Republic of Macedonia
National and Regional Roads Rehabilitation Project (P148023)
Public Enterprise for State Roads
Skopje

Terms of Reference

for Consultants Services for Preparation of

Conceptual Design for Rehabilitation of the following State Roads:

1. Regional road R1207, Mlado Nagoricane – Pelince border, L=19 km
2. National road A3e, Delcevo – Zvegor, L=5 km
3. National road A4, Strumica – Novo Selo – MK/BG border, L=20 km
4. Regional road R1106, Jurumleri – Dracevo, L=5 km
5. Regional road R1107, Kavadarci – Rosoman, L=11 km
6. Regional road R1109, Dedeli - Furka – Bogdanci – Gevgelija L=24 km
7. Regional road R1204, Kumanovo – Sveti Nikole, L=25 km
8. Regional road R1209, Tetovo – Popova Sapka, L= 15 km
9. Regional road R1302, Delcevo - Pehcevo, L=15 km
10. Regional road R1304, Berovo - Vinica, L=7 km
11. Regional road R1305, Bitola – Demir Hisar, L=10 km
12. Regional road R2131, Dracevo – Oresani – Taor, L=10 km

Total length for conceptual design study = 250 km << The length should be the length of the conceptual design study for each road, and not the length of the expected rehabilitation works that should to be defined by the conceptual design>>

Skopje, February 2017

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1. BACKGROUND

National and Regional Road Rehabilitation Project (NRRRP) is a project supported through a loan financed by the World Bank. This project implements the National Transport Strategy (NTS) of the Republic of Macedonia. The Project is consistent with the National Transport Strategy (2007-17), which sets out improved road connectivity to the Corridors as the national priority after the completion of Corridors X and VIII. The strategy highlights the important role of roads in promoting the country's competitiveness and harmonious development through ensuring that the national road network is connected efficiently to the corridors and existing bottlenecks are eliminated.
The key indicator would be the reduction of road user costs after the completion of the works. The road user cost reduction is to be measured by comparing road user costs before and after the road works carried out under the Program.
This Project represents the implementation of the last phase of NRRRP for the period 2017-2018 and covers the following:

- improvement of condition on state road network by means of studying approximate 250 km of the existing roads, on which around 166 km are expected to require rehabilitation works;
- increase of road safety condition through appliance of measures for improvement of road safety in all phases of the Project implementation;

The institution in charge for the Project implementation is the Public Enterprise for State Roads (PESR). Within the PESR there is a Project Implementation Unit (PIU) responsible for implementation of all necessary activities and actions for successful management and completion of the Project.

Besides implementation of Works on rehabilitation of roads, the Project will include activities, procedures and processes that advance contracting the Works. It is envisaged that the rehabilitation of these roads will be under a Design – Build and Take-Over contract for which a key step is the provision of conceptual engineering designs for that would be completed in compliance with modern principles of safe road designing. The majority of the conceptual engineering design will be focused on the pavement rehabilitation design, considering that the project roads require no widening or other road improvements that would require.

Procedure for provision of conceptual detailed design for rehabilitation works (periodic maintenance, strengthening and reconstruction works) covers the activities given on the table below. Under this contract, the responsible entity for each activity will be either PESR, or the Design Consultant.

No	Activity	Responsibility	Purpose
1	Road diagnostic measurements (FWD deflections and roughness measurements)	PESR	Pavement structure design, conceptual design BoQ preparation
2	Pavement diagnostic works (core samples from existing pavement)	Consultant	Pavement structure design, conceptual design BoQ preparation
3	Road diagnostic assessment	Consultant	Conceptual design BoQ preparation

No	Activity	Responsibility	Purpose
	(inventory, drainage and surface distress assessment)		
4	Traffic counts and projections	PESR and Consultant	Conceptual design BoQ preparation. PESR will provide available traffic counts to be validated and updated by Consultant
5	Pavement design of rehabilitation alternatives	Consultant	Compare pavement design rehabilitation alternatives and select best evaluated rehabilitation alternative for conceptual design
6	Cost-Benefit Analysis of rehabilitation alternatives	PESR	Economic indicators computed using the HDM-4 model
7	Design of other road elements	Consultant	Design and cost other road elements required by the project road (e.g. shoulders, line making and signs, drainage works)
8	Preparation of conceptual design Bill of Quantities and total cost estimate for best evaluated rehabilitation alternative and technical specifications	Consultant	Contribute to the preparation of the bidding documents for design and construction works
9	Definition of levels of service to be fulfilled by the contractor (e.g. maximum roughness and deflections and minimum asphalt concrete layer thickness)	Consultant	Contribute to the preparation of the bidding documents for design and construction works
10	Preparation of bidding documents for works	PESR	Bidding documents for design and construction works
11	Road Safety Audits	Consultant, Road Safety Auditor, PESR	Comply with road safety audits to be done by Road Safety Auditor/PESR
12	Environmental and Social Impact assessment for road rehabilitation	Consultant	Comply with law provisions

The following state roads will be studied on the conceptual design:

1. Regional road R1207, Mlado Nagoricane – Pelince border, L=19 km

2. National road A3e, Delcevo – Zvegor, L=5 km
3. National road A4, Strumica – Novo Selo – MK/BG border, L=20 km
4. Regional road R1106, Jurumleri – Dracevo, L=5 km
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2. OBJECTIVE

The objective of this commission is to assist PESR with the implementation of the Design-and-Build (D & B) civil works contracts. The Consultants shall undertake a full assessment of the roads conditions, undertake a pavement design options analysis to determine the preferred rehabilitation option, do a conceptual design and cost estimate and, finally, support the finalization of the required bidding documents by PESR for the rehabilitation works preparing the design and construction specifications and the required levels of service to be achieved by the designs and the rehabilitation works.

The Consultant shall prepare conceptual designs for road rehabilitation of approximately 166 km of National and Republican roads to be selected among the 250 km of the existing roads that are part of this conceptual design contract, which would ensure: an increase of usability and durability of the project roads, improvement of traffic safety and road user's comfort, incorporation of requirements of local community (social aspect), proper economic justification, and compliance of requirements for environmental protection. To the greatest possible extent the designs will be done under conditions of spatial limitations (context of the section) and limitations that result from the type of allowed construction and traffic interventions (legal grounds). The identified and recommended rehabilitation will be implemented as separate "design-and build" contracts.

3. SCOPE OF SERVICES

3.1 GENERAL REQUIREMENTS

The duration of the assignment is 60 days from the date of commencement of services. The assignment is estimated to commence at April, 2017. While preparing technical documents, the Consultant shall:

- comply with valid Macedonian laws, regulations and quality norms in relation to roads infrastructure;
- review the surface distress, roughness and structural bearing capacity and necessary completeness of the road through the rehabilitation design in order to extend the pavement service life;
- perform all necessary surveys, investigation work and laboratory testing needed;
- propose alternatives for cost effective rehabilitation options, including modern technological options;

- consider repair works or new works on the structures (culverts, drainage systems, retaining walls, small bridges, etc.) and road furniture elements as well as road markings and shoulders;
- identify all existing and planned utilities affected by the designed works and commission designs if any;
- in populated areas, consider interests and minimum requirements of local residents, such as drains, sidewalks, bus stops, speed reduction measures and other necessary arrangements which will help to improve traffic and pedestrian safety;
- include on the conceptual design documentation basic illustrative drawings, BoQ, cost estimates, and technical specifications;
- define level of service to be achieved by the contractor for the design and once the rehabilitation works are completed; and
- While it is not expected for these project roads, identify, through a screening exercise, potential land acquisition and other resettlement activities, if required. The Consultant will also take into account the Environmental and Social Assessment (ESIA).

3.2 PROJECT ROADS CHARACTERISTICS

Location

The Consultant shall locate all project roads in Google Earth and provide to the client the resulting Google Earth file(s). The Consultant shall make a video of the entire length of each project road to be given to the client. The video preferable shall be embedded with georeferenced information.

Planned Period

Traffic load needed for a road designing process refers to a certain period of road durability planned for the future, so the planning period (design life) has been defined to be 10 years.

Traffic Analyses

Information on traffic loads is published in the "Traffic Counting on the National Road Network of the Republic of Macedonia for 2015, 2014, 2013, 2012, 2011" by the PESR, which will be used for reference and validation purposes. For needs of traffic analyses, the current average annual daily traffic for each project road shall be determined by the Consultant and projections of traffic loading for the planned period shall be prepared.

The Consultant shall undertake traffic counts on all project roads if needed. These shall include one traffic count of at least three consecutive days with one day's count being a 24-hour count and the other two being 18-hour counts. These counts should be used with the available traffic data to determine current AADT-volumes for the project roads. Traffic count will differentiate traffic between the different vehicle types monitored by PESR.

Unless a substantiated alternative proposal by the Consultant is approved by PESR, normal traffic growth rates within the planned period shall be accepted based on the study "Cost Benefit Analysis for part of road network in Macedonia" (December 2014). For the period of projection, a moderate scenario for traffic growth shall be adopted (Table 2).

Table 2: Forecast of traffic growth 2015-2025 for Program Analyses

Scenario	Traffic Growth Rates in %			
	2015 - 2020	2021 - 2025	2015 - 2020	2021 - 2025
	Passenger Traffic		Fright Traffic	
Optimistic	4.2	7.2	3.5	6.0
Moderate	**3.6**	**4.8**	**3.0**	**4.0**
Pessimistic	3.0	3.6	2.5	3.0

The Consultant shall estimate the generated traffic that will occur due to the project road works based on expected reduction in travel times and road user costs with the project. For that purpose, the Consultant shall measure the current travel times on the project roads and estimate the travel times with the project.

If diverted traffic to a project road from an alternative road is expected to occur, the Consultant shall estimate the diverted traffic and characterize the alternative road in terms of length and condition. Based on the above analyses, the Consultant shall provide detailed annual traffic forecasts during the planned period, with and without the project, for each project road.

Maximum allowed axle loading relevant for pavement dimensioning should be adopted in accordance with the relevant legislation.

Road Condition Analyses

Bearing capacity of the existing pavement shall be determined based on measurement of deflections. All relevant deflection data will be provided by the PESR. Deflection measurement shall be done by PESR by a falling weight device (FWD) at distances not greater than 100m for every traffic lane, including correction of deflection in regard to temperature and normalization of deflection according to the load.

PESR shall provide Consultant with measurement of pavement roughness by appropriate measuring device expressed through the International Roughness Index IRI (m/km) at maximum of 100 m of distance. Measurements of transversal deformation on stretches where rutting was noted or where deformation of cross-section is clearly visible shall be done by the Consultant. Measurement shall be conducted by appropriate measuring device or by a 1.2m long rod and spud, in accordance with AASHTO Guidelines for rutting measurement or by a profilograph.

The Consultant is responsible for the assessment of pavement distress characteristics of the pavement surface (cracking, potholes, raveling, etc.) to be based on a visual survey of condition of the pavement surface according to damage catalogue. The Consultant shall extract core samples from the existing pavements to assess their layers composition, thicknesses, materials and strength.

Based on the measured deflections, roughness and functional characteristic of pavement structure, the Consultant shall defined the homogenous sections in need of rehabilitation works. These sections in need of rehabilitation works will be part of the design and build bidding documents. The Consultant shall determine a type, degree, quantity and cause of damage for the sections in need of rehabilitation works and prepare a graphical presentation on a layout in appropriate scale.

Regarding drainage, a functional condition of shoulders, gutters, ditches and curbs, drain flumes, culverts and other elements of drainage system shall be determined. A condition assessment implies collection of condition indicators through visual inspection and assessment of every element of draining system according to the OECD Methodology from 1990. Special attention shall be paid to the following:

- Terrain topography (side cut/embankment);
- Pavement and shoulders gradient;
- Geometry and condition of ditches and drain flumes;
- Effectiveness of drainage system.

All structural damages shall be noted for drainage elements. It is also necessary to assess type and degree of impact of the existing condition of drainage system on presence of pavement structural and surface damages.

Based on the condition assessment, solutions for drainage improvement shall be proposed for the road sections in need of rehabilitation works. It is also necessary to determine whether it is needed to have new culverts constructed in the road base of embankment of access roads, if they have a negative impact on draining along the road.

Bridges, Other Structures

If there are small structures (bridges, retaining walls, etc) on the project roads, they should be evaluated by the Consultant to determine their adequacy and structural integrity and show the condition of the each component. The Consultant shall prepare a separate conceptual design (separate BoQ, cost estimate and specifications) for each structure as well as any structure requiring replacement following the review.

Sufficient information shall be obtained by the Consultant based upon the guidelines provided by the Client and supplemented by other relevant sources of information, to justify, recommendations on the required rehabilitation needs of each structure. The Consultant shall prepare the BoQ for the required rehabilitation works for each bridge and other structure.

Ancillary Works

The need for junctions, bus lay-bys, fencing, guard-rails, slope protection works, road signs and road marking will be identified and designed to an appropriate level for incorporation in the bid documentation.

Investigation of Alignment and Road Width

The intention of the planned interventions is to improve the road conditions of existing roads without requiring lane addition, partial widening or realignment of the roads to avoid land acquisition and impacts on houses/buildings. Therefore, the alignment and width of the existing roads is not expected to be changed. However the Consultant shall bring to the notice of the Client for discussion if there will be a need to change any part of the existing alignment or widen a project road.

Village and Residential Sections

In village and residential sections: (i) particular attention should be paid to the drainage design to ensure that water is channeled into existing drainage systems and away from houses and gardens; (ii) economic impact of paving all shoulders within villages should be

assessed to prevent excessive wear on the shoulder and reduce the possibility of edge breaks, and allow for some off-carriageway parking space; (iii) sidewalks should be provided on sections with heavy pedestrian traffic; (iv) the need of reallocation of utility lines should be investigated; (v) the rehabilitation of short access roads to schools, medical centers and main government building located along the road should be considered; and (vi) designs should consider positive benefits of additional road safety improvement measures such as crosswalks and speed reduction measures near schools and other critical locations from a road safety perspective.

Road Safety Audit of both Conceptual and Final Design

The Consultant should note that a Road Safety Auditor and the Road Safety Unit (RSU) of PESR will review the adequacy of both the conceptual and detailed designs for road safety and traffic calming measures. The RSU will also review other aspects of the rehabilitation designs and in particular the junction layouts and geometric elements of the roads. The comments and recommendations of the RSU shall be incorporated in the final conceptual design.

The recommendations of the RSU should also be included in the Bidding Documents as guidance to the Contractor in preparing the final design and should, in addition, note that the Contractor's final design shall be subjected to the same traffic safety audit as part of the design review. The Contractor shall take full account of the findings of such audit and make all necessary modifications to the design.

3.3 ENVIRONMENTAL IMPACT ASSESMENT

For the purpose of this project, the Consultant shall be obliged to prepare an Environmental Impact Assessment (EIA). During preparation of technical documents, the consultant shall completely comply with provisions of the laws, with particular reference to the environmental protection measures and monitoring program.

The Consultant shall submit the completed EIA to the Client for consent, both in soft and hard copy format. In case that either the Client or financing institution discover deficiencies of the EIA, the Consultant shall be obliged to correct the said EIA and amend it, if necessary, in accordance with the remarks.

Based on the data collected during a tender preparation phase (field surveys, conditions of relevant institutions), a consultant shall also state other measures for environmental protection and define an appropriate monitoring program.
The rehabilitation of the project roads is not expected to lead to land acquisition.

3.4 SOCIAL SAFEGUARD REQUIREMENTS

Given the project context and requirements for improvement of local community position, a consultant's task shall be to take into regard all road elements and contents along the road that may be of influence on life quality of local community and to benefit the improvement of that quality by his/her design solution within limits of the allowed and possible.

Under this part of the Services, the Consultant shall take into regard the following:

- intensity and flow of pedestrian movement with the analysis of needs and possibilities for constructing footpaths, fencing, footbridges, etc;
- necessity for crosswalks and related speed reduction measures and signs;
- necessity for construction of bike paths;

- necessity for regulation of parking surfaces, i.e. accesses to certain commercial facilities;
- necessity for arrangement, i.e. construction or rehabilitation of bus stops;
- necessity for relocation of installations, i.e. construction of lighting on certain parts of the section;
- necessity for arrangement of public surfaces located along the road reserve;
- necessity for arrangement of accesses to arable land properties with analyses for construction of accesses to the road;
- necessity for the relocation or construction of utilities lines;
- necessity for improvements to accesses to schools, hospitals, fire stations etc;
- all other details which based on the Consultant's opinion may be of use for local community;

4. PAVEMENT DESIGN

Based on the testing, surveying and analyses referred to in Section 3, traffic loading, estimate of fatigue and remaining service life, the Consultant shall prepare all necessary elements of pavement rehabilitation.

The most appropriate design option shall be established, for the road sections in need o of rehabilitation, on life-cycle costing and technical and economic considerations taking design period of 10 years.

Relevant climate and hydrological conditions for pavement structure dimensioning shall be determined based on results of surveying climate and hydrological properties of the area and spatial position of the section.

Reference temperature for pavement dimensioning is t_{ref}=20°C. It is necessary to define relevant values of particular mechanical properties of all materials and layers that would be used in designing of options for pavement solutions.

Pavement dimensioning shall be made by appropriate empirical and/or theoretical procedures. Some of the recognized procedures may be also applied for dimensioning, but it should be confirmed that the procedure is appropriate for this category and significance of road, i.e. traffic load and surveyed material quality. The applied method shall be described and explained. Valid standard in Macedonia applies for pavement dimensioning.

The Client may ask the Consultant to check the received results by applying a different method. In that case, the Consultant shall have no right to request any compensation of costs that may occur due to the Client's request.

All proposed pavement rehabilitation solutions shall be checked in regards to frost resistance by applying one of the valid and recognized procedures.

The Consultant shall determine the minimum thickness of the asphalt surface layer that is needed to achieve the required levels of service, for the road sections in need of rehabilitation.

Relevant traffic load for pavement designing shall be calculated based on the data from the Section 3.2 of the ToR.

The design shall define the following:

- the road sections in need of rehabilitation, for which:
- necessary preliminary works on pavement, which do not refer to repair of damages or demolition and removal of layers;
- designed thickness of new layers and type of materials and mixtures with provision of technological (minimal and maximal) thicknesses for construction of leveling courses;
- required road furniture, rock fall protection measures, structures, signs, road markings and environmental mitigation measures; and
- technical conditions for construction covering all items and particularities of design.

Conceptual Design

The conceptual design shall be suitable in all respects for bidding purposes for a design and build contract. The conceptual design shall include an appropriate set of technical specifications. The conceptual design of pavement shall involve for the road sections in need of rehabilitation the (i) design of the proposed new pavement of the road including the shoulders and (ii) proposed pavement design for included crossing roads, if any. The conceptual design shall be described in sufficient detail to determine the following: (i) an accurate estimate of the required construction quantities; (ii) a conceptual design bill of quantities; and (iii) the minimum design and construction specifications required for inclusion in the bidding documents.

Cost Estimates

In order to make a fair and reasonable estimate of the cost of the 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.) He shall show separately the cost of all taxation (direct or indirect). In addition, the cost of supervision of construction by the Consultant shall be analyzed on a unit price basis and included in the overall cost estimates. The estimated financial cost resulting from this analysis shall be accurate to within +/- 10%, and shall be compared with costs of previous and ongoing contracts for similar works executed in the area or the Region. Should any differences be found, the causes shall be identified and studies made to arrive at comparable market prices

5. SPECIFICATIONS AND DRAWINGS

Specifications

As bases for preparation of technical specifications to be included on the bidding documents, the Consultant shall use the Client documents used in previous projects for road rehabilitation works. The Client shall make available this document to the Consultant (in e-form). Use of this source and consultations with the Client do not release the consultant from full responsibility in regards to completed technical specifications.

When deciding on requirements for quality of materials to be used, special attention shall be paid primarily to quality of the ready product, but also to properties of materials from the domestic market, whenever possible, under condition that quality of designed solution is not endangered.

Specifications are part of the bidding documents which should cover identification and description of a construction technology for the designed Works, technical conditions for execution of the Works, requirements and criteria for quality of material and Works,

method of measuring and calculation, as well as any other aspect typical for safe execution of the Works and protection of structures and surroundings during the Works execution. In addition, the bidding documents should include specifications for the final design to be done by the contractor.

For every item of Works stated in the Bill of Quantities (BoQ), the following shall be provided

- detailed technical description of the item;
- requirements for quality of component materials as well as requirements for acceptance of the constructed item;
- requirements for technological process for execution of the item (production, purchase and transport of materials, conditions for execution of the Works on the item or incorporation of material, necessary equipment for execution of the Works, safety and protection of the neighboring structures, requirements for the environmental protection, etc.); and

While preparing the Specifications, special attention shall be paid that numbering and data stated in the Specifications match those stated in the General BoQ.

Drawings and Plans

Each road section must have basic illustration drawings and plans. The conceptual design should be prepared based on strip diagram identifying for each 100 m what are the proposed treatments are and quantities. A conceptual design bill of quantities shall be prepared generally under the following sections: general items, preparatory works, earthworks, pavement, drainage, bridges, road junctions, safety elements, utility lines, slope protection measures, environmental mitigation measures, insurance, miscellaneous, and contingencies.

Bidding Documents

The conceptual design shall have all elements needed to support PESR on drafting the technical aspects of the bidding documents for the design and build contract. The conceptual design should present the following:

- Start point, end point and length of the road sections in need of rehabilitation on each study road.
- The total rehabilitation BoQ and cost estimate of all road sections in need of rehabilitation on each study road.
- The location of each bridge or structure in need of rehabilitation on each study road.
- The BoQ and cost estimated for each bridge and structure in need of rehabilitation individually.
- The cost estimate for the road signage, marking and furniture for each study road.
- The cost estimate for emergency works for each study road, if needed.
- The cost estimate for provisional sum for unforeseen conditions for each study road, if needed.
- Specifications for final design to be done by the contractor.
- Specifications for construction to be done by the contractor.
- Minimum equipment required for the contractor to have available.
- Service level required for the design to be done by the contractor.
- Service levels required to be achieved by the contractor on the completed road rehabilitation works (e.g, roughness, deflections, potholes, cracking, minimum surface layer thickness, shoulders, etc.)

- The requirements to comply with environmental and social safeguards and legislation.

The conceptual design consultant should prepare the following documents to be included on the bidding documents to provide relevant information to the bidders.

- Conceptual Design Input Data. Presenting all the input data collected and used on the conceptual design (e.g., roughness, deflections, traffic, surface distress data, etc.)
- Conceptual Design Report. Presenting the results of the conceptual design analysis.
- Conceptual Design Illustrative Drawings and Plans.

6. TRAFFIC SIGNS, ROAD MARKING AND EQUIPMENT

The Consultant should carefully consider road safety as a key part of the design (including traffic calming, pedestrian crossings, sidewalks in urban areas, guardrails, signing, marking, geometric changes, and other road safety features). The consultant will review previous road safety audit reports for similar standard roads in Macedonia and identify any consistent themes which need to be addressed, for example pedestrian safety and the design of guardrails/crash barriers.

Real condition of spatial and physical structure in the right of way, as well as other elements of importance for traffic safety shall be determined based on the visit to the section in question. It shall be in the Consultant's responsibility to prepare relevant photo documentation, especially for the zones of accesses.

Consultant shall take over from the Clients traffic designs and shall perform revision of the solutions that refer to the following:

- Driving-dynamic and visual characteristics of the section;
- Maximum speed of the vehicles in curves;
- internal conformity and dynamic homogeneity of elements of the road alignment
- traffic safety for all participants
- determination of required overtaking and stopping sight distance, available and overtaking visibility conditions, etc.

Existing detailed traffic designs for the following roads are in possession of the Client, which should be reviewed and updated if needed by the Consultant:

1. National road A4, Strumica – Novo Selo – MK/BG border,
2. Regional road R1106, Jurumleri – Dracevo,
3. Regional road R1107, Kavadarci – Rosoman,
4. Regional road R1109, Dedeli - Furka – Bogdanci – Gevgelija,
5. Regional road R1204, Kumanovo – Sveti Nikole,
6. Regional road R1304, Berovo - Vinica,
7. Regional road R1305, Bitola – Demir Hisar &
8. Regional road R2131, Dracevo – Oresani – Taor.

Detailed traffic designs for the following roads will have to be prepared by the Consultant:

1. National road A3e, Delcevo – Zvegor – Border with Bulgaria,
2. Regional road R1209, Tetovo – Popova Sapka,
3. Regional road R1302, Delcevo – Pehcevo, and
4. Regional road R1207, Mlado Nagoricane – Pelince border, L=19

Elements of traffic signalization and road furniture such as guardrails, signposts, etc. shall be separately treated and designed in accordance with valid MKS-EN standards.

The consultant shall be obliged to justify specific solutions separately within the Technical Report.

The Specifications shall include in an item description all work needed for completion of the item, including purchase of material, equipment, machinery, transport and workmanship.

The traffic signs, road marking and equipment shall be mandatorily included in the BoQ. Names of the items in quantity of the Works must correspond to the names of the items in the Specifications. All additional descriptions of the items are mentioned in the Specifications and must be precisely defined and harmonized with details on drawings. The same item shall not be described differently on different places in the design, i.e. data in the quantity of the Works, Specifications and on drawings must be identical.

All relevant technical details and descriptions that enable ordering of signalization and furniture must be presented on Specifications without favoring of particular suppliers and their products.

7. CONTENTS, PROCESSING AND DELIVERY OF DOCUMENTS

The bid documents to be prepared by PESR shall include all necessary technical documents prepared by the Consultant and sections requested by the valid legislation.

Details of rehabilitation shall be prepared, bounded and submitted to the Client in hard and soft copies and shall contain relevant textual, graphical and numerical attachments.

Technical documents shall be prepared in Macedonian and in English.

Technical documents shall be delivered to the Client **in 6 (six) copies** (3 in Macedonian and 3 in English) with the cover letter which in addition to basic data on the design and consultant, shall include identification of the contract. Copy implies printed version of design and e-form on a CD of appropriate capacity.

While processing the technical documents, the following shall be respected:

- e-form of technical documents shall cover all source files (unprotected e-documents in form of program used for preparation and processing) and unprotected pdf form. Both e-forms shall be identical;
- e-form of technical documents shall be fully compliant with the printed copy;
- text of technical documents shall be written by UNICODE font.
- document processing (text, graphics, vector, grids) shall imply use of generally accepted and available commercial programs (such as applications from package MS Office, Auto CAD, etc.). Forms of these documents shall be compatible with older versions of those programs.
- if the consultant, for processing of documents, uses non-standard programs which are not available to the Client, the consultant shall, with previous agreement with the Client, convert all documents to formats available to the Client before final processing of technical documents;

- documents including contents in English shall bear the title in English, while documents containing contents in Macedonian shall bear the titles in Macedonian. Bilingual documents shall have a Macedonian title with a unique postfix mark ME to indicate bilingual form.
- cd cover shall bear the name of consultant, title of technical documents and date, where the date represents the month of verification of design by technical control. Text on the cover shall be printed electronically. Also, the disc shall bear legible name of technical documents and consultant;
- textual parts of design shall be processed, printed and packed in hard covers in A4 format;
- graphical attachments shall be processed and printed in appropriate format A3 and bound in A4 format;
- Printed copies shall be bound in hard covers, verified and sealed in accordance with valid regulations;

It shall be considered that the consultant has not complied with contracted obligations and become entitled to payment in accordance with the contract conditions as long as the consultant does not meet the above stated requirements.

8. CONTROL OF PREPARATION OF DOCUMENTS FOR ROAD REHABILITATION

Preparation of documents for road rehabilitation shall be continually monitored and controlled by the Client through its appointed representative and the World Bank.
The Consultant shall, with the Client's coordination, cooperate with representatives of international financing institutions, and with the Client's consent shall act in accordance with suggestions and requests resulting from such review.
The Consultant is not entitled to compensation of work costs resulting from requests of international financing institutions and it shall be considered that all work on modifications and amendments of design based on this reason has been included in the contract price.

9. TIME AND DYNAMICS FOR PERFORMING SERVICES, WORK PLAN

Time for performance of the Service: Time for performance of the Services and duration of the Contract is 2 (two) months (60 days).

Dynamics of performance of the Services represents a mandatory part of Work Plan presented as part of the Consultant's Proposal and shall include proposed time for submission of all reports specified under the Section 10 of the ToR, as well as the following activities.

- Mobilization, preparation of appointment decisions for members of key and non-key staff, preparation of initial and updated work plan;
- Examination of available archive documents, obtaining of conditions and consents and necessary documents from the relevant institutions;
- Pavement condition survey and other field investigations in accordance with the ToR;
- Preparation of preliminary version of design documents which includes:
  - pavement design;
  - design for traffic signage and road furniture.
- Delivery of complete technical documents to the Client;

Work Plan shall include:

1. Textual part where the consultant presents a description of the following: manner in which he/she intends to perform the assignment, method to be used and key activities that the consultant intends to implement during performance of the Services. This part shall be prepared by the consultant in a free form;
2. Organizational chart of the team to be engaged on performance of the Services. The chart shall be prepared in form of an appropriate diagram and shall cover all members of the consultant's team, including key and other staff;
3. Dynamics for performance of the Services (Time chart of Activities): the consultant shall provide the time chart of activities in form of an appropriate linear or net diagram. The diagram shall present all key and other activities and must clearly indicate the critical path of activities;
4. Plan for engagement of staff, including key and other staff intended for realization of the Services. The consultant shall provide a plan of key staff engagement in the form 7, while the plan of engagement of other staff shall be provided in similar form or in some other appropriate form. The consultant shall provide the requested data for key staff in the form 8, while for other staff, the data will be provided in the form 9. If the consultant intends to engage more staff than presented in the form, it is necessary to have the form copied. While preparing the plan for engagement of the staff, the consultant shall plan engagement of key staff during whole of the Services, while for the other staff, the engagement shall be for the time needed for completion of particular assignments for which the engagement of particular staff is planned.

The Consultant submits for the Client's approval the initial and updated Work Plans for performing the Services within the schedules and in a manner stated by the GCC.

10. REPORTING REQUIREMENTS

Reports requested from the consultant under this section, represent a base for monitoring the quality and dynamics of performance under the Services, as well as a base for payment according to the GCC.

The consultant is obliged to specify all dates of delivery of the requested reports under the dynamics for performance of the Services, which is a constituting part of the Work Plan.

Requested reports, including a suggested indicative due date, are the following:

#	Deliverable	Suggested Due Date *
1	Inception Report	D + 7 days
2	Report on completed engineering, and other field investigations	D + 30 days
3	Report on design solutions	D + 45 days
4	Final Conceptual Design Report Package	D + 60 days

Where D is the contract signature date and the number of days reflect calendar days added to the contract signature date

Inception Report

The report shall include initial findings, detailed work program, staffing and methodology.

Report on completed engineering and other field surveys

The consultant shall prepare and provide the Client with a report on completed engineering and other field surveys fully in accordance with the Section 3.2. The report shall include at least the following:

- Graphical presentation of a layout;
- Graphical and numerical presentation of the results;
- Results of traffic counts and traffic forecasting.
- Results of testing the pavement bearing capacity by measuring deflections;
- Results of testing the pavement roughness;
- Results of visual condition survey;
- Photo documents from field surveys;
- Results of core sampling testing;
- Analyses of data and conclusions.

Report on design solutions

This report shall include a description of considered possible technical solutions and justification of selected technical solutions, with special elaboration of treatment of activities along the road in settlements and out of settlements, choice of measures for improving traffic safety, as well as all other important aspects mentioned in the section 3.2. of the ToR.

Final Conceptual Design Report Package

The final design report package shall present the previous reports incorporating all revisions deemed necessary arising from comments received from the Client. In addition, the final design report package shall present a Pavement Design Report, Specifications, Summaries, Explanatory Notes, Bill of Quantities, Cost Estimates, Google Maps, Performance Specifications as well as minutes of consultation meetings with villages representatives. The Final Design report should have at least the following contents:

- Introduction
- Description of Project Road
- Road Surveys, Investigations and Instrumental Testing
- Climate
- Traffic
- Pavement Study and Design
- Road Safety
- Drainage
- Bridges and Structures
- Cost Estimates
- Environmental Impact Assessment Summary
- Summary of recommended rehabilitation project-alternative

The consultant is obliged to comply with remarks of the client in reference to technical documents which are subject to final control, if such remarks exist. For every particular remark, the Consultant shall indicate the request for correction, as well as description of manner in which the remark was corrected with appropriate justification.

All reports that are conditions for payment shall be prepared in Macedonian and in English (3 hard copies and one electronic copy in Macedonian and 3 hard copy and one soft copy in English). The electronic copy should contain the same information as the hard copy in one pdf-file.

11. CONSULTANT'S PROFILE

The Consultant, as a company or consortium, is expected to have appropriate experience in the engineering design of road rehabilitation projects and social and environmental issues. The consultant is further expected to have appropriate experience in providing consulting services for the implementation of road projects in a similar environment. Since knowledge of local legislation will be required, international consulting firms are encouraged to associate with, or to subcontract to, local companies or individuals with the relevant expertise.

The consultant shall specify in its Proposal key staff to be engaged in case of the contract award, requested references in accordance with the Request for Proposal. The key staff specified in the Proposal cannot be replaced, except in cases and under conditions clearly stated in general and particular conditions of the contract.

In addition to the key staff, the consultant shall engage sufficient number of other staff of necessary expertise (e.g., Road Safety Specialist, etc.) along with other auxiliary staff. A list of other staff engaged on the contract with description of assignments and responsibilities with periods of engagement shall be a composing element of the Work Plan presented on the Consultant's proposal.

11.1 Key experts

All experts who have a crucial role in implementing the contract are referred to as key experts. The profiles of the key experts for this contract are as follows:

Key expert 1: Team Leader and Road Expert

Qualifications and skills

At least M. Sc. civil engineering.

General professional experience

At least 20 years of general professional experience.

Specific professional experience

At least 10 years of experience related to road designs (preferable with some financing by international financing institutions), with proven records of managerial experience in projects of similar nature and magnitude.

The team leader shall have fluency in English, in particular in road sector terminology.

Key expert 2: Pavement Engineer and Road Expert

Qualifications and skills

At least M. Sc. civil engineering.

General professional experience

At least 10 years of general professional experience.

Specific professional experience

International experience related to pavement designs.

Key expert 3: Environmental and Social Expert

Qualifications and skills

At least M. Sc. civil engineering.

General professional experience or environmental and social disciplines

At least 10 years of general professional experience.

Specific professional experience

International experience related to environmental and social aspects of road projects.

11.2. Other experts, support staff & backstopping

In selection of other experts, it is expected from Consultant to be transparent, and shall be based on pre-defined criteria, including professional qualifications, language skills and work experience.
CVs for experts other than the key experts should not be submitted in the tender but the tenderer will have to demonstrate in their offer that they have access to experts with the required profiles. The Consultant shall select and hire other experts as required according to the needs.
The costs for backstopping and support staff, as needed, are considered to be included in the tenderer's financial offer.

11.3. Office accommodation

Office accommodation for each expert working on the contract is to be provided by the Consultant.

11.4. Facilities to be provided by the Consultant

The Consultant shall ensure that experts are adequately supported and equipped. In particular it must ensure that there is sufficient administrative, secretarial and interpreting provision to enable experts to concentrate on their primary responsibilities. It must also transfer funds as necessary to support their work under the contract and to ensure that its employees are paid regularly and in a timely fashion.

The Consultant shall pay travel expenses and vehicles for inspection and all other transport of his staff, equipment, supplies, surveys, investigations, testing, telecom equipment and services and consumables, secretarial services and all other input required for the purpose of the assignment proper delivery. The Consultant should provide all interpreters and/or translators that might be required to undertake the assignment. These costs should be included in the Consultant’s Financial Proposal.

11.5. Equipment

No equipment is to be purchased on behalf of the Client as part of this service contract or transferred to the Client at the end of this contract.

12. DURATION OF ASSIGNEMENT

The assignment is estimated to require 2 months and should be completed in the period until June, 2017. Expected start of services is April 2017.