

Terms of Reference

Contract number:

Project name: Modernisation of Local Public Services in the Republic of Moldova

Project number: 08.2167.8-001.00

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Terms of reference

For acquisition of the GIS software for the Municipal Enterprise Apa Canal Cahul

1. Background and introduction

The German Development Cooperation through GIZ initiated the project „Modernization of Local Services in the Republic of Moldova“, which is implemented in collaboration with local, regional and central governmental stakeholders. The main partner of GIZ in implementing this project is the Ministry of Regional Development and Construction (MRDC).

The GIZ MLPS project has been assisting the Regional Development Agencies North and South in implementing the two pilot projects:

1. Water supply and sewage services in the village of Duruitoarea Veche, Commune of Costesti, Riscani Rayon
2. Water Supply Services in Rosu village, Cahul Rayon

Apart from providing funds and assisting the Regional Development Agencies and local partners in implementing the investments in service infrastructure improvements, the GIZ project provides its assistance in the following complementary areas:

- Integrated planning and programing
- Improved cooperation
- Capacity development
- Citizens engagement

Cahul and Riscani were the first rayons in Moldova that prepared and updated a chapter on Water Supply and Sanitation in their Socio-Economic Development Strategies. These strategies, which were approved in mid-2012, foresee that the existing fragmented water supply systems will be regionalized and grouped based on one or two centralized water sources. In the Rayon of Cahul, the entire territory will be supplied with water from the existing surface water intake and treatment plant in the city of Cahul. In the case of Riscani, the “Prut” cluster will be supplied from a new surface water intake and water treatment plant nearby the city of Costesti, while eastern (“Riscani”) cluster of the Rayon (including city of Riscani) will be supplied from modernized Soroca-Balti surface water pipeline (the supply of “Riscani” cluster is a subject of separate studies).

In Cahul rayon the villages Rosu, Crihana Veche and Manta decided to connect their water supply and sanitation networks to the water supply and sanitation network of the city of Cahul. The construction works on connecting the infrastructure are finalized. In order to deliver the water supply and sanitation services the city of Cahul and the villages have to develop and agree on the legal and institutional form for the joint provision of WSS on their territories.

As part of its capacity building efforts for service provider and based on recommendations provided by Diagnostic Analysis developed for ApaCanal Cahul in 2012 , the service provider to improve the capacity on operating water and sewer infrastructure through development and practical application of the software – "The GIS system, with database and web application, of water and sewage supply networks"

Following its procurement regulations GIZ (in the following called "Employer") decided to call for bids for development and practical application of the software – "The GIS system of water and sewage supply networks "for the Municipal Enterprise Apa Canal Cahul, in order to select the most qualified group of experts or service company (in the following called "Contractor") as well as technically and economically most advantageous offer.

2. Scope of work, key tasks and activities of the expert team

The general task of the Contractor is to purchase the GIS software and necessary hardware to contribute for the improvement of the service for the future joint provision of WSS in Cahul. In addition the results of the work of "Contractor" will contribute to the improvement of the service for the joint provision of WSS in similar cases in the Republic of Moldova.

The company will provide the software in strict cooperation and coordination with the service provider administration and GIZ focal point.

3. Expected Results and Deliverables:

The following results and deliverable are expected:

The GIS software of water and sewage supply networks, in digital form, will contain the geographical map of all water and sewerage networks, managed by the water supplier, should fulfill next modules:

- 1. Hydraulic Modeling Software**
- 2. Hydraulic calculation software for designing water supply network**
- 3. Software for the computation of transient (water hammer)**
- 4. Software for building graphical piezometric**
- 5. Software for crossings tasks**

4. Requirements and reports

The following methods shall be applied (among others):

- Visits in the territory of Cahul area for collecting of needed data;
- Desk work on development of analysis and relevant documents;
- Workshops for presentation and discussion of assignment results;

All materials (including reports) will be prepared in one hard copy and one electronic copy.

All the events and materials will be developed in strict coordination with RDA South and GIZ Project.

5. Logistics

The operational base for the project is Chisinau. The coordination meetings will take place in Chisinau to the extent necessary to accomplish the tasks efficiently.

6. Monitoring and Evaluation of the Assignment

All the reports will be submitted to GIZ in Romanian and English in 5 working days after the finalization of the events/activities and have to include disaggregated information on the involvement of men and women, occupation, and age.

7. The required profile of the Contractor

The Contractor should have:

- Experience in conducting similar activities for at least 5 years and preferably the ability to present references activities.
- Sufficient human and technical resources to successfully implement the proposed activities.
- Faculties in the elaboration of the activities and measures for the requested profile.
- Availability for the organization and conducting of the action within the terms limit indicated.
- Positive experience working with international organizations.

8. Implementation and contact persons

The intended commencement date is October 2014, and the period of execution of the contract will be about 2 months from the date of contract signing.

List of deliverables and services :

HARDWARE

No.	Article	Quantity
	HARDWARE	
1	Workstation GIS - system for data management and processing GIS	2
2	A0 plotting and scanning equipment	1
3	A3 color laser printer	3
4	A3 scanner	1
5	Uninterruptible power station	2
6	Total Station	1
7	Portable GPS System	1
	SOFTWARE	
10	Software GIS	1
11	Hydraulic Modeling Software	1
12	Hydraulic calculation software for designing water supply network	1

13	Software for the computation of transient (water hammer)	1
14	Software for building graphical piezometric	1
15	Software for crossings tasks	1
SERVICES		
16	Configuration and commissioning solution	
17	Testing solution	
18	Training	

1. Workstation GIS - system for data management and processing GIS	
Processor	A processor installed with the following minimum characteristics: - Intel or equivalent - Min dual core - Frequency: min 3 GHz - Cache: min 3 MB - 64-bit instructions
Memory	Installed memory: at least 4 GB DDR3 Support upgrade memory to 8 GB min
HDD	Min. 250 GB, SATA, 3.5 ", 7200 rpm
Optical Drive	16x DVD ± RW dual layer
Graphics	Min 512MB dedicated memory
Network Card	Gigabit Ethernet
Expansion Slots:	Min 2 PCI Express
Inputs / Outputs:	min 4 x USB 2.0
Mouse	USB Optical Mouse with scroll
OS	Windows 7 Professional preinstalled with OEM license and installation kit or equivalent
Antivirus Software	Subscription on min 2 years
Monitor	
display Type	LCD or LED
diagonal	Min. 21"
Resolution	Min. 1600x1200
Response time	2 ms
Certifications	TCO'04
Warranty	2 years on-site
UPS system and power equipment will keep running for periods of at least 30 minutes. System Warranty: min 1 year	
2. A3 color laser printer	
Format:	A3
Standard RAM	Min 512 MB
Print technology:	Inkjet color
Print Speed Black:	28 ppm - A4 and 11 ppm - A3
Print Speed Color:	28 ppm - A4 and 11 ppm – A3
Minimum Resolution Print:	600 x 600 dpi
Recommended volume / month:	Min 10,000 copies / month
Network:	10/100/1000 Base-T
drivers	Window 2000 / XP / Server 2003 / Vista / 7
Warranty	1 year, on-site

3. A0 plotting and scanning equipment	
Equipment	Plotter, copier, scanner - black and white and color
Format	A0
Speed	Minimum A0 format / min (indicative)
Resolution	Min 600 dpi
Printing width	Min 1000 mm
Paper Feed Rollers	2
Paper type accepted	all possible
Select roll	Manual or automatic
OS	Real-time
Network interface	Dual core processor or equivalent 2 GB RAM min Minimum 160 GB HDD
Color toner	10/100/1000 Base-T
Keeping color CAD	Min 4 colors
Output Tray	Yes
Language print	Yes
Drivers	HP-GL/2, HP-RTL, TIFF, JPEG, PDF
Web scan using FTP, scan to network folder, scan controller	Window NT 4.0 / Server 2003 / XP / Vista / 7 AutoCAD 2004/2006/2008
Warranty	Yes
4. Scanner A3	
Resolution	600x1200 dpi
Scan speed black	A4 (200dpi) minim 23 ppm, A3 (200) dpi minim 13 ppm
speed color scanning	A4 (200 dpi) minim 21 ppm, A3 (200dpi) minim 8 ppm,
Network	10/100/1000 Base-T
drivers	Windows NT 4.0/Window 2000 / XP / Server 2003 / Vista / Windows 7
Operating Manuals	RO
Warranty	1 year, on-site
5. Total station GIS	
Accessories included	support, bag, tripod aluminum Battery - 2 pcs, Charger, Data Transfer Cable, support and target prism Set - 2 pcs .; Milestone 2 pieces ..
measuring distances	minutes. 3000 m
Reflectorless	up to 300m
keyboard	alphanumeric
Battery operating time	8 hours
optical Zoom	30x
Accuracy	Standard deviation ISO-17123-3) 2", 1.5 mm+2 ppm / typ. 2.4 s, Fast: 3 mm+2 ppm / typ. 0.8 s, Tracking: 3 mm+2 ppm / typ. <0.15 s
Leveling and centering point	guided laser
SD Card	Yes
USB interface	YES
data transfer	Transfer data to the computer via cable or wireless system
software	Licenses for the use and the software required for data transfer to PC
technical documentation	in Romanian or if not available then in English
Warranty	min 1 year

6. Portable GPS System	
General Description	GPS data acquisition for topographic surveys, create maps and transfer import / export to and from GIS software
other requirements	System accuracy GNSS data collection; Technology precise tracking satellite signal; Radio-modem; The possibility of measuring in real time
Accessories	Jalon, data transfer cable, charger for batteries, 2 sets of batteries, PC software for data processing.
Number of signals	dual frequency system with the ability to connect via modem MOLDPOS measurement system
constellations	GPS/GLONASS/SBAS optional GIOVE-A/GIOVE-B, the possibility of using COMPASS and Galileo.
Connectivity	- RS 232 interface or Bluetooth accessories; - USB connector for communication with the PC; - Bluetooth
internal Memory	at least 128 MB
SD Card	possible to use external memory card of at least 1GB
Display	color
Operation	outreach resistant to water falls from a height of at least 1.5m
Working time	at least 10 hours
Precision measurement of the signal	Measurement precision GNSS signal phase accuracy less than 1 mm and a bandwidth of 1 Hz
modem	Modem GSM / GPRS: Maximum operating distance = 70km
For cold initialization	max. 60 sec
For signal recapture	max. 1 sec
Accuracy	In kinematic mode: <ul style="list-style-type: none"> • Horizontal: 10 mm + 1 ppm, • Vertical: 20 mm + 1 ppm In static mode : <ul style="list-style-type: none"> • Horizontal: 5 mm + 0.5 ppm • Vertical: 10 mm + 0.5 ppm
Operating Temperature	-25°C la 60°C
warranty	min 1 year

All hardware is expected to be branded and licensed; equipment without a certificate of origin will not be accepted as offer.

SOFTWARE

1. Software GIS – basic license (standard)

GENERAL:

- Software which will be purchased has to:
 1. to do part of the professional GIS products are used worldwide for the management of infrastructure, including water and sanitation.
 2. to enable raster data management mixed with the vector and alphanumeric. Vector and alphanumeric data must be managed in an integrated relational database professional, type Oracle or MS SQL.

3. should allow the storage of data in any local coordinate system (defined custom) and in the national and international in all coordinate systems recognized and their processing without the need to import data from one system to another (ie have coordinate transcalculul allow "on-the-fly" system which stores data as they are displayed).
4. to allow both physical modeling network (geographical positioning network elements) and modeling logic network (connectivity between elements, eg connectivity between a pipe and a valve).
5. system is configured in Romanian or if there is not this option, it will be in English.
6. Maintenance, free upgrade and technical support on-line for one year.

INSTALLATION AND OPERATION:

1. system must be able to operate a computer network;
2. license software is protected by "dongle". It is not registered on one computer.
3. system will run on a standard PC with MS-Windows (XP, Vista, 7)

INTERNAL STRUCTURE AND ORGANIZATION OF DATA:

• GIS software will be organized as a mixed system that supports objects "VECTOR" "RASTER" and "CAD" and will have the following characteristics:

1. complete functions fully supports import / export for the following types of data:
 - a) VECTOR (minimum: SHP, E00, DXF);
 - b) RASTER (minimum: TIF, JPG, TIF GEO, ERDAS, ASCII, ECW, MrSID, JPEG2000);
 - c) CAD (minimum: DXF, DGN, DWG)
 - d) database (minimum: DBF, MDB, TXT / DAT).
2. supports the following topologies: points, lines, polygons and networks.
3. allows networks sewage / water distribution be represented as topological networks are networks in which the lines (collector sewer / water distribution pipe) and nodes represent manholes or other accessories (pumping stations, water stations tratatare stations, treatment);liniile si nodurile pot avea propriile baze de date;
4. positions snapping to existing features
5. functions to display values from the database descriptive attributes (labeling);
6. system should allow users to define their own data base structure networks, without the need for further action, eg. extension system, allocations etc .;
7. allows the connection and links to external databases (eg. MS-ACCESS) through ODBC or other means;
8. allows the import files are coordinated inventories (with structure tipulNumar point, X, Y, Z, cod), resulting from topographical surveys, without any additional development;
9. allows processing raster files (geo-rectification, geometric transformations, move, rotate, cut;)
10. external data tables are integrated fully into the internal database;
11. items "VECTOR" "RASTER" and "CAD" can be linked geographically independent of each other, but can be displayed together;
12. application will be implemented coordinate systems commonly used in Moldova, (Moldref Gauss-Krueger, WGS 84, UTM), and will also offer the possibility of defining coordinate systems coordinate noi.sistemele recognized geographically definable by the user;

13. recognized coordinate systems can be defined geographically by the user;
14. There is no limit on geographic objects (eg. amount of points, lines, nodes and polygons) database attributes and records attached to it;
15. system provides full mapping capabilities, including dynamic captions, correct representation of the different coordinate systems, proper scaling, paper playing correctly according to the selected projects;
16. maps can be played at full scale in various formats up to A0. Drawing files can be played via printer / plotter is as well and in digital formats (eg. TIF, PDF). The size of the symbol (eg. Breadth line or line size) may vary depending on the scale used automatically;
17. includes an application system will automatically generate the longitudinal profile of the sewerage network project (section) and elements (manholes, culverts) to release notices

2. Hydraulic Modeling Software

The purpose of testing calculation is to determine the flow distribution in the water supply network, supply and pressure sources with known diameters of pipes and water withdrawals at the nodal points.

When checking calculations known values are:

- The diameters and lengths of all portions of the network and, consequently, their hydraulic resistance
- Fixed nodal water withdrawals
- Pressure-flow characteristics of all sources
- Geodetic mark all nodal points

As a result of testing calculation is determined by:

- Expenses and loss of pressure in all parts of the network
- Supply sources
- Piezometric head at all nodes in the system.

By checking calculations should include payment system in case of fire to an hour and a maximum water consumption calculations and water supply network with an acceptable reduction in the water supply due to accidents in some areas. These calculations are needed to evaluate system performance under conditions different from normal, to identify possible use in these cases, the projected pumping equipment, as well as for the development of activities, excluding the fall of free and reduced supply pressures below the limit values.

3. Hydraulic calculation software for designing water supply network

The aim of the design calculation of deadlock and circular water supply system is to determine the diameters of the pipelines pass providing estimated costs of water with a given pressure.

Under rated operating mode of the network to be understood as the possible combinations of selection of water and its supply pumping stations for which we have the greatest burden for

the individual structures of the system, in particular the water supply network. To include the cost of water stress and head (pressure).

Water supply system, as well as other utilities, it is necessary to count on in the relationship of all structures of water supply and distribution.

Calculation of the water supply system is made with any set of objects that characterize the water supply system, including multiple sources.

4. Software for the computation of transient ("Water hammer")

Calculation of non-stationary processes in complex pipeline hydraulic systems. The purpose of the calculation - identifying sites and nodes, exposed for the transient effects of abnormally high or low pressure. As the events giving rise to transients is expected to enable or disable the pumps or the opening or closing of valves and pipe rupture.

5. Software for building graphical piezometric

In order to build piezometric schedule is a graphic illustration of the results of the hydraulic analysis (verification, design).

6. Software for switching tasks

Allows to calculate the changes in the network due to disconnection or isolation of defined network objects (sites, valves, etc.). Also calculates the volume of the internal systems of heat demand and heat consumption load on the system when the data changes in the network. The results of the analysis are displayed on the map as a thematic coloring and displayed in the report.

All software is expected to be licensed; software without a certificate of origin will not be accepted as offer.

SERVICES

7. Configuration and commissioning

The entire solution will be configured to operate as a turnkey solution, so suppliers' responsibility with configuration and delivery of all required hardware and software installation / configuration / interconnecting following system components:

- Workstations;
- Plotting and scanning equipment A0;
- A3 color laser printers;
- A3 color scanner
- GIS software server / web to work with GIS databases;
- UPS software for automatic shut-down in case of power failure;

Workstations, devices and applications will be connected logically and physically in a computer network at the final beneficiary of possibility additional extensions and connections with other existing systems at the beneficiary office.

8. Testing Solution

With GIS solution will be delivered test scenarios that will be approved by the beneficiar. These tests will cover the main functionality specified in the requirements of desktop and web GIS solution, using the data contained in a test database, made available by the beneficiar.

Tests will be conducted in the presence of the beneficiary and shall be deemed concluded after signing a test report.

Maintenance software of Desktop GIS must have a minimum of 1 year. Software maintenance includes:

- The right to upgrade to new versions emerged;
- Technical Support via email and phone;
- Access to patches and fixes released by the software manufacturer;
- Support any extensions, reconfiguration of solution or any other requests of the beneficiary.

Warranty and the software maintenance will begin to run from the date of signing the test report.

9. TRAINING

Training on all equipment and software contracted functions will be performed in Romanian.

The training material will be presented after signing the contract.

All costs will be borne by the vendor trainers. Each student will receive course materials.

Each training session ends with a Training Report ,it will include:

- Training material / lecture notes (hard copy);
- Presence of trained;
- Final evaluation of the trainees.

Training will be carried out by experts with significant experience in the field.

Training days will be calculated on a working day of 8 hours.

Training will be conducted for all technical specifications offered as required above

Training will last as long as they take all the facilities offered by the program limited requirements above.

Trained personnel will sign for attending and understanding all the requirements specified above.

Training in the use of equipment and software will be made at the IM Apa Canal Cahul. Training expenses will be included in the offer price.

Training will start within 5 working days after signing the acceptance protocol of the Software

Nr.	Course title	Duration (days)
1	GIS, water and sewage networks	2
2	GPS measurements and data processing field Total Station field measurements and data processing	2
3	Hydraulic Modeling - 2 days water network - 2 days sewerage network	4
	Total	8

1. Use standard GIS license

This course will present an introduction to the fundamental concepts concerning GIS software (standard license) and the use thereof for viewing, creating, managing and analyzing geographic data. In the exercise, students will be able to use GIS tools to perform various operations and basic GIS workflows. By the end of this course, students will be able to understand class standard GIS functionalities license and be prepared to

work with these standard GIS applications in order to create GIS maps, geographic data using GIS analysis and realization.

2. GPS and total station Training

GPS:

- overview GPS solution
- Introduction to GPS technology
- Setting up the equipment and software installation
- Planning GPS measurements
- GPS- basic measurements
- Advanced GPS measurements (ROMP)
- Discharge measurements and export to GIS
- Advanced GPS measurements
- Post-processing of GPS measurements
- Discussions and questions

Total Station:

- Introduction to total station
- Presentation device
- Types of measurements
- Menu apparatus
- Installation, setting camera - point and orientation station
- Measurements: points radiated
- Measurements: traverse
- Measurements: leveling, transmission rate
- Download / Processing / Data Interpretation

3. Training on the use of hydraulic modeling application

This course will present basic concepts that students need to learn the application in order to use hydraulic modeling of water supply systems and sewage and will track issues: import GIS data, historical and artificial drainage, infiltration into sewers, hydraulic simulation of water supply networks and sewage generation longitudinal profiles, presentation rezulatelor. La end of this course, participants will have to acquire the knowledge needed to use the main features of the application of hydraulic modeling

Trained personnel will sign for attending and understanding all the requirements specified above.

People who are trained will be trained for GIS and hydraulic modeling.