

**INTEGRATED LAND ADMINISTRATION SYSTEM PROJECT  
(IBRD Loan no. 8086-HR)**

**TERMS OF REFERENCE**

**CONSULTING SERVICES FOR THE STUDY OF THE ESTABLISHMENT OF NATIONAL  
INTEGRATED UTILITY GEO-INFORMATION SYSTEM INFRASTRUCTURE**

Zagreb, June 2014

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## **TERMS OF REFERENCE**

### **CONSULTING SERVICES FOR THE STUDY OF THE ESTABLISHMENT OF NATIONAL INTEGRATED UTILITY GEO-INFORMATION SYSTEM INFRASTRUCTURE**

#### **1 Background information**

The Integrated Land Administration System Project (hereinafter: ILAS Project) is a project of the Government of the Republic of Croatia ratified by the Law on Loan Agreement between the Republic of Croatia and the International Bank for Reconstruction and Development for the ILAS Project (OG MU 13/2011), and launched to modernize the land administration system in order to improve state administration services in terms of efficiency, transparency and cost. The Project is managed by the Croatian Ministry of Justice (hereinafter: MoJ) and the State Geodetic Administration (hereinafter: SGA), and the two institutions are equally responsible for its implementation. In accordance with the Loan Agreement, the Project Implementation Unit (hereinafter: PIU) is responsible for procurement, financial management, payments, monitoring and evaluation and it supervises the compliance of safeguards compliance under the ILAS Project.

##### **1.1 Introduction**

The State Geodetic Administration (SGA) is a public agency dealing with administrative and professional tasks in the field of geodesy, cartography, cadastre and photogrammetry. The SGA's activities include computerization of the cadastre, geodetic and spatial system, official state cartography, geodetic and technical documentation, statistics of the real estate cadastre and spatial units, and geodetic works connected with the state border.

The SGA consists of the Head Office in Zagreb, 20 regional cadastral offices and 112 branch cadastral offices. The Head Office is divided into four sectors: Sector for Financial Affairs, Strategic Planning, Procurement and General Operations, Sector for Geoinformation Systems, Sector for Cadastral System, and Sector for State Survey.

##### **1.2 Current status of Utility Cadastre system**

The analogue utility cadastre register was first regulated in 1969 with the "Regulations on methods and methodology of work in surveying underground installations and facilities" (Official Gazette 49/1969).

This was followed by the 1973 "Law on Utility Cadastre" (OG 44/73), the 1988 "Law on Utility Cadastre" (OG 50/88), resulting in the "Regulations on Utility Cadastre" (OG 52/89).

Pursuant to the "Law on Utility Cadastre" (OG 50/88), lines are recorded in the utility cadastre that are laid on the ground, above ground, under ground and under water, as all the related object are also considered utility lines.

Responsibilities for managing utility cadastre registers have changed over the years. The establishment of utility cadastre registers, pursuant to the "Law on Utility Cadastre" (OG 44/73), was passed on cadastral offices, which at the time were part of the local government. The 1988 Law treats the utility cadastre registers kept by utility lines owners

and those kept by municipal authorities equally. The “Law on State Survey and Real Estate Cadastre” (OG 128/99) stipulated that utility cadastre registers are under the responsibility of future surveying offices in the bodies of local government, while the SGA should adopt a new “Regulation on the content, method of production and utility cadastre management”. That was not made before the adoption of the new “Law on State Survey and Real Estate Cadastre” (OG 16/07) 2007. Pursuant to the new “Law on State Survey and real Estate Cadastre” (OG 16/07), utility cadastre registers remain under the jurisdiction of the bodies of local government.

The Croatian utility cadastre is now regulated by the 2007 “Law on State Survey and Real Estate Cadastre” (OG 16/2007, 152/08, 124/10) and the 2008 “Regulations on Utility Cadastre Lines” (OG 71/2008, 148/09).

The “Law on State Survey and Real Estate Cadastre” (OG 16/2007, 152/08, 124/10) defines the following:

- Local governments are responsible for establishing and managing the utility cadastre.
- Geodetic activities in local government are defined, and they are as follows:
  - Establishment and management of the utility cadastre
  - Establishment and management of spatial units (settlements, streets and house numbers, determining house numbers)
- In the utility cadastre, the following are recorded: electricity lines, telecommunications, water, sewer, hot water, oil and gas pipeline network. In terms of the “Law on State Survey and Real Estate Cadastre” (OG 16/07), other objects belonging to utility cadastre are considered as part of the utility network.
- Utility cadastre registers contain information on the types and purpose, the basic technical characteristics and position of constructed lines, as well as names and addresses of their stakeholders.
- The utility cadastre is established and maintained based on registers for each type of cables, which their stakeholders need to establish and maintain. Stakeholders are required to provide data on utility lines to the body responsible for establishing the utility cadastre. Data are provided free of charge and within deadlines specified by the local government.
- Supervision of the affairs of utility cadastre updating is carried out by the SGA geodetic inspection.

In the past decade, only a few major cities founded and took over maintenance of the utility cadastre, while on the rest of the Croatian territory, SGA cadastral offices continued to collect utility cadastre elaborates.

The cities of Bjelovar, Koprivnica, Osijek and Velika Gorica established the utility cadastre in accordance with the “Law on State Survey and Real Estate Cadastre” (OG 16/07) and maintained them for the areas of their cities.

As for the City of Zagreb, the utility cadastre is established and maintained by the Municipal Bureau of Surveying and Cadastral Affairs in the Department of Cadastre and Spatial Records.

Cadastral offices use CAD technology for technical cadastre management, while in some

local governments, along with AutoCAD MAP the ESRI ArcGIS is in use. The City of Zagreb has a digital database of the cadastre lines maintained in VodGIS GE Smallworld GIS.

For 2.7% of the total area of the Republic of Croatia, the utility cadastre was established pursuant to the “Law on State Survey and Real Estate Cadastre” (OG 16/07). As for the number of residents who live in these areas, the percentage is higher and amounts to 27.5% of the population of Croatia, while in the City of Zagreb alone 17.6 of the Croatian population lives.

From the above, it can be seen that on 97.3% of the territory of Croatia, where 72.5% of the population lives, the utility cadastre is still maintained by SGA regional cadastral offices. Most of the regional offices only confirm analogue geodetic elaborates and then archive them. However, some regional offices, with tremendous effort, are still trying to maintain the utility cadastre for their areas using modern GIS tools (Vinkovci, Vukovar, Slavonski Brod).

Big and bigger cities, or at least county seats, have not yet taken over utility cadastre data and have not established the utility cadastre pursuant to the “Law on State Survey and Real Estate Cadastre” (OG 16/07).

## 2 Purpose of the project

The purpose of the project is to produce a study and an operational document to define the basic facts about the establishment, implementation and management of the Utility Cadastre in Republic of Croatia (*Croatian: Infrastruktura VODova, i\_VOD*), together with an action plan for the implementation of the Utility Cadastre. The aim of the study is to gain complete coverage of utility cadastre network and related rights, institutional and organizational framework, legal framework, and cadastral data content and IT environment. The Utility Cadastre (i\_VOD) should be viewed as an organizational-technical model, the purpose of which is to record and share spatial data on infrastructural lines among various stakeholders and users.

The goal of the study is to establish a work plan on how to integrate the geo-information systems infrastructure (i\_VOD) in the Republic of Croatia, which should include the following:

- Transport network,
- Energy network (electricity, natural gas, thermal energy, oil and oil products),
- Utility network (water supply, sewerage, public lighting),
- Telecommunications network.

Most of the utility infrastructure concerned was built some time ago and was not, generally, appropriately measured and recorded in geodetic terms. As a result, no adequate digital data are available when the spatial position of infrastructure is in question. Unfortunately, this applies mainly to underground infrastructure. As there are no data about the location of infrastructure, many problems are encountered in practice.

## 2.1 Strategic direction

The vision of utility cadastre system establishment in the Republic of Croatia is divided in two main areas of development:

1. With the Utility Cadastre covering more than 90% of all utility infrastructure in the Republic of Croatia, in the next 10 years the following will be achieved:
  - Realizing major savings because of the use of the utility cadastre.
  - Reducing costs on different levels (state, municipalities, companies, general public) due of less damage on the utility infrastructure.
  - Rising the volume of investment due to higher loan capability of infrastructure owners.
  - Preparing a financial and an action plan to transform old infrastructure utility plans in digital format.
2. The SGA will coordinate core activities in the implementation and maintenance process, together with local administration and cadastral offices, and thus generate revenues from services based on the Utility Cadastre, as well as from the implementation and maintenance process.

## 2.2 Strategic objectives

Based on the current status of the Utility Cadastre in the Republic of Croatia, the new implemented cadastre will achieve the following goals:

- Obtaining information about the “occupancy of space” with regard to the underground utility and other infrastructure,
  - Prevention of infrastructure-related negative publicity - preventing and reducing the cost of direct and indirect damages.
- Management of the infrastructure,
  - Implementation of conditions for keeping records of the utility infrastructure.
- i\_VOD should be developed in such a way that infrastructure data, together with land cadastre data, are available in the same projected coordinate reference system (HTRS96\_TM/ETRS89\_TM) to all interested parties.
- Development of the SGA as the main coordinator and manager of the utility cadastre together with local administration.

## 3 Tasks

The tasks that need to be carried out before writing a “Study of the establishment of national integrated utility geo-information system infrastructure” are as follows:

**Task A:** The legal, organizational and financial framework as a precondition for the implementation of i\_VOD cadastre on the national level:

- Snapshot of the current situation and the availability of records of infrastructure data and other related objects in the Republic of Croatia. This is

- Official visit to SGA regional and local cadastre offices:
  - a. Regional office – Karlovac
  - b. Local offices – Vinkovci and Jastrebarsko
- Official visit to local government offices that maintain utility cadastre data:
  - a. City of Zagreb - Municipal Bureau of Surveying and Cadastral Affairs in the Department of Cadastre and Spatial Records
  - b. City of Velika Gorica – Administrative Department for Geodetic Works
- Official visits to other stakeholders.
- Preparing recommendations for establishing i\_VOD of Croatia on the basis of the Consolidated Cadastre of Public Infrastructure in the European Union similar to the system inherited in Croatia.
  - Analyze organizational and legislative opportunities in Croatia.
  - Analyze the document “Utility Cadastre from December 2012”.
  - Identify potential customers and interested parties.
  - Identify the specific needs of stakeholders in Croatia.
  - In the end: prepare a draft “Assessment” document.
- Analysis of the relevant existing legislative framework and analysis of the EU regulatory framework to provide specific recommendations for the development or adaptation of the legal framework.
- Preparing draft new legislation about the Utility Cadastre (draft “Legal framework”)
  - New legislation has to define the processes, responsibilities and competencies among different stakeholders.
- Preparing recommendations for establishing the IT infrastructure
  - The Utility Cadastre cannot be managed without an efficient and integrated IT infrastructure on the national level.
- Preparing the organizational structure
  - As the SGA will be the organization responsible for the Utility Cadastre on the national level (draft “Organizational framework”), a new internal organizational structure has to be implemented.
- Defining the processes of data maintenance
  - Without regular maintenance of data, the implementation of the Utility Cadastre will only be a one-off job. Thus the processes have to be determined and regulated by legislation.
- Preparing a plan on how to obtain 80% digital infrastructure data in the next 5 years
  - In order to develop services and generate revenues, a massive volume of data has to be digitalized and entered into the system.
  - The focus is more on the volume of data than on the high accuracy (not mm accuracy).
  - Analysis of financial, material, human and time resources required to transfer data from analogue to digital format.

**Task B:** Propose a Data Model and a solution for i\_VOD system on the basis of the following:

- Analysis of international and European standards (INSPIRE Directive (Infrastructure for Spatial Information in Europe), ISO/TC211 standards, OpenGIS Consortium (OGC) standards), and the steps that need to be implemented to fulfil the obligations arising from the INSPIRE directive:
  - Description of metadata
  - Establishment of service
  - Creating data models
- Analyze the draft “Assessment” document and the draft document “Legal framework”, and propose an i\_VOD data model on the basis of the assessment of available data types and needs in the end. Propose the initial establishment of i\_VOD system based on existing data that are maintained and managed by cadastral offices, local government and other stakeholders.
  - Analysis and implementation of different examples of analogue/digital utility reports.
  - Design a technical solution for a system for storing and maintaining utility cadastre data
    - a. Analysis and comparison of similar existing solutions (in Croatia and internationally)
    - b. Adaptation of the proposed solution to SGA needs
- After the initial establishment of i\_VOD system, the consultant needs to provide methodology of data collection, entry, processing, datum transformation (HDKS\_GK (y, x, H (TRST)) → HTRS96\_TM (E, N, H (HVR571))) and quality control procedures.
- Define the criteria by which some information is considered relevant to be included in i\_VOD system for the entire country.
- Define an interchange format in which to submit data lines.
- Provide an estimate of the financial and human resources necessary to implement i\_VOD system (organization, implementation and data level) on the national level.
- Provide timelines for each phase of work.
- Make proposals for IT connectivity of i\_VOD and the following:
  - Real estate/Land cadastre,
  - Register of Spatial Units,
  - Local Governments,
  - Geoportal NSDI (National Spatial Data Infrastructure, <http://www.nipp.hr/default.aspx?id=112>)
  - Process for viewing and confirming utility cadastre (light version) in Joint Information System (JIS) <http://www.uredjenazemlja.hr/default.aspx?id=22>
  - Other stakeholders.
- After presenting the draft document to the SGA, produce the following:
  - Final draft of the document “Assessment”, and assess the extent of data and the scope of work on the national level
  - Final draft of the document “Legal framework”
  - Final draft of the document “Organizational framework”



- Draft document of the proposed Data model (“Proposal of data model”), within which the initial proposal of establishing i\_VOD of the Republic of Croatia will be given and assessed the extent of data and the scope of work on the national level
- Draft document “Regulations on i\_VOD Cadastre”
- Draft document “Technical Specifications of i\_VOD Cadastre”

## 4 Expected Reports and Products

The official language of the contract will be English. All materials and reports made by the consultant under this contract will be made available to the client in analogue and digital format and be owned by the state contracting authority.

The consultant shall prepare and submit the following reports as parts of the final product in the individual phases of the task. The contractor will submit the following reports to the client in the English and Croatian language in one hard copy and also on CD:

- Inception report of cca 12 pages made two weeks after the start of implementation. In the report, the consultant will describe, for example, the first results (progress in data collection, difficulties he encountered or anticipated) in addition to the program of work and mobilization of personnel.
- Draft final report of cca 30 pages (main text, without appendices). This report will be submitted no later than one month before the completion of the tasks.
- Final report with the same specifications as the draft final report, incorporating all comments received from all interested parties on the draft Final report. Detailed analysis, underlying the recommendations, will be presented as appendices to the main report:
  - Final draft “Assessment”
  - Final draft “Legal framework”
  - Final draft “Organizational framework”
  - Final draft “Proposal of data model”
  - Final draft “Technical specifications of i\_VOD cadastre”
  - Final draft “Regulations on i\_VOD Cadastre”
  - The final document “Study of the establishment of national integrated utility geo-information system infrastructure”, final document that emerged from the draft documents “Legal, organizational and financial framework as a precondition for the implementation i\_VOD cadastre on the national level”,

The submission period for the study of establishing i\_VOD cadastre in Croatia is maximum 2.5 months from the acceptance of the inception report.

#### **4.1 Transfer of knowledge and training**

The consultant is required to organize workshops for:

- representatives of the most important government bodies, representatives of state bodies and institutions,
- owners/stakeholders of infrastructure,
- public consultation for users of data lines and all other stakeholders in Croatia in which the consultant will present:
  - Draft document “Legal, organizational and financial framework as a precondition for the implementation of i\_VOD cadastre on the national level”
  - Draft document “Proposal of data model”
  - Draft document “Regulations on i\_VOD Cadastre”
  - Draft of “Technical specifications of i\_VOD Cadastre”

The conclusions of the discussion should be included in the Final report: “Study of the establishment of national integrated utility geo-information system infrastructure”. Within the study, the consultant should propose a method and methodology for raising awareness of the need to establish i\_VOD Cadastre and its importance for all participants.

### **5 Planned duration of Consultant's engagement and reporting timeline**

The Consultant is planned to be engaged in the period between August 2014 and November 2014. The total estimated number of working days is 65.

The submission of reports and other deliverables:

- Within the first two weeks after commencing the service, the Consultant shall submit the Inception Report.
- Draft final report of cca 30 pages (main text, without appendices) will be submitted no later than one month before the completion of the tasks.
- At the end of the work, the Consultant shall submit the Final report.

The Inception Report and the Final report shall be in the English and Croatian languages. One copy of the Final report shall be submitted in hardcopy and also on CD, in open format.

## 6 Client's support

The Client will ensure cooperation with the Consultant during the term of the contract and will provide overall guidance and inputs.

The Client shall provide the Consultant with the following:

- Contact person at the SGA:  
Marinko Bosiljevac, Sector head  
Gruška 20, 10000 Zagreb  
Phone: 01/6165 412  
E-mail: [marinko.bosiljevac@dgu.hr](mailto:marinko.bosiljevac@dgu.hr)
- All existing SGA documents related to the current utility cadastre status in Croatian or English, depending on the availability.
- Ensure premises at the SGA for holding appropriate meetings.

## 7 Requirements

To accomplish the task, it is necessary to hire a Consultant (company or joint venture including several consultants or sub-consultants) with experience in providing services in the field of land administration, with an emphasis on infrastructure/utility cadastral services. The experts must have experience in the establishment, management and operation of utility cadastre systems, and must have made at least one study in the field of integrated utility cadastre/land administration.

The execution of the required consulting services will be provided by a team of experts who will be engaged for a period of three months. The contracted team of experts will provide the following:

- Team leader for a period of three months - one person, 35 person/days.
- Legal expert - one person, 5 person/days,
- IT expert for data modelling, one person, 10 person/days,
- Cadastral expert, one person, 15 person/days,
- Translators and any other experts proposed and agreed with the Client.

With the following skills and experience:

**Team Leader** (relevant professional experience):

- Minimum university degree in land surveying, with experience working in and establishing the utility cadastre on the national level.
- Proven experience in the field of working on and establishing spatial data infrastructure of the Utility Cadastre for the last 5 years.
- Knowledge of legal requirements of the EU and applicable standards.
- Experience in managing at least two projects related to the field of utility cadastre.

- Good knowledge of the Croatian system of land administration and the current situation and availability of real estate cadastre and land registry.
- Experience in the implementation of projects financed by the World Bank will be an advantage.
- Proven familiarity with the Croatian Utility Cadastre and transfer of INSPIRE directive into the Croatian legislature is considered an advantage.
- Knowledge of English.

**Legal expert** (relevant professional experience):

- Minimum university degree in law and at least 5 years of professional experience in the Croatian legal system related to land administration and the utility cadastre.
- Experience in activities related to proposing and adopting a legislative framework.
- Experience in working in the field of land administration in Croatia.

**IT expert** (relevant professional experience):

- University degree in information technologies, and at least 5 years of working experience in the analysis and design of ICT systems.
- Domain experience in the implementation of the themes of transport network and utility services defined in the INSPIRE Directive.
- Experience in the development and implementation of at least one project related to GIS.

**Cadastral expert** (relevant professional experience):

- The level of education which corresponds to completed university studies of at least three years as evidenced by a degree in surveying and land administration.
- 5 years of professional experience in utility-related activities.
- Practical experience in at least one project to establish the utility cadastre, knowledge of the situation in the region.
- Experience in one project related to GIS.

A consultant will be selected in accordance with the *selection based on the Consultants' Qualifications (CQS)\** procedures set out in the World Bank's Guidelines: Selection and Employment of Consultants by World Bank Borrowers (*January 2011*)\*.

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\* Updated July 9, 2014