TOPOGRAPHIC MEASUREMENT AND CONSTRUCTION STAKE OUT P+2F, TERRITORIAL ADMINISTRATIVE UNIT (U.A.T.) GIROC, VILLAGE GIROC, COUNTY TIMIȘ

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Abstract: The Administrative-Territorial Unit (UAT) Giroc is located in the center of Timș county. Giroc village is made up of the localities Giroc and Chișoda, having the locality of Giroc as a village residence, county Timiș, Banat, România. Giroc Village is located at 6.9 km from the Center of Timisoara Municipality. The studied area is at 1.4 km and in the North part of the Giroc Administrative-Territorial Unit. After identifying the cadastral number and land book belonging to the village Giroc, study of plans and maps from the bases of O.C.P.I. (cadastre and land registration office) Timiș, B.C.P.I. (cadastral office and real estate advertising) Timișoara, the land is visited and the area of interest is recognized. The position within the location of the plot (Cad. No. 414831 from CF 414831, with an area of 12168 sqm) is identified. The aforementioned steps will establish the topo-cadastral methods: necessary equipment, the necessity of clearing the land in order to facilitate the placement of station points, etc. The main purpose of this topographic identification and survey is to build four housing blocks to be rented to young people. Their aimed height is P+2F (ground floor + 2 floors). The structure of the construction will be on reinforced concrete columns of 25x25cm, with brick masonry walls and reinforced concrete foundation. For processing the topographic survey and subsequently executing the staking 2 of 4 blocks, Leica Electronic Total Station, model TS06 PLUS, Leica GPS GS 14 equipment and Leica Viva GS08 equipment were used. The data processing was performed with the Leica Geo Office Combined software, after which the calculated points were reported in AutoCAD making the topographic map. The surface calculation was performed by analytical calculation. For the measurements made with the Leica 1200 GPS equipment, the raw data were obtained in the WGS (World Geodetic System) 1984 reference system. Coordinates that were later transformed into the office with the help of the TransDat program. For the Leica GS08 equipment trans-calculation was not necessary because the field data was obtained in the STEREOGRAPHIC 1970 reference system, which was possible with the implementation of the TransDat system in the controller. The Leica Electronic Total Station, model TS06 PLUS has an angle measurement accuracy of 6 cc, respectively 2 cc and distances of 2 ppm. The data from the device was downloaded using the Leica Geo Office Combined program, both for GPS equipment and for the Total Station. The points were subsequently uploaded in Autocad in order to merge the points and draft the topographic map. Verification of the topographic map and the staking of the 2 blocks was performed with the LEICA VIVA TS16A Total Station with an angle measurement accuracy of Hz, V of 1 " (0.3 mgon), 2 " (0.6 mgon), 3 " (1 mgon), 5 " (1.5 mgon) / typically 3-4s.

Key words*: *Leica Viva GS14, Leica Geosystems, Leica FlexLine TS06, Leica FlexLine TS06plus, Leica TS16

INTRODUCTION

The Administrative-Territorial Unit (UAT) Giroc is located in the center of Timș county. Giroc village is made up of the localities Giroc and Chișoda, having the locality of Giroc as a village residence, county Timiș, Banat, România. Giroc Village is located at 6.9 km from the Center of Timisoara Municipality. The studied area is at 1.4 km and in the North part of the Giroc Administrative-Territorial Unit. The studied area is at 1.4 km and in the North part of the Giroc Administrative-Territorial Unit (figure 1).

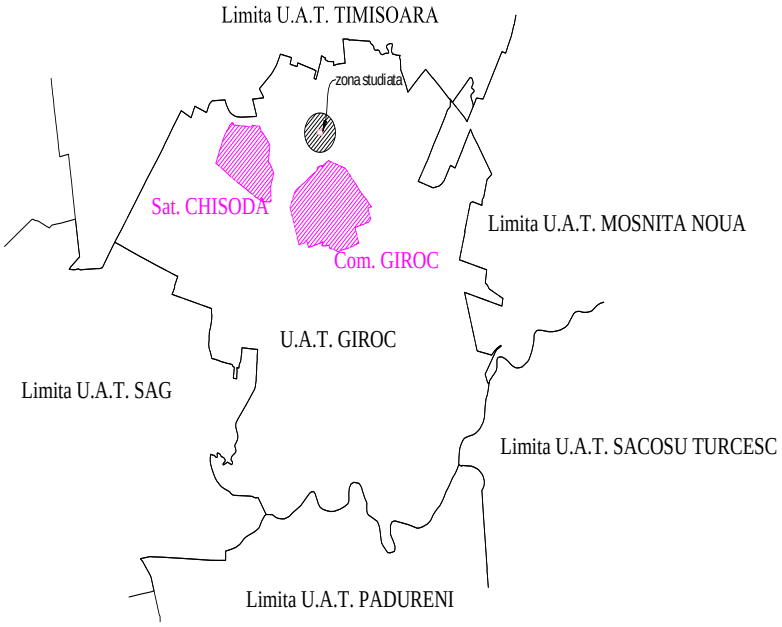


Fig. 1. The location of the studied area

After identifying the cadastral number and land book belonging to the village Giroc, study of plans and maps from the bases of O.C.P.I. (cadastre and land registration office) Timiș (ȘMULEAC, A. ET ALL., 2016), B.C.P.I. (cadastral office and real estate advertising) Timișoara (SIMON M. ET ALL., 2017, 2018), the land is visited and the area of interest is recognized. The position within the location of the plot (Cad. No. 414831 from CF 414831, with an area of 12168 sqm) is identified (figure 2).

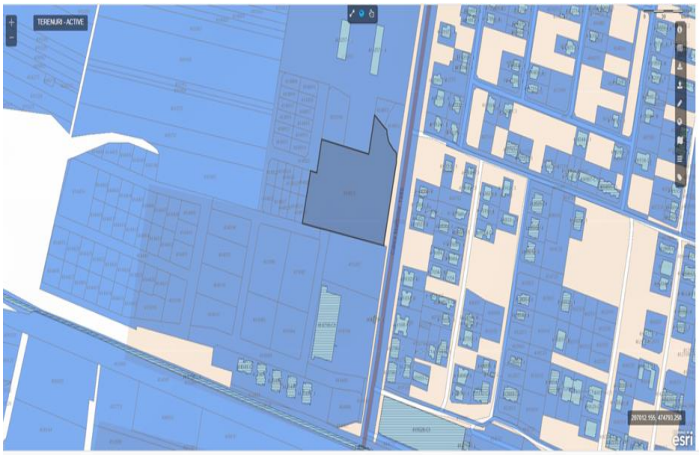
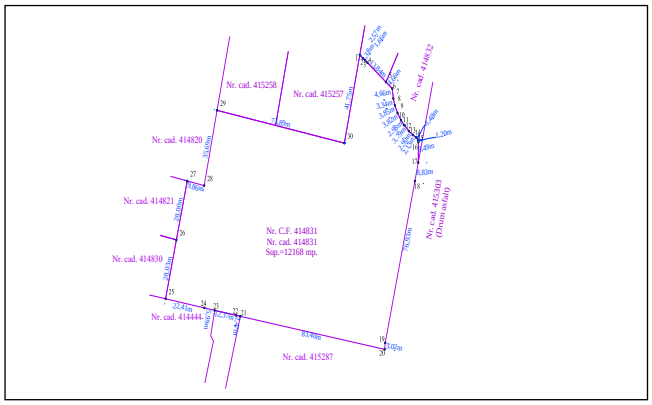


Fig.2. Property CF 414831 – UAT GIROC

MATERIALS AND METHODS



The aforementioned steps will establish the topo-cadastral methods: necessary equipment, the necessity of clearing the land in order to facilitate the placement of station points, etc. The main purpose of this topographic identification and survey (HERBEI, M. V. ET ALL., 2010, 2016) is to build four housing blocks to be rented to young people. Their aimed height is P+2F (ground floor + 2 floors). The structure of the construction will be on reinforced concrete columns of 25x25cm, with brick masonry walls and reinforced concrete foundation (figure 3).

Fig. 3. Building P+2F

Required tools

For processing the topographic survey (ŞMULEAC, A. ET ALL., 2016, 2017) and subsequently executing the staking 2 of 4 blocks, Leica Electronic Total Station, model TS06 PLUS (figure 5), Leica GPS GS 14 (figure 5) equipment and Leica Viva GS08 equipment were used. The data processing was performed with the Leica Geo Office Combined software (SMULEAC, A. ET ALL., 2012).

Fig. 4. Leica Viva GS14 SmartRover with CS 20 controller

Fig. 5. Total station Leica TS06 PLUS

The connection to ROMPOS (Romanian determination position system that ensures precise positions in the European reference and coordinate system ETRS89) and the verification of the parameters corresponding to the reading of the station points is done with great attention.

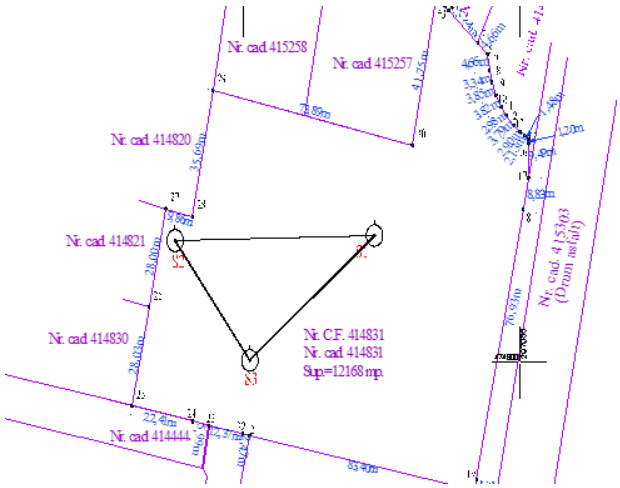


Fig. 6. Determination of station points in the field – Leica Viva GS14 SmartRover

After careful connection, RTK Int (Real Time Kinematics) confirms the correct connection to ROMPOS and you can read the 3 stations - X (north), Y (east), Z (elevation) with errors agreed by B.C.P.I. Timisoara (2-4 mm) virtual station TIM_1. The stations points have been materialized so that all the necessary details can be seen.

Topographic measurement with Total Station Leica TS06 PLUS

After determining the Topo-Geodetic network consisting of the 3 station points, the station point is S1 and the station is positioned (figure 7 and 8).

Fig. 7. First step to level the Total Station Leica TS06 PLUS

Fig. 8. The second step to level the Total Station Leica TS06 PLUS

The setting process is easy and simple due to the technology implemented but at the same time requires attention and concentration.

The file work is created, then in the created file we will occupy the station point S1 with orientation on S2 (figure 9).

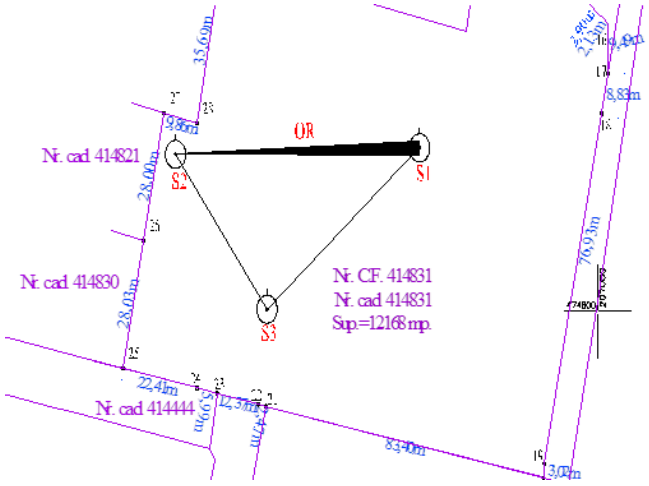


Fig. 9. The station point S1 with orientation on S2

The orientation from S1 to S2 must be verified to be in parameters of 2-4mm.

Locating the station points in the field

The station points must be located in such a way to be easy to spot, In this case we have landmarks to the boundaries of the plot that are materialized by the fence with concrete base (figure 10).

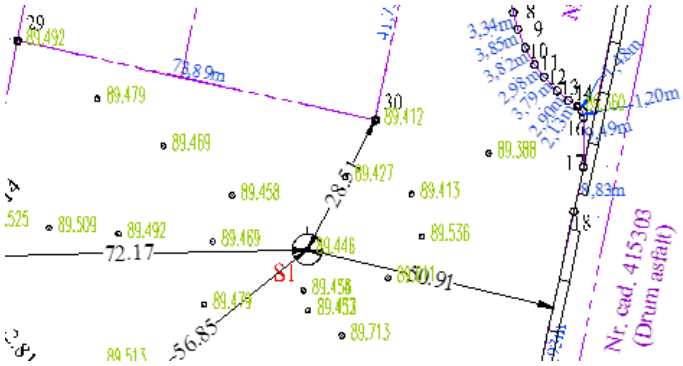


Fig. 10. Location – Station points S1

Station point S1 is located according to the distances from the sketch, so we will proceed with sketching marks for stations point S2 and S3 (figure 11 and 12).

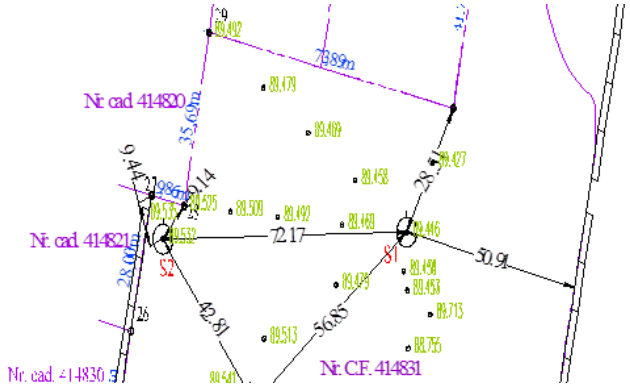


Fig. 11. Location – Station points S2

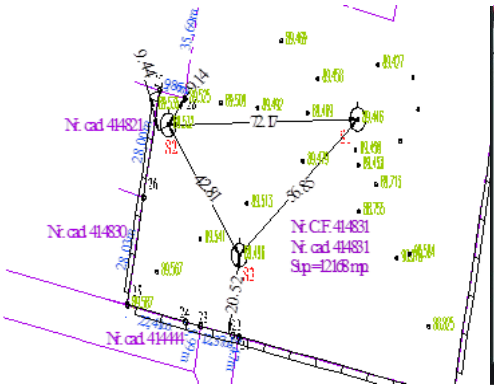


Fig. 12. Location – Station points S3

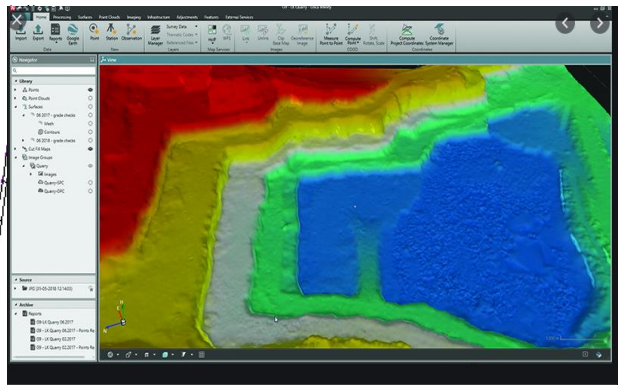


Fig. 13. Leica Infinity Survey Software

Office stage

Downloading and processing data from the equipment

With the Leica Infinity Survey Software we can analyse and process the data from TS06 PLUS Total Station or by simply inserting a USB (Universal Serial Bus) (Flash drive).

With TopoLT software, a program that is installed in Autocad, it makes data processing easier, but it can be processed only with AutoCAD Civil 3D (NEX, F.; REMONDINO, F. (2014; ŞMULEAC, L. ET ALL., (3).

The file downloaded with the TXT extension (ASCII- American Standard Code for Information Interchange) is very friendly with a number of software for processing the downloaded data: (figure 13)

Preparation of the situation plan for the architect (figure 14, 15 and 16).

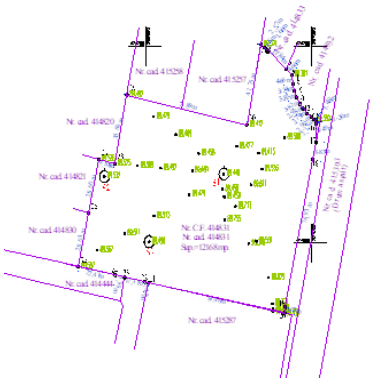


Fig. 14. Situation plan

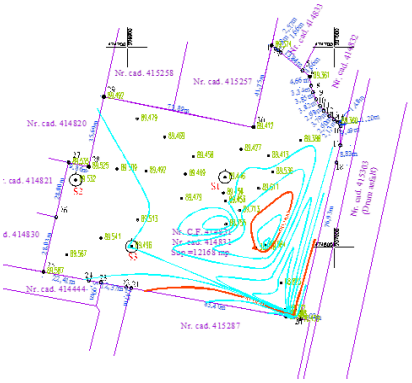


Fig. 15. Level curves

Preparation for stake out construction and checking the limits (figure 17).

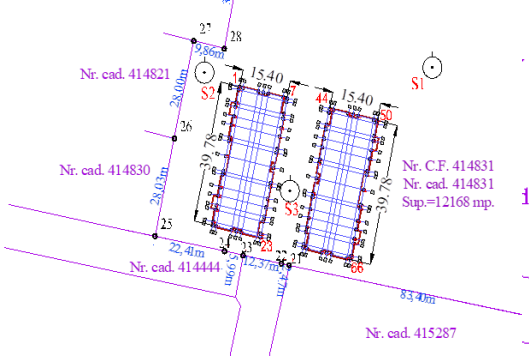


Fig. 16. P + 2F construction - construction axes

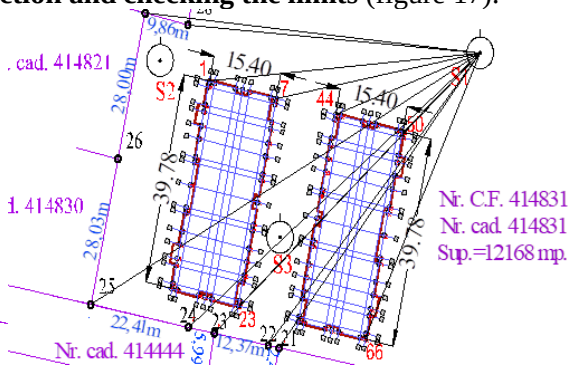


Fig.17. Drawing plan, limit and construction axes

Preparing the verification plan - axes and property limits (figure 18).

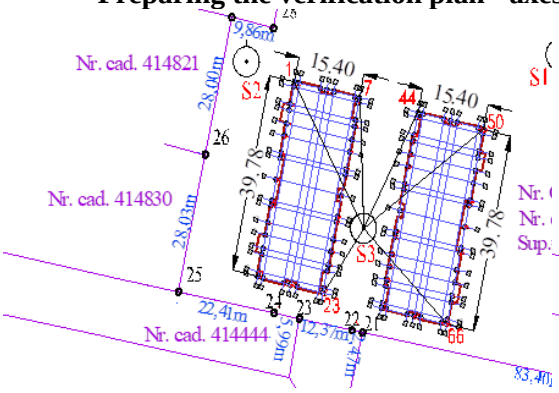


Fig.18. Drawing plan - checking the axes

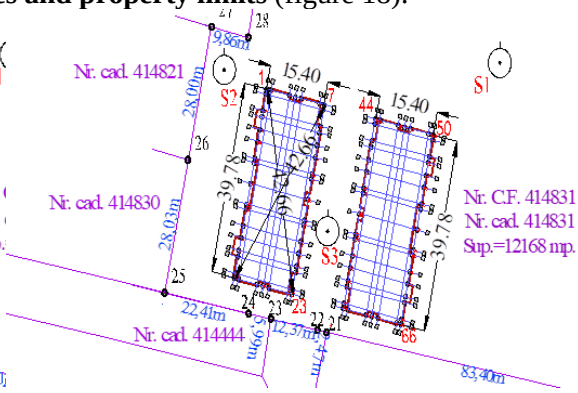


Fig.19.Verification stake – diagonal

Stake out by the method of rectangular coordinates (X, Y) (figure 19)

At the request of the site manager the axes of the construction are transmitted on continuous or interrupted bench, the zero level is established by the project or it will be established together with the site managers and the beneficiary of the work (ŞMULEAC, A. ET ALL., 2016, 2017).

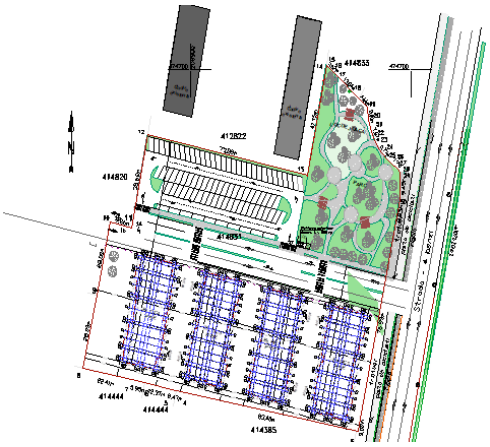
Stake out verification of the rectangular coordinates

Transmitting the axes on the bench is a verification of the staking with the LEICA VIVA TS16A Total Station is performed with an accuracy of 1 " to 3 " operated by the surveyor engineer.

CONCLUSIONS

The presented work is part of the project of "Construction of housing for young people for rent in height regime P + 2F - 4 blocks" and only two of the 4 block constructions have been staking, the other two was already made.

To this 4 blocks in the case of the above mentioned project, the entire area of 1.2168 Ha was systematized with parking, a children's playground, a park and access on the main road.



In conclusion, the construction of the 4 blocks is a small part of extension project and improvement of U.A.T. Giroc.

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