



Ministry of Construction,
Transport and Infrastructure



The Serbia Railway Sector Modernization (SRSM) Project Phase 1 of the Multi-Phase Programmatic Approach

TERMS OF REFERENCE

**for Technical Design Review and Supervision of installation for 4
measurement stations**

February 2023

Abbreviation	Meaning
ADF	Agence Francaise de Développement
CBA	Cost-benefit analysis
EIA	Environmental Impact Assessment Study
GIIP	Good International Industry Practice
FIDIC	International Federation of Consulting Engineers
IBRD	International Bank for Reconstruction and Development
IZS	Serbian Railways Infrastructure
MoCTI	Ministry of Construction, Transport, and Infrastructure
PIU	Project Implementation Unit
PIT	Project Implementation Teams
PD	Preliminary Design
Project	Serbia Railway Sector Modernization (SRSM) Project
RAP	Resettlement Action Plan
RAMS	Reliability, availability, maintainability and safety
TA	Technical Assistance
TEN-T	Trans-European Networks - Transport
ToR	Terms of Reference
WB	World Bank
WB ESIA	World Bank Environmental and Social Impact Assessment
WB EHSG	World Bank Environmental, Health, and Safety Guidelines
WB ESMF	World Bank Environmental and Social Management Framework
WB ESF	World Bank Environmental and Social Framework
WB LMP	World Bank Labour Management Procedure
WB OHS	World Bank Occupational Health and Safety

1. Background information

1.1 Beneficiary country: Republic of Serbia

Client: Ministry of Construction, Transport, and Infrastructure of Republic of Serbia (MoCTI).

Final Beneficiary: Infrastruktura železnica Srbije (Serbian Railway Infrastructure - IZS).

1.2 Project Information

The World Bank launched the Multiphase Programmatic Approach (MPA) to support the Government of Serbia in the continuation of institutional, physical and operational modernization of the railway sector in an integrated manner through providing financial support to Serbia Railway Sector Modernization Project as part of the MPA to be implemented in three overlapping phases over the ten-year period.

To finance Serbia Railway Sector Modernization Project, Phase 1 of the MPA (the Project), the International Bank for Reconstruction and Development (IBRD), as part of the World Bank Group, and the Agence Francaise de Développement (AFD), jointly, granted to the Republic of Serbia EUR 102 million loan to support enhancing the efficiency and safety of existing railway assets and improving governance and institutional capacity of the railway sector. The Project includes the following Components:

- Component 1: Infrastructure Investments and Asset Management. This component focuses on improving the quality and safety of railway infrastructure and enhancing rail asset management practices. This ToRs is part of the Sub-Component 1.1 Reliable and Safe Railway Infrastructure
- Component 2: Institutional Strengthening and Project Management. This component focuses on strengthening rail policies and institutions to deepen and sustain recent reforms.
- Component 3: Railway Modernization Enablers. This component will finance measures to protect the vulnerable and poor and strengthen sectoral enablers for sustainable business growth and job creation.

The Project is managed by the MCTI through the Project Implementation Unit (PIU) supplemented by the Project Implementation Teams (PITs) in Railway Directorate (RD) and in railway companies, respectively IZS, SV and SC. PITs act as subordinate implementing agencies and provide technical support for specific Project subcomponents or activities of the MPA that pertain to their area of expertise. The Central Fiduciary Unit (CFU) in the Ministry of Finance provides procurement and financial services for the project. Primary responsibility for Project execution lies on PIU, which will ensure that the Project development objectives are met.

1.3 General Railways Sector Information

The position of Serbia in the European railway network is such that it forms part of the shortest traffic line between West and South-East Europe and as such is often referred to as a gateway of Europe. The length of the railway lines in the Republic of Serbia is 3 736 km, of which 3 441 km are single-track and 295 km of double-track railway lines, of which 1,546 km are electrified.

The Core Network extends for 1,414 km and it encompasses Corridor X (with branches Xb and Xc -770 km), Route 4 (421 km), Route 10 (84.5 km) and Route 11 (138 km). Except for one section on the Corridor Xc (Nis - Dimitrovgrad), Corridor X is electrified with 108 km of double track sections and 219 km of single track sections. As for Route 4, connecting RoS with Montenegro and Romania, approximately 157 km is in very good and good condition, major part of route 4,212km is in medium condition, single track, electrified except for the section Pančevo - Vršac with diesel traction. Largest part of Route 10 traversing RoS is in good condition, and Route 11 section from Požega to Kraljevo is in very good condition.

Infrastructure modernization is essential to address various cross-cutting performance issues like safety, resilience, inclusion, and digitalization. Decades of low and non-strategic investments, outdated management structures and practices, and neglect of maintenance have led to serious deterioration of the network infrastructure, obsolescence of the rolling stock, and low service quality.

Even though the railways are considered as one of the safest form of transport, it is not possible to avoid unfortunate events, sometimes very serious and with great material damage. Many railway accidents, especially those in freight traffic, can be attributed to faulty axle bearings and brakes. To prevent such events, devices (“measurement stations”) that measure the temperature of the axle bearings, brake discs and wheel rims are placed in certain places on the railway network along the rail lines.

Currently, measurement stations are not installed on the railway network of RoS. Monitoring of state of axle bearings, brake discs and wheel rims is done manually by the personnel of the railway transport companies that perform freight and passenger traffic in RoS. The Internal Rulebooks No. 253 Rulebook defines the procedures for manual monitoring for carriage inspectors (together with Rulebooks No. 252 and 254) and 256 Rulebook on handling and inspecting of electrical devices of passenger carriages.

To increase safety and modernize its operations, IZS plans to develop a diagnostic system on the lines for monitoring railway vehicles during operation. Deployment of the measurement stations will enable constant monitoring of the superstructure's vehicle status and load parameters, ensure a constant level of quality and provide legally reliable proof of the measured values.

It is estimated that covering the entire railway network of IZS requires the installation of 24 measurement stations on the following railway lines:

- Beograd- Novi Sad – Subotica- State border: 4 measurement stations;
- Beograd – Ruma – Šid- State border: 4 measurement stations;
- Beograd – Mladenovac – Niš: 5 measurement stations;
- Jajinci-Mala Krsna-Velika Plana: 2 measurement stations;
- Niš-Preševo- State border: 2 measurement stations;
- Niš – Dimitrovgrad -State border: 2 measurement stations;
- Resnik – Užice – Vrbnica -State border: 3 measurement stations;
- Ruma - Brasina-State border: 1 measurement station and
- Pančevo – Vršac: 1 measurement station.

Within this Project, it will be procured and installed approximately 4 measurement stations located at strategic points in the network to prevent accidents/derailments and thus increase the safety of railway operation and decrease wear and tear of railway tracks.

Table 1. List of locations for installation of measurement stations

No.	Railway line	No. of tracks	Station vicinity
1	Beograd Centar – Stara Pazova – Šid – državna granica – (Tovarnik);	2	Šid
2	Beograd Centar – Rasputnica „G” – Rakovica – Mladenovac – Lapovo – Niš – Preševo – državna granica – (Tabanovce)	1	Preševo
3	Niš – Dimitrovgrad – državna granica – (Dragoman)	1	Dimitrovgrad
4	Subotica – Horgoš – državna granica – (Röszke)	1	Horgoš

The Consultant will be assigned to perform a technical design review of Preliminary Design(s) prepared by the Contractor to be selected for the design, supply and installation of the measurement station and review and give consent on Performing Designs¹ and supervision of activities on supply, installation and commissioning of measurement stations in line with relevant national regulations and engineering practices.

1.4 Measurement stations

Measuring stations planned for procurement will have a modular design and the ability to connect several types of measuring and diagnostic modules within the same central managing unit (hot box and hot wheel, dynamic scale, gauge (dimensions) measurement, suspended load detection, train/vehicle recognition, interface with train auto-stop device).

Modules for "hot wheel" and "hot box" will include devices that measure the temperature of the axle set, wheel, axles and brake discs. Devices will recognize when it comes to detecting overheated wheels due to blocked brakes at the same wheel the devices will measure, i.e. to monitor the temperature of axle bearings and brakes without contact with the measured elements. Module for the rolling stock detection should use wheel sensors with 2 detection channels that are fully functionally independent and galvanically isolated. Due to compatibility with existing traction vehicles that operate on infrastructure, the solution will be harmonized with the CCS TSI, Index 77 - frequency management with technical parameters of train detection system - Part 2: Axle counters of SRPS EN 50617- 2.

Devices will be integrated into the central managing unit, which will be deployed in standard containers for the accommodation of technical devices and systems that can meet the condition of optimal temperature necessary for the operation of electronic measuring devices which will be supplied with the necessary electrical installations of strong and weak current. The software must be installed on the computer for evaluation and data management, and it should perform the functions of evaluation, management and diagnostics of the entire system.

¹ Performing Design (srb. Projekat za izvođenje) - contains detailed technical solutions elaborating the details and technical solutions within the boundaries of the construction area, specified by the construction permit design. Performing Design can be drafted in phases, i.e. by segments, in line with the schedule of construction, i.e. execution of works.

2. Objective, purpose and expected results

2.1 Definitions

The term “**measurement stations**” refers to the Wayside monitoring measurement station system to be supplied and installed on the Serbian railway network in locations defined in Table 1.

The term “**Works Contract**” refers to the contract for design, supply, civil and electro works, installation and commissioning of the equipment for measurement stations to be signed with a selected contractor. The Contractor shall be engaged in accordance with WB Plant Design, Supply and Installation procurement method.

The “**Contractor**” refers to the firm/joint-venture to be selected for undertaking the Works Contract.

The “**Approval of work**” refers to the decision on approval of works that is passed to approve the execution of works defined in Article 145 of the Law on Planning and Construction. Approval of Works is issued based on the Preliminary design that presents the planned works, which must comply with the previously issued location conditions

The “**Consultant**” refers to the consulting firm/joint-venture selected through the present procurement process to undertake the Services.

The “**Project Manager**” refers to the person appointed by the Consultant to perform duties delegated by the Client within Works Contract.

The “**Services**” are described in Section 3.

2.2 Objectives of the Services

- Technical design review of the Preliminary Designs, which will be prepared by the Contractor to be selected and,
- Supervision services of supply and installations for 4 measurement stations.

3. Scope of the work

All the activities to be executed by the Consultant are divided into 2 phases as follow:

3.1 Phase 1 – Design Review Phase

Includes activities relevant to a technical review of Preliminary Design(s). Designs will be prepared in accordance with Article 145 of Law on Planning and Construction ("Official Gazette of RS", No. 72/221A9, 81/221A9 - corrigendum, 64/2010 - US decision, 24/2011, 121/2012, 42/2013 - US decision, 50/2013 - US decision, 98/2013 - US decision, 132/2014, 145/2014, 83/2018, 31/2019, 37/2019 - other law, 9/2020 and 52/2021). The Consultant will be obliged to review it in accordance with the Rulebook on the content, manner and procedure of preparation and manner of control of technical documentation according to the class and purpose of the object ("Official Gazette of RS", No. 73/2019).

Activity 1: Inception period

Following the Kick-off Meeting to be held with the MoCTI/PIU representative(s) and IZS/PIT, the Consultant's first task shall be to visit sites where measurement stations are going to be installed, to be familiar with the specific area, to meet with the relevant stakeholders and to gather the necessary data. Gathered information, data and collected documents shall be included in the Inception Report, with a detailed description and assessment of the current situation.

The Consultant shall propose the outline of the Inception Report. The Inception Report shall be the specific output of the Inception Period and present an overall approach and detailed program work plan and completion schedule for the services. It should discuss constraints and challenges identified by the Consultant and ways to address them to timely and effectively deliver the assignment.

Within the Inception period, the Consultant will appoint a qualified person for the Project Manager role who will perform all delegated duties by the Works Contract.

Activity 2: Technical Design Review

Technical design review of the Preliminary Design(s) shall be conducted in all respects in accordance with the Law on Planning and Construction ("Official Gazette of RS", No. 72/221A9, 81/221A9 - corrigendum, 64/2010 - US decision, 24/2011, 121/2012, 42/2013 - US decision, 50/2013 - US decision, 98/2013 - US decision, 132/2014, 145/2014, 83/2018, 31/2019, 37/2019 - other law, 9/2020 and 52/2021) and accordance with Rulebook on the content, manner and procedure of preparation and manner of control of technical documentation according to the class and purpose of the object ("Official Gazette of RS", No. 73/2019);

The Consultant shall undertake to apply legal and other regulations, technical norms and standards that regulate the subject services during the technical design review of the Preliminary Design, as well as to perform the service in accordance with good engineering practices.

3.2 Phase 2 - Supervision and Works Contract Administration

The Consultant shall provide full supervisory services during supply, and installation works in accordance with the Contract for Design, Supply and Installation

For this purpose, the Consultant shall set up an adequate organization, including monitoring systems, to meet requirements for efficient supervision and administration. In the performance of duties, the Consultant shall ensure that the Contractor brings the supply and installation works to completion within the approved time, quality and budget in accordance with the requirements of the Works Contract. The Consultant shall provide services to the IZS and MoCTI/PIU concerning the scope of this Contract and shall establish, with the consent of the MoCTI/PIU, the implementation program for the facilities and be generally responsible for the coordination and administration of all Works Contract's issues.

The Consultant shall be required to establish and follow detailed supervision procedures based on sound international practice to monitor the completion of the works contract within the agreed program, budget, quality standards and environmental provisions stipulated in the works contract.

Wherever appropriate and not in conflict with the Works Contract, the Consultant shall exercise every reasonable care to protect the interests of the IZS and MoCTI/PIU.

The Consultant will comply his activities with the provisions of both the Law on Planning and Construction (Official Gazette of RS No. 72/221A9, 81/221A9 - corrigendum, 64/2010 - decision US, 24/2011, 121/2012, 42/2013 - decision US 50/2013 - decision US, 98/2013-US, 132/2014, 145 / 2014, 83/2018, 31/2019, 37/2019, 9/2020 and 52/2021) and the Rulebook on the content and method of conducting the site supervision ("Official Gazette of RS", No. 22/2015 and 24/2017) as well as with provisions of the WB Conditions of Contract Plant, Design, Supply and Installation. Taking into that into account, the Consultant should have a license indicating the eligibility to act as a Supervisor in RoS for civil, electro and mechanical works.

Generally, the scope of services shall include, but should not be limited to, the following:

- Supervision of all activities of the Contractor in all aspects of fulfilment of its obligations, responsibilities and actions taken in relation to the performance of contractual obligations and timely completion of the contract;
- Issuing of Commencement Order for works;
- Daily supervision of works with checking the performance of works according to technical documentation, specifications and applicable standards. The control includes monitoring the Contractor's activities on and off the construction site, as well as works environmental impacts which may happen under contractor's activities. Also, the obligations include supervision of the applicability of contractor's equipment for performance of works, safety of works, property, personnel and third parties;
- Supervision and control of the Contractor regarding the implementation of environmental protection measures, occupational, health and safety measures, as well as ensuring compliance with recommendations and requirements of traffic safety during the contract implementation;
- Supervision and control of application of WB environmental and social standards during execution of works;
- Supervision and control of implementation of environmental protection measures in accordance with the requirements defined by the Preliminary Design and the Performing design;
- Preparation of all documents, especially technical and financial documents, relevant for the execution of this contract or decision-making, for the needs of the PIU/MoCTI and IZS;
- Preparation and provision of necessary evidence, analysis and testimonies that represent the interests of PIU/MoCTI and IZS in all disputes that may arise during the term of the Works Contract;
- Pre-approval of the interim payment application and sending it for final approval;
- Supervision of equipment and devices received;
- Attend and supervise equipment and facility handover and working with the final handover committee;
- And other duties delegated to the Consultant in Works Contract.

The Consultant shall obtain the specific approval of the MoCTI in the performance of his duties before taking the following actions:

- 1) Agreeing or determining any matter, which will change the Contract Price of the works contract;
- 2) Giving consent to a Sub-contractor for which a different sub-contractor is named in the works contract;
- 3) Agreeing or determining a time extension for the works contract;

- 4) Instructing an Administrative Order which is expected to change the Contract Price for the Works Contract or in any change in the scope, character or quality of the works. No Administrative Order shall be given by the Consultant without the consent of the MoCTI regardless of whether it will change the price or not (including the change of materials and design);
- 5) Issuing an Administrative Order for the use of the provisional sums/contingencies/day works;
- 6) Issuing a Suspension Order.

Within this phase of the Contract, the Consultant shall be responsible for:

Activity 1: Pre-construction services

These activities will initiate with the award of works contract and ceases with the commencement of the implementation. Most of the pre-construction activities (reviews, time and activity planning etc.) will be performed in the main office in Belgrade.

a) Supervision of Performing designs preparation

The Contractor may subdivide the Performing design of the structure into design packages in accordance with the type and schedule of works. Every design package or whole Performing design will be submitted in advance to the Consultant for acceptance. The design packages must relate to the significant and clearly identifiable parts of the Preliminary Designs and shall address the design requirements as described herein. The design packages shall facilitate the review and understanding of the Preliminary Designs as a whole and shall be produced and submitted in an orderly, sequential and progressive manner. During the Supervision of preparation of Performing designs, the Consultant shall carry out the following but not limited to:

- Monitoring the preparation and control of compliance of the Performing design with the Approval of Works, the Preliminary Designs and with all relevant laws, standards, regulations and other documents that define the content and scope of the project;
- Control that all parts of the designs are mutually harmonized and whether designs solutions can be implemented on the site;
- Control whether the project specifies technical measures for environmental protection and prevention of harmful effects on land and facilities in the environment during the implementation of the projected works and later during the exploitation phase;
- Control of the characteristics of the materials proposed within the projects from the aspect of justification and adequacy;
- Control definitions of the technical conditions for the execution of works for each item, specific descriptions of the quality control methods of applied materials and work performed, which clearly and precisely must present the tests to be performed and the criteria to be met;
- Consent on Performing designs in writing and inform the Contractor.

b) Other Pre-construction activities

Within this, the Consultant shall:

- Ensure that all Consultant's Representatives on the sites are prepared to act with a common approach and performing the activities in the same manner and in accordance with the rules and procedures of the Project;

- Prepare detailed time and activity schedule (supervision plan), for easy monthly (minimum) updating throughout the duration of the contract and with reference to reporting requirements;
- Mobilize and set-up in the on-site offices at the premises to be provided by the Contractor as indicated in the works contract;
- Confirm the responsibilities and duties of the supervisory staff with the MoCTI, IZS and the contractor;
- Mobilize the supervision staff to the site per works contract signature and demobilize supervision staff per work completion;
- Ensure/check that all activities/formalities and in particular all Supervisor's responsibilities are fulfilled prior to the works are carried out or started up for works contract signed or taken-over, such as insurance of works, detailed Implementation Program, Notice of Commencement Order, approval of contractors representative and other staff, approval of sub-contractors, suppliers (of works contract), supply of documents of contractors, data for setting-out, safety on site, machinery and equipment used in the construction works, approval of means and format of the communication and reporting;
- Hold kick-off meeting with the IZS, PIU and the contractor and keep the minutes of the meeting;
- Agree to regular site meetings, weekly, monthly meeting formats and attendance,
- Agree on timing and commencement of the works;
- Supervise implementation of environmental, occupational, health and safety (OHS) and community safety related activities as outlined in the ESMF of the Project and further defined in the Environmental and Social Management Plan (ESMP), required by the WB Safeguards Policies and the relevant national regulation.

Activity 2: Services during construction

The Consultant shall provide full supervision services during construction of the works on behalf of the IZS and PIU/MoCTI.

This phase will commence at the Commencement Date of the work contract and will continue until the temporary acceptance and issuing of taking-over certificate.

The Consultant's services will include but not be limited to:

- Overall day-to-day supervision, including, but not limited to, management and planning, cost and quality control, reporting and monitoring physical and financial progress of the works contract(s) and related activities;
- Organization of the bi-weekly site meetings, and ad hoc site meetings, whenever necessary, with the contractor(s) and other related parties (IZS, PIU/MoCTI, Municipalities, etc.), if any, to monitor the progress of works to ensure sound and timely completion of the works in the desired quality;
- Carry out quantity surveys to verify the progress of the works;
- Checking and approving of the quality of executed works, quality of built-in materials and installed equipment, all test runs of completed works along with the tests proving the achievement of guaranteed parameters set out in the works contract(s) and all related activities taken by the contractor(s), checking quality certificates, approvals, statement of compliance, certificates, guarantees etc.;
- Prepare post-contract documentation, checking the contractor's invoice(es), that amounts claimed have actually incurred in accordance with the requirements of the

works contract(s), issuing the certificates of payment, variation orders, take-over certificates, payment certificates, performance certificates etc.;

- Follow-up on cash flows and monthly progress time schedules;
- Control the contractor's hand-over of completed works, review and approve the as-built drawings and Operation and Maintenance Manuals prepared by the contractor(s) post-construction activities;
- Review and approve the testing plans, performance test and commissioning plans in accordance with the conditions of the works contract(s);
- Carry out the take-over inspections;
- Control the trial operating periods, performance tests and the handing-over of the works to the IZS/MoCTI;
- Settlement of disputes amicably;
- Prepare and submit Progress Reports (weekly, monthly) which includes progress reporting, photos, physical and financial progress schedules, minutes of meetings related to the reporting period;
- Supervise implementation of environmental, OHS and community safety related activities as outlined in the ESMF of the Project and further defined in the ESMP, required by the WB Safeguards Policies and the relevant national regulation.

More precisely, supervision for installation works of measurement stations will further cover all aspects related to railway traffic, mechanical, civil and electrical works in accordance with all design elements, as well as all obligations defined in the Rulebook on the content and method of conducting the site supervision ("Official Gazette of RS", No. 22/2015 and 24/2017).

Activity 3: Equipment control and testing services

The Consultant's services will include but not be limited to:

- Monitoring and ensuring timely purchase and delivery of the equipment at the specific installation site,
- Acceptance of equipment delivered from the plant to the specific installation site,
- Quality control of installations performed,
- Check-up of documents availability,
- Check-up of completeness of equipment in accordance with packing lists,
- Check-up of completeness of spare parts and accessories in accordance with documents,
- Check-up of components, assembly parts and materials,
- Check-up of delivered equipment integrity,
- Compliance of foundation (bottom) for mounting of equipment,
- Control of the quality of installation,
- Visual inspection of assembly and check-up of the whole equipment,
- Applicable testing of the equipment,
- Set out basic principles for the safe and reliable operation of equipment as a reference for the Contractor(s) to prepare his O&M manual,
- Check-up integration of new, installed equipment into existing system,
- Supervise implementation of environmental, OHS and community safety related activities as outlined in the ESMF of the Project, further defined in ESMP of the sub-project, required by the WB Safeguards Policies and the relevant national regulation; Supervision of trainings to be provided by the Contractors.

Activity 4: Handover and commissioning services

The Consultant's Services shall include but not be limited to:

- Carry-out and/or supervise the technical inspections, tests and verifications prior to Works Contract milestones and Client acceptance;
- Carry out the taking-over inspections;
- Control, approve and compile the As-Built documents prepared by the Contractor;
- Providing assistance in the work of the Commission for handover of works; preparation of documentation and participation in the work of the Commission for final settlement;
- Supervision of works on elimination of deficiencies according to the remarks of the Commission for technical inspection of works.

4. Location and timing

4.1 Location

The operational base and main office of the Consultant shall be on territory of Republic of Serbia. Once established, the site offices of the Contractors will provide additional premises for the staff of the Consultant.

4.2 Commencement date and period of implementation

The intended commencement date is **April 2023**, but the actual commencement date will be defined with the signature of the Contract. The contract implementation period will be **10 months** starting from the commencement date. Respectively duration of Phase 1 is estimated to be **1 month** starting from the Commencement Date. The duration of Phase 2 is estimated to be **9 months**.

The Consultant will carry out the services in line with a detailed time schedule to be submitted as part of his proposal, which could be changed during the negotiations in order to reflect the comments and/or requirements by the parties.

5. Consultant requirements

5.1. Personnel

The Consultant shall establish his Team in accordance with the needs and requirements of this ToR. The Team shall consist of a core team of key experts with the qualifications and skills defined in **Error! Reference source not found.**, below and non-key experts, as needed.

The Consultant is obliged to ensure adequate staff in terms of expertise and time allocation, as well as needed equipment, to complete the activities required under the scope of work and to achieve the objectives of this Contract in terms of time, costs, and quality. The Consultant is expected to be flexible in terms of travelling.

All experts shall be independent and free from any conflicts of interest in the responsibilities.

The Consultant shall secure that the construction sites are permanently staffed with the relevant key experts at any time during the construction/installation phase.

Note that staff of the public administration of the beneficiary country (Republic of Serbia) cannot be proposed as experts.

The Project language is English. All the team members assigned by the Consultant must be able to communicate effectively in English. A sufficient number of the Consultant's team should be fluent in the Serbian language, especially the staff assigned to be on site.

The Consultant shall provide adequate administrative staff (secretary, translators, drivers accountant) needed to support the expert team.

5.1.1 Key experts

The team should include key experts with the qualifications and experience listed below, as well as non-key experts, if necessary. As a minimum, the Consultant shall provide the following experts:

Table 2. Key experts for the assignment

Title	Qualifications/Experience	Skills
Team Leader	<u>Education:</u> Have a minimum M. Sc. Degree in Civil, electrotechnical or another relevant engineering discipline. <u>Relevant professional experience:</u> At least 15 years of general experience, of which 7 years in the railway sector in experience in design development/revision and/or construction and/or supervision related to railway infrastructure. Work experience as a responsible designer, supervisor and/or responsible contractor on at least 1 project of modernisation, construction/reconstruction of railway or road infrastructure completed in the last 10 years, which was realised according to the FIDIC or similar model contract of investment value at least 5 million euros.	Excellent command of the English language. Computer literacy. Knowledge of the Serbian language will be an advantage
Phase 1 – Technical Design Review		
Electrotechnical Engineer	<u>Education:</u> Have as a minimum MSc. Degree in Electrotechnical Engineering <u>Relevant professional experience:</u> At least 10 years of general professional experience, of which at least 7 of relevant experience in preparation of technical documentation in the railway sector. Participation in at least 2 projects in the last 7 years for railway infrastructure design for rail remote and/or wayside monitoring, control and command systems. <u>Valid license 353 or 352 (or new licence number equivalent)</u>	Excellent command of the English language. Computer literacy. Knowledge of the Serbian language will be an advantage
Phase 2 - Supervision and Works Contract Administration		
Electrotechnical Engineer	<u>Education:</u> Have as a minimum M. Sc. Degree in Electrotechnical Engineering <u>Relevant professional experience:</u> At least 10 years of general professional experience, of which at least 7 in the rail sector design and/or supervision of deployment/installation of remote	Excellent command of the English language. Computer literacy. Knowledge of the Serbian language will be an advantage

	<p>(SCADA etc.) and wayside monitoring, control and management systems.</p> <p>During the last 7 years, experience as a key expert, responsible designer, supervisor or responsible contractor in at least 1 (one) successfully completed supervision contract related to the installation of wayside monitoring stations or other similar railway devices, systems or equipment.</p> <p><u>Valid license 353 or 352 or 453 (or new licence number equivalent)</u></p>	
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If the key experts proposed for **Phase 1 – Technical Design Review** meet the qualifications and relevant professional experience for **Phase 2 - Supervision and Works Contract Administration**, the Consultant may propose them for performing services for both phases.

5.1.2 Non-key experts

The Consultant is expected to select and hire other experts, including but not limited to geodetic engineers, civil engineers, rail signaling engineers, electrical engineers, mechanical engineers and, architectural engineers, RAMS engineers They must indicate clearly which profile they have so it is clear which fee rate in the budget breakdown will apply. All experts must be independent and free from conflicts of interest in their responsibilities.

The pool of non-key experts is expected to support/complement all the activities of the key experts. Possession of a relevant Serbian license for design/construction would be required, as applicable.

The Consultant is expected to include in their proposals other positions that they consider necessary for the assignment. CVs for non-key experts should be submitted in the proposal. However, they would not be the subject of evaluation.

5.2 Office accommodation

Office accommodation for each expert working on the Contract is to be provided by the Consultant. Once established, the site offices of the Contractors will provide additional premises for the staff of the Consultant on the construction sites.

The Consultant shall ensure that experts are adequately supported and equipped. In particular, it shall ensure sufficient administrative, secretarial and interpreting provision to enable experts to concentrate on their primary responsibilities.

No equipment is to be purchased on behalf of neither Client (MoCTI), PIU or Beneficiaries (IZS) as part of this service contract or transferred to the Client or beneficiaries at the end of this Contract.

6. Outputs

6.1 Outputs requirements

The Consultant shall prepare, as a minimum, the below-listed reports during the period of execution of the Contract.

Table 3. Assignment deliverables

Deliverables	Description	Due date	Format
Phase 1 – Design Review Phase			
Inception Report	Describe the initial findings, progress in collecting data, any difficulties encountered or expected, and the proposed approach, taking into consideration the situation at the starting date of the assignment. It will also set out a detailed work plan for the completion of the activities. If there are any proposed modifications to the original Terms of Reference due to changed circumstances after arrival on the site, these are to be discussed and agreed in principle with the Client and IZS before the submission of the Report (up to 20 pages) Subject to the approval of the PIU/MoCTI	No later than 15 days after the commencement date	Digital and 2 hard copies in English and Serbian language
Technical Design Review Report	Findings, guidelines and recommendations for changes/supplements for reviewed Preliminary designs and conclusions of technical design review. Subject to approval of the PIU/MoCTI	No later than 15 days from receiving the Preliminary Design from the Contractor	Digital and 4 hard copies in Serbian and 1 hard copy in English language
Phase 2 - Supervision and works contract administration			
Supervise Basis Report	The Supervise basis report shall summarise all data accessed and to be used as input to the construction. It shall include a section on the validation of data and lack of data if any.(up to 10 pages) Subject to the approval of the PIU/MoCTI.	No later than 1 month after the commencement of supervision	Digital
Monthly Reports	Description of the level of implementation of the contractor's dynamic plan, possible problems and proposals for their solution, review of adopted works by variations and explained proposal for change/variation, plan for engagement of supervision for the next period, data on inspections, data on incidents during works, and others important events. Monthly reports must also contain an overview of all receivables submitted by the Contractor since the beginning of the implementation of the construction contract. This review should be done in a convenient form that allows consideration of requests, previous activities and key deadlines for resolving requests. The monthly report should also contain photo documentation (up to 20 pages).	Not later than 1 week after the end of month	Digital
Works Contract Completion Report	On completion of works contract, upon issue of the Taking-Over Certificate, within 15 days the Consultant shall submit a Completion Report to the IZS and PIU/MoCTI. The main report must contain: <ul style="list-style-type: none"> – Copies of the Taking-Over Certificate(s) – Verified "as-built" drawings are showing all revisions to the design of the works. – A complete analysis of the complete cost of the works. – An overview of the actual progress of the works detailing reasons for delays and/or extensions of time 	No later than 15 days after issue of Taking-Over Certificate of works contract.	Digital and 4 hard copies in Serbian and 2 hard copies in English language

Deliverables	Description	Due date	Format
	<ul style="list-style-type: none"> – Commissioning report for the various mechanical and electrical components of the works – Details of all permits required for the operation of the works – An overview of site safety procedures, any problems in this regard and recommendations for improvement. – An overview of the Consultant's working practices and resources. – An assessment of the quality of materials and workmanship any problems in this regard and recommendations for improvement. – Details of technical difficulties encountered and how these were overcome. – Details of administrative difficulties encountered and how these were overcome <p>An appraisal of the strengths and weaknesses in the contract documents and in the design of the works (including but not limited to the Special Conditions of works contract, technical specifications, price schedules, design details and drawings) with recommendations on how improvements could be made for future contracts.</p> <p>Subject to the approval of the PIU/MoCTI</p>		

6.2 Submission and approval of outputs

All reports and other outputs, if any, must be written in English and translated into the Serbian language. The draft version of the reports (electronic copy) shall be submitted to PIU for distribution to the MoCTI and IZS. The commenting period for the outputs is 2 weeks. In case of no-reaction to the submitted outputs, such status will be interpreted as “no objection” and shall be deemed approved.

The Consultant shall prepare the Minutes of Meetings (MoM) for the site meetings and monthly progress meetings. All Meetings must be ensured to lead to clear decisions, persons in charge and deadlines. Minutes of Meetings will be distributed by the Consultant. MoM of the site meetings must be commented on within 7 calendar days by participants. MoM for the monthly progress meetings will be always on the agenda of the next monthly meeting to be approved and followed up.

All deliverables will be sent as electronic copies to PIU.

Hard copies will be sent to the following addresses:

- Serbia Railway Sector modernization project – Project Implementation Unit
Uzun Mirkova street No. 3, office 31-36, 11000 Belgrade, Republic of Serbia.

7. Terms of Payment

The Consultant should note that the proposed contract for this assignment will be as follows:

- For Phase 1 – Technical Design Review – Lump Sum payments with milestones against submission of deliverables and,
- For Phase 2 - Supervision and Works Contract administration – Time Based with periodic payments against time actually spent on the services.

8. Conflict of Interest

The engaged Consultant firm must not be involved in any other related activity to this Project.