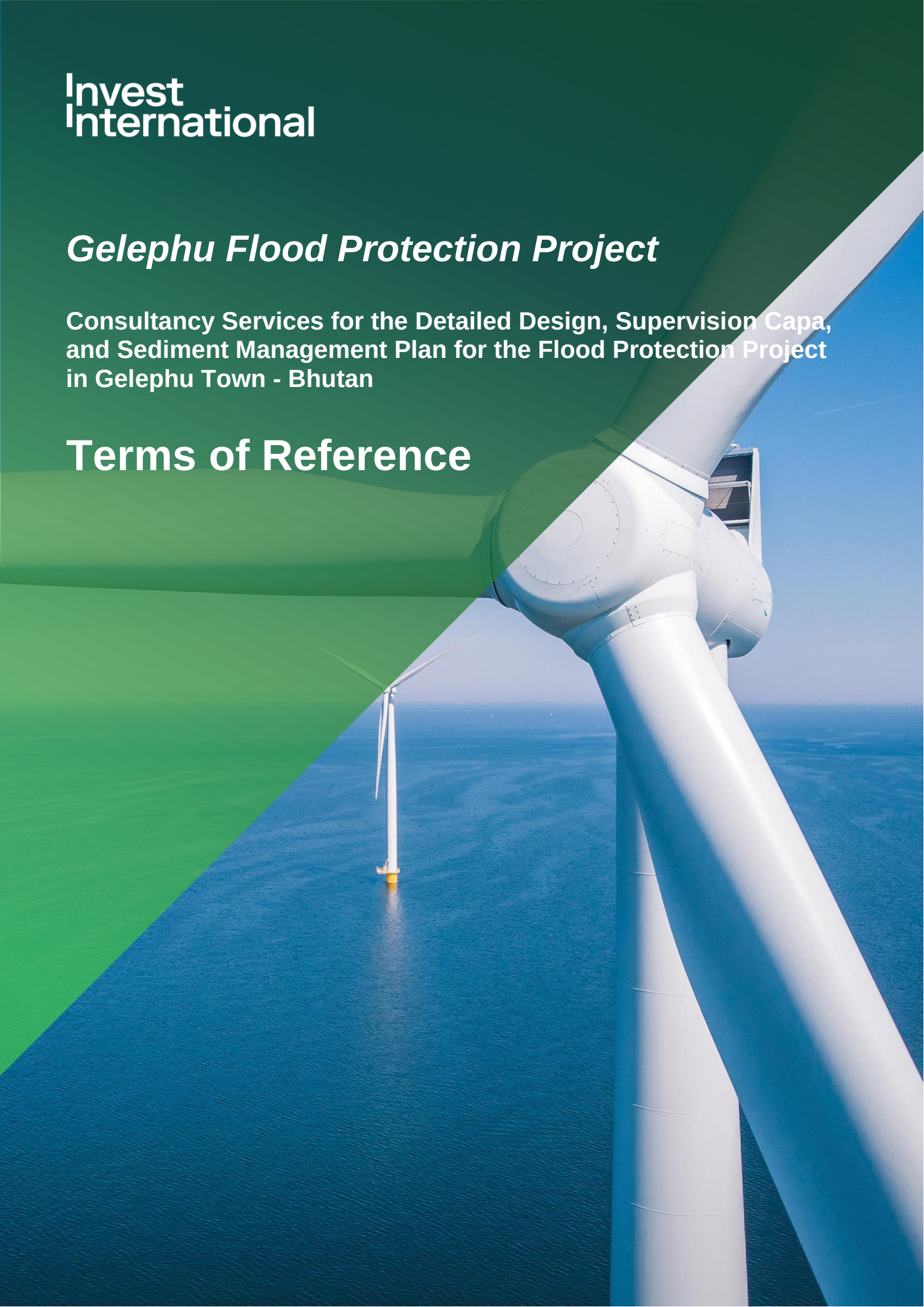
Invest International

Gelephu Flood Protection Project

Consultancy Services for the Detailed Design, Supervision Capa, and Sediment Management Plan for the Flood Protection Project in Gelephu Town - Bhutan

Terms of Reference



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Definitions

Agreement	The binding contract for executing the Assignment
Assignment	The consulting services contracted under DRIVE-TA for the Project, described in the Terms of Reference
BoQ	Bill of Quantities
Competent Authority	The government agency or department in the beneficiary country that is the recipient of the technical assistance and the contractual counterpart to the Consultant (unless procured directly by IIPP).
Consultant	The firm or consortium that bids for the Assignment, one of which is awarded the Agreement
DRIVE	Development Related Infrastructure Investment Vehicle – is a government-to-government grant (funding) programme of the Dutch Ministry of Foreign Affairs aimed at promoting development-related public infrastructure in countries as specified on a list of eligible countries.
DRIVE TA	Development Related Infrastructure Investment Vehicle Technical Assistance – is a grant funding programme aimed to support the execution of DRIVE infrastructure projects, particularly in meeting DRIVE requirements, risk mitigation of projects, and in increasing the impact of projects.
ESHS	Environment, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
Evaluation Committee	The Committee that evaluates the bids of the bidders for the works contracts
Funding	Source of inflow consumed in a Project to offset its costs, such as revenue or government contributions in grants and subsidies. Funding does not need to be repaid overtime.
IESG	Impact, Environmental and Social Governance
IFC-PS	International Finance Corporation Performance Standards
IIPP	Invest International Public Programmes B.V., a division of Invest International in charge of managing and deploying the DRIVE/DRIVE-TA/D2B program of the MoFA
IPFAD	Infrastructure Planning and Flood Adaptation Division of MoIT
MENR	(Department of Forest of) Ministry of Environment and Natural Resources
MoF	Ministry of Finance of the Kingdom of Bhutan
MoFA	Ministry of Foreign Affairs of the Kingdom of the Netherlands
MoIT	Ministry of Infrastructure and Transport of Bhutan
NCEA	Netherlands Commission on Environmental Assessment
OMU	Operations and Maintenance Unit
O&M	Operations and Maintenance
Project	Gelephu Flood Protection Project

Proposal	The proposal that the Consultant submitted based on the Terms of Reference to get awarded the contract
PMU	Project Management Unit
PSC	Project Steering Committee

1 Background Information

1.1 Beneficiary Country, Competent Authority & Contracting Authority

The Kingdom of Bhutan represented by the Ministry of Finance (MoF) has received a DRIVE Grant from Invest International on behalf of the Ministry of Foreign Affairs of the Kingdom of the Netherlands (MoFA) to enhance the flood resiliency of the Gelephu Thromde town, Bhutan.

On behalf of the MoF, the Ministry of Infrastructure and Transport of Bhutan (MoIT) has been assigned the responsibility of Competent Authority to implement the Project via its Infrastructure Planning and Flood Adaptation Division (IPFAD).

The procuring and contracting authority of this consultancy service is Invest International Public Programmes B.V. (IIPP) on behalf of the Competent Authority.

1.2 Relevant Country Background

Bhutan is a small landlocked country located between China and India with 38,394 sq. km of area. With a population of 800,000, the country is located in the eastern Himalayas and is mostly mountainous and heavily forested. Bhutan has long borders of 470 km in the north with Tibet and 605 km in the south with India. It is one of the most rugged mountain terrains in the world. It has elevations ranging from 160 meters to more than 7,000 meters above sea level. The geographical location of Bhutan makes it vulnerable to natural disasters and climate-related hazards such as: Glacial Lake Outburst Floods, erratic and extreme rainfall patterns inducing soil erosion; flash floods and landslides; seasonal droughts; and wind and hail storms, all adversely affecting property, human lives, and livelihood security. Rich in valleys, Bhutan's abundant water resources provide conducive conditions to use renewable energy sources with hydropower development which has driven economic growth and allowed collective access to low-cost energy.

Rapid economic growth in the country has substantially reduced poverty in the past two decades and has transformed Bhutan into a lower-middle economy. Its annual real GDP growth averaged 7.5 percent since the 1980s, with hydropower sector, services sector, and tourism as the primary drivers. The Government of Bhutan has been a constitutional monarchy since 2008 and, since then, the country has focused its development strategy on the principle of gross national happiness. As with many other countries, Bhutan has suffered and is still recovering from the two consecutive years of the COVID-19 pandemic. The pandemic-driven economic contraction from 2020 to late 2022 (due in part to the sharp drop in tourism activities) directly affected livelihoods, production, and income opportunities, thereby contributing to increased macroeconomic vulnerabilities.

In fiscal year 2021-2022, the country's current account deficit has more than doubled to 27.4 percent of the GDP and exports' share-to-GDP remained subdued due to the absence of tourism-related services exports. Meanwhile, imports surged due to an increase in capital goods for hydropower projects, ICT equipment, and high fuel and food prices. This resulted in a rapid decline of gross international reserves which reached USD 840 million – a 37% year-on-year drop.

In terms of economic outlook, Bhutan is expected to grow by 4.1 percent in fiscal year 2022-2023. The easing of quarantine restrictions and opening up of the country during the third quarter of 2022 is foreseen to support growth in services and industry sectors. Inflation is expected to remain high in the medium term owing to high commodity prices and sustained supply disruptions. Nevertheless, poverty is expected to drop from 2022 onwards.

1.3 Project Area

The Project location is Gelephu Thromde (municipality) and the Dungkhag (sub-district) administration is located around 30 km to the east of Sarpang, the Dzongkhag (district) headquarters. Gelephu Thromde is the third biggest municipality in Bhutan with vast fertile and plain area and is a bordering town of India. Being one of Bhutan's important gateways, Gelephu Thromde's role is to support socio-economic development and diversification for creating employment and income generating activities for the people of the central region of Bhutan.

Aside from being a critical access point to India, Gelephu is also an area with a lot of available scarce flat land for economic development and agriculture. As opposed to Bhutan's other southern agricultural and economic city, Phuntsholing, Gelephu

still has sufficient land to develop. It is in this regard the formulation of the Gelephu Structural plan (2005) has laid out its vision to transform Gelephu as an economic hub. To do so, Gelephu is setting up an Industrial Service Centre. A leasable area of 46.4 acres is divided into 110 plots for industrial services. All of these plots have been already assigned to the industrial organisations, and all public infrastructures have been built. In addition, about 733 acres of land in Jigmeling under Sarpang Dzongkhag have been landmarked for a Special Economic Zone (SEZ).

Figure 1. Geographical location of Bhutan with the Municipality of Gelephu (in red) at the border with India

1.3.1 Flooding in Gelephu

The geographical setting of the town with flat terrain, proximity and well-established connectivity with India, and its location as a nodal connection for the central parts of Bhutan, makes the place one of the preferred locations for future development. However, Gelephu is prone to floods from and erosion along the adjacent rivers. Heavy rainfall occurs during the monsoon season (mid-June until mid-September). Furthermore, flooding in the area in recent years has become more extreme than ever before.

While flooding occurs in most parts of the country, it is most recurrent in the southern region of Sarpang Dzongkhag. Flood problems in Bhutan are caused by heavy rainfall in the upper catchment areas. Because of the very steep mountains, high discharges are observed in the downstream part of the rivers. As the mountains contain soft rock materials, the high discharges are causing large volumes of sediments in the rivers. This is the main cause of the so-called braided behaviour of the rivers: almost each year the river changes its course. The result is that existing land owner properties are threatened by the river and that land use planning is very difficult.

1.3.2 Mow River

The main problems of Gelephu are related to flood events in the Mow river and its tributaries (i.e., Thewar Stream, Shetikhari Stream, Dawia Stream, and Jogi Stream) due to high rainfall in the monsoon season that often result in flooded areas and erosion of the river banks. A stretch of approximately 10 kilometres flowing from the Ai bridge to the Indian border, the problem area in the Mow river is characterised by a steep gradient and several braiding stream channels and is about 1000 metres wide. This geographical configuration has led to various water- and sediment-related flow phenomena that have resulted in several problems relating to:

- Riverbank erosion
    - Leads to loss of agricultural and forested land along both banks of the Mow river;

- Damages critical infrastructure (e.g., roads, bridges) including the water treatment plant and sewerage treatment plant in Gelephu

- Intense rainfall and river floods
  - Causes flooding of low-lying agricultural areas, the drinking water treatment plant and infiltration gallery and the wastewater treatment facility. Damage to the water treatement plant leads to water contamination and poses health risks and eventual problems in terms of access to safe drinking water
  - Causes large sediment transport leading to sediment deposition and tendencies of the tributaries to form new outlets (due to the confluence of these tributaries to the Mow river); this results in continuous decline in land productivity
  - Leads to landslides along the Mow river resulting in instantaneous influx of sediment in the river system which affects the course of the Mow river; such changes in flow also contaminate the source of drinking water e.g., wells, and leaves pockets of ponds where insects flourish i.e., increasing risk of malaria.

Figure 2. Damage caused by the monsoon 2021 heavy flooding event

1.4 Background and Description of the Infrastructure Project

The Royal Government of Bhutan has received a grant of EUR 3.27 million from the Government of the Netherlands through the Development-Related Infrastructure Investment Vehicle (DRIVE) programme to co-fund the implementation of the Bhutan Gelephu Flood Protection Project (hereinafter "Project"), which will support the resilience of Gelephu to climate-related disasters.

1.4.1 Project Objectives

The Project aims to achieve two main objectives:

- To support the resilience and adaptive capacity of the area to climate-related disasters
  - By ensuring the communities' safety from flood hazards;
  - By protecting critical infrastructure from floods and erosion.
- To improve conditions for socioeconomic and private sector development
  - By creating the conditions for usage of scarce flat land for economic development and safe living conditions, thereby attracting investments that provide income-generating opportunities;
  - By creating the conditions to develop the Bhutan-India corridor into an economic hub.

1.4.2 Target Beneficiaries

The target beneficiaries of the Gelephu Flood Protection Project are the people of two administratively separate entities: The Gelephu Thromde[1] (Gelephu Town) and the Sarpang Dzongkhag (Sarpang District). In terms of magnitude, this translates to over 23,100 residents (based on 2017 census) benefitting from the project.

1.4.3 Project Description

The Project consists of 5 flood and erosion protection interventions on the western bank of the Mow river and the protection of the bank near a school. These interventions focus on the most vulnerable hotspots in the area and include the following:

Intervention 1. Main Mow river system revetment along the infiltration gallery and water treatment plant: Identified as the main intervention for the Project, this largely involves restoration and improvement works of existing structures on the main riverfront of Gelephu.

Intervention 2. School revetment: This intervention aims to protect against erosion of the river bank around Sershong primary school area, situated on a steep cliff and undercut by one of Mow river's tributaries.

Intervention 3. Groyne structure for agricultural fields: This intervention is intended to protect against erosion through the construction of groyne as flow guiding structure at the northern side of Mow river's tributaries (Jogi Stream).

Intervention 4. Groyne structure for Sewage Treatment Plant (STP): This structural component is an erosion protection intervention in the south of Gelephu in the branch between the Mow river leading towards the STP.

Intervention 5. Embankment Gelephu town (Shetikhari Stream): this intervention aims to provide protection against flooding and erosion along one of Mow river's biggest tributaries, Shetikhari Stream, by means of revetment along the sections prone to erosion and overbank flow.

Figure 3. Locations of the flood protection interventions

[1] Gelephu Thromde is an autonomous municipal entity within Sarpang Dzongkhag. The beneficiaries of Sarpang Dzongkhag are the people of four Gewogs (administrative blocks): Gelephu Gewog on the west bank and Sershong, Umling, and the Chhuzanggang Gewogs on the east bank.

The set of flood protection interventions has been further defined and prioritized based on detailed studies. The Structural Design and the approach and methodology of the selected interventions were prepared by CDR International. An Environmental and Social Impact Assessment (ESIA) is also included in the study. These are documented in the following feasibility study reports:

a. Inception Report, September 2018
b. Phase I Final Report, August 2019
c. Phase II Interim Report, September 2020
d. Phase II Final Report, December 2021
e. ESIA Report (including ESMP), December 2021

A link to the above documents may be provided upon request.

The Project with a total Project cost of EUR 6.55 million will be co-funded on a 50%/50% basis by the Government of the Netherlands through the DRIVE programme and the Royal Government of Bhutan. The implementation of these interventions is expected to kick off in the first quarter of 2024 with a foreseen duration of 24 months. Prior to the procurement of works, a technical assistance to the Government of Bhutan with regards to the update of the detailed design and ESMP, capacity building for E&S supervision, and sediment management plan is required.

1.4.4 Management Structure of the Project

The organisational structure foreseen to steer the Project is described as follows:

- *Grantor* – the Government of The Netherlands, on its behalf the Minister for Foreign Trade and Development Cooperation, represented by Invest International Public Programmes B.V. The Grantor provides 50% grant funding for the civil works and 100% grant funding for the technical assistance to support the implementation of the Project.

- *Grantee* – the Royal Government of Bhutan, represented by its Ministry of Finance. The Grantee is the recipient of the grant funding from the Netherlands and co-funds 50% the civil works for the Project.

- *Competent Authority* – the Infrastructure Planning and Flood Adaptation Division of the Ministry of Infrastructure and Transport of Bhutan. The organisation that is responsible for the overall execution of the Project on behalf of the Grantee. It is primarily responsible for coordinating with the Grantor on Project implementation, i.e. the technical assistance and the civil works. The Competent Authority supervises the works implemented by the Project Management Unit and approves all the reports and deliverables related to this technical assistance and the civil works.

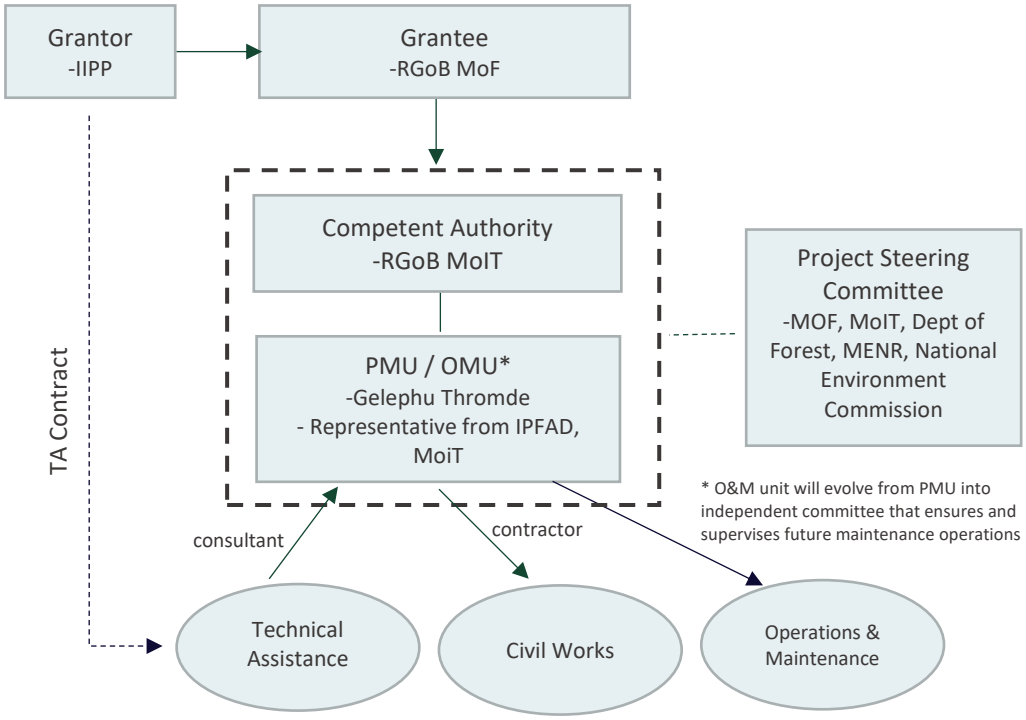
- *Project Steering Committee (PSC): strategic level* – to be established at the central government level, the PSC will oversee and support the Project from a managerial level. Members of the PSC are representatives of national governmental bodies, including representatives of the Ministry of Finance and Ministry of Infrastructure and Transport. In addition, the Ministry of Energy and Natural Resources (Department of Forest and Park Services) will be involved to safeguard the alignment of different stakes and jurisdictions through one committee.

- *Project Management Unit (PMU): implementing level* – foreseen to be set up under the Competent Authority, the PMU will be led by a representative of the Competent Authority and will further consist of representatives from the Gelephu Thromde in close cooperation with Sarpang Dzongkhag Administration. The PMU will oversee and monitor the day-to-day operations during the execution phase of civil works, will conduct the supervision of the works of the contractor, and report to the Competent Authority. The PMU will in its day -to-day operations be headed by a representative with a technical background (e.g. engineering or hydraulic science with experience in Project management) and is further foreseen to include environmental, social and health and safety (ESHS), procurement, and financial officers. Activities related to surveying and modelling shall be executed under the guidance of IPFAD who can share its knowledge and capacity in that matter.

- *Operations and Maintenance Unit (OMU): Operations and maintenance (O&M) after construction* – This unit will evolve from the PMU, including the local representatives and technical experts from the central government level (i.e., IPFAD). The unit's main task will be to implement and update the sediment management plan for the Mow river and Shetikhari Stream, to organise the necessary works for maintenance and operations after the implementation of

the interventions, and to ensure that monitoring activities and reparation works are carried out regularly and as needed.

Figure 4. Management Structure for Project implementation and O&M



1.4.5 Institutional Roles and Responsibilities

The Project includes interventions along the Mow River, its tributaries and the riverbeds, and thus involves different administrative bodies responsible for different areas. As reflected in the Management Structure in Figure 4, the following agencies and stakeholders in Bhutan are involved and concerned in the Project:

- Ministry of Finance (MoF): mandated institution regarding development planning coordination, resource allocation and monitoring and evaluation of projects. The MoF has an oversight role in the Project with regards to the competent authority and will monitor the projects as per its indicators, will distribute funds and arrange disbursement .
- Ministry of Energy and Natural Resources, Department of Forest (DoF) has the jurisdiction over the Mow river bed and has a responsibility towards providing technical capacity for its sediment management;
- Ministry of Infrastructure and Transport of Bhutan (MoIT) its Department of Engineering Services (DES) and specifically the Infrastructure Planning and Flood Adaptation Division (IPFAD) have the role of Competent Authority to implement the Project and provide technical capacity and oversight on the PIU;
- Sarpang Dzongkhag District Administration, has the jurisdiction over Mow river tributaries, their riverbanks, and riverbeds. In the Project it has a coordinating role through representation of other ministries in the district council.
- Gelephu Thromde Municipality Administration (PMU & Supervision), has the Jurisdiction over riverbank along Gelephu city and has a coordinating role as part of the PIU and will lead the day-to-day supervision of the implementation of the Project in collaboration with Sarpang Dongkhag administration.

- National Environmental Commission is the highest decision-making coordinating body on all the matters relating to protection, conservation, improvement of the natural environment. In the Project it will provide technical capacity and oversight through its representation in the PSC.

2 Objectives of the Assignment

This Terms of Reference describes the work programme of the consultancy services for the detailed design, training for supervision, and sediment management plan for the construction works of the Gelephu Flood Protection Project. This assignment is commissioned by Invest International Public Programmes B.V., on behalf of the Dutch Ministry of Foreign Affairs, through its DRIVE technical assistance programme to support the execution phase of the flood protection Project.

2.1 Overall Objective

The overall objective of this consultancy assignment is to support the successful implementation and sustainable operations of the proposed flood protection interventions in Gelephu by providing technical assistance to the implementing authorities in Bhutan on the Project's detailed design, capacity development on technical and Environmental, Social, Health and Safety (ESHS) supervision, as well as sediment management plan of the Project.

2.2 Specific Objectives

The specific objectives of this Consultancy are the following:

- Check, update and finalise the Detailed Design of the 5 flood and erosion protection interventions to establish the full set of technical documents required to procure the works. This includes but is not limited to the technical specifications, drawings, bill of quantities, and cost estimation as recommended in the Project's feasibility study phase (CDR International, 2021). The consultant is referred to the Full Feasibility Phase II final report 2021 for full details and drawings which is the current technical documentation and starting point of this consultancy assignment.
- Check, update, and finalise the ESMP as integral part of the ESIA (CDR International, 2021) to establish the full set of ESHS requirements in accordance with the International Finance Corporation Performance Standards (IFC PS) to procure the works. This includes:
    - An overview of the environment, social, health and safety (ESHS), socio-economic and cultural heritage policies, standards and the national legislation;
    - Ensuring the alignment of the identified mitigation measures in the ESIA with the requirements IFC PS;
    - Guidance on how to manage ESHS risks in the construction phase of the Project in compliance with the applicable policies, standards and regulations to ensure that Project commitments are fulfilled;
    - The roles and responsibilities of the PMU and contractors to ensure compliance during the construction and O&M phases of the project;
    - Grievance delivery and dispute resolution, as well as community engagement activities and the reporting scheme, and;
    - Regularity of the monitoring activities for overall ESHS performance, as well as the streamlined reporting systems.

  By structure, the ESMP should include the following but not limited with:

    - Introduction;
    - Project Definition;
    - Project Standards;
    - Management Plans;
    - Implementation of the ESMP;

- Monitoring Plan, and;
- Environmental and Social Management Plan (itemized): Determining the mitigation measures, implementation plans, time interval and responsibilities to be applied in the management of the impacts arising from the Project.

- Support the PMU in the procurement of the works contract, including the integration of the updated detailed design and ESMP in the bidding document, the development of the bidding documents with respect to the technical and ESHS specifications, evaluating the bids conformity with these specifications, support related to contract negotiations, and support the PMU regarding DRIVE subsidy application procedure as per the applicable DRIVE Policy Rules[2] of the successful bidder.
- Build the knowledge and capacity of the PMU on implementation and supervision of the works contract, particularly on international ESHS standards as per the ESMP and the monitoring and reporting of work progress according to IFC PS;
- Develop a Sediment Management Plan for post-construction that can be updated yearly by the OMU, and;
- Strengthen the knowledge and capacity within the OMU to operate and maintain the Project.

2.3 Results to be Achieved by the Consultant

The Consultant shall be responsible for the following results:

- Timely delivery of the Detailed Design, ESMP and input for procurement documentation;
- Provision of intermittent support during procurement of the works contract to ensure that the process is timely and fully complies with the requirements of IIPP. This includes the effective and efficient review and evaluation of bid proposals in terms of compliance with technical and ESHS requirements, support in contract negotiations as needed, and assistance to the winning bidder in the DRIVE subsidy application procedure in the form of checking the documents and providing advice;
- Delivery of capacity building activities for the PMU staff on supervision as per the ESMP (with focus on quality, health, environment, and safety standards), field visits and regular offline/online check-ins with PMU to monitor and provide guidance on supervision;
- Timely delivery of Sediment Management Plan for post-construction that the OMU can update and use as basis for the operations and maintenance of the Project, and;
- Provision of capacity building activities and setting up of a learning framework for the OMU staff to ensure effective operations and maintenance of the Project.

[2] DRIVE-Policy-Rules-unofficial-translatation.pdf (rvo.nl), whereas RVO.nl should read as IIPP

3 Scope of Works: Overview of Tasks

This Consultancy has three main components: 1) the check and update of the **Detailed Design and ESIA/ESMP** of the technical interventions recommended in the Feasibility Study Phase of the Project and **Procurement Support**, 2) the delivery of **Capacity Building** activities for effective supervision and operations and maintenance of the Project, including field visits during the construction period, and 3) the development of a **Sediment Management Plan** to ensure the integrity and proper functioning of the flood and erosion protection interventions in Gelephu in the long run. An overview of the anticipated scope of the three components is summarised below.

3.1 Component 1 – Detailed Design and Procurement Support

3.1.1 Description of activities for the detailed design and procurement support component

The Consultant for the Detailed Design component shall take the outcome from the Feasibility Study forward and finalise the detailed designs of the technical interventions for the flood protection Project. The updated designs, including the full technical documentation will be included in the bidding documents for the physical construction works.

The Consultant shall perform the following tasks with exact timing in agreement with the Competent Authority (MoIT) and the Contracting Authority (IIPP):

Task 1: Check, update and complete Detailed Design, ESIA/EMSP, and Bidding Documents

- **1a: Check and update the Detailed Design.** The Mow river is a very dynamic river, i.e., changing topography and bathymetry but also migrating channels. The Consultant shall therefore carry out a detailed survey of the bathymetry/topography of all sites at which interventions are planned. This survey shall be done with sufficient resolution for detailed design purposes. The Consultant shall use the survey to check and update where necessary all detailed design documentation including detailed design calculations, detailed design drawings, bill of quantities (BoQs) and cost estimations (originally prepared by CDR International, 2021) and make recommendations regarding any amendments for the 5 flood and erosion protection interventions, including advantages and disadvantages. If changes in the existing detailed design are deemed to be required, proper motivation shall be forwarded to MoIT and IIPP for review and approval. The final Detailed Design will be an integral part of the procurement documents for the works.

- **1b: Check and update the ESIA and ESMP:** As part of the ESIA report (CDR International, 2021), an Environmental and Social Management Plan (ESMP) was prepared (chapter 8, ESIA Report). The ESMP includes a set of general and specific recommendations that will provide the basis for mitigation, management and environmental monitoring of the impacts identified in the ESIA for the Project's construction as well as operations and decommissioning phase. The ESIA and ESMP will, therefore, be an integral part of procurement documents of the works.

  With the update of the Detail Design a check is required whether the impacts identified in the ESIA are appropriate and complete. Moreover, the existing ESMP is found to be incomprehensive to ensure the works' implementation is in full compliance with the IFC PS. The consultant is therefore to check, update and finalise the ESIA and specifically the ESMP. This includes but is not limited to the ESMP completeness in terms of the proposed work programme, budget estimates, schedules, performance indicators to track/ monitor the adequacy of the mitigation measures, staffing and training requirements and other necessary support services to implement the mitigation measures. Institutional arrangements required for implementing this management plan shall be indicated. The cost of implementing the monitoring and evaluation, including staffing, training and institutional arrangements, must be specified as time-bound activities. Changes to the ESMP shall be forwarded to MoIT and IPP for review and approval.

Task 2: Procurement Support. After the finalisation of the Detailed Design and ESMP, the Consultant shall advise the PMU on the procurement strategy, support the PMU in the finalisation/review of bidding documentation for civil works in accordance with the Bhutanese Procurement Guide, and assist the PMU in the evaluation of the bids. This will include supporting the PMU in integration of comments and requirements of IIPP on the procurement documents. It must be noted that the drafting of the procurement documents for civil works is the responsibility of the PMU.

During the procurement, the Consultant shall:

- Review, verify, and understand the logic behind the documentation primarily to ensure that the final Detailed Design, its technical specifications, the ESMP, IIPP requirements, and any other supplementary information that describes the works to be procured are aligned and correctly incorporated in the bidding documentation;
- Attend pre-tender meetings as an observer, the works tender opening as a technical adviser, and provide guidance to the procurement Evaluation Committee;
- Attend pre-contract clarification meetings with contractors and, in relation to technical or E&S matters, assist during negotiation, contract documentation preparation, and contract signing, as required;
- Assist the PMU in specific technical and ESHS aspects of tender evaluation as observer in the evaluation committee, and;
- Assist the PMU and the winning bidder in the DRIVE application procedure by providing advice and checks on documentation requirements, as needed.

3.1.2 Deliverables and timeframe

Deliverable 1: Inception report

This report includes the Consultant's update of its Proposal regarding organisation, programme of work and implementation schedule, methodology, approach, and schedule of manpower to reflect the result of Consultant's initial finding.

The Inception report updates the Consultant's proposed establishment (including office arrangements), personnel, and where they will be based, as well as the Consultant's proposed approach to the Project, taking into consideration the situation at the starting date of the assignment. The report also sets out a detailed work plan for completion of the activities in components 1, 2 and 3, including the operation period of execution and together with a detailed work plan for interrelated, sequential, and complex activities with an agreed Project log-frame matrix.

The expected achievement of the outputs listed in this Terms of Reference is clearly identified, with any milestones, and the confirmation of the counterpart staff (i.e., IPFAD, MoIT) and other commitments is made by the recipient counterparts. The inputs to support key activities in each beneficiary is based on a thorough needs assessment taking account of individual circumstances.

This deliverable is to be submitted one month after the contract start date.

Deliverable 2: Detailed Design, ESIA/ESMP, Bidding Documents

- **Final detailed design report:** The results of the design exercise (task 1a) shall be presented in the form of a final detailed design report and technical inputs to tender documentation for the works contract (task 2). The design report covers, but is not limited to:
    - An overview of the criteria used in the design, including emphasis on minimising environmental and social impacts;
    - The results of various analyses and surveys and its conclusion;
    - Auditable calculation verifying, updating and finalizing the detailed design calculations;
    - Motivation and description of the approach followed for the changes of the design, including options to minimise environmental and social impacts;
    - Updated BoQs of the works to be constructed and equipment to be purchased;

- Construction drawings with enough details and at appropriate detailed design scales to allow the contractors to prepare their bids;
- Maps with locations and layouts of all infrastructure at appropriate scales for construction purposes, and;
- Overall cost estimates.

The technical input to tender documentation includes technical specifications, BoQs, contract drawings, and plans for the works contract. The drawings are scaled, as appropriate for the intended purposes. For the procurement evaluation stage, the Consultant also provides technical notes supporting the evaluation.

- **Final ESIA & ESMP Report:** Final ESIA report (task 1b: part of the ESIA/ESMP report) includes the existing Netherlands Commission for Environmental Assessment (NCEA) advisory review and suggestions, especially on the materials and sediment mining for the intervention, as well as labour and working conditions and disaster management plan. The ESMP includes itemized actions for construction and O&M phases, clearly indicating the responsible parties, costs, resources, and the timeframe for each.
- **Bidding documents:** Final detailed design, ESIA and ESMP as specified above are fully integrated in the bidding documents.

This deliverable is to be submitted 3 months after the contract start date.

3.2 Component 2 – Capacity Building for Supervision of the Project

3.2.1 Description of activities for the capacity building for supervision component

As the foreseen works are in general common in Bhutan and normally supervised by the government itself, the PMU has been mandated the role of Supervisor. However, the construction works potentially include technical specifications for which the experience of the PMU is limited and technical assistance is required. In addition, a capacity gap was identified at the PMU with the supervision of ESHS aspects in accordance with the requirements of IIPP. As such, a Technical Assistance is required to support the PMU in its associated supervision activities.

Component 2 therefore requires the Consultant to develop a capacity needs assessment and a technical assistance action plan for the supervision of the Project during execution of the works in consultation with the MoIT (the Competent Authority), PMU, and IIPP (the Contracting Authority).

As part of the technical assistance the Consultant is expected to perform at least the following tasks:

Task 1: Technical Assistance for ESMP Supervision. To assist the PMU in Project implementation, the Consultant shall build the capacity of the PMU in terms of Environmental, Social, Health, and Safety (ESHS) supervision and to assist the PMU in ESHS supervision, inspections and the affiliated reporting.

The Consultant is therefore expected to:

- Develop a needs assessment and action plan regarding capacity building for the PMU with respect to ESHS supervision that conforms with the ESMP;
- Conduct the defined capacity building activities and training before the commencement of the works;
- Conduct a number of field inspections at the construction sites in agreement with the PMU and IIPP during the construction period (estimated to be around 24 months) to check compliance with the ESMP and provide on-the-job training to the PMU and its supervision engineers with regard to ESHS supervision;
- Conduct regular offline or online check-ins with the PMU and its supervision engineers to monitor ESMP compliance and provide guidance on EHS supervision and the resolution to any non-conformities;
- Assist the PMU in drafting the ESHS related chapters of the semi-annual Project progress reporting to IIPP.

In its proposal the Consultant should propose a methodology to conduct this task. The methodology is to be reviewed, updated and agreed upon in the inception report following the consultations with the MoIT, PMU, and IIPP.

Task 2: Technical Assistance for Technical Supervision. To assist the PMU on the technical aspects of supervision, the Consultant shall build the capacity of the PMU to perform technical supervision in terms of compliance of the works within the contract, verification on the use of certified materials, inspections, and related reporting, amongst others.

The Consultant is thus expected to:

- Include in its needs assessment and action plan for capacity building activities for the PMU with regard to managing construction contracts and technical supervision during construction stage, including providing guidance on the set of processes relevant to the management of the Project and technical aspects such as testing, quality monitoring, measurement, billing and monitoring of quantities of BOQ with stipulated time schedule;
- Conduct the defined capacity building activities and training before the commencement of works;
- Conduct a number of field inspections at the construction sites in agreement with the PMU and IIPP during the construction period (estimated to be around 24 months) to check technical compliance of the works within the contract and provide on-the-job training to the PMU with regard to technical supervision;
- Conduct regular offline or online check-ins with the PMU to monitor technical supervision and provide guidance and/or resolution to any non-conformities.

As in task 1, the Consultant should propose in its technical proposal a methodology to conduct this task. The methodology is to be re-assessed and agreed upon in the inception report following the consultations with the MoIT, PMU, and IIPP.

3.2.2 Deliverables and timeframe

Deliverable 3: Capacity needs assessment and capacity building action plan

- Following task 1 and 2 of component 2, the Consultant presents a **capacity needs assessment** for the supervision of the works (including ESHS) following the consultations with the relevant stakeholders.
- In line with the capacity needs assessment the consultant presents a **capacity building action plan** following the consultations with the relevant stakeholders. The plan specifies at least in relation to each activity the objective, the responsible expert, the stakeholders involved, and the specific sub-activities and deliverables. A RACI matrix can be considered in this regard.

This deliverable is to be submitted 3 months after the contract start date, the identified training activities shall follow an agreed timeline as per the action plan.

Deliverable 5.1: Completion Report for supervision

- After the conduct of the capacity building activities for supervision, a completion report providing all the activities conducted is submitted to MoIT and IIPP. The report provides an overview of the actual outputs and measures of success (measured against the objectives), and recommendations/information on additional training activities and learning framework that could be considered in the future.
- This deliverable consists of the first volume of deliverable 5 (volume 1 - supervision capacity building activities and volume 2 - O&M capacity building activities).

This deliverable is to be submitted 6 months after the contract start date.

Deliverable 6: Semi-annual progress report 1 and 2 (including site visit report), and;

Deliverable 7: Semi-annual progress report 3 and 4 (including site visit report).

These deliverables (6 and 7) entail the Project's reporting requirement during the implementation stage, and covers the progress reporting on (but not limited to): technical and financial progress of the Project, ESHS reporting, and the proved technical assistance to the Project (including field visits and on-the-job training at construction sites).

The reports follows the DRIVE/IIPP progress report template (to be provided during the tendering of works). As part of deliverable 3, the Consultant agrees with MoIT, PMU, and IIPP on a number of fields visits during the construction period to provide on-the-job training to the PMU and its supervision engineers and check the works and ESHS supervision in the construction sites. These deliverables include:

- A **semi-annual DRIVE progress report**, signed by the Competent Authority and including the input of the Consultant.
- A **field visit report** summarising the observations during the construction site visits of the Consultant. The report is included as an annex to the DRIVE Progress Report.

These deliverables are to be submitted after signature date of the works contract and depending on the actual construction calendar. The assumption is that there will be two periods of construction – ideally during dry season – of about 7 months each.

3.3 Component 3 – Sediment Management Plan and Capacity Building for O&M

3.3.1 Activities and deliverables for the O&M capacity development component

The third component of this Assignment is the development of a Sediment Management Plan to ensure the long-term integrity and proper functioning of the technical interventions for the Project, accompanied by necessary capacity building activities for the Operations and Maintenance (O&M) phase of the Project.

The O&M activities for the proposed interventions will go hand-in-hand with the implementation and execution of a sediment management plan for the Mow river and Shetikhari Stream, as described in the Outline Sediment Management Plan in the final Feasibility Study Report prepared by CDR International (2021). At the time of the Feasibility Study, there was no sufficient data and information yet to develop a full sediment management plan. However, a pragmatic approach on sediment management has been proposed to be implemented in two phases: the construction phase and the period after the construction is completed. This component of the Assignment focuses on the sediment management after construction is completed. The information needed for a rational planning and the questions to be addressed include the following:

1) How much is the sediment supply by the Mow River and the tributaries?

2) How much sediment is at present removed for external purposes? (For use as fine and coarse aggregate or fill material outside the river limits).

3) Is it possible to continue, or even expand, the practice of withdrawing sediments, and where should it be stored/stockpiled?

4) To what extent does removal of sediment (disturbance of armour layer) affect the stability of the bed?

5) Should sediment be removed from the mouths of the streams to allow flood waters in the streams to freely pass to the Mow River, and if so, how much?

6) What is the best configuration for the water intake at the confluence of the Mow River and Shetikhari Stream (to supply water to downstream fishponds and paddy land)?

7) What should be done to monitor the situation and to adjust the ongoing practice if necessary?

Given the aforementioned, the Consultant shall perform the following tasks:

Task 1: Develop a full Sediment Management Plan. The Consultant shall develop evidence-based guidance for future sediment management in the river in close coordination with the stakeholders and report this in a sediment management plan.

For this purpose, the Consultant is expected to perform two main activities:

- First, the Consultant shall develop a better understanding of the sediment transport and morphology of the Mow River and how current and future interventions affect the system. For this purpose, the Consultant is expected to setup a 2D hydro-morphological model. This model shall capture the hydrodynamics, the relevant sediment transport modes and classes, and morphological changes in an integrated way. This model shall be based on the hydrodynamic model developed during the Feasibility Study.

For this purpose, a topo/bathymetry survey for the entire riverine area of interest shall be carried out (see Figure 3) with sufficient resolution to feed into the modelling effort for the current baseline situation. The model shall be calibrated/validated to the extent possible given the data available. The Consultant shall derive insights by running multiple scenarios of the baseline (e.g. sediment input, sediment transport paths, role of extreme events, etc.), current interventions (e.g. sand mining) and future management strategies (e.g. different strategies of sediment removal in the river, near the mouths of the streams, and water intake configuration). Also, the Consultant shall develop detailed survey plan (e.g. yearly monitoring of river bed levels, sediment characteristics etc.) to develop/improve the understanding and develop the numerical model as a standard O&M tool as part of this management plan. Mindful of the sediment management questions for this specific situation, the Consultant shall detail in the proposal the morphological modelling approach, an initial outline of the scenarios to be investigated, and the way how to deal with the (inherent) uncertainties of this river.

- Second, the Consultant is expected to investigate the institutional aspects of the sediment management in the river for the purpose of the sediment management plan. A detailed analysis of the current roles and responsibilities but also required optimizations (e.g. licensing sediment extraction, precise definition of mining areas, enforcement activities, etc.) shall be identified and detailed. This will require intensive cooperation with the various stakeholders involved.

Task 2: Conduct Capacity Building Activities for O&M. Like previous component, Component 3 requires the Consultant to develop a training needs assessment of the Project's O&M team and a technical assistance action plan in consultation with the MoIT, PMU, and IIPP.

The Consultant is therefore expected to:

- Review the existing corrective and preventative maintenance capacity of the Gelephu O&M team (OMU). This is to identify gaps and provide advice to the Competent Authority on effective planning and execution of the O&M phase of the Project.
- Subsequently, the Consultant shall make a proposal with a detailed description of the required capacity building activities. The Consultant should provide the capacity building activities throughout the duration of this assignment to the O&M team to ensure effective execution of the O&M upon the termination of this Assignment.
- The Consultant is also expected to include training in the modelling tools developed for the sediment management plan. This tool is expected to be used by the OMU to further optimize and finetune the sediment management strategy of the river system in the future.

3.3.2 Deliverables and timeframe

Deliverable 4: Sediment Management Plan and O&M capacity needs assessment and action plan

- **Sediment management plan:** The activities described in task 1 and 2 of this component are integrated into a comprehensive sediment management plan and needs assessment. This plan outlines the technical activities (where to extract sediments, how much and where stockpiling on a yearly basis, detailed overview of necessary monitoring and updating of the modelling) and non-technical activities such as licensing, monitoring and enforcement of sediment mining activities. The roles and responsibilities of the various stakeholders to successfully implement this sediment management plan are detailed. The sediment management plan will be intensively discussed and reviewed by the relevant stakeholders and comments shall be addressed.
- Including but not limited to the sediment management plan, the Consultant presents a comprehensive **O&M capacity needs assessment** for all O&M aspects of the Project (including ESHS) following the consultations with the relevant stakeholders.
- In line with the O&M capacity needs assessment the consultant presents an **O&M capacity building action plan** following the consultations with the relevant stakeholders. The plan specifies in relation to each activity the objective, the responsible expert, the stakeholders involved, and the specific sub-activities and deliverables. A RACI matrix can be considered in this regard.

This deliverable is to be submitted 12 months after the start of the assignment date and will be finalised 4 weeks after receipt of comments from the Local Committee (technical lead: IPFAD, MoIT) and IIPP.

Deliverable 5.2: Completion Report of O&M capacity building activities

After the conduct of the capacity building activities for O&M, a **completion report** providing all the activities conducted must be submitted to MoIT and IIPP. The report must provide an overview of the actual outputs and measures of success (measured against the objectives), and recommendations/information on additional training activities and learning framework that could be considered in the future.

This deliverable consists of the second volume of deliverable 5 (volume 1 - supervision capacity building activities and volume 2 - O&M capacity building activities).

This deliverable is to be submitted 18 months after the contract start date.

Deliverable 8: Final report

The final draft version of this report is submitted one month before the end of the period of implementation of all tasks and describes the overall status of the Project, including a description of any major problems which may have arisen during the performance of the Assignment, as follows:

- Describes the status and results of the technical assistance given to each beneficiary;
- Presents recommendations the Consultant wishes to make in view of improving the design and implementation of any future similar activities.

This deliverable is to be considered final after incorporating and addressing comments received from the parties on the draft report. The deadline for sending the final version of the report is 30 days after receipt of approval on the draft final report.

4 Communication & Management

4.1 Communication

Regular and open communication shall be established among the Consultant, IIPP, and the Project stakeholders in Bhutan. However, the primary communication for this consultancy assignment is between the Consultant and the Project stakeholders (i.e., government authorities) in Bhutan and the PMU/OMU specifically.

During the Inception Phase, a kick-off meeting shall be organised by the consultant with all key stakeholders, to introduce the Consultant's team and the scope of the services. The Consultant shall establish good lines of communication with and collect information from relevant stakeholders.

4.2 Management and Composition of Contracting Authority and Local Counterpart

From the Contracting Authority's side, the management of this Technical Assistance Assignment will be under the Grantor's responsibility, represented by the Investment Managers from Invest International Public Programmes B.V.

From the local counterpart's side, the management of this Assignment and work programme will be under the responsibility of a multisector committee, consisting of representatives from the key institutions in Bhutan responsible for the Project chaired by the MoF.

The composition of the Local Committee is as follows:

- Department of Macro-Fiscal and Development Finance, Ministry of Finance (Chair);
- Infrastructure Planning and Flood Adaptation Division, Department of Engineering Services, Ministry of Infrastructure and Transport;
- Gelephu Municipality;
- Sarpang District Administration, and;
- National Centre for Hydrology and Meteorology (NCHM).

The Committee has the responsibility to inter alia:

- Assist the Consultant in providing required information on behalf of their respective agency;
- Timely review and provision of necessary feedback on the report/findings presented by the Consultant;
- Participate in every consultation arranged for the Consultant;
- Be available to meet regularly and as and when required;
- Periodic monitoring to be carried out together with relevant agencies;
- Review and endorse the final report submitted by the Consultant;
- Review any issues related to the Assignment and provide necessary directives;
- Make decisions, in consultation with the Contracting Authority (IIPP), related to the Assignment;
- Endorse the capacity needs assessment and work plan of the Assignment; and
- Review and endorse the deliverables/reports submitted by the Consultant.

The table below provides an indicative division of the roles and responsibilities of the different committee members with regards to the Project.

Organisation	Roles and Responsibilities
MOF	• Chair the Committee Meetings
	• Act as channel of communication to the Contracting Authority (DRIVE/IIPP) and stakeholders on any Assignment related matters.
	• Coordinate, together with MoIT, all meetings including public consultations
	• Facilitate/assist the Consultant in acquiring data/ information
IPFAD, DES, MoIT	• Liaise with the MOF, Sarpang Dzongkhag, Gelephu Thromde and NCHM on the technical aspects of the Assignment • Lead in reviewing and approving all the deliverables of the Consultant • Lead reviewing and approving the capacity needs assessment and work plan of the Consultant • Data compilation from relevant stakeholders • Provide working space and technical backstopping to the Consultant
NCHM	• Facilitate in providing and collection of: o Meteorological data o Hydrological data o Sediment data
Gelephu Thromde and Sarpang Dzongkhag	• Facilitate public consultation • Provide required field data • Provide necessary support to the Assignment mission to the site • Implement the Project on the ground (during the Implementation Phase)

5 Location, meetings and reporting and approval deliverables

5.1 Start Date and Period of Implementation

The intended start date of the Assignment is June 2023 and the foreseen construction period of the civil works is 24 months from the commencement date.

5.2 Location

The Assignment will be conducted both at the Premises of the Consultant and in Bhutan, as required. The Consultant is expected to visit the Project site in Gelephu to conduct surveys for the detailed design (for Component 1), for the analysis of sediment transport and morphology of the Mow River (for Component 3) and to conduct capacity building activities for ESHS/Technical Supervision and O&M (for Components 2&3). The Consultant should specify missions to Bhutan and estimate required budget also as part of the incidental expenditures. Furthermore, the Consultant shall define the share of own-office work to on-site work in its methodology. Office space in Bhutan will be provided by IFPAD, MoIT for 4-5 experts.

5.3 Progress Meetings and Reporting Requirements

Progress meetings should take place monthly and shall be attended by the Investment Managers representing IIPP (the Contracting Authority) and some members of the Local Committee in Bhutan. Attendance from the local counterpart's side will depend on the topics to be discussed corresponding to the Local Committee members' defined specific roles and responsibilities.

The Consultant is expected to organise these progress meetings to describe the current status of the Assignment in relation to technical progress, to forecast the expected progress of the activities for the next period against the proposed schedule in the action plans, to discuss outstanding issues that may result in extension of time or unforeseen costs, and to describe the Consultant's staff levels and their deployment during the report period. The Consultant shall write the Minutes of the Meetings, clearly itemising the action points for all parties and identifying activities/outputs achieved and considered finished as well as activities in progress. The Minutes of Meetings shall be sent to the attendees of the meetings and any comments/inputs received from the parties shall be consolidated and addressed by the Consultant before submitting the final version of the Minutes for approval. The Minutes are to be approved by the Local Committee in coordination with IIPP.

5.4 Submission

All deliverables and reports must be written in concise, clear, and well-edited English. Detailed analyses, tables, maps and drawings shall be included as annexes. All reports shall be submitted electronically (soft copy both in PDF and editable format – MS Word or equivalent). A list of essential contact persons is to be included. Spreadsheets and schedules shall be produced in excel and a maximum of A3 size for reporting purposes and may be printed single-sided. Any submitted spreadsheet model shall be easily readable and shall not contain locked cells / rows / tabs, be free of error (e.g. #REF, #NUM etc.) and shall not be setup with a usage limitation in time, by use of macros or other means rendering models unreadable or hard-coded after a given period.

The reports should have a cover page that includes Project name, Project code or reference (if applicable), report title, date issued, and period covered, and the name and the address of the Consultant. The reports shall be discussed with the Local Committee prior to the final submission for approval.

The number of copies of the reports and deliverables referred to above must be submitted at the same time to the Investment Managers at IIPP and the members of the Local Committee as detailed below. Any additional contact details from the beneficiary authority to which the reports and deliverables shall be submitted will be communicated to the Consultant during the Assignment's kick-off meeting.

5.5 Review and Approval of Deliverables

The Consultant should allow for a minimum review time of two (2) weeks for each draft and final deliverable, unless otherwise indicated, and include sufficient resources and time to adjust deliverables accordingly on basis of comments and observations. These two weeks should not conflict with any foreseeable holiday or festive season. The Consultant is responsible for consolidating and addressing comments received from all parties, with the revised version highlighting these changes before formally submitting the final version. The beneficiary authority (Local Committee) is primarily responsible for approving the reports and deliverables after consultations with IIPP and shall be kept informed by the Consultant of the dates of submission.