TERMS OF REFERENCE FOR PROVISION OF CONSULTANCY SERVICES FOR UNDERTAKING FIELD ASSESSMENT, DETAILED ENGINEERING DESIGN AND PREPARATION OF PROCUREMENT DOCUMENTS FOR THE REHABILITATION OF TRACK AND STRUCTURES (BRIDGE & CULVERTS) ALONG TANGA – MOSHI – ARUSHA LINK LINE INCLUSIVE (626 KM).

1. BACKGROUND

The Government of the United Republic of Tanzania has applied for financing from the International Development Association (IDA) equivalent to US$200 million towards the cost of the Second Tanzania Intermodal and Rail Development Project (TIRP-2), and it intends to apply part of the proceeds for payments under the Contract for provision of Consultancy Services for undertaking field assessment, detailed Engineering design, and preparation of procurement documents for Railway Track and Structures (Bridges & Culverts) Rehabilitation Works for Tanga-Moshi-Arusha and Link Line connecting Mruazi and Ruvu Junctions (626 km).

TIRP-2 is a continuation of the previous Tanzania Intermodal and Rail Development Project (TIRP) and is implemented by the Tanzania Railways Corporation (TRC), a 100% Tanzania Government-owned company on behalf of the Government of Tanzania, and will finance the following four (4) components:

Component A: Strengthening of Railway Infrastructure and Support of Transport Studies
Component B: Strengthening Climate Resilience of Kilosa – Gulwe - Igandu Section
Component C: Operational and Institutional Support
Component D: Contingent Emergency Response

The Project Development Objective (PDO) is to improve safety, climate resilience and operational efficiency of the railway along the Dar es Salaam to Isaka segment in Tanzania.

Tanga-Moshi-Arusha and Link Line connecting Mruazi and Ruvu Junctions (626 km) forms part of northern Meter-Gauge Railway Corridor that is famous for transportation of passengers and freight in northern regions of Tanzania. The link line is 188.1 kilometers long and begins at Mruazi Junction, and runs via various stations, including Mwakinyumbi, Gendagenda, Mkalamo, Mvave, Wami, Kidomole, Kwalaza, Usingwa, and finally ending at Ruvu Junction, 3 kilometers from Ruvu Station on the central railway. The Tanga line (437.9Km) connects the following railway main stations; Tanga, Muheza, Korogwe Mombo, Mkomazi, Makanya, Moshi and Kikuletwa, and Arusha. The line also serves Tanga Port which is strategically located to serve the northern Regions of Tanga, Kilimanjaro, Arusha, Manyara, the lake zone, and neighboring countries of Kenya, Rwanda, Burundi, and Uganda. The railway track and structures have been deteriorating due to very long service and effects of change in climatic conditions, and therefore require major rehabilitation.

TRC now intends to undertake a Field Assessment, Detailed Engineering Design, and preparation of Procurement Documents for Railway Track and Structures (Bridges & Culverts) Rehabilitation Works under TIRP-2 to enhance the efficiency and safety of railway operations, with a minimum axle-loading of 18.5 tonnes and a minimum line speed of 75 km/h.

The Tanzania Railways Corporation (TRC) is now seeking a qualified and experienced Consulting Engineering Firm (the Consultant) to provide Consultancy Services for undertaking field assessment, detailed Engineering design, and preparation of procurement documents for Railway Track and Structures (Bridges & Culverts) Rehabilitation Works for Tanga-Moshi-Arusha and Link Line connecting Mruazi and Ruvu Junctions (626 km). The anticipated duration of the assignment is 10 calendar months covering field assessment, detailed Engineering design, and preparation of procurement documents.

2. OBJECTIVE OF THE ASSIGNMENT

The objective of the assignment is to undertake consultancy services on behalf of the Tanzania Railways Corporation (TRC) for the field assessment, detailed Engineering design, and preparation of procurement documents for Railway Track and Structures (Bridges & Culverts) Rehabilitation Works for Tanga-Moshi-Arusha and Link Line connecting Mruazi and Ruvu Junctions (626 km).

The specific objectives of the Consultancy services are:

(i) to carry out field assessment and investigations of the railway track and the associated infrastructure including Structures (Bridges & Culverts), station yards, station buildings, level crossings, signal & telecommunication system, and recommending/determining the rehabilitation scope for improvement.

(ii) to carry out the detailed Engineering design that improves the safety, and operational efficiency of the railway track and the associated infrastructure including Structures (Bridges & Culverts), station yards, station buildings, level crossings, signal & telecommunication system, and recommend/determine the rehabilitation scope for improvement.

(iii) to carry out the preparation of procurement documents, cost estimates, work plans, and Environmental, Social Health and Safety documents for the proposed improvement works. The Consultant shall ensure that the cost of implementing the Environmental and Social Management Plan (ESMP) is fully incorporated into the Bill of Quantities to enable their implementation on the ground.

3. SCOPE OF SERVICES

3.1. Detailed field assessment and Investigations of railway track and the associated infrastructure

The Consultant shall perform detailed field assessment and investigations of the railway track and the associated infrastructure to comprehend the condition, and determine the scope and requirements for improvement. The Consultant shall also review all available and relevant documents, maps, and previous studies (if any) and perform all engineering, Environmental, Social, Health and Safety safeguard assessments of risks and impacts of the impending rehabilitation works, field investigations and the related works herein described as well as any other related work required to attain the objectives of the assignment and shall at all

times utilize the most economical, effective and widely accepted engineering concepts in this work. The detailed field assessment and investigations are expected to involve but not limited to the following;

3.1.1 Railway Track.

a) Detailed Line Inspection of fixed Infrastructure

The Consultant must undertake a detailed line inspection of the relevant section of the Scope of the Assignment on the following railway line attributes:

- Geographic Information System (GIS) data collection
- Earthworks: Cuttings and Banks for **t**rack formation
- Drainage: Side drains and Catch water drains
- Curves: Geometrical status
- Ballast: Condition status
- Sleepers and fasteners: Condition status.
- Rails: Condition status
- Turnouts: Condition status
- Station yards
    - Loop lengthening;
    - Drainage system at yards and Turnouts
- Signage
- Kilometer posts
- Level crossings
- Cattle Crossings
- Track Renewal and Refurbishment sections

b) GIS Data Collection

The Consultant must obtain the setting out reference point for the applicable scope section ie From Tanga, Moshi to Arusha, and Mruazi Junction to Ruvu Junction. The Consultant will also locate concrete markers at other key stations in order to transfer Horizontal and Vertical Control along the corridor. A real time kinetic global navigation satellite system (GNSS) with LiDAR

(Light Detection and Ranging) technology survey instrument will be used to collect the longitude and latitude coordinates of the following points:

i. Mainline switches – Consultant will collect the coordinates of all mainlines switches together with height information.
ii. Signage – This includes station name boards, kilometer posts and level crossing signs.
iii. Start and finish of horizontal curves in order to check the radii off the curve and enable the realignment of the curves.
iv. Start and finish of vertical curves in order to check the radii off the curve and enable the locating of sag and summit points
v. Start and finish of areas, where improvements have been identified to drainage, rock and bank stabilizations and other earthworks.
vi. Earthwork cross section profile: at start and finish; relative levels and all other dimensions at areas where profiles of cuttings and banks are not to specification or generally acceptable engineering standard, whichever is superior.
vii. Longitudinal and horizontal profile of the entire railway segments of the applicable scope section.

c) Earthworks

i. Cuttings

a. Rock cuts that are prone to rock falls. Locations of all rock cuttings must be identified in the form of chainage, coordinates and in plan-profile drawings.
b. Nature and extent of failures on the side slopes of each cutting must be diagnosed and remedial measures presented in acceptable standard to Client.
c. Using surveying measuring equipment like Global Navigation Satellite System (GNSS) and levers, produce existing and planned cutting cross-sections profiles at density not greater than 25m intervals.
d. Cross section drawings of critical locations along each cutting must be produced.

e. Consultant must present planar drawings detailing side drains, catch water drains and the cutting openings.
f. Calculated quantities of remedial works in sufficient details for each item of works necessary to treat/stabilize rock falls then present in the form of Bill of Quantities (BOQ).
g. Specifications of works, materials and machineries must be drawn in details.
h. Proposed works statement is to be produced to adequate coverage.
i. Identify material source and produce sufficient details regarding their quality, quantity, efficient haulage distance and other logistic issues must be proposed by Consultant for getting them at installation site economically.
j. Consultant must specify economic disposal of spoil and debris.
k. Conduct the Geotechnical investigation of the whole embankment in order to determine its strength

ii. Banks: Earthworks required to achieve the standard cross section

a. Identify and locate using chainages and coordinates, stretches of railway banks that are prone to bleaching, erosion and landslides caused by intense run-off, unlawful vehicular crossings including human and animal trespassing.

b. Using surveying measuring equipment like GNSS and levers, produce existing and planned banks cross-section profiles at density not greater than 25m centers

c. Nature and extent of failures and/or erosion of the side slopes and formation shoulder, of each continuous bank stretch must be diagnosed and remedial measures presented in detail acceptable to Client.

d. Cross section drawings of critical locations along each bank must be produced

e. Consultant must present as part of planar drawings the banks stretches.

f. Calculated quantities of remedial works in sufficient details for each item of works necessary to treat/stabilize landslides and/or narrowing of banks then present in the form of BOQ

g. Specifications of works, materials and machineries must be drawn in details

h. Proposed works statement is to be produced to adequate coverage

i. Identify material source and produce sufficient details regarding their quality, quantity, efficient haulage distance and other logistics issues for getting them at installation site economically.

d) Drainage

i. Side drains

Consultant is tasked to undertake field assessment, as part of field inventory report, must present observations, diagnosis and proposed remedial measures. Additionally, the Consultant is tasked to work out provision of improved drainage systems. Minimum is the standard specified in the TRC (CEM-1998).

a. Identify locations requiring drainage ditches in terms of chainage and coordinates. This will consist of at least all cuttings, level grounds and all station yards,
b. Present layout drawings with respect to track alignment
c. Locations and drawings of plain and lined stretches of side drains must be well differentiated in all drawings and texts.
d. Produce cross section drawings at 25m intervals for plain and lined drainage stretches.
e. Produce longitudinal profile drawings of all drain's ditches.
f. Calculate quantities of all work items in the form BOQ for each continuous drain stretch but not that exceeding scale readable to A3 drawing paper.
g. Compile particular specifications for materials, works and equipment for construction of side drains.
h. Proposed comprehensive method statement.
i. Propose material source and disposal method.

ii. Catch Water drains

The Consultant is tasked to undertake field assessment of status of catch water drains on all slopes and cuttings. As part of field inventory report, Consultant must present observations made during field inspections, diagnosis and proposed

remedial measures. Additionally, the Consultant is tasked to work out provision of improved drainage systems. Minimum is the standard specified in the TRC-CEM (1998), this will be supported by a thoroughly hydrological assessment of the project area.. To achieve the target consultant must execute at least the following;

a. Identify locations requiring catch water drains in terms of chainage and coordinates. This will consist of at least all cuttings, level grounds and all station yards,
b. Present layout drawings with respect to track alignment
c. Locations and drawings of plain and lined stretches of catch water drains must be well differentiated in all drawings and texts.
d. Produce cross section drawings at 25m centers for plain and lined catch water drains stretches,
e. Produce longitudinal profile drawings of all catch water drains
f. Calculate quantities of all work items in the form of BOQ for each continuous drain stretch but not that exceeding scale readable to A3 drawing paper
g. Compile specifications for materials, works and equipment for construction of side drains
h. Proposed comprehensive method statement.
i. Propose material source and disposal method.

e) Curves

i. The Consultant must inspect each curve and compare the curve register against the GNSS survey information. The line after renewal/rehabilitation works will be operated to a minimum speed of 75km/h. Hence it is necessary to ascertain all curves geometrical status.
ii. Produce horizontal and longitudinal alignment of the whole line using high precision real-time GNSS equipment.
iii. Existing horizontal curves must be located by identifying the beginning and end of transition and full curves.
iv. Confirm all geometrical parameters of the curves namely radius/degree, lengths, permissible and maximum cant, cant slopes, cant deficiency and design speed.

v. Produce curves register having two parts, part-I: curves register for horizontal curves; part-2: curves register for vertical curves.

vi. Produce track plan and longitudinal profile to indicate horizontal and vertical curves.

vii. Based on the field survey, Consultant must propose curve parameters that will be adopted by the Contractor.

f) Ballast

i. The Consultant must conduct inventory survey of ballast status to establish quantity and quality of existing ballast bed. This has to be accomplished by visual inspection followed by application of ballast templates finally opening-up inspection pits of 30cm depth x 20cm width and 30cm traversal. Will open spot pits on the stretches that status of ballast cannot be established in order to quantify and specify ballasting works. The number and intervals of spot pits should be reasonably justified by the Consultant.

ii. Consultant will record the locations, observations, recommendations supported by pictures for representative trial pits to be part of deliverables.

iii. At identified locations, Consultant must produce existing quality status and existing ballast profile.

iv. Classify intervention to five (5) levels,

Level-1: Adequate depth of clean and sound ballast bed is in place

Level-2: Inadequate depth of clean and sound ballast bed is in place

Level -3: Adequate depth of contaminated and sound ballast bed is in place

Level- 4: Inadequate depth of contaminated and sound ballast bed is in place

Level 5: Practically ZERO-ballast bed is in place

v. Produce quantity of works required for each one-kilometer segment in terms of ballast materials, transportation and logistics, handling equipment for mechanical screening, placing, dressing, tamping and stabilization.

vi. Produce specification of works, materials and equipment for the detailed ballast operations established in (iii) above.

vii. Compute quantities and condition of the ballast in each block section.

viii. Establish stone quarries for feeding each block section with required ballast volumes. The Consultant must investigate quality and quantities of each quarry site to be standards specified in CEM-1998. Since transport components contribute hefty share in ballast cost structure, Consultant is also encouraged to explore stone quarries report that were being used by rail and roads projects all along the rail project route in question, from TRC (such as Pangani and Weruweru), TANROADS, Donors or Local Government. The Consultant's exploration should give a highlight of the status of Compliance to the NEMC's laws and regulations on the operation of the quarries and borrow pits and state whether the permits are valid or not.

g) Turnouts

(i) The Consultant must assess the status of existing turnouts covering the number, type and condition of main line 1:12 turnouts for each station. The Consultant will also identify the track structure (type, size and spacing of sleepers, fittings, ballast, turnouts, and type of rail) and condition of the crossing loop tracks and other yard tracks. Turnout components should be re-used wherever they are suitable and in good condition.

(ii) The consultants must take account of the proposed station layouts, requirements in consultation with TRC operations. An outline specification of these proposed layouts will be prepared post assessment of the sections.

(iii) All main line turnouts should be protected by breather switches if Continuous Welded Rail (CWR) is laid up to the turnout and should be fitted with an approved point Lock, where turnouts on the main line or loops are to be removed, new plain line must be installed to at least the same standard as that laid in the main line and must be (de) stressed to meet the designated specification.

h) Station Yards

i. Loop Lengthening

The plan is to extend crossing loop lengths of the stations to 650 meters on Tanga, Moshi to Arusha, and Link line railway.

a. As part of field inspections, Consultant must survey both ends of loop tracks, propose which ones be lengthened and recommend at which end the lengthening should occur (or if recommendation is for both ends, how much on each end).
b. For each loop to be extended, Consultant must produce survey report and drawings for topographical drawings map of the station area indicating contours and drainage patterns, physical features both natural and man-made, updated loops layout and setting out details of loop and turnouts.
c. Produce quantities in the form of BOQ for earthworks required; drainage requirements, track works; and any obstructions that will need to be addressed.

ii. Drainage system at yards

a. Consultant must assess functioning of existing drainage system at station yards consisting of surface and underground cross-drainage network at station yards.
b. At each station the Consultant must propose improvement measures.
c. Based on site observations and interrogation of TRC field staff, the Consultant must provide drawings, quantities and specifications for drainage works it is proposing.

iii. Station buildings

a. To check structural integrity of building and designs of remedial works. The Consultant shall use appropriate technology/scientific means as necessary to ascertain the structural safety, integrity of the building and condition of each and every structural element. Based on the findings of investigation the consultant shall suggest appropriate remedial measures best suited for rehabilitation of the building. In proposing rehabilitation, the Consultant should consider modern amenities to passengers particularly to communities' special groups and current

norms in railway transportation. If the condition of the building(s) is/are not suited for rehabilitation the consultant shall inform the Client before commencing with the design of new building(s).

b. To prepare Architectural Design Layouts. Consultant shall produce the architectural design layouts of existing or new facility as the case.

c. To prepare architectural designed detailed drawings for construction. The consultant shall provide the relevant architectural detailed designs as required for the execution and completion of the works and shall produce the necessary drawings to define the works.

d. To prepare design, firefighting and plumbing, mechanical (HVAC), electrical and ICT drawings. The consultant shall provide the relevant detailed designs for all electromechanical, ICT and all allied works as required for the execution and completion of the works and shall produce the necessary drawings to define the works properly and completely.

e. To prepare schedule of materials and a complete bill of quantities for all builder's work, firefighting and plumbing, mechanical (HVAC), electrical and ICT components. The consultant shall extract quantities and provide detailed calculations of works building wise/room wise for all disciplines architectural, civil, electromechanical, ICT works and all allied works as required for the execution and completion of the works. The consultant shall prepare Bill of Quantities building wise which shall define the scope of the works contract.

iv. Proposed New Station Yards and Buildings

The Consultant shall propose and include in the procurement documents the new station yards and buildings to be constructed aiming at improving operational efficiency for the trains. The additional station yards and buildings prioritized by TRC are Kwalaza and Kidomole.

3.1.2 Signage

i. The consultant must establish locations, design, quantity and layout required as per current standards in reference to the CEM-1998 and Land Transport Regulatory Authority (LATRA) guidelines.

ii. Undertake field assessment to review existing status and identify the number, location and condition of signs including but not limited to Station name boards; Kilometer posts; Boulders Falling warning signs, Level crossing signs, shunting limits, railway reserve boundary markers/posts, gradient posts, and all other signs as specified in CEM-1998.

3.1.3 Structures (Bridges and Culverts)

The indicative number of structures for detailed field assessment is shown in the table below;

Indicative Number of Bridges and Culverts to be Assessed

STRUCTURE	CATEGORY	TANGA - MOSHI - ARUSHA & LINK LINE
Culverts	Pipe	1186
	Box	185
Arch bridges/culverts	< 3m	32
	> 3m	27
Single Span Bridges	3-10m	27
	> 10m	16
Mult Spans Bridges	3-10m	12
	> 10m	16

3.1.4 Signalling and Telecommunication.

The Consultant shall assess the existing signaling and telecommunication systems and develop a detailed proposal for improvement. The improvement of the system shall cover the railways section from Ruvu Junction Station to Mruazi Junction Station, then stretching to Tanga Station, Moshi Station and Arusha Station.

Telecommunication network shall include approximate 36 stations/locations between Tanga Line (Tanga – Moshi - Arusha) and the entire Link line (Mruazi Junction – Ruvu Junction). Upon completion of this project, the Consultant should submit a study and procurement documents for ensuring reliable means of signaling and communication for the safety of train operations.

3.2. Detailed Engineering design and preparation of procurement documents for the railway line and the associated infrastructure.

The Consultant shall perform the detailed Engineering design that improves the safety, and operational efficiency of the railway track and the associated infrastructure. The procurement documents must also be prepared by the Consultant. Additionally, the Consultant shall prepare the Works specifications to comprehend with the proposed design solutions. The detailed Engineering design and procurement documents are expected to include, but not limited to the following;

a) Track Works

(i) Track Renewal and Refurbishment

Consultant must estimate quantities of permanent way materials required for complete track renewal installation and refurbishment on the relevant assignment rail section.

Must produce detailed BOQs for packages formed that accommodate cost of provision of properly installed/refurbished 80lb-CWR stabilized and distressed track to acceptable safety level. Concrete sleepers suitable for the section shall be considered for the works. The Contractor must cost manufacture of all track components, Quality Control regimes at factory as well as during installation and after welding and final tamping, also shipment to Dar es Salaam port, clearing and forwarding costs with Tanzania Ports Authority (TPA) and Tanzania Revenue Authority (TRA), handling and transportation right from docked ship at Dar es Salaam port to installation site. Lastly, all pre-relaying, relaying and post-relaying operations to be specified at acceptable stabilized state of CWR-80lb track in optimized geometrical layout. The

renewed/rehabilitated track parameters will be measured by using the track recording car.

(ii) Structures (Bridges and Culverts)

b) The Consultant shall carry out the Detailed Engineering Design required to execute the Strengthening Works and Remediation of Bridge and Culverts in consultation with TRC along the relevant sections of Assignment scope. The detailed Engineering design and procurement documents preparation shall include but not limited to the following;

i. **Strengthening *Works:*** All works required to upgrade the capacity of railway bridges and culverts to support the Container Block Train **(Figure 1 – See Annex 1)**. These works are to be executed at bridges and culverts whose capacity is deemed insufficient. The works may include both in-situ reinforcement of bridges & culverts and replacement of entire spans & culverts.

ii. ***In*-Situ R*einforcement:*** The reinforcement of existing structures through in-situ works such as the addition of steel plates and beam sections or reinforced concrete jackets. These works must improve the structure's capacity rating to at least 18.5t/axle **(Figure 1 – See Annex 1).**

iii. ***Span/Culvert Replacement:*** The replacement of spans or entire box culverts is to be applied when in-situ reinforcement is either not feasible or not economical. Replacement spans are to be designed to 25t/axle **(Figure 2 – See Annex 1)**. The Consultant must ensure that all abutments selected for re-use under new spans are in good working condition and capable of withstanding 25t/axle load. Where existing abutments are deemed to be in poor condition or incapable of carrying 25t/axle load, the Consultant must propose a design to strengthen the existing abutments or provide an alternative means of transferring bridge loads to the underlying soil.

iv. **New Construction:** if the consultant assesses that the structure is in a poor condition, incapable of carrying 25t/axle load, or decide to add a new structure, it must propose a new design of complete structure from foundation, deck, abutment all to cater for the section based on best engineering practices.

v. The Consultant shall carry out the Detailed Engineering Design required to execute the Strengthening Works and Remediation of Bridge and Culverts post assessment studies in concurrence with TRC along the relevant sections of Assignment scope.

(iii)Assessed Sites under item 3.1 Above

The Consultant is also responsible for undertaking the detailed Engineering design and preparation of procurement documents for the all the assessed sites under item 3.1 above and Package them accordingly for the Strengthening Works.

3.3. Tasks to be undertaken

The Consultant shall do everything necessary to achieve the objectives stated above and in doing so it shall carry out all necessary tasks including but not necessarily limited to the elements and tasks outlined below:

3.3.1 Task 1 - Site Assessment and Investigations

Undertake site assessment and investigations as required to establish cost-effective and constructible design solutions and their corresponding material quantities. All proposed solutions must be compatible with the constraints inherent to each individual site. The Consultant is expected to undertake subsurface geotechnical investigations as required to ensure the proposed solutions are safe and robust.

3.3.2 Task 2 – Preparation of Detailed Datasheets for Each Proposed Site

The Consultant is required to prepare a detailed datasheet at each proposed site that will contain the following fields:

- GPS Coordinates

- Type of structure
- Structure geometry (incl. opening height, opening width, structure depth, number of spans)
- Photographs of structure
- Nature of defect(s)
- Abutment conditions
- Remediation options
- Proposed solution
- Abutment work required (if any)
- Scour protection required (if any)
- Spillway work required (if any)
- Other relevant structure condition notes
- Recommended construction methodology for proposed solution
- Material and equipment requirements for proposed solution
- Site accessibility issues
- Special precautions required (if any)
- Approximate execution time of proposed solution
- Operation interruptions required for proposed solution
- Significant weather factors
- Significant environmental factors
- Significant social impact factors
- Estimated cost of proposed solution
- Signalling
- Telecommunication

Similar detailed datasheet for each proposed track sites with similar relevant information must also be prepared.

These datasheets will be transferred to potential Contractors as part of the bid documents and should be of sufficient quality to permit the user to quickly evaluate the magnitude and nature of works required at the site.
Wherever possible, the datasheets will serve as the principal vehicle for the pricing of the Remediation of Urgent Defects.

3.3.3 Task 3 – Detailed Engineering Design

The Consultant is responsible for the preparation of the Detailed Engineering Design Packages for the Strengthening Works. These packages must conform to 'The American Railway Engineering and Maintenance-of-Way Association' (AREMA) Guidelines. Any substitutions to this design code must be justified by the Consultant and approved in writing by TRC prior to commencement of the Works.

The Detailed Engineering Design Package will comprise the following outputs:

- Detailed Design Calculations justifying the proposed design solution and conforming to AREMA Guidelines.
- Engineering Drawings with an appropriate scale and sufficient level of detail, as per prior approval by the Client, to allow the accurate pricing and safe construction of the Strengthening Works.
- Bills of Quantity (BOQs) for each specific site and for general items, to a format and level of detail acceptable to the Client. The BOQs will be of such a nature to establish efficient Work Packages.
- General and Particular Technical Specifications that clearly defines the Scope of Work and acceptable Work Methods and Materials for the execution of the Work Packages, taking into account environmental and social impacts and their mitigations clearly stated in the ESMP.
- Detailed Cost Estimate, Recommended Procurement Strategy, Plan, Work Contract Packaging strategy and Construction Schedule for the Strengthening Works and the Remediation of Urgent Defects.

3.3.4 Task 4 - Materials Investigations.

The Consultant shall investigate sources and establish locations, quantity and quality of construction materials namely stone ballast, aggregates, earth fill, sand and water to reduce risk factor in pricing the bid by works Contractors.

In that regard the Consultant will collect materials report(s), source location(s) from various nearby rail/road authorities who implemented the relevant projects along the relevant study scope section.

During field assessment the Consultant will identify proper sources of local construction materials and incorporate in their all reports and finally will form part of tender documentations to guide Contractors.

3.3.5 Task 5 - Hydrological - Hydraulic Assessment

The Consultant shall assess the structural condition of the existing drainage structures including the inlet and outlet of the structures, and carry out the required design. The Consultant shall also carry out hydrological analysis for all new drainage structures and existing ones, which are hydraulically and structurally unsound, and in need of replacement.

3.3.6 Task 6 - Environmental and Social Impact Assessment

The Consultant's detailed engineering design and procurement documents shall be prepared in compliance with the National and World Bank's Environmental and Social Framework (ESF) and its applicable Standards (ESSs). Among others, the consultant shall;

- Conduct Environmental and Social Impact Assessment (ESIA) as per Environmental Management Act, 2004, Environment Impact Assessment and Audit Regulations (2005) as amended in 2018 and obtain EIA certificate; as well as The World Bank's Environmental and Social Framework of 2018 and its applicable standards (ESSs) and WBG EHS general and sector specific (Railways) guidelines to identify potential environmental, social and health and safety risks and recommend appropriate mitigation measures/plans to minimize any negative impacts and enhance positive impacts. Please also note that the ESIA would be subjected to an independent review and hence the Consultant should ensure that the ESIA is a bankable one to fulfil the World Bank requirements. The ESMP inherent the Environmental Impact Statement (ESIA Report) should be site specific to manage the environment and social risks and impacts identified for the site. . The Resettlement Action Plan (RAP) shall form a basic part of the ESMP as per World Bank's

ESS5 on Land Acquisition, Restrictions on Land Use and Involuntary Resettlement.

- Conduct social economic assessment and establish the number of Project Affected Persons (PAPs) and recommend appropriate mitigation measures/plans to minimize any negative impacts as per WB's Involuntary Resettlement Policy Framework and guidelines.
- Establish the existence of Indigenous Peoples/Sub-Saharan African historically underserved traditional local communities residing along the project corridor and recommend appropriate mitigation measures/plans as per WB's ESS7 objectives.

3.3.7 Task 7 – Safety Strengthening in All level crossings.

Undertake site assessment and investigations, and establish a constructible design solution for strengthening safety in all level crossings. The method is expected to enhance safety to all users including trains operations.

3.3.8 Task 8 - Construction Schedule

In order to assist in evaluating the required construction period and forward budget needs, the Consultant shall carry out a network analysis of the project using suitable deterministic or probabilistic theory or a combination of both showing, inter alia:-

- Major activities and their duration;
- A "network" showing the proposed ordering or sequencing of the major activities;
- Duration of the entire project in the form of a bar chart;
- Monthly cost of each activity; and
- Anticipated monthly expenditure presented in form of an S-curve.

In carrying out the analysis of the construction schedule, due account shall be taken of the climatic conditions of the areas concerned. Also consider Works package where necessary.

3.3.9 Task 9 - Preparations Of Procurement Documents

The Consultant shall undertake the above assignment for International Competitive Bidding (ICB) in accordance with the current Standard Procurement Documents and the World Bank Procurement Regulations for IPF Borrowers, Fifth Edition issued September 2023.

Based on the approved detailed design the Consultant shall prepare complete Procurement Documents comprising of:

- Volume 1:
  PART 1: Procurement Procedures
  Section I. Instruction to Bidders
  Section II. Bid Data Sheet
  Section III. Evaluation Criteria and Qualification Criteria
  Section IV. Bidding Forms
  Section V. Eligible Countries
  PART 2: Works Requirements
  Section VI. Works Requirements
  PART 3: Conditions of Contract and Contract Forms
  Section VII. General Conditions (GC)
  Section VIII. Particular Conditions (PC)
  Section IX. Annex to the Particular Conditions – Contract Forms

N.B: This document shall be clearly marked on the cover as "BIDDING DOCUMENT"

- Volume 2: - Technical Specifications (Standard and Special)
- Volume 3: - Drawings (photo-reduced to "A3" size)
- Volume 4 (A): - Materials Report
- Volume 4 (B): - Hydrological/Hydraulic Report
- Volume 5 - ESIA (with NEMC registration certificate)

The volumes 4(A) & (B) shall be factual reports clearly marked on the cover " FOR INFORMATION ONLY AND NOT PART OF PROCUREMENT DOCUMENTS" with preamble in the text stating that these reports only represent the investigations and findings (without analysis or interpretation of results/findings) of the Client and that it shall be the Bidder's responsibility to verify for any source the quantity and quality of materials, etc. without binding the Employer.

3.4. Detailed Engineering Design Requirements

3.4.1 Field Data Review and Analysis

With the available information (if any) as provided by TRC, consultant shall carry out detailed field investigation to confirm the scope of works and provide detail reports on inspections which shall be produced in the field reports. Upon completion of the track and structures inspections, the team will gather in Dar es Salaam/Tanga/Arusha to analyze the collected field data.

The consultant shall review the data of railway track and associated infrastructure, and based on the condition assessment, classification, defects requiring urgent remediation etc. as the case in line with remedial measures in accordance with the scope of assignment.

3.4.2 Detailed Engineering Design

Based on the field investigation, the consultant in discussion with TRC, shall confirm /identify structures to be designed and shall undergo detailed design of these structures.

The Consultant shall further conduct a detail engineering design of track and associated components based on the findings of the field investigation.

3.4.3 Presentation of Collection GNSS Data

In addition to be used for generating quantities, and for reference in tender documents, GNSS documents will be provided to the Client in the format of their preference including:

i. Keyhole Markup Language Zipped (KMLZ) file;
ii. Raw GNSS file;
iii. Excel file (summary of reference locations with GNSS points); and
iv. Loaded into Google Earth.
v. Decimal Latitude and Longitude set of data for the entire section to be used in TRC's track recording car.

The data shall be accompanied with a short narrative categorizing and briefly describing the data.

3.4.4 Engineering Drawings

The Consultant shall prepare the following engineering drawings for the project using format and title sheets as required by the Client, with the originals becoming the property of the Client.

(i) Topographic Plans, scale 1:2000;
(ii) Plans and Profile, scale 1:1000/1:100;

The drawings shall show natural ground levels, horizontal and vertical curve details, running chainage, cross-section chainages, side drains' locations, description and references to all drainage works, location of bench marks, location of railway furniture, any other relevant information in the format approved by the Client.

(iii) Typical Cross-Sections, scale 1:50;
Showing all details of railway cross section in cuts and fills, side drains, Blanket thickness, camber and super-elevation and formation widening, natural ground level and super - imposed road prism and structural drawings details as required.

(iv) Typical Cross sections of Crossing layouts, scale 1:50;
The drawings shall include details of crossing layouts along the railway where appropriate. Based on the nature of the railway and

traffic analysis, the Consultant shall determine the appropriate location of crossings including the signs, signals, formation markings and other control features.

(v) Cross Sections, scale 1:100;

Showing natural ground level and superimposed railway prism at 25m intervals.

(vi) Bridges, scale 1:100 and 1:50/20 for more detailed elements;

Showing all the details for construction of a bridge superstructure and sub structure as well as any protection works.

(vii) Culvert details, scale 1:25;

Showing details of all types of culverts, their inlets and outlets and any necessary protection works.

(viii) Soil plans;

Showing the location of borrow and quarry sites and characteristics of soil for various sections of the route using the appropriate scale.

(ix) Traffic Management Plans

Showing details of the location of temporary structures, barriers, signs, signals and other physical features necessary to accommodate traffic flow during construction. The Consultant should note that the Traffic Management Plan is basically part of the site-specific ESMP and could be well informed by the Stakeholders' Engagement as per World Bank's ESS10.

(x) Auxiliary Works

Showing all auxiliary works using the appropriate scales

3.4.5 Logistics and Project Operation Matters

In the specifications or condition of contract consultants must highlight all major logistics and project operation issues that potential Contractors must take into consideration during preparation for submission of works tenders.

3.4.6 Risk Management

Risks associated with the contract implementation must be identified, analyzed and documented. The Consultant will be responsible for devising the proposed appropriate mitigation by Client.

3.4.7 Quality Assurance Plan for the Works Contracts

The consultant must draw up a manual for an independent quality assurance plan regarding all the contractors' activities specified in the BOQ that are mainly in two parts;

Part-1: Quality Assurance plan at manufacturing factory of all project materials. Special coverage is required on Inspection and Testing regime for Permanent Way Materials that must be witnessed by Client at Factory.

Part-2: Quality Assurance plan at installation site for all activities of works, materials and equipment.

3.4.8 Construction quantities

The calculated quantities for the items of construction shall be in accordance with the Standard Specifications for railway works and shall be based on the final design drawings. The earthwork quantities shall be derived from calculations based on the field cross sections along the railway centre-line and in accordance with acceptable methods of measurements that shall be agreed with the Client. A detailed bill of quantities shall be prepared under the following sections: preliminary and general; clearing and earthworks; drainage; culvert and protection works; ballast, rails, bridges including major structures; railway furniture; ancillary works (including railway reserve markers); schedule of day works etc.

3.4.9 Cost Estimates

The Consultant shall estimate likely ruling bill rates applicable to the proposed time of construction, showing how these are derived. In order to make a fair and reasonable estimate of the cost of project, the Consultant shall prepare a unit price analysis of each item using basic cost elements (labor, materials, equipment, tools, overheads, on - site costs, profit, etc.), and showing separately the cost of all taxes (direct or indirect, duties, levies and fees). The estimated financial cost resulting from this analysis shall be accurate to within ±10% and shall be compared with costs of previous projects or similar works executed in the area and adjusted accordingly. The cost estimates shall also include the costs for implementation of ESMP, RAP and HIV programme which should be reflected in the Procurement Document.

The Consultant shall give cost estimates broken down by main works' items into foreign and local currency components as follows: -

- For foreign currency:
  - Imported equipment, materials and supplies;
  - Identifiable foreign components of domestic manufactured equipment, materials and supplies;
  - Salaries of expatriate personnel; and
  - Profit and overheads of foreign firms where appropriate.

- For local currency:
  - Land acquisition if necessary;
  - Local materials, supplies, and services; and
  - Salaries and wages of local employees both skilled and unskilled.

In addition, the Consultant shall present separately the taxes and duties element of the cost estimates.

4. CONSULTANT'S PERSONNEL

The professional staff to be provided by the Consultant is estimated at 78 staff-months covered by the services of a (i) Team Leader/Railway Infrastructure Engineer, (ii) Railway Infrastructure Engineer (iii) Structural/Bridge Engineer, (iv) Materials Engineer, (v) Hydrologist, (vi) Environmental, Health and Safety (EHS) Expert, (vii) Social Specialist, (viii) Measurement Engineer/Quantity surveyor, (ix) Signaling Engineer (x) Telecommunication Engineer and (xi) GIS/Land Surveyor, for the field investigations and design. The Consultant shall provide the above-mentioned key professional staff with academic and professional qualifications and experience to recognize and deliver acceptable international industry practice with respect to Environment, Social, Sexual Exploitation and Abuse (SEA), and Gender Based Violence (GBV) in order to fulfill the objectives of the services and for which he/she will receive remuneration as specified in the contract document. TRC Environmental and Social Policy is appended in annex 2 for Consultant's reference and compliance.

In addition to the key experts, the Consultant shall determine the support staff deemed necessary for proper implementation of the assignment.

The Consultant must provide in the proposal CVs and certified copies of the highest education certificates for all key experts including the duration in man-months during which the staff will be deployed under the Contract.

THE ESTIMATED KEY EXPERTS INPUT FOR THE ASSIGNMENT			
S/N	**POSITION**	**UNIT**	**QTY**
1.1	Team Leader/ Railway Infrastructure Engineer	Staff - Month	10
1.2	Railway Infrastructure Engineer	Staff - Month	9
1.3	Structural/Bridge Engineer	Staff - Month	9
1.4	Materials Engineer	Staff - Month	6
1.5	Hydrologist	Staff - Month	6
1.6	The Environmental, Health and Safety (EHS)	Staff - Month	8
1.7	Social Specialist	Staff - Month	6
1.8	Measurement Engineer/Quantity surveyor	Staff - Month	6
1.9	Signaling Engineer	Staff - Month	6
1.10	Telecommunication Engineer	Staff - Month	6
1.11	GIS Expert/Land Surveyor	Staff - Month	6
	Sub Total		**78**
	TOTAL	**Staff-Months**	**78**

4.1. Staff Requirement during Field Investigations and Detailed Engineering Design

The Consultant shall undertake the Field Investigation and detailed Engineering design of the railway and the associated infrastructure. The following experts will be required; The Consultant is free to propose a staff complement that will carry out the exercise.

(a) Team Leader/ Railway Infrastructure Engineer

The Team leader shall be responsible for the proper coordination of the entire assignment and shall be the principal contact person between the Consultant's team and the Client. She/he will develop plans, analyze procedures, and oversee the performance of the team to ensure success and optimal results.

General Qualifications. The expert must be a holder of a degree in Civil/Railway Engineering. Postgraduate qualification is an added advantage. The expert must be a registered with recognized /relevant Professional Board. However, the expert will be required to be registered with the ERB Tanzania if awarded a contract

She/he must have a minimum of fifteen (15) years of cumulative experience in managing designs and construction of railway tracks/infrastructure and the associated infrastructure and contracts management.

Adequacy for the Assignment: She/he must have served in a similar capacity on at least three (3) projects for the design of railways of similar magnitude, nature, and complexity in the last 10 years.

Experience in the Region and Language: She/he must have a working experience of at least 3 years in SSA. Fluency in written and spoken English is mandatory

(b) Railway Infrastructure Engineer

The Railway Infrastructures Engineer shall be responsible for detailed field investigations, engineering design, producing high-quality Engineering Drawings and Design Calculations, and Packages for the Strengthening/rehabilitation Works. She/he must possess thoroughly knowledge in permanent way field investigation, design, construction & maintenance.

Qualifications and skills: The Railway Infrastructure Engineer must possess a bachelor's degree in civil or railway engineering, a master's degree is an added advantage. She/he must be registered by the relevant professional board.

General professional experience: She/he must have a minimum of (15) years' cumulative experience in designing railway infrastructure.

Specific professional experience: She/he must have served in similar position in at least three (3) railway projects of similar nature in the last ten (10) years. Must be proficient in written and spoken English. Working experience in Sub-Saharan Africa will be an added advantage.

(c) Structural/Bridge Engineer

The Structural/Bridge Engineer is responsible for detailed field investigations, engineering design, producing high-quality Engineering Drawings and Design Calculations, and Packages for the Strengthening/rehabilitation Works. She/he must have significant experience managing a team of CAD technicians and structural engineers.

Qualifications and skills: She/he must possess a bachelor's degree in civil or railway engineering. She/he must be registered by the relevant professional board.

General professional experience: She/he shall have a minimum of ten (10) years cumulative experience in structural design with a focus on bridges.

Specific professional experience: She/he must have served in similar position in at least two (2) railway projects of a similar nature in the last ten (10) years. Must be proficient in written & spoken English. Working experience in Sub-Saharan Africa will be an added advantage.

(d) Material Engineer

Material Engineer will be responsible for conducting field investigations of the materials with a view of achieving optimal design strategy. She/he shall source, test and assess the materials to be used in design and rehabilitation, in charge of all geotechnical site investigations including geological research, establishing the type of site whereby investigations are needed, undertaking such investigations, geotechnical analysis and drawing conclusions and making recommendations from such analysis, will be part of the team that analyses data and categorize for incorporation into tender documents.

Qualifications and skills: She/he must possess a bachelor's degree in civil or railway engineering. A master's degree in geotechnics or engineering geology is an added advantage. She/he must be registered with the relevant professional board.

General professional experience: The material Engineer should have a minimum of fifteen (15) years' experience in civil engineering including 5 years in geotechnical investigation

Specific professional experience: She/he must have served in similar position in at least three (3) railway projects of similar nature in the last ten (10) years and must be proficient in written and spoken English. Working experience in Sub-Saharan Africa will be an added advantage.

(e) Hydrologist

The expert will be responsible for all hydrological site investigations conducted including, hydrological research, establishing hydrological history at sites likely to be vulnerable to storm flows, calibrating and extrapolating data to allow for climate change, hydrological analysis, and making recommendations for bridge and culvert capacities from such analysis.

Qualifications and skills: He/she must have bachelor degree in Civil Engineering. A post graduate in hydrology or water engineering will be an added advantage.

General professional experience: The expert must have at least ten (10) years cumulative experience in Hydrological Investigation of major civil engineering works.

Specific professional experience: He/she must serve in similar position in at least three (3) hydrological investigation projects of similar nature in the last ten (10) years. Must be proficient in written and spoken English. Working experience in Sub-Saharan Africa will be added advantage.

(f) Environmental, Health and Safety (EHS) Specialist

The Expert shall be responsible for environmental, health and safety field investigations, and development of the bankable ESMP for guiding on the avoidance, minimization,

mitigation and remediation, if necessary, of any negative EHS impacts and risks and enhance the positive impacts of the project. The expert shall be responsible for preparation and registration of ESIA with NEMC.

Qualifications and skills: The EHS Expert shall be a registered EIA Expert, holder of a degree in Environmental Science and Management or Environmental Engineering, and Occupational Health and Safety or equivalent qualification. A postgraduate qualification in related field is an added advantage.

General professional experience: He/she must have a cumulative experience of at least ten (10) years related to EHS management in infrastructure design projects.

Specific professional experience: The Expert should have worked for a similar position in at least two (2) projects of a similar nature within the last five (5) years. He/she must have at least three (3) years working experience in Sub-Saharan Africa. The expert must be familiar with the current National Environmental Act and policy, World Bank Environmental and Social Framework (ESF), and other relevant EHS guiding policies. Proficiency in both written and spoken English and Swahili is mandatory.

(g) Social Specialist

He/she shall be responsible for Field Investigation and preparation of appropriate Social Safeguards documents.

Qualifications and skills: The expert must have a bachelor's degree in Sociology or related field from an internationally recognized institution is essential. A master's degree in social science or equivalent is an added advantage.

General professional experience: The expert must have a minimum of ten (10) years cumulative experience in social impact fields.

Specific professional experience: The Expert should have worked for a similar position in at least two (2) projects of a similar nature within the last five (5) years. He/she must have at least three (3) years working experience in Sub-Saharan Africa. The expert must be familiar with current internationally recognized social standards as well as Tanzanian legal requirements and best practices, and with the World Bank Environmental and Social Framework (ESF), and other relevant EHS guiding policies. Previous working experience in Tanzania and proficiency in both written and spoken English and Swahili is mandatory.

(h) Measurement Engineer / Quantity surveyor

The expert will be responsible for drawing up comprehensive estimates for track works, civil earthworks, bridges and culverts works that are earmarked for reconstruction, reinforcement and repair taking into account the appropriate construction and repair methodologies applicable in Railway sector.

Qualifications and skills: The ideal candidate should be registered with the respectively professional board. Must have a bachelor degree in relevant field. A postgraduate degree in relevant field will be an added advantage.

General Professional experience: A minimum of ten (10) years of cumulative experience in preparing cost estimates for major civil engineering works.

Specific Professional experience: He/she must serve in similar position in at least three (3) railway projects of similar nature in the last ten (10) years. Must be proficient in written and spoken English. Working experience in Sub-Saharan Africa will be added advantage.

(i) Signaling Engineer

The signaling expert shall be responsible for leading site assessments and investigations, reviews and production of the design, and specifications for the Improvement of Signaling systems. The design scope shall include improving safety at level crossing with appropriate source of power to energize the designed system. Compatibility of the designed system with respect to the available signaling systems is necessary. International standards shall be considered in the site assessment and investigation, review and design of the proposed solution.

Qualifications and skills: The ideal candidate should be registered with the respectively professional board. He/she must possess a bachelor's degree in signaling/ /Electronics engineering. A postgraduate degree in Railway Signaling will be added an advantage.

General Professional experience: She/he must have a minimum of ten (10) years cumulative working experience in signaling field, including five (5) years' experience in Railway signaling and safety.

Specific Professional Experience: He/she must serve in a similar position in at least three (3) year's railway project of a similar nature in the last ten (10) years. Must be proficient in written and spoken English. Working in Sub-Saharan Africa will be an added advantage.

(j) Telecommunication Engineer

The Telecommunication Engineer shall be responsible for leading site assessments and investigations, reviews, producing the design, and specifications for the Improvement of Telecommunication systems. Compatibility of the designed system with respect to the available Telecommunication systems is paramount. International standards shall be considered in the site assessment and investigation, review and design of proposed solution.

Qualifications and skills: The ideal candidate should be registered with the respectively professional board. He/she must possess a bachelor's degree in Telecommunication/Radio network/Transmission system network and computer engineering. A postgraduate degree in Railway Telecommunication Engineering will be added an advantage.

General Professional experience: She/he must have a minimum of ten (10) years cumulative working experience in Telecommunication and Electronics or related field, including five (5) years' experience in Railway Telecommunication and safety.

Specific Professional experience: He/she must serve in similar position in at least three (3) year's railway project of similar nature in the last ten (10) years. Must be proficient in written and spoken English. Working in Sub-Saharan Africa will be an added advantage.

(k) GIS Expert/Land Surveyor

The expert will be responsible for collection of all GNSS data and will undertake analysis necessary for use in estimating works requirements and for inclusion in tender documents. He/she will also prepare GNSS data and submit in format preferred by Client.

Qualifications and skills: The ideal candidate must be registered by relevant professional board. The Expert must possess a bachelor in Geomatics /Civil Engineering/GIS and Remote Sensing or related field.

General Professional experience: He/she must have a minimum ten (10) years' cumulative experience as GIS/Land surveyor in major civil engineering works.

Specific Professional experience: He / she must have served in similar position in at least two (2) railway projects of similar nature in the last ten (10) years. Must be proficient in written and spoken English. Working Experience in Sub-Saharan Africa will be an added advantage.

Support and Backup staff: In addition to the above key staff the Consultant shall determine the Support and Backup staff deemed necessary to assist with successful completion of the assignment. However, their qualifications will not be considered in the evaluation of the proposals.

5. REPORTING REQUIREMENTS

5.1. Inception Report

The Consultant will submit an inception report, in five (5) hard copies and 1 electronic copy acceptable to the Client, within four (4) weeks after commencement of services that includes a detailed work plan and summarizes the first decisive elements of the assignment. The inception report will also provide a revised implementation plan that defines the detailed methodology required to accomplish the key tasks of the assignment.

Any additional tasks that lie within the assignment scope that could be useful to the Consultant, as well as their associated time and cost, are to be included in the Inception Report along with any modifications to the Project Management Plan.

5.2. Progress Reports

(a) The Consultant shall prepare separate monthly progress reports throughout the contract duration starting one month after submission of the inception report up to and including one month after substantial completion. These are to be submitted in five (5) copies and should reach TRC no later than fifteen (15) days after the end of the month being reported on. Failure to submit reports whether at intermediate stages or overall, on specified periods may result in the imposition of liquidated damages equal to 1/1000th (one-thousandth) of the value of the invoice raised payable per day of delay up to 15% (fifteen percent) of the said value of the invoice

(b) The format and the content of the monthly progress reports shall be as agreed with TRC. They will include but not be limited to the following:

i. Summary progress of the Works, both physical and financial;

ii. Project Data including key milestones;
iii. Major changes of items in the Consultant Contract
iv. Suggestions for resolving any technical and other problems including ESHS metrics that occur and those affecting the progress of the works.
v. The financial status of consultancy contract;
vi. Progress charts including percentages of completion of individual main items and overall project;
vii. Weather information and charts.

5.3. Field Assessment and Investigations Reports.

The Consultant will submit the field assessment and investigation reports for the detailed investigation conducted under item 3.1 above in five (5) hard copies and 1 electronic copy acceptable to the Client, within three (3) months after the submission of the inception report.

5.4. Draft Final Report

The draft final reports shall be submitted to TRC and to the WORLD BANK as follows:

a) Ten hard copies in English language and three soft copies to TRC.
b) Two hard copies in English language and one soft copy to World Bank.

5.5. Final Report

The Consultant shall submit to TRC two sample printouts (in English language) of the various assignment documents, briefs, and drawings with indication of the format and layout; likewise, the data media used shall be submitted in two copies. After taking into consideration the corrections and improvements made by TRC and the WORLD BANK, the consultant shall produce and submit, in English language, the Final Report and must include:

- Final Detailed Engineering Design Report [5 copies]
- Procurement Documents [10 copies]
- Engineering Drawings [10 copies]
- Confidential cost estimate including the cost for implementation of ESMP on the ground [5 copies]
- Hydrological - Hydraulic Report [5 copies]
- Materials Investigations Report [5 copies]
- ESIA [5 copies] with NEMC Registration Certificate
- Signaling Report [5 copies]
- Telecommunication Report [5 copies]

The Final Report is to be in **COLOURED PRINT** consisting of sets as set out above, should be submitted in Fourteen hard copies and six soft copies in MS-word English

6. SPECIFIC RESPONSIBILITIES OF THE CONSULTANT

(i) All information, data and reports obtained from TRC in the execution of the Consultancy Services shall be properly reviewed and analyzed by the Consultant. The Consultant shall be responsible for the correctness of using such data. All such information, data and reports shall be treated as confidential.

(ii) The Consultant shall be responsible for arranging for all necessary office and living accommodation, transport, equipment, supplies, secretarial services,

7. OBLIGATIONS OF THE CLIENT

(i) The Client shall provide the Consultant with copies of the data and reports as available and considered relevant to the execution of the Consultant's services.

(ii) The Client shall facilitate liaison with other institutions in order to introduce the Consultant to them. The Consultant shall be fully responsible for collection of data and information from the agencies and shall be responsible for accuracy and any costs thereof.

8. DURATION

The timeframe for the execution of this assignment is 10 months' period for Detailed design and preparation of Procurement documents and preliminary Environmental & Social Impact Assessment. The arrangement of the milestone with duration are as follows;

(i) Signing/Effective Date of Contract	**M**
(ii) Commencement of services	**M + 1**
(iii) Inception Report	**M + 2**
(iv) Field Reports	**M + 5**
(v) Draft Detailed Engineering Design Report including Tender Documents and Cost Estimates	**M + 8**
(vi) Comments by Client	**M + 9**
(vii) Final Design Report	**M + 10**

9. PAYMENTS TO THE CONSULTANT

9.1. Payment schedule will be as per the deliverable tabulated hereunder.

	Deliverable	Payment Schedule (%)
1	Advance Payment	15% of Contract Price upon submission of acceptable Advance Payment Bank Guarantee.
2	Inception Report	10% of Contract Price upon submission of acceptable Inception Report
3	Draft Final Report	50% of Contract Price upon submission of acceptable Draft Final report
4	Final Report (once approved)	40% of Contract Price upon submission of acceptable Final Report.

The Consultant shall hire the costs for carrying out the assignment using the forms provided in the Request for Proposal (RFP).

9.1.1. Advance Payment

An advance payment of not more than 15% of the total cost (excluding contingency allowance) may be provided to cover initial mobilization costs upon submission of an acceptable Bank guarantee through the corresponding local Bank if not issued by the local Bank. The advance payment shall be recouped by deductions from the Consultant's deliverables invoices in the same currencies in which the advance was made.

9.1.2. Payment certificates

Payment invoices will be subjected to 5% retention to a maximum of 10% of the contract sum which will be released after the Consultant has furnished the final design report and submission of procurement documents as required.

10. CLIENT'S INPUT AND COUNTERPART PERSONNEL

10.1. Services and Facilities to be provided by the Client

a. The Client shall provide the Consultant with copies of the data and reports as available and considered relevant to the execution of the Consultant's services.

b. The Client shall facilitate liaison with other institutions in order to introduce the Consultant to them. The Consultant shall be fully responsible for collection of data and information from the agencies and shall be responsible for the accuracy and any costs thereof.

10.2. Counterpart Staff Personnel

The Client will assign up to 2 counterpart staff relevant to the assignment during the execution of the services to work with the Consultant in all aspects of the study as a way of knowledge transfer. The Consultant will only provide a shared/office space and transport for counterpart staff and their other costs and remunerations will be provided to them directly by the Client.

ANNEX 1

The new loading specification will have axle-load spacing as shown in Figure 1.

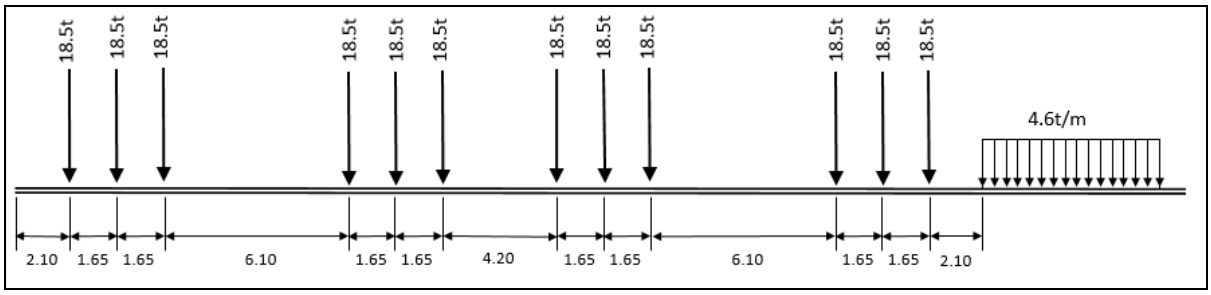

Figure 1: Container Block Train witz 18.5t/Axle Loading

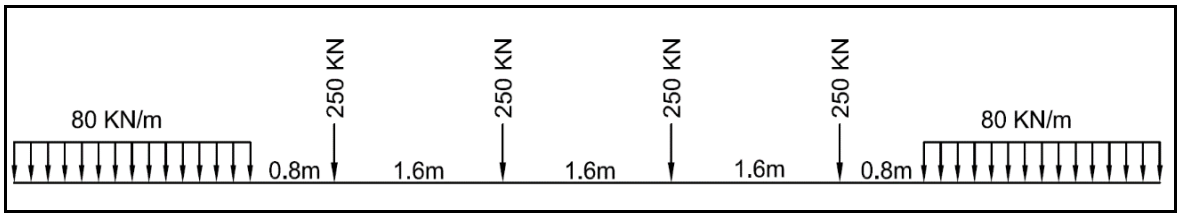

Figure 2: 25t/Axle Loading for Replacement Spans

ANNEX 2