EXECUTION OF TOPOGRAPHIC AND IDENTIFICATION WORK TO ACHIEVE THE TOPOGRAPHIC SUPPORT NECESSARY FOR THE ISSUANCE OF THE REGIONAL PLANNING CONSENT

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Abstract: *The scientific research for the execution of the topographic work and the edification involved in the peformance of the topographic support needed for the development of the Local Urban Planning, has been performed in the commune Mosnita Noua, Timis County, in an area delimited by DE.116/3.HC.20, and DC .97,, Drumul Boilor"("The Oxen Road") at approximately 1200m vest from the Eastern border of the old built-up area of Mosnita Veche. The equipment used for the implementation of the trigonometrical survey was a dual frequency receiver Trimble R6 Receiver, which is a compact upgradable system operating on 220 channels. The antenna, the receiver and the battery are included in the same casing. Equipped with technology Trimble R-Track, it allows the reception of the signals emitted by GLONASS satellites, which helps improving the GPS solution, enabling the researcher to obtain better results under more difficult conditions for the satellites measurements. The Local Urban Regulation represents the technical regulations system required for the elaboration of the technical documentation for the technical approval of plotting, construction, and the public utility endowment for the area for whish it has been issued. The Local Urban Regulation (R.L.U) has a double utility: firstly, it establishes suitable rules for the area for which it has been issued, in accordance with the sustainable development principles (the parcels' configuration, the nature of the property, the position and the compliance of constructions and related arrangements, as well as the occupation and use conditions of the land). Secondly, it specifies the permanent character of the area (according to the provisions of the General Urban Regulation) and imposes the necessary restrictions and conditions needed for respecting those provisions. The Local Urban Regulation is issued at the same time with the Regional Planning Consent and once approved by the Local Council, on the grounds of the opinions and agreements set out by the law, becomes public authority act of the Local Public Administration. The application domain of the Local Urban Regulation is a land area from the administrative territory of the Commune Mosnita Noua, constituted by cadastral plots. A116/1/10,A 116/1/11/2, of an area 24.180 mp, identified by CF Mosnita Noua . The Provision of the Zonal Urban Plan could be extended to bordering areas.*

Keywords: *GNSS, Trimble R6, GLONASS, P.U.Z., R.L.U., topographic surveying*

INTRODUCTION

The Satellite System of Global Navigation (GNSS) are systems which allow the determination with high precision of a position in a geocentric reference system, in any point placed on the terrestrial surface, near or outside it, using Earth's artificial satellites. The determination of the position refers to obtain by satellite measurements from focal points, of absolute and relative coordinates of these points in a precise reference system. The reference system employed is WGS84 (World Geodetic System 1984). It is essential to visit the points for every point that needs to be stationed, before the beginning of the measurements. It is indicated that all the members of the team participate to the field recognition and to analyze on the spot the obstruction diagram.

Based on the field recognition one can determine with precision: the most comfortable access to the point, the complete draft containing the important access directions, the marking mode, the complete blueprint of the field with the important access directions, marking mode, for facilitating point recognition in the area, regarding the private properties. During the stations identification one will take into consideration the weather conditions which do not

affect the GPS system or the receivers, but in exchange it could affect the access to station. Still in the recognition phase one identifies the points signaling systems, taking precaution measures for those placed on roads (through directional flashes) or those stationed during the night (adequate illumination systems) (https://rompos.ro/).

The technical documentation (the topographic survey) is a combination of office work and field work. A topographic survey is needed when one intends to obtain a construction or demolition authorization for the obtention or modification of a detailed urban plan, zonal general for the planning and implementation of utilities networks. The regional planning consent is the regulation which coordinates the integrated urban development of some areas with high level of complexity or with exacerbated urban dynamic (http://www.ocpibv.ro/index.php/ridicari-topografice).

Through PUZ it is insured the urban development plan or the area with the General Urban Plan (PUG). The main regulations established through PUZ refers to the occupation percentage, the field use ratio, the maximal height, the functionality of the area, the construction regime, the withdrawal of the buildings from the alignment and distances to the sidelines and the rear of the plots.

A zonal urban planning (PUZ) is issued in analog and digital format including written parts and drawings (general memorandum and the local urban regulation)

The law for the drafting of the Regional Planning Consent is Law no 350/2001.Par. 18. - (1) The zonal urban Plan includes specific detailed regulations for the studied area according to the law, structured in written and drawings parts. The structure is formed from at least the general memorandum and the local urban regulation (Ordinul nr. 233/2016).

MATERIAL AND METHODS

The site subject to this project is placed in the Moșnița Nouă commune, central-north area of the administrative territory, on Oxen Road, between Moșnița Veche and Timișoara city.

The field is surrounded by plots for housing and complementary functions. According to the General Urban Plan (ongoing) and the Urban Development Masterplan of Moșnița Nouă, the whole block in which the studied field is included is part of a bigger area with mixed functions - housing and commerce. The field studied is situated in the extra urban area of Mosnita, in an area of high interest for real estate developers. Some fields from the neighbouring of the topographic number treated are already plotted and some of them are already built upon.

Timișoara is part of the Banato-Crișană Plain, subunit interfluvial Timiș-Bega Plain (Timisoara Plane) which appears as a surface relatively plain and monotone. The studied zone fits into the general characteristics of the city. The field is relatively flat, with no water logging danger or land sliding. Moșnița Nouă belongs to the temperate continental climate with sub Mediterranean influences.

The climate is marked by the diversity and irregularity of the atmospheric processes. The dominant air masses during spring and summer are the temperate ones, of oceanic origin which bring massive precipitations. The average annual temperature is 10,6°C, the hottest month being June (21,1°C), resulting a thermic amplitude of de 22,7°C. From a practical point of view, the number of days with favorable temperatures for crop development. Those with averages over 15°C, is 143/year, between 7 May and 26 September.

The measurements processing were performed through the topographic calculation tool Trimble Total Control v.2.73, the coordinates being determined in the projected system Stereographic 1970. The data downloaded from the device were stored on digital supports and

organised on files: „04.02.20.dc", „04.02.20.htm", „04.02.20.job"and „04.02.20.jxl", annexed hereby.

Fig. 1 – The studied zone.

The representation in documentation of those was done respecting the provisions of the Conventional Signs Atlas for topographical plans at scales 1:5000, 1:2000, 1:1000 and 1:500, edition 1978.Due to the fact that the surface referred to in the PUZ is over 2 ha, we have determined two landmarks with a GPS receiver through the static mode. The topographic surveys from the field were made in measuring mode Real Time Kinematic (RTK) with a GPS receiver which receives corrections in real time from the permanent station TIM1, through GPRS connection. In this scientific research we have used the Trimble R6 GPS which is illustrated bellow in figure 2.

The static method was the first method developed in the GPS measurement framework. It can be used for the measurement of the long bases, usually 20 km or longer. A receiver is placed on a point who's coordinates are known with precision in the system l WGS'84. This is known under basic receiver name. The other receiver is at the other end of the base and it is known as mobile receiver (rover). The data obtained are registered simultaneously by both station. It is crucial that those data are registered at the same time frame. The time span between the data registration can be set out at intervals of 15, 30 or 60 seconds. The receivers need to collect the data for a certain timespan. This time span is influenced by the base length, the number of satellites observed and the satellites geometry.

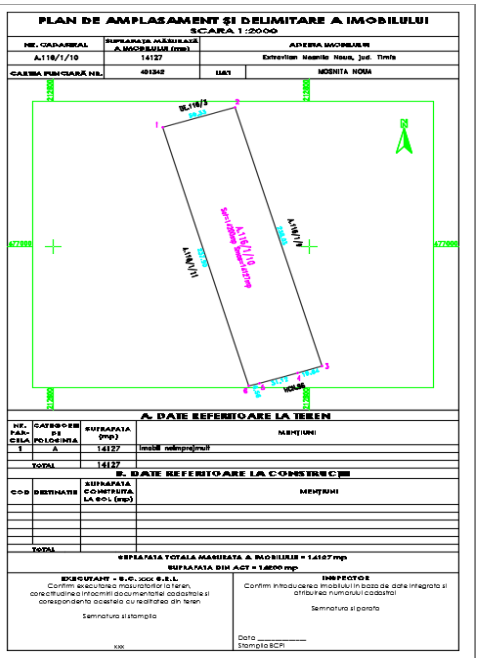
As a basic rule, the observation time is minimum one hour for a baseline of 20 km with 5 satellites and a GDOP predominant of 6. The longer basis need a longer observation time.

RESULTS AND DISCUSSIONS

The first step taken in the beginning of the topographic work consisted in the updating all the info of the building no. cadastral A.1161/10, registered in the lang register no. 401342 - Mosnita Noua, for the modification of surface from 14200 sqm to14127sqm.

The topo-cadastral operation made in the framework of the research were: the topographic survey of the outline points through the method „Real Time Kinematic"; the output of supplementary measurements with the total station for the verification of the property borders and for the determination of the points that could not have been surveyed with the GNSS equipment; data processing and the report issuing; the determination of the outlines

points with the altimetric projection system Stereographic 1970, respectively level Black Sea 1975.


PLAN DE AMPLASAMENT ŞI DELIMITARE A IMOBILULUI
SCARA 1:2000

NR. CADASTRAL	SUPRAFAŢA MĂSURATĂ A IMOBILULUI (mp)	ADRESA IMOBILULUI
A.116/1/10	14127	Extravilan Mosnita Noua, Jud. Timis
CARTEA FUNCIARĂ NR.	401342	UAT MOSNITA NOUA

A. DATE REFERITOARE LA TEREN

NR. PARCELA	CATEGORIE DE FOLOSINŢĂ	SUPRAFAŢA (mp)	MENŢIUNI
1	A	14127	Imobil neimprejmuit
TOTAL		14127	

B. DATE REFERITOARE LA CONSTRUCŢII

COD	DESTINAŢIE	SUPRAFAŢA CONSTRUITĂ LA SOL (mp)	MENŢIUNI
TOTAL			

•SUPRAFAŢA TOTALĂ MĂSURATĂ A IMOBILULUI = 1.4127 mp
SUPRAFAŢA DIN ACT = 1.4200 mp

EXECUTANT - S.C. xxx S.R.L.
Confirm executarea masuratorilor la teren, corectitudinea informatiilor documentelor cadastrale si corespondenta acestora cu realitatea din teren.
Semnatura si stampila

INSPECTOR
Confirm introducerea imobilului in baza de date integrata si atribuirea numarului cadastral
Semnatura si parafa
Data _____
Stampila BCPI

Fig.3 - On site plan and delimitation of the building (update tenement data)

Fig.2 - Presentation of the equipment GNSS Trimble R6

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The result of the work is presented in figure 3.

The second step was the dismantling of the tenement with the cadastral no A.1161/11, registered in the land registry no. 402870-Mosnita Noua, in tow plots:

Plot no 1, A.1161/11/1, S=5872sm

Plot no 2, A.1161/11/2, S=10053sm

For the performance of measurements was used GNSS "Dual frequency Trimble R6 Receiver", and the methods used for documenting the dismantling are the following: the topographic survey of the outline points through the method "Real Time Kinematic", the performance of additional measurements for the verification of the property borders and for the determination of the points which could not have been surveyed: the processing of data and

issuing of reports,; the determination of the coordinates of the outline points in the projection system with the Stereographic 1970.

Following the measurements and the office processing the on site planning and delimitation with dismantling proposal. This is illustrated in the fig 4.

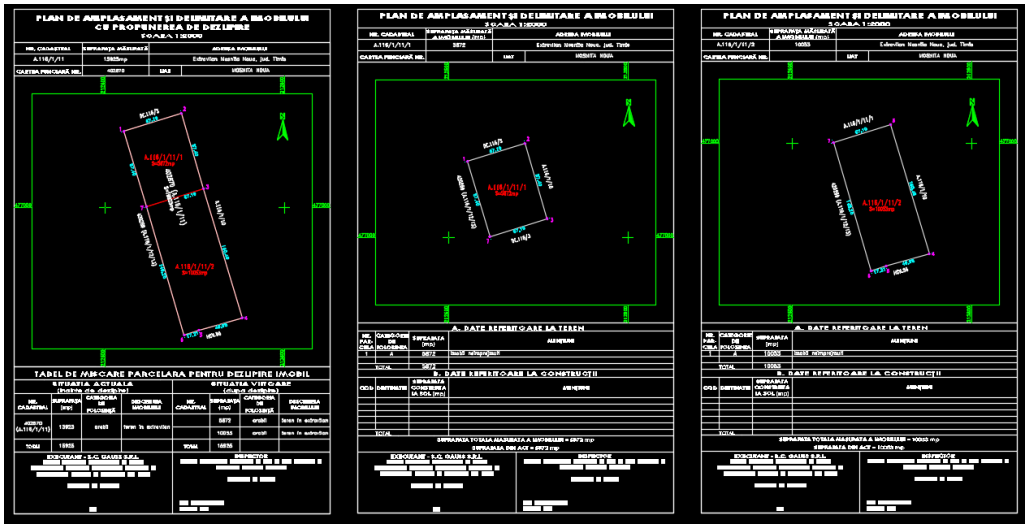

Fig.4 - Site plan and delimitation with dismantling proposal.
Dismantling and the first registration in the land registry

After the finalisation of the step above we will pursue to the third step - the drafting of the request for the issuing of the Urban Certificate (U.C) regarding the authorisation of the construction works, republished with the modifications and subsequent modifications and the request for the emission of the urban certificate for the following purpose: PUZ-Development residential area with complementary functions utilities and public services.

The issuing of documentation for the authorisation of the construction works, according to the provisions of the art, 3. par (1) from the law regarding: the construction, reconstruction, expansion, restoration, conservation, and any other works no matter the value; which are to be executed; constructions representing historic monuments, established by law ; works of construction, modification, extension, reparations, modernisation, and rehabilitation of the communication networks of any kind; forestry roads, art works, networks and technical-municipal, hydro technical works, riverbeds planning, land ameliorations, work of infrastructure instalments , works for new production capacity, production, transportation, energy distribution and/or thermic, as well as rehabilitation and technology modernisation of the existing ones; fancying and urban furnishing, green areas planning, parks, markets, and other public spaces planning.

In figure 5 it is presented the topographic support for the issuance of the urban certificate.

The fourth step has as purpose the output of the topographic and cadastral support needed for the Zonal Urban Plan, having as purpose: “DEVELOPMENT OF RESIDENTIAL AREA WITH COMPLEMENTARY FUNCTIONS, UTILITIES AND PUBLIC SERVICES”.

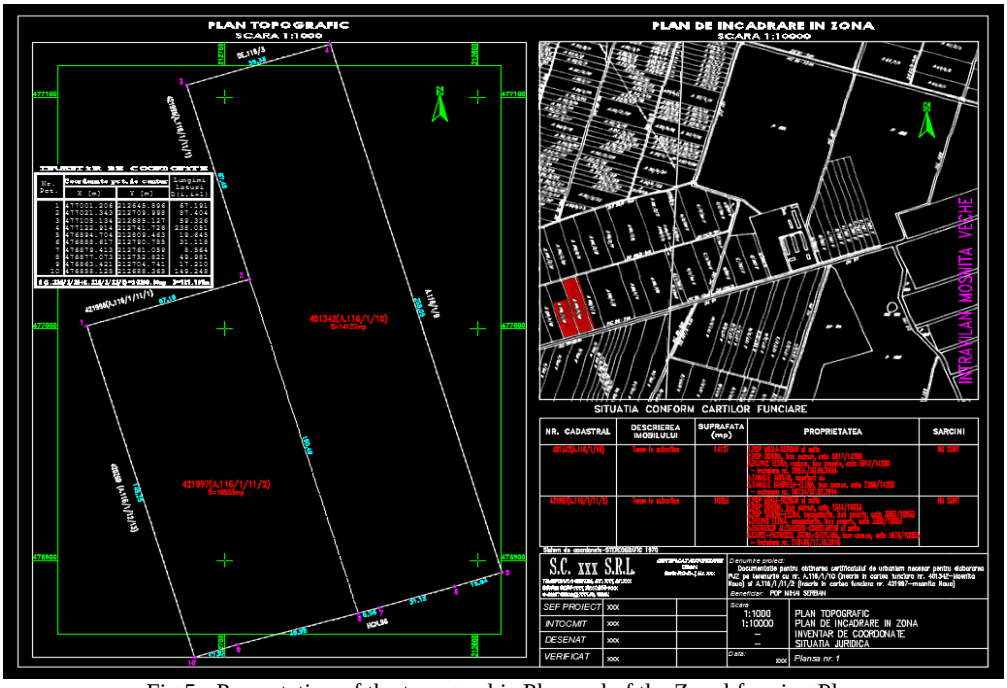

Fig.5 - Presentation of the topographic Plan and of the Zonal framing Plan

This plans is based on the following operations: the recognition of the field; the study of documents specified in the opinion for the beginning of works issued by the OCPI; the gathering of the outline points coordinates for the buildings within the mentioned block which were subject to certain cadastral works and are registered in the database of OCPI; the output of the outline of the field subject to the Urban Detailed Plan and its identification in the field ; the realisation; the output of the support network and of survey needed in order to perform the topographic measurements; performing measurements in the field through classical methods or using the GNSS method, for the survey of the elements needed for the documentation.

The processing of measurements will be realised with the help of the programme for topographic calculations „Trimble Total Control v.2.73". The data resulted from the measurements both in digital and analog format will be included in the documentation needed for the issuing of the expert opinion of OCPI for the Regional Planning Consent, drafted in accordance to the art. 264 from the Regulation for opinion, reception and registration in the land register, approved by the Decision of the General Director of ANCPI no 700/09/07/2014, with the subsequent modifications and additions.

After the processing and gathering of data the following topographic plan was shaped.

The last step from this project is the output of the Regional Planning Consent-Development of Residential Area with Complementary Functions, Utilities and Public Spaces.

The working methods used were: due to the fact that the area for the PUZ is over 2 ha, we determined two landmarks (as presented in the beginning of the article) with a receiver GPS through the static method. The topo-cadastral surveys from the field were made in the Real Time Kinematic (RTK) mode with a GPS receiver which receives corrections in real time from the permanentTIM1 station though GPRS connection.

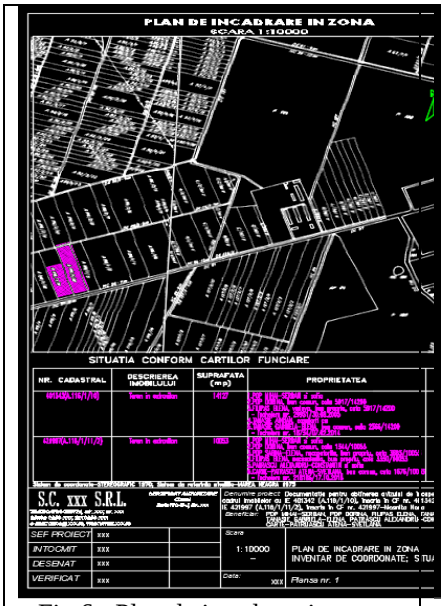

Fig.6 - Plan de incadrare in zona

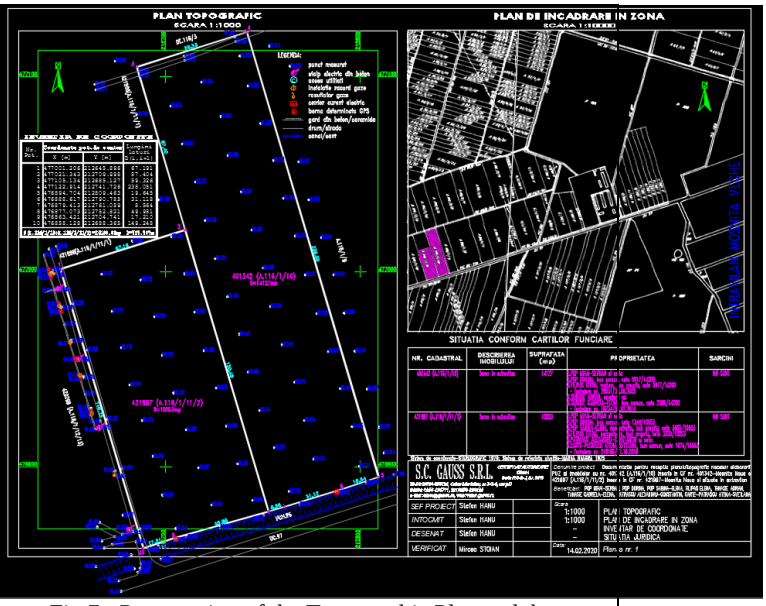

Fig.7 - Presentation of the Topographic Plan and the Enclosure Plan in the area

The coordinates of the outline points were obtained though the graphic database of the eTerra application.

Coordinates system – STEREOGRAPHIC 1970

Level reference system– BLACK SEA 1974.

Processing and storage, organization and presentation of data:

The measurements were processed using the Trimble Total Control v.2.73 topographic calculation program, the coordinates being determined in STEREOGRAPHIC 1970 projection. Data downloaded from the device was stored on digital media and organized on files: "04.02.20.dc", "04.02.20.htm", "04.02.20.job" and "04.02.20.jxl", attached. Their representation in the documentation was made in accordance with the provisions of the Atlas of conventional signs for topographical plans at scales 1:5000, 1:2000, 1:1000 and 1:500, 1978 edition.

Accuracy obtained:

Precision conditions for the calculation of detail point coordinates were observed:

Hz = 0.009 – 0.037

Vt = 0.011 – 0.053

The area on which the work was performed is **2.4180 ha.**

The following applications resulted in the following Topographic Plan in Figure 7.

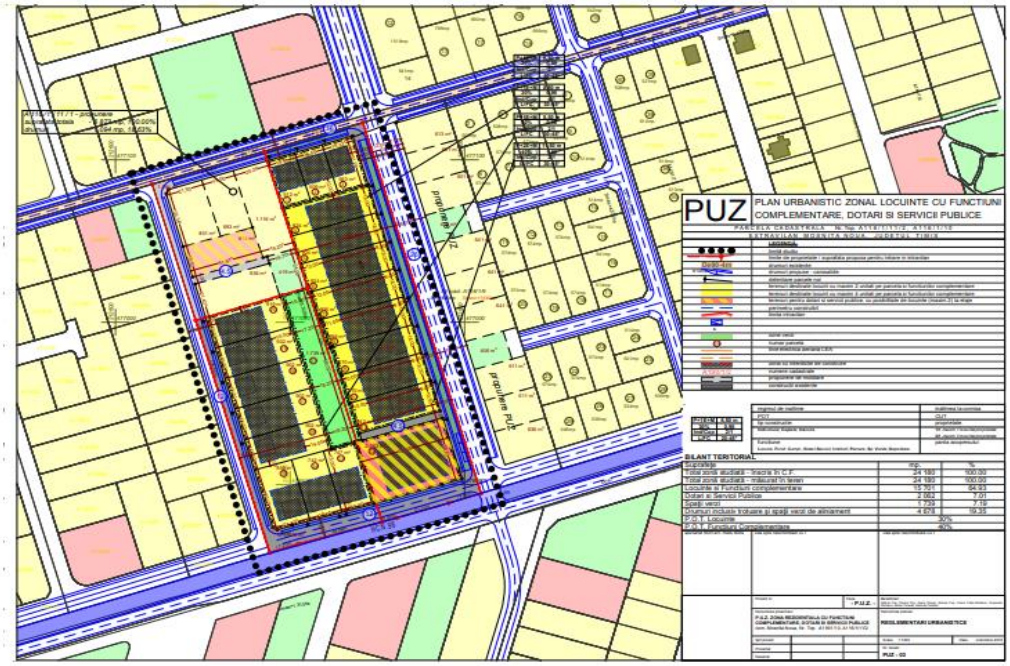

Fig.8 - Presentation of regulations from the P.U.Z.

CONCLUSIONS

It is appreciated that the proposals presented are part of the provisions of the General Urban Plan - in the process of being developed - the efforts of the designer being directed towards the realization in the most normal conditions of the main function: habitation.

The development of the Zonal Urban Plan will be carried out in accordance with the Guide on the development methodology and the framework content of the PUZ approved by Order No. 176/N/2000 of the Ministry of Public Works and Territorial Planning and the legal provisions in force. When developing the PUZ, consideration will be given to: integrating the whole into the budding urban tissue; linking with the urban plans approved so far for the studied area and adjacent areas; ensuring the necessary sites and facilities for the objectives set out in the theme. We recommend to the City Council of Mosnita Noua the taking over of the provisions considered beneficial and their introduction into the PUG, in order to achieve an unified urban policy at the level of the whole area. For the preparation of the topo-cadastral work, the following working methods were brought to the attention: the first step was to modify the surface of the building, then to dismantle it in lots and to entake the plots, after which the Certificate of Urbanism and the opinion of the beginning of the work were requested, and in the end the necessary works were drawn up to obtain the opinion of the PUZ. It is recommended centralizing the information on the operations that will follow the approval of the P.U.Z. and placing them in the existing database for the purpose of linking and maintaining the situation in the area.

Article 25.This Regulation, an integral part of the Regional Planning Consent- Development of Residential Area with Complementary Functions, Utilities and Public Spaces of residential area with complementary functions, public facilities and services, Mosnita Nouă, Cad. no. A116/1/10, A116/1/11/2" shall enter into force once with its approval under the law.

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