control, pollution prevention, occupational health and safety measures, traffic and access management, stakeholder engagement, and livelihood protection strategies. A structured monitoring framework and clear institutional roles are established, with responsibilities shared among MoWE, local authorities, contractors, supervision engineers, and regional environmental bodies.

Overall, the project is expected to deliver significant social and economic benefits by restoring critical connectivity in a climate-vulnerable region, provided that the ESMP is effectively implemented in accordance with national regulations and World Bank standards.

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1. Project Background and Context

The Lower Awash Valley, encompassing Afambo and Assaita woredas in Northeastern Ethiopia, is a low-lying, extremely hot, and drought-prone region where the Awash River serves as a critical lifeline for both human populations and surrounding ecosystems. The area is deeply intertwined with the history, culture, and livelihoods of the Afar people, whose socio-economic systems are closely adapted to the harsh environmental conditions.

The region is characterized by arid lowland climate conditions, high temperatures, and sparse vegetation cover. Local livelihoods are predominantly pastoral and agro-pastoral, relying on livestock such as goats, sheep, and camels, alongside limited flood-recession agriculture where water access allows. Afambo, due to its proximity to Lake Abbe, holds particular ecological importance, supporting diverse birdlife and unique desert landscapes. However, the broader Lower Awash Basin continues to face recurring challenges, including prolonged droughts, water scarcity, land degradation, and increasing climate variability.

Assaita, located along the Awash River, benefits from relatively improved access to water resources compared to surrounding areas. This has enabled the development of irrigation-based agriculture, including cotton production and other crops under both state-led and commercial farming schemes.

In preparation for the 2025 rainy season, river dredging was carried out as an emergency measure to reduce flood risk in the Lower Awash Basin. While these interventions have improved river flow capacity and lowered the likelihood of flooding, they have also unintentionally disrupted traditional mobility patterns. In particular, the widening of the river channel has reduced access to customary crossing points used by local communities for daily activities, livestock movement, and social interaction. This has created significant challenges, especially during periods of high water levels, limiting access to essential services such as schools, health facilities, and markets, and negatively affecting local economic activities and social cohesion.

In response, discussions among local communities, the Ministry of Water and Energy (MoWE), and the World Bank have focused on identifying practical and sustainable solutions to restore

connectivity. Under the Ethiopian Flood Management Project (EFMP), the Ministry has identified priority locations along the Awash River where pedestrian crossing structures can be constructed to improve accessibility and resilience.

However, the construction and operation of such infrastructure may result in both temporary and permanent environmental and social impacts if not properly managed. Therefore, this Environmental and Social Management Plan (ESMP) has been developed to identify potential risks and impacts associated with the proposed crossing structures and to outline appropriate mitigation measures, monitoring mechanisms, institutional responsibilities, and budget provisions. The ESMP aims to ensure that project activities are implemented in an environmentally sound and socially responsible manner, while enhancing positive outcomes for local communities.

1.1. Integration of ESMP with Design and procurement & contract documents

The ESMP prepared by the PMU safeguard team was shared with the design consultant to ensure that the proposed mitigation measures were adequately reflected in the engineering estimates and tender documents. Accordingly, the environmental and social management costs were incorporated into the Bill of Quantities (BoQ) and procurement documents. The design consultant and PMU verified that the environmental and social mitigation measures were properly integrated into the engineering design, technical specifications, and cost estimates. In addition, the ESMP requirements, obligations, and associated budget provisions were clearly incorporated into the bidding documents and contractual clauses for contractors. During the procurement process, bidders will also be evaluated based on their capacity to implement the ESMP requirements, including the availability of qualified personnel, proposed methodology, and compliance arrangements.

2. Objective of the ESMP

The overall objective of this Environmental and Social Management Plan (ESMP) is to ensure that the construction and operation of pedestrian crossing structures along the Awash River in

Afambo and Assaita woredas are carried out in an environmentally sustainable and socially responsible manner.

Specifically, the ESMP aims to:

- Identify and assess potential environmental and social risks and impacts associated with the design, construction, and operation of proposed crossing structures (e.g., bridges, culverts, and causeways) in the Lower Awash Valley.
- Propose practical and context-appropriate mitigation measures to avoid, minimize, or compensate for adverse impacts on local ecosystems, livelihoods, and community wellbeing.
- Enhance positive project outcomes by improving safe and reliable mobility for local communities, livestock movement, and access to essential services, while strengthening resilience to flooding and climate variability.
- Establish a monitoring and evaluation framework to ensure effective implementation of mitigation measures and compliance with national environmental regulations and applicable international standards.
- Define institutional roles and responsibilities among key stakeholders, including the Ministry of Water and Energy (MoWE), local authorities, contractors, and communities, for effective ESMP implementation.
- Provide a framework for stakeholder engagement, ensuring that affected communities, particularly pastoral and agro-pastoral groups are adequately consulted and their concerns addressed throughout the project cycle.
- Outline budgetary provisions required for the implementation of environmental and social mitigation, monitoring, and capacity-building activities.

3. Project Description

The proposed project involves the construction of pedestrian crossing structures along the Awash River in the Middle and Lower Awash Basin, with particular focus on Afambo and Assaita woredas in northeastern Ethiopia. This intervention is part of ongoing efforts under the Ethiopian Flood Management Project (EFMP) led by the Ministry of Water and Energy (MoWE), in collaboration with development partners, to address flood risks while improving community

resilience and connectivity. The pedestrian crossing structures are designed by competent design consultant **KIM FC Water Works Consultancy Plc. and ABEK Business Group.**

3.1. Design Considerations

The pedestrian crossing structures are designed by competent design consultant **KIM FC Water Works Consultancy Plc. and ABEK Business Group.**

The bridge axis is selected based on the assumption that the site will optimally serve the local population and satisfy the following conditions:

- Proximity to the traditional crossing point
- Adequate space for bridge foundations
- Minimum required freeboard
- Acceptable level difference between the two riverbanks
- Compliance with general design requirements
- Stable bank and slope conditions
- Favorable river flow and hydraulic conditions
- Shortest possible span

In response, the construction of pedestrian crossing structures has been identified as a priority intervention to restore and enhance safe, reliable, and climate-resilient connectivity across the river. These structures are intended to provide safe and durable crossing points that are resilient to seasonal flooding and changing hydrological

conditions. Key project activities will include:

- Site clearing and preparation at designated crossing locations
- Construction of bridge foundations and abutments adapted to local hydrological and geotechnical conditions

- Installation of steel bridge superstructures to ensure durability and structural integrity
- Construction of approach paths to facilitate access for pedestrians and livestock
- Installation of safety features, including railings and protective elements
- Implementation of finishing works, including protective coatings and drainage systems to enhance longevity and reduce maintenance needs

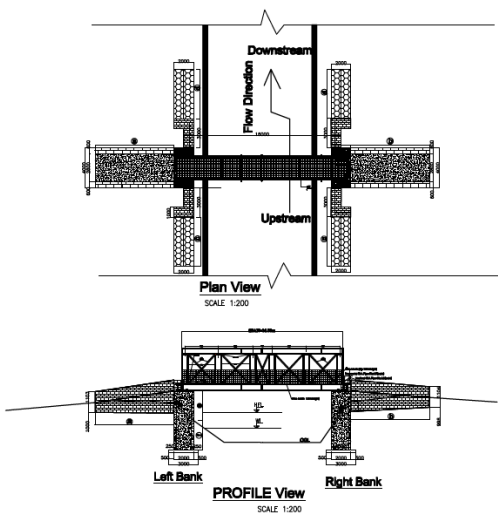


Figure 1 Plan and profile view of proposed pedestrian crossings

While the project is expected to generate significant social and economic benefits, including improved mobility, reduced travel risks, and enhanced resilience to climate variability, it may also lead to localized environmental and social impacts during both the construction and operation phases. These impacts may include temporary land disturbance, vegetation clearance, restricted access during construction, and potential safety risks if not properly managed.

Accordingly, this Environmental and Social Management Plan (ESMP) has been developed to guide the planning and implementation of the project in a manner that avoids, minimizes, and mitigates adverse impacts, while maximizing long-term benefits for local communities and the surrounding environment.

3.2. Approach roads/trucks and other Ancillary Facilities

No new approach roads or tracks to the crossing structures will be constructed. The crossing structures are designed to facilitate the safe movement of pedestrians, livestock, motorbikes, animal-drawn carts, and light vehicles (Bajajs). Existing footpaths and tracks will be utilized, with only minor

surface repairs and clearance works undertaken where necessary. Accordingly, no significant environmental and social (E&S) risks or impacts are anticipated in relation to the existing footpath approach roads/tracks.

There will be no construction camps or temporary storage areas established for the pedestrian crossing construction. Due to the presence of nearby villages, the contractor will establish the construction camp in the nearest town. Construction materials required for the pedestrian crossing, including steel and stones, will be transported directly to the designated construction locations and unloaded as needed. Therefore, no separate material storage sites will be required.

In the downstream sections, particularly within Afambo and Asaita woredas, the rivers are relatively narrow and bordered by low banks. Under these conditions, a minimum bridge span of approximately 16 m is considered adequate to safely convey the flow and accommodate hydraulic requirements.

3.3. Sitting of Crossing Bridges

Consultations with community elders and clan leaders were undertaken to support the identification and mapping of Potential River crossing locations in line with World Bank Environmental and Social Standard 7 (ESS7). These consultations were essential for integrating local knowledge systems into the planning process, particularly in the Afar pastoral context where land use is governed by mobility, seasonal resource availability, and customary institutions rather than fixed land ownership.

Through participatory mapping exercises, elders and clan representatives provided detailed information on how proposed pedestrian bridge locations intersect with or may potentially disrupt key traditional use areas. These included established Afar pastoral mobility corridors, seasonal grazing routes used during wet and dry seasons, and critical communal water access points such as wells, rivers, and seasonal ponds. The discussions also captured inter-clan territorial arrangements and negotiated access systems that regulate the use of shared rangelands and migration pathways.

This locally derived spatial information was then used to analyze the potential impacts of pedestrian crossing structures. The analysis focused on identifying whether proposed bridge sites

would facilitate or hinder livestock movement, alter seasonal migration patterns, restrict access to essential water and grazing resources, or affect the integrity of customary land-use governance systems. Particular attention was given to whether infrastructure placement could fragment mobility corridors, concentrate livestock movement at limited crossing points, or create pressure on already sensitive resource areas.

In accordance with ESS7 requirements, this participatory and spatially informed approach ensured that the design and siting of crossing structures incorporated the perspectives and priorities of affected pastoral communities. It also helped to minimize the risk of unintended adverse impacts on livelihoods, while promoting solutions that respect traditional governance structures, maintain mobility systems, and support equitable access to shared natural resources.

4. Rationale for a Cluster ESMP for Assaita and Afambo River Crossings

4.1. Justification

The development of a single cluster Environmental and Social Management Plan (ESMP) for the proposed pedestrian river crossing structures in Assaita and Afambo woredas is justified by the geographic continuity, environmental homogeneity, and socio-economic similarities of the intervention sites within the Lower Awash Valley.

The coordinates and elevations of these sites indicate that all crossings are situated within a narrow elevation range (approximately 380.99–381.02 meters above sea level), confirming their location within a continuous low-lying floodplain system of the Awash River.

This spatial clustering demonstrates that all proposed structures are embedded within the same hydrological and geomorphological setting, characterized by flat topography, seasonal flooding, and high sensitivity to river morphology changes. As such, the environmental risks associated with construction activities—such as riverbank disturbance, sediment movement, localized vegetation clearance, and hydrological alterations—are expected to be similar across all sites.

From a socio-economic perspective, the project area is uniformly inhabited by Afar pastoral and agro-pastoral communities whose livelihoods depend on livestock mobility, seasonal grazing patterns, and access to water points. Traditional river crossing points at these locations are essential for daily movement, trade, access to education, and health services. The recent river dredging activities implemented for flood risk reduction under the Ethiopian Flood Management Project (EFMP) have similarly affected all these crossing points by widening the river channel and disrupting established mobility routes, thereby creating comparable access constraints across both woredas.

Technically, all proposed interventions involve similar engineering works, including the construction of pedestrian bridges with foundations, abutments, steel superstructures, approach paths, and safety features such as railings and drainage systems. Given the uniformity in design, construction methods, and expected environmental and social impacts, a standardized mitigation approach is appropriate for all sites.

In addition, the World Bank Environmental and Social Framework (ESF), particularly ESS1 on Assessment and Management of Environmental and Social Risks and Impacts, encourages proportional and efficient risk management approaches where subprojects share similar characteristics. A cluster ESMP ensures consistency in applying mitigation measures, monitoring indicators, and stakeholder engagement processes across all sites while reducing duplication of effort and improving implementation efficiency.

The cluster approach also strengthens institutional coordination among the Ministry of Water and Energy (MoWE), local authorities in Assaita and Afambo, contractors, and affected communities. It facilitates harmonized planning, budgeting, and monitoring arrangements while allowing for minor site-specific adjustments where necessary.

In conclusion, given the physical proximity of the sites within the same Awash River floodplain, their nearly identical elevation range, similar environmental and hydrological conditions, shared socio-economic characteristics, and uniform engineering design, the preparation of a single cluster ESMP for the eight proposed crossing structures is both technically sound and aligned with World Bank ESF requirements. This approach ensures efficient, consistent, and effective

management of environmental and social risks while supporting improved mobility and resilience for communities in the Lower Awash Valley.

4.2. Location of Proposed Crossing Structures

The proposed subprojects comprise a network of eight (8) pedestrian crossing structures located along the Awash River corridor, distributed between Assaita and Afambo woredas. The identified sites include Mamulie (3), Mamulie (2), Mamulie (1), and Handaga in Assaita woreda, and Alesenbolu, Humudeta, Miego (Upper), and Miego (Lower) in Afambo woreda. The coordinates are provided in table 1 below.

Table 1 List of Bridges

PID	Kebele	Woreda	East	North	Elevation
1	Mamulie (3)	Asayita	770,828.86	1,274,028.90	381.02
2	Mamulie (2)		773,055.25	1,274,200.32	381.01
3	Mamulie (1)		774,153.65	1,274,356.85	381.01
4	Handaga		775,262.10	1,278,757.31	381.01
5	Alesenbolu	Afambo	777,172.12	1,275,012.96	381.01
6	Humudeta		782,145.41	1,274,261.05	381
7	Miego (Upper)		784,096.78	1,272,977.64	381
8	Miego (Lower)		785,739.66	1,273,479.51	380.99

5. Legal and Institutional Framework

The ESMP shall consider applicable National and World Bank Laws & standards. National Frameworks to be reviewed and considered includes;

- Environmental Impact Assessment Proclamation No. 299/2002
- Environmental Pollution Control Proclamation No. 300/2002
- Water Resources Management Proclamation No. 197/2000
- Labor Proclamation No. 1156/2019
- Regional Environmental Authority guidelines (Afar Region, if available)

World Bank Environmental and Social Standards including;

- ESS1: Assessment and Management of E&S Risks
- ESS2: Labor and Working Conditions

- ESS3: Resource Efficiency and Pollution Prevention
- ESS4: Community Health and Safety
- ESS5: Land Acquisition and Resettlement (if applicable)
- ESS6: Biodiversity Conservation
- ESS7: ESS7: Indigenous Peoples
- ESS8: Cultural Heritage
- ESS10: Stakeholder Engagement

In addition, the IFC Environmental, Health and Safety (EHS) Guidelines need to be considered for implementation of safety measures.

6. Description of the Environmental and Social Baseline Conditions

The proposed pedestrian river crossing structures in Assaita and Afambo woredas are located within the Lower Awash Valley, a low-lying floodplain system of the Awash River characterized by flat topography, arid climatic conditions, and strong dependence on seasonal river dynamics. The baseline environmental and social conditions of the project area are summarized as follows:

6.1. Physical Environment

The project sites are located within a narrow elevation range of approximately 380.99–381.02 meters above sea level, confirming their position within a continuous floodplain environment. The terrain is generally flat with minimal slope, which increases susceptibility to hydrological disturbances, particularly seasonal flooding and sediment-laden flows during peak rainfall periods in the upstream catchment. These conditions are further exacerbated by the area’s high erosion potential during the rainy seasons, when intensified runoff contributes to riverbank instability and sediment transport.

The Awash River is the dominant hydrological feature in the area and plays a central role in shaping local landforms through ongoing processes of erosion and sediment deposition. Its morphology remains dynamic, influenced by both natural flow variability and recent dredging and flood management interventions implemented under national flood control programs, which have altered channel width and flow patterns. Groundwater conditions are generally shallow but

variable in quality, with salinity levels affected by seasonal recharge and evaporative concentration.

The climate is predominantly arid to semi-arid, characterized by high temperatures, low and erratic rainfall, and high evaporation rates. This climatic condition contributes to water scarcity stress, limited soil moisture retention, and increased vulnerability to erosion processes. Vegetation cover is sparse, consisting mainly of drought-resistant shrubs and grasses adapted to pastoral ecosystems.

Overall, the physical environment is defined by floodplain dynamics, seasonal hydrological extremes, erosion susceptibility, and arid climatic conditions, all of which significantly influence land stability and environmental sensitivity in the area.

6.1.1. Soil Conditions

The proposed pedestrian river crossing structures in Assaita and Afambo woredas are located within the Lower Awash River floodplain, an active alluvial depositional environment characterized by uniform low elevation (approximately 380.99–381.02 m a.s.l.) and flat topography. The soils across all eight sites are predominantly young, unconsolidated alluvial deposits formed through repeated river flooding and sedimentation processes.

The soil profile is generally composed of loose to medium dense sandy materials in the upper layers, underlain by interbedded silts and clays with occasional dense sand or gravel lenses at deeper levels. These soils are highly variable over short distances, reflecting the dynamic nature of riverine deposition and channel migration.

The soil environment across the project sites is weak to moderately stable, with high sensitivity to hydrological changes and flood events. These conditions necessitate careful geotechnical investigation and the incorporation of appropriate foundation systems, erosion control measures, and soil stabilization techniques to ensure the stability and durability of the proposed crossing structures.

6.2. Biological Environment

The Lower Awash Valley, including Afambo and Assaita, supports limited but ecologically important dryland vegetation characterized by acacia species, scattered shrubs, and seasonal grasses that provide essential grazing resources for livestock. However, vegetation cover is generally sparse and has been further reduced in many areas due to drought, overgrazing, and other human activities.

Wildlife presence in the area is generally low as a result of arid conditions and human pressure, though small mammals, reptiles, and bird species adapted to dry environments are still present. These species are mainly associated with shrubland and riverine habitats where ecological conditions are relatively more favorable.

Riparian zones along the Awash River provide comparatively richer and more diverse vegetation than the surrounding drylands. These areas support reeds, sedges, grasses, and scattered trees, and serve as important grazing and watering sites for both livestock and wildlife. However, these habitats are highly sensitive to disturbance from construction activities, riverbank modification, and sedimentation changes.

A significant ecological feature of the area is the widespread invasion of *Prosopis juliflora*, particularly along riverbanks, grazing lands, and abandoned fields. This invasive species forms dense thickets that displace native acacia and grass vegetation, reduce available pasture, restrict access to water points, and alter natural ecosystem structure. Although it is sometimes used for fuel wood and charcoal, its rapid spread has had largely negative impacts on biodiversity and rangeland productivity.

The Awash River also supports aquatic ecosystems, including freshwater fish species adapted to seasonal flow variations. These aquatic habitats, along with riverine vegetation, represent the most productive ecological zones in the area but remain vulnerable to water abstraction, sedimentation, and land use pressures.

Overall, the biological environment of the Lower Awash Valley is a fragile dryland system increasingly influenced by human activities and invasive species, resulting in declining native biodiversity and significant changes to natural ecosystem balance.

6.3. Socio-Economic Environment

The project area is inhabited mainly by Afar pastoral and agro-pastoral communities whose livelihoods depend on livestock rearing (cattle, goats, sheep, and camels). Seasonal livestock mobility across grazing areas and access to water points is central to their economy and culture. Communities also rely on river water for domestic use and small-scale irrigation.

The area includes livestock migration routes, communal grazing lands, and temporary settlements that shift seasonally. Several river crossing points—Mamulie, Handaga, Alesenbolu, Humudeta, Miego (Upper), and Miego (Lower)—serve as key mobility corridors for people and livestock, providing access to grazing areas, markets, schools, and health facilities. However, river channel changes and seasonal flooding have disrupted these crossings, limiting safe movement and increasing risks.

Access to basic services remains limited, with communities often traveling long distances under harsh conditions. Poverty levels are high, and livelihoods are highly vulnerable to climate variability, droughts, and flooding.

In this context, the construction of pedestrian crossing structures is essential to improve safe mobility, enhance access to services, and support livelihood resilience in the project area.

6.4. Land Use and Settlement Patterns

Land use in the project area is primarily communal grazing land with scattered temporary and semi-permanent settlements. There is minimal formal land tenure, as land is traditionally managed under customary systems. Settlements are generally located near water points and seasonal grazing areas.

The river corridor is a shared resource used for livestock watering, dry-season grazing, and movement routes. The absence of permanent infrastructure in many crossing points highlights the dependence on traditional river fords, which are highly vulnerable to seasonal changes.

6.5. Key Environmental and Social Sensitivities

The baseline conditions indicate several key sensitivities relevant to the project:

- High vulnerability to seasonal flooding and riverbank erosion

- Dependence of communities on river crossings for essential mobility and livelihoods
- Sensitivity of riparian vegetation to disturbance
- Limited alternative access routes during high-flow periods
- Strong reliance on communal land and natural resources under customary management systems

Overall, the project area is characterized by a fragile arid floodplain ecosystem with dynamic river behavior and limited ecological resilience. Socio-economically, it is a pastoral system highly dependent on mobility and access to natural resources. These baseline conditions underscore the importance of carefully designed mitigation measures to minimize environmental disturbance and ensure continued livelihood access during and after construction of the pedestrian crossing structures.

7. Potential Environmental and Social Impacts

7.1. Construction Phase Impacts

7.1.1. Environmental Impacts

a) Vegetation clearance and habitat disturbance

Vegetation clearance and habitat disturbance are key environmental impacts expected during construction of pedestrian crossings along the Awash River in Afambo and Assaita woredas. Site preparation—such as clearing land for foundations, access paths, and work areas—will remove riparian vegetation that stabilizes riverbanks, increasing erosion risk and reducing habitats for birds, small mammals, and reptiles.

Construction will also disturb sparse dry-land vegetation that supports livestock grazing, potentially affecting pastoral livelihoods. Additional impacts include noise, human activity, and machinery movement, which may temporarily displace local wildlife.

Although these effects are expected to be localized and temporary due to the small project footprint, the ecological sensitivity of the Awash River corridor and community reliance on vegetation make careful management and restoration essential.

b) Soil erosion and sedimentation

Excavation for bridge foundations and abutments will disturb and expose soils within the highly sensitive floodplain. These exposed surfaces are particularly vulnerable to erosion and scouring, especially during periods of increased river flow, potentially leading to soil loss and sedimentation.

c) River morphology disturbance

Construction of the river crossings will temporarily modify riverbanks through excavation and related works, disrupting their natural stability. This disturbance can increase sediment runoff into the Awash River, elevating sediment loads—particularly during high flows—and potentially degrading water quality and affecting aquatic habitats.

d) Water pollution

Construction activities may lead to accidental leakage of fuel, oil, and other wastes, introducing pollutants into the surrounding soil and the Awash River. In addition, improper handling of concrete washout can release highly alkaline residues into the water, degrading water quality and posing risks to aquatic life.

e) Dust and air pollution

Movement of machinery and transport of construction materials will generate dust and disturb surface soils, while excavation and earthworks in dry conditions will further increase airborne dust levels. These activities can reduce air quality, affect visibility, and cause nuisance to nearby communities and workers.

f) Noise and vibration

The operation of construction machinery during the river crossing works will generate noise and vibration, which may disturb nearby communities and local fauna. This can lead to temporary displacement of wildlife from the area and create nuisance or disruption to daily activities of surrounding residents.

7.1.2. Social Impact

g) Temporary restriction of mobility

Construction of the river crossing structures may temporarily disrupt traditional river crossing points used by local communities. This can restrict movement across the river, leading to reduced access to essential services such as schools, markets, and health facilities until alternative crossing arrangements are provided or construction is completed.

h) Livelihood disruption

The proposed river crossing construction may interfere with established livestock movement routes, disrupting normal herding patterns. It may also lead to temporary reduced access to nearby grazing areas, affecting livestock mobility and availability of forage until construction activities are completed.

i) Occupational health and safety risks

Construction activities may pose safety risks to both workers and nearby community members. The use of heavy machinery and the presence of open excavations increase the likelihood of accidents, including falls, collisions, or injuries if proper safety measures are not strictly implemented.

j) Community safety risks

Construction-related vehicle movement may increase traffic hazards on local roads, raising the risk of accidents involving workers and community members. In addition, activities near the river crossing sites may pose drowning or other water-related risks, particularly in areas with open water and unstable riverbanks.

k) Labor influx impacts

The presence of construction workers may create potential social tensions or conflicts with local communities, particularly over behavior and interaction. In addition, the influx of workers can increase pressure on local resources such as water and firewood, potentially straining already limited supplies.

7.2. Operation Phase Impacts

Once the pedestrian river crossing structures are completed and operational, the project is expected to generate largely positive long-term environmental and social outcomes by improving connectivity and resilience. However, several residual and operational-phase impacts may still occur and require proper management.

7.2.1. Environmental Impacts

a) Riverbank erosion and scour risks

The presence of bridge abutments and approach structures may alter local flow dynamics of the Awash River over time. This can lead to localized scouring around foundations and gradual riverbank erosion, particularly during peak flood events. Without regular monitoring and maintenance, these processes may affect structural stability and surrounding habitats.

b) Hydrological and sediment transport changes

Although the structures are designed to minimize obstruction, they may still slightly influence sediment deposition patterns and local flow velocity. This could lead to minor changes in channel morphology near crossing points over time, especially in this dynamic floodplain environment.

c) Maintenance-related environmental disturbance

Routine maintenance activities (e.g., repainting steel components, clearing debris, and minor repairs) may generate small amounts of waste, noise, and localized disturbance. If not properly managed, improper disposal of maintenance waste could lead to localized pollution.

d) Indirect pressure on riparian areas

Improved accessibility may increase human and livestock movement near riverbanks. This could place additional pressure on already fragile riparian vegetation, particularly through grazing, trampling, and fuel wood collection.

7.2.2 Social Impacts

a) Improved mobility and access (positive impact)

The most significant positive impact of the operation phase is improved and safer year-round mobility for communities and livestock. The crossings will enhance access to schools, health facilities, markets, and administrative services, reducing travel time and associated risks during flooding periods.

b) Enhanced livelihood resilience

Improved connectivity will strengthen pastoral and agro-pastoral livelihoods by facilitating livestock movement between grazing areas, improving access to veterinary services and markets, and supporting small-scale trade and economic integration.

c) Traffic and safety risks (bridge usage phase)

Although pedestrian bridges are generally low-risk infrastructure, improper use (e.g., overcrowding, livestock-pedestrian conflicts, or use during extreme flood events) may pose safety hazards. Children and vulnerable groups may also be at risk if safety awareness is not adequately promoted.

d) Equity and access concerns

If crossing points are not evenly distributed or if access paths are not well maintained, some communities may perceive unequal benefit distribution. Seasonal changes in river flow may also temporarily limit usability of certain crossings.

e) Increased movement-related social interactions

Improved crossings may increase interaction between previously separated communities, which is generally positive but may also require strengthened local conflict management mechanisms in case of disputes over resources or crossing use.

8. Mitigation and Management Measures

8.1. Pre-Construction Phase

Impact Area/Activities	Likely Impacts	Mitigation Measures	Frequency of Mitigation	Responsibility	Monitoring Indicators	Estimated Budget
Design and planning	Inappropriate site selection, weak soil foundation problem, land slide, wetland/sensitive ecological area leading to avoidable environmental/social impacts	Proper site investigation and planning, geotechnical & hydrological studies, Conduct detailed hydrological, geotechnical, and environmental assessments; micro-siting to avoid sensitive habitats and erosion hotspots; apply “avoidance first” principle	Once-off during design stage with reviews at key design milestones	PMU/Design consultant	Approved design/site selection report; ESMP clearance	PMU budget; design consultant budget
Stakeholder engagement	Community Complaints /grievances; lack of awareness	Conduct meaningful consultations/training; disclose ESMP; include pastoralists and vulnerable groups	Continuous throughout pre-construction phase (at key milestones)	MoWE, PMU, ABDO	Consultation records; functioning GRM,	MoWE/PMU budget; ABDO budget
Temporary access restriction	As the approach roads are existing footpaths, no construction camp and significant	Ensure fair and immediate consultation and documentation for temporary access	As required during pre-construction phase	MoWE, ABDO	Minute of consultation	Local government Budget

	storage area required, only temporary restriction of access exists	restriction				
Community Livestock access	Disruption of mobility during construction (anticipated); Livestock movement interference	<ul style="list-style-type: none"> • Community consultation during planning • Develop temporary crossings/ access plan (rope crossings, detours, boat crossings if needed); Include livestock ramps/underpasses in design (ramp should be design with proper side support and basement • Consider migration periods in work planning 	During planning phase with validation before construction	Contractor, MoWE/ABDO; Design Engineer / Contractor	Meeting records, consultation reports, Approved access continuity plan; Design compliance	Design consultant budget; contractor cost
Contractor mobilization	Labor risks, GBV/SEA risks	Prepare LMP; enforce workers' Code of Conduct; GBV Action Plan, awareness training, establish GRM before work start	Prior to mobilization and continuously enforced throughout mobilization period	PMU / Contractor	Approved LMP; Signed CoC; functional GRM	Part of contract
Cultural chance finds	Damage to unknown heritage sites	<ul style="list-style-type: none"> • Develop stop-work procedure • Include Chance Find Procedure (CFP) in 	Once-off before procurement, with	Contractor, PMU	Procedure included in contract	Part of contract; local government/ABDO budget

		contracts • Cultural heritage screening • Inform authorities protocol	continuous application if triggered			
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8.2. Construction Phase

Impact Area/Activities	Likely Impacts	Mitigation Measures	Frequency of Mitigation	Responsibility	Monitoring Indicators	Estimated Budget
Vegetation & Habitat	Loss of riparian vegetation and habitat disturbance	Limit clearing to footprint; demarcate no-go zones; restore vegetation with native species	Daily supervision; restoration at completion	Contractor	Area cleared vs. approved limit; re-vegetation success	Part of contract
Soil & Erosion	Soil erosion and sedimentation into Awash River	Use silt fences, sandbags, sediment traps; phased excavation; stabilize exposed soil	Daily during earthworks; weekly inspection	Contractor	Sediment control structures in place; turbidity levels	Part of contract
Water Quality	Pollution from oil, fuel, cement wash	Provide bunded fuel storage; prohibit waste discharge into river; designate washout areas	Daily monitoring near water; weekly inspection	Contractor	No visible pollution; spill records	Part of contract
River Morphology	Disturbance to riverbanks and flow	Avoid in-river works during high flows; minimize excavation footprint; apply bank protection	Weekly and after heavy rainfall events	Contractor	Stable riverbanks; reduced scouring incidents	Part of contract
Air Quality	Dust emissions and air pollution	Water spraying; covering trucks;	Daily (especially in	Contractor	Dust levels; complaint	Part of contract

		maintain equipment	dry conditions)		records	
Noise & Vibration	Disturbance to communities and wildlife	Restrict working hours; maintain equipment; use low-noise machinery	Daily monitoring; weekly checks	Contractor	Noise level monitoring; complaints	Part of contract
Mobility Access	Temporary disruption of crossings	Provide temporary crossings; phased construction; advance community notice	Continuous throughout construction period	Contractor, MoWE	Functioning temporary access points	Part of contract; MoWE/PMU supervision cost
Livelihoods	Disruption of livestock movement and grazing access	Maintain livestock corridors; schedule works to avoid peak movement times	Continuous with weekly coordination	Contractor, Local Leaders	No blocked grazing routes	Part of contract and coordinated with local authorities
OHS Risks	Injuries to workers	PPE enforcement; safety training; first aid provision; hazard signage	Daily supervision; monthly training	Contractor	Incident reports; PPE compliance rate	Part of contract
Welding/Hot Work	extremely bright and intense light that may seriously injure a worker's eyesight noxious fumes to which prolonged exposure can cause serious chronic diseases.	Provision of proper eye protection such as welder goggles and/or a full-face eye shield for all personnel involved in, or assisting, welding operations Follow Standard Operating Procedures (SOPs)				
Working at Heights	a worker is exposed to the hazard of	Implement Fall prevention and				

	falling more than two meters; into operating machinery; into water; or through an opening in a work surface.	protection measures; Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area; Proper use of ladders and scaffolds by trained employees; Use of fall prevention devices, including safety belt; Appropriate training in use, serviceability, and integrity of the necessary PPE				
Community Safety	Accidents involving public	Fence construction sites; traffic management plan; safety awareness	Daily supervision; weekly audits	Contractor	Number of incidents; safety audits	Part of contract
Labor Influx	Social conflict, resource pressure	Code of conduct; local hiring; worker camp management	Continuous; monthly review	Contractor	GRM records; compliance reports	Part of contract
Waste Management	Improper disposal of waste	Segregate waste; safe disposal at approved sites	Daily collection; weekly monitoring	Contractor	Waste disposal logs	Part of contract

8.3. Operation Phase

Impact Area/Activities	Likely Impacts	Mitigation Measures	Frequency of Mitigation	Responsibility	Monitoring Indicators	Estimated Budget
Structural Integrity	Scour and Long-term	Periodic inspection;	Quarterly	MoWE, AWBD,	Structural	MoWE /

	erosion around bridge foundations/abutments	Install erosion protection (riprap/gabions) protection; Re-vegetation; post-flood maintenance	and after flood events	Design consultancy/engineer	stability; Erosion rates, visual inspection reports, stability of riprap/gabions, vegetation cover assessments	Local Authority maintenance budget
River Morphology	Gradual channel changes near structures	Monitor sedimentation and flow changes; apply corrective protection works	Bi-annual and after major floods	MoWE	Morphology monitoring reports	MoWE operational budget
Environmental Protection	Waste accumulation and pollution	Install waste bins; community awareness campaigns	Weekly cleaning; monthly awareness	Local Authorities	Cleanliness of crossing areas	Local government budget
Vegetation Clearance	Pressure on riparian vegetation from	Maintain buffer zones; enforce grazing controls	Quarterly monitoring	Local Authorities, Communities	Vegetation condition surveys	AWBD; Local EPA and Community
Community Safety	Unsafe bridge use during floods or overcrowding	Install warning signage; restrict access during extreme flows	Continuous with seasonal focus	Local Authorities	Safety signage installed; incident reports	AWBD; Local government Budget
Livelihoods	Improved mobility (positive impact)	Maintain access roads and approaches; integrate crossings into service networks	Annual review	Local Authorities	Usage rates; reduced travel time	Local authority / regional government budget

Monitoring	Lack of adaptive management	Conduct periodic environmental and social monitoring	Quarterly reporting	MoWE	Monitoring reports submitted	MoWE operational budget
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8.4. Decommission Phase

Impact Area/Activities	Likely Impacts	Mitigation Measures	Frequency of Mitigation	Responsibility	Monitoring Indicators	Estimated Budget
Close out	Risks and impacts associated with river off take structures sites closeout; Worker exit issues	Number of outstanding E&S issues (Target: 0). Waste and excess materials at the canal areas (Target: none). Rehabilitated, reinstated, and revegetated areas. Site clearance issued by the local and regulatory bodies. Provide notice; settle payments; GRM active	Continuously during the monitoring period; End of contract	MoWE/PMU/ABDO; Contractor	Percentage of E&S corrective action plans implemented on time; Worker grievances resolved	Government budget, contractor retention budget

9. Monitoring Plan

Impact Area/Activities	Likely Impacts	Mitigation Measures	Method	Frequency	Responsibility	Monitoring Indicators	Estimated Budget
Site selection & design	Impacts on sensitive areas, poor foundation design	Geotechnical & hydrological studies; micro-siting; avoid sensitive habitats	Document review	Once	PMU / Design Consultant	Approved ESMP-integrated design; clearance reports	PMU/MoWE; design consultant budget

Stakeholder engagement	Community dissatisfaction, lack of awareness	Meaningful consultations; disclosure of ESMP; inclusive participation	Meetings & records review	Continuous	MoWE / PMU / ABDO	Consultation records; functional GRM	PMU/ABDO
Community access and Livelihood	Disruption of livestock movement routes	Design access continuity plan; include livestock ramps; schedule around migration	Plan review	Once before works	Contractor / Engineer / PMU	Approved access plan; design compliance	Part of contractor budget
Vegetation & soil erosion	Limit clearing; silt control; re-vegetation		Site inspection	Daily/weekly	Contractor	Area cleared; sediment control in place	Part of contractor budget
River morphology	Monitor sediment and flow changes	Monitor river morphology; corrective works	Technical survey	Bi-annual	MoWE	Morphology reports	PMU/MoWE; Supervision consultant budget
Structural safety	Scour, erosion, damage	Periodic inspection; riprap protection; vegetation stabilization	Engineering inspection	Quarterly + post-flood	MoWE / ABDO	Structural integrity; erosion condition	MoWE/ABDO recurrent maintenance budget; contractor budget
Waste accumulation	Litter at crossings	Waste bins; awareness campaigns	Inspection	Monthly	Local government/ ABDO	Cleanliness status	Part of contractor budget; local government
Noise and dust emission	Disturbance to nearby communities and workers	Water spraying for dust control; restrict noisy works to daytime; maintain equipment; provide PPE to workers	Monitoring and GRM records	Weekly/monthly	PMU/Local EPA	Community complaints / decibel checks; Visual observation	PMU monitoring budget; government budget

9. Institutional Responsibilities

The implementation of the Environmental and Social Management Plan (ESMP) is guided by clearly defined institutional responsibilities and coordinated arrangements among key stakeholders. The Project Implementing Unit (PIU) holds overall responsibility for overseeing ESMP implementation, including consolidating reports and ensuring compliance with World Bank requirements. Day-to-day execution of ESMP measures is carried out by the Contractor, who is directly responsible for integrating environmental and social safeguards into routine project activities.

To ensure compliance and accountability, the Supervision Engineer (or Supervision Consultant) plays a critical role in monitoring implementation progress and verifying that all ESMP requirements are met on the ground. This includes regular inspections, documentation, and corrective guidance where necessary. In parallel, the Regional Environmental Authority provides independent regulatory oversight, ensuring that the project adheres to national environmental laws and standards.

Together, these institutions form a coordinated framework that supports effective ESMP implementation, monitoring, and enforcement throughout the project lifecycle.

10. Capacity Building

- Environmental and social training for contractors
- Community awareness on road/bridge safety
- OHS and emergency response training

11. Conclusion

The proposed pedestrian river crossings in Afambo and Assaita woredas will significantly improve mobility, safety, and access to essential services for pastoral and agro-pastoral communities in the Lower Awash Valley. The project responds to disruptions caused by river dynamics and flood management interventions and is expected to strengthen livelihood resilience and local connectivity.

However, the area is environmentally and socially sensitive, with risks including vegetation loss, soil erosion, temporary access restrictions, and safety concerns during construction and operation. The ESMP provides measures to avoid, minimize, and manage these impacts through appropriate mitigation actions, monitoring, and stakeholder engagement.

With effective implementation in line with national regulations and World Bank standards, the project will deliver strong social and economic benefits while ensuring environmental protection and sustainable development in the project area.

**MINISTRY OF WATER AND ENERGY
ETHIOPIA FLOOD MANAGEMENT
PROJECT**

**Environmental and Social Management Plan
(ESMP)**

**For construction of River off-take structures
at Assayita and Afambo woredas in Lower
Awash River Basin**

EFMP Safeguard

May, 2026

Executive Summary

This Environmental and Social Management Plan (ESMP) has been prepared for the proposed construction of irrigation turnouts and cattle watering facilities along the Awash River in Asayita and Afambo Woredas of the Afar Region under the Ethiopian Flood Management Project (EFMP), implemented by the Ministry of Water and Energy (MoWE) with support from the World Bank. The project was initiated following recent river dredging and flood mitigation works conducted before the 2025 rainy season, which successfully reduced flood risks but unintentionally restricted traditional community access to river water for small-scale irrigation and livestock watering.

The proposed interventions aim to restore equitable and controlled access to river water while maintaining the integrity of flood protection infrastructure. The project includes the construction of irrigation off-take structures, masonry-lined canals, flow control systems, cattle troughs, drainage systems, and associated erosion protection works. Depending on site conditions and topography, the system will utilize both gravity-fed irrigation and solar-powered pumping technologies to maximize water use efficiency and climate resilience.

The ESMP has been developed in accordance with Ethiopian environmental legislation and the World Bank Environmental and Social Framework (ESS1–ESS10). Its primary objective is to ensure that project activities are implemented in an environmentally sustainable and socially responsible manner while maximizing livelihood benefits and minimizing adverse environmental and social impacts. The ESMP identifies potential risks and impacts associated with the pre-construction, construction, operation, and decommissioning phases of the project and provides mitigation, monitoring, and institutional management measures.

The project area lies within the arid and semi-arid Lower Awash Basin, characterized by high temperatures, low and erratic rainfall, seasonal flooding, erosion-prone soils, and fragile riverine ecosystems. Communities in the area are predominantly pastoral and agro-pastoral, relying heavily on the Awash River for livestock watering, small-scale irrigation, and domestic use. The intervention is therefore expected to contribute significantly to improved agricultural productivity, water access, livelihood resilience, and sustainable water resource management.

Potential environmental impacts identified include localized soil erosion, sedimentation, vegetation disturbance, water quality degradation from construction activities, and minor alterations to river flow regimes. Ecological impacts may include temporary disturbance to riverine vegetation and aquatic habitats if mitigation measures are not properly implemented. However, hydrological analysis indicates that the proposed irrigation abstraction represents only approximately 0.83% of the minimum environmental flow of the Awash River, suggesting limited downstream impact when managed appropriately.

Potential social impacts include temporary restrictions on access to communal grazing areas and water points during construction, occupational health and safety risks, community safety concerns associated with construction activities and open canals, and possible conflicts over water allocation between upstream and downstream users. Risks related to labor influx, gender-

based violence (GBV), sexual exploitation and abuse (SEA), and grievances among water users were also identified as requiring proactive management.

To address these risks, the ESMP outlines comprehensive mitigation and monitoring measures, including environmental flow management, erosion and sediment control, proper waste management, occupational and community health and safety procedures, stakeholder engagement, grievance redress mechanisms, biodiversity protection, and Codes of Conduct for workers. The plan also emphasizes participatory implementation through continuous consultation with local communities, clan leaders, Water User Associations (WUAs), and local administrations to ensure equitable water distribution and community ownership of the project.

Institutional responsibilities for ESMP implementation are clearly defined. The Project Management Unit (PMU) under MoWE will oversee overall compliance and reporting, while contractors will be responsible for day-to-day implementation of mitigation measures. Supervision engineers and regional environmental authorities will provide monitoring and regulatory oversight to ensure adherence to both national and World Bank environmental and social requirements.

Based on the scale, nature, and reversibility of the anticipated impacts, the project has been classified as a Moderate Environmental and Social Risk under the World Bank Environmental and Social Framework. Most identified impacts are localized, temporary, site-specific, and manageable through established mitigation measures and good international industry practice.

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1. Introduction

Recent river dredging and flood mitigation works undertaken before the 2025 rainy season significantly reduced flood risks along sections of the Awash River. However, these interventions also restricted traditional community access to river water for small-scale irrigation and livestock watering. Following consultations among local communities, the Ministry of Water and Energy (MoWE), and development partners, controlled water abstraction structures were identified as necessary to restore equitable access to river water while maintaining flood protection objectives. Accordingly, selected sites have been identified for the construction of irrigation turnouts and cattle watering facilities.

While the proposed interventions are expected to improve local livelihoods and water access, they may also generate environmental and social impacts. Potential environmental impacts include vegetation clearing, soil disturbance, erosion, sedimentation, and localized effects on riverbank stability. Potential social impacts include temporary land-use restrictions, construction-related disturbances, occupational health and safety risks, and possible conflicts over water distribution.

This Environmental and Social Management Plan (ESMP) has therefore been prepared to identify, mitigate, and monitor potential environmental and social risks throughout the project lifecycle. The ESMP outlines mitigation measures, monitoring requirements, and implementation responsibilities, while promoting stakeholder engagement and equitable water resource management.

The ESMP covers the planned construction of irrigation turnouts and cattle troughs along the Awash River in Assayita and Afambo woredas of the Afar Region under the Ethiopian Flood Management Project (EFMP), implemented by the Ministry of Water and Energy with support from the World Bank. The ESMP has been prepared in accordance with Ethiopian environmental regulations and the World Bank Environmental and Social Framework (ESS1–ESS10) to ensure environmentally sustainable and socially acceptable project implementation.

2. Objectives of the ESMP

The main objective of this Environmental and Social Management Plan (ESMP) is to ensure that the construction and operation of irrigation turnouts and cattle troughs along the Awash River in Asayita and Afambo woredas are implemented in an environmentally sustainable and socially responsible manner, while maximizing project benefits and minimizing adverse impacts.

Specifically, the ESMP aims to:

- Identify and assess potential environmental and social impacts associated with the construction and operation of irrigation turnouts, cattle troughs and related infrastructure
- Define practical mitigation measures to avoid, minimize, or compensate for adverse environmental effects such as soil salinization, waterlogging, erosion, and ecosystem disturbance
- Address social risks and impacts, including equitable water access, land use conflicts, impacts on vulnerable groups, and community health and safety concerns
- Ensure compliance with national regulations and international best practices related to environmental protection and social safeguards
- Establish monitoring and evaluation mechanisms to track the effectiveness of mitigation measures and ensure adaptive management throughout the project lifecycle
- Clarify institutional roles and responsibilities for implementing environmental and social safeguards at all stages of the project
- Promote stakeholder engagement and participation, ensuring that local communities—including women, youth, and vulnerable groups—are meaningfully consulted and involved
- Enhance awareness and capacity of implementing agencies and communities on environmental and social management practices
- Ensure occupational health and safety for workers and surrounding communities during construction and operation phases

3. Project Description

This project aims to develop a water management network that will increase agricultural productivity and maximize water use efficiencies in the floodplains of the Lower Awash Basin. The project will consist of a series of irrigation outlet, flow control devices, and drainage systems to support these structures. The engineering design will consider site-specific topography so that systems located on the steeper slopes of the rivers will use solar powered pumps, while those on flatter land will use conventional gravity fed systems.

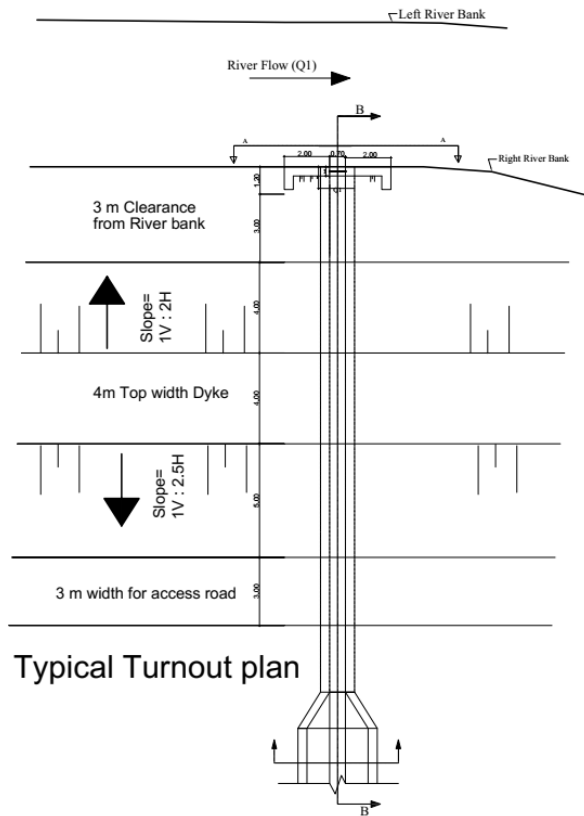


Figure 1 Typical turn out plan

The canal is Masonry canal type covered with slab, 45 m length and follows the existing traditional irrigation waterway. The characteristics of the structure include:

• The systems are also engineered to remain resilient under unexpected hydrological variations and heavy sediment loads. A central objective of the design is to minimize environmental impacts, including soil salinity, waterlogging of agricultural land, and negative downstream consequences. The project adopts an integrated, sustainable, and holistic approach to the management of the region’s critical water resources by combining irrigation infrastructure with flood protection measures and dedicated livestock watering facilities.

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The canal is Masonry canal type covered

- **Hydraulic Design:** The design of the structure is such that it can accommodate on average up to 1.5 - 2m above the deck of the bridge for the estimated maximum flood along with enough freeboard, sediment fill-up in addition to floating debris to cover it.
- **Structural Design:** The design of the steel superstructure for each bridge will be in compliance with industry standards for the structural design and loading of vehicles, pedestrians, and livestock.
- **Decking:** The decking of the bridge will be designed with steel grating that is galvanized and uses non-slip features to allow for sediment and water to pass through. The use of grating also reduces the amount of sediment that will accumulate on the decking and limit the amount of wind load that will be placed on the structure during high wind events, such as ones caused by desert storms.

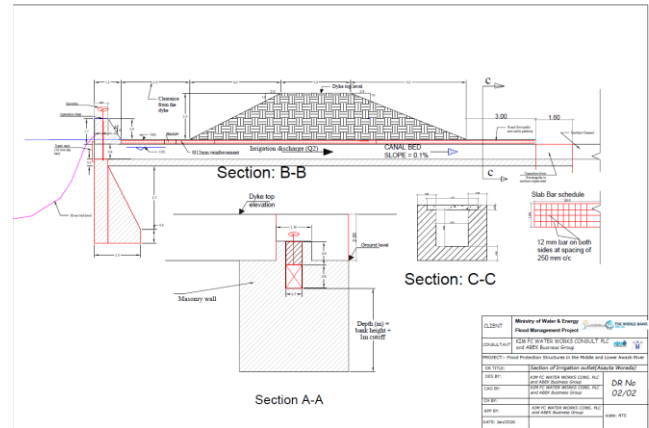


Figure 2 Irrigation turn-out structure sections

- **Erosion and Scour Protection:** The installation of appropriate erosion and scour protection will be provided using a loose rock or gabion implementation for river banks and bridge abutments, and by a combination of gabion and reinforced concrete embankment installations for bridge approaches.

Key project activities include river intake construction, canal excavation and lining, installation of gates and flow control structures, establishment of temporary access roads and construction camps, and the development of operation and maintenance arrangements to ensure long-term functionality and sustainability of the infrastructure.

3.1. Design Considerations

For the design of irrigation turnouts, the following important considerations were taken

- ⇒ Required discharge (Q) to irrigate the intended command area
- ⇒ River water level
- ⇒ Gravitation flow and available head
- ⇒ Buried rectangular channel in the dyke

The design considers, for the planning purpose of irrigation turn out, estimates of water requirements by FAO (Critchley & Siegert, 1991) for common crops is considered. Considering the location of the sites (the area is arid to semi-arid with high evapotranspiration and low rainfall, necessitating almost constant irrigation), the average of the maximum values in the range of the crop water requirements for the crops listed out in Table 1 has been considered for the estimation of the crop water requirement and hence the discharge of the turnouts.

Table 1 Approximate values of seasonal crop water needs (Critchley & Siegert, 1991)

Crop	Crop water need (mm/total growing period)
Beans	300–500
Citrus	900–1200
Cotton	700–1300
Groundnut	500–700
Maize	500–800
Sorghum/Millet	450–650
Soybean	450–700
Sunflower	600–1000

Hence, the average seasonal crop water requirement considered is 744mm and a turnout is designed to irrigate 60 ha of land, considering management, operations and cost of the turnout structures.

Key activities include:

- River intake construction
- Canal excavation and lining
- Installation of gates and control structures
- Temporary access roads and construction camps

- Operation and maintenance arrangements

For the design of irrigation turnouts, the following important considerations were taken

- Required discharge (Q) to irrigate the intended command area
- River water level
- Gravitation flow and available head
- Buried rectangular channel in the dyke

The type of turnout considered is open channel turnout with upstream gate control system. The average head difference between the adjacent land and the water level determined to be 0.33m and it shows the viability of the gravity irrigation on those sites by directly diverting the river water to the irrigable areas. The intake level has been fixed 0.8m below the observed water surface levels or 0.7m below the OGL of the adjacent land (land lying about 15-30m distance from the river banks). Hence size of the turnout is 0.8m by 0.7m. The water from the turnout is discharged into a lined masonry rectangular canal that passes in the dike embankment and exits into a trapezoidal earthen canal.

Hence, the hydraulics of this has been designed as shown below to correspond to the hydraulic conditions of the turnout stated above.

Hydraulic parameters of the canal leading from the turnout

- Canal cross-section: Trapezoidal
- Bottom Width (m) = 0.7000
- Side Slopes (z:1) = 1.0000, 1.0000
- Slope (%) = 0.1000
- N-Value = 0.025
- Q (m³/s) = 0.2000
- Depth of flow (m) = 0.4
- Freeboard=0.3m
- Flow Velocity (m/s) = 0.5
- Total Depth (m) = 0.70

To stop floating and submerged debris (logs, branches, aquatic vegetation, plastic, etc.) from entering the conveyance system, trash racks have to be placed at the mouth of the turnout intake.

Steel bars of thickness 10 mm are recommended. The bars have to be placed with a spacing of 100 mm.

For some reaches of the river course, especially in the middle reach of the river, gravity system tapping of the river water using turnouts to irrigate the adjacent land is not possible. Solar pumped irrigation system with the following specifications is recommended for such instances.

Required pump capacity: is 0.1 m³/s (flow), and 6 m head. Select solar-powered Horizontal centrifugal pump with 10–11 kW power; 74–92 kWh daily energy; 22–25 kWp PV array; 45 panels (550 W) PV array; and solar VFD (15 kW recommended) controllers.

3.2. Environmental Flow

Studies conducted in the Awash Basin indicate that environmental (low-flow) conditions in the Middle and Lower Awash River commonly range between 10 and 25 m³/s, depending on location and season. Environmental flow assessments reported:

- approximately 16.4 m³/s near the Awash Compensation reach (weir/dam), a hydraulic structure located in the Middle Awash Basin; and
- approximately 24.2 m³/s near Tendaho in the Lower Awash Basin.

The proposed irrigation turnout is designed to irrigate 60 ha of land with a diversion discharge of 0.20 m³/s. Considering the representative minimum environmental flow of 24.2 m³/s for the Awash River, the proportion of river flow diverted for irrigation is calculated as follows:

$$\left(\frac{0.2}{24.2} \right) \times 100 = 0.83\%$$

Therefore, the irrigation diversion represents approximately **0.83 % of the minimum environmental flow** of the Awash River, indicating that the proposed abstraction is relatively small compared to the river's low-flow condition.

3.3. Construction Methodology

The technical specifications encompass all major construction components required for the project, including excavation and earthworks, fill and compaction, reinforced and plain concrete works, reinforcement steel, stone masonry, plastering, gabion protection works, installation of irrigation gates, and the fabrication and erection of structural steel components. These specifications establish the required standards for material quality, workmanship, and construction procedures to ensure the durability, structural integrity, safety, and long-term performance of the proposed steel pedestrian bridges, irrigation turnouts, and cattle trough facilities.

The specifications are prepared in accordance with recognized national and international engineering standards, including ASTM, AASHTO, and other applicable codes and guidelines. Particular attention is given to the quality of structural steel materials, corrosion protection through galvanization, proper fabrication and welding techniques, concrete quality assurance and control, and the correct installation of hydraulic and structural elements. Compliance with these requirements is intended to ensure reliable performance, serviceability, and sustainability of the completed works under the expected operational and environmental conditions.

These technical specifications shall serve as a comprehensive guideline for contractors during project execution and shall form an integral part of the bidding, contract, and construction documentation for the implementation of the proposed project works.

4. Rationale for Similar ESMP and Sub-project Location

4.1. Justification

A single grouped Environmental and Social Management Plan (ESMP) for the proposed irrigation off-intake/turnout structures in Asayita and Afambo woredas of the Lower Awash Sub-Basin, Afar Region, is justified because the subprojects share similar biophysical, topographic, environmental, and socio-economic conditions, as well as common design characteristics, construction methodologies, and operational activities. Although the sites are geographically

dispersed, they are all small-scale irrigation structures located within the same ecological setting and are expected to generate comparable environmental and social impacts, including minor soil disturbance, water abstraction effects, and localized construction-related impacts. In addition, the affected communities have similar pastoral and agro-pastoral livelihoods, resulting in largely uniform social impacts and stakeholder engagement requirements. Given these similarities, preparing a clustered ESMP is both practical and efficient, as it enables standardized impact assessment, harmonized mitigation measures, and coordinated implementation, monitoring, and reporting arrangements, while still allowing for the integration of site-specific considerations where necessary. This approach also strengthens consistency in environmental and social management and supports improved assessment and management of cumulative impacts on water resources and local ecosystems.

4.2. Location

The following table presents the geographic locations (northing and easting coordinates) of irrigation turnouts identified in Asayita and Afambo woredas, detailing their distribution across the respective kebeles of Nengelta, Handeg, Mamulie, Mehandista, Alesenbolu, Humudeta, and Miego.

Table 2 Location of Irrigation turnouts at Asayita Woreda

No	Northing	Easting	Woreda	Kebele
1	41.45979852	11.54757935	Asayita	Nengelta
2	41.46775148	11.55690915	Asayita	Nengelta
3	41.46391930	11.55333060	Asayita	Nengelta
4	41.52446204	11.55670088	Asayita	Handeg
5	41.57050920	11.57133510	Asayita	Handeg
6	41.52995282	11.55998710	Asayita	Handeg
7	41.53947442	11.56009356	Asayita	Handeg
8	41.54145300	11.56103397	Asayita	Handeg
9	41.54631370	11.55904120	Asayita	Handeg
10	41.53638430	11.56243670	Asayita	Handeg
11	41.53656570	11.56221140	Asayita	Handeg
12	41.53320670	11.56279350	Asayita	Handeg
13	41.54526574	11.55808206	Asayita	Handeg
14	41.55039782	11.55917540	Asayita	Handeg
15	41.55261202	11.56083648	Asayita	Handeg

No	Northing	Easting	Woreda	Kebele
16	41.55699171	11.56282178	Asayita	Handeg
17	41.56169500	11.56594860	Asayita	Handeg
18	41.55059600	11.55968350	Asayita	Handeg
19	41.56132470	11.56168120	Asayita	Handeg
20	41.56358070	11.56691978	Asayita	Handeg
21	41.48217468	11.51414595	Asayita	Mamulie
22	41.48035509	11.51383401	Asayita	Mamulie
23	41.47816498	11.51326968	Asayita	Mamulie
24	41.47653010	11.51301940	Asayita	Mamulie
25	41.48365475	11.51471160	Asayita	Mamulie
26	41.48779233	11.51637497	Asayita	Mamulie
27	41.49083170	11.51609595	Asayita	Mamulie
28	41.49355344	11.51616299	Asayita	Mamulie
29	41.49266771	11.51664848	Asayita	Mamulie
30	41.48964595	11.51658591	Asayita	Mamulie
31	41.48136659	11.51445003	Asayita	Mamulie
32	41.47687280	11.51335795	Asayita	Mamulie
33	41.49757372	11.51711158	Asayita	Mamulie
34	41.50296687	11.51557612	Asayita	Mamulie
35	41.49987557	11.51656782	Asayita	Mamulie
36	41.49790481	11.51712861	Asayita	Mamulie
37	41.49986964	11.51656055	Asayita	Mamulie
38	41.50044673	11.51677461	Asayita	Mamulie
39	41.50697126	11.51601375	Asayita	Mamulie
40	41.50985941	11.51695520	Asayita	Mamulie
41	41.51047429	11.51627511	Asayita	Mamulie
42	41.51349721	11.51696715	Asayita	Mamulie
43	41.51442971	11.51748126	Asayita	Mamulie
44	41.51610593	11.51669159	Asayita	Mamulie
45	41.51830905	11.51613942	Asayita	Mamulie
46	41.51973386	11.51563916	Asayita	Mamulie
47	41.52185340	11.51599124	Asayita	Mamulie
48	41.52252760	11.51453971	Asayita	Mamulie
49	41.52436714	11.51431593	Asayita	Mamulie
50	41.52594967	11.51404016	Asayita	Mamulie
51	41.52794603	11.51496251	Asayita	Mamulie
52	41.52980062	11.51847024	Asayita	Mamulie
53	41.46993420	11.51818670	Asayita	Mamulie
54	41.47002330	11.51828670	Asayita	Mamulie
55	41.47057240	11.51741330	Asayita	Mamulie
56	41.47181690	11.51608010	Asayita	Mamulie

No	Northing	Easting	Woreda	Kebele
57	41.47170240	11.51448300	Asayita	Mamulie
58	41.47329760	11.51300450	Asayita	Mamulie
59	41.47530510	11.51345790	Asayita	Mamulie
60	41.47887950	11.51429450	Asayita	Mamulie

Table 3 Location of Irrigation turnouts at Afambo Woreda

#	Northing	Easting	Woreda	Kebele
1	41.53300812	11.52371652	Afambo	Mehandista
2	41.5319365	11.52348070	Afambo	Mehandista
3	41.53299927	11.52371009	Afambo	Mehandista
4	41.52986867	11.52148896	Afambo	Mehandista
5	41.53574279	11.52347736	Afambo	Mehandista
6	41.53797473	11.52321961	Afambo	Mehandista
7	41.54127811	11.52258772	Afambo	Mehandista
8	41.54176858	11.52078736	Afambo	Mehandista
9	41.54187668	11.51864565	Afambo	Mehandista
10	41.54176858	11.52078736	Afambo	Mehandista
11	41.54274175	11.51489678	Afambo	Mehandista
12	41.54323845	11.51307631	Afambo	Mehandista
13	41.5309773	11.52317690	Afambo	Mehandista
14	41.5452501	11.51161278	Afambo	Mehandista
15	41.5462777	11.51426228	Afambo	Mehandista
16	41.54627593	11.51425895	Afambo	Mehandista
17	41.54897989	11.51310774	Afambo	Alesenbolu
18	41.55063454	11.51031901	Afambo	Alesenbolu
19	41.55271212	11.50907197	Afambo	Alesenbolu
20	41.55378335	11.50937321	Afambo	Alesenbolu
21	41.5673207	11.51590850	Afambo	Alesenbolu
22	41.5496385	11.51334180	Afambo	Alesenbolu
23	41.55446159	11.50955736	Afambo	Alesenbolu
24	41.55737875	11.51086038	Afambo	Alesenbolu
25	41.55771437	11.51088499	Afambo	Alesenbolu
26	41.56273252	11.51489299	Afambo	Alesenbolu
27	41.56364474	11.51553938	Afambo	Alesenbolu
28	41.56364474	11.51553938	Afambo	Alesenbolu
29	41.56933443	11.51686677	Afambo	Humudeta
30	41.5710318	11.51571667	Afambo	Humudeta
31	41.57276563	11.51511242	Afambo	Humudeta
32	41.57431489	11.51462337	Afambo	Humudeta

#	Northing	Easting	Woreda	Kebele
33	41.57597997	11.51499253	Afambo	Humudeta
34	41.57832921	11.51655486	Afambo	Humudeta
35	41.58036075	11.51653070	Afambo	Humudeta
36	41.58395519	11.51621038	Afambo	Humudeta
37	41.58655438	11.51587764	Afambo	Humudeta
38	41.58797223	11.51420716	Afambo	Humudeta
39	41.58886374	11.50905191	Afambo	Humudeta
40	41.59094813	11.50796323	Afambo	Humudeta
41	41.59453051	11.50673218	Afambo	Humudeta
42	41.55063454	11.51031901	Afambo	Miego
43	41.55266722	11.50917176	Afambo	Miego
44	41.58655234	11.51587476	Afambo	Miego
45	41.58796621	11.51419972	Afambo	Miego
46	41.58886272	11.50905074	Afambo	Miego
47	41.59094148	11.50795706	Afambo	Miego
48	41.59452136	11.50672349	Afambo	Miego
49	41.61008289	11.50170020	Afambo	Miego
50	41.61406027	11.50258374	Afambo	Miego
51	41.61741774	11.50386409	Afambo	Miego
52	41.61921636	11.50869218	Afambo	Miego
53	41.62378598	11.50914802	Afambo	Miego
54	41.60423818	11.50375534	Afambo	Miego
55	41.60056	11.50636600	Afambo	Miego
56	41.5972165	11.50678150	Afambo	Miego
57	41.6262877	11.50903650	Afambo	Miego
58	41.6276361	11.50914680	Afambo	Miego
59	41.6285846	11.50968550	Afambo	Miego
60	41.6295296	11.51042440	Afambo	Miego

5. Policy, Legal, and Institutional Framework

The ESMP shall consider applicable National and World Bank Laws & standards

National Frameworks to be reviewed and considered includes;

- Environmental Impact Assessment Proclamation No. 299/2002
- Environmental Pollution Control Proclamation No. 300/2002
- Water Resources Management Proclamation No. 197/2000
- Labor Proclamation No. 1156/2019
- Regional Environmental Authority guidelines (Afar Region, if available)

World Bank Environmental and Social Standards including;

- **ESS1:** Assessment and Management of E&S Risks
- **ESS2:** Labor and Working Conditions
- **ESS3:** Resource Efficiency and Pollution Prevention
- **ESS4:** Community Health and Safety
- **ESS5:** Land Acquisition and Resettlement (if applicable)
- **ESS6:** Biodiversity Conservation
- **ESS7:** ESS7: Indigenous Peoples
- **ESS8:** Cultural Heritage
- **ESS10:** Stakeholder Engagement

In addition, the IFC Environmental, Health and Safety (EHS) Guidelines need to be considered for implementation of safety measures.

6. Description of the Environment and Social Settings

6.1. Physical Environment

6.1.1. Water Resources

Irrigation in the project areas of Asayita and Afambo woredas relies primarily on the Awash River, which serves as the main source of water for small-scale irrigation and livestock watering. Seasonal flows and floodplain water retention also contribute to water availability. However, water supply is highly variable due to climatic conditions and upstream abstraction, making the system vulnerable to periodic shortages, particularly during the dry season.

Recent flood control and dredging interventions have improved flood protection but have also limited traditional access points to the river. Additionally, irrigation efficiency is constrained by sedimentation in informal canals and turnouts, reducing conveyance capacity and increasing maintenance requirements.

6.1.2. Seasonal Flooding and Sediment-Laden Flows

The river system is characterized by strong seasonal variability, with high flows during the rainy season and significantly reduced flows during dry periods. Flood events are typically associated with high sediment loads, contributing to deposition along riverbanks and within irrigation channels.

These conditions create risks of riverbank instability and sediment accumulation, particularly in areas where construction activities may alter natural flow patterns. The river system is already under stress from natural hydrological fluctuations and sediment dynamics, making it sensitive to further disturbance.

6.1.3. High Erosion Potential during Rainy Seasons

The project landscape exhibits high susceptibility to soil erosion, especially during the rainy season. The combination of sparse vegetation cover, loose alluvial soils, and intense rainfall events increases the likelihood of surface runoff and soil loss.

Construction activities, including excavation and land clearing, may exacerbate erosion risks if not properly managed, leading to increased sediment transport into the river system and potential degradation of surrounding land.

6.1.4. Climate

The project sites are located within the arid to semi-arid climatic zone of the Afar Region lowlands. The climate is characterized by high temperatures, often exceeding 30–40°C, low and erratic rainfall, and frequent drought events.

These conditions result in high evapotranspiration rates and place significant pressure on limited water resources, making efficient water management essential for sustaining agricultural and pastoral livelihoods.

6.1.5. Soil and Land Use

Soils in the project area are predominantly alluvial and sandy loam, with localized clay deposits in floodplain zones. Common constraints include soil salinity and alkalinity, particularly in irrigated areas, as well as susceptibility to erosion in exposed locations.

Land use is characterized by a combination of small-scale irrigated agriculture and extensive pastoral and agro-pastoral systems. While improved irrigation infrastructure can enhance water availability and agricultural productivity, it may also introduce risks such as soil salinization, waterlogging in low-lying areas, and reduced downstream flows if not properly managed.

6.2. Biological Environment

6.2.1. Vegetation and Biodiversity

Natural vegetation in the project area is sparse and primarily composed of drought-resistant species, including Acacia shrubs and dry grasslands. Environmental pressures such as overgrazing and wood harvesting have contributed to vegetation degradation.

The project area also includes riverine vegetation and wetland ecosystems associated with the Awash River. These habitats play critical ecological roles, including stabilizing riverbanks, supporting biodiversity, and maintaining water quality. However, they are highly sensitive to changes in water flow and abstraction.

6.2.2. Fish Species and Aquatic Ecosystems

The river system supports aquatic biodiversity, including fish species and other aquatic organisms adapted to variable flow conditions. These ecosystems depend on stable flow regimes and water quality.

Changes in water abstraction, increased sedimentation, or pollution during construction and operation phases may negatively affect aquatic habitats and biodiversity. This highlights the need for careful management of in-stream activities and water use.

6.3. Social Environment

6.3.1. Settlement Patterns

The project areas in Asayita and Afambo woredas are characterized by predominantly rural and dispersed settlement patterns. Communities are located in kebeles such as Nengelta, Handeg, Mamulie, Mehandista, Alesenbolu, Humudeta, and Miego, often situated near water sources and irrigation areas.

Settlements include both permanent villages and temporary pastoral camps, reflecting the mobility of pastoral and agro-pastoral livelihoods. Communal grazing lands and livestock migration corridors are key features of land use, indicating shared and flexible resource utilization systems.

The strong dependence on river water increases the potential for competition and conflict over water resources, particularly where access is limited or unevenly distributed.

6.3.2. Population and Livelihoods

Local communities are predominantly pastoralists and agro-pastoralists, relying on livestock rearing (including cattle, goats, and camels) and small-scale irrigation for their livelihoods. These activities are highly dependent on access to water from the Awash River.

Livelihood systems are closely linked to seasonal patterns, with mobility playing a key role in accessing grazing and water resources. Limited infrastructure and economic opportunities contribute to vulnerability, particularly during periods of drought or reduced water availability.

6.3.3. Potential Social Risks around Turnouts

The development of irrigation turnouts and cattle troughs may introduce several social risks if not properly planned and managed. Poorly designed or inadequately sized structures may lead to:

- Conflicts among water users
- Inequitable water distribution between upstream and downstream communities
- Reduced irrigation efficiency

The presence of mobile pastoral populations and temporary settlements may increase pressure on water points, particularly during dry seasons. In addition, construction activities may temporarily restrict access to land and water resources and pose health and safety risks to local communities.

7. Potential Impacts

7.1. Overview

The proposed construction of irrigation turnouts and cattle troughs along the Lower Awash River basin will generate environmental and social impacts across three key phases: pre-construction, construction, and operation. While most impacts are localized and manageable, early-stage (pre-construction) activities play a critical role in shaping overall project sustainability, particularly in terms of land access, stakeholder engagement, and resource allocation.

7.1. Environmental Impacts

i. Hydrology and Water Resources

One of the most significant environmental concerns is the potential alteration of river flow regimes due to water abstraction for irrigation. If not properly managed, this may lead to reduced downstream water availability, particularly during dry seasons when flows are already low. This can also increase pressure on existing water users and ecological systems dependent on minimum flow conditions.

Construction activities near the river may further disturb natural flow patterns, especially during intake installation, leading to temporary diversion of flows and localized hydrological disruption.

ii. Soil Erosion and Sedimentation

Excavation, canal construction, and riverbank disturbance are likely to increase soil erosion and sediment runoff, particularly in an area already identified as erosion-prone. This can result in

sedimentation of the river channel, reduced water quality, and potential blockage or inefficiency of water conveyance structures.

Without proper erosion control, these impacts may extend downstream, affecting both aquatic habitats and irrigation performance.

iii. Water Quality Degradation

Construction activities may introduce pollutants into the river system, including sediments, fuel, oils, and construction waste. Accidental spills or improper handling of chemicals can lead to localized water contamination, affecting both ecological systems and communities relying on the river for drinking water and livestock.

iv. Biodiversity and Ecosystems

The project may result in loss or disturbance of riverine vegetation and wetland habitats, particularly in areas cleared for construction or access roads. These habitats are important for stabilizing riverbanks and supporting biodiversity.

Aquatic ecosystems, including fish populations, may also be affected due to changes in flow regime, increased turbidity, and habitat disruption. This could reduce species abundance and ecological balance in affected river sections.

v. Waste and Material Impacts

Construction and operation activities will generate solid and liquid waste, including excavated spoil, construction debris, and maintenance waste. If not properly managed, these may contribute to soil and water contamination or create localized pollution hotspots.

7.2. Social Impacts

i. Land Use and Access Impacts

As indicated in the project description, the proposed canal will be a masonry-lined canal covered with concrete slabs, extending for approximately 45 meters in length. The canal alignment follows the existing traditional irrigation waterway currently used by the local community and will be constructed within the established route. Consequently, the project is not expected to require significant new land acquisition or permanent physical displacement of households and assets. By utilizing the existing irrigation corridor, the project minimizes disturbances to surrounding land uses and reduces the potential for adverse environmental and social impacts commonly associated with the development of new canal alignments.

Although large-scale resettlement and displacement are not anticipated, some localized and temporary impacts may occur during the construction phase. These may include temporary restriction of access to communal grazing areas, water access points, livestock movement routes, and other community pathways frequently used by pastoralists and agro-pastoral communities. Minor temporary disturbances to agricultural activities and mobility patterns may also arise due to excavation works, material handling, and construction traffic within the project area.

To minimize such impacts, construction activities will be carefully planned and implemented in consultation with local communities and relevant stakeholders. Appropriate mitigation measures, including maintaining temporary access routes, scheduling construction works to avoid peak agricultural and livestock movement periods, and restoring disturbed areas immediately after construction, will be applied to reduce inconvenience to local users.

The project will be implemented through continuous consultation and close coordination with clan leaders of the Afar community, irrigation users, Water User Associations (WUAs), local administrations, and other relevant stakeholders throughout the construction process. Community members and project beneficiaries will be actively involved during site preparation, construction scheduling, and operational planning to ensure that local concerns, traditional water-use practices, and community priorities are adequately incorporated into project implementation.

This participatory and inclusive approach will help strengthen community ownership of the project, enhance transparency and cooperation among stakeholders, minimize potential conflicts related to water access and construction activities, and support the long-term sustainable

management and operation of the irrigation off-take structure. Furthermore, regular communication and grievance-handling mechanisms will be established to ensure that any community concerns arising during construction and operation are promptly addressed in a fair and culturally appropriate manner.

ii. Livelihood Impacts and Water Competition

Because local communities depend heavily on the Awash River for livestock watering, domestic use, and small-scale irrigation, the project may lead to increased competition over water resources. Reduced downstream flows or altered distribution patterns could create tensions among upstream and downstream users.

While the project aims to improve irrigation supply, uneven water allocation could still result in perceived or actual inequities in access.

iii. Labor Influx and Community Disruption

Construction activities are likely to bring in external workers, which may lead to social interaction challenges, including pressure on local services and increased risk of social conflict, gender-based violence (GBV), and sexual exploitation and abuse (SEA) if not properly managed.

The presence of non-local workers can also contribute to cultural and behavioral tensions within nearby communities.

iv. Occupational Health and Safety (OHS)

Construction and maintenance activities involve risks such as injuries from machinery, excavation accidents, and exposure to dust and noise. Without proper safety measures, workers may face significant occupational hazards.

Community members may also be exposed to risks from construction zones, including vehicle movement, open excavations, and restricted access areas.

v. Community Health and Safety

The project may create safety hazards for nearby communities, particularly children and livestock, due to open canals, excavation pits, and construction traffic. There is also a potential risk of water-related accidents such as drowning once canals and structures are operational.

vi. Social Conflict and Grievances

Given the dependence on shared water resources, there is a risk of community grievances and conflicts over water allocation, access restrictions, and construction disturbances. If not effectively managed, these grievances may escalate into broader social tensions between user groups.

vii. Health risks

Standing water in poorly maintained systems may become breeding grounds for disease vectors (e.g., mosquitoes).

7.3. Overall Impact Summary

In summary, the project is expected to generate **moderate environmental impacts** mainly related to water abstraction, erosion, sedimentation, and ecosystem disturbance, as well as **moderate social impacts** linked to water resource competition, livelihood dependence, labor influx, and community safety risks.

However, most of these impacts are **manageable through the ESMP mitigation measures**, particularly environmental flow management, erosion control; waste management, strong stakeholder engagement, and effective grievance redress mechanisms.

7.3.1. Justification for risk classification

The proposed construction of irrigation off-take structures in Assayita and Afambo Woredas of the Lower Awash Basin is classified as having Moderate Environmental and Social Risk under the World Bank Environmental and Social Framework (ESF).

The classification is justified by the nature, scale, location, and reversibility of the anticipated environmental and social impacts, as well as the availability of feasible mitigation measures and institutional arrangements for effective risk management.

The proposed activities consist primarily of small- to medium-scale civil works involving river intake construction, canal excavation and lining, installation of flow control structures, temporary access roads, and limited ancillary facilities. The project does not involve large dams, major river diversion infrastructure, hazardous industrial activities, or extensive land acquisition. Most impacts are site-specific, temporary, localized, and reversible through standard mitigation measures.

The project area is environmentally sensitive due to its semi-arid climate, erosion-prone soils, seasonal flooding patterns, and ecologically important riverine habitats associated with the Awash River system. Key environmental risks include localized alteration of river flow regimes, downstream water stress, soil erosion, sedimentation, temporary water quality degradation from construction activities, vegetation disturbance, and impacts on aquatic ecosystems. There is also a potential risk of soil salinity and waterlogging if irrigation water management is not properly controlled. However, these impacts are not expected to be significant, irreversible, or cumulative at a large scale because the intervention involves relatively small abstraction structures with controlled discharge capacities and incorporates environmental flow considerations into the design.

Social risks are similarly assessed as moderate. Communities in the project area are predominantly pastoral and agro-pastoral populations that rely heavily on shared water resources, grazing land, and seasonal mobility. Potential impacts include temporary restriction of access to communal resources, localized conflicts over water allocation, labor influx-related risks, occupational health and safety concerns, and community safety risks associated with construction activities and open canals. Risks related to gender-based violence (GBV), sexual

exploitation and abuse (SEA), and social tensions associated with non-local labor are recognized but are expected to remain manageable due to the limited workforce size and short-term nature of construction activities.

The project does not currently anticipate significant physical displacement or large-scale economic displacement. Any minor land acquisition or temporary access restrictions will be managed through applicable land donation or resettlement procedures consistent with ESS5 requirements where applicable.

The Moderate Risk classification is further supported by the presence of a comprehensive ESMP that includes:

- ♣ Mitigation measures for all identified environmental and social impacts;
- ♣ Environmental flow management and water allocation controls;
- ♣ Erosion and sediment control measures;
- ♣ Occupational and community health and safety provisions;
- ♣ Labor management procedures and Codes of Conduct;
- ♣ GBV/SEA prevention measures;
- ♣ Stakeholder engagement and grievance redress mechanisms;
- ♣ Biodiversity protection and vegetation restoration measures; and
- ♣ Detailed monitoring, reporting, and institutional responsibilities

Institutional capacity for implementation is considered adequate. The Project Management Unit (PMU), contractors, supervision engineers, regional environmental authorities, and water management institutions have defined responsibilities for implementation and monitoring of environmental and social measures throughout the project lifecycle.

Overall, the anticipated adverse environmental and social impacts are expected to be predictable, site-specific, temporary, and manageable using known mitigation measures and good international industry practice. Therefore, the subproject is appropriately classified as Moderate Risk under the World Bank ESF.

A. Pre-Construction Phase ESMP Matrix

Activity	Potential E&S Impact	Mitigation / Enhancement Measures	Monitoring Indicators	Frequency of Mitigation	Responsibility	Budget Estimate
Site selection & design	Increased downstream water stress; poor siting affects ecosystem	Ensure intake design maintains environmental flow; confirm abstraction permits; avoid wetlands & sensitive habitats	Approved ESMP; hydrological study completed	Once-off during design stage, with review prior to final approval	PMU/ Design Consultant	Part of contract
Turn out design and placement	Conflicts among users due to poorly located or undersized turnouts	Design turnouts based on peak demand; ensure equitable spacing along canals; involve stakeholders in layout planning	Functionality of turnouts; user satisfaction; reduction in disputes	Irrigation Authority / Engineers / WUAs		Part of contract
Land acquisition	Loss of land; Temporary restriction of access	Follow land Donation or resettlement procedure (if required/ applicable); ensure fair consultation and documentation	Evidence of land donation and resettlement procedures and measures accordingly if required /applicable,	As required during pre-construction phase (until land acquisition is completed)	PMU	Part of contract

			signed land agreements; consultation records			
Contractor mobilization	Labor risks, GBV/SEA risks	Prepare LMP; enforce workers' Code of Conduct; GBV Action Plan, awareness training, establish GRM before work start	Approved LMP; Signed CoC; functional GRM	Prior to mobilization and continuously enforced throughout mobilization period	PMU / Contractor	Part of contract
Stakeholder engagement	Community Complaints /grievances; lack of awareness	Conduct meaningful consultations/training; disclose ESMP; include pastoralists and vulnerable groups	Consultation minutes; attendance sheets	Continuous throughout pre-construction phase (at key milestones)	PMU	Part of contract
Cultural heritage screening	Damage to unknown sites	Include Chance Find Procedure (CFP) in contracts	CFP include in contract documents	Once-off before procurement, with continuous application if triggered	PMU	Part of contract

B. Construction Phase ESMP Matrix

B1. Environmental Impacts and Management

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Frequency of Mitigation	Responsibility	Budget Estimated
River intake construction	Bank erosion, sedimentation	Use cofferdams; riprap, gabions and bio-engineering measures; restrict works to dry season, stabilize slopes immediately	Visible erosion control structures in place	Weekly	Contractor	Part of contract
Excavation & canal works	Dust, noise, spoil	Water spraying; noise control; proper spoil management; disposal spill; stabilize exposed soil; limit work hours	Dust levels; noise complaints	Weekly	Contractor	Part of contract
Fuel & chemical handling	Water pollution	Designated/bounded fuel storage areas; spill kits on site; no refueling near river prevention plan, train workers	Spill incidents recorded	Continuous	Contractor	Part of contract
Vegetation clearing	Habitat loss	Minimize/Limit clearing; mark no go zones; replant/re-vegetate disturbed areas	Area re-vegetated/restored	Monthly	Contractor	Part of contract
Waste generation	Soil & water contamination	Waste segregation; approved disposal sites; no dumping near river	Waste disposal logs	Weekly	Contractor	Part of contract

B2. Social Impacts and Management

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Frequency of Mitigation	Responsibility	Budget Estimated
Workforce deployment	Occupational risks	Provide PPE; toolbox talks; enforce OHS Plan; first aid availability	Accident records; PPE compliance	Continuous	Contractor	Part of contract
Labor influx	Social conflict, GBV/SEA	Prioritize local hiring; enforce CoC; GBV awareness training; referral system	Training records; complaints received	Monthly	Contractor	Part of contract
Community access	Restricted access, accidents	Fence hazardous areas, install warning signs; implement traffic management plan	Incident reports	Weekly	Contractor	Part of contract
Water abstraction	Resource conflicts (e.g. downstream users)	Ensure equitable allocation; coordination with water user/committees; Stakeholder consultation	Complaints logged	Monthly	PMU/Contractor	Part of contract
Grievance handling	Unresolved complaints	Functional GRM; timely response	GRM reports	Monthly	PMU	Part of contract

C. Operation & Maintenance Phase ESMP Matrix

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Frequency of Mitigation	Responsibility	Budget Estimated
Operation of off-take/water	Reduced irrigation efficiency/	Install flow control structures (gates, measuring devices); Maintain environmental flow;	Water delivery efficiency; Flow measurement	Quarterly	MoWE/ABDO/Operators	Government O&M budget (MoWE/ABDO);

abstraction/water allocation efficiency	reduced downstream flows/and unequal benefit distribution	use calibrated outlets; upgrade adjustable systems; Monitor river discharge; regulate abstraction;	records			may also include water user service fees for monitoring and regulation
Canal operation/maintenance	Sediment accumulation/disposal impacts	Routine desilting; Proper disposal of sediments at approved sites	Maintenance logs/Disposal records	As needed	MoWE/ABDO	Routine O&M budget (MoWE/ABDO); supplemented by irrigation service fees / WUA contributions for desilting activities
Social equality in water access/use	Upstream and downstream inequality and water use conflicts	Establish Water User Associations; implement transparent allocation system/schedules; participatory decision making	Compliance with water schedules; number of conflicts reported /grievance records	Monthly	WUAs/Local government/MoWE/ABDO	Institutional/administrative budget (MoWE/ABDO)
Worker safety	Injury during maintenance	OHS procedures/plan; PPE; safety training	Accident records	Continuous	O&M Agency	Government operational budget
Community safety/Open canals	Drowning risks	Install fencing; Warning signage; community awareness campaign	Safety measures in place/reports	Quarterly	MoWE/ABDO	Project O&M budget (MoWE/ABDO); local administration/com

						munity outreach budgets
Infrastructure durability	Damage to canals and turn outs from misuse or overuse	Use durable materials; standardize construction; schedule maintenance and inspections	Structural integrity; maintenance records		Engineering Unit/Local technicians	Project O&M budget (MoWE/ABDO);
Health Risks	Standing water in poorly maintained systems may become breeding grounds for disease vectors	Ensure proper drainage and regular cleaning of canals and drains; avoid prolonged stagnant water; conduct community awareness on vector-borne diseases; coordinate with local health offices for vector control measures	Presence of stagnant water; incidence of vector-borne diseases; maintenance and drainage records	Monthly / During routine maintenance	MoWE/ABDO/Local Health Offices/WUAs	Government O&M budget (MoWE/ABDO); public health and community awareness budgets

D. Decommission Phase

Activity	Potential Impact	Mitigation Measures	Monitoring Indicators	Frequency	Monitoring Responsibility	Monitoring Cost
Closeout Period	Risks and impacts associated with river off take structures	Number of outstanding E&S issues (Target: 0). Waste and excess materials at the canal areas (Target: none). Rehabilitated, reinstated, and revegetated areas.	Continuously during the monitoring period	Continuously during the monitoring period	PMU at MoWE Supervising firm Regulatory bodies	Part of EFMP budget Part of supervising firm's contract (if any)

	sites closeout	Site clearance issued by the local and regulatory bodies.				Part of regulatory bodies'
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E. Integrated ESMP Monitoring Plan (All Phases)

Phase	Activity	Indicator	Method	Frequency	Responsibility	Monitoring Budget
Pre-Construction	Site selection & design	Approved ESMP, hydrological study in place	Document review	Once before approval	PMU / Design Consultant	Part of the contract budget
	Risk of potential land acquisition	Signed agreements, consultation records	Field verification, document review	As required	PMU	Part of local/woreda governments budget
	Contractor mobilization	LMP approved, CoC signed, GRM functional	Checklist verification	Before mobilization + follow-up	PMU	Part of the contract budget
	Stakeholder engagement	Consultation minutes, attendance	Meeting records	Continuous	PMU	Part of the contract budget Part of local/woreda governments budget
	Cultural heritage	Chance Find Procedure included	Contract review	Once	PMU	Part of the contract budget
Construction (Environmental)	River intake works	Erosion control structures in place	Site inspection	Weekly	Contractor / PMU	Part of the contract budget
	Excavation & canal works	Dust levels, noise complaints	Observation, community feedback	Weekly	Contractor	Part of the contract budget
	Fuel handling	Spill incidents	Incident logs, inspection	Continuous	Contractor	Part of the contract budget
	Vegetation clearing	Area restored	Site measurement	Monthly	Contractor	Part of the contract budget
	Waste management	Waste logs, disposal records	Logbook review	Weekly	Contractor	Part of the contract budget Part local government
Construction (Social)	Workforce safety	PPE use, accident records	Inspection, logs	Continuous	Contractor	Part of the contract budget

	Labor influx / GBV	Complaints, training records	GRM review	Monthly	Contractor / PMU	Part of the contract budget
	Community safety	Incident reports	Field checks	Weekly	Contractor	Part of EFMP budget Part of supervising firm's contract Part of regulatory bodies'
	Water abstraction conflicts	Complaints logged	GRM review	Monthly	PMU	Part of EFMP budget Part of supervising firm's contract Part of regulatory bodies'
	Grievance mechanism	Resolution time, number of cases	GRM database	Monthly	PMU	Part of the contract budget Part of EFMP budget Part of supervising firm's
Operation & Maintenance	Water abstraction	River flow records	Flow measurement tools	Quarterly	MoWE / ABDO	Part of EFMP budget Part of Local government
	Canal maintenance	Desilting logs	Maintenance records	As needed	MoWE / ABDO	Part of EFMP budget Part of Local government
	Water use conflicts	Complaint records	GRM review	Monthly	MoWE / ABDO	Part of EFMP budget Part of Local government
	Worker safety	Incident records	Safety audits	Continuous	O&M Agency	Part of EFMP budget Part of Local government
	Community safety	Fencing, signage	Field inspection	Quarterly	MoWE / ABDO	Part of EFMP budget Part of Local government Regulatory body

8. Institutional Arrangements

The implementation of the Environmental and Social Management Plan (ESMP) is guided by clearly defined institutional responsibilities and coordinated arrangements among key stakeholders. The Project Implementing Unit (PIU) holds overall responsibility for overseeing ESMP implementation, including consolidating reports and ensuring compliance with World Bank requirements. Day-to-day execution of ESMP measures is carried out by the Contractor, who is directly responsible for integrating environmental and social safeguards into routine project activities.

To ensure compliance and accountability, the Supervision Engineer (or Supervision Consultant) plays a critical role in monitoring implementation progress and verifying that all ESMP requirements are met on the ground. This includes regular inspections, documentation, and corrective guidance where necessary. In parallel, the Regional Environmental Authority provides independent regulatory oversight, ensuring that the project adheres to national environmental laws and standards.

Together, these institutions form a coordinated framework that supports effective ESMP implementation, monitoring, and enforcement throughout the project lifecycle.

9. Conclusion

The implementation of this ESMP will ensure that environmental and social risks associated with the irrigation off-take structures are effectively managed, and that project benefits are achieved in a sustainable and socially inclusive manner in compliance with World Bank requirements.

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