**PRIMARY EDUCATION IMROVMENT PROJECT (PEIP)**

TERMS OF REFERENCE

Assessment of IT and network infrastructure of public primary schools

in North Macedonia

1. **Background of the Project**

The Primary Education Improvement Project (PEIP) development objective is to improve conditions for learning in primary education in North Macedonia.

The Project would support the Government of North Macedonia’s initiatives geared to:

* Improve learning environment at the primary level;
* Increase number of primary education teachers with proven professional practice in two core teacher professional competencies i.e., teaching and learning and creating a stimulating learning environment;
* Improve quality of teaching practices; and
* Implement school improvement plans that use performance data and monitoring tools for improving student learning.

The project will be organized around three main elements that need to be aligned in order to be complementary to each other. Component 1 focuses on school-level interventions, which are closest to students and most likely to impact learning while also mitigating and recovering learning losses generated by COVID-19. Two enabling elements are system-level reforms that would create the necessary enabling conditions so the school teachers are empowered with data on learning and up-to-date training. Component 2 would develop a comprehensive national assessment program to inform both school improvement planning and professional development programs, serving to link the school and system levels. Component 3 would put into practice professional competences for educators. Together, these elements will provide adequate information, tools, training and support to create effective and improved conditions for learning and ultimately increase student achievement. Component 4 would strengthen sector management, project management and monitoring and evaluation. The legal framework for implementation of above-mentioned reform interventions was recently adopted and there is an adequate institutional set up to embed them and eventually further enhance. The project activities are targeted toward building the foundation of a modern and efficient primary education system that is orienting all parts of the system toward learning.

The Ministry of Education and Science (MOES) is the main implementing agency of the Project in close cooperation with the National Examination Center (NEC), Bureau for Development of Education (BDE) and State Educational Inspectorate (SEI). Projects direct beneficiaries will include primary education students, but focused support will be given those who are vulnerable (Roma, girls, students coming from economically vulnerable families with risk to abandon studies, students disproportionally affected by the closure of schools due to the COVID-19 pandemic) which are expected to benefit from improved learning and physical environment in the schools as well as from better-trained teachers. Primary education teachers, school principals, and MPSTs will benefit from more efficient professional development and career advancement, digital teaching aids, teaching material that can be updated/corrected and improved fast based on the feedback received and grant program to implement their school improvement plans. The project activities are targeted toward building the foundation of a modern and efficient primary education system that is orienting all parts of the system toward learning.

1. **Objective of the assignment**

For the past years the public school network expanded from a very small workgroup network to a multi-building Ethernet network. The school’s information processing capability continuously grows due the amount of content accessed (files, streaming/video conference, videos). However, the existing infrastructure is already outdated and no longer suffice to the current data transmission requirements and overall network operation of the schools, especially having in mind the aim of the Government to implement digitalization in primary education, following similar trends and activities already present in the educational systems in the region and in the EU. To respond to this, MoES intends to upgrade the existing network installation and to install new equipment in each primary school.

The overall objective of this assignment is to review the network needs of 118 public primary schools and design IT and network infrastructure with high performance, improved availability and greater reliability.

List of primary schools and locations is provided in Macedonian language in Attachment 1.

1. **Scope of work**

The main objective is to conduct an assessment of the existing IT and network infrastructure in 118 public primary schools, write a comprehensive report of findings, present the findings and the solution to the MoES management and design a new IT and network infrastructure (networking, installing new devices such as modems/media convertors , SD-WAN enabled routers, managed switches L2+, wireless access points WiFi6 , desktop computers, smart boards, etc.) or to proposed upgrade of the existing infrastructure for each school (including all facilities that are part of the school).

In order to optimize the costs during the design, it is necessary to take into account the existing IT and network infrastructure of the schools, which can be used in the planned infrastructure.

The consulting company is expected to perform the following activities:

1. Review the existing network infrastructure in 118 schools including but not limited to:

* Assessment of the existing network infrastructure in order to identify the current situation of network infrastructure in each school. It is necessary to consider whether the existing network infrastructure has capacity to be used by all teachers and students in the school. In the assessment the evaluation of the present passive networking (cabling) must also be included
* Create a detailed topological design of the present network infrastructure mentioning (the equipment model and part number and how they are connected , IP addresses used by interfaces, present connection to the internet- technology used, speed…)
* Analysis of the current state of the network infrastructure protection (cyber security and risk assessment)
* Point of view about the situation of the infrastructure per school and precise action plan that needs to be done including what components can be preserved and what needs to be changed.

1. Review the existing IT infrastructure in 118 schools including but not limited to:

* Assessment of the existing IT infrastructure in order to identify the need to upgrade the IT infrastructure (new desktop computers, smart boards, printers, projectors, etc.)

1. Review the existing electrical infrastructure in 118 schools

* Assessment of the existing electrical infrastructure in order to identify the current situation of electrical infrastructure in each school. It is necessary to consider whether the existing electrical infrastructure can serve the existing and the proposed IT and network infrastructure (including all IT and network devices that will be installed). Focus should be put on load capacity, safety, fire protection, grounding.

1. Proposal for network infrastructure design based of the assessed results

* Proposed network infrastructure design with a high level of information security and high-performance IT services architecture. The planned network infrastructure should insure minimum costs for administrating and maintaining
* Provide detailed specification for proposed network equipment and components (modems/media convertors, SD-WAN enabled routers, managed switches L2+, wireless access points WiFi6, etc.)
* Provide estimation of costs of the proposed network infrastructure, indicating: costs of the required software, costs of the required equipment, costs of work in stages for deployment, assessment of expenses for administration and support of the planned infrastructure, costs of labor. The estimation need to be done for each school

1. Proposal for upgrading the existing IT infrastructure based of the assessment results

* Provide detailed list of hardware needed for upgrading the existing IT infrastructure for each school
* Provide detailed specification for proposed hardware (desktop computers, smart boards, printers, projectors, etc.)
* Provide estimation of cost of the proposed IT infrastructure, including: costs of the required hardware (desktop computers, smart boards, printers, projectors, etc.), costs of installation of hardware. The estimation need to be done for each school

1. Electrical infrastructure design

* Proposed cabling plan for structured cabling having in mind the needs of the newly designed IT and network infrastructure
* Proposed electrical wiring installation and all required electrical materials and equipment
* Provide estimation of costs of the proposed electrical infrastructure, including: costs of the required equipment, costs of work in stages for deployment and costs of labor. The estimation need to be done for each school

1. Analysis of internet service providers by region and school

* Analyses of the availability of internet services providers according to the needs of each school
* Provide estimation of costs of internet connections according to the needs of each school

Design Requirement

* The proposed design must be based on open distribution architecture so that existing equipment and facilities as well as future equipment from multiple vendors can be supported by the proposed system
* The proposed design must ensure compatibility and allow open design for Wireless Technology (Wi-Fi 6 and WPA 1.3 support) access point in all classrooms in the school (including all facilities that are part of the school). The connection must be stable and with the capacity to be used smoothly by all teachers and students in the school
* The proposed design must meet the current standards of architectural and structural components for the renovation of IT and network infrastructure facility

1. **Expected deliverables/Reporting obligations**

The expected deliverables are as follows:

* Report encompassing the findings from the assessment of the existing network infrastructure for each school (including drawing of present network topology)
* Report encompassing the findings from the assessment of the existing IT infrastructure for each school
* Report encompassing the findings from the assessment of the existing electrical infrastructure for each school
* Report on the proposed network infrastructure design including engineering plans, schematic diagram/designs, layout, working drawings and technical specifications for each school
* Report encompassing the proposal for upgrading the existing IT infrastructure including technical specifications of proposed hardware for each school
* Report on the proposed electrical infrastructure design including engineering plans, schematic diagram/designs, layout, working drawings and technical specifications for each school
* Report on the analysis of internet service providers and internet services by region and school
* Report on the estimation of costs including costs of the proposed network infrastructure, costs of proposed IT infrastructure, costs of the proposed electrical infrastructure and costs of internet connections

All deliverables shall be prepared in Macedonian language and will be reviewed and approved by the PEIP IT Specialist and Project Director.

1. **Minimum Qualifications**

For the purpose of the assignment a team of experts with relevant experience and qualifications in their subject area as indicted further below shall be engaged. The Consultant firm may associate with other Consultant firm (s) in the form of a joint venture or of a sub-consultancy to complement their respective areas of expertise, strengthen the technical responsiveness of their proposal, and avail themselves to a broader pool of experts.

The qualification requirements of the Consultant firm are summarized as follows. The Consultant shall be a firm or a group of firms with the following qualifications:

GENERAL COMPANY QUALIFICATIONS

* General experience: The company should have proven expertise in the field of design of IT and network architecture, installation and maintenance of LAN & power cabling systems, supply & installation of ICT equipment or similar.
* Specific experience: The company should have undertaken and completed a minimum of three (3) ICT projects in the last five years in the field of design of IT and network architecture, installation and maintenance of LAN & power cabling systems or supply and installation of ICT equipment.
* The company should provide at least the following key staff: 1 team leader, 1 network infrastructure expert, 1 IT equipment expert and 1 electrical engineering expert
* The company should also provide the following non-key staff that will be available for field work: 24 specialists for network infrastructure, 24 specialists for IT equipment and 24 specialists for electrical installations

The credibility of mentioned generalexperience shall be presented in a list of contracts references for provided Consultancy - Technical assistance within the past 5 (five) years.

The credibility of mentioned specific experience shall be presented in a list of at least three (3) similar\* assignment references within last five (5) years with description of services provided (including information on contract value, contracting entity/client, project location/country, duration, assignment budget, percentage carried out by consultant in case of association of firms or subcontracting and main activities) and accompanied by certificates of orderly fulfillment of the contracts verified by other party from such contracts.

\*Similar nature and scope of the assignments are those that have similar activities and objectives (e.g.assessment of IT or network infrastructure,design or installation of network infrastructure, design or installation of IT infrastructure).

The Consultant shall have the organizational capacity (it is expected that the Consultant shall have at least below listed key experts for performing activities under this assignment) and available appropriate skills among staff. The consulting team assembled to implement the project should be composed of experts with strong knowledge as per the below requirements.

KEY STAFF QUALIFICATIONS

1. Team leader with a university degree, proven experience in similar projects, at least 10 years proven experience in design of IT network infrastructure and fluency in Macedonian and English language
2. Network infrastructure expert with the following qualifications:

* University degree in computer science, information systems or ICT infrastructure;
* At least 5 years of experience in planning and design of IT network architecture;
* Demonstrable knowledge and experience in managing and overhauling ICT infrastructure with proven certificates of expert level , at least 2 vendors.
* Good understanding of new and evolving network technologies;
* Excellent verbal and writing skills in Macedonian and English.

1. IT equipment expert with the following qualifications:

* University degree in computer science, information systems or ICT infrastructure;
* Experience in installation and maintenance of IT equipment with proven certificates, at least 2 vendors.
* Excellent verbal and writing skills in Macedonian and English

1. Electrical engineering expert with the following qualifications:

* University degree in Electrical engineering;
* Professional experience in the design and installation of electrical systems;
* Excellent verbal and writing skills in Macedonian and English.

1. **Contract arrangements and duration of assignment**

The expected duration of this assignment is 3 months. Expected start of services is April/May 2022.

The consulting company is expected to work in North Macedonia with considerable amount of field work. The contract will be lump sum. Payment shall be made based on deliverables. The company must submit each product for review and approval for the payment to be executed.

Attachment 1. List of schools

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Општина** | **Назив на основно училиште** | **Населено место** |
| 1 | Аеродром | Аеродром - ООУ „Лазо Ангеловски“ | Скопје |
| 2 | Аеродром | Аеродром - ООУ „Љубен Лапе“ | Скопје |
| 3 | Аеродром | Аеродром - ООУ „Гоце Делчев“ | Горно Лисиче-Аеродром |
| 4 | Арачиново | Арачиново - ООУ „Ѓерѓ Кастриоти Скендербеу“ | Haraçinë |
| 5 | Берово | Берово - ООУ „Дедо Иљо Малешевски“ | ,,Маршал Тито“ бр.66 |
| 6 | Битола | Битола - Државно основно музичко училиште | Bitola |
| 7 | Битола | Битола - OОУ „Св.Климент Охридски“ | Битола |
| 8 | Битола | Битола - OОУ „Коле Канински“ | Битола |
| 9 | Боговиње | Боговиње - ООУ „Сабедин Бајрами“ с.Камењане | Kamenjane |
| 10 | Боговиње | Боговиње - OОУ „Абдил Фрашери“ с.Боговиње | 101 бр.6 |
| 11 | Боговиње | Боговиње - ОOУ „Сами Фрашери“ с.Пирок | 101 |
| 12 | Брвеница | Брвеница - ООУ „Коста Рацин“ с.Брвеница | Брвеница |
| 13 | Бутел | Бутел - ОOУ „Петар Здравковски Пенко“ | Бутел, Скопје |
| 14 | Бутел | Бутел - ОOУ „Ацо Шопов“ Радишани | Скопје |
| 15 | Бутел | Бутел - ОOУ „Лиман Каба“ с.Љуботен | с.Љуботен |
| 16 | Валандово | Валандово - ООУ „Јосип Броз Тито“ | Валандово |
| 17 | Василево | Василево - ООУ „Гоце Делчев“ с.Василево | Василево |
| 18 | Василево | Василево - ООУ „Атанас Нивачински“ с.Нова Маала | бб |
| 19 | Велес | Велес - ООУ „Васил Главинов“ | Велес |
| 20 | Велес | Велес - ООУ „Блаже Конески“ | Велес |
| 21 | Виница | Виница - ООУ „Славчо Стојменски“ | Виница |
| 22 | Виница | Виница - ООУ „Гоце Делчев“ | Виница |
| 23 | Врапчиште | Врапчиште - ООУ „Мехмет Дерала“ с. Градец | GRADEC |
| 24 | Врапчиште | Врапчиште - ОOУ „Сали Лиси“ с.Добридол | С.Добридол |
| 25 | Гази Баба | Гази Баба - ОOУ „Кирил и Методиј“ с.Стајковци | Стајковци |
| 26 | Гази Баба | Гази Баба - ОOУ „25 Мај“ Сингелиќ | Alija Avdoviq Nr6 |
| 27 | Гази Баба | Гази Баба - ОOУ „Дане Крапчев“ Маџари | М.А.Ченто, општина Гази Баба, Скопје |
| 28 | Гевгелија | Гевгелија - ООУ „Владо Кантарџиев“ | Гевгелија |
| 29 | Гевгелија | Гевгелија - ООУ „Крсте Мисирков“ | Гевгелија |
| 30 | Гостивар | Гостивар - ООУ „Гоце Делчев“ | Гостивар |
| 31 | Гостивар | Гостивар - ООУ „Исмаил Ќемали“ | Gostivar |
| 32 | Градско | Градско - ООУ „Даме Груев“ с.Градско | Градско |
| 33 | Дебар | Дебар - ООУ „Пенестиа“ | Дебар |
| 34 | Дебар | Дебар - ООУ „Саид Најдени“ | Debar |
| 35 | Делчево | Делчево - ООУ „Св.Климент Охридски“ | Делчево |
| 36 | Демир Капија | Демир Капија - ООУ„Димче А.Габерот“ | Демир Капија |
| 37 | Долнени | Долнени - ООУ „Исмаил Ќемали“ | бб |
| 38 | Долнени | Долнени - OОУ „Мирче Ацев“ с.Лажани | с.Лажани |
| 39 | Ѓорче Петров | Ѓорче Петров - ООУ „Тихомир Милошевски“ с.Ново Село | Ново Село |
| 40 | Ѓорче Петров | Ѓорче Петров - ООУ „Димитар Поп Беровски“ | Скопје Ѓорче Петров |
| 41 | Ѓорче Петров | Ѓорче Петров - ООУ „Мирче Ацев“ | Скопје |
| 42 | Желино | Желино - ООУ „Ибрахим Темо“ с.Стримница | С Стримница |
| 43 | Желино | Желино - ООУ „Луиѓ Гуракуќи“ с.Желино | с.Желино |
| 44 | Илинден | Илинден - ООУ „Гоце Делчев“ | Илинден |
| 45 | Илинден | Илинден - ООУ „Браќа Миладиновци“ с.Миладиновци | с. Миладиновци |
| 46 | Јегуновце | Јегуновце - ОOУ „Шемшево“ с.Шемшево | f.Shemshovë |
| 47 | Кавадарци | Кавадарци - ООУ „Тоде Хаџи Тефов“ | Кавадарци |
| 48 | Карпош | Карпош - ООУ „Петар Поп Арсов“ | Скопје |
| 49 | Карпош | Карпош - ООУ „Владо Тасевски“ | Скопје |
| 50 | Карпош | Карпош - ООУ „Војдан Чернодрински“ Тафталиџе | Скопје |
| 51 | Кисела Вода | Кисела Вода - ООУ „Кирил Пејчиновиќ“ | Скопје |
| 52 | Кисела Вода | Кисела Вода - ООУ „Рајко Жинзифов“ Драчево | н.Драчево, |
| 53 | Кисела Вода | Кисела Вода - ООУ „Климент Охридски“ с.Драчево | с.Драчево |
| 54 | Кичево | Кичево - ООУ „Кузман Јосифовски Питу“ | Кичево |
| 55 | Кичево | Кичево - ООУ „Д-р Владимир Полежиноски“ | Кичево |
| 56 | Кичево | Кичево - ООУ „Санде Штрејоски“ | КИЧЕВО |
| 57 | Кочани | Кочани - ООУ „Св.Кирил и Методиј“ | Кочани |
| 58 | Кочани | Кочани - ООУ „Никола Карев“ | Кочани |
| 59 | Кратово | Кратово - ОOУ „Кочо Рацин“ | Кратово |
| 60 | Крива Паланка | Крива Паланка - ОOУ „Јоаким Крчовски“ (зграда 1) | Крива Паланка |
| 61 | Крива Паланка | Крива Паланка - ОOУ „Јоаким Крчовски“ (зграда 2) | Крива Паланка |
| 62 | Крушево | Крушево - ООУ „Никола Карев“ | Крушево |
| 63 | Куманово | Куманово - ОМУ „Панче Пешев“ Куманово | Куманово |
| 64 | Куманово | Куманово - ООУ „Бајрам Шабани“ | Куманово |
| 65 | Куманово | Куманово - ООУ „11 Октомври“ | Куманово |
| 66 | Липково | Липково - ООУ„Фаик Коница“ с.Слупчане | населено место без уличен систем |
| 67 | Липково | Липково - OOУ„Антон Зако Чајупи“ с.Отља | p.nr |
| 68 | Липково | Липково - ООУ„Рилиндја“ с.Љојане | - |
| 69 | Мaкедонска Kaменица | Мaкедонска Kaменица - ОOУ „Св.Кирил и Методиј“ | Македонска Каменица |
| 70 | Македонски Брод | Македонски Брод - ООУ „Св.Климент Охридски“ | Македонски Брод |
| 71 | Неготино | Неготино - ООУ„Гоце Делчев“ | Неготино |
| 72 | Неготино | Неготино - ООУ„Страшо Пинџур“ | Неготино |
| 73 | Охрид | Охрид - ОМУ „Методи Патче“ | Охрид |
| 74 | Охрид | Охрид - ООУ„Христо Узунов“ | Охрид |
| 75 | Охрид | Охрид - ООУ „Кочо Рацин“ | Охрид |
| 76 | Петровец | Петровец - ООУ „Братство-Единство“ с.Средно Коњари | Средно Коњари |
| 77 | Пласница | Пласница - ООУ„Мустафа Кемал Ататурк“ | бб |
| 78 | Прилеп | Прилеп - ООМУ„Ордан Михајлосkи-Оцка“ | Прилеп |
| 79 | Прилеп | Прилеп - ООУ„Кочо Рацин“ | Прилеп |
| 80 | Прилеп | Прилеп - ООУ„Добре Јованоски“ | Прилеп |
| 81 | Пробиштип | Пробиштип - ООУ „Браќа Миладиновци“ | Пробиштип |
| 82 | Пробиштип | Пробиштип - ООУ „Никола Карев“ | Пробиштип |
| 83 | Радовиш | Радовиш - ООУ „Крсте Петков Мисирков“ | Радовиш |
| 84 | Радовиш | Радовиш - ООУ „Никола Карев“ | бб. |
| 85 | Ранковце | Ранковце - ОOУ „Христијан Тодоровски Карпош“ | Општина Ранковце |
| 86 | Ресен | Ресен - ООУ „Мите Богоевски“ | Ресен |
| 87 | Ресен | Ресен - ООУ „Гоце Делчев“ | Ресен |
| 88 | Сарај | Сарај - ООУ „Дитуриа“ | Сарај |
| 89 | Сарај | Сарај - OОУ „Дрита“ с.Рашче | f.Rashçe -Saraj |
| 90 | Сарај | Сарај - ООУ „Фаик Коница“ с.Радуша | с.Радуша |
| 91 | Свети Николе | Свети Николе - ООУ „Кирил и Методиј“ | Свети Николе |
| 92 | Свети Николе | Свети Николе - ООУ „Гоце Делчев“ | Свети Николе |
| 93 | Струга | Струга - ООУ „Гоце Делчев“ с.Подгорци | Подгорци |
| 94 | Струга | Струга - ООУ „Јосип Броз Тито“ | Струга |
| 95 | Струмица | Струмица - ОOУ „Герас Цунев“ с.Просениково | Просениково |
| 96 | Струмица | Струмица - ООУ „Никола Вапцаров“ | Струмица |
| 97 | Струмица | Струмица - ООУ „Маршал Тито“ | Струмица |
| 98 | Студеничани | Студеничани - ООУ „Алија Авдовиќ“ с.Батинци | без уличен систем |
| 99 | Студеничани | Студеничани - OОУ„Наим Фрашери” | Ул 113 бр 7 |
| 100 | Студеничани | Студеничани - ООУ „Мустафа Кемал Ататурк“ Долно Количани | б.б. |
| 101 | Теарце | Теарце - ООУ „Екрем Чабеј“ с.Слатино | Слатино |
| 102 | Теарце | Теарце - ООУ „Исмаил Ќемали“ с.Нераште | Nerasht |
| 103 | Теарце | Теарце - ООУ „Фаик Коница“ с.Доброште | Доброште |
| 104 | Тетово | Тетово - ООУ „Ѓерѓ Кастриоти Скендербег“ с.Порој | с. Порој |
| 105 | Тетово | Тетово - ООУ „Наим Фрашери“ | Тетоово |
| 106 | Тетово | Тетово - ООУ „Кирил и Методиј“ | Тетово |
| 107 | Центар | Центар - ДМБУЦ „Илија Николовски Луј” | Скопје |
| 108 | Центар | Центар - ОOУ „Кочо Рацин“ | Скопје |
| 109 | Центар | Центар - ОOУ „11 Октомври“ | Скопје |
| 110 | Чаир | Чаир - ООУ „Лирија“ | Shkup |
| 111 | Чаир | Чаир - ООУ „Тефејјуз“ | Скопје |
| 112 | Чаир | Чаир - ООУ „Хасан Приштина“ | Чаир |
| 113 | Чашка | Чашка - ООУ „Лирија“ Г.Јаболчиште | pa numer |
| 114 | Штип | Штип - ООУ „Тошо Арсов“ | Штип |
| 115 | Штип | Штип - ООУ „Димитар Влахов“ | Штип |
| 116 | Штип | Штип - ООУ „Гоце Делчев“ | Штип |
| 117 | Шуто Оризари | Шуто Оризари - ООУ „26 Јули“ Шуто Оризари | Скопје |
| 118 | Шуто Оризари | Шуто Оризари - ООУ „Браќа Рамиз Хамид“ Шуто Оризари | Шуто Оризари |