STUDY REGARDING THE NECESSARY TOPOGRAPHIC WORKS DRAWING ON THE FIELD OF THE MAIN TOPOGRAPHIC ELEMENTS OF AGRITOURISTIC CONSTRUCTION

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ABSTRACT

The paper presents a modern method of field application of an agrotourism reception structure using a high-performance topographic equipment of the latest generation, with the help of which a series of completely new procedures and tracing operations could be applied on the field. The construction will be located in the beautiful and dynamic agrotourism area Bulzești - Măldărești, in the South-West Oltenia development region, an area that has a rich and valuable natural and anthropic tourist potential, which has not been capitalized on its true value, due to the lack of main of the tourist reception structures. The aim of the paper was to prepare in the best conditions the technical documentation necessary primarily for the design of the construction, but at the same time it can be used further in the next phases of its drawing and actual execution. From the presented, it was found that the work performed fully complies with the precision requirements and legal regulations imposed on such a work, and tracing as the main method of field application of the main elements of a construction could be performed according to the requirements of precision, detail and accuracy by the designer and the beneficiary.

INTRODUCTION

The agritourism construction is located in the South-West Oltenia - Romania Development Region, made up of 5 counties: Dolj, Olt, Vâlcea, Gorj and Mehedinți. It represents approximately 12.25% of the total area of the country and is an economically important area, standing out especially at the agronomic level through: in the counties of Olt, Dolj and Mehedinti where cereals occupy the largest areas, while in the counties Gorj and Vâlcea, orchards occupy important areas (Sescu et al., 2018).

The geographical position and the diversity of the relief, arranged in steps, respectively of the mountains, submontane hills, foothills and meadow plateaus, make the region benefit from a wide climatic variety, with moderate continental temperate characteristics and slight Mediterranean influences in the hills and foothills. (Burghilă et al., 2016).

Among the most representative tourist reception structures present in the agrotourism area Bulzești - Maldărești are: Maldăr Mansion and “Casa Veche” Pension. Maldăr's mansion is an old Oltenian cula, which keeps intact all their architectural details: thick walls, majestic whitewashed exterior, high tower and interior stairs, "secret" exits and especially the porch with arches, located on the entire facade of the catwalk superior. It is built on the site of an Oltenian cula, a former aristocratic house built in the twentieth century. Being a category B historical monument, the owners had to keep intact all the details of the former mansion and not to make too many changes to the construction. Thus, the thick walls, the whitewashed exterior, the high tower and the interior stairs, the hidden exits or the porch with arches were preserved and renovated with great taste.

At the mansion you will be captivated by the beauty of the traditions from the Oltenia area: the master carpets, the rhythm of the Oltenian choirs, the unforgettable Ciuleandra and especially the ceramics - the craft of giving life to clay. Maldăr's mansion

has 15 rooms in the main building and another 2 rooms recently inaugurated in a separate building, above the restaurant. As they are organized on the initial structure of the mansion, each room is different, has its own personality and bears the name of another "story character". To all this is added a generous area, with apple orchard, much green in general, a swimming pool and a pavilion for the warm season.

Just a few minutes walk you have the manors from Măldărești: the Greceanu manor, the Duca manor and what was once once I. GH. Duca's vacation home. They are suitable for a short walk before a meal. For a longer walk (55km) you can choose the Buila - Vânturariţa Nature Reserve or a tour on the Transalpina (50 km). More details about objectives and activities can be found directly at the mansion. Manors are over 300 years old in Oltenia and represents fortified boyar dwellings, built to defend against Turkish invasions or thieves. They are spread throughout the Balkan Peninsula, and in Romania most are in Vâlcea, Gorj and Mehedinți (Adamov et al., 2020).

Casa Veche is located in Măldărești commune, approximately 1 kilometer from the commune town hall on the main street, and 3 kilometers from Horezu town, the access being made on DN 65C (Horezu-Craiova).

The clients of agritourism pensions are individuals and legal entities, Romanian tourists living in urban areas or foreign tourists interested in seeing something other than what they have in their country such as: customs, household and craft activities, cultural. In general, tourists interested in these services are delighted to talk to the "hosts" and try culinary specialties specific to the place and area. More and more Romanian and foreign tourists prefer the peace and rustic atmosphere of an agritourism pension (Sima E., 2019).

Demand for rural tourism in the area could be structured in several segments:

1. The citizen, who wants to get rid of daily stress, to spend his vacation in a clean environment and

to have a healthy diet and rest (Ciolac et al., 2019);

2. People with high incomes who want to try something new and are usually the people who have

children, wanting to provide them with an attractive and cleaner holiday environment (Galluzzo, 2021);

3. People with lower incomes, who cannot afford to spend their holidays in a classic boarding house.

4. Anyone who wants to relax, to practice sports activities in a natural and pleasant environment (Ex: hunting, sport fishing, climbing, hiking, cycling or ATV, horseback riding, river-rafting, etc.)

5. People who want to learn some of the secrets of crafts (pottery, painting icons on glass, skinning, carving, etc.) (Iagăru et al., 2016);

6. Young people eager to learn about activities related to raising and caring for animals (Galluzzo, 2017).

Another representative tourist structure located near Bulzești, the native village of the great writer Marin Sorescu, is the holiday village "Colţ de Rai"("Corner of Heaven") located 32 kilometers from Craiova, in the north of Dolj county, near the border with Vâlcea county. Here, time seemed to stand still. Some areas of Bulzeşti seem to be really detached from the stories. On the Răchita Valleys, two dams and accumulation lakes were arranged, in order to prevent the flooding of the river. At the dam from Gura Vâlcelei Răchita, between the Răchita hills and the extension of Ţiganu 'hill, the accumulation lake was formed. After 1990, the land became private property, and an investor arranged here a recreational tourist area called "Corner of Heaven" (Răduțoiu et al., 2018).

Tourists can find here a traditional house from Dolj and one from Vâlcea, 8 wooden houses with 22 beds, 6 gazebos, pontoons on the water, grills, all built near a landscaped lake, real fairytale places, ideal for a holiday spent with family in the middle of nature. The

land has an area of 17 hectares with special landscaping, with oak and acacia forests, meadows, a lake with an area of 8 hectares populated with carp, pikeperch, perch, teno, crucian and catfish, passionate fishermen can enjoy on the shore the lake. The place offers relaxation, the tranquility of nature, the chirping of birds, the whisper of water, fresh air, ie a particle of heaven (Iacob, D., and Toma, E., 2021).

Those who want to relax outdoors can enjoy a walk in the woods, a good night's sleep in a hammock, a boat ride or a water bike ride on the lake. Visitors also have other possibilities. The most athletic can play badminton, darts, can practice sport fishing, table tennis or sleigh rides in winter. The most comfortable can sunbathe, admire wild ducks, black storks, egrets or different species of flowers. Those who want to visit the birthplaces of the author of the poems from "La Lilieci" must go to the village of Bulzeşti, at the Marin Sorescu Memorial House. Here are exposed the poet's hat and sweater, but also the typewriter, manuscripts, painting tools and paintings that they belonged to the poet.

Having in the area, as can be seen from the above, several examples of successful agrotourism projects and benefiting from the rich natural and anthropic tourist potential of the area, the owner decided to carry out an agrotourism project in the area and asked to be make a topo-cadastral documentation that will serve him in all stages of the agrotourism project: design, tracing and implicitly the execution of works.

MATERIAL AND METHOD

In order to carry out the technical documentation necessary for the elaboration of the Execution Project, the specific topographic measurements were performed. Within the planimetric surveys of the studied area, the traverse method will be chosen for the elaboration of the support and lifting network, necessary to determine the coordinates of the detail points in the field and their processing with the drafting of the necessary cadastral plans: (Herbei MV, and Sala F., 2020).

1. Location plan and delimitation of the real estate at a scale of 1: 500;
2. Real estate file (may or may not include the location plan);
3. Plan for framing in the area;
4. Inventory of coordinates (which is relevant only for land and not for apartments);
5. Survey (sketch with measurements of interior spaces) in the case of new constructions;
6. Survey apartments at a scale of 1:50 or 1: 100;

All these data are sent to the designer for the elaboration of the final construction project and who will in turn send us the project of tracing this building on the land (Calinovici and Călina, 2008; Pop et al., 2019).

In this project, one of the classic traverse necessary for thickening the geodetic points was not performed, the project being a small one, no local triangulation network was used, but it was decided to build and thicken a support network by GPS measurements (Li et al. , 2009). The multi-receiver method was used, it is sufficient to have at least two GPS receivers that receive signal from at least 4 visible satellites and have a common parking time (Barazzetti et al., 2010). Thus, one of the two receivers becomes a point with known coordinates and determines by calculation the coordinates of the other (Călina et al., 2014; Rosca et al., 2020). The number of two receivers is minimal, as for the forward intersection at least two points with known coordinates from which the new point is aimed are sufficient. At least three GPS receivers are frequently used (Doneus and Neubauer, 2005).

After the surveying network consisting of the 5 points was built, the detail points were surveyied. The collection of details, as a final operation in terms of field measurements, refers to the determination of the positions of the characteristic points of the details in the field. The characteristic points are points of change of direction which in

number and position are conditioned by the required accuracy and the scale of representation. The actual methods of picking up the details used were: the polar coordinate method; the method of rectangular coordinates or the method of abscissas and ordinates (Kolbe et al., 2011; Păunescu et al., 2020).

After all the technical documentation and all the approvals necessary for the construction of the building have been finalized, the transition to the execution phase follows. The tracing, as the main topographic execution work, aims at transposing on the field the characteristic points of the constructions, in plan and in height, according to the provisions of the project. The methods of drawing in plan the characteristic points of the constructions are the following: the method of polar coordinates; the method of rectangular or perpendicular coordinates; intersection method; the method of repeated intersection (Călina et al., 2015).

RESULTS AND DISCUSSIONS

Against the background of growing demand for accommodation in agritourism structures in the area Bulzești - Măldărești and taking into account the location in a quiet area with a relief and a wonderful landscape, protected from any sources of pollution, the developer, the owner, decided to build and the registration in the Land Book of a building made up of S (technical and garages) + P + E, on this land with an area of 1880 sqm.

Before starting the work, the surveyor must carry out the documentation operations, which begin with the request for information in the database of the OCPI territorial office regarding: - topogeodesic works performed in the area; - geodetic networks, existing local networks; - inventory of coordinates; - plans for framing in the area; - plot plans; - orthophotoplans; - the coordinates of the neighborhood points; - land book extract for information; - copies of the minutes of possession and their attached sketches in the case of real estate acquired under property laws (Mihai et al., 2015). Each cadastral documentation differs depending on the situation and specific. Most of the time we talk about files that contain a large volume of documents. Depending on the complexity, additional information and documents may be required (Călina et al., 2018).

In order to effectively carry out the lifting and tracing work, a support and lifting network was built consisting of 5 points (S1, S2, S3, S4, S5) which we determined by GNSS (Global Navigation Satellite Systems) methods of determination of the autonomous geo-spatial position by the GPS - RTK method, being materialized by metal pickets, signaled with red paint (Figure 3). Usually, after marking and signaling the station points, a proper topographic description of them is made, a sketch that is made for each station point and that includes the number and name of each point that allows easy identification of these points (Figure 1 and 2).

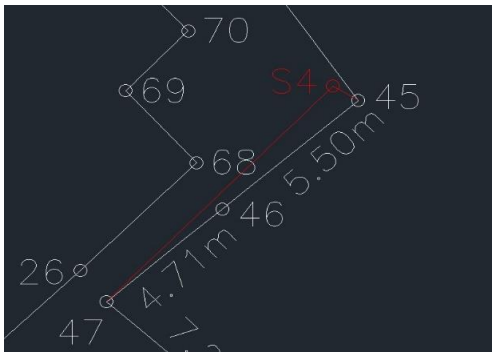

Figure1. S_2 point

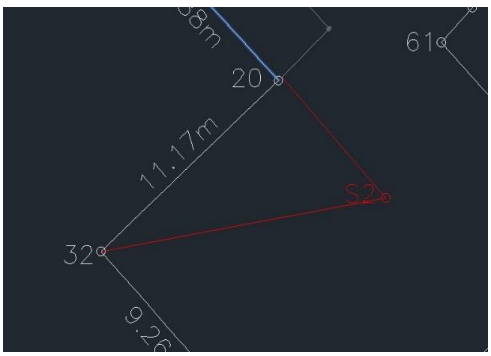

Figure 2. S_4 point

Along with the process of drawing up the technical documentation, for all the approvals necessary for the construction of the building, the construction of the support network necessary to raise the detail points and the tracing for the beginning of its actual construction began.

The topographic survey was carried out with the GPS device STONEX S10A GNSS and the total station Leica TCR 407, in the Stereographic Projection System 1970 and the Altitude System Black Sea 1975.

By thickening the lifting network, the aim is to ensure the number of points necessary for surveying the detail points (Călina and Călina, 2019). Then the existing details on the field were picked up by the polar coordinate method.

The advanced technology currently used allows all topographic measurements, the calculation of coordinates of points of interest, distances, alignment orientations, the calculation of surfaces, the development of plans of all kinds, etc., to be made much easier, with the help of modern topographic equipment and increasingly high-performance computers and various dedicated software programs. The coordinates and altitude of these points, the distances between them, the orientations of the formed alignments, we obtain them automatically, and we will download them to the computer (Călina J. and Călina A., 2019).

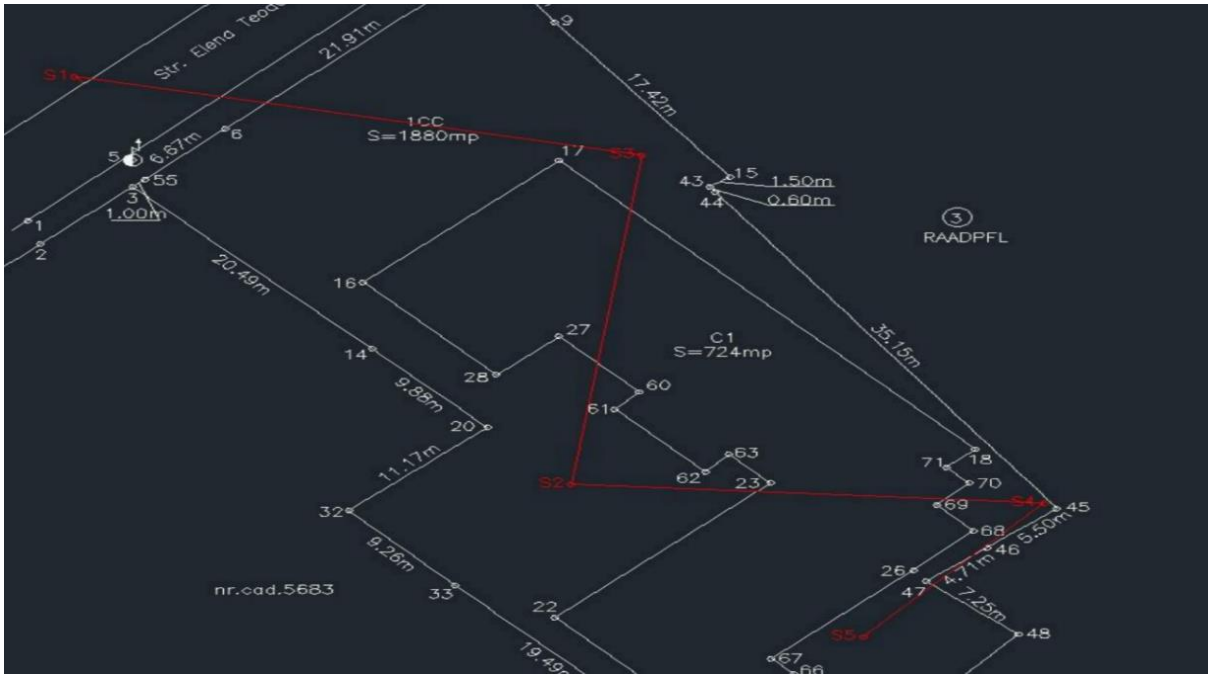

Figure 3. Support network (S1, S2, S3, S4, S5)

The coordinates of the surveyed points were determined and saved automatically in a file using the total station, then being downloaded to the computer (Table 1 and 2).

Table 1.

Inventory of support point coordinates

Pct.	X (m)	Y (m)
S1	314144.270	403060.390
S2	314107.340	403089.994
S3	314137.178	403094.199
S4	314105.649	403118.150
S5	314093.522	403107.378

Table 2.

Inventory of detail point coordinates

Point	X (m)	Y (m)	Point	X (m)	Y (m)	Point	X (m)	Y (m)
1	314131.244	403057.640	18	314110.531	403114.059	47	314098.557	403111.167
2	314129.158	403058.396	20	314112.500	403085.000	48	314093.767	403116.606
3	314134.298	403063.844	21	314086.892	403096.978	52	314084.192	403096.599
5	314136.725	403063.853	22	314095.281	403089.024	55	314134.989	403064.568
6	314139.594	403069.396	23	314107.460	403101.867	60	314115.717	403094.037
7	314157.478	403084.492	26	314099.594	403110.373	61	314114.163	403092.596
8	314154.706	403085.267	27	314120.768	403089.248	62	314108.503	403097.963
9	314149.185	403089.036	28	314117.259	403085.547	63	314110.058	403099.404
10	314158.471	403089.349	32	314104.980	403076.736	64	314087.642	403097.769
11	314161.428	403079.160	33	314098.215	403083.058	65	314086.117	403099.062
12	314138.093	403055.266	38	314083.512	403101.270	66	314090.125	403103.289
14	314119.615	403078.141	39	314087.182	403104.634	67	314091.576	403101.913
15	314135.213	403099.439	40	314084.039	403108.204	68	314103.129	403113.952
16	314125.647	403077.593	43	314134.317	403098.236	69	314105.501	403111.765
17	314136.697	403089.247	44	314133.828	403098.583	70	314107.467	403113.690

The creation of plans and maps has been modernized due to easy access to high-capacity computers and equipment that can record data in the field, store and then download to the computer where the plans and maps are obtained in digital format. Modern total stations and GPS receivers have their own applications with which, working on codes, you can get the plan and map directly to the field. They are then downloaded to the computer and can be plotted from there (Sala et al., 2020).

After all the technical documentation and all the approvals necessary for the construction of the building have been finalized, the transition to the execution phase follows. The tracing, as the main topographic work of execution, aims at transposing on the field the characteristic points of the constructions, in plan and in height, according to the provisions of the project.

The characteristic points drawn on the ground will be partially destroyed due to the execution of construction works (for example, digging the foundation pits leads to the destruction of the points that delimit the basic axes of the construction). In order to apply this method, a series of auxiliary wooden constructions called fences are made in the field, which can be continuous or discontinuous. The fences are executed in the form of a rectangle, not taking into account the small entrances and exits of the foundation, compared to the basic axes of the construction. This fence requires a lot of wood and is not convenient for construction work, as it makes it difficult for vehicles to move.

The tracing of constructions involves the application on the field of topographic elements (sizes), in relation to a support network, using procedures and tools appropriate to the situation on the ground and the required accuracy. The choice of tracing methods is made according to: - the existing measurement conditions; - dimensions and plan shape of the constructions; - required accuracy; - how to make the tracing network; - type of equipment (Călina et al., 2020).

The tracing, as the main topographic work of execution, aims at transposing on the field the characteristic points of the constructions, in plan and in height, according to the provisions of the project. The use of one or another of the planimetric tracing methods depends on the required accuracy and the position of the ends of the alignments with respect to the elements known on the plane and in the field (Figure 4).

The elaboration of the tracing project and the elaboration of the tracing schemes and the connection (establishing the coordinates) of the main axes of the construction with the tracing base points (topo-geodetic support network) was made by the building designer. The tracing was done with the help of the total station. The planimetric methods of tracing the foundation of our building that we used were the method of tracing the

coordinates from memory with the manual entry of the coordinates of the points in the tracing project, and the polar method (Table 3).

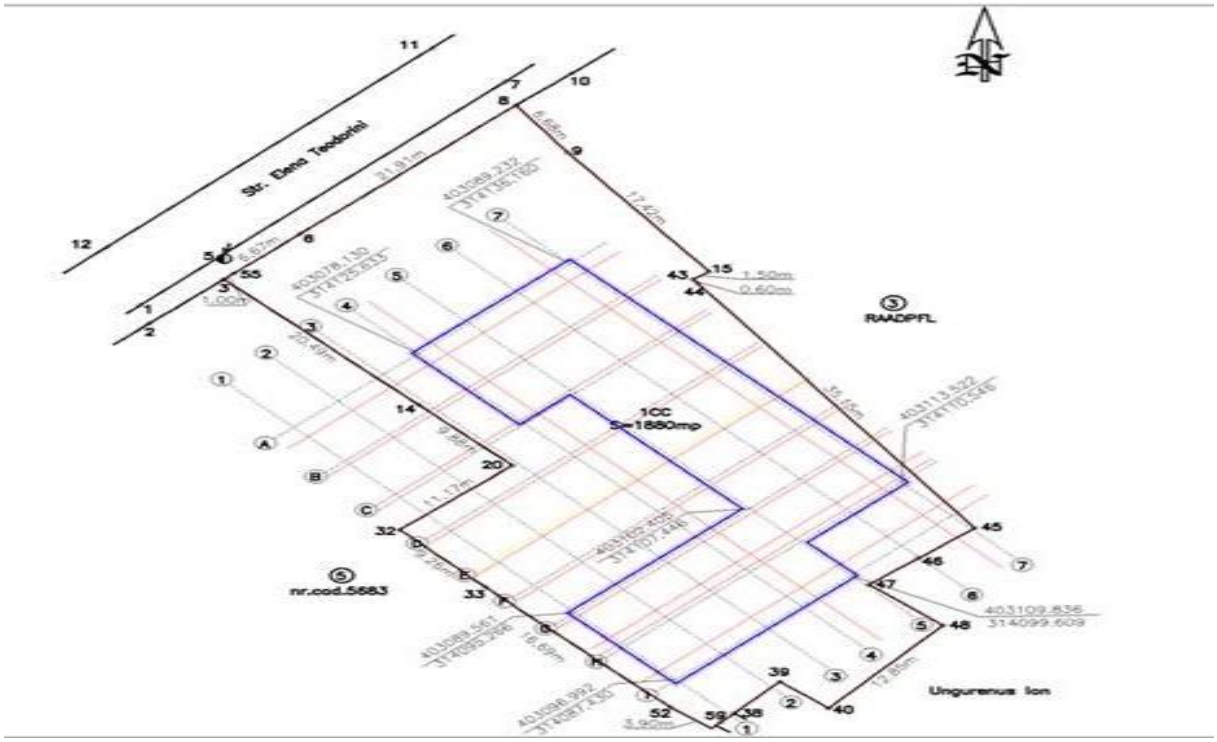

Figure 4 Representation of the eraser tracing axes

Table 3.

Coordinates of the eraser points

Intersection points of tracing axes	X (m)	Y (m)
A4	314125.633	403078.130
A7	314136.160	403089.232
I1	314087.430	403096.992
G1	314095.266	403089.561
G5	314107.446	403102.405
I5	314099.609	403109.836
H7	314110.546	403113.522

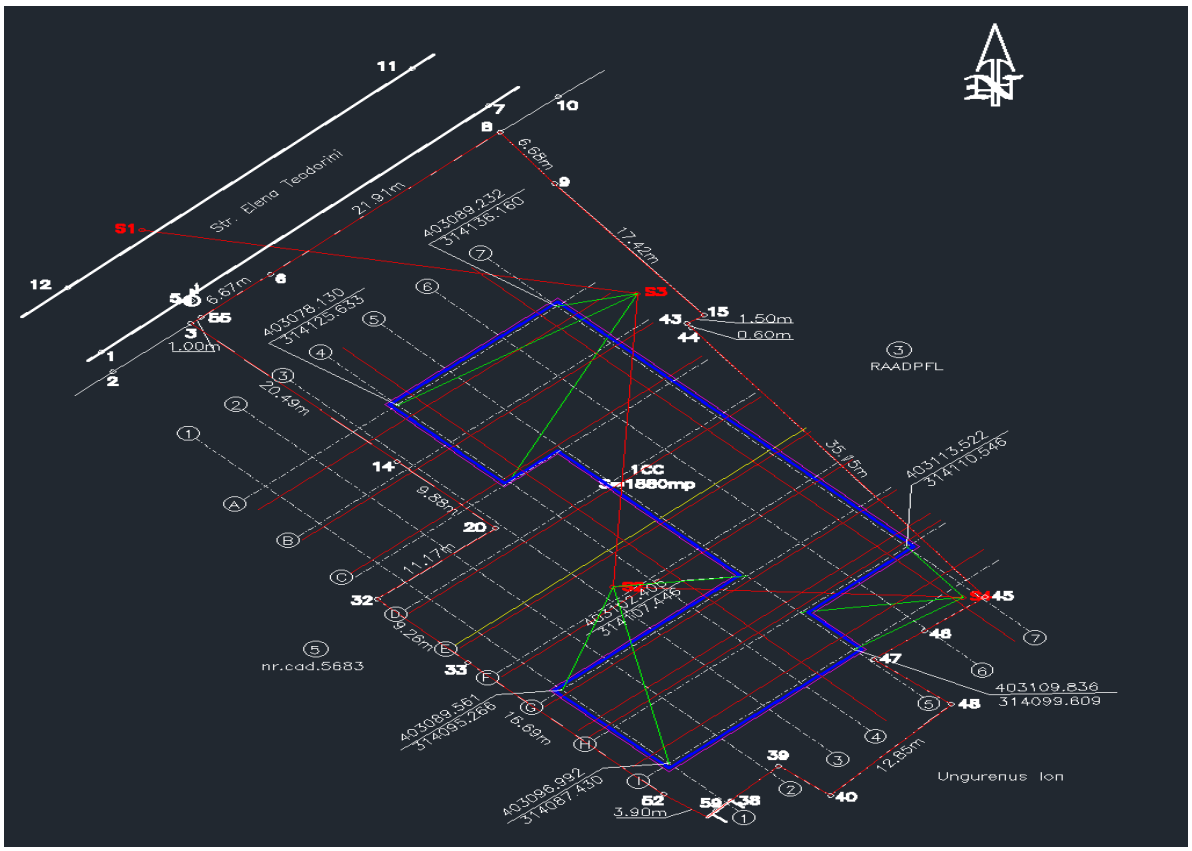

Figure 5. Tracing the eraser points

From the X and Y coordinates of the eraser points and of the support network points, which we have, we calculate the topographic tracing elements:

1. - the distances between the support points from which we will perform the tracing;
2. - distances between the main points of the eraser (length of the sides);
3. - the guidelines of the alignments formed by the points of the support network;
4. - orientations of the sides of the eraser;
5. - the horizontal angles between the alignments of the support points and the sides of the eraser

Point A4 is drawn as follows:

1. - park with the total station at support point S3, where it is centered and set;
2. - the S2 point of support is targeted and draw to the right the polar angle αA7 with medium precision;
3. - in the new direction obtained, the polar distance DS3-A7 is applied starting from point S3, at the other end of the distance the point A7 of the eraser is materialized with a stake.

The other points of the eraser are drawn in a similar way (Figure 5).

Figure 6. Basement plan

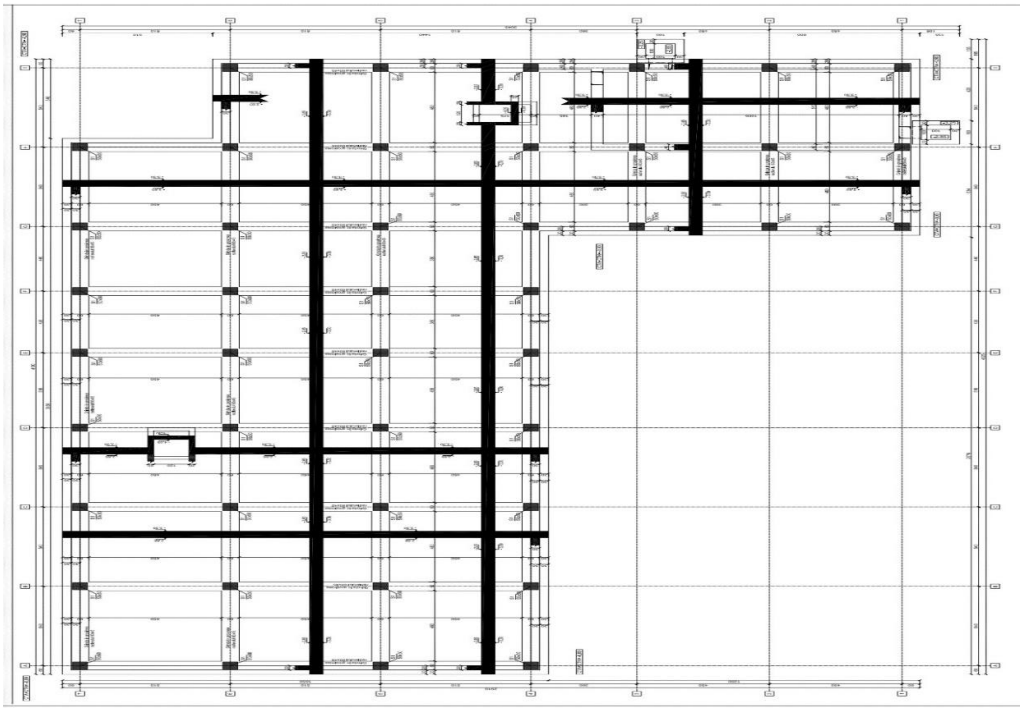

Figure 7. Foundation plan

The construction surveys are executed in order to register the construction in the Land Book in order to tabulate the property right both to the apartments and to the lands with construction. Also, the purpose of a relevant plan is to make the most accurate and complete technical documentation both on the buildings for which there is no data (plans, sections, facades, details) and for those whose initial design existed but which, for various reasons (execution errors, transformations, degradations), no longer corresponds to the real situation (Figure 6 and 7).

CONCLUSIONS

Based on the technical documentation prepared with great precision and accuracy, the designer was able to design the structure of the agritourism reception in the best conditions, in compliance with all technical and legal rules imposed on such work. The technical documentation was performed using state-of-the-art topographic equipment such

as Stonex S10 GNSS GPS and the Leica TCR 407 total station, which led to a high level of accuracy and a very high efficiency of work execution. Topographic survey was performed in the Stereographic Projection System 1970 and the Altitude System used in our country which is called the reference level Black Sea 0, 1975, and the support network was determined GPS, so as to ensure the number of points required for topographic measurements and cadastral detail.

Due to the fact that the support and thickening network was made at a high level of precision and with great rigor, its points could be used both in the design phase and in the other phases of drawing and execution of construction works. Its thickening was achieved by specific topographic methods, thus ensuring a sufficiently large number of points, indispensable for specific tracing works. The agrotourism construction was located on the land in the best conditions and ensured from a topographic point of view all the elements necessary to achieve and follow all the execution stages. The work performed was of real use for both designer, executor and owner because it provided them with all the parts drawn, executed precisely and in detail necessary for the preparation of all documents, estimates and implicitly of the Task book.

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