

# AGENCY FOR REAL ESTATE CADASTRE

## Cadastrre of infrastructure objects in Republic of Macedonia

**Skopje, 10.2014**

**Vasil Miskovski**

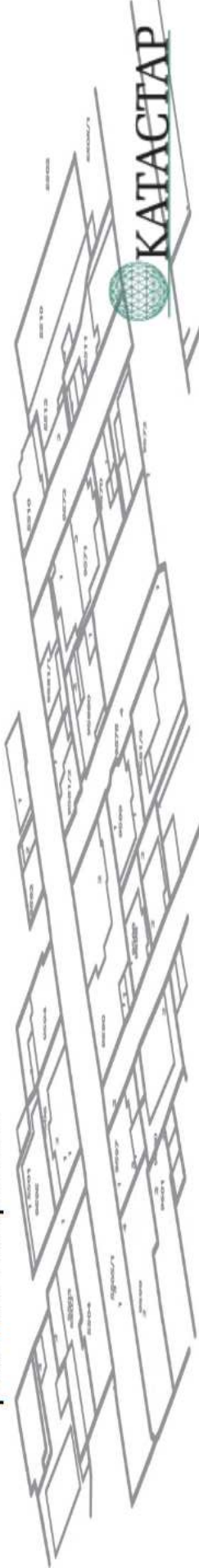
*rukovodilac sektora za digitalnih katastarski planova,  
cuvanje I izdavanje podataka*



## **ESTABLISHMENT OF CADASTRE OF INFRASTRUCTURE OBJECTS**

The Program of the Government of R. Macedonia for the period of 2011 – 2015, stipulates that during 2014, AREC to establish a Cadastre of Infrastructural Objects in R. Macedonia

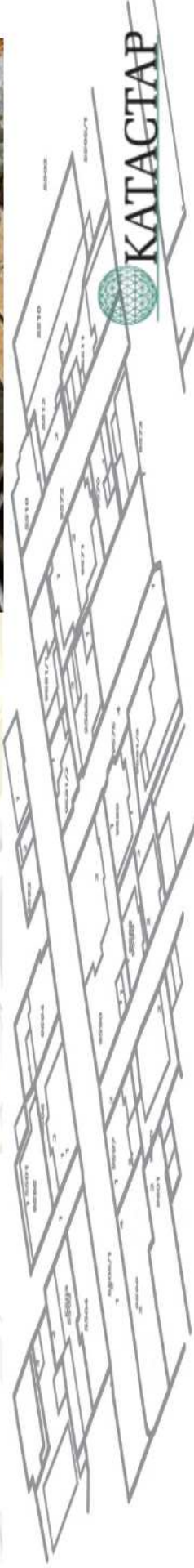
- In mid 2012, AREC established a Working Group which initiated activities for drafting an analysis for the current status of the data required for this type of cadastre which are owned by the holders of the infrastructural objects
- AREC organized working meetings in Skopje with utility companies – holders of infrastructural objects (telecommunication providers, cable operators, water supply and sewage, EVN, BEG and others)
- AREC organized working meetings with the local self-government units and their public enterprises.





# Identified status of the infrastructure objects

- Unknown location of the underground installation,
- Unknown ownership of the underground installation,
- Lack of complete construction-technical documentation,
- Lack of protection from damaging the infrastructure, prevention and decreasing the costs of direct and indirect damages,
- Long process of collecting documents from several institutions for the location of the installations prior the start of the construction.





# Identified status of the infrastructure objects in Republic of Macedonia expressed in numbers

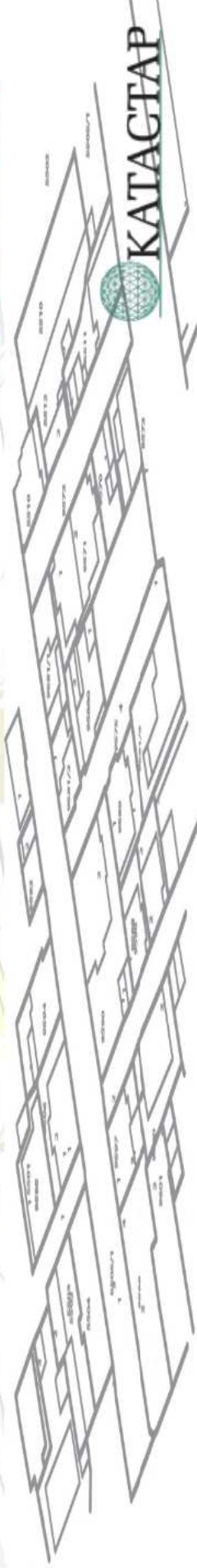


## Electricity supply

- High voltage 0% digital data, incomplete documentation
  - 100 000 km low voltage network out of which only ~ 30% is in digital format
  - Transfer of heating energy - Skopje
- 250 km network, data available for 95%

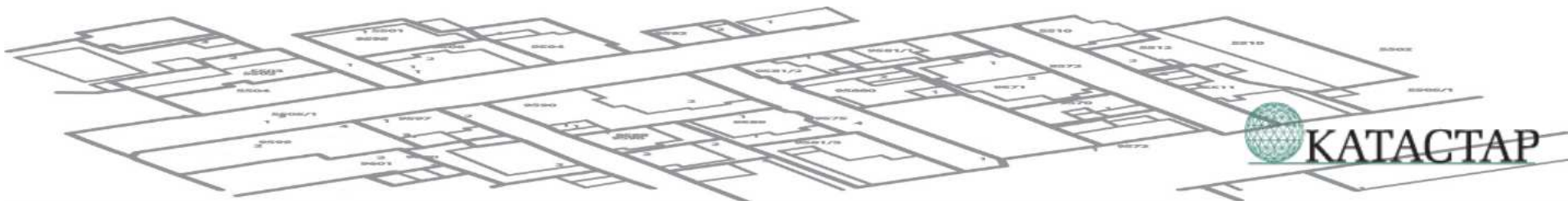
## Telecommunications – T-HOME

- 15000 km out of which data is available for 60%, while the remaining 40% need to be discovered and geodetic survey needs to be performed
- Water supply and sewage
- 6000 km networks in R.M. data is available for less than 26%
- Gas line, Oil line,...
- Accuracy of data ranging from 1 to 5 meters



# Studies, analyses and workshops

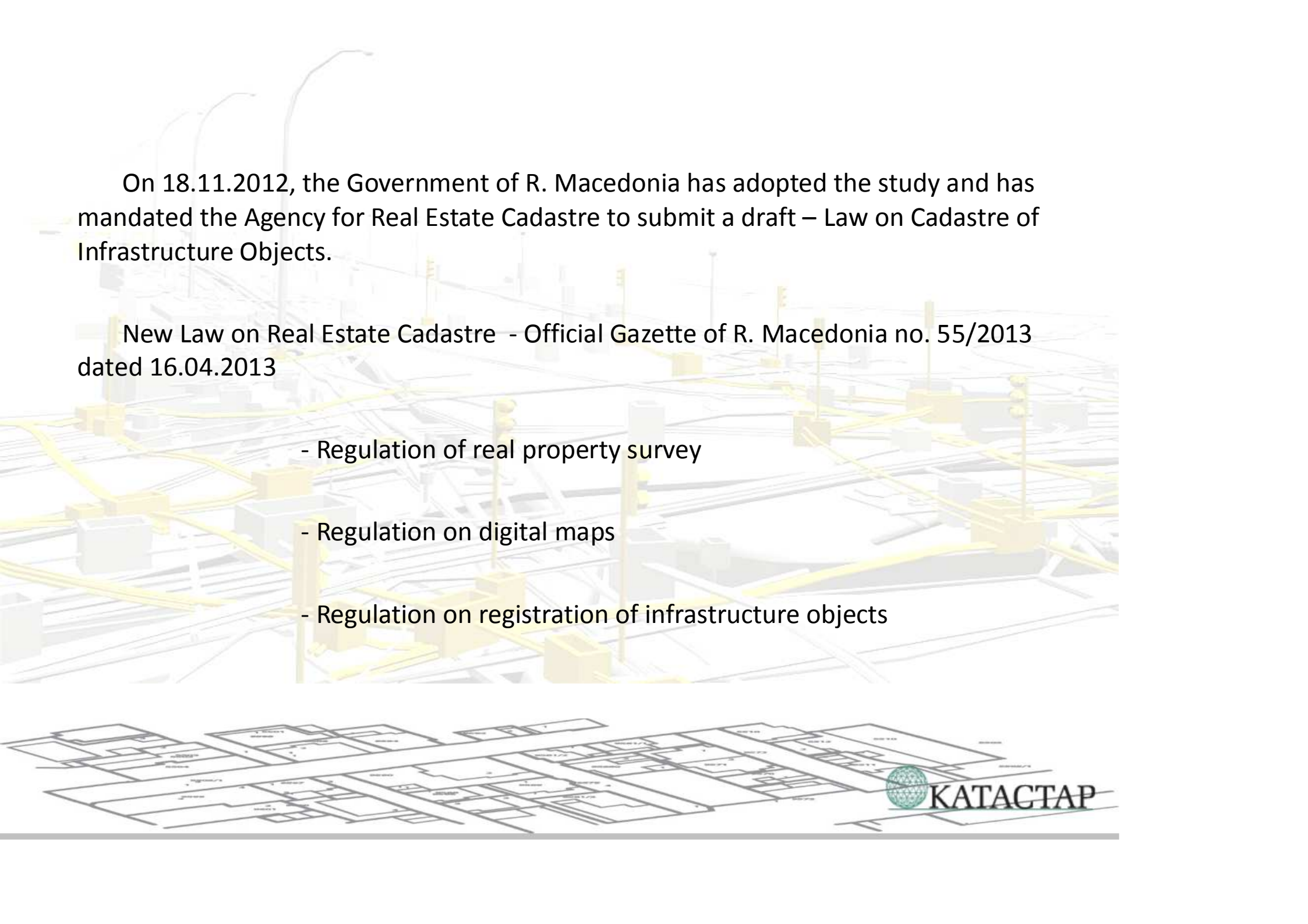
- The SIDA funded project provided resources for drafting an analysis and a feasibility study.
- “As Is Analysis Utility Cadastre”
- Feasibility Study
- Study visits in the Cadastre Institutions of the Netherlands, Lithuania, Slovenia in order to obtain information and gather experiences in reference to the cadastre of infrastructure objects
- A Public hearing was organized in reference to the Feasibility Study





# Recommendations from the analysis and the studies

- Need of accurate information about the location of the underground installation or infrastructure within one or more parcels
- Obtaining completely digital information
- Ownership of the underground infrastructure (Property List)
- Improvement of the safety during construction works
- Further development of the mortgage market
- Prevention of damages to the infrastructure, decrease of the costs of direct and indirect damages and loss of human lives
- Simple and fast process of acquiring a document for the underground infrastructures from one place



On 18.11.2012, the Government of R. Macedonia has adopted the study and has mandated the Agency for Real Estate Cadastre to submit a draft – Law on Cadastre of Infrastructure Objects.

New Law on Real Estate Cadastre - Official Gazette of R. Macedonia no. 55/2013 dated 16.04.2013

- Regulation of real property survey
- Regulation on digital maps
- Regulation on registration of infrastructure objects



# Cadastral of infrastructure objects in Republic of Macedonia

- “Infrastructure object” is an object in the field of traffic (land, water and air traffic), underground and above ground installations (lines) and electronic communication networks and means, with all auxiliary installations.





# Basic classification of the infrastructure objects

- Traffic infrastructure
- Water supply infrastructure (primary and secondary network)
- Sewage infrastructure
- Energy infrastructure
- Electronic communication infrastructure
- Other types of infrastructure
- The basic classification has 19 types or ~ 190 subtypes of infrastructure objects which may be registered in the Cadastre of infrastructure objects

# Survey of infrastructure objects

- ✓ Basic data which is collected for one infrastructure object
  - Spatial data - coordinates for intersection points per position and per height (Y,X,H), as well as for specific points of the infrastructure objects
  - Descriptive data – type of infrastructure object, height, length, width, personal and address data for the right holder, strength, profile, type of material...
  - Unique identification code of the Infrastructure Object



# Methods of detecting i.e. discovering the underground infrastructure objects

- The process of detecting i.e. discovering the underground infrastructure objects is performed with:
  - utility scanner/radar,
  - by digging
  - combined with a utility scanner/radar and digging
- The accuracy of the objects being discovered i.e. detected is 15 cm
- Control is being performed at the beginning of the Infrastructure object, specific points, locations where the dimensions change, merging points or separation of two or more objects



# Survey of newly built infrastructure objects

- The newly built underground infrastructure objects are to be surveyed before they are covered in the utility trench.
- Spatial 3D data(Y,X,H) which are being collected during the survey stipulated in paragraph 1 of this article should be with accuracy not less than 10 cm

## Methods of Survey

- Polar method
- Method of Global Satellite Positioning – GNSS

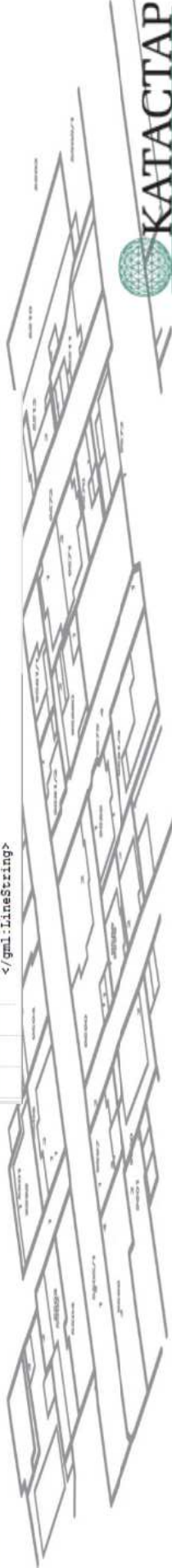


# Geodetic Report for Infrastructure Objects

- Geodetic Reports are being produced at the request of a client from the performed survey of the infrastructure objects in service of the establishment of the cadastre of infrastructure objects
- The Geodetic Reports are produced in xml/gml format
- The Geodetic Report must be properly signed with an electronic signature by the entity drafting the report
- AREC has developed a custom-made software called MakEdit which enables the private geodetic companies to process the field data

# Spatial data for the infrastructure object gml - lines

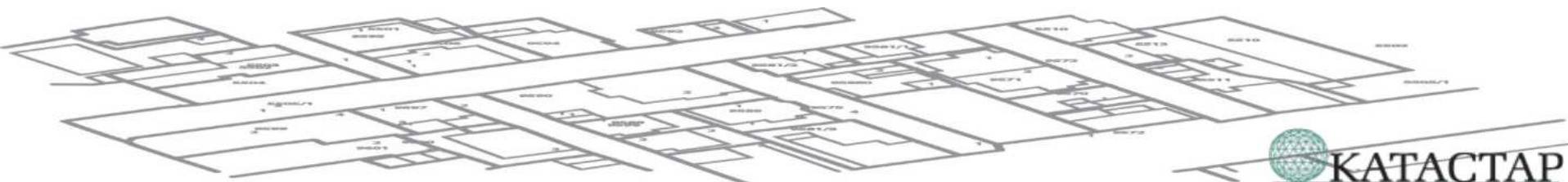
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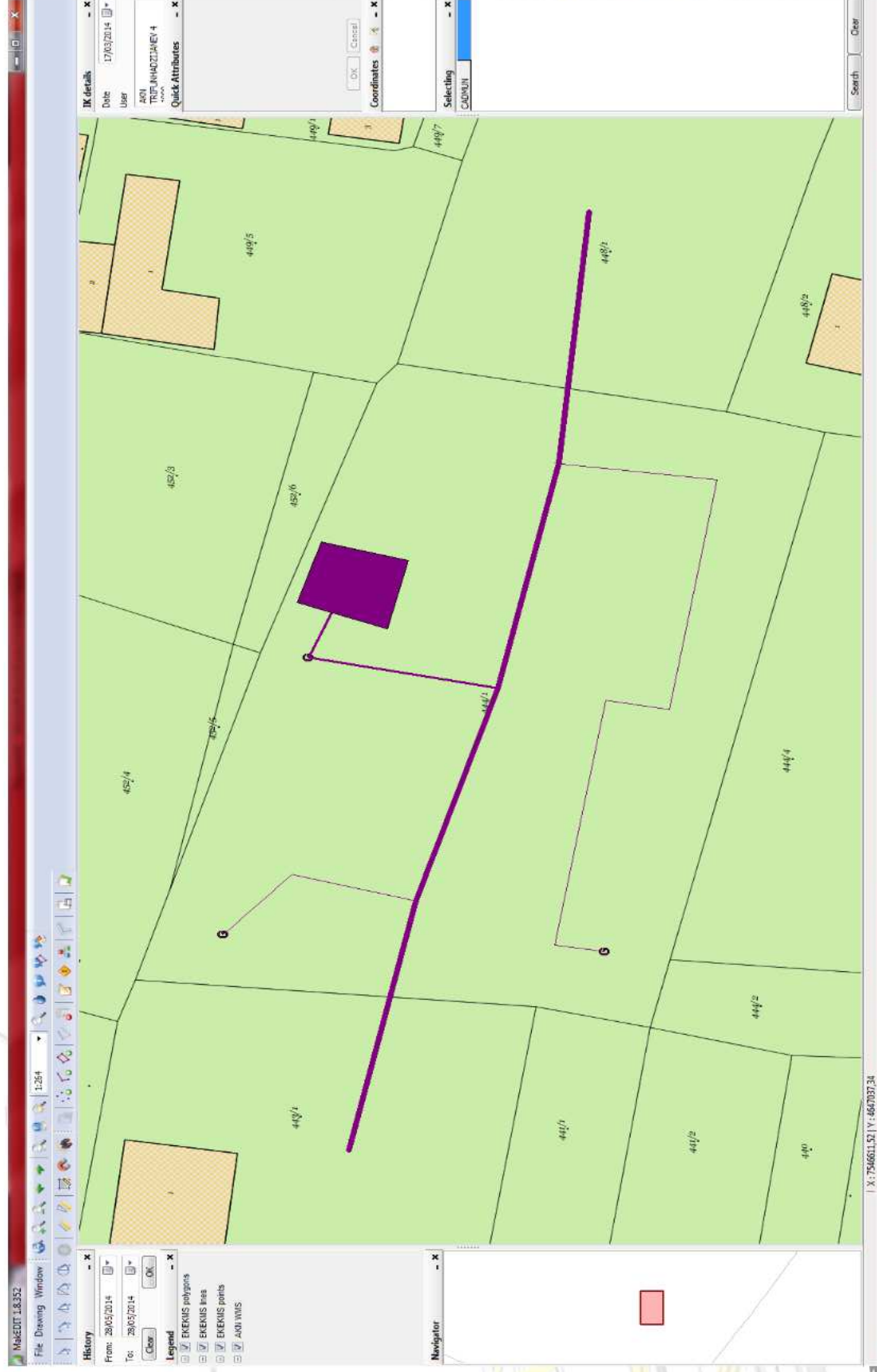


# Spatial data for the infrastructure object gml – height i.e. elevation

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# MakEdit





# Data Processing

**MakEDIT 1.8.352**

File Drawing Window

History: From: 28.05.2014 To: 28.05.2014

Legend: ☒ EKEKMS polygons ☒ EKEKMS lines ☒ EKEKMS points ☒ AKN WMS

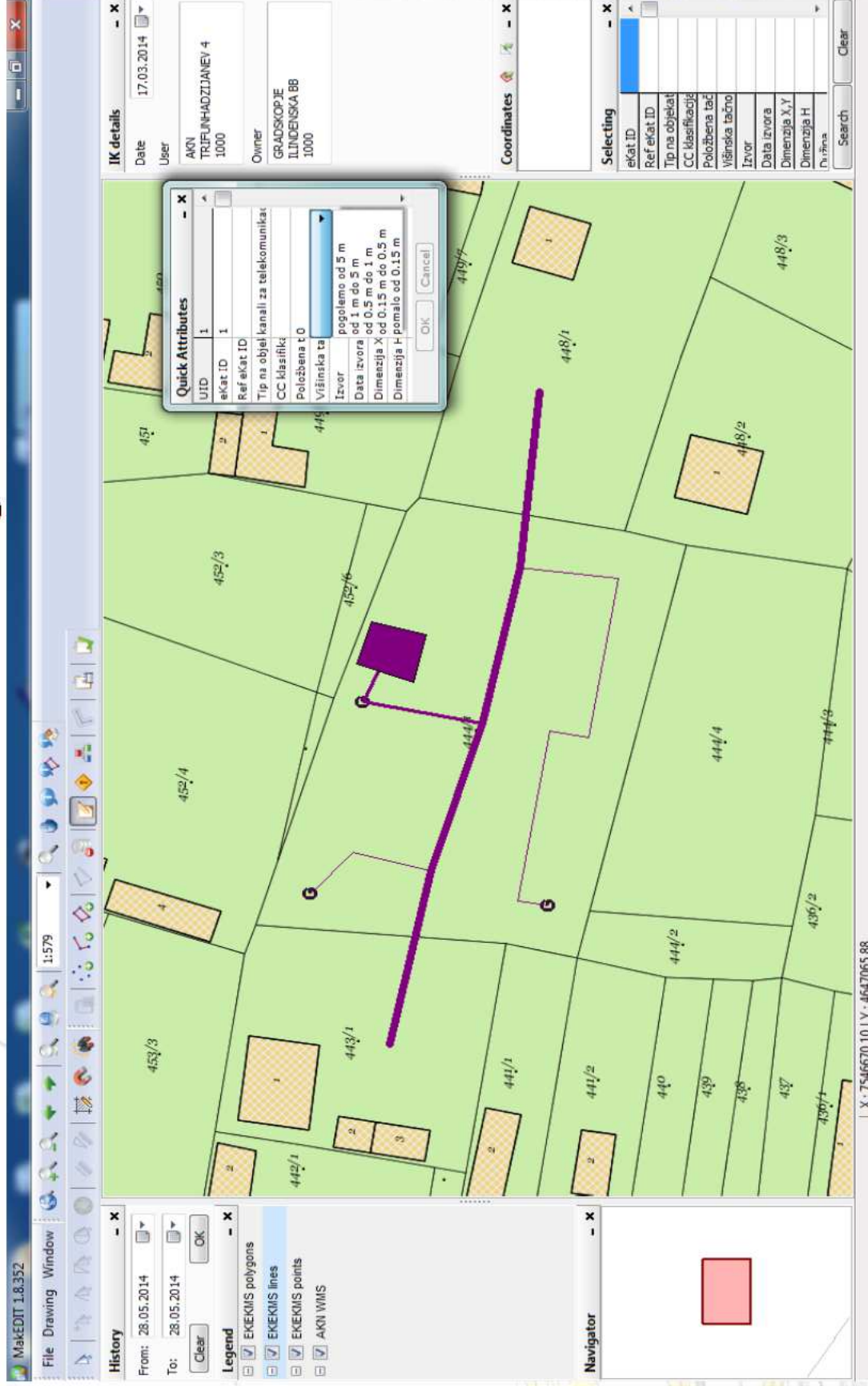
IK details: Date: 17.03.2014 User: AKN TRIFUNHAOZIJANEV 4 1000 Owner: GRADSKOPJE ILINDENSKA BB 1000

Quick Attributes: UID: 1 eKat ID: 1 Ref eKat ID: 1 Tip na objekat: Tip na objekat za telekomunikac CC klasifik: Polozbena to: Višinska ta: Izvor: pogolemo od 5 m od 1 m do 5 m Data izvora: od 0.5 m do 1 m Dimenzija X: od 0.15 m do 0.5 m Dimenzija H: pomalo od 0.15 m

Coordinates: X: Y:

Selecting: eKat ID: Ref eKat ID: Tip na objekat: CC klasifikacija: Polozbena tač: Višinska tačno: Izvor: Data izvora: Dimenzija X,Y: Dimenzija H: Dužina: Search Clear

Navigator: X: 7546670.10 Y: 4647065.88



# Details for the infrastructure object in the E-Kat system

Firefox ☐ ekat :: ☐ ekat platform.katastar.gov.mk ekat/Prebaruvanje/ModulPrebaruvanje.jsp?id\_req=-1

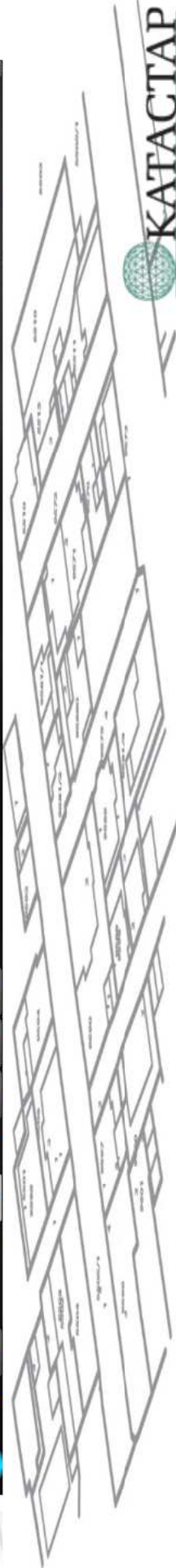
Most Visited ☐ ekat NOV ☐ infrastrukturen

Details for infrastructure: 1

Основна класификација:	ЕК/ЕКМС - Електрд	Подкласификација:	ЕК/ЕКМС4 - бакар	ИО од компанијата:	198
Бр. на ИП:	1	Поврзано со:	0	Повр. со Комп.:	
Коefициент тол. УХ:	до 0.10 m	Коefициент тол. Н:	до 0.10 m	Должина(м):	54.29
Извор:	отворен ров	Датум на преглед (гггг.мм.дд):		СС класификација:	0
Ширина(м):	0.1	Висина(м):	0	Искористеност:	во употреба
У почеток:	7528644.33	Х почеток:	4542362.14	Викано место почеток:	Питу Гули
У крај:	7528683.19	Х крај:	4542331.54	Викано место крај:	Климент Охридски
Материјал на ИО:	бакар	Име на ИО:	Кабел 97 Битола		
Висина/длабочина м, отворена површина:	0	Напонско ниво/напон/електрифицирана:	50		
Насока/тип на колок:	---	Тип на железница/име:			
Основ:	СО ГРАДЕЖНА ДОЗ	Право:	СОПСТВЕНОСТ	Предбелешка:	НЕ Е ПРЕБЕЛЕЖАН
Опис:					

Затвори

Пребарај по инфраструктура





## СПИСОК НА ПРОМЕНИ ЗА ИНФРАСТРУКТУРЕН ОБЈЕКТ 1'2014

ПРОМЕНИ НА ПОДАТОЦИ ЗА НОСИТЕЛИТЕ НА ПРАВООТНОСИТЕЛИТЕ									
Нова Состоба									
ИД	ИД	ИД/Е/С/С/С	Име и презиме / Име	Адрес		Датум на издаване	Промени според заповедите	Базис на издаването на разрешението	Содержание запис
				Место	Улица				
1	1	110060	НАЦИОНАЛНИТЕ ИСТОРИЧЕСКИ И КУЛТУРНИ ПАМЯТНИЦИ - СКОПЈЕ	СКОПЈЕ	БЛ. 19-19 КОСОВСКА	8	РЕШЕНИЕ ЗА ОДОБРВУВАЊЕ НА ПРАЗНА УПР. 10-881 ОД 19.02.1998 ГОДИШНО ОД НАЦИОНАЛНИТЕ ИСТОРИЧЕСКИ И КУЛТУРНИ ПАМЯТНИЦИ И ЗА ПРАЗНИКАТА СРЕДИНА - ПЕ ВТОРАТА ЖИВОТНАТА СРЕДИНА - ПЕ ВТОРАТА РЕШЕНИЕ ЗА УПОСОБИ ЗА ПРАЗНА УПР. 10-464 ОД 23.04.1998	1130-10214	Легенда Вуковаци

[illegible]

ПРОМЕНИ КАЈ ПОДАТОЦИ ЗА КАРАКТЕРИСТИЧНИ ПАРАМЕТРИ НА ИНФРАСТРУКТУРНИОТ ОБЈЕКТ											
Нова Состојба											
Идентификациска Бројка	Димензии (m)	Средна Дебелина (m)	Волумен (m <sup>3</sup> )	Материјал	Натпрегнат Статус	Ресурси за објектот	Налични документи	Тип на настанала промена	Датум на извршена промена	Вид на промена (најчесто замена на објектот)	Објектен назив
1	100 m	1 m	100 m <sup>3</sup>	Бетон	Не	1	1	1	1	1	1





# FIRST PROPERTY LIST FOR INFRASTRUCTURE OBJECTS ISSUED ON 22.04.2014

РЕПУБЛИКА МАКЕДОНИЈА  
АГЕНЦИЈА ЗА КАТАСТАР НА НЕДВИЖНОСТИ  
1134-1/2014 од 22.04.2014 16:15:04



## ИМОТЕН ЛИСТ ЗА ИНФРАСТРУКТУРНИ ОБЈЕКТИ број: 1 ИЗВОД

ЛИСТ И1:ПОДАТОЦИ ЗА НОСИТЕЛОТ НА ПРАВОТО								
Ред. бр.	ЕМБГ / ЕМБС	Име и презиме / Назив	Адреса / Седиште	Дел на недвижност	Сопственост / сопственост / заедница	Правен основ на запишување	Број на предмет по кој е извршено запишувањето	Датум и час на запишување
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ЛИСТ И2:ПОДАТОЦИ ЗА ПОЛОЖБАТА НА ИНФРАСТРУКТУРНИОТ ОБЈЕКТ										
Единствен идентификатор		Име на објект	Описан податок за почеток и крај на инфраструктурен објект		Почеток на инфраструктурен објект со координати		Крај на инфраструктурен објект со координати		Број на предмет по кој е извршено запишувањето	Датум и час на запишување
префикс	идентификатор		Почеток: викано место/адреса	Крај: викано место/адреса	Y	X	Y	X		
ЕКИЕК МС4	1198	Кабел 97 Битола	Питу Гули	Климент Охридски	7528644.33	4542362.14	7528683.19	4542331.54	1138-1/2014	22.04.2014 16:03:02





ИМОТЕН ЛИСТ ЗА ИНФРАСТРУКТУРНИ ОБЈЕКТИ број: 1 ИЗВОД

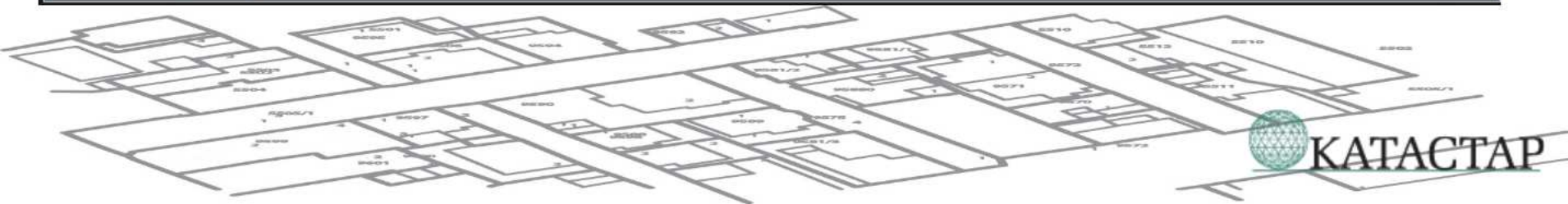
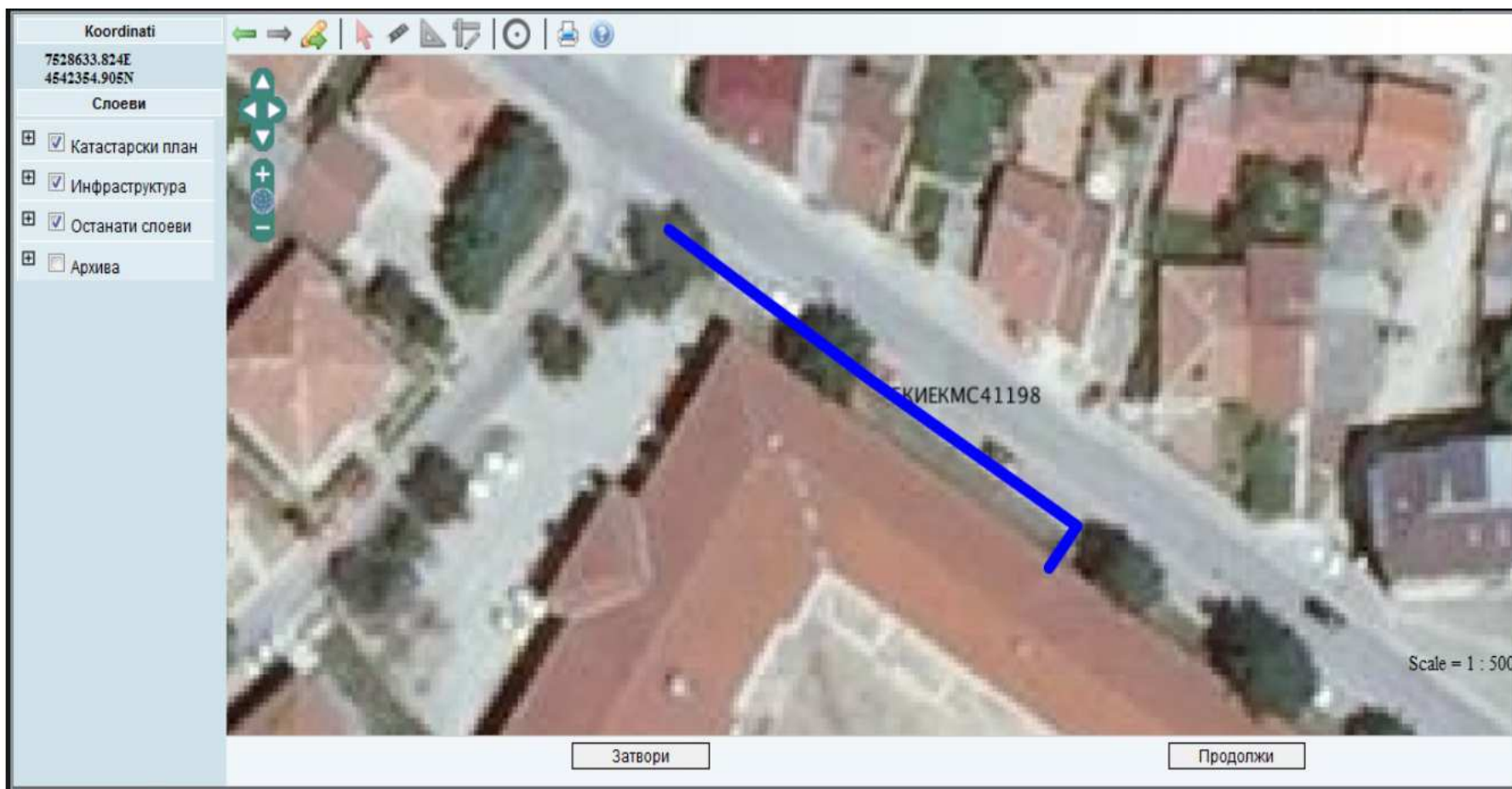
ЛИСТ ИЗПОДАТОЦИ ЗА КАРАКТЕРИСТИЧНИ ПАРАМЕТРИ НА ИНФРАСТРУКТУРНИОТ ОБЈЕКТ													
Единствен идентификатор	Должина м	Основен пресек м <sup>2</sup>	Основен пресек м <sup>2</sup>	Волумен во м <sup>3</sup>	Материјал на столбот	Пресек/профил	Наложба на капацитет	Насока на сообраќајница	Тип на железница	Должина на резервен кабел	Број на Евидентен лист (ЕЛ)	Број на предмет по кој е извршено запишувањето	Датум и час на запишување
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М.П.  
Овластено лице:  
Енвер Идризи  
име и презиме, потпис





# GRAPHIC PRESENTATION OF AN INFRASTRUCTURE OBJECT





**Thank you for your attention**

[www.katastar.gov.mk](http://www.katastar.gov.mk)

[v.miskovski@katastar.gov.mk](mailto:v.miskovski@katastar.gov.mk)

