Republic of Liberia

Ministry of Public Works

South Lynch Street
Monrovia, Liberia

REQUEST FOR EXPRESSIONS OF INTEREST (REOI) – FIRM SELECTION

COUNTRY:	**Republic of Liberia**
NAME OF PROJECT:	**Liberia Urban Resilience Project**
PROJECT ID:	**P169718**
CREDIT/GRANT No.:	**IDA-7122-LR and E041-LR**
ASSIGNMENT:	**Consultancy Services for the Conduct of Feasibility Studies, Preparation of Technical Designs & Bidding Documents, Environmental & Social Instruments and Construction Works Supervision Services in Northern Bushrod Island and Southeastern Paynesville Areas (Phase One) and in Central Monrovia and Omega Market (Phase Two).**
REFERENCE No.:	**LR-MPW-448885-CS-QCBS**
Place of Assignment:	**Northern Bushrod Island and Southeastern Paynesville (Phase One) and Central Monrovia and Omega Market (Phase Two) in Greater Monrovia**

The Government of the Republic of Liberia has received financing from the World Bank toward the cost of the **Liberia Urban Resilience Project (LURP)** and intends to apply part of the proceeds for the **Consultant's Services for the Conduct of Feasibility Studies, Preparation of Technical Designs & Bidding Documents, Environmental & Social Instruments and Construction Works Supervision Services in Northern Bushrod Island and Southeastern Paynesville Areas (Phase One) and in Central Monrovia and Omega Market (Phase Two).**

The objective of the Consultancy services ("the Services") is to engage a competent firm, JV or consortium, to prepare acceptable bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, fully costed neighborhood upgrade interventions, Local Area Resilience Plans, Preliminary Design Report including urban design sketches, preliminary cost estimate, Detailed Design report

and Bidding documents, including Final Design Basis, Environmental and Social Framework (ESF) instrument preparation including, Environmental and Social Impact Assessment (ESIA) and associated Environmental & Social Management Plan (ESMP), Biodiversity Management Plan (BMP), Site Specific Solid Waste Management Plan (S-WMP), Umbrella Solid Waste Management Plan (U-WMP), and standalone Resettlement Action Plan (RAP) Report, and Supervision of Construction Works for the prioritized LURP Areas in Northern Bushrod Island and Southeastern Paynesville and Feasibility Studies only in Central Monrovia and Omega Market.

The assignment is expected to commence in January 2025. The successful firm will sign both lump sum and timed-based contracts, in respect to the assignment.

For detailed terms of reference for this assignment with scope of assignment and specific tasks, qualifications and experience and other requirements, please visit the Ministry's website: https://www.mpw.gov.lr, www.iiu-mpw.org and www.emansion.gov.lr

The Ministry of Public Works ("the Client") now invites eligible Firm Consultants, JV or a consortium to submit Expression of Interest (EOI) in providing the Services. Interested Consultants must provide their detailed profile demonstrating that they meet the following shortlisting criteria:

- **Core business of the firm/JV/Consortium that is relevant to the assignment**
- **At least 12 years of general experience implementing study, design and works supervision contracts for civil engineering projects, specially designing urban drainage infrastructure and flood mitigation nature-based solutions, conducting ESIAs, ESMPs, RAPs, WMPs, and BMPs, worldwide, specifically in developing countries. Experience in the West African Sub-Region is an advantage.**
- **At least 10 years demonstrated specific experience in the study, design and works supervision of flood risk management and/or hydrological/hydraulic engineering projects in developing countries**
- **Have a proven record of successful completion of at least 3 assignments related to the design and construction supervision or rehabilitation of hydraulic structures, dredging works, and or urban drainage and water management projects involving investments over $10 million. Demonstrated proven record of successful completion of at least 3 assignments related to ESIAs, ESMPs, RAPs, WMPs, and BMPs involving investments over $10 million is required. This list must include relevant projects successfully completed in Liberia, if the firm has worked in Liberia before.**
- **Experience in providing technical assistance for the preparation of procurement packages and bids evaluation reports**.

- **Evidence of technical and managerial capability to complete the assignment (Provide only the structure of the firm, general qualifications, and number of key staff. Do not provide CVs of staff as Key experts will not be evaluated at the shortlisting stage.)**

The attention of interested Consultants is drawn to the fact that Selection of Firm/Consortium will be done in accordance with the World Bank's "Procurement Regulations for IPF Borrowers ("Procurement Regulations") dated July 2016 and updated fifth edition dated September 2023.

Consultants may associate with other firms in the form of a Joint Venture (preferably with Liberia-based firms) or a sub consultancy to enhance their qualifications.

A Firm/Consortium of firms will be selected in accordance with the Quality and Cost Based Selection (QCBS) method set out in the IPF Procurement Regulations.

Further information can be obtained at the address below during office hours (0900 to 1700 hours) from Monday to Friday excluding lunch hour (1300 to 1400 hours) and public holidays. A copy of the TOR for the assignment can be accessed through our website: https://www.mpw.gov.lr, www.iiu-mpw.org and www.emansion.gov. (Note that there may be slight amendment in the TOR).

The completed expression of interest documents in writing must be delivered in hard copies and via email so as to be received on or before **September 27, 2024,** at 1500 hours GMT. For Expressions of Interest (EoIs) that will be deposited at the Tender Box, the packages must be clearly marked: Contract No: **LR-MPW-448885-CS-QCBS: CONSULTANCY SERVICES FOR THE CONDUCT OF FEASIBILITY STUDIES, PREPARATION OF TECHNICAL DESIGNS & BIDDING DOCUMENTS, ENVIRONMENTAL & SOCIAL INSTRUMENTS AND CONSTRUCTION WORKS SUPERVISION SERVICES IN NORTHERN BUSHROD ISLAND AND SOUTHEASTERN PAYNESVILLE AREAS (PHASE ONE) AND IN CENTRAL MONROVIA AND OMEGA MARKET (PHASE TWO) IN GREATER MONROVIA** ; and addressed to:

Project Coordinator
Liberia Urban Resilience Project
Ministry of Public Works
P O Box 9011, Monrovia, Liberia
Tel: +231 886 651 3239
Email: gsflaboesr@mpw.gov.lr cc: lurpmidp.procurement@gmail.com
Website: www.mpw.gov.lr

Republic of Liberia
Ministry of Public Works

Liberia Urban Resilience Project (LURP)

Revised Terms of Reference

Consulting Services for the Preparation of Technical Design & Bidding documents, Environmental & Social Instruments, and Construction Works Supervision Services in Northern Bushrod Island and Southern Paynesville (Phase One) and Omega Market and Central Business District (Phase Two)

September 2024

Acronyms

AOI	Area of Influence
BMP	Biodiversity Management Plan
BOQ	Bill of Quantity
E&S	Environmental and Social
EPA	Environmental Protection Agency
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESHS	Environment, Social Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
GBV	Gender Based Violence
IAP	Interested and Affected Parties
KE	Key Expert
LLA	Liberia Land Authority
LMP	Labour Management Procedures
LURP	Liberia Urban Resilience Project
LWSC	Liberia Water and Sewerage Corporation
MCC	Monrovia City Corporation
MIA	Ministry of Internal Affairs
MOT	Ministry of Transport
MPW	Ministry of Public Works
NDMA	National Disaster Management Authority
PAD	Project Appraisal Document
PAP	Project affected person
PCC	Paynesville City Corporation
PMU	Project Management Unit
PSC	Project Steering Committee
PTC	Project Technical Committee
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
S-WMP	Site-Specific Waste Management Plan
SEA/SH	Sexual Exploitation and Abuse/Sexual Harassment
SEP	Stakeholder Engagement Plan
TOR	Terms of Reference
U-WMP	Umbrella Waste Management Plan
WB	World Bank

1.0 Introduction

Urban development and disaster risk management are key elements of Liberia's medium and long-term national development strategy. Floods are highlighted in the National Disaster Risk Reduction and Resilience Strategy of Liberia (2020) which aims to reduce and control the risks associated with floods, coastal erosion, and windstorms in the Monrovia area (Action 3.1.). Coastal erosion risks are being addressed by the United Nations Development Program (UNDP) through the "Monrovia Metropolitan Climate Resilience Project".

Monrovia's vulnerability to floods is due to its low-lying, flat topography and lack of adequate drainage. Flood events in Monrovia and the surrounding areas resulted in over 30,000 affected people, during 2018, including thousands of children. Monrovia's surface water system was constructed between 1955-1957 with later additions to accommodate urban growth. The system is plagued by several challenges, including lack of maintenance, inadequate and fragmented drainage construction and connection to sewers, illegal connections of sewage pipes to drains, intersection of drainage with major sewer line leading to sewage spillage in the city, broken force-main sewer system, and lack of funding. Flood impacts on residential areas and infrastructure are set to increase, including disruptions in access to markets and schools, and significant health risks for the population. A disaster and climate risk assessment for Monrovia reveals that about 140,000 people (14 percent) in Greater Monrovia are directly affected by predominantly pluvial flooding on average every year. The average annual direct economic damage is about US$20 million (0,6 percent of GDP). Climate change will further increase these numbers.

Pluvial flooding (from the rain) poses the highest flood related risk in Liberia. Although fluvial (river) floods are of the greatest depth, pluvial flooding creates the highest risk in terms of damage due to the area covered and frequency. Greater Monrovia experiences regular flooding from both coastal flooding and flooding from the St Paul River to the north of the city. Severe fluvial flooding can affect larger areas of the city given the low-lying nature of the land around the Mesurado River and Stockton Creek. The existing built-up area requires a combination of grey-green–blue interventions to mitigate the growing impacts of urban flooding including substantial repairs.

Inadequate infrastructure and flood risks combined with management deficiencies negatively affect the resilience, economic activity, and revenue potentials of markets in Greater Monrovia. Duala market is one of Monrovia's biggest markets and is illustrative of the challenges faced by Monrovia's markets. The Duala market has expanded 11.8 times in size without planning since its creation. Therefore, the Duala market suffers from a fragmented and ineffective drainage system. Further, it is estimated that 93 percent of toilets are within 100m of wetlands with exposure to flooding, posing epidemiological risks. A lack of clarity of organizational structure and lack of investments contribute to food losses (5.6 percent of daily products) and a lack of revenues to invest in the market infrastructure. Currently, 72-89 percent of vendors operate informally and their inclusion in an improved formal market management system could increase revenues by 2.6-7.9 times. Consolidating and regulating market fees throughout the entire expanded area would decrease informal payments and increase payment of daily market ticket fees.

Within this context, the Government of Liberia (through the Ministry of Public Works) requested financing from the World Bank for the Liberia Urban Resilience Project (LURP), which is part of a package of World Bank support for urban development and economic transformation. The project was approved in May 2022 and became effective in February 2023. The Project Development Objective

(PDO) is to enhance climate resilience and urban living conditions in Liberia and to strengthen institutional capacity for sustainable urban management. The overarching objective of this assignment is to develop a cost-effective, community-owned, and sustainable plan and design for flood risk management infrastructure and targeted upgrading interventions. Specific objectives include:

1. Defining a local area resilience plan and a package of interventions within the available budget.
2. Preparing detailed designs and bidding documents according to the World Bank's standards.
3. Ensuring environmental and social safeguard impacts are properly assessed and mitigation plans prepared.
4. Ensuring drainage infrastructures in the Project areas are designed to cope with flood events between 5-10 years.

Currently, the Bank supports several other projects, where synergies and collaboration are being forged, including the Cheesemanburg Landfill and Urban Sanitation Project (P159961), the Liberia Urban Water Supply Project (P155947), and the Liberia Land Administration Project (P162893).

To meet its development objectives, the proposed LURP will have four components:

Component 1	Climate Resilient Infrastructure and Urban Upgrading	**US$30 million**
	1.1.Climate Risk Management Infrastructure	US$25 million
	1.2.Climate Resilient Community and Market Upgrading	US$5 million
Component 2	Strengthening Integrated Resilient Urban Development Capacity	**US$6 million**
	1.1.Resilient Urban Planning and Development Control	US$3 million
	1.2.Solid Waste Management Operations and Financing	US$3 million
Component 3	Project Management	**US$4 million**
Component 4	Contingency Emergency Response Component	**US$0 million**
Total		**US$40.0 million**

In addition to US$40 million IDA financing, the French Development Agency (AFD) will provide parallel financing for EUR 10.0 million (US$11.3 million) for neighborhood upgrading activities. AFD will finance neighborhood upgrading activities under component 1 in three neighborhoods (Shoe Factory, Wood Camp, Lakpazee). AfD funding activities are not covered or included in the activities of this consultancy service. However, both projects are expected to be implemented in parallel with similar implementation periods and working through the same implementation arrangements, including using the same Project Management Unit (PMU), housed in the Ministry of Public Works (MPW).

A Project Steering Committee (PSC) is established to provide strategic oversight, review annual work plans and budgets, regularly review implementation status, support in resolving policy coordination challenges throughout project implementation, and ensure ownership and institutional sustainability beyond the project term. The PSC is chaired by MFDP and MCC, Ministry of Internal Affairs (MIA) and PCC are co-chairs. Members are EPA, LLA, MPW, and NDMA. A Project Technical Committee (PTC) is established to guide technical discussions and coordinate technical input to TORs, specifications, evaluation committees, and technical reviews of consultancy outputs. The PTC ensures that technical inputs are provided in time and regularly monitors implementation progress at the technical level. The PTC is chaired by MPW and members include EPA, MCC, MFDP, MIA, and PCC. The PMU serves as the secretariat for the PTC. AFD and the World Bank are observers of this group.

With support from the World Bank, the Ministry of Public Works (MPW) intends to re-tender the project for completing feasibility studies, preliminary and detailed designs, preparation of environmental and social instruments (including ESIA, BMP, ESMP, S-WMP, U-WMP, C-ESMP, RAP) and preparing bidding documents for the Liberia Urban Resilience Project (LURP). This document outlines the revised TOR, focusing on drainage, flood risk management, and community upgrading infrastructure and formulation of Environmental and Social instruments in Greater Monrovia, specifically in Northern Bushrod Island, Omega Market area, Central Business District, and Southeastern Paynesville.

This assignment will focus on drainage and flood risk management interventions and upgrading in the communities identified above which are financed under Component 1 through the Bank's IDA financing only (see Figure 1). The upgrading tasks in communities are expected to be front-loaded in this assignment. In consultation with the project Management Unit (PMU) and MPW, the consultant will identify community upgrading interventions in the four project areas that will not require environmental and social instruments and design these activities for tendering before completing the final design.

This Consultancy Services will focus on Component 1 of the LURP which finances rehabilitation of existing and implementation of flood risk management and community upgrading infrastructure in selected areas. The rehabilitation of drainage systems will finance the cleaning of surface and underground channels by the removal of sludge, silt, organic material, and debris. The component will also finance the repair of surface and underground channels, including the replacement of broken or missing manhole covers. This will be complemented with new blue-green-grey drainage measures, including blue solutions (open water areas for temporary stormwater storage), green solutions (wetland or green vegetated areas to maintain soil infiltration and temporarily store surface stormwater), and grey solutions (traditional constructed drainage of adequate size and design to drain roads and residential areas). The project is envisaged to finance several measures with traditional concrete drain channels conveying water towards rehabilitated/protected urban wetlands and permeable paving to enhance infiltration or green swales (vegetated strips that capture and store stormwater from roads and residential areas). Such measures will be combined with improved land use planning, zoning, and construction permitting (see below). The drainage design should also consider protection against solid waste (generated from marketplaces or nearby households) as well as human waste associated with such an environment.

Apart from access and drainage investments, the activities will include other public infrastructure for markets and communities such as water supply, sanitation (wastewater and solid waste collection facilities), and community facilities such as community halls, open spaces, playgrounds, etc. Many of these facilities should consider the functional rehabilitation of underutilized spaces where feasible. Project investments would complement existing/ongoing World Bank-financed projects in related sectors either through working in neighborhoods where no network services are in place or by focusing on upgrading reticulation/neighborhood systems where there is access to network services. The specific investments will depend on the completion of feasibility reports with recommendations from the consultant, which will also ensure that gender gaps will be identified and addressed through the investments, for example ensuring that sanitation facilities are safe for women.

These Terms of Reference are organized as follows. A further description of the project scope is provided in Section 1.2. Section 2 provides the details of the objectives and the required tasks in this

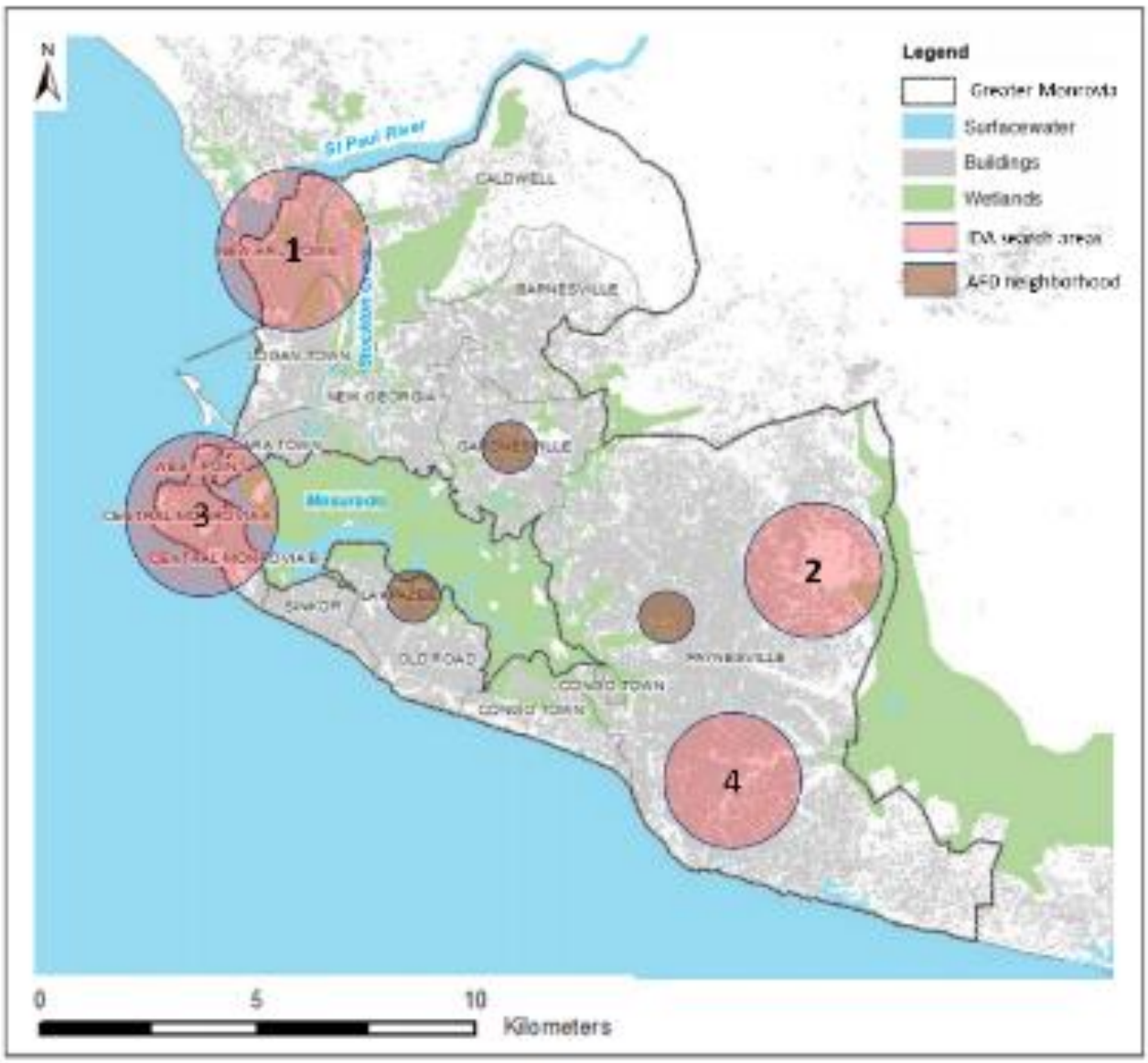

Figure 1: Four search areas in Monrovia for Component 1 in this TOR: The northern part of Bushrod Island (1), the area around Omega Market (2), the Central Business District (3) and southeastern Paynesville around Duport Rd (4). Areas (1) and (4) are to be front-loaded. The selected AFD neighborhoods (Lakpazee, Shoe Factory and Wood Camp) are also indicated in this map.

Consultancy Services and the necessary expertise required of the Consultant for this assignment.

1.1 Project Description

This assignment shall further define the scope of interventions in the four locations depicted in Figure 1 which will fit into this budget. It is expected that the majority of the available budget will be spent on improving the urban flood risk management infrastructure (+/- 80%), and the remainder will be dedicated

to other small public infrastructure in the neighborhoods. Depending on the outcome of the Feasibility Study, the final selection of the interventions for implementation may or may not cover all areas depending on budget and other constraints. The budget allocation and also the tentative overall timeline of the project implementation are provided in Tables 1 and 2 below. This schedule is subject to change as project preparation and procurement continues.

Table 1: Component 1 Budgetary Allocation

Component 1 Allocation (US $ M)	**30**
Flood Risk Management Infrastructure (of which 15-20 percent Urban Upgrading)	26
Feasibility, Design, Environmental and Social Studies and Instruments and Supervision	2.5
Resettlement Compensation	1.5

Table 2: Tentative timeline for implementation

Key Activity	Proposed Start Date
Consultant's commencement of services Component 1	November 2024
Draft Inception Report including design standards, review, and assessment of existing data, reports, including a detailed work plan. and a work plan for the ESIA and associated ESMP (including BMP and S-WMP), U-WMP, and RAP.	December 2024
Feasibility Studies and Preliminary Designs Component 1 Completed – Location 1	March 2025
Preliminary/Scoping report of the ESIA and associated ESMP, BMP, S-WMP and U-WMP, and RAP – Location 1	March 2025
Detailed Designs Component 1 Completed – Location 1	July 2025
Submission of ESIA and associated ESMP, BMP & S-WMP, U-WMP, and RAP Report to PMU, WB and EPA – Location l	July 2025
Issuance of EPA's ESIA Permit/License – Location 1	October 2025
Works Bidding Completion for – Location 1	January 2026
Works Contract Awarded – Location 1	January 2026
Feasibility Studies and Preliminary Design Component 1 Completed – Location 4	September 2025
Detailed Design Component 1 Completed – Location 4	January 2026
Submission of ESIA and associated ESMP, BMP & S-WMP, and RAP Report to PMU, WB and EPA – Location 4	January 2026
Issuance of EPA's ESIA Permit/License – Location 4	April 2026

Works Bidding Completion – Location 4	July 2026
Works Contract Awarded – Location 4	July 2026
Works Substantially Completed – Locations 1	October 2026
Feasibility and Pre-design studies including ESIA and its associated ESMP, BMP & S-WMP, and RAP Report Completed - Locations 2 and 3	May 2026
Works Substantially Completed – Locations 4	May 2027

Note: It is expected that pre-design studies and preliminary and detailed designs for Location 4 will be executed concurrently with the Bidding and Contract Award phases for Location 1.

The main locations being considered for this intervention, which requires further feasibility assessment and validation to determine the economic, technical, environmental, and social viability of these locations are as indicated below (see also Figure 1):

Location 1: Northern Bushrod Island

- The northern part of Bushrod Island around the Duala Market (under the jurisdiction of Monrovia City Council, MCC) extending from the south of Logan Town, Jamaica Road – UN Drive Intersection, Momboe Town, Duala Market (both east toward the St. Paul River tributary and westward toward New Kru Town and Beer Factory Community. Approximate area 2224 acres (900 ha).

Location 2: Omega Market Area

- The Omega Market includes the entire section of the Omega Ball (approximately 452 acres) and the north of Soul Clinic Community (under the jurisdiction of Paynesville City Corporation, (PCC). Approximate area 1235 acres (500 ha).

Location 3: Central Monrovia, Soniwein CBD

- The central business district of Monrovia with particular reference to the Water Street business area extending to the UN Drive Road. Further priority is given to the City's only functional stormwater drainage facility, Soniwein, serving the south of the City's CBD. Approximate area 865 acres (350ha).

Location 4: Southeastern Paynesville

- The southeast of Paynesville includes the south of Zayzay Community, GSA Road & Duport Road Communities and extends toward the coast in the South (RIA Highway). Approximate area 2965 acres (1200 ha).

See Appendix A for detailed descriptions of the project locations.

The Consultant shall initially focus its work on Locations 1 and 4, commencing with Location 1. He shall complete all works for Location 1—Pre-design studies, preliminary and final designs, E&S instruments, and final bidding documents—before commencing work in Location 4. Upon completing works for Location 4 through the delivery of the final design, E&S instruments, and final bidding documents, the Consultant shall commence Pre-design studies for Locations 2 and 3. The rest of the works for Locations

2 and 3 (preparation of preliminary and final designs, preparation of E&S instruments, final bidding documents, procurement support, and civil works supervision) shall be executed contingent upon the availability of funds and time and would require a scope change for this assignment; their sequencing shall be similar to that of Locations 1 and 4, beginning with Location 2. **The Consultant's price proposal shall be a lump sum disaggregated into: 1) cost for completing all works for Locations 1 and 4 (Pre-design studies through procurement support, including E&S), 2) works supervision for Locations 1 and 4, and 3) Pre-design studies, with cost, for Locations 2 and 3 (See also Section 3.0).**

A previous consultant, whose contract was not continued, completed a significant amount of the pre-design studies for the four project locations, including surveys (topographic and bathymetric), community mapping to identify needs and priorities, development of Local Area Resilience Plans, and development of a Design Basis. A detailed analysis of the previous consultant's effort is attached as Appendix B to assist the Consultant assess the level of completeness of this work and the level of effort that would be required to complete the studies. **Appendix C contains the list of reports, maps, and data, including shapefiles, DEMs, contour maps, etc. generated by the previous consultant, all of which will be handed over to the Consultant. While the Consultant will do a detailed review of and verify this information during the inception stage, it is strongly recommended that the Consultant review this information prior to submitting its proposal.**

Description Scope of services

This Section describes the scope of services, objectives, goals, specific tasks required to implement the assignment, and relevant background information; provides details on the required qualifications of the key experts; and lists the expected deliverables. This information is for planning, surveys, engineering designs, and bidding documents preparation for the Liberia Urban Resilience Project to be implemented in the above-mentioned locations.

2.0 Objectives of Consultancy Assignment

The overarching objective of this assignment is to work in close collaboration with the Project Management Unit (PMU) and other relevant stakeholders to review previous studies and reports to identify information and data gaps, and implement additional studies and surveys, as may be required, including the development of the necessary reports, to finalize the pre-design studies that will inform the development of a cost-effective, community-owned, and sustainable plan and design for flood risk management infrastructure and targeted upgrading interventions in specific areas of Greater Monrovia. This work shall initially be limited to Locations 1 and 4. Interventions in Locations 2 and 3, to be initially limited to Pre-design studies with cost, shall follow the completion of pre-design study and design works in Locations 1 and 4.

Specific objectives of this assignment are:

For Locations 1 and 4:

a) define a Local Area Resilience Plan and a package of interventions in the selected areas within the available budget for blue-green-grey flood risk management and community infrastructure, based on a community-oriented planning and design exercise,

b) Prepare Preliminary Design based on data review, additional surveys as may be required, and hydrologic and hydraulic modeling

c) Prepare Environmental and Social Instruments (ESIA and associated ESMP, BMP, S-WMP, U-WMP, and standalone RAP)

d) Prepare Detailed Designs with Bidding Documents following the World Bank's Standard Bidding Documents for the selected contract package of works

e) Provide Procurement Support and Works Supervision.

For Locations 2 and 3: Perform Pre-design studies.

2.1 Principles and Guidelines

The following overarching considerations need to be addressed during the preparation of all aspects of the project:

a) Stakeholder involvement

The guiding principle is the active participation of communities in all stages of preparation and implementation. Demands from stakeholders shall be taken carefully into consideration in the further detailing and design of the interventions. The consultant shall identify, analyze, and map stakeholders to facilitate consultations with such stakeholders and entities, to factor their views, needs, and priorities into the planning, designing and construction phases of the intervention. All stakeholder engagement should be inclusive targeting gender, youth, and diverse ethnic groups and persons with disabilities. The Consultant will undertake public consultations, as much as it is possible, with the relevant stakeholders including the different categories of project participants and other affected people like the elderly, the youth, women, people with disabilities, and other marginalized groups. Some important stakeholders and institutions of Government already identified under this project include:

NATIONAL LEVEL
Ministry of Finance & Development Planning (MFDP)
Ministry of Public Works (MPW)
Ministry of Internal Affairs (MIA)

MUNICIPAL LEVEL
Monrovia City Corporation

Paynesville City Corporation
Townships

AGENCIES
Liberia Institute of Statistics and Geo-Information Services (LISGIS)
Environmental Protection Agency (EPA) (including relevant nature protection/ wetland groups)
National Disaster Risk Management Agency (NDRMA)
National Water Sanitation & Hygiene Commission (NWASHC)
Liberia Water and Sewer Corporation (LWSC)
Liberia Land Authority (LLA)
Liberian Hydrological Service (LHS)(MME)
Liberian Meteorological Service (LMS)(MOT)
WASH Commission
Liberia Marketing Association (LMA)

PARTNERS

Japan International Cooperation Agency (JICA)
European Union (EU)
Cities Alliance
Liberian WASH Consortium
United States Agency for International Development (USAID)
Agence Francaise de Development (French Development Agency)
World Bank (WB)
United Nations Development Programme (UNDP)

b) Environmental and Social issues

Upgrading should aim to improve infrastructure and services with minimum relocation or resettlement in order to maintain the social fabric of communities and minimize expropriation costs. Also, infrastructure will be designed to maximize environmental benefits and minimize any negative environmental impacts, using costed alternative design options and scenarios. Special consideration of environmentally sensitive areas around Monrovia, including the RAMSAR-designated Mesurado Wetlands. Also, special attention shall be paid to any contaminated dredged material/excavated soil and garbage (e.g., cleaning of primary drains) that must be collected, transported, stored, treated, and disposed of in a landfill. Since clogging of the drains by garbage is a widespread issue, this project shall take this aspect as a key priority into account during feasibility and design studies.

c) Green-blue-grey urban drainage infrastructure

Investments that must be considered are green-blue-grey infrastructure. All locations of interest including, initially, Northern Bushrod Island (Location 1), and Southeastern Paynesville (Location 4), but also Monrovia Central Business District (CBD) - Soniwein (Location 2) and Omega Market (Location 3) have good opportunities to maximize the use of green-blue infrastructure in combination with grey infrastructure to lower the flood risk. This will include blue solutions (open water areas for temporary stormwater storage), green solutions (wetland or green vegetated areas to maintain soil infiltration and temporarily store surface stormwater), and grey solutions (traditional constructed drainage of adequate

size and design to drain roads, residential areas and markets). These opportunities shall be carefully considered in the initial stages of the exploration of interventions. The recent World Bank Catalogue of Nature-Based Solutions for Urban Resilience should be consulted and integrated wherever possible. https://openknowledge.worldbank.org/handle/10986/36507

d) Integration in the urban fabric and community upgrading

Although the focus will be on drainage infrastructure, opportunities for park & community infrastructure/furniture that would create a community space that could be used during the dry season. Neighborhood upgrading should be considered where it can be easily integrated. The consultant should explore options of urban integrated interventions that look into sustainable urban mobility, social, economic, environmental, and technical aspects; in this sense review the use of public spaces including retention basins that could bring durable improvement to the community utilizing solutions articulated to the existing urban fabrics, with emphasis on optimum use of spaces, building on existing features in each of the selected areas for the provision of public services and facilities. Since waste management is a major problem in the targeted project areas and also leads to clogging of the drainage system, this aspect shall have special attention. Improvements and interventions to improve waste collection and disposal shall be identified and designed if possible through close consultation with the local stakeholders as part of the feasibility studies (e.g. small-scale waste depots).

e) Affordable, sustainable, and responsive to Community demands

Investments must be built at an affordable level, specifically because of Operation and Maintenance during the lifetime of these investments. This could also imply a strong focus on use of local materials and equipment to maximize the impact of the existing budget but also to ensure that the infrastructure can be easily maintained. The Consultant should explore local trends that are applicable as well as cosmopolitan realizing that the nature and architecture of the environment have a significant bearing on the quality of livelihood of the environment. Labor-intensive methods should be considered throughout, to maximize opportunities for employment and livelihood opportunities for the local community.

Adopting a multisectoral approach will encourage communities to include the most basic service improvements in their upgrading packages, these synergies tend to increase social and economic benefits. Previous investigation of residents in similar communities indicates a strong preference for the specific needs:

Top priority needs common to all communities are:

- drainage
- improved roads (with safe designated pedestrian spaces)
- drinking water
- community halls
- public toilets

Specific needs expressed by women and young people are:

- playgrounds

- drainage
- access to drinking water
- libraries
- recreation/sports areas

Women expressed that is it very important for them to have a safe place where they can take their children and grandchildren and where youngsters can have an occupation (sports, recreation, education, etc.). The consultant is expected to validate these demands for possible inclusion to an extent where budget and facilities are available.

f) Climate resilient and adaptable

Investments must be built with a thorough investigation of future climate changes (e.g., rainfall) and also be adaptable when the city further grows and/or climate is changing requiring higher service levels of the infrastructure. The infrastructure will be designed with climate resilience in mind so that 10-year floods under the most likely 2070 climate scenario will be anticipated and designed for. This objective will be validated in this study to ensure that this is economically viable and cost-effective. It may be that a 1-in-5 return period in 2070 is more cost-effective. Appropriate modelling and cost-effectiveness analysis needs to be conducted to validate the most cost-effective design.

g) Project management aspects

The project is under a tight time constraint, having already lost several months. Therefore, timely delivery of the consultancy services according to the schedule presented in these Terms of Reference is critical for the client. The consultant shall make every effort to adhere to the schedule. The Ministry of Public Works, as well as the PMU, will work closely with the Consultant to provide all services necessary to achieve the previously stated objectives in full and to the satisfaction of the Client per the Principles & Guidelines and the provisions defined in these Terms of Reference.

3.0 Scope of the Assignment

This project was conceptualized and designed to mitigate flooding risk in four designated neighborhoods in Greater Monrovia, including Northern Bushrod Island (Location 1), Omega Market Area (Location 2), Central Monrovia, Sonewein CBD (Location 3), and Southeastern Paynesville (Location 4) by constructing climate risk management infrastructure, and to improve urban livelihoods. This Terms of Reference is structured into the following four distinct PARTS to clearly delineate the work that needs to be done:

PART 1: Feasibility Studies and Designs
PART 2: Environmental and Social Impact Instruments (ESIA and associated ESMP, BMP, S-WMP, U-WMP and Standalone RAP)
PART 3: Procurement Support
PART 4: Works Supervision

As outlined in Section 1.1, the above work shall be limited to Locations 1 and 4, except that the Consultant shall also undertake feasibility studies, with cost, for Locations 2 and 3. The Feasibility Studies and Designs, and Environmental and Social Impact Assessment (ESIA and RAP) shall be completed for Location 1 before commencing the feasibility study and design for Location 4. The Consultant shall also

prepare the Umbrella-Solid Waste Management Plan for Grater Monrovia during the feasibility study for Location 1. The assignment will require two dedicated teams to enable the feasibility studies and designs to proceed simultaneously with the preparation of the Environmental and Social Instruments (ESIA and associated ESMP, BMP, S-WMP, U-WMP, and Standalone RAP).
The Consultant shall anticipate that the total budget for the works for which detailed designs, bidding documents, environmental documentation, and supervision must be carried out is US$25 M. How these funds will be allocated to the various locations will depend on the outcome of the detailed studies and costing of the interventions.

3.1 PART 1: Feasibility Studies and Designs

Under this phase, the Consultant shall undertake feasibility studies to assess the risks of flooding and associated impacts in the project communities, determine interventions required to mitigate those risks, and prepare preliminary and detailed designs of the proposed infrastructure. The designs shall be accompanied by Local Area Resilience Plans.

This phase of the project will require active stakeholder engagement. Stakeholder meetings shall be organized together with the Ministry of Public Works and the PMU for consultations with stakeholders in all the project locations to understand project concerns from the stakeholders, to obtain feedback during the design process and sensitize them to proposals being considered, and to discuss possible ideas with the stakeholders for integrating the interventions into the urban context of Greater Monrovia.
Official stakeholder meetings are required at three moments: (i) to consult on priorities at the start of the Local Area Resilience Plan and Preliminary Design Stage, (ii) to validate the plan and designs at the end of the preliminary design phase and (iii) to consult on the detailed design. The first two have been completed but need to be validated.

These meetings will be organized in each project area and will include both local and governmental stakeholders with discussions in English. The Consultant is responsible for the logistics and costs of the venue, light snacks/drinks. The Ministry of Public Works and PMU will be responsible for inviting the stakeholders. The Consultant will prepare presentation materials in coordination with the PMU, be present at the meetings and present the proposed works, and do the reporting of these meetings.
PART 1 consists of the following three stages:

1. Stage 1: Inception
2. Stage 2: Feasibility studies (surveys, hydrological and hydraulic modeling, etc.) and preliminary Design, resulting in a Local Area Resilience Plan
3. Stage 3: Detailed design

These three stages are discussed in detail below.

Stage 1: Inception

The Consultant shall use the inception phase to review and verify the work done under the previous consultancy, including the Inception and Pre-design Studies Reports, all surveys, hydrologic and hydraulic modeling, geotechnical investigations, etc., and define any additional survey and other work needed; get familiar with the project scope, data availability, and the stakeholders' involvement; develop a detailed work plan for the neighborhood upgrade task, and design phase of the project. The PMU will visit the project areas with the Consultant, have initial meetings with stakeholders, and discuss the details of the

project. Also, the Consultant will be introduced to the relevant agencies and Ministries of Government. The Consultant will also discuss with MPW practical details regarding the use of formats and software in which the digital versions of the documentation of this assignment shall be presented to the PMU for approval and record.

The PMU will hand over at the start of the Inception phase the following data:

- Past reports on the drainage system and other infrastructure assessments (e.g. JICA study)
- Orthophotos collected in 2019-2020 (source: World Bank)*
- Digital Elevation Model (source: World Bank)**
- Modeling data Flood Hazard and Risk Assessment (source: World Bank)***
- Maps of relevant project areas/ previously analyzed settlements
- Topographic and bathymetric survey data and reports (Source: WAPCOS, 2024)****
- Reports and minutes of Stakeholder engagement meetings (Source: WAPCOS, 2024)
- Partially completed geotechnical investigation data and report (Source: WAPCOS, 2024)
- Project Inception Report (Source: WAPCOS, 2024)
- Pre-Design Studies Report—Stage 2, including all maps, shapefiles, computer models, and other data, (Source: WAPCOS, 2024)
- Know Your City Neighborhoods (Greater Monrovia)
- Earlier survey reports of Omega Market including road designs, etc.
- EPA studies and data on flooding in Monrovia
- All other related project reports and data of studies conducted around the proposed project locations containing information relevant to the design of the project.

* The orthophoto imagery covers most of the search areas except for the Omega Market area. These orthophotos provide a very detailed imagery of the areas of interest.

** The Digital Elevation Model available is a satellite-derived product with a 0.5-meter horizontal resolution. This elevation model was not calibrated against local benchmarks and thus has an unknown vertical accuracy in the area of interest. The (uncalibrated) vertical accuracy of this DEM is in the order of 1 meter which is not sufficient for a feasibility/design study. Ground truthing and detailed calibration of this DEM shall be done for the areas of interest as part of this assignment.

**** In 2019/2020, a detailed flood hazard and risk assessment was carried out for the Greater Monrovia area. The baseline of pluvial, fluvial, and coastal flood hazard and risk was determined for existing and future conditions taking into account climate change and socio-economic scenarios. A two-dimensional model has been developed for the area of interest with relevant forcings such as rainfall, water levels, and river discharge. Pluvial, fluvial, and coastal events with a range of different return periods have been evaluated for hazard and risk mapping. At the conceptual level, solutions were proposed to reduce the risk of flooding in the Greater Monrovia area. The reports and results of this analysis will be shared with the Consultant.

**** The preliminary predesign study also produced a large set of survey points with elevations against a local benchmark; also a Digital Elevation Model with a 0.1 meter horizontal resolution has been produced based on a drone survey. The consultant will review all survey and data info and generate a Digital Terrain Model for final design in the area of interest.

The previous consultant commenced and completed the stakeholders and community engagement efforts. This Consultant shall review and verify that work and build on it. The Consultant's review and verification of the previous consultant's work shall focus, in consultation with MPW/PMU and other stakeholders, on the adequacy of the effort. The Consultant shall be careful not to duplicate previous

efforts completed and approved by the PMU unless the Consultant's reviews justify a repeat of the work, and the PMU approves.

The Inception report shall include a detailed methodology and work plan for completing the assignment, including detailed timelines, and a detailed approach to the community consultation process. Specific attention shall also be paid to the choice of software and methodology for the modeling and analysis necessary for sizing the drainage infrastructure and performing the necessary hydraulic, hydrological, geotechnical, and structural calculations. In addition, the Consultant shall outline in the Inception Report what process will be followed to reach recommendations for the design, and how to include the views from the stakeholders in this process. Also, a fully costed proposal for possible additional survey activities shall be proposed. An indicative program shall form part of the consultants' technical proposal for this sum including a rationale for the selection of specific surveys based on the information provided in these Terms of Reference. The Inception Report should also include a preliminary overview and analysis of proposed locations including an initial review of topography data and site conditions (ground conditions) of the proposed locations and a strategy for prioritizing investment and selection of these locations in the context of the overall objectives of the intervention.

Deliverables Stage 1
The following deliverables are expected at the end of Stage 1:

- Inception Report

The Consultant is expected to produce a draft Inception Report within 3 weeks after signing the contract. The PMU and World Bank will review this document and provide comments within 2 weeks after submission. The final Inception Report shall be ready to be submitted to the World Bank for review no later than 7 weeks after signing the contract.

Stage 2: Feasibility Studies and Preliminary Design

Once the Consultant becomes familiar with the project scope and has assessed the level of effort required to complete the assignment through inception, he shall commence the feasibility studies to assess flooding risks in the project locations, beginning with Location 1, and to determine the type and level of interventions required to mitigate the risks. The Consultant shall then proceed to prepare preliminary designs of the proposed interventions to be submitted to the MPW/PMU and the Bank, along with the feasibility studies report, for review and approval. **The feasibility study and preliminary design for Location 4 shall commence during and be performed in parallel with the Procurement phase (PART 3) for Location 1.** The work of this stage shall include improving, where necessary, topographic and bathymetric surveys, geotechnical and soil investigations, and hydrological and hydraulic modeling. The Consultant shall use results of the hydrological and hydraulic modeling to define the types and sizes of interventions. The information gathered will feed into three deliverables of this stage: a Local Area Resilience Plan for each of the areas, a Design Basis, and Preliminary Designs. **The Consultant shall commence feasibility studies for Locations 2 and 3 upon completing all works (Stage 1 through Stage 3) for Location 4.**

The previous consultant performed topographic and bathymetric surveys, as well as hydrological and hydraulic modeling but several gaps remain, particularly in the area of hydrological and hydraulic

modeling (See Appendix B). The Gap Analysis in Appendix B is provided to assist the Consultant in its review and verification of the work performed under the previous consultancy during the inception stage and to enable the Consultant to estimate the amount of effort that would be required to complete this task. **Appendix C contains the list of reports, maps, and data, including shapefiles, DEMs, contour maps, etc. generated by the previous consultant, all of which will be handed over to the Consultant. It is strongly recommended that the Consultant review this information before submitting its proposal.**

The following tasks shall be carried out under Stage 2:

Task 1: Topographic and bathymetric surveys

The topographic and bathymetric surveys were substantially completed by the previous consultant (See Appendix B). **Appendix C contains the list of reports, maps, and data, including shapefiles, DEMs, contour maps, etc. generated by the previous consultant, all of which will be handed over to the Consultant**. The Consultant shall review and verify this work and undertake further surveys where applicable to inform preliminary and detailed engineering designs to be carried out in the areas of interest. The Consultant is free to select appropriate subcontractors to perform additional surveys where applicable in time and with the required quality. The Consultant shall be careful not to duplicate data and is encouraged to use local sub-consultants to carry out these activities where possible. The consultant shall utilize provisional sums allocated under the project for this activity. The survey requirements are detailed in Appendix D.

Task 2: Geotechnical and soil investigations

The geotechnical and soil investigations are intended to ascertain ground and soil conditions at each site to inform flood water absorption rates, drainage channel excavation requirements, infrastructure foundation works, etc. The previous consultant substantially completed the investigations to determine the engineering characteristics of the ground and soils in the project areas, including drilling 4 boreholes and collecting and analyzing soil samples. Appendix B summarizes the remaining gaps. The geotechnical and soil investigation requirements are detailed in Appendix D. **Appendix C contains the list of Geotechnical and soil investigation reports prepared by the previous consultant, all of which will be handed over to the Consultant.** The Consultant is strongly encouraged to review this information before submitting its proposal.

Task 3: Hydrological and hydraulic modeling for the selected areas

The hydrological and hydraulic modeling is intended to determine the level of flooding in the project areas and based on that information define the appropriate interventions to mitigate flood damage. The Gap Analysis in Appendix B summarizes the work done by the pervious consultant under this task; significant gaps still remain. **Appendix C contains the list of hydrological and hydraulic data, reports, computer models, etc. generated by the previous consultant, all of which will be handed over to the Consultant.** The Consultant shall assess the adequacy of this effort against the requirements detailed in Appendix D.

Task 4: Community mapping, needs and prioritization

This task is intended to catalogue the makeup of each of the project areas with emphasis on its infrastructure and other basic services, but also its economic profile, local governance structure, demographics, etc. The previous consultant substantially completed this task. The Gap Analysis in

Appendix B summarizes the gaps. **Appendix C contains the list of information/reports generated by the previous consultant, all of which will be handed over to the Consultant.** The Consultant shall assess the adequacy of this effort against the requirements detailed in Appendix D.

Task 5: Local Area Resilience Plans

The Consultant is to develop a Local Area Resilience Plan for each of the project areas. Each plan shall provide a detailed baseline description of the area and the functioning of its communities, the potential hazards/disasters as well as present key priorities in flood resilience and other community infrastructure. This task was partially completed by the previous consultant. The Gap Analysis in Appendix B summarizes the remaining gaps. **Appendix C contains the list of information/reports generated by the previous consultant, all of which will be handed over to the Consultant.** The Consultant shall assess the adequacy of this effort against the requirements detailed in Appendix D.

Task 6: Develop a Design Basis with boundary conditions and requirements

The Design Basis shall lay down appropriate guidelines for preparing detailed designs of all works, including engineering plans for different types of structures and reports for the Project. The Design Basis shall also include recommended design criteria, specifications, technical standards, and codes of practice giving due consideration to relevant international design criteria/codes of practice/specifications. The previous consultant completed some of the work under this task. The Gap Analysis in Appendix B summarizes the work done by the previous consultant under this task. **Appendix C contains the list of information/reports generated by the previous consultant, all of which will be handed over to the Consultant.** The Consultant shall assess the adequacy of this effort against the requirements detailed in Appendix D.

Task 7: Preliminary Design

Once the Consultant has become familiar with the project scope and the baseline situation through inception and feasibility studies, the Consultant shall develop preliminary designs for submission to PMU for consideration and approval. **All the tasks of this stage shall initially focus exclusively on Location 1 (Northern Bushrod Island)**. **The Consultant shall commence Task 7 for Location 4 (Southeastern Paynesville) during PART 3 work for Location 1**.

The Consultant is expected to present comprehensive, cost-efficient, and supported drainage solutions integrated into the urban fabric for each of the two areas at the preliminary design level and provide suggestions for prioritization. Based on the findings, the PMU will decide which of the interventions will feed into the work packages for detailed design and implementation under Component 1. Preliminary designs will be carried out for each project area. In parallel, this Consultant shall prepare the ESIA and RAP as part of developing the Environmental and Social Instruments for the project (PART 2).

This task comprises detailing drainage infrastructure design, including green solutions and small-scale societal functionalities, and detailing of socioeconomic impacts of the works, e.g., unavoidable resettlements, development of a site analysis plan, detailing of the environmentally friendly retention areas, preparation of preliminary drawings, initial Bills of Quantities (BOQ) and the Engineer's cost estimates.

This task will need intensive stakeholder consultations following the initial consultations as described in the previous tasks. The Consultant shall use these consultations to further get feedback/input, appraised of potential concerns and get inputs for design ideas for integrating the interventions into the urban fabric. The Consultant is also expected to explain why certain scenarios are not feasible, including possibly cost, environmental, social or technical reasons. Participants are asked to express explicit preferences in order to narrow down the options as much as possible. The Consultant can initiate discussions with communities on their likely role in project implementation and where relevant provide details on the implied roles and responsibilities of the community in the management/operation and maintenance of facilities chosen through the consultation process.

This task will require an iterative approach to arrive at a set of support investments by the PMU and other stakeholders involved based on costs, environmental/social benefit impacts, etc. The overarching principles and guidelines as outlined in this TOR shall be given specific attention during this task.

Subtask 7.1: Develop structural interventions for drainage and urban upgrading

This task involves the development of a preliminary design for the drainage and other urban upgrading interventions for the two locations under consideration. This shall include further development of ideas generated at the stakeholder meetings as appropriate. It is important that the Consultant follow a clear process to be outlined at the inception stage to reach design recommendations for the two selected areas.

The drainage infrastructure can include but is not limited to specific road drainage (e.g. along UN Drive, roads in other areas of interest), connecting/constructing new primary drainage channels, improving the connectivity between retention areas, sizing new retention areas, dredging/cleaning of existing primary drains, and constructing new outlet structures and/or widening existing outlet structures. Dredging/excavation of primary drains will result in sediments which might be reused if the quality of these sediments is sufficient. When the sediment quality is not sufficient, suitable areas for storage of these sediments shall be identified and auxiliary infrastructure (e.g. sediment depot) must be developed where these sediments can be stored and/or treated.

The preliminary design of the drainage infrastructure shall be based on a thoroughly chosen set of design calculations. These shall include but are not limited to the hydraulic (water levels, etc.) and any other relevant load calculations and the strength calculations such as hydraulic/geotechnical/structural stability of structures where applicable. The Consultant shall use state-of-the-art software for these analyses. The Consultant shall perform a detailed analysis of the availability, price and options for key construction materials. The Consultant shall perform the design assessments with the models set up as part of the feasibility studies (add other modeling /calculations if necessary) to ensure the solution meets the design flood protection level during its design lifetime.

Special emphasis shall be also paid during the development of the urban drainage and other neighborhood interventions such as water supply/sanitation, community facilities such as playgrounds, footpaths, waste collection points, drinking water points, etc. to integrate these into and work with the existing natural system and the urban fabric. The Consultant is expected to include urban planning and design experts

throughout the entire design process of these structural interventions to ensure that these solutions fit within and can enhance the existing surroundings and urban space. This shall be supported by sketches and drawings to visualize this integration and enhancement of the urban space.

Subtask 7.2: Preparation of Preliminary Drawings

Drawings shall be prepared for all elements of the scope described above which shall be created with use of suitable commercially available design software (AUTOCAD DWG format, version 2021, or any other suitable software agreed with the PMU). For each of these elements, the drawings should include but not be limited to:

- General design documentation (including three-dimensional perspectives, general arrangement/site plans, floor plans, elevations, and sections)
- Longitudinal sections and cross sections of drainage and market/urban upgrading interventions;
- Initial structural drawings for features such as culverts, drainage canals, storage basins, water supply/sanitation, sediment depots, etc.

The Consultant shall also produce detailed maps for each area of interest, showing, besides principal new or rehabilitated drainage and green infrastructure works proposed, further essential works, such as vehicle crossings, pedestrian and (motor) bike crossings, envisaged stockpile areas, etc. and non-essential, though additionally proposed works, such as secondary/tertiary infrastructure and small parks, pedestrian amenities, playgrounds, and other facilities fulfilling societal needs. The output of this preliminary plan will serve as input for the following subtasks and will be refined once decisions have been made on the intervention packages that will be implemented under the project.

The output of this activity will be site plans and profile sheets at 1:1000 horizontal scale and 1:200 vertical scale (or any other scale deemed appropriate if more detail is needed – to be agreed with PMU in the inception phase) showing all existing plan features, landownership boundaries, construction limits, existing ground levels, proposed finished profiles, typical cross sections, etc. These technical drawings shall be further complemented with good visuals (artist impressions with bird's eye views, landscape drawings) to communicate the proposed interventions to the wider audience.

Subtask 7.3: Bills of Quantities and Cost Estimate

Prepare initial Bills of Quantities for the above works, focusing initially on Location 1, and use these to prepare preliminary cost estimates. Separate cost estimates are required for the different main elements of the scope. Also, the Consultant shall present the costs for different options in a clear way to enable decision-making. **The accuracy of this cost estimate shall be +/- 20%.** The Consultant shall describe the potential costs for the additional facilities for each of the areas of interest in order to allocate a provisional budget, to be agreed with the PMU, as a guideline for further detailing. This shall also have sufficient detail with a 20% margin.

Subtask 7.4: Multi-criteria analysis

The Consultant shall make a multi-criteria analysis to recommend prioritization of investments in the targeted areas. This shall include technical, environmental, social, and economic aspects. As part of this, an economic analysis of the urban drainage and urban upgrading interventions shall be carried out to show the economic justification of the interventions. This analysis shall also take into account operation and

maintenance costs. The assumptions of the economic analysis shall be justified (e.g. interest rate) and the robustness of the conclusions will be tested with sensitivity analysis. The interventions can be based on a preliminary design level with a capital investment cost estimate of +/- 20%. The economic analysis should also estimate the socio-economic costs and benefits of implementing the defined interventions: inter alia damage reduced due to implementation of the prioritized measures but also resettlement costs. The economic analysis should also reflect on the costs and benefits of the project that are harder to monetize, including effects and/or co-benefits on urban development, poverty, and the environment.

The economic analysis shall be reported as part of the preliminary design report. Results of economic analysis and full CBA (IRRs, NPV's, and cost-benefit ratios) should be included. Insights in financial sustainability should be provided also in regard of coverage of O&M costs by national or local authorities. All models (financial analysis, CBA in Excel, or other software) will be handed over to the client as annexes to the preliminary design report.

Task 8: Procurement Strategy

The Consultant shall propose a procurement strategy for the recommended package(s) based on an analysis of the local and regional construction industry that takes account of potential contractors' relevant experience; technical and financial capacity; and anticipated interest. Consideration should also be given to current levels of industry demand at the national, regional, and international levels. The strategy should, amongst other aspects, recommend contract package sizes and the type of work contracts.

Deliverables Stage 2

The following deliverables are expected from the Consultant at the end of Stage 2:

- Topographic/bathymetric survey data and reports (Task 1)
- Preliminary Geotechnical and Soil Report (Task2)
- Hydrological/hydraulic and risk modeling (Task 3)
- Local Area Resilience Plans (Task 5)
- Design Basis (Task 6)
- Preliminary Design Report and drawings (Tasks 7.1 through 7.4)
- Procurement Strategy (Task 8)

Tasks 1 through Task 6 deliverables shall be delivered 10 weeks (2 months and 2 weeks) after contract signing. After a review period of 2 weeks by the PMU/WB, the Consultant has another 2 weeks to deliver final versions of these deliverables to the PMU. For Location 4, the deliverables shall be submitted within 33 weeks (8 months and 1 week) of contract signing with 2 weeks of review and 2 weeks for delivery of final versions.

Tasks 7 and 8 deliverables shall be submitted within 16 weeks (4 months) after contract signing with 2 weeks of review and 3 weeks for delivery of final versions, for Location 1. For Location 4, the deliverables shall be submitted within 39 weeks (9 months and 3 weeks) of contract signing with 2 weeks of review and 3 weeks for delivery of final versions.

Stage 3: Detailed Design and Bidding Documents

All the tasks of this stage shall initially focus exclusively on Location 1 (Northern Bushrod Island). The Consultant shall commence Stage 2 tasks for Location 4 (Southeastern Paynesville) only after all Stage 3 tasks in Location 1 have been completed and the bidding documents are ready for procurement of the works contractor.

Detailed design shall be carried out for the package of works identified in the Preliminary Design. It is envisaged that the detailed design will proceed immediately after the final Preliminary Design Report has been submitted to MPW/PMU for consideration and pending World Bank approval of the final package of works to be funded under the project. Before the commencement of the detailed design and approval of the final package of works, the Consultant shall obtain formal agreement from MPW/PMU on the elements of the works package on which work should initially proceed. These will be non-contentious elements that will proceed irrespective of the final package of works that is eventually approved. The Consultant is responsible for ensuring that all design elements comply with relevant national and/or international engineering standards and building codes.

This stage will also kick off with stakeholder meetings as described earlier in this document. The Consultant shall use these meetings to inform the stakeholders about the results of the preliminary design stage and provide feedback on how suggestions from the previous stakeholder meetings have been incorporated. Also, the stakeholder meetings shall be used to get feedback/inputs on the project's scope, potential concerns, and input for design modifications. These stakeholder meetings shall take place at three locations in the area of interest.

Task 1: Additional Surveys and Update Design Basis

The Consultant shall undertake any additional surveys considered necessary for detailed design beyond those already carried out. These surveys shall be defined based on the outcomes of the Preliminary Design Phase and shall be weighed against reducing the technical risk and the costs involved. The Consultant shall also update the Design Basis if needed based on new information from the surveys and/or other comments/inputs. The Final Design Basis shall be delivered as a separate deliverable.

Task 2: Feedback Environmental and Social Assessment into Design

The Consultant shall refine the designs based on the findings of the ESIA and RAP to maximize environmental and social benefits, minimize risks, and consider the cost-benefit of how changes in design or alignment can reduce or increase the number of project-affected persons, and associated costs of compensation. The consultant shall also include the mitigation measures in the detailed design, cost estimates, bidding, and contract documents.

Task 3: Detailed Design and Drawings

The Consultant shall develop detailed construction documentation based on the approved preliminary designs. These shall include all engineering drawings needed for the bidding package including but not limited to general arrangement plans; structural, electrical, mechanical, and civil engineering plans, sections and details; connection details and site utility layouts; landscaping plans, plant schedules, and

details; bed and bank protection plans; sections and cross-sectional details; elevations, as well as all needed schedules, technical details, and construction specifications. Design drawings shall be prepared at scales suitable for construction and agreed upon with MPW/PMU before the commencement of this Stage.

Task 4: Bills of Quantities and Final Cost Estimate

The Consultant shall update the Bills of Quantities and cost estimates prepared for the final design making provision for physical and price contingencies. The Consultant shall also undertake an estimate on the proportions of the project's base costs in terms of (i) foreign exchange cost (including direct and indirect foreign exchange costs), (ii) local currency cost, and (iii) taxes. These calculations shall be presented on a spreadsheet or similar format. This final cost estimate shall have an accuracy of +/- 10%.

Task 5: Bidding Documents

The Consultant shall prepare draft bidding documents per the approved procurement strategy prepared at the feasibility stage. Contract packages will be procured under arrangements acceptable to the World Bank. Detailed design will be used to prepare the bidding documents. The appropriate WB's Standard Bidding Documents shall be used based on the estimated maximum budget per package.

The Consultant shall submit completed draft bidding documents to MPW/PMU for review. The PMU shall present Bidding documents reviewed and accepted to the World Bank for further review and No-Objection. After receipt of comments from MPW including observations made by the World Bank, the Consultant will prepare the final versions of the documents in the required number of copies and provide soft copies of all documents, suitably documented.

Deliverables Stage 3

The following deliverables are expected from the Consultant during Stage 4:

- Updated Survey report (task 1)
- Updated Design Basis (Task 1)
- Final Design Report and drawings including reporting on findings from ESIA/RAP incorporated into the designs (Task 2 and 3),
- BoQs and Bidding Documents (Task 4 and 5)

These deliverables will be submitted 25 weeks (6 months and 1 week) after contract signing for Location 1. After a review period of 3 weeks by the PMU, the Consultant has another 2 weeks to send final versions of these deliverables. For Location 4, these deliverables will be delivered 48 weeks (12 months) after contract signing. After 3 weeks by the PMU, the Consultant has another 2 weeks to submit the final versions.

PART 2: Environmental and Social Impact Assessments and associated documents

Environmental and social assessment is an integral part of the design process. This Consultant shall develop all relevant Environmental and Social Instruments. This includes Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP), Biodiversity

Management Plan (BMP), Umbrella Waste Management Plan (U-WMP), Site-specific Waste Management Plan (S-WMP), Resettlement Action Plan (RAP). The detailed description and tasks for the E&S instruments is included in Appendix E. The work shall proceed in parallel with the work of PART 1.

The Consultant shall ensure that the requirements of these instruments are addressed in the preliminary design. For example, the draft ESIA and RAP shall be finetuned during the preliminary design stage and submitted together with the preliminary design report/drawings. It is expected that the Consultant shall work with MPW/PMU to respond to questions from stakeholders and the World Bank and implement any changes in the preliminary designs as deemed necessary.

Development of the Environment and Social (E&S) Instruments shall initially focus exclusively on Location 1. Upon completion of works in this location, the Consultant shall proceed to Location 4. The Consultant shall commence the development of RAP and ESIA documents for Locations 2 and 3 upon completing work for Location 4. **See Section 1.1 under Project Description of these Terms of Reference for detailed description of the project locations.** It will be critical to develop the E&S instruments in parallel to the design activities described in the Stages and start timely with the E&S activities so that no time will be lost during the entire assignment. Also, the surveys required for E&S shall be integrated into the survey plans for the design stages.

Rationale for the Environmental and Social Instruments

The World Bank's Environmental and Social Framework (ESF), which became operational in October 2018, sets out requirements for borrowers to identify and assess the environmental and social risks and impacts associated with projects supported by the World Bank. Project activities outlined in section 2 above will likely have environmental and social risks and impacts, and as required under the ESF, the preparation of Environmental and Social instruments in accordance with the ESCP will need to be carried out by the Borrower to guide the management of these risks and impacts and therefore, improve social and environmental sustainability, and inclusive development. This TOR is in line with the ESF and the Environmental and Social Standards (ESS) that are relevant for the project (ESS 1, 2, 3, 4, 5, 6, 8, and 10), and environmental and social management framework (ESMF) to guide the preparation of the Environmental and Social instruments relevant to all Component 1 works, and informed by the feasibility and design study.

Main Objective of the Assignment

The objective of this assignment is to prepare a site-specific Environmental and Social Impact Assessment (ESIA) and the associated documents which include an Environmental and Social Management Plan (ESMP) as required in Component 1, a Biodiversity Management Plan (BMP), a Site-Specific Waste Management Plan (S-WMP), an Umbrella Waste Management Plan (U-WMP) and a Resettlement Action Plan (RAP). Works contractors will be required to use the overall Project ESIA/ESMP to prepare site and/or activity specific Contractor ESMP (C-ESMP) as may be needed to help them comply with the relevant environmental and social standards in the implementation of their contract activities.

The U-WMP aims to identify, quantify, characterize and propose strategies for safe disposal of the wastes. It will assess the total cumulative volume and estimated composition of waste and excavated/dredged materials that will need to be safely disposed of and assess the disposal capacity of the City's landfills to accommodate such waste. The S-WMP will be more detailed and developed as part of the ESIA/ESMP. The preparation of these documents shall be informed by:

- Community-based consultations.
- Liberia's EPA ESIA Procedural Guidelines and the Environmental Protection Management Law of Liberia; and other relevant National framework documents.
- World Bank's Environmental and Social Framework (ESF), relevant ESF Good Practice Notes, and best international practices, and the project specific ESMF and RPF.

Scope of the assignment

In support of this overarching objective, the Consultant is also expected to:

- Review all existing relevant documentation related to the project. (Project Appraisal Document (PAD), Environmental and Social Management Framework (ESMF), Resettlement Policy Framework (RPF), Environmental and Social Commitment Plan (ESCP), Stakeholder Engagement Plan (SEP), Labor Management Procedures (LMP), Appraisal Environmental and Social Summary (A-ESRS), feasibility and design study, etc.).
- Identify all relevant stakeholders for consultation.
- Identify and assess potential environmental and social risks and impacts of the project activities during site preparation/pre-construction, construction and operational/maintenance, and decommissioning phases of the project.
- Recommend measures for mitigation with site-specific considerations to address the identified environmental and social risks and impacts of project activities in accordance with the ESF and the WBG and EHS guidelines.
- Prepare an Environmental and Social Impact Assessment (ESIA) and associated Environmental and Social Management Plan (ESMP) for all proposed project activities as per the Liberia Environmental and Social laws and policies, World Bank ESF, and detailing findings and recommendations for E&S risks and impacts management. The ESIA/ESMP document should be prepared separately for each project location.
- Prepare a site-specific Biodiversity Management Plan (BMP) in accordance with the guidelines of the ESMF, and consistent with ESS6 of the ESF.
- Prepare a Site-Specific Waste Management Plan (S-WMP), to manage general construction waste, disposal of the dredged sediments (silt, sand, and solid wastes) and other construction materials as well as hazardous and non-hazardous wastes, consistent with ESS3 of the ESF.
- Prepare an overall Umbrella Waste Management Plan (U-WMP) for all project locations that will be informed by a feasibility and design study for Component 1.1 activities and integrate recommendations into public works bidding documents prior to the start of bidding and disbursement of drainage works under Component 1.1. The U-Plan will identify acceptable disposal arrangements based on a proper assessment of the cumulative quantity and type of waste expected to be generated under Component 1.1. The umbrella waste management plan will assess the cumulative waste management impacts of all waste generated by the project to determine the capacity of landfills to accommodate the waste generated. The U-Plan will make recommendations of possible modifications to the proposed Project engineering designs, based on the assessment of the findings.
- Prepare a Standalone Resettlement Action Plan (RAP) to address physical and/or economic displacement, depending on the nature of the impacts expected from a project.
- Conduct two rounds of public consultations (the first one during the scoping stage and the second one on the review of the draft ESIA) and meaningful stakeholder engagement in line with ESS10 with project affected persons, government organizations and Non-Governmental Organizations (NGOs) professional associations/organizations, and the private sector about the project's environmental and social impacts, as well as offer opportunity to receive their opinions and feedback so as to take their views into account and reflect the issues raised into the final design for the project.

- Document baseline for Gender based violence (GBV), Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH), child labour, forced labour, minority groups and people with disability in each site-specific area and identify any significant issues related to them.
- Prepare a time schedule to ensure that consultations with key stakeholders for this project, including national NGOs representing key stakeholder groups, government agencies, vulnerable groups (or their associations), and others to ascertain risks and impacts and informed mitigation measures are included in the design to ensure inclusive development outcomes.
- Document key issues likely to generate disagreement and grievances to inform the development of a functional easy to use grievance mechanism.

The Consultant for this assignment is expected to utilize available information as well as gather relevant data on the environmental, social, and economic activities of the proposed project activities and the locations where the project will be implemented. The Consultant must assess the physical, environmental, biological, economic, and social activities of the beneficiary communities

Deliverables of PART 2

The Consultant will be required to prepare and deliver the instruments listed below.

- Standalone Environmental and Social Impact Assessment (ESIA) and associated Environmental and Social Management Plan (ESMP) including:
  - Standalone Biodiversity Management Plan (BMP);
  - Site-specific Waste Management Plans (S-WMP);
- Umbrella Waste Management Plan (U-WMP) for all four project locations; and
- Site specific Resettlement Action Plan (RAP).

The draft Scoping Report for ESIA and associated plans (ESMP, BMP, S-WMP, U-WMP and RAP shall be submitted 10 weeks (2 months, 2 weeks) after contract signing for Location 1. After a review period of 2 weeks by the PMU, the Consultant has another 2 weeks to submit the final version of the report. For Location 4, the report shall be submitted 33 weeks (8 months, 2 weeks) after contract signing. After a review period of 2 weeks by the PMU, the Consultant has another 2 weeks to submit the final version of the report.

The Consultant shall obtain the EPA Permit 42 weeks (10 months and 2 weeks) after contract signing for Location 1, following a 90-day review period. For Location 4, the Consultant shall obtain the Permit 65 weeks (16 months, 1 week) after contract signing.

The Consultant will ensure that these instruments complement each other and cover environmental and social issues in a comprehensive and coherent manner. The detailed scope for these deliverables is included in Appendix E.

The activities of this stage are expected to be conducted in parallel with those of the previous 5 Stages. According to the Liberia EPA Procedural guidelines, it takes 90 days/three months for EPA to review, access the sites, coordinate public hearings and make a final decision on the ESIA, and give a response or issue a License.

EPA's Rule Governing International Consultants

According to EPA's ESIA 2022 Revised Procedural Guidelines, The EPA welcomes the cross-pollination of ideas to strengthen the sector. Proponents with projects involving the hiring of international consultants are encouraged to submit a formal application of introduction to the EPA, while the EPA in return shall require the following:

- Ensure that the international consultancy firm is registered in its home country with all relevant legal documents;

- Acquire the EPA's Project-specific annual license for international consultants (renewable under new terms and conditions);
- All international consultancy firms shall be required to partner with an EPA-certified local consultancy firm;
- Ensure all projects requiring international consultants are Category A-related and no international consultants shall practice locally;
- Show evidence of work permit in Liberia and Visas, etc.

PART 3: Procurement Support

Procurement under the project is to be carried out per the 'World Bank Procurement Regulations for IPF Borrowers for Goods, Works, Non-Consulting and Consulting Services' dated July 2016 and revised in November 2017, August 2018, and November 2020 and updated September 2023 (fifth edition) ('Procurement Regulations') and applicable to Investment Project Financing (IPF). The project is subject to the World Bank's Anticorruption Guidelines, dated October 15, 2006, and revised in January 2011 and as of July 1, 2016. As required, a comprehensive Project Procurement Strategy for Development (PPSD) has been prepared by the Project. These procurement regulations are available on the World Bank website (www.worldbank.org).

The Consultant will assist the MPW/PMU in carrying out the following procurement actions for the works related to Component 1 of LURP:

- To prepare bidding documents for international procurement as per the World Bank's Procurement Guidelines for the World Bank's No Objection,
- To support the advertisement of the bid documents across multiple platforms and networks,
- To prepare the responses to bidders' queries,
- To assist in organizing a pre-bid meeting if this is adopted,
- To assign an expert to sit on the bid evaluation committee,
- To check the conformity of bids to eligibility criteria in the bidding documents, technical specifications, BoQ, etc. to clarify any issues with the bidders, and to evaluate bidders per bid evaluation criteria,
- To prepare a bid evaluation report in a confidential manner containing a concise set of bases and justifications for the ranking of bids and to prepare presentation materials to the PMU for deciding the tenders, and;
- To proceed in contract award procedures, to prepare contract agreements for signing contracts, which shall be submitted by the PMU to the Bank for approval upon signature by the successful bidder.

The Consultant will coordinate the activities above with the Procurement Specialist from the PMU.

PART 4: Works Supervision

The Consultant shall provide full-time Construction-Related Services (CRS) for all the infrastructure works. The services shall include but not be limited to:

- Acting as the Engineer and Employer's Representative

- Providing general supervision of the works to ensure compliance with the design drawings, technical specifications, quality standards and regulations
- Supervising all quality control and performance tests
- Assisting the works contractor clarify the technical specifications and construction drawings as and when required
- Reviewing the contractors' work plan and regularly tracking work progress against the plan.
- Holding regular progress meetings with the participation of the MPW/PMU
- Ensuring the works comply with all environmental, social, health and safety requirements
- Reviewing and modifying the detailed construction drawings as necessary for the works.
- Conducting independent assessments on environmental, social, health and safety compliance and provide recommendations to contractors as necessary.
- Monitoring contractors' implementation of environmental standards, environmental and social mitigation measures, implementation of contractor Environmental and Social Management Plans (C-ESMP), and gender action plans, and providing contractors with mitigation measures in case of failures.
- Assisting, monitoring, and assessing the GRM implementation and record-keeping by the contractor and providing recommendations as required.
- Establishing a quality assurance system, including verification of source of materials and quality.
- Carrying out necessary quality control activities and certifying that the quality of works conforms to the specifications and drawings.
- Reviewing and certifying the contractor's interim and final payment certificates.
- Assisting with third-party inspections, if necessary, as decided by the MPW/PMU
- Reviewing and finalizing the "As Built" drawings submitted by the Contractor.
- Certifying work completion and assisting the MPW/PMU in issuing completion certificates.
- Assisting with the resolution of all contractual issues, including examining the contractor's claims for variations/extensions, additional compensations, etc., and preparing recommendations for approval by the MPW/PMU.
- Preparing monthly project progress reports,
- Assisting the MPW/PMU with other construction-related tasks as may be requested by the MPW/PMU.

Construction for all infrastructure in Location 1 are expected to be completed 89 weeks (22 months and 1 week) after contract signing, and those in Location 4 are expected be completed within 112 weeks (28 months) after contract signing.

4.0 Deliverables, Reporting, Price Proposal and Payment Schedule

It is anticipated that the period of the Consulting Services (exclusive of support to PMU in evaluating bids but inclusive of works supervision) shall be 112 Weeks (28 months). The Consultant will report frequently to the Project Director of the PMU on the status of the project and the progress, and issues to be resolved. Various specialists from the PMU will be the counterpart for the Consultant's team to work on specific issues. For example, the Consultant will be expected to work closely with the engineers from the PMU on

design related aspects. In respect of the ESIA and the RAP, the consultant will be expected to work in close collaboration with the E&S Team of the PMU, etc.

All report deliverables of this assignment shall initially be presented as drafts and subsequently, on receipt of comments from PMU, shall be updated to final versions. All deliverables shall be submitted in 5 hard copies in English/1 soft copy in English. Language in reports shall be high quality with editing for language and technical accuracy by a translator familiar with technical terminology if necessary. Drawing formats shall all be agreed upon with the PMU and the number and format of drawings (hard copy/soft copy) shall be agreed upon with the MPW.

Survey data shall be delivered to the Consultant in digital formats agreed with MPW/PMU in the Inception Phase. Two electronic copies of all survey data sets shall be delivered to the MPW/PMU. The survey data shall include sufficient metadata for later use. Metadata shall be provided in English. All other data (e.g., video and photo footage) generated during the project shall also be delivered to the MPW/PMU. All other data and model schematizations etc. generated during this assignment shall also be handed over to MPW/PMU at the end of the assignment in a structured database with sufficient metadata for later use.

The table below shows the proposed schedule for this assignment. It also includes the time required for reviews by the MPW/PMU. The MPW/PMU will coordinate the reviews by other agencies within the GoL and produce a comment matrix for the Consultant. The Consultant shall implement the comments in the final deliverables and also shall deliver the comment matrix including a response on how the comments were implemented into the deliverables.

Table of Outputs

Ref #	***Output/Report***	***Time from Start of Services (weeks)***
PART 1, Stage 1: Inception		
	Draft Inception Report including design standards, review and assessment of existing data, reports, and the ESIA and associated ESMP (including BMP and S-WMP), U-WMP, and RAP	Due 3 Weeks after contract signing
	Comments from MPW/PMU and response	1 Week
	Comments from World Bank	1 week
	Final Inception Report	Due 7 weeks after contract signing
Part 1, Stage 2: Feasibility Studies and Preliminary Design Location 1		
	Draft Survey Report with bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, fully costed neighborhood upgrade interventions, Local Area Resilience Plans, Initial Design Basis.	Due 10 weeks from contract signing
	Comments from MPW/PMU	1 Week
	Comments from World Bank	1 Week

	Final Survey Report with bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, Neighborhood upgrade interventions, Local Area Resilience plan, Initial Design Basis.	Due 14 weeks from contract signing
	Draft Preliminary Design and draft bidding documents and preliminary cost estimate, procurement strategy, Updated Design Basis,	16 Weeks from contract signing
	Comments from PMU & MPW	2 Weeks
	Final Preliminary Design and draft bidding documents, including cost estimate and procurement strategy, updated Design Basis	21 Weeks from contract signing
Part 1, Stage 3: Detailed Design and Bidding Documents Location 1		
	Draft Detailed Design / Bidding documents / Final Design Basis	25 Weeks from the signing of the contract
	Comments from MPW & PMU on all draft reports	2 Weeks
	Comments from WB on all draft reports	3 Weeks
	Final Detailed Design /Bidding documents/Final Design Basis,	30 Weeks from the signing of the contract
Part 2: Environmental and Social Instruments – Location 1		
	Draft Scoping Report for ESIA and associated plans (ESMP, BMP, S-WMP, U-WMP and RAP Report).	10 weeks from the signing of the contract
	Final Scoping report for ESIA and associated plans (ESMP, BMP, S-WMP, U-WMP and RAP Report) submitted	14 weeks from the signing of the contract
	Draft U-WMP Submitted (Greater Monrovia)	14 weeks from the signing of the contract
	Final U-WMP Submitted (Greater Monrovia)	16 weeks from the signing of the contract
	Draft- ESIA and associated Plans (ESMP, BMP & S-WMP and Standalone RAP Report) Submitted	25 weeks from the signing of the contract
	Final ESIA and associated Plans (ESMP, BMP & S-WMP and Standalone RAP Report) Submitted	30 weeks from the signing of the contract
	EPA's review of the final ESIA and associated ESMP, BMP, and Site-Specific WMP and RAP Report and issuance of the ESIA Permit	42 Weeks from the signing of the contract
Part 3: Procurement Support Location 1		
	Ad hoc inputs to evaluation as required	12 Weeks
	Final contract document	3 Weeks
Part 1 Stage 2: Feasibility Studies and Preliminary Design Location 4		
	Draft Survey Report with bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, fully costed neighborhood	33 Weeks

	upgrade interventions, Local Area Resilience Plans, Initial Design Basis.	
	Comments from MPW/PMU	1 Week
	Comments from World Bank	1 Week
	Final Survey Report with bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, Neighborhood upgrade interventions, Local Area Resilience plan, Initial Design Basis	37 Weeks
	Draft Preliminary Design and draft bidding documents and preliminary cost estimate, procurement strategy, Updated Design Basis	39 Weeks from contract signing
	Comments from PMU & MPW	2 Weeks
	Final Preliminary Design and draft bidding documents, including cost estimate and procurement strategy, updated Design Basis, and Scoping Report for ESIA and associated plans (ESMP, BMP, S-WMP, and RAP Report).	44 Weeks from contract signing
Part 1 Stage 3: Detailed Design and Bidding Documents Location 4		
	Draft Detailed Design / Bidding documents / Final Design Basis	48 Weeks from the signing of the contract
	Comments from MPW & PMU	2 Weeks
	Comments from WB on all draft reports	1 Weeks
	Final Detailed Design /Bidding documents/Final Design Basis	53 Weeks from the signing of the contract
Part 2: Environmental and Social Impact Assessment – Location 4		
	Draft Scoping Report for ESIA and associated plans (ESMP, BMP, S-WMP, and RAP Report).	33 Weeks from the signing of the contract
	Final Scoping report for ESIA and associated plans (ESMP, BMP, S-WMP, and RAP Report) submitted	44 Weeks from the signing of the contract
	Draft- ESIA and associated Plans (ESMP, BMP & S-WMP, UWMP, and Standalone RAP Report) Submitted	48 Weeks from the signing of the contract
	Final ESIA and associated Plans (ESMP, BMP & S-WMP, and Standalone RAP Report) Submitted	53 Weeks from the signing of the contract
	EPA's review of the final ESIA and associated ESMP, BMP and Site-Specific WMP and RAP Report and issuance of the ESIA Permit	65 Weeks from the signing of the contract
Part 3: Procurement Support Location 4		
	Ad hoc inputs to evaluation as required	12 weeks
	Final contract document	3 weeks
Stage 2: Pre-studies Locations 2 & 3		

	Draft Survey Report with bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, fully costed neighborhood upgrade interventions, Local Area Resilience Plans, Initial Design Basis,	63 Weeks from the signing of contract
	Comments from MPW/PMU	65 Weeks from the signing of contract
	Comments from World Bank	66 Weeks from the signing of contract
	Final Survey Report with bathymetric, topographic, geotechnical, structural investigations, hydrological/hydraulic assessment, Community needs and prioritization, Neighborhood upgrade interventions, Local Area Resilience plan, Initial Design Basis	70 Weeks from the signing of contract
Part 4: Works Supervision		
	Complete works supervision Location 1	89 Weeks from the signing of contract
	Complete works supervision Location 4	112 Weeks from the signing of contract

Propose Price Proposal Format

Table 3: Price Proposal Breakdown

No.	Activity	Contract Type	Cost (US$)
1a	Completion all works in Locations 1 and 4 (feasibility studies, preliminary design, final design, E&S assessments, bidding documents, procurement support)	Lumpsum	
1b	Feasibility Studies in Locations 2 and 3	Lump sum	
2	Works Supervision for Locations 1 and 4	Time-Based	

Table 4: Payment Schedule (See notes below table for application of percentages)

No.	Deliverable	% of Contract Amount
Parts 1, 2 & 3 (Studies, Designs, E&S, Bidding Support Locations 1&4		
1	Acceptance of Part 1, Stage 1 (Inception)	10
3	Acceptance of Part 1, Stage 2 (Feasibility Studies and Preliminary Design) – Location 1	15
5	Acceptance of Part 1, Stage 3 (Detailed Design and Bidding Documents) & Completion of Procurement support – Location 1	20
6	Acceptance of Part 2 (Environmental and Social Impact Assessments and associated documents) – Location 1	10
7	Acceptance of Stage 2 (Feasibility Studies and Preliminary Design) – Location – Location 4	15
8	Acceptance of Stage 3 (Detailed Design and Bidding Documents) & completion of Procurement Support – Location 4	20

9	Acceptance of Part 2 (Environmental and Social Impact Assessments and associated documents) – Location 4	10
10	Acceptance of Feasibility Studies – Locations 2 & 3	100
Part 4 (Works Supervision) – Monthly IPCs		

Required Expertise of Consulting Firm

The Consultant is expected:

- To be a consulting firm or an association of consulting firms with the appropriate capabilities and experience to execute the services.
- Have at least 10 years of general experience implementing design and supervision contracts for civil engineering and flood risk management projects, conducting ESIAs, ESMP and RAP, including Solid Waste Management Plans, BMP, worldwide, specifically in developing countries; experience in the West African Region in general and in Liberia is an advantage.
- Have at least 10 years of specific experience in the design and supervision of flood risk management and/or hydrological/hydraulic engineering projects in developing countries.
- Have a proven record of successful completion of at least 3 assignments related to the design and construction supervision or rehabilitation of hydraulic structures and dredging works in urban environments, and/or urban drainage and water management projects involving investments over $10 million.
- Have experience with the preparation and or technical support for the preparation of procurement packages and evaluation reports.
- To be able to mobilize the internationally and locally experienced Key Experts and staff listed in the tables below.
- Must be in a partnership with an EPA certified Liberian Environmental consulting firm.

The table below provides an indicative staffing for this assignment**.** The Consultant must evaluate the staff required to achieve the objectives of the assignment and may propose additional or alternative staff. Some related positions could be combined or be filled with separate experts (e.g., environmental specialist and social/community specialist). Other specialist staff may also be necessary. Only resumes from Key Experts (KE) must be included in the Consultant's proposal. One of the other Key Experts shall be designated as Deputy Team Leader in the absence of the Team Leader and the requested qualifications of the Deputy Team Leader listed below shall also be shown for this Key Expert in the proposal.

Phase one of this assignment will be a lump sum contract while phase 2 will be time based as per the quotes indicated in Table 2 and it is the Consultant's responsibility to determine the duration of inputs required to achieve the objectives. The specific specialists are only intended to guide the Consultant to submit its proposal. The firm may adjust and optimize the structure according to the needs of the tasks provided that the requirements of this outline for the qualifications of consultants are met.

Table 5: Indicative Staffing for Design, Bidding Documents, Environmental, Social and Supervision

Ref	Description
Lead Key Staff	

1	Team Leader (KE)
2	Hydraulic/Hydrological Engineer (KE)
3	Environmental Specialist (KE)
4	RAP Specialist (KE)
5	Biodiversity Expert/Ecologist (KE)
6	Geotechnical Engineer (KE)
7	Green Infrastructure/Urban Design Specialist (KE)
8	Solid Waste Management Specialist (KE)
9	Civil Engineer (KE)
10	GIS Specialist (KE)
Support / Non-Key Staff	
1	Sanitary/Water supply Engineer
2	Social Specialist
3	Quantity Surveyor
4	Urban Planner
5	Economist
6	Procurement Specialist
7	Technicians – surveyors, draughtsman etc.
8	Field Researchers (at least 2)

Legend:

KE – Key Expert

The Key Experts are required to fulfill, at a minimum the requirements listed below and in addition, they must be fluent in written and spoken English. "Assignment Details" included are indicative only. A gender-balanced project team is encouraged. The Consultant is expected to present an organizational diagram in its proposal.

Team Leader

- At least an MSc in Civil Engineering / Urban Planning or a strongly related discipline/field with verifiable experience in project management of infrastructural urban upgrading projects;
- At least 15 years of relevant international experience in managing integrated design studies for completion of detailed designs in hydraulic engineering or related projects with a focus on drainage infrastructure in urban environments, including at least 5 years of experience in working with development partners such as the World Bank, African Development Bank, ECOWAS Bank, or other International Finance Institutions (IFIs) in developing countries.
- Experience working in Africa and Liberia would be advantageous.
- Excellent communication and presentation skills and ability to prepare/manage the preparation of high-quality reports and project documentation.

Assignment Details: Responsible for all engineering aspects of the assignment. As Team Leader he/she shall have overall responsibility for the assignment and shall communicate directly with the PMU and ensure that the objectives of the scope of services are met. He/she shall be available for regular but also ad-hoc discussions with the MPW about project-related issues. He/she shall be based in Monrovia for no less than 50% of the duration of the project.

Deputy Team Leader:

- At least a BSc in Civil Engineering or a closely related discipline;
- At least 10 years of relevant experience in the feasibility, preliminary, and detailed design of urban infrastructure, such as drainage, and sanitary infrastructure including at least 5 years of experience working with development partners or projects of similar nature and scope.
- Must have experience working in West Africa preferably in Liberia.

Assignment Details: As Deputy Team Leader shall assist and work under the direction of the Team Leader to ensure that the objectives of this scope of services are met. Shall assist the Team Leader with all engineering and management aspects of the assignment. Shall be based in Monrovia.

Hydraulic/Hydrological Engineer:

- At least a BSc in Civil Engineering, with hydraulics/drainage engineering experience or a closely related discipline.
- At least 10 years of relevant experience in the feasibility, preliminary, and detailed design studies with surveys, modeling, and design of urban drainage infrastructure including at least 5 years of experience working with development partners or projects of similar nature and scope.
- Specific experience developing and using computer models of hydraulic/hydrologic systems employing commonly recognized software in the industry, including the Hydrologic Engineering Center's (HEC) suite of software, the US EPA's Storm Water Management Model (SWMM), etc.
- Experience in West Africa and Liberia would be advantageous.

Assignment Details: The hydraulic/hydrological specialist is responsible for modeling and designing urban drainage works.

Geotechnical Engineer

- At least a BSc degree in Civil / Geotechnical Engineering.
- At least 10 years of relevant experience in the geotechnical design of structures including urban drainage works. Experience with setup and monitoring and interpretation of geotechnical surveys data.
- Specific experience with embankment stability, retaining structures and or improvement of weak subsoils is required.

Assignment Details: Responsible for all geotechnical engineering aspects of the assignment.

Procurement Specialist/Quantity Surveyor (international) with

- At least a BSc degree in Civil Engineering, Quantity Surveying, Engineering Measurement, or similar.
- At least 10 years of relevant experience in projects of similar nature including experience in the preparation of bidding documents, Bills of Quantities, and cost estimates for civil engineering construction projects over US$ 15 Million.
- At least 5 years of experience working on World Bank or other IFIs projects in developing countries and familiarity with the procurement requirements of these organizations.
- Experience in flood risk management schemes will be advantageous.

Assignment Details: Prepare and, as the assignment progresses refine, cost estimates for the proposed works; prepare a procurement strategy for the flood risk management infrastructure improvements that include gender-sensitive considerations; prepare general and specific procurement notices, bidding documents, and other documents as necessary per the World Bank procurement guidelines and Standard Bidding Documents; during the procurement of Works and Goods Contracts assist MPW to evaluate bids, including participating in technical discussions with bidders; secure clearance of evaluation reports from GoL and no objection from the World Bank; and prepare final contract documents.

Environment Specialist:

- At least a MA degree in natural resources management, environmental studies, management, policy, and environmental engineering or a related discipline.
- At least 10 years of post-qualification professional experience working on environmental and social management issues with grounding in environmental assessments and monitoring, pertaining to water resources, water supply and sanitation, etc. and familiarity with national and World Bank/IFI environmental and social safeguards policies, including gender and citizen engagement requirements.
- Proven experience and familiarity in sub-Saharan African region with specific focus in Western Africa.
- Proven knowledge in sustainable development financing and environmental and social risk management.

- Excellent knowledge, skills and experience in preparing Environmental and Social Audits of development projects, designing frameworks and systems associated with Environmental and Social Impact Assessments (ESIAs) and Environmental and Social Management Plans (ESMPs), monitoring, evaluation and compliance assessment pertaining to large civil infrastructure projects, especially road and drainage projects.
- Working experience of the Liberian EPA regulations and World Bank Environmental and Social Framework (ESF) is required

Assignment Details: Supports the team overall and lead the team on all environmental aspects of the tasks under Part 2; *c*oordinate with other team members at all stages of the assignment to ensure environmental and social aspects are addressed as an integral part of the design assignment; work with the PMU's Procurement Specialist to ensure that environmental and social protection requirements are included in the works bidding document; in conjunction with the Team Leader arrange and conduct all necessary public consultations including those relating to people who will be directly impacted by the project.

Social Specialist:
- A minimum of 10 years of post-qualification professional experience in thematic areas related to social risk management issues with grounding in social assessments and monitoring.
- Minimum of master's degree in social sciences. sociology or any other social science field
- Proven experience and familiarity in the sub-Saharan African region with a specific focus on Western Africa.
- Proven knowledge in sustainable development financing social risk management.
- Excellent knowledge, skills, and experience in designing frameworks and systems associated Social Impact Assessments, Audits, and the social aspects of development projects, monitoring, evaluation, and compliance assessment.
- Working experience in projects with gender issues including GBV, SEA/SH, and child labor issues.
- Working experience of the Liberian EPA regulations and World Bank Environmental and Social Framework is required.

RAP Specialist:
- Minimum of Master's degree in sociology, Economics or related social science field obtained from a recognized Institution of learning;
- A minimum of 6 years of post-qualification professional experience in the development and implementation of Resettlement Action Plans, and vast understanding in social risk management issues, social assessments and monitoring, conducting socio-economic surveys, inventory of loses and valuation of affected assets and preparation of RAP report in accordance with the World Bank's Environmental and Social Framework with emphasis on ESS5;
- Working experience of the Liberian EPA regulations and World Bank Environmental and Social Framework is required. Working experience of conducting Resettlement studies on development projects in Liberia or within the region is required.

Assignment details: Responsible for preparing the Resettlement Action Plans including all related preparatory activities. Also, responsible for providing inputs to the ESIA and other E&S instruments where relevant.

Biodiversity Specialist/Ecologist:
- A Biologist/Biodiversity specialist with at least 10 years of experience and a minimum of Master's degree in Biology, Ecology or related university degree.

- Extensive knowledge of local species of fauna and flora and their habitats including terrestrial and aquatic management and previous work experience in West Africa Region/Liberia will be an advantage.
- Experience in the preparation of Biodiversity Management Plans.
- Working experience of Liberia EPA requirement and the World Bank Environmental and Social Framework is required.
- Have an understanding of and experience in applying international standards on natural and critical habitat assessments especially World Bank ESS6 and/or IFC PS6.

Assignment details: Responsible for preparing Biodiversity Management Plan including all related preparatory activities. Also, responsible for providing inputs to the ESIA and other E&S instruments where relevant.

Green Infrastructure/ Urban Design Specialist:

- At least a BSc degree in Urban Design, Urban Planning, Urban Landscape Architecture/Design, Urban Sustainable (environmentally friendly) Drainage Systems, Architecture, or similar.
- At least 10 years of experience in urban design, urban planning, landscape architecture, urban green engineering, or similar in developing urban design plans/strategies and design standards, including at least 5 years working in developing countries.
- Specific working experience in urban flood risk management, green infrastructure development for flood risk mitigation, and climate change.
- Experience in West Africa and particularly Liberia would be advantageous.

Assignment Details: Responsible for designing attractive, functional, inclusive, safe, and context-appropriate infrastructure solutions ensuring the effective integration of the project into the overall urban fabric of the Greater Monrovia area and enhancing its environmental and ecological appeal. Shall work closely with the Hydraulic Engineer and other technical staff to promote Sustainable Urban Drainage Solutions and to ensure that other eco-friendly and bioengineering solutions are adopted to the extent possible. Shall take specific responsibility for preparing the Urban Design Plan, Site Analysis Plan, and Urban Design Standards; as well as the development of the interventions such as greenery, and urban design aspects such as walkability, accessibility of the recreational activities, etc.

Solid Waste Management Expert:

- At least an MSc degree in Civil/Environmental Engineering, waste management, environmental management, or a related field.
- At least 10 years of professional international experience in solid waste management, and planning studies. Familiarity with the Sub-Saharan Africa (SSA) or Liberia context a strong plus.
- Relevant experience in the design and management of waste facilities.
- Experience with removal, handling, and disposal of waste from urban drainage systems and urban environments in general.
- Experience in West Africa and particularly Liberia would be advantageous.

Assignment Details: Responsible for all waste management aspects of the assignment.

Civil Engineer

- At least a BSc degree in Civil Engineering
- At least 10 years of experience in construction management with focus on urban infrastructure defined under this project such as drainage infrastructure and other public urban infrastructure;
- Experience in West Africa and particularly Liberia would be advantageous;

- At least 5 years of experience working on World Bank or other IFIs projects in developing countries and familiarity with the procurement requirements of these organizations.

Assignment Details: Responsible for managing and supervising all construction works.

GIS Specialist:

- A Master's degree in a relevant field such as geographic information systems, remote sensing, geospatial sciences, database management, or related field; and
- And at least 10 years of professional experience in mapping, geospatial analysis, remote sensing, imagery processing, and database management.

Assignment details: Responsible for data management during the project by setting up relevant databases for archiving and sharing all information such as surveys, reports, etc., and providing intensive support during the studies and preparation of the ESIA and all associated plans and reports

Field Researchers:

- At least 2 Field Researchers should have at least 6 years of experience in a relevant field.
- Must have strong oral and written communication skills in local languages as well as English.
- Field researchers should have a Bachelor's degree qualification in waste management, environmental management, environmental engineering, social studies, or similar with a proven ability to carry out field work applying research methodologies.

Assignment details: Responsible for data collection and analysis, field research and surveys, provide intensive support during the studies and preparation of the ESIA and all associated plans and reports

Required facilities from consultant and support from MPW/PMU

The Consultant is responsible for providing its own facilities for the Engineer and the Engineer's staff. MPW will provide support in obtaining data, maps, and supporting materials from other Ministries. Administrative support will be provided to facilitate obtaining work permits and visas for international staff if necessary.

The following items shall be fully arranged by the Consultant. The Consultant may choose to utilize their existing resources if available or quote in their proposals any or all items if deemed necessary. All equipment and data procured under this contract will be the property of the employer after completion of the contract. However, the employer encourages the consultants to utilize their existing equipment as available to increase their financial competitiveness:

- Rented accommodation, office equipment (including computers and printers), site equipment, and all stationery for the Consultants' staff;
- Vehicles, drivers, fuel and vehicle maintenance;
- Airfares for Team Leader and international staff to attend meetings in Liberia;
- Unskilled labor needed as helpers for surveys and quality control.
- Training / Capacity Building of local authorities assigned to the project.

The consultant will be responsible for other services that may be needed, including:

- Professional editing and design of developed communications materials;

- Accommodation and catering for stakeholder consultations;
- Local transport;
- National, and international telecommunication;
- Field visits;
- Other means required for performing the services.

Appendix A
Description of Project Locations

The following describes in more detail the selected project areas**.** As outlined in the Introduction, the envisioned interventions in these areas are to finance the rehabilitation of existing and implementation of new drainage infrastructure in the selected areas. Neighborhood upgrading activities will provide access to basic services and reduce flood risks, also providing economic and social benefits. Project activities may also support improved other infrastructure including pedestrian walkways, market stalls, roofing, water and sanitation facilities, runoff and tertiary drainage, electricity including solar panels, childcare centers, and cold and dry storage facilities where feasible within the available budget. For each location, the neighborhood upgrading activities will be front-loaded for implementation before the submission of the final designs of the other infrastructure interventions.

The infrastructure investments should be designed to climate and disaster resilient standards, taking into account 2070 climate scenarios, and prioritizing low-impact and low-carbon investments where possible. These are priorities identified in an earlier assessment but require further updating based on the latest situation. Neighborhood upgrading activities have been identified by an earlier consultancy through a participatory bottom-up community engagement process. This Consultant shall review and validate the results. Active participation by communities in all stages of preparation and implementation is essential, ensuring inclusive engagement targeting gender, youth, diverse ethnic groups, and persons with disabilities.

These infrastructure measures will be complemented by improved land use planning, zoning, and development control (under Component 2).

Location 1: Northern Bushrod Island

This area is under the jurisdiction of the Monrovia City Corporation (MCC), and has the UN Drive as an important transport link towards the north with the Duala Market as an important economic hub, which is currently being upgraded under another donor-funded project. This area is densely urbanized for the most part. The topography of this area varies significantly with the urbanized areas around UN Drive/Duala Market at relatively high ground (> 4m+MSL) whereas the northeastern urbanized part and also the open and green spaces towards the east are close to 1 – 2m+MSL and just above maximum tide levels at present. The entire area is underserved regarding drainage infrastructure and frequent flooding occurs around the Duala market and in other urbanized parts mainly as a result of pluvial events. Also, the neighborhoods have limited basic services like water and sanitation facilities, pedestrian walkways, street lighting, etc.
Envisioned urgent structural interventions for drainage of stormwater runoff in this area at this moment include:

i) Road drainage along the northern part of UN Drive (currently non-existent),
ii) Enhance connectivity of runoff from the urbanized areas to the low-lying and open spaces on the east part of the island.
iii) Preserve and connect the open green areas as retention areas for (future) rainfall events.
iv) Improve drainage connections towards the north (St Paul River mouth) and/or east (Stockton Creek).
v) Drain channels for effective runoff management within communities

The northern and eastern part of Bushrod Island is also vulnerable to fluvial and coastal flooding. To mitigate these risks, a wide variety of measures could be considered including raising embankments. But the question is also if these risks can be mitigated with structural solutions effectively and if these should be prioritized over pluvial drainage infrastructure interventions. This shall be investigated carefully in an early stage of the assignment.

Neighborhood upgrading interventions envisioned in this area should rely on bottom-up community engagement to set priorities and must be implemented immediately (2024). Potential neighborhood upgrading activities to be considered are water and sanitation services, pedestrian walkways, and other improvements such as cold and dry storage facilities around/at Duala Market. Also, the two large green spaces in the East of Bushrod Island are divided by a raised (about 5m) abandoned Bong Mines railway line which is used as a walkway that connects the island to the north of the Port area in the East. This could be considered as one potential urban upgrading project.

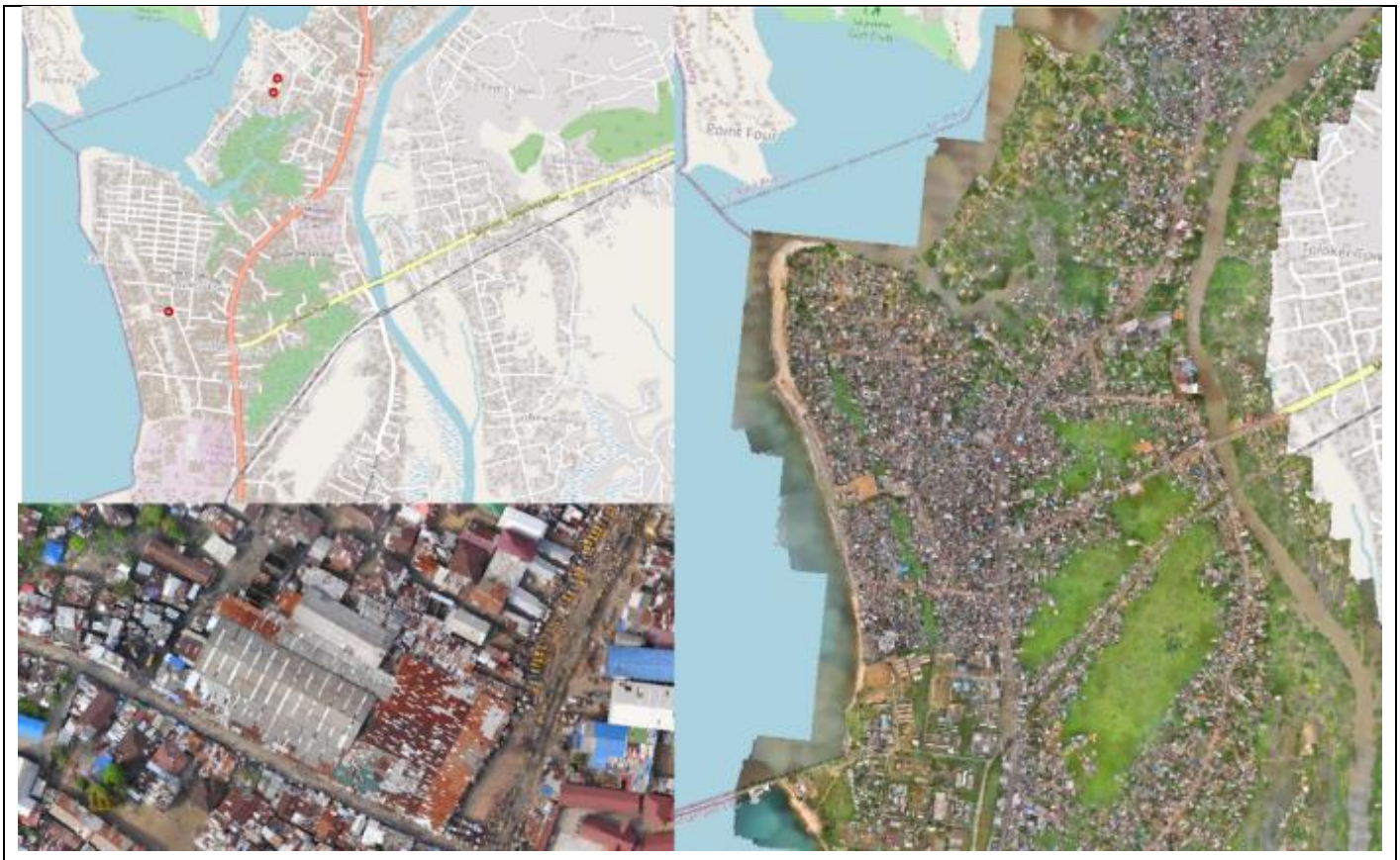

Figure 2: Impression of the northern part of Bushrod Island based on available orthophoto imagery with Duala Market at the bottom left panel.

Photo 1: Green Corridor in New Kru Town area

Photo 2: Roads intersecting the green corridor

Photo 1: Character of green open spaces in Logan Town/King Peter

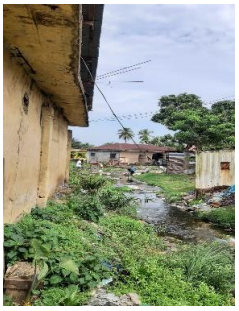

Photo 2: Garbage blocking drainage through culvert underneath UN Drive (left), Photo 3: Outlet Duala Market towards St Paul River (right)

Figure 3: Impression of Northern Bushrod island.

Location 2: Omega Market Area

This area is located under the jurisdiction of the Paynesville City Corporation (PCC) and the Omega Market is located at the former Paynesville Transmission Tower. This tower was demolished in 2011 and some urban development has taken place in this area, but the area remains quite undeveloped, probably because it is so low-lying and flood-prone. The Omega Market was opened in 2016 and further expansion of the market is ongoing. The Omega Market area faces issues including inadequate water and sanitation, Warehousing and Cold storage facilities, and significant flood issues during pluvial rainfall events. Based on an initial analysis of the topography and modeling, the former Transition Tower area (4 – 6 m+MSL) is surrounded by relatively higher ground (10-20 m+MSL) which likely results collection of rainwater in this relatively flat area before draining further towards the southeast into the Mesurado River. Potential bottlenecks for sufficient drainage are i) insufficient secondary/tertiary infrastructure surrounding the built-up area including Omega Market, ii) insufficient storage/retention area, iii) insufficient conveyance capacity of the stream towards Mesurado River due to a limited and vegetated cross-section, road crossings, or a combination of the above. Potential neighborhood upgrading activities to be considered include market stalls, roofing, water and sanitation facilities, runoff and tertiary drainage, electricity

including solar panels, childcare centers, and other improvements such as cold and dry storage and warehouse facilities, prioritizing these bottlenecks and identifying and designing structural solutions to resolve these for immediate implementation will be part of this assignment.

It will be essential that the drainage interventions be integrated into the current urban development and plans as much as possible and accompanied by potential urban upgrading and/or amenities. Consideration must be given to proposed layouts and designs planned by MPW for the area including road network and also to further development of land use plans and identifying upgrading activities with engagement of communities (also linking to Component 2). For example, the open spaces in both areas that could function as retention areas (ponds/basins) must be considered. These could be further upgraded as city parks / recreational areas during dry weather conditions.

Figure 4: Omega Ball area with indication of ongoing activities and drainage patterns.

Figure 5: Site Images for Omega Site Location

Location 3: Central Monrovia, Soniwein CBD

Central Monrovia serves as the primary business area of the city with existing drainage structures constructed between 1972-78. Inadequate urbanization and facility expansion as well as poor maintenance culture have heavily influenced the poor functional state of the current drainage facilities.

The existing Soniwein drainage has two sections (Soniwein I and II). Soniwein Drain I commences from the top of Benson Street, Mamba Point, running through and beneath some of the principal streets of the city and discharges at the back of the Monrovia Central Prison. Soniwein Drain II originates from the junction point of Gurley Street and Benson Street and crosses Central Street, Lynch Street, and Johnson Street, passes through Rally Time Market, crosses the UN Drive, and flows towards the Atlantic Ocean at the back of the Buzzy Quarter Community and BTC Barracks. The Soniwein drain is clogged with much garbage, sediment, and sludge resulting in reduced conveyance and also health issues (Photo 1). According to local knowledge, the Soniwein drain does not overtop during very severe rainfall events except for some small parts. The secondary natural drain running into the Soniwein Canal at Johnson Street is known to be flood-prone affecting the community nearby (Photo 2). At the downstream end, the Soniwein Canal drains into the Atlantic Ocean (Photo 3). The outlet opens during the rainy season but also closes during the dry season because of the coastal sediment transport. Large amounts of garbage are present near the opening and also due to the ponding of water in this area.

Potential interventions in this area may include but are not limited to maintenance/dredging of the existing primary drain, repairs to broken infrastructure elements (e.g., culverts, manholes, etc.), and connecting and improving the drainage of specific neighborhoods (e.g., community near Johnson Street). Consideration should be given to cosmopolitan attractive urban solutions that incorporates sustainability requirements for this effort.

Neighborhood upgrading should be carefully considered alongside the drainage infrastructure improvements including the construction of intermediate manholes and the replacement of stolen or damaged manhole covers. Potential ideas in this area are upgrading/improving the downstream part close to the beach and making this a more attractive urban green corridor connecting to the beachfront at the Atlantic Ocean. These interventions should also integrate future land use plans and zoning requirements to ensure such intervention's sustainability. Example of such zoning requirements could include designation of protected areas to mitigate future flooding risk to the city.

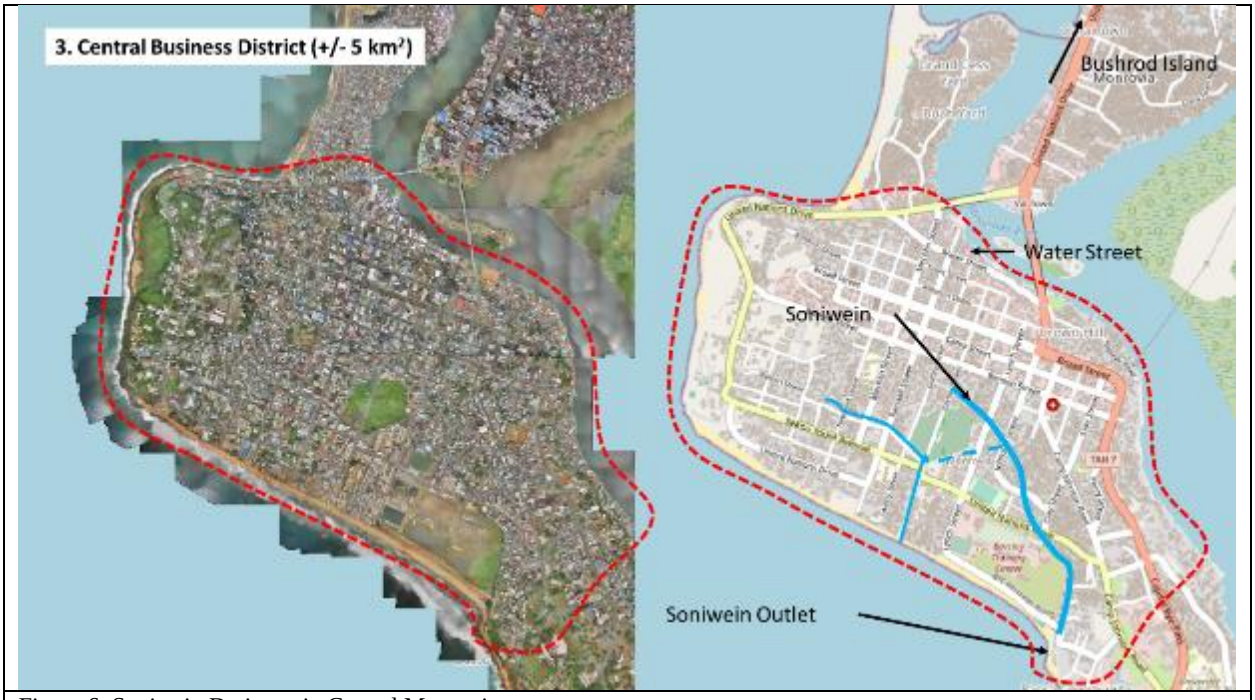

Figure 6: Soniwein Drainage in Central Monrovia

Photo 1: Garbage and siltation in Soniwein Drain (left), Photo 2: Natural drain entering Soniwein Drain near Johnson Street (right)

Photo 3: Outlet Soniwein Drain at Atlantic Ocean

Photo 1: View on Water Street / Mesurado Estuary from Front Street

Photo 2: Open Space between Water Street and Front Street (left), Photo 3: Clogged drain at Water Street towards Mesurado Estuary (right)

Figure 7: Impression of the CBD area regarding drainage.

Location 4: Southeastern Paynesville

Paynesville City is a fast-developing metropolitan city with inadequate and in some areas, nonexistent drainage facilities. Although fast developing, the city is not laid out, non-existent drainage plan / strategy, and has poor resilience to flooding which has become a regular occurrence during the raining season. The South of Paynesville City has seen regular flooding for some time due to pluvial activities which serves as a serious risk for communities' low-lying towards the Mesurado River. Potential interventions in this area are to improve and enlarge the existing natural corridors which drain the rainfall water towards the lower areas. Also, removing potential bottlenecks (e.g. blocked culverts) underneath roads is likely to be addressed to improve the drainage capacity. Urban upgrading options in these areas could be to make these natural drains more attractive for the neighboring communities and develop green park-type solutions for the residents which are also protected from further encroachment.

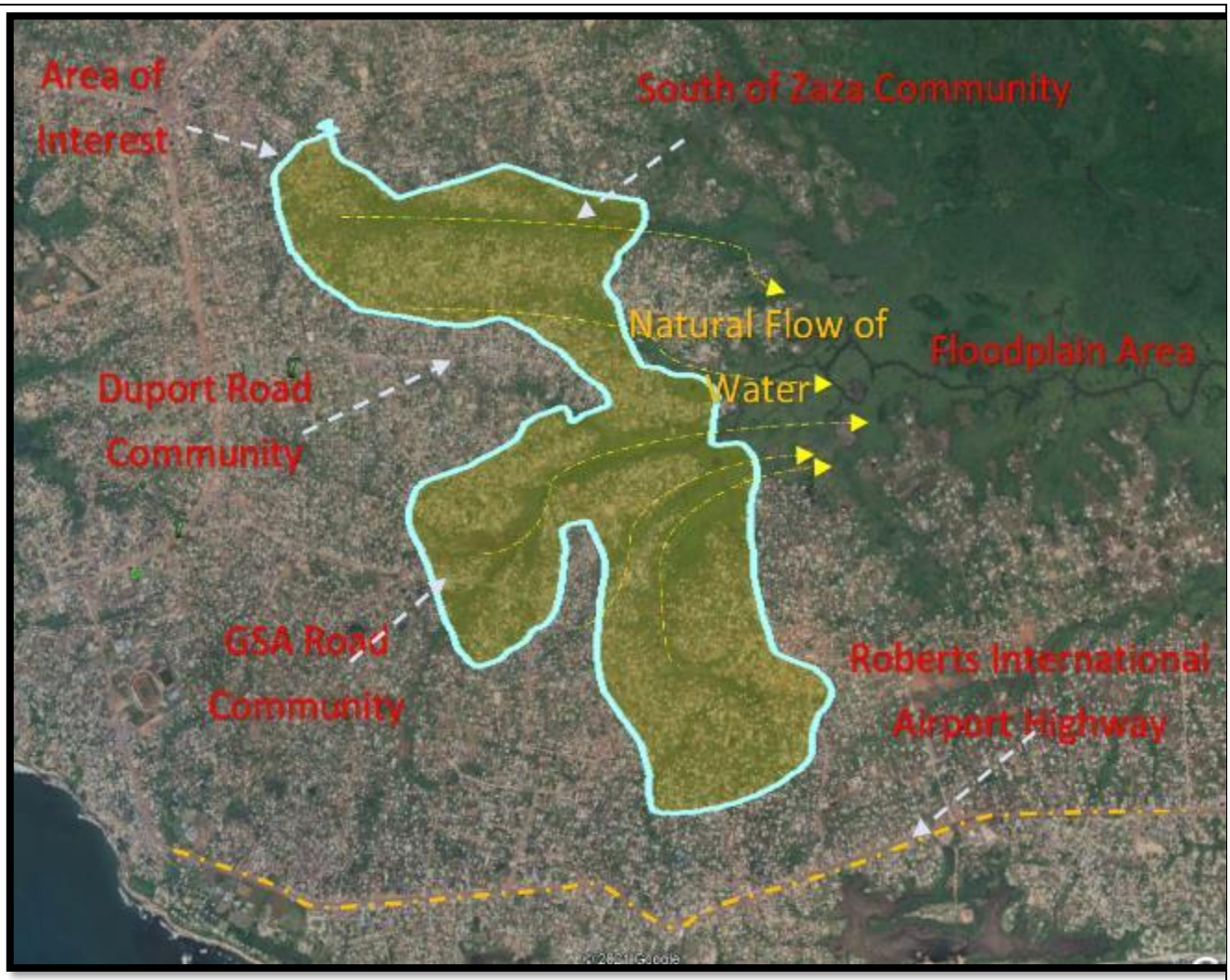

Figure 8: Impression of the project area in Paynesville with particular area of interests identified.

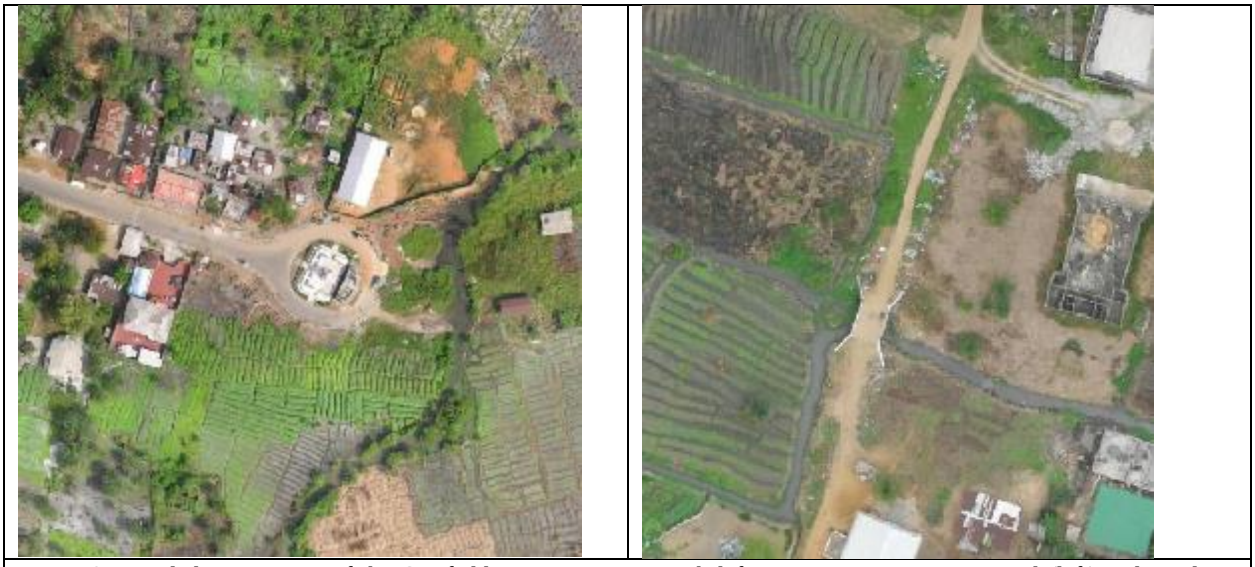

Figure 9: Detailed impressions of the Cowfield community area with left situation at Benson Hospital (left) and a culvert underneath a small road between Dillian Ave and Duport Rd (right).

The Government of Liberia is currently implementing some projects with similar activities and in some instances near the targeted sites for intervention. Below is a list of some of these projects that are planned or ongoing:

- Liberia Beach Sporting & Recreational Facility – Donor funded (Abu Dhabi Fund for Development)
- Omega International Market Expansion & Upgrade Projects – GOL funded (Ministry of Public Works & LACE)
- Monrovia Raw Water Pipeline Project – Donor Funded (World Bank)
- ELWA Junction – Red Light Road Project: Donor Funded (World Bank)

Some of these projects are currently ongoing including the roads project, pipeline construction project, drainage and market construction project while the beach recreational facility construction is expected to start quite shortly. Interfaces with these projects shall be carefully considered during this assignment.

APPENDIX B – GAP ANALYSIS SUMMARY			
Task	**Key deliverables (See Appendix C for details)**	**Deliverables Completed**	**Gaps**
Task 1A **Topographic survey**	1. Provide 2 sets of printed survey reports and maps and all information (raw data, maps, shapefiles etc.) handed over in digital format on USB and cloud folder. 2. Control Network Map including bearing and distance to each control station. 3. An Index Map 4. Survey Maps in 1:1000 scale with Gridlines and if tiled with joint lines. 5. Survey and map the following: A. The meets and bounds of the project locations and reflecting particular flood risk zones and communities targeted under this project. B. All permanent public & private structures (social, commercial, and residential) located within the project area. C. The immediate land and floodplain areas around the area of interest including the access road, existing drainage infrastructure, earth drainages, and all relevant flood-related areas for planning. D. Build-up approaches E. Limit of green areas, agricultural land, open spaces, reclaimed areas, cemeteries, F. The boundaries of all the plots, with a specific	**1.** Survey essentially completed. A comprehensive survey was carried out by an earlier consultant using DGPS and Drone instruments for the project study areas. **See Appendix C for the list of reports, maps and data, including shapefiles, DEMs, contour maps, etc. generated by the earlier consultant, all of which will be handed over to the Consultant. The Consultant may obtain this information from the PMU for review prior to submitting its proposal.**	1. Confirmation of the vertical accuracy of Digital Elevation Model (DEM Files) with reference to the mean sea level of the Digital Terrain Model. 2. Review and validation of existing reports, data, and maps. The Consultant shall be careful not to duplicate previous efforts that have been completed unless the Consultant's reviews justify a repeat of the work, in which case the PMU's approval will be required.

	use, should be identified including: a. Any residential plots (block-level demarcation is sufficient) b. Any public buildings (e.g., schools, island offices, mosques, etc.) c. Any utilities and municipal land use (e.g., powerhouses, cemeteries, water plants, etc) d. Any commercial and industrial buildings, public facilities, e. Natural water flow section, f. Possible retention ponds/basins, Permanent structures, etc.		

Task	Key deliverables (See Appendix C for details)	Deliverables Completed	Gaps
Task 1 B **Bathymetric survey**	1. Survey Stockton Creek, area around St. Paul River and the Mesurado Estuary near the Central Business District (CBD)	1. The survey was essentially completed by an earlier Consultant. See Appendix C for the list of reports and data, including maps and shapefiles, generated by an earlier consultant, all of which will be handed over to the Consultant	1. Review and validation.
Task 2 **Geotechnical and soil investigations**	1. Detailed methodology that includes the scope and nature of site-specific investigations to be carried out: A. Choice of the method of boring B. Selection of the type of samples and procedure for sampling C. Location plan for the ground investigation	1. Geotechnical and soil investigation essentially completed by an earlier Consultant. **See Appendix C for the list of Geotechnical and soil investigation reports prepared by an earlier consultant, all of which will be handed over to the Consultant. The**	2. Review and validation.

	D. Type, scope, and nature of investigation at each site as well as boreholes and field tests along with their interval for repetition E. Establish ground level before commencing operation. The ground level shall be related to an established benchmark. 2. Preliminary and detailed site investigation and ground condition to determine: ✓ General data of site topography ✓ Weather conditions ✓ Human and natural actions ✓ General climate risk analysis ✓ Exploration of the soil and ground conditions to inform flood water absorption rates, drainage channel excavation requirements, quality of dredged/excavated sediments, borehole sinking, infrastructure foundation Work required for the project F. plate load tests and other field tests	**Consultant may obtain this information from the PMU for review prior to submitting its proposal.**	
Task	**Key deliverables (See Appendix C for details)**	**Deliverables Completed**	**Gaps**

Task 3 **Hydrological and hydraulic modeling for the selected areas**	1. Assess existing hydrological/hydraulic data and information. 2. Review the existing information and define the final areas to be analyzed in the hydrological/hydraulic analysis. 3. Define appropriate boundaries and modeling methodology. 4. Refine the approach used in previous studies and calibrate the 2D modeling with data and/or local knowledge of the flooding and make the analysis as accurate and realistic as possible. 5. Construct appropriate hydrological and hydrodynamic models for the project area, employing non-propriety software 6. Use modeling to analyze different design storm events (e.g. rainfall events including the combined effect of other driving forces like tidal water levels which can limit gravity drainage). 7. Produce detailed flood maps for the baseline situation and future scenarios 8. Determine a realistic return period for the preliminary design of the drainage infrastructure. 9. Quantify benefits of interventions (avoided damages, reduction in population affected). 10. Determine direct and indirect economic damages	1. The consultant performed the following activities: A. Data collection through surveys such as Drone & Bathymetry, review, extraction, and adjustment of data, B. Rainfall analysis and development of IDF curves C. Delineation of catchments D. Development of 1-D and 2-D HEC-RAS models of the various catchments **See Appendix C for the list of hydrological and hydraulic data, reports, computer models, etc. generated by the earlier consultant, all of which will be handed over to the Consultant. The Consultant may obtain this information from the PMU for review prior to submitting its proposal.**	1. Some hydrological and hydraulic modeling have been performed, but several questions remain. A. Rainfall analysis is questionable—significant variance compared to a study by another consultant B. Did not quantify/discuss flood damage from the baseline condition. C. No economic analysis performed to determine direct and indirect economic damages and to address the question of cost-benefit D. No "Realistic return period for the preliminary design of the drainage infrastructure" recommended E. In report, hydrologic and Hydraulic models development not sufficiently transparent. Report needs to include a. All inputs, including the different boundary conditions modeled. b. justifications for all coefficients and n values used, etc. c. Properly sized plans to illustrate reaches of river channels modeled, and locations of river stations, in addition to HEC-RAS outputs.

			d. Justifications for flow change locations. 2. Review, calibration and validation of the data presented in the previous study.

Task	Key deliverables (See Appendix D for details)	Deliverables Completed	Gaps
Task 4 **Community mapping, needs, and prioritization**	1. Perform detailed mapping of communities to capture: A. Building footprints, B. Location of relevant infrastructure including drainage structures, water supply, etc. C. Analyze and summarize: a. relevant physical (land elevation, climate, and rainfall characteristics) b. socio-historical information (historical patterns of establishments, local governance structures, etc.) c. demographic information (population densities, growth rates, population structure, etc.) d. economic profile (predominant occupations, significant commercial businesses, etc.) e. housing conditions (building footprints	**1.** Community mapping, needs, and prioritization essentially completed. **See Appendix C for the list of information/reports generated by an earlier consultant, all of which will be handed over to the Consultant. The Consultant may obtain this information from the PMU for review prior to submitting its proposal.**	Review and validation

	with permanent and temporary structures, water supply, electricity, etc.) f. transportation (main transport modalities, infrastructure, critical facilities) g. land tenure (delineation of state lands, private lands, etc.) 2. Carryout community consultations and engagements.		

Task	Key deliverables (See Appendix D for details)	Deliverables Completed	Gaps
Task 5 **Local Area Resilience Plans**	1. Provide a detailed baseline description of each area and the functioning of its communities, potential hazards/disasters (not limited to floods) 2. Present key priorities in flood resilience and other community infrastructure 3. Key futures of plan (LARP): A. Layout of main drainage pathways B. Areas to be protected for water retention during the rainy season and public spaces during the dry seasons C. Key community facilities and other critical infrastructure including transport routes, waste management facilities, and collection routes D. Potential hazard maps	1. Provided the basic information including: A. key priorities, B. drainage pathways, C. green areas, D. transport routes, etc. 2. Some aspects discussed under community mapping. **See Appendix C for the list of information/reports generated by an earlier consultant, all of which will be handed over to the Consultant. The Consultant may obtain this information from the PMU for review prior**	1. Local Area Resilience Plans required missing priorities per area expected 2. No discussion of potential hazards/disasters other than floods (fire, crimes, epidemic, etc.) 3. No potential hazard maps 4. No maps of other recent hazard/disasters or a statement to say whether there were no recent hazards/disasters 5. Except for Central Monrovia, drains not properly identified (open channel, pipe, etc.)

	E. Maps of other recent hazards/disasters such as fire, etc. F. Outline key priorities regarding flood resilience and other community infrastructure priorities based on community consultations.	**to submitting its proposal.**	

Appendix C

Available data files, reports, computer models and maps generated by an earlier Consultant

to be handed over to the Consultant

Sl.No.				TITLE
TASK 1 TOPOGRAPHICAL SURVEY				
1.0				DEM FILES
	1.1			Bushrod Island DEM
	1.2			Central Monrovia DEM
	1.3			Omega DEM
	1.4			Paynesville DEM
2.0				AERIAL IMAGERIES
	2.1			Bushrod Island Orthophoto Imagery
	2.2			Central Monrovia Orthophoto Imagery
	2.3			Omega Market Orthophoto Imagery
	2.4			Paynesville Orthophoto Imagery
3.0				SURVEY MAPS AND DATA
	3.1			*Bathymetric Survey Maps*
		3.1.1		*CALDWELL BRIDGE LOCATION*
			3.1.1.1	Details & River Bed Contour Map
			3.1.1.2	Details & River Bed Cross Section_1
			3.1.1.3	Details & River Bed Cross Section_2
			3.1.1.4	Details & River Bed DSM
			3.1.1.5	Details & River Bed Grid Elevation Map
			3.1.1.6	Details & Water Top Grid Elevation Map
			3.1.1.7	Profile Map
		3.1.2		*OCEAN*
			3.1.2.1	Details & Contour Map
			3.1.2.2	Details & Grid Elevation Map
			3.1.2.3	Profile Map
			3.1.2.4	Cross Section
			3.1.2.5	3D DSM
		3.1.3		*SOALI DRIVE or DOUBLE BRIDGE*
			3.1.3.1	Details & River Bed Contour Map
			3.1.3.2	Details & River Bed Cross Section_1
			3.1.3.3	Details & River Bed Cross Section_2
			3.1.3.4	Details & River Bed Cross Section_3
			3.1.3.5	Details & River Bed DSM

Appendix C

Available data files, reports, computer models and maps generated by an earlier Consultant

to be handed over to the Consultant

Sl.No.				TITLE
			3.1.3.6	Details & River Bed Grid Elevation Map
			3.1.3.7	Details & River Bed Profile
			3.1.3.8	Details & Water Top Grid Elevation Map
		3.1.4		*ST PAUL RIVER 1*
			3.1.4.1	Details & River Bed Contour Map
			3.1.4.2	Details & River Bed Cross Section
			3.1.4.3	Details & River Bed Cross Section_2
			3.1.4.4	Details & River Bed Cross Section_3
			3.1.4.5	Details & River Bed DSM
			3.1.4.6	Details & River Bed Grid Elevation Map
			3.1.4.7	Details & River Bed Profile Map
			3.1.4.8	Details & Water Top Grid Elevation Map
		3.1.5		*ST PAUL RIVER 2*
			3.1.5.1	Contour Map ST Paul River 2
			3.1.5.2	River Bed Profile
			3.1.5.3	Details & River Bed Cross Section_1
			3.1.5.4	Details & River Bed Cross Section_2
			3.1.5.5	Details & River Bed DSM
			3.1.5.6	Details & River Bed Grid Elevation Map
			3.1.5.7	Details & River Water Top Grid Elevation
		3.1.6		*ST PAUL RIVER 3*
			3.1.6.1	Details & River Bed Contour Map
			3.1.6.2	Details & River Bed Grid Elevation Map
			3.1.6.3	Details & Water Top Grid Elevation Map
			3.1.6.4	Profile Map
			3.1.6.5	Cross Section_1
			3.1.6.6	Cross Section_2
			3.1.6.7	Cross Section_3
			3.1.6.8	Cross Section_4
			3.1.6.9	Cross Section_5
			3.1.6.10	Cross Section_6
			3.1.6.11	Details & River Bed 2D DSM
		3.1.7		*VAI TOWN BRIDGE OR PROVIDENCE ISLAND*
			3.1.7.1	Details & River Bed Contour Map
			3.1.7.2	Details & River Bed Grid Elevation Map
			3.1.7.3	Details & River Bed Profile Map
			3.1.7.4	Details & Water Top Grid Elevation Map
			3.1.7.5	River Bed Cross Section Map (Cad)_1
			3.1.7.6	River Bed Cross Section Map (Cad)_2

Appendix C

Available data files, reports, computer models and maps generated by an earlier Consultant

to be handed over to the Consultant

Sl.No.				TITLE
			3.1.7.7	River Bed Cross Section Map (Cad)_3
			3.1.7.8	Details & River Bed DSM
		3.1.8		*Bathymetry Raw Data Caldwell Bridge location*
		3.1.9		*Bathymetry Raw Data Ocean location*
		3.1.10		*Bathymetry Raw Data SOALI DRIVE or DOUBLE BRIDGE*
		3.1.11		*Bathymetry Raw Data St Paul River 1*
		3.1.12		*Bathymetry Raw Data St Paul River 2*
		3.1.13		*Bathymetry Raw Data St Paul River 3*
		3.1.14		*Bathymetry Raw Data Vai Town Bridge or Providence Island*
	3.2			CONTOUR MAPS
		3.2.1		Details & Contour Map of Northern Bushrod Island
		3.2.2		Details & Contour Map of Omega Market
		3.2.3		Details & Contour Map of Paynesville
		3.2.4		Details & Contour Map of Central Monrovia
		3.2.5		Contour Maps on Grid
	3.3			Flood Inundation Maps(a)
		3.3.1		Flood Inundation Map - Bushrod Island
		3.3.2		Flood Inundation Map - Omega Market
		3.3.3		Flood Inundation Map - Paynesville
		3.3.4		Flood Inundation Map - Central Monrovia
	3.4			Existing Drain Network Maps with access roads, etc(c)
		3.4.1		Drain Network Maps with access roads, etc
	3.5			Land Cover(d) to (g)
		3.5.1		Land Cover Map - Bushrod Island
		3.5.2		Land Cover Map - Central Monrovia
		3.5.3		Land Cover Map - Omega Market
		3.5.4		Land Cover Map - Paynseville
	3.6			Land Map Layout(b)
		3.6.1		Land Map Layout - Bushrod Island
		3.6.2		Land Map Layout - Central Monrovia
		3.6.3		Land Map Layout - Omega Market
		3.6.4		Land Map Layout - Paynesville
	3.7			Land Use Maps(h)
		3.7.1		Bushrod Island Land Use Map
		3.7.2		Central Monrovia Land Use Map
		3.7.3		Omega Land Use Map
		3.7.4		Paynesville Land Use Map

Appendix C

Available data files, reports, computer models and maps generated by an earlier Consultant

to be handed over to the Consultant

Sl.No.				TITLE
	3.8			Stormwater Drain Network Maps including demarcation of sub-catchments (j) to (k)
		3.8.1		Bushrod_Island_catchment_area_maps
		3.8.2		Central_Monrovia_catchment_area_maps
		3.8.3		Omega Market catchment_area_maps
		3.8.4		Paynesville catchment_area_maps
		3.8.5		Existing Drain Network Maps
	3.9			RAW SURVEY DATA 22.04.2024
		3.9.1		CSV Files Survey Data
		3.9.2		Final Central Monrovia Complete All Survey Data
		3.9.3		Final Northern Bushrod Island Complete All Survey Data
		3.9.4		Final Omega Market Complete All Survey Data
		3.9.5		Final Paynesville Complete All Survey Data
		3.9.6		Shape Files of Survey Data
	3.10			Digitized Files(Raw) 4 Areas
		3.10.1		Bushrod Island CAD & Shape Files
		3.10.2		Central Monrovia CAD & Shape Files
		3.10.3		Omega Market CAD & Shape Files
		3.10.4		Paynesville CAD & Shape Files
4.0				Topographical Survey Chapter
TASK 2 GEOTECHNICAL INVESTIGATIONS				
2.0	2.1			Geotechnical Investigation Methodology
	2.2			WAPCOS replies to comments on Geotechnical Investigation Method
	2.3			Geotechnical Investigation Report
	2.4			Updated Geotechnical Investigation Report duly complying PMU comments
	2.5			Editable Geotechnical Investigation Report
TASK 3 HYDROLOGICAL AND HYDRAULIC MODELLING				
	3.1			RAINFALL DATA
		3.1.1		Haindii_Rainfall Data
		3.1.2		LHS_Old-Road-Sinkor_Montserrado-County-6 (1)
		3.1.3		LHS_Rainfall Data
		3.1.4		NASA 3_Hourly_Liberia (1)
		3.1.5		Piatta_Rainfall Data
		3.1.6		PML Data BTC SAR

Appendix C

Available data files, reports, computer models and maps generated by an earlier Consultant

to be handed over to the Consultant

Sl.No.				TITLE
	3.2			RAINFALL ANALYSIS
		3.2.1		IMERG_data_processing_for_time_distribution
		3.2.2		Rainfall input for Modelling
	3.3			RIVER FLOW DATA
		3.3.1		Haindii_Daily Flow
		3.3.2		Piatta_Paul_Daily Flow
	3.4			RIVER FLOW ANALYSIS
		3.4.1		Development of UH+hydrograph
	3.5			3.5 Development of IDF Curves at LHS Station
	3.6			3.6 Mean Temperature at Haindii
	3.7			3.7 Mean Temperature at Piatta
	3.8			3.8 Mean Temperature at stgpaulbr
	3.9			3.9 Rainfall Analysis at Haindii station from Worldclim
	3.10			3.10 Rainfall Analysis at piatta station from Worldclim
	3.11			3.11 Rainfall Analysis at stpaulbridge station from Worldclim
	3.12			HEC RAS 2D Model Files
		3.12.1		Central Monrovia-20240724T161758Z-001
		3.12.2		Northern Bushrod-20240723T210325Z-002
		3.12.3		Northern Bushrod-20240724T163624Z-001
		3.12.4		Omega-20240724T113505Z-002
		3.12.5		Omega-20240724T183012Z-001
		3.12.6		Paynesville-20240724T125620Z-001
		3.12.7		Paynesville-20240724T125620Z-002
	3.13			HEC RAS 2D Model RESULTS
		3.13.1		Central Monrovia Files
		3.13.2		Northern Bushrod Files
		3.13.3		Omega Market Files
		3.13.4		Paynesville Files

Appendix C

Available data files, reports, computer models and maps generated by an earlier Consultant

to be handed over to the Consultant

Sl.No.				TITLE
TASK 4 COMMUNITY MAPPING NEEDS AND PRIORITIZATION				
	4.1			Stakeholder Engagement Plan
	4.2			Stakeholder Consultation Report
	4.3			Community Mapping Needs and Prioritization Chapter
TASK 5 LOCAL AREA RESILIENCE PLAN				
	5.1			Flood Hazard Maps
		5.1.1		Flood Hazard Maps - Bushrod Island
		5.1.2		Flood Hazard Maps - Central Monrovia
		5.1.3		Flood Hazard Maps - Central Monrovia1
		5.1.4		Flood Hazard Maps - Omega Market
		5.1.5		Flood Hazard Maps - Paynesville
		5.1.6		Flood Inundation Map - Bushrod Island
		5.1.7		Flood Inundation Map - Omega Market
		5.1.8		Flood Inundation Map - Paynesville
		5.1.9		Flood Inundation Map - Central Monrovia
	5.2			Local Area Resilience Plan Chapter
TASK 6 DEVELOP A DESIGN BASIS WITH BOUNDARY CONDITIONS AND REQUIREMENTS				
	6.1			Development of Design Basis Chapter INCLUDING NO REGRET INTERVENTIONS
I - FINAL PRE-DESIGN STUDIES REPORT				
I - A - Final Combined Pre-Design Studies Report – PDF Version				
I - B - Final Pre-Design Studies Report – Word Version				
I - C WAPCOS replies to PMU comments on Pre-design studies report				
II - WAPCOS COMPLIANCE REPORT				
II A WAPCOS COMPLIANCE REPORT				

Appendix D
Requirements for Stage 2 Tasks

Task 1: Topographic survey requirements

The surveyors must survey and map the following:

a. The meets and bounds of the locations mentioned above for intervention reflecting particular flood risk zones and communities as targeted under this project;
b. All permanent public & private structures (social, commercial, and residential) located within the project area.
c. The immediate land and floodplain areas around the area of interest, as directed by the PMU, including the access road, existing drainage infrastructure including nature earth drainages, and all relevant flood-related areas for planning.
d. Built-up approaches
e. Limits of green areas including coconut groves, isolated trees of significance, etc.
f. Limits of agricultural land within the area if any
g. Limits of open space, including parks, sports grounds, reclaimed areas, cemeteries, etc.
h. The boundaries of all the plots, with specific uses should be identified:
    - any residential plots (block-level demarcation is sufficient)
    - any public buildings (e.g., schools, island offices, mosques, etc.)
    - any utilities and municipal land uses (e.g., powerhouses, cemeteries, water plants, etc.)
    - any commercial and industrial buildings, public facilities, etc.
i. All other permanent structures
j. Nature water flow sections
k. Identify possible retention ponds/basins

The topographic survey must have sufficient vertical and horizontal accuracy and shall result in a detailed 3-D plan/3D-reality model of the area of interest. As said earlier, there is an existing elevation model with a 0.5-meter horizontal resolution. The Consultant's review and validation of the WAPCOS survey is expected to confirm that it includes a DTM with a vertical resolution within +/- 0.10 m. The consult can perform ground truthing with sufficient ground control points in the areas of interest to generate a DTM with a vertical resolution within +/- 0.10 m. Specific emphasis shall be on areas which are critical for the drainage infrastructure (e.g. possible retention areas, existing drainage channels, man-made structures, etc.) which shall be surveyed with high accuracy (+/- 0.03 m). Also, existing drainage structures in the areas of interest shall be surveyed with high accuracy for making detailed designs (e.g. estimating m3 of material to be dredged). It is noted that the orthophoto imagery can also be used for defining some relevant dimensions (e.g. culvert lengths, etc.).

For the areas of interest, collection of high-resolution aerial imagery is required with a minimum of 2 cm GSD using survey grade UAS/Drone having on board dual GNSS system and calibrated camera of 20 MP. The UAV Aerial Photo Acquisition shall be done to cover the areas mentioned above making up

the specific scope of the survey. Images shall be clear/sharp imagery with good light condition with XYZ coordinates and rotational information, sensor size, focal length, etc.

The Surveyor shall supply surveyed maps in AutoCAD DWG format (version 2021 or less), also all the Maps should be combined into one .pdf file. The digital raw files from the survey also should be submitted for review. Final processed data in .csv file format (Point ID, Easting, Northing, and Description) and required shape files should be submitted.

The results of any analyses, tests, and audits carried out shall be supplied as part of the survey report.

All the Maps shall include:

- Grid Information (grid intervals at 50m)
- Survey date and time and shorelines surveyed date
- Name of the chief surveyor, surveyor registration number.
- All the Maps should be in A3 or larger paper size.
- Control Network Map shall include bearing and distance to each control station.
- An Index Map (This map should fit in one A3 paper)
- Survey Maps in 1:1000 scale with Grid lines and if tiled with joint lines.
- CAD Layer naming as per CAD standards provided by MLSA.

The Surveyor shall supply 2 sets of printed survey reports and maps and all information (raw data, maps etc.) shall also handed over in digital format on USB and cloud folder, details of which can be confirmed in the inception stage.

Bathymetric survey:

This Consultant is also expected to do bathymetric surveys where necessary. A particular area of interest the Stockton Creek area, St Paul River, and Mesurado River Estuary near the CBD. These water bodies are relevant to analyze the tidal levels and also the conveyance capacity during high river floods (in particular St Paul River/Stockton Creek). The Consultant is expected to propose a sufficiently high but efficient horizontal survey resolution, keeping in mind that the purpose of the data is for analysis and engineering.

Task 2: Geotechnical and Soils Investigation Requirements

For adequate engineering analysis of the site, the geotechnical investigation shall be carried out as part of the preliminary & detailed design activities. However, preliminary site investigation and ground conditions shall be done during the pre-design studies to provide general data on the site topography, weather conditions, human and natural actions affecting the land, and general climate risk analysis to inform the type and nature of detailed investigations. Further geotechnical and soil investigations will be conducted for project-specific locations following the identification and acceptance of community-specific interventions during the detailed design phase.

The scope of the geotechnical & soil investigations shall cover all activities associated with the infrastructure proposed to be constructed under this project as well as exploration of the soil and ground conditions to inform flood water absorption rates, drainage channel excavation requirements, sediment quality of dredged/excavated materials, borehole sinking, infrastructure foundation works required for this project. The Consultant shall confirm that the work completed by WAPCOS covers these considerations and that it conforms to all specifications and procedures for soil investigations in line with the Standards used in Liberia for such geotechnical investigation works, as provided by the Ministry of Public Works / PMU.

The Consultant shall also ensure that all studies, data, and works applied as a result of the geotechnical investigation are carried out as required/instructed by the Client. Specifications for geotechnical investigation for drainage interventions shall be updated following preliminary investigation and depending on the scope of the intended works to be carried out on the site.

The purpose of the proposed sub-soil investigation is to provide adequate information on sub-surface and surface conditions for the foundations and other sub-structures for the proposed project, leading to their economical and safe designs.

The Consultant shall provide a detailed methodology for approval by the PMU during the detailed design stage of the work that sets out the scope and nature of site-specific geotechnical and soil investigation to be carried out. This will include the planning of the work, choice of the method of boring, selection of the type of samples, and procedure for sampling shall be detailed and outlined in his methodology for review and approval by the PMU before a detail investigation can be conducted.

For tender preparation, the Consultant shall furnish his tentative program regarding the above along with his offer which, necessarily, should consider the site conditions and schedule for completing the work, comprising subsurface features, borings, in-situ tests, sampling, visual observations and laboratory tests of samples, reporting of the test results, including discussions, correlating the field and the laboratory test values and commendations.

For each of the proposed communities, the Consultant shall be required to provide a location plan for the ground investigation indicating key/major facilities with proposed facilities being marked as “proposed study area” attached. The location plan will set out to detail the type scope and nature of soil / geotechnical investigation to be conducted at each location for review and approval by the PMU. The plan should also capture specific locations for boreholes and field tests along with their interval for repetition. At each location, plate load tests and other field tests, the Consultant shall establish the ground level prior to commencing of the operations. The ground level shall be related to an established benchmark or to a GTS benchmark or as directed by the PMU.

Task 3: Hydrological and hydraulic modeling for the selected areas

The Consultant is expected to assess existing hydrological/hydraulic data (modelled and observed if available) in combination with additional detailed modeling in the project areas. Appropriate boundaries and an appropriate modeling methodology must be defined in the Inception Report. The geographical

outlines of the areas of interest based on the initial mapping of the hydrological catchment can be used as a starting point. The Consultant is expected to review the existing information and define the final areas to be analyzed in the hydrological/hydraulic analysis.

For the four selected areas, the Consultant shall use appropriate modelling software for the construction of the hydrological and hydrodynamic models to be used in this LURP study. Preferably, this software should be non-proprietary and must be compatible with national choices and standards. As inputs for the modeling, the Consultant may use the existing data (e.g. rainfall statistics/curves, etc.) and models developed during the hazard and risk assessment in 2019/2020. It is expected that the Consultant will check and refine this approach (e.g. by including existing structures and/or creeks/channels and including more detailed topographic survey information) and calibrate the 2D modeling with data and/or local knowledge of the flooding to make the analysis as accurate and realistic as possible. Special attention shall be given to how to deal with uncertainties in the entire modelling chain in this methodology.

The consultant shall use the modeling to analyze different design storm events (e.g. rainfall events including the combined effect of other driving forces like tidal water levels which can limit gravity drainage). The consultant is expected to produce detailed flood maps for the baseline situation and also future scenarios for the project areas. Initial computations must be carried out to understand the local system behavior. Also, some preliminary interventions may be evaluated to understand the sizing, etc., and get an understanding of a realistic return period for the preliminary design of the drainage infrastructure.

The Consultant is also expected to quantify the benefits of the interventions (i.e. “avoided damages”, or “reduction of affected population”). For this purpose, the Consultant shall evaluate the risk of flooding for the baseline situation and for the situation with interventions as inputs for cost-benefit analyses (see also next stage). Similar to the hydrological/hydraulic modeling, the existing data and models developed during the hazard and risk assessment in 2019/2020 can be applied. For these selected areas, quantification of the number of affected people and the direct economic damage is required, taking into account the exposure distribution (assets, population) and vulnerability. Indirect economic damage can be added as a fixed allowance on top of the direct economic damage, but the allowance must be justified based on situations with similar characteristics.

The Consultant shall include in its report all boundary conditions and other model input data simulated, appropriately labeled schematics illustrating catchment basins, drains, flow change locations for drains, and other elements modelled. The Consultant shall submit to the MPW/PMU all hydrologic/hydraulic models developed for this project at the end of the project. If requested, the Consultant shall also submit the models along with its report for review.

Task 4: Community mapping, needs and prioritization

a) Do in-depth mapping of the communities in the areas of interest based on available data and fill in gaps with additional surveys and desk research. These maps shall cover building footprints as well as locations of relevant infrastructure (with emphasis on drainage infrastructure) and other basic services

(water supply, etc.) in the four areas of interest. Also, the Consultant is expected to analyze and summarize relevant physical (land elevations, climate, and rainfall characteristics, etc.), socio-historical information (historical patterns of establishments, local governance structures, etc.), demographic information (population densities, growth rates, population structures, etc.), economic profiles (predominant occupation, significant commercial businesses, etc.), housing conditions (building footprints with permanent and temporary structures, water supply, electricity, etc.), transportation (main transport modalities, infrastructure, critical facilities), land tenure (delineation of state lands, private lands, etc.),

b) Engage in a series of consultations with communities through various fora (as appropriate) including large "town hall" meetings, small focus group meetings, and meetings with specialized groups to further explain the project scope and identify specific needs and priorities but also implementation aspects like land ownership and land use rights, etc. which are relevant for defining investment options. Steps to be undertaken could be first to explain the basic objectives, principles, processes, parameters, and time frames and to obtain initial feedback on these and consult the community on general land use rights and other pertinent issues. The Consultant is expected to organize a round of consultations so that teams representing selected communities are (i) sensitized about the overall budget envelope (hard budget constraint) in terms of per capita, per household and/or per hectare cost, and about the need to make trade-offs regarding priorities within that envelope; (ii) informed about the possible need to factor in cost recovery requirements; (iii) asked to rank their community's infrastructure needs in order of priority (drainage will be of paramount importance but other community infrastructure shall also be considered). The consultants should facilitate these sessions and provide feedback to the teams if different actors produce different results.

Task 5: Local Area Resilience Plans

a) Develop a Local Area Resilience Plan for each of the targeted areas. This plan shall be based on the information gathered from the community consultations (Task 4), surveys, and hydrological/hydraulic modeling (Tasks 1 - 3). It shall be a high-level plan for each of the targeted areas and provide a detailed baseline description of the area and the functioning of its communities, the potential hazards/disasters (not limited to floods), and also presenting key priorities in flood resilience and other community infrastructure. Aspects to be included but not limited to the area: layout of the main drainage pathways, areas to be protected for water retention during rainy seasons and public spaces during dry seasons, key community facilities, and other critical infrastructure including transport routes, waste management facilities, and collection routes. This plan shall also present maps with potential hazards in the neighborhoods. Apart from presenting flood maps (see Task 3), this may include maps of recent other hazards/disasters such as fires, etc. The plan shall outline the key priorities regarding flood resilience and other community infrastructure priorities based on consultations with the communities and the consultant's analysis.

Task 6: Develop a Design Basis with boundary conditions and requirements

a) Develop for all identified structural interventions a so-called Design Basis based on the information gathered in Task 1-4. In this document, the consultant will lay down in consultation with the Ministry and Technical stakeholders as well as the PMU appropriate guidelines to prepare detailed designs of all works, including engineering plans for different types of structures and reports for the Project. The

design basis shall summarize the outputs from the community consultations and shall define the specific needs and priority in terms of drainage and neighborhood upgrading for each of the areas.

b) The Design Basis shall also include recommended design criteria, specifications, technical standards, and codes of practice giving due consideration to relevant international design criteria/codes of practice/specifications and taking due account of advice provided by the PMU. Where GoL codes of practice/specifications and standards are not available, international codes of practice, specifications, and standards may be adopted with the approval of the PMU. The approved criteria and specifications will become part of the design and this Design Basis will be a separate deliverable throughout the project.

c) The Design Basis will provide an initial view of potential interventions of drainage infrastructure and neighborhood upgrading in the areas of interest following the surveys, desk research, and community consultations. The relevant aspects to be covered in this Design Basis for all these interventions under consideration are (but not limited to):
   - General: design time horizon, durability considerations, reference levels
   - Geotechnical: soil characteristics such as soil strength, consolidation, subsidence, sediment quality etc.
   - Structural: concrete, steel norms/specifications
   - Mechanical and Electrical: electrical circuit and power requirements, lifting mechanisms
   - Drainage: conveyance capacity / cross-sectional profile/design storm frequency (return periods)
   - Sustainability, Operations & maintenance: painting, cleaning, vegetation minimization/removal/ minimum recurring O&M requirements
   - Environmental: disposal of polluted sediments, minimization of vegetation
   - Landscaping/public realm: recreational/public facilities, ground surfaces/paving, fences
   - Safety and inclusion: Crime Prevention Through Environmental Design (CPTED) principles, public safety, lighting, universal design, fire protection

Appendix E: Detailed description of expected activities for E&S instruments

The Consultant will be required to prepare and deliver the 6 instruments listed below:

- Environmental and Social Impact Assessment (ESIA, see section 1 below) and associated Environmental and Social Management Plan (ESMP, section 2) including:
    - Biodiversity Management Plan (BMP, section 3);
    - Site-specific Waste Management Plans (S-WMP, section 4);
- Umbrella Waste Management Plan (U-WMP, section 5) for the project; and
- Resettlement Action Plan (RAP, section 6).

The Consultant will ensure that these instruments complement each other and cover environmental and social issues in a comprehensive and coherent manner. A detailed description of the expected activities for each instrument is provided below.

1. Preparation of the Environmental and Social Impact Assessment (ESIA)

The detailed scope of work for the ESIA includes the following:

The Consultant shall prepare independent Environmental and Social Impact Assessment (ESIA) exclusively for locations 1 and 4 in accordance with the Environmental Protection Agency (EPA) of Liberia Environmental and Social Assessment Procedures, the Project's ESMF, World Bank's Environmental and Social Framework (ESF) and it's relevant Environmental and Social Standards (ESSs) for the project.

The Consultant will be responsible for gathering, reviewing, and analyzing all necessary data and information for the preparation of the ESIA/ESMP report, which shall be based upon the final identified project specific locations from the updated or revised feasibility and design study of the project in consultation with the PMU/MPW teams. Where the available required data is found to be inadequate for the purpose, the Consultant shall make all practical efforts to collect and analyze the additional information needed to support the preparation of the ESIA/RAP report. Additional data collection will include field investigation and such additional data funded by the project may be obtained from professional estimates and predictions, maps, and other relevant information from similar project situations/conditions.

Specific Tasks for the ESIA Preparation

ESIA Task 1: Detailed Desk Review

Review the existing documentation of the LURP but not limited to the ESMF, PAD, E&S screening report, LMP, SEP, A-ESRS, and any previous ESIA and ESMP reports prepared for similar investments financed by the World Bank, and other relevant project documents, The Consultant shall also review all completed and ongoing environmental studies in and around the project site in order to fully understand relevant scope and impact of climate change on urban communities in and around Monrovia.

Desk review shall involve a detailed review and mapping of communities within each proposed project location in order to fully describe the proposed project sites.

MPW and other stakeholders including the EPA shall provide all studies relevant to this assignment for review by the Consultant. The Inception report of the Consultant shall capture a brief summary of the documents reviewed, an overview of their contents and observations on all the documents relevant to the assignment/task to be carried out, the methodology and consultation process with project affected persons (PAPs) and other stakeholders in line with the Terms of Reference.

ESIA Task 2: Scoping Study
The Consultant shall work in close consultation with PMU, MPW, and EPA as well as all project stakeholders, including local authorities for site visits and assessment for the scoping report. The Consultant shall carry out scoping assessments of the proposed project locations and provide a detailed list of communities assessed during the scoping visit. The E&S Consultant shall concisely describe each site assessed, their geography, ecology, water bodies, reserved areas, and general layout, including maps at an appropriate scale.

The scoping visit will include consultation sessions (at which project details and objectives will be shared) with residents and beneficiary communities in order to acquaint them with the project and collect relevant project information including challenges, limitations, and opportunities. The key results of the scoping of the Project should be presented.

ESIA Task 3: Description of the Proposed Project
The Consultant will provide a description of the Project, including maps (at appropriate scales), and schematic diagrams, with all necessary information on the project activities. The Consultant shall make use of available information, data, maps, and drone/satellite imagery (For example, GoogleEarth and https://openaerialmap.org/)

The Consultant will describe the following:

- The project location (geographic locations and project areas);
- The current site conditions (environment and social);
- Scope of the works which includes the proposed project and activities during the (pre-construction/mobilization, construction, operations & maintenance, and decommissioning), including the technology to be used and the construction timeline;
- Project ancillary facilities and potentially linked activities that may be required (access roads, quarries, waste disposal and transfer sites, worker camps/accommodation, and raw material or product storage facilities);
- Associated Facilities – facilities or activities that are not funded by the Project but are directly related to the Project and are necessary for the Project to be viable.
- Description of materials and equipment required for construction during the different phases and the project activities;
- Labor requirements and
- The Project Cost.

ESIA Task 4: Legislative and Regulatory Framework

The Consultant shall identify and describe the relevant regulations and standards both National and international treaties, conventions, and agreements, and explain how these regulations and standards are applicable to the project activities and the actions/steps the Project should take to comply with the required regulations/standards. The specific regulations/standards should include those of the Liberian Environmental Protection Agency (EPA), Ministry of Agriculture (MOA), Ministry of Labour (MOL), Liberia Electricity Cooperation (LEC), Liberia Water, Sewer Cooperation (LWSC), Liberia Land Authority (LLA), Forestry Development Authority (FDA), Ministry of Mines and Energy (MME), Ministry of Internal Affairs (MIA), Monrovia City Corporation (MCC), Paynesville City Corporation (PCC), Ministry of Health (MOH), etc. and the World Bank (WB) ESF requirements and the World Bank Group Environmental, Health and Safety Guidelines (EHSGs). The gaps between national systems and the ESSs shall be identified, and gap filling measures proposed. Guidelines governing the environmental quality, health and safety, protection of sensitive areas, land use control at the national, and local levels and ecological and socioeconomic issues shall be reviewed. Thereafter, the Consultant shall identify the project activities that should comply with the identified regulations. The relevant institutions with their respective roles and responsibilities towards the Project should be captured.

ESIA Task 5: Analysis of Alternatives to the Proposed Project
The Consultant will:

- Systematically compare feasible alternatives to the proposed project and associated ancillary facilities, such as alignment, technology, design, and operation - including the "without project" situation -in terms of their potential environmental and social impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions; and their institutional, training, and monitoring requirements;
- For each of the alternatives, quantify the environmental and social impacts to the extent possible, and attach economic values where feasible; and
- State the basis for selecting the project design proposed.

ESIA Task 6: Description of the Baseline Environment and Social Conditions
During the scoping studies, the Consultant is required to collect, collate, analyze, and present baseline information and data on the environmental characteristics and socio-economic situation of the proposed project communities or sites including information on data gaps, the significance of these gaps for decision-making and how these gaps will be addressed. This description of the E&S baseline should involve but not be limited to:

- Physical environment (topography and geomorphology, land cover, geology, climate and meteorology, air quality, hydrology (surface and groundwater, noise and vibration, land use pattern through appropriate techniques, etc.), waste management. The Consultant should sample and analyze air and water quality, noise levels, and sediment quality (the latter will be conducted over two seasons (wet and dry seasons). The baseline should also cover Community Health Environment and related issues such as water supply, solid waste management practices, healthcare facilities, vulnerability to natural hazards, etc.
- Biological environment (i.e., Terrestrial Ecology and biodiversity/ Aquatic ecology including flora and fauna types diversity and ecology, endangered species, sensitive habitats/reserved areas, protected forest, wildlife sanctuary, bird sanctuary, etc.);
- Present and projected social and cultural environment. Where appropriate include population, land use, planned development activities, community social structure, employment and labor market, sources and distribution of income, cultural heritage (chance find) / religious sites and properties,

vulnerable groups, and indigenous populations, condition of women and girls with reference to SEA/SH/GBV, etc.;
- Economic activities, including income / commercial activities, agriculture, livestock, fisheries, small scale market or industries, etc.

The Consultant shall also define the methodology for the assessment of biophysical environmental and social attributes, and collect baseline data on any environmental or social issues that are of risk to the potential sites or project locations. All associated risks and impacts of the proposed activities should be ranked and rated based on their severity and potential risks and impact on the environment, communities, and project locations.

ESIA Task 7: Determination of Environmental and Social Risks and Impacts of the Project and Activities

The Task will assess the nature and significance of potential risks and impacts of the Project. Based on the baseline environment and social conditions, the Consultant shall analyze and describe all significant risks and impacts (such as land acquisition and involuntary resettlement, risk of SEA/SH, the potential spread of communicable diseases resulting from labor influx, risk of soil and water pollution) associated with the project activities, such as cleaning and dredging of existing drainage channels, waste management, construction of new drainage channels and other blue-green drainage infrastructure such as retention ponds, storage of dredged materials, and supporting community infrastructure including but not limited to urban park facilities, toilets, drinking water facilities, etc. These would encompass an assessment of the environmental, ecological, and social risks and impacts, both positive and negative, as a result of civil work/activities that are likely to bring about changes in the baseline environmental and social conditions. Since the project site locations and preliminary and or detailed design will be known at the time of reaching this task, the E&S Consultant is expected to provide site and works specific E&S impacts and mitigation measures and refrain from presenting generic impacts and mitigation measures.

The Consultant shall identify surface water, wastewater, and solid waste pollution streams entering the channel systems; identify the social and environmental impacts of dredging and the proposed civil works on water quality, impacts of the wastes and sedimentation (increase in turbidity) on the aquatic biodiversity of the ecosystem, analysing the sediments for heavy metals, organics, toxic materials, etc. and recommending acceptable means of handling, transporting and disposing of the dredged materials.

Assess the impacts of the construction/dredging during the rainy season/flooding on the environment and nearby communities.

Identify the impacts on air quality (dust, odour), noise, water quality, soil pollution, groundwater, and downstream users from the diversion of the drains, disruption in downstream flows, etc.

Identify and assess disruption in traffic from the movement of construction and waste materials, and removal of dredged materials, and health-and-safety impacts from the construction activities.

The Consultant will prioritize all concerns identified and differentiate between short, medium, long-term, and cumulative impacts during the pre-construction, construction, operation/maintenance, and decommissioning phase of the project. The Consultant shall also identify both temporary and permanent impacts. A detailed outline and discussion of specific conditions that might affect the environment which are unique to the type of services and/or operation being implemented should be provided.

The Consultant shall analyze and describe all occupational health and safety concerns brought about by activities during all the phases of the project. The Consultant shall make recommendations on corrective and remedial measures to be implemented under the Environmental Social Management Plan (ESMP). COVID-19 and other communicable diseases should also be considered.

ESIA Task 8: Public Consultations and Disclosure

The Consultant shall organize and carry out two rounds of public consultations (one will be during the scoping stage and the second one will be on the draft ESIA) to inform stakeholders (affected and interested parties) about the project (its objectives, activities, and potential positive and negative impacts) and to listen to and gauge the concerns, views, and opinions of the stakeholders regarding the proposed project. The concerns and views of the stakeholders will be summarized and incorporated into the ESIA Report.

The Consultant shall consider vulnerable groups, socially diverse groups, or community dwellers as well as gender groups within each project area and analyze the Project's potential positive and negative impacts on them. The Consultant should describe the groups' roles and activities within the project area, their needs and interests in the project, and their levels of influence. Detailed considerations should be given to vulnerable groups and potential exclusions or inclusions that will need to be considered for them within the project. Gender Base Violence (GBV) assessment should also be analyzed for site specific situations/project locations and their related risk as a result of the project with consideration of the existing Gender Action Plan of the project.

The Consultant will:

- Identify persons affected by construction activities and will facilitate dissemination of information to relevant authorities and interested and affected parties (IAPs) concerning the proposed project, NGOs and government departments and agencies that may have a stake in the Project and its effects should be consulted;
- Describe a schedule for public consultation with these different groups, including the number and timing of public input, and the methods to be employed (e.g., media announcements, community or town hall meetings, questionnaires, one-on-one meetings, public environmental assessment (EA) steering committees). Public consultation should occur, at least, during the inception and collection of baseline information, and at the draft report stage. An annex of the ESIA should summarize the public consultation process and the results of the consultation process;
- Gather more detailed information through which the study team could anticipate issues not raised by the IAPs that will be addressed by the environmental, social impact assessment report;
- Focus the study on relevant issues and recommend specific investigations, such that the resulting ESIA is useful to decision makers and it addresses the concerns of IAPs.
- Document the Public Consultations, including consultation dates, venues, minutes and attendance lists and signatures of attendees, photos of consultation sessions, written inputs submitted and a summary of both the views and opinions of the stakeholders, the question and answer session, positive and negative concerns of the stakeholders, and how these concerns, expectations, and opinions are incorporated into the final design of the project;

Disclosure of the ESIA will be in a manner, form, and language that is understandable and will be accessible, to enable full public participation.

ESIA Task 9: Grievance Redress Mechanisms

The Consultant shall fulfill this task by only making reference to the overall Project Grievance Redress Manual, which is being developed by the E&S staff of the PMU. The GRM Manuel being developed will

be broad enough to deal with project related complaints/grievances at various levels of the project implementation activities.
ESIA Task 10: Environmental and Social Management Plan (ESMP) (see below)

2. Preparation of the Environmental and Social Management Plan (ESMP)

The ESMP shall be developed as part of the main ESIA document. The plan shall be prepared with considerations of all required WB standards and in consultation with the LURP-PMU Team /MPW. A review of existing regulations, laws, or established procedures of the Liberia Environmental Protection Management Law and best international practices shall also be referenced in the development of the ESMP. The ESMP should include the applicable noise, air pollution, surface water, groundwater, and heavy metal regulations.

The Consultant should summarize the impacts and the mitigation measures in a table consisting of significant environment/issues, their adverse impacts, the proposed mitigating measures, the agencies responsible for implementing and supervising the mitigation measures, the implementation timeline, and the cost estimate of each measure.

The Consultant is required to give a description of the types of monitoring, and technical details of monitoring measures for the project ESMP, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements, definition of thresholds that will signal the need for corrective actions as well as monitoring and reporting procedure. The E&S Consultant should provide a time frame and implementation schedule for measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans, training, and the associated cost for each monitoring measure.

Specific Tasks for the ESMP Preparation
ESMP Task 1: Identify potential Risks and Impacts
Identify and summarize all anticipated significant site and project specific adverse environmental and social risks and impacts and define site specific environmental and social mitigation measures during pre-construction, construction, operation/maintenance, and decommissioning phases of the project. Since the project details (locations and design) will be known to a large extent, the impacts and the proposed mitigation measures are expected to be specific to each site.

ESMP Task 2: Provide Mitigation Measures for each Identified Risk and Impact
The E&S Consultant shall identify measures and actions in accordance with the mitigation hierarchy that reduces potentially adverse environmental and social impacts to acceptable levels. The Consultant shall provide technical details for each mitigation measure, including the type of impact to which it relates and the conditions under which it is required (e.g. continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; The mitigation measures shall be for the pre-construction, construction operational and decommissioning phases of the project. The Consultant will, during the assessment, identify any residuals negative impacts that cannot be mitigated and explore opportunities for environmental enhancement (offset). The Consultant will describe all anticipated adverse environmental and social impacts identified and summarized in a form of a table

consisting of significant environment/issues, their adverse impacts, the mitigating measures, the agencies responsible for the mitigation, the timeline, and the estimate of each of the measures.

The Consultant shall prepare an environmental health and safety plan including an analysis of the risk of accidents during dredging of the Channels, and during transport of the dredged materials, construction and waste materials, identify appropriate security measures and develop a preliminary contingency plan.

ESMP Task 3: Develop an Environmental and Social Monitoring Plan

The Consultant shall develop a monitoring section of the ESMP that identifies monitoring objectives and specifies the type of monitoring, with linkages to the impacts assessed in the environmental and social assessment and the mitigation measures described in the ESMP. Specifically, the Consultant shall identify all monitoring measures and summarize in a form of a table with the following sequence (i) the mitigation measures, parameters to be measured, methods to be used, sampling locations, frequency of measurements, the agency responsible for the monitoring, and the associated cost for each monitoring measure. Monitoring and reporting procedures shall be captured to (a) ensure early detection of conditions that necessitate particular mitigation measures, and (b) furnish information on the progress and results of mitigation.

ESMP Task 4: Institutional Arrangements

The Consultant will describe the institutional arrangements for ESIA/ESMP implementation, which will include but not limited to:

i. Review the institutional arrangements, responsibilities, and procedures within LURP, the Supervision Engineer/Consultants and the Contractors to carry out each of the migratory, and monitoring measures (e.g., for operation, supervision, enforcement, monitoring of implementation, remedial action, financing, reporting, and staff training);
ii. Describe the role of EPA in monitoring the implementation of the ESIA/ESMP and in certifying compliance;
iii. Training of the PMU, Contractors, and Supervision Engineer/Consultants regarding the environmental and social clauses that apply to them
iv. An estimate of the resources required by LURP to implement and monitor the ESMP, such as level of effort (LOE), and equipment; and
v. An assessment of the capacity building and training gaps and needs required for all responsible parties in the implementation of the ESIA/ESMP, additional technical support, or organizational changes, to ensure timely and effective implementation of the ESMP.

ESMP Task 5: Budget

Estimate the cost of each of the mitigation measures laid out in the ESMP and provide an overall budget for implementing the ESMP. Implementation schedule for mitigation and monitoring measures that must be carried out as part of the project, showing phasing and coordination with overall project implementation plans; and the capital and recurrent cost estimates and sources of funds for implementing the ESMP. For monitoring of noise and specific air pollution and water quality parameters, the Project should consider acquiring portable, hand held monitoring meters to carry out ad hoc monitoring to assess Contractors' performance and assist in resolving stakeholders' complaints about noise, dust, and so on.

ESMP Task 6: Develop an Environmental and Social Action Plan and its implementation Cost

Identify and list the main environmental and social actions that must be implemented and documents that must be developed by the PMU, along with the timeline for implementation, the responsible parties, and the approximate cost of implementing them. The PMU must ensure that these are completed or in place prior to the commencement of civil works.

ESMP Task 7 / ESIA Task 11: Contractor Clauses

The Consultant will develop Contractor clauses to be part of bidding documents covering worksite health and safety, community health and safety, the environmental and social management of construction sites; waste management, labour camps/out of area workers, HIV/AIDS and other Sexually Transmitted Diseases (STDs), stakeholder engagement plans, grievance redress mechanism, child protection, gender equity and sexual harassment, labour rights, and the employment of community members, etc.

Based on the ESIA/ESMP, the Consultant will define standardized environmental and social clauses to be included in the bidding documents and contracts for the construction contractor(s) to ensure satisfactory environmental, social, health and safety (ESHS) performance by the contractors and to ensure that E&S technical requirements are addressed. Such clauses will include penalties for non-compliance.

The clauses will cover the following issues. These are:

i. Environment, Social Health and Safety (ESHS) requirements at the work sites: The E&S Consultant will take into account the size and nature of the proposed project as well as the nature and extent of potential Environmental, Social Health and Safety risks. The ESHS requirements will include the objectives of Environmental and Social regulations of the Employer, Employer's ESHS Requirements for Works which include Pre-Bid Environmental, Social, Health & Safety Considerations, Minimum Environmental, Social, Health and Safety outcomes and other requirements that build on employer responsibilities, Contractor's Environment and Social Management Plan (C-ESMP), ESHS Payment Requirements, minimum requirements for the bidder's code of conduct, ESHS compliance enforcement procedures etcEnvironmental and Social Monitoring by Contractor: The E&S Consultant will ensure that environmental and social clauses are captured for monitoring contractor compliance with their contractual commitments and ensuring that all contractors operate in a manner consistent with the ESS, including project specific ESCP requirements.
ii. Grievance Mechanism for Workers; The Consultant will ensure that workers can file complaints through a grievance mechanism in line with the LURP Grievance Redress Mechanism Manual, which shall be consulted for further guidance on grievance processing aspects, institutional responsibilities, capacity building, and monitoring & reporting;
iii. Stakeholder Engagement Plans; The Consultant will ensure that relevant provisions from the LURP Stakeholder Engagement Plan are considered, including but not limited to stakeholder analysis, outreach to target communities, stakeholder engagement methodologies, dissemination and information, monitoring and reporting, and
iv. Women and Children Protection Strategy;The Consultant will ensure that this is in line with the Project's Gender Based Violence (GBV) Action Plan, including the specific handling of cases of GBV survivors, as well as child labor laws;
v. ESHS staff requirements for the contractor;: The Consultant will take into account the eligibility requirements and qualification criteria and incorporate specific experience in managing Environmental and Social aspects. This will include requirements key ESHS personnel (Environmental social, Gender, Health and Safety, etc) must have demonstrable working knowledge of local conditions and language
vi. C-ESMP requirements: The Consultant will ensure the adequate requirement for the management of the ESHS aspects of the works, including implementation of the requirements of the ESHS

requirements and any specific requirements of an ESMP) and RAP for the works are captured. This will include (i) a description of procedures and methods for complying with these general environmental management conditions, and any specific conditions specified in an EMP; (ii) a description of specific mitigation measures that will be implemented in order to minimize adverse impacts (iii) a description of all planned monitoring activities (e.g. sediment discharges from borrow areas) and the reporting thereof; and (iv) the internal organizational, management and reporting mechanisms put in place for such. and,

vii. OHS requirements: The Consultant will ensure that E&S contract conditions contain OHS obligations and the details, qualifications, and work experience of OHS key personnel OHS requirements are captured.

3. Preparation of the Biodiversity Management Plan (BMP)

The Biodiversity Management Plan (BMP) **shall initially be conducted exclusively for locations 1 and 4** and shall be consistent with the World Bank ESF requirements under Environment and Social Standard 6 (ESS6) -Biodiversity Conservation and Sustainable Management of Living Natural Resources and National laws and regulations on biodiversity.

Background

Construction activities of the proposed projects which cover the four intervention areas identified in this TOR may have negative risks and impacts and may affect sensitive receptors in its vicinity such as wetlands, rivers, and flora and fauna in its area of influence. In order to ensure that there is minimum impact on important biodiversity areas (if any) encountered in the project areas, a specific Biodiversity Assessment Study shall be undertaken by the Consultant to identify impacts and to provide necessary mitigation measures that can be developed into a Biodiversity Management Plan (BMP) of the project.

The BMP will ensure that the project avoids to the extent possible areas of ecological value during design, including Mesurado wetland areas. Further, the BMP will assess the potential impacts of an increase or decrease of the flow of water into wetland areas due to drainage and water retention interventions. Finally, the BMP will assess and provide recommendations on how to avoid major disturbances of natural habitats, where possible, and encourage preservation.

A more detailed and area-specific task on biodiversity assessment and preparation of the BMP will be provided to the successful Consultant, at a later date, once the feasibility and design study has confirmed the intervention areas.

Objectives & Scope of the Study:

The purpose of the Biodiversity management study is to undertake a terrestrial/aquatic biodiversity assessment of the project area that will be potentially affected by the proposed project activities identified in Section 3 of the TOR which include the construction/rehabilitation of flood-resilient structures (drainages, sedimentation ponds, community roads, centers, etc.) and aims at identifying potential risks and impacts on flora and fauna and to suggest relevant compensatory and mitigatory measures to protect/conserve biodiversity in the likely impacted area along or near the project due to the project activity. The assessment will supplement the ESIA/ESMP studies. To achieve this, the Consultant shall carry out a comprehensive study on biological, and socio-economic aspects along the proposed locations of the project area and assess the potential impacts and risks (direct as well as indirect/induced) due to the project activities and shall suggest appropriate measures for minimizing, mitigating and compensating measures for managing the same. This study will describe the biodiversity values present on the development site and the impact of the project activity on these values and also identify reasonable measures and strategies that can be adopted to avoid and minimize impacts on biodiversity.

Approach and Methodology of the Study

The study will essentially be carried out as indicated in the tasks given below:

BMP Task 1: Document review and Mapping of the Study Area

- Review the national policy, legal, and institutional framework related to biodiversity and the World Bank ESS 6.
- Describe the methodology used for the biodiversity study.
- Conduct a review of the relevant existing literature and database(s) (IBAT for example) to determine what flora & fauna species of concern exist in the project area of influence, including sensitive receptors, to establish: (a) a list of species potentially occurring in the project areas and (b) legally protected areas and internationally recognized areas of high biodiversity conservation value within a 50 km radius of the Project location and associated facilities. Review of secondary data should also include satellite images of the study areas or similar locations, IUCN Red data lists, academic research papers, forest, and wildlife management plans, etc.
- Supplement the IBAT list of species using national red lists, National Biodiversity Strategic Action Plan, and other data sources (such as Global Biodiversity Information Facility)
- Establish and compile a map of the Project's Area of Influence (AoI) for which mitigation will be required to address impacts.
- Map the Ecological Area of Analysis (EAA) that is relevant to the important species likely to be affected (such as from the IBAT report and supplementary data). The EAA is likely to be much larger than the AoI (if in doubt, use the 50 km radius applied by IBAT)

BMP Task 2: Field Assessment

- Conduct on-site field survey and collect primary data in the project area in protected/sensitive areas on key parameters such as: flora and fauna baseline information using relevant tools (GIS/GPS technologies) to supplement the terrestrial and aquatic ecosystem/biodiversity data available in the ESIA/ESMP.
- Collect seasonally relevant baseline information within the AoI on flora and fauna that may be affected directly, indirectly, and cumulatively by the proposed activities and any other affected protected areas (legally protected and internationally recognized areas) and the Consultant will be responsible to obtain relevant permits for any sampling.
- Details of flora & fauna with special reference to endemic/threatened species and estimate of the population reported from the study area.
- Description of habitat for such endemic/threatened species, ecology and like threat including the breeding, foraging pattern and its conservation plan/biodiversity action plan undertaken, if any
- Socio-economic values of the affected area vis-à-vis biodiversity values.
- Assess downstream impacts of "first flush" and subsequent runoff on the receiving waters and the surrounding communities and possibly on the Montserrado wetlands (protected Ramsar site) as a result of the "Drainage Cleaning Activity" (or "Quick-Win Activity") under Component 1

BMP Task 3: Stakeholder Consultation

This task consists of conducting stakeholder consultation at the national and local levels to acquire genuine information that will feed into the development of the plan. Thus, this task involves:

- Consultations with relevant ministries, forest/wildlife officials, relevant stakeholders, local communities, NGOs, and technical & managerial staff of the client regarding ecosystem services, high profile species, ecological functions, etc.

BMP Task 4: Data entry analysis and development of the Biodiversity Management Plan

- Conduct an assessment of the pre-mitigation risks and impacts of the project on flora and fauna biodiversity, including habitats, protected areas, and important ecosystem services.

- Outline threats and other factors outside the proposed project that may result in a future change in the flora and fauna baseline conditions.
- Propose mitigation measures following the mitigation hierarchy (avoidance, minimization, mitigation, compensation/offset) in the ESF.
- Develop a Biodiversity Management Plan that defines mitigation measures, skills, equipment, timeframes, and costs required for its implementation. Establish key performance indicators (KPI) and methods of monitoring the effectiveness of the mitigation measures. The Management Plan will apply the mitigation hierarchy toward meeting no net loss, net gain and additional conservation requirements. Mitigation and monitoring actions will integrate with, and reference other management plans developed as part of the Project ESIA.

BMP Task 5: Expected Output

The Consultant will submit a biodiversity management plan as part of the ESIA/ESMP covering the following aspects:

i) ***Baseline status of diversity values of project affected area***: Biodiversity assessment shall include details on wetlands, forest/ tree cover, and other sensitive areas with species and girth distribution, density/crown, description of understory and middle story flora & fauna, if any, a survey of fauna including species abundance, major habitats, current distribution etc. The study should also cover the distribution of species in terms of seasonal issues related to breeding and feeding ecology and geographical issues related to the movement of wild species including species from cryptic habitats. This study will also identify any rare, endangered, threatened, and endemic species of flora and fauna present in the sensitive areas near the project. If such species are present, the assessment shall also include geographical features and other associations important for the survival of these species and their role in community ecology.

ii) ***Study of ecological, environmental and socio-economic impacts***: The study shall concentrate on the likely impacts on flora & fauna including their role in community ecology due to project activities. The study shall include the impact on the socio-economic aspect and also the impact on ancillary activities such as the provision of access roads, storm water drainage, construction activities, etc., and their impacts on other resources on biodiversity value in the affected area.

iii) ***Management and Monitoring Plan for bio-diversity conservation***: Based on the assessment, a suitable management plan shall be prepared to describe adequate compensation, mitigation, and management measures with respect to identified impacts, if any. It should focus on measures for conserving important resources, recommending avoidance of impacts by modifying the design of specific activities/components if practical, minimum compensatory measures required by GoL for mitigation and/or management measures for indirect or induced impacts, institutional arrangements including co-ordination mechanisms that need strengthening, description of roles and responsibilities, and the necessary budgetary resources. With reference to the indicative content of a Biodiversity Management Plan (BMP) in the Guidance Note on ESS6, the E&S Consultant shall include an implementation schedule of key BMP activities, considering planned construction and other project activities (refer to the Project Annual Work Plan).

4. Preparation of the Site-Specific Waste Management Plan (S-WMP)

The site-specific waste management plan **will initially cover Locations 1 and 4**, and will address the management of site-specific project WMP related solid waste streams. The tasks to be undertaken by the Consultant will include but not be limited to:

S-WMP Task 1:

i. Review the national policy, legal, and institutional framework related to solid waste management.

ii. Review the draft U-WMP.
iii. Describe the methodology used for the S-WMP study.

S-WMP Task 2:

The Consultant shall identify the purpose of sampling (characterize the silt and test for heavy metals, toxic and hazardous materials of dredged materials from the targeted drainage channels (e.g. Clara Town to Doe Community Channel) and every other channel independently; conduct tests and comprehensive analyses, especially for heavy metals, to determine pollution status and if regulatory standards are met. Identifying surface water, wastewater, and solid waste pollution streams entering all Channels; identifying impacts of the wastes and sedimentation (increase in turbidity) on the aquatic biodiversity of the ecosystem, analyzing the Channel sediments for heavy metals, organics, toxic materials, etc. and recommending acceptable means of handling, transporting and disposing the dredged materials

S-WMP Task 3:

As part of the ESIA/ESMP, conduct consultations with the PMU and relevant Government agencies and stakeholders.

S-WMP Task 4:

Identify the social and environmental impacts of dredging and the proposed civil works on water quality and aquatic environment of the streams flowing through the area and on downstream users of the eco-services. *S-WMP Task 5:*

Develop an implementation plan for the site-specific waste management plan, training and capacity building plan, monitoring plan, and implementation budget.

Indicative outline of the ESIA/ESMP, including BMP and S-WMP

The Consultant shall prepare an ESIA/ESMP report based on the project description and proposed sites for interventions through the feasibility and design study consultant's preliminary report. The report shall consider all the available information on proposed communities and ensure compliance with the World Bank ESF requirements and Guidelines.

The ESIA/ESMP report will be expected to include (but not limited to) the following, which are also indicative of the depth of the scope:

- **Executive Summary**: This shall include a concise description of the proposed project; environmental and social context, an account of the main environmental and social issues, the ESMP (mitigation, monitoring, training budget, etc.) procedures, and the consultation process.
- **Methodology**: A description of the methodology used by the E&S Consultant to carry out the study shall be well-stated.
- **Policy, Legal, and Administrative/Institutional Framework**: This shall include a detailed description of existing international treaties, conventions and agreements, national laws, legislation, regulations, and policies relating to biophysical, social, and health issues including solid and liquid waste management, air emissions, environmental quality, health and safety among others. The relevant standards and guidelines for compliance have been listed including those relating to biophysical, social, and health issues. The level of compliance with the applicable laws and corporate environment, safety and health policy shall be clearly stated. Identify any gaps between the National systems, laws, and the World Bank ESF and propose gap-filling measures.

- **Description of the proposed project**: The E&S Consultant shall give the proposed project an introduction covering a short description of the project (pre-construction, construction, operations and maintenance, decommissioning, and closure) – including the technology to be used for the project, project design and technical drawings. The description will include but not be limited to land requirements, associated facilities as defined in the ESF (where applicable), project timetable

for each project phase, materials to be used during the different phases, and labor requirements.

- **Project Alternatives**: Consider project alternatives from the technical, financial, economic, socio-cultural aspects.
- **Description of the Baseline Environment and Social**: The E&S Consultant shall describe Environment components (climate, geology, soils, dredged sediment/disposal site locations, surface hydrology, groundwater, noise, air quality, terrestrial and aquatic ecology, solid wastes) including field sampling, in-situ measurements and laboratory analyses of samples of relevant biophysical parameters within the project area. Discuss the sampling results and their implications for the proposed project. Social components (Social structure of local community, Demographics, settlement patterns, community safety, GRM, etc.) and cultural components.
- **Environmental and Social Impacts identification, assessment, and impact significance ranking** during the pre-construction, construction, operations and maintenance, and decommissioning phases of the project. The E&S Consultant will consider the cumulative impacts.
- **Environmental and Social Management Plan**: As outlined above.
- **Environmental and Social Monitoring Plan**: As outlined above.
- **Public Consultation and Stakeholder Engagement**: Provide a summary of steps taken to consult local interested parties, government agencies, affected people, and NGOs; with key concerns of each party being included and minutes and comments/recommendations made during the consultation taken into the consideration in the design and for the implementation of the project.
- **Proposed GRM mechanisms** for workers and communities according to the LURP SEP and LMP and ESMF and Labor, Occupational health and safety regulations of Liberia
- **Environmental/Social technical specifications** to be included in the contract based on those included in the ESMP prepared in the ESIA.
- **Institutional arrangements** by LURP, contractors, and supervision engineer/ consultant(s), including proposed strengthening and capacity building activities with budgets;
- **Mandatory obligations of contractors** including insurance, permits, emergency plan, implementation of the LMP, and preparation of the Contractor's ESMP.
- **Major Conclusions and Recommendations**.
- **References**: All sources of information shall be clearly documented with clear names and proper locations under references.
- **Appendices** will include and not be limited to references to relevant studies References-written materials both published and unpublished, used in study preparation. Record of interagency and consultation meetings, including public consultations for obtaining the informed views of the affected people and local nongovernmental organizations (NGOs). The record specifies any means other than consultations (e.g., surveys) that were used to obtain the views of affected groups and local NGOs; including minutes of the meetings held.
- Where applicable include chance find procedures, traffic management plan, code of conduct, emergency preparedness plan, occupational health and safety plan, workers campsite management plan, borrow pit management plan, etc.
- **Biodiversity management plan:** As outlined above.
  Site-specific waste management plan: As outlined above.

5. Preparation of the Umbrella Waste Management Plan (U-WMP)

The Umbrella Waste Management Plan (U-WMP), will be done for the Entire Project Area including the four intervention locations, and will be informed by the feasibility and design study activities for Component 1. It will assess the total cumulative volume and estimated composition of waste and excavated/dredged materials that will need to be safely disposed of and assess the disposal capacity of the

City's landfills to accommodate such waste. U-WMP recommendations will be integrated into the project's bidding documents prior to the start of bidding and disbursement of drainage works under Component 1 that will identify acceptable disposal arrangements based on a proper assessment of quantity and types of waste expected to be generated under Component 1.

A large part of the material dredged along the potential drainage channels is expected to be silty sand and solid waste. There are no industrial areas alongside the channels so it is not expected that there will be significant hazardous waste.

The right approach for testing, storing, sorting, treating, transportation, and disposing of dredged material will be outlined, including dewatering at a temporary handling site along the channel in order to separate the liquid/water/leachate from solid waste and silt. The dry residual material can be further separated to remove solid wastes from silt. Solid waste will be sent to the landfill, and the silt may be reclaimed for use in construction, brownfield rehabilitation, backfill, or as daily cover at the landfill, depending upon contamination levels, to be determined in the ESIA and the Waste Management Plan.

The U-WMP will be a standalone instrument, that will be informed by the feasibility and design study to manage general construction waste as well as hazardous and non-hazardous wastes, consistent with ESS3. Given the possibility of not having a disposal site for hazardous waste, the project may need to finance the separation of such waste and the establishment of a sealed and capped cell in a landfill (probably Cheesemanburg) to accommodate the waste and ensure that it has the capacity to receive the quantities of the waste generated. The Consultant will also assess other solutions for hazardous waste treatment, such as thermal treatment, chemical treatment, etc.

It is unlikely that any significant quantities of hazardous waste will be produced in the project; however, all project-related activities will comply with 'Hazardous Materials Management Environmental Health and Safety Guidelines (IFC, 2007). If hazardous waste is discovered, which may require a hazardous waste cell at Cheesemanburg or any other engineering solution to handle the hazardous waste, the project will handle the engineering aspects. The U-WMP will outline specific disposal pathways in the event that significant quantities of hazardous wastes are generated.

<u>Specific Tasks for the U-WMP Preparation</u>
Specific tasks for the Consultant will include but not be limited to:

1) Review the existing documents including World Bank EHS Guidelines on Environmental Waste Management, 'Hazardous Materials Management Environmental Health and Safety Guidelines' (IFC, 2007), Liberia regulation and guidelines on solid waste management
2) Develop a sampling and analysis plan to conduct the sampling of the waste and excavated/dredged materials, testing methodology and analyzing the results of the sampling.
3) Identify the types of wastes anticipated from the project, quantify the waste generated, and conduct a waste characterization study to get a full understanding of the materials in the waste and excavated/dredged materials along the potential drainage channels. The waste characterizations study will include a comprehensive composition analysis.
4) Conduct sampling of dredged materials from selected Channels/drains within the project areas to cover two seasons of sampling; and comprehensive analyses as per the approved sampling and analysis plan, especially for heavy metals, to determine pollution status and if regulatory standards are met. The E&S Consultant shall provide detailed analysis of the findings of the sampling and composition analysis.

5) Identify the surface water, wastewater, and solid waste pollution streams entering the selected Channels/drains within the project areas;
6) Identify acceptable disposal arrangement based on proper assessment of quantity and type of waste expected to be generated under Component 1.1 and provide protocols to guide the safe disposal of waste and excavated/dredged materials as well as hazardous and non-hazardous waste, consistent with ESS3.
7) Where disposal site(s) for sediment material is not available, assess the suitability to accept the dredged material in the selected disposal site.
8) Provide standard approaches for the safe handling, collection, transportation, storage, treatment, and subsequent disposal of hazardous wastes and excavated/dredged materials.
9) Conduct consultations with relevant Government agencies and stakeholders.
10) Develop a health and safety plan for the field activities related to sampling and analysis of the solid waste. Develop an implementation plan for the U-WMP, training and capacity building plan, monitoring plan, and implementation budget.
11) Based on the analysis of samples, prepare the minimum requirements and technical specifications for Hazardous Waste Management.

6. Preparation of the Resettlement Action Plan (RAP)

Objectives

In an effort to ensure that the proposed project is implemented in an environmentally and socially sustainable manner, the RAP Consultant shall prepare a detailed RAP report in line with the World Bank Policy, project RPF and relevant national regulations initially for locations 1 and 4. The RAP includes measures to address physical and/or economic displacement, depending on the nature of the impacts expected from a project.

The specific objectives of the RAP studies will be as follows:

- To prepare a Resettlement Action Plan (RAP) for the project in line with EPA regulations and World Bank's policies; and other guidance in the project's resettlement policy framework;
- To undertake census survey and ensure that all potential PAPs and the impacts of the proposed projects on their livelihoods are identified and appropriate measures to minimize resettlement effects and safeguard livelihoods are recommended;
- To undertake socio-economic survey of the PAPs and ensure that baseline data for monitoring and evaluation during project implementation period is generated;
- To undertake asset inventory survey and ensure that all potential assets that will be affected by the proposed project are enumerated;
- To compare ESS5 and national regulations on involuntary resettlement, identifying the gaps and proposed mitigation measures; and any other national relocation and resettlement related legislation (i.e. Land Rights Act 2018) that govern the infrastructural development sector;
- To provide guidelines to stakeholders participating in the minimizing resettlement impacts of the project during RAP preparation and implementation;
- To recommend cost effective measures to be implemented to safeguard the livelihoods of the people living within and depending on the project area;

The RAP plan shall be developed as a separate report from the main ESIA document with site specific plans for each of the project locations agreed with the feasibility and design study consultant. The RAP report shall cover the elements provided in Annex 1, ESS5 of ESF. The scope of requirements and level of detail of the resettlement plan vary with the magnitude and complexity of resettlement.

Annex 1 also provide additional elements to be included in the RAP where resettlement involves physical or/and economic displacement. The RAP Consultant shall be engaged and report the following RAP activities in detail:

Specific Tasks for RAP Preparation

RAP Task 1: Obtain Overall Understanding of Project, World Bank and Liberia Requirements

The RAP consultant must ensure familiarity with ESS5 of the WB; to understand the Liberian law and regulars about compensation, assistance and resettlement; to understand the project/subproject scope.

RAP Task 2: Map Project Impacted Area

The objective of this task is to depict and map the project impact area, specifically to indicate the boundaries of land acquisition. The RAP preparation team should work with the Design Team to obtain the technical parameters of the project. The RAP team also needs to collect cadastral books from the district and/or commune people committee. Subsequently, the following actions should be taken:

- Prepare a detailed large-scale map on which individual affected structures and land plots are identified.
- Insert (overlay) the project boundaries onto the map to identify affected structures and land plots.
- Undertake land survey to collect available information from cadastral maps (e.g., land users, land tenure, land use).
- Discuss with the engineering/design team how to minimize the land acquisition from a technical design perspective.

RAP Task 3: Conduct Census and Inventory of Affected Assets

The objective of this task is to collect data on the project's potential impacts in affected communities and households, including affected community facilities and services. The format for the census and the inventory of losses must be adapted to the specific context and informational requirements of the project. It is advisable that the forms be field tested to ensure that the questions and their phrasing elicit the required information. At a minimum, the forms should result in (i) a complete and accurate count of population and households affected by land acquisition; and (ii) a complete count and description of losses.

To accomplish this task, the actions must include:

- Development of various forms/tools (census, inventory of losses) for data collection.
- Collection of data from all DPs (individuals/households, organizations, communities) having losses of assets or livelihoods due to the project execution. It is necessary to determine what population characteristics should be collected, such as information about vulnerable persons (the poor, elderly, handicapped, children, female-headed households with young dependents, minority populations and others); and
- Entering and processing of data to prepare inventory of losses and profiles of affected groups, including their needs and requests.

RAP Task 4: Conduct Socio-Economic Studies

The objective of this task is to understand the socio-economic patterns of affected households and to identify suitable strategies for livelihood restoration and minimize risks, impacts (e.g., housing condition; accessibility to and use of water supply, drainage and sewerage, power supply, solid waste collection, health service; customs, habits and practices of local residents in connection with the construction or operation of the proposed infrastructure facilities, benefit and/or affected areas by the project).

Although substantial data are collected during the census and inventories of losses, further analysis is often needed, especially for severely impacted and/or vulnerable households. Thus, it is important to survey livelihood patterns and income sources of affected households in order to prepare a feasible and effective livelihood restoration program. This also serves as baseline data for monitoring and ex-post resettlement evaluation to identify whether resettlement objectives have been met.

RAP Task 5: Describe and Analyze Legislative and Regulatory Framework

The objectives of this task are to (i) review and describe the pertinent laws, decrees, procedures and standards of both the Government of Liberia and the World Bank, regulating the resettlement-related activities; and (ii) identify and address gaps between the legal framework of the Borrower and that of the World Bank.

The legal framework will lay down the foundation for three key elements of the RAP: (i) eligibility for compensation and resettlement assistance; (ii) compensation policies and entitlements; and (iii) mechanisms to resolve grievances among affected populations related to eligibility and compensation.

Actions to undertake include:

- Review ESS5 (from Task 1), policies of the Government of Liberia (at national level), and regulations and procedures specific to the sector and regulations (at provincial level) applicable in project areas.
- Review and use as appropriate other legislative and regulatory frameworks prepared for projects in Liberia.
- Review gap analyses prepared for other projects in Liberia and use gap analysis to determine what additional measures will be needed to satisfy the requirements of ESS5.
- Discuss proposed additional measures with relevant local authorities.

RAP Task 6: Establish Compensation Packages

In order to establish compensation packages for the DPs affected by the project, the RAP consultant will need to consider the project impacts (based on the census, inventory of losses and socio-economic survey) and specifically identify the types of losses (temporary and permanent) incurred.

Actions to undertake include:

- Assess and determine who is eligible for compensation/assistance
- Describe the valuation methods for determining compensation rates, e.g., replacement cost.
- Establish the types of compensation sufficient to compensate for losses, i.e., prepare an entitlement matrix that identifies the kinds of compensation/assistance, allowances, relocation options and livelihood restoration program appropriate for each type of loss
- Evaluate the mechanisms to achieve the objective of restoring livelihood and income and preferably improving the lives of the DPs
- Establish the amount needed to meet the requirement of Compensation at Full Replacement Cost for lost assets
- Propose the compensation packages to be applied for each affected group
- Consult with DPs and other relevant stakeholders to discuss the compensation package

RAP Task 7: Initiate Planning for Physical Relocation

The Consultant shall assist the PMU in working with relevant stakeholders (local authorities, affected people, etc.) to determine the resettlement arrangements (e.g., relocating the household or business in the same site; relocating to a specific resettlement site; or arranging for the DPs' self-relocation). This is an iterative process, reflecting negotiation and discussion among relevant actors to (i) ensure that DPs are generally ready to accept specific resettlement sites; (ii) prepare the relocation sites before the date of actual move; and (iii) identify assistance to be provided to DPs during the physical move. To the extent possible, the RAP should capture the selection and development processes of resettlement site; progress/schedule for site preparation and relocation process; and the preparation of housing and other social infrastructures and services.

Actions may include:

- Consult with DPs who need to be relocated about their relocation preferences (partly informed by socio-economic survey), for example, self-arrangement, reorganizing in the existing place; relocate to a resettlement site. If necessary, consult and coordinate with local authority to arrange resettlement site for DPs affected by the sub-project
- Consult with affected communities and with government agencies with regard to the relocation of cultural property and structures associated with religious worship
- Consult with host communities and prepare mitigation measures for impacts due to the relocation process; necessary technical and social infrastructures of the new resettlement sites as well as their design
- Prepare the relocation schedule and guideline as needed.

RAP Task 8: Initiate Planning for Income and Livelihood Restoration

Based on the findings of socio-economic survey and consultation process, the Consultant shall assist the PMU with development of livelihood restoration programs to improve or at least maintain the living standard of affected households at pre-project levels. To design an income and livelihood rehabilitation program as such, the preparation team should use the information provided in the socio-economic survey.

Actions to undertake include:

- Analyze existing sources of income of DPs; their existing economic conditions; and the potential opportunities for income generation in local settings of project areas
- Work with relevant agencies/organizations to learn more about existing programs to support job training, job creation in the localities
- Conduct a rapid assessment on labor demands in the localities
- Examine dependencies of DPs on common resources or community facilities and services that may be affected
- Determine the need for support during a transitional period
- Work out the package of livelihood restoration and rehabilitation support with associated requirements for implementation such as training, financial support, personnel, supervision, M&E, etc. Identify potential types of institutions/organizations that will actually implement livelihood support.
- Consult with DPs and other relevant stakeholders to discuss the package of income and livelihood restoration.

RAP Task 9: Establish/Set up Implementation Arrangements

To accomplish this task, actions to undertake include:

- Determine the organizational responsibilities in RAP implementation: the RAP must assign clear responsibilities for each stakeholder in the process, including for example, (i) the identification of agencies responsible for resettlement activities, (ii) and assessment of the institutional capacity of such agencies, and (iii) any steps that are proposed to enhance their institutional capacity.
- Identify a grievance redress mechanism applicable to the project. During the RAP preparation, the RAP team must examine and propose how such a mechanism will work in reality, including the time-frame,

responsibilities for lodging and recording grievances, and procedures for considering them at progressively higher levels, ending with the courts.

- Propose monitoring, evaluation and reporting arrangements to determine how activities under the RAP will be monitored, evaluated and reported.
- Plan the implementation. The RAP implementation should be synchronized with the project's schedule of construction of civil works. Linking resettlement and construction schedules ensures that project managers place key resettlement activities on the same critical path as key project construction activities.

RAP Task 10: Propose the RAP Implementation Budget

Actions to undertake include:

- Itemize resettlement expenditures including costs related to compensation, assistance, allowances, relocation, training, project management, and monitoring
- Apply the rates previously defined in Tasks 6 – 8 and estimate the budget for RAP implementation
- Estimate the cost of staff (or consultants) to carry out implementation, management cost
- Estimate the cost of monitoring (internal and external); and grievance redress arrangement
- Include contingencies (for inflation, changes in exchange rates used for imported materials, changes in the number of DPs and the magnitude of impact during the project implementation).

RAP Task 11: Disclose, Consult, and Promote Participation with Affected People and Communities

In a World Bank-financed project, the resettlement program should be designed on the basis of continuous consultation and participation of DPs, their representatives, and other project stakeholders. This consultation activity should be undertaken in coordination with the E&S consultant.

The responses and comments obtained from the consultation process should be recorded and reflected in the Social Assessment Report, and later on be incorporated in the final Engineering Design Document.

Describe the requirements for information disclosure in accordance with the World Bank's procedures.

RAP Task 12: Completing RAP

The expected outcomes of performing the tasks of RAP preparation shall be included in the RAP.

Contents of the RAP: The RAP documentation shall include a full reporting of standardized tasks and activities as described above and also be detailed as follows:

- Determination and announcement of cut-off date to the DPs;
- The process of consultation, along with results/findings as well as any agreed actions and matters;
- Eligibilities for determining DPs/PAPs, their entitlements, resettlement site, livelihood restoration measures, etc.
- Access sites and agreed mode of project information disclosure;
- Agreed independent grievance redress and complaint resolution mechanism;

The draft ESIA, ESMP, BMP, U-WMP, S-WMP and RAP shall undergo review by the Client and the World Bank. All comments provided as a result of these reviews shall be addressed by the E&S Consultant.

<u>Deliverables</u>

The expected final deliverables of this assignment are:

- Environmental and Social Impact Assessment (ESIA)
    - Environmental and Social Management Plan (ESMP)
    - Biodiversity Management Plan (BMP)
    - Site-specific Waste Management Plan (S-WMP)
- Umbrella Waste Management Plan (U-WMP)
- Resettlement Action Plan (RAP)