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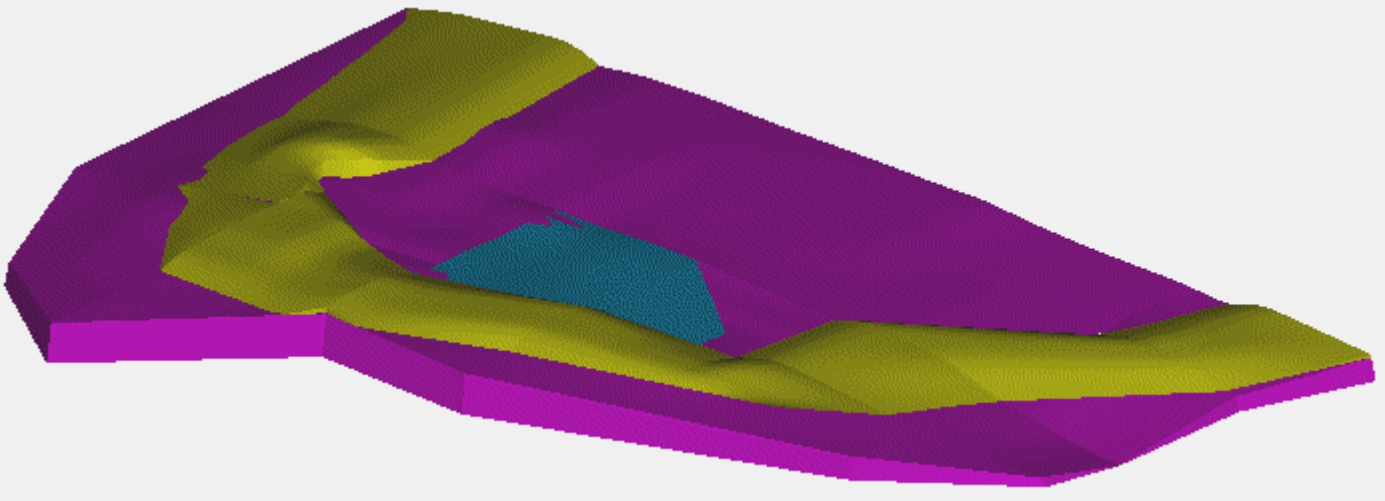
Dr. Mihail Georgiev, Dimiter Stoev, M.Sc. Kiril Velkovsky
Sofia

RESULTS OF THE GEOPHYSICAL PROSPECTING OF THE PREHISTORIC SETTLEMENT PROMACHON - TOPOLNITSA



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ACKNOWLEDGEMENTS

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In the period from October 12-27, 1996, a research team from the Institute of Thracology of the Bulgarian Academy of Sciences, consisting of Research Associate Mihail Georgiev, Engineer Dimiter Stoev and Engineer Kiril Velkovski, continued the geophysical investigations which started during the previous year of the prehistoric settlement Promachon-Topolnitsa. The investigations form a part of complex research of this site, organized by the Museum in Kavala.

GENERAL INFORMATION ABOUT THE SITE

The archaeological site Promachon-Topolnitsa is located in the eastern foothills of the Belassitsa Mountain, along the right bank of the Strouma valley. The terrain on which the prehistoric settlement is localized is divided between the state border between the Republic of Bulgaria and the Republic of Greece. The nearest settlement from the Greek side is Neo Petritsi, at a distance of approximately 15 km. The total area of the site is about 5 hectares.

GEOLOGICAL AND ARCHAEOLOGICAL CONDITIONS. GEODESIC MEASUREMENTS

The archaeological site is located over a positive relief form, 300-400 m long and about 150 m wide, which can be considered to have been a fragment of an old non-flooded river terrace.

The terrain is flat, with a slight slope to the east, towards the Strouma river, with altitude about 75-85 m. The structure considered expands to the west, its slope increases, passing into a slope of the Belassitra Mountain. The plain on the north, east and south is a younger non-flooded terrace of the Strouma river.

According to preliminary data, the following materials take part in the geological structure:

- superficial humus layer, 0.15-0.20 m thick, consisting of black humus clay, with many organic plant inclusions and rock fragments;

- layer of anthropogenic sediments, consisting mainly of clays mixed with ceramic materials and stones. The layer is about 1.5 m thick;

- clayey layer with rock fragments and gravels of mixed origin: from the weathering of the underlying rock layer, from the erosion of the mountain slopes, as well as from alluvial materials from the river terrace;

- rock foundation built of metamorphites: shales and gneisses.

The eastern part of the prehistoric settlement was studied in the recent past by archaeological excavations, but its other boundaries have not been precisely determined yet.

The geodesic measurements for determining the position and orientation of the areas studied and the geophysical profile were made with respect to the geodesic grid of the site, stabilized on the terrain by means of metal (iron) rods.

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RESULTS OF THE MEASUREMENTS

Area 1

Fig 1. Plan of the Geophysical surveys. Area 1

On the basis of the results of the geophysical prospecting of the site, carried out in 1995, the aim of the measurements in 1996 was determined, namely to outline the contours of the settlement and to study its stratigraphy. The task was solved by using an electrical sounding method according to profiles.

The methodology of the measurements was adapted for detailed exploration of the uppermost 5 m of the geological section in which the archaeological site, the prehistoric settlement, is localized.

The grid used in the prospecting was in accordance with the results of the work completed so far and with the existing situation of the terrain [excavations (green color), terrain forms (brith color), etc.] (Fig. 1).

The length of the profiles was determined on the basis of the data obtained in the course of the measurements. Measurement were made in 120 points along 6 profiles with different length (magenta color). Control measurements were made in four points.

Seven new geoelectrical sections were plotted as a result of the processing of the data of the measurements (Fig. 2 and Fig. 3). Their interpretation also takes into account the results of the archaeological excavations and the surveying of the terrain. The following layers have been differentiated, with their respective

geophysical, geological and archaeological characteristics:

Layer 1 - these are the surface 0.20 m of the section. It is built of humus clays with rock fragments having an uneven concentration. They, as well as the differences in the humidity of the different parts, are the reason for the wide range in which the values of the apparent resistivity change in this layer - from 30 to 160 Ohm.m.

Layer 2 - built of clay, stones and materials of anthropogenic origin: ceramic, bones, clay fired to different degrees, more or less preserved structural elements. Its thickness is from 1.50 to 1.80 m.

Fig 4. Map of the anthropogenic layer. Upper sublayer

This layer has a complex structures and can be subdivided:

1. in plan - into three zones:

- zone 1 - with apparent resistivity above 75 Ohm.m;

- zone 2 - with apparent resistivity from 50 to 75 Ohm.m. The two zones cover entirely an area, irregular in shape, having a nonuniform mosaic character of distribution.

- zone 3 - in which apparent resistivities between 30 and 40 Ohm.m have been found.

It represents the outer contour of the area comprising zone 1 and zone 2, being marked in some places in the form of narrow strips, as well as within the area itself.

The cross-section of this zone is an irregular trapeze, its lower base being rather elongated along the sloping parts of the terrain on which the settlement was built, on its southern and northern sides.

2. in depth - into two sublayers (Fig. 2 and Fig. 3):

sublayer 1 - upper sublayer with 0.8-1.0 m thickness;

sublayer 2 - lower sublayer with about 1.0 m thickness. In the area between S411 and S418 (Fig. 3) it is not possible to distinguish clearly the lower sublayers of zone 2 and zone 3. It can be assumed that the lower sublayer of zone 2 continues outside the contour, while zone 3 is represented only by the upper sublayer.

On the map of the lower sublayer (Fig 5.), in the area of the unclarified relation between zone 2 and zone 3, the latter is presented with two sublayers.

Layer 3 - an inconsistent layer, build of sandy clays with rock fragments, naturally deposited after the settlement stopped functioning. Marked outside the contour of the anthropogenic layer, along the sloping parts of the base.

Layer 5 - the natural base on which the settlement was built. These are proluvial clays with rock

fragments and gravel intercalations. The structure of this formation is seen by the natural or artificial exposures in the region. The results of the electrical sounding reflect the geological structure: stage by stage and vault-like deposition of torrential materials from the mountain.

Attempt at archaeological interpretation of the geophysical results

Figure 6. Three-dimensional reconstruction of the layers. Area 1 (View)

The object of the commentary can be layer 2 and the sublayers and zones deposited within its thickness and area distribution. It is possible to assume the following:

1. Zone 1 is an accumulation of stone, ceramic material and bones. This zone probably marks the places of the built dwellings.

2. Zone 2 covers the spaces of the settlement without construction.

3. Zone 3 - on the one hand, traces of its have been marked around the dwellings themselves, on the other - it comprises the entire settlement. It could be assumed that zone 3 is an element of the structure of individual dwellings and of the whole settlement, being of a defensive nature.

4. Basically the two-sublayer character of anthropogenic layer 2 gives the idea about two stages in the existence of the settlement, which do not differ substantially in their area.

5. The obscure interrelations between the lower suwlayers of zones 2 and 3 in the area between S411 and S418 can raise additional questions conserving the layout and construction of the settlement.

Recommendations

For verification and reconsidering of the results of the interpretation of the geophysical operations, as well as for the complete specifying of the structure and stratigraphy of the settlement, we recommend the following checks and additional investigations:

1. Checks with geological drillings or ditchs for clarifying the character of zone 3;

2. Additional geophysical studies with a view to obtaining more information for inspection of the unexplored area and for verification by drillings;

3. Geophysical measurements over the part of the settlement localized on Bulgarian territory and unaffected by the archaeological excavations conducted there.

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Area 2

Fig 7. Plan of the geophysical explorations. Area 2

The profiles S101-S132, S201-S208 and S300-S306, made in 1995, and the profiles S601-S614 and S701-S718, made in 1996 (Fig.7), yielded preliminary evidence about the principal elements of the geological and archaeological situation in that area (Fig.8).

Layer 1 - builds the topmost 0.20 m of the section. Its composition consists of clays, with humus and rock fragments in different quantities. This, as well as the uneven humidity, define the broad range of variation of the values of the apparent resistivity - from 30 to 250 Ohm.m.

Layer 2 - this is the layer which can be defined as anthropogenic. Its apparent resistance is from 50 to 300 Ohm.m In a zone with a width of approximately 25 m to the west of the gulch and the dirt road, this layer reaches a depth of 2.4 m from the surface. It is divided into three sublayers: to a depth of 0.60-0.80 m and the highest apparent resistivity; to a depth of 1.30-1.50 m, and to a depth of 2.30-2.40 m. In the remaining explored part of the area, this layer is with a lower apparent resistivity. Its lower boundary is about 0.60-0.80 m from the surface. Intervals with lowered apparent resistivity, below 45 Ohm.m, were marked in the plan of the periphery of the anthropogenic layer, in some places also inserted into it.

Layer 3 - these are natural deposits on the sloping parts of the terrain, immediately to the north and south of the settlement, formed after the settlement ceased to exist.

Layer 4 - Materials with apparent resistivity of 65 to 80 Ohm.m, filling the negative form west of the dirt road, with depth of up to 5.50 m. A verification is needed in order to identify the nature of the layer: whether it is of natural or anthropogenic origin.

Layer 5 - materials building the natural geological cross-section on which the settlement rests. It is possible to identify in it sublayers whose composition and structure can be seen in the slopes and exposures.

Fig 8. Geoelectrical sections. Area 2

The information obtained so far about area 2 is rather fragmentary. In order to clarify it, it is necessary:

1. To make geophysical measurements in the zone of the dirt road and the gulch;

2. To expand the grid of profiles to the north and to the west;

3. To pay special attention to the southern border of the plateau.

4. Verification with geological drillings or ditchs for clarifying the character of layer 4;

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Compiled by: Dr. Mihail Georgiev, Dimiter Stoev, MSc. Kiril Velkovsky.
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Sofia, March 1997

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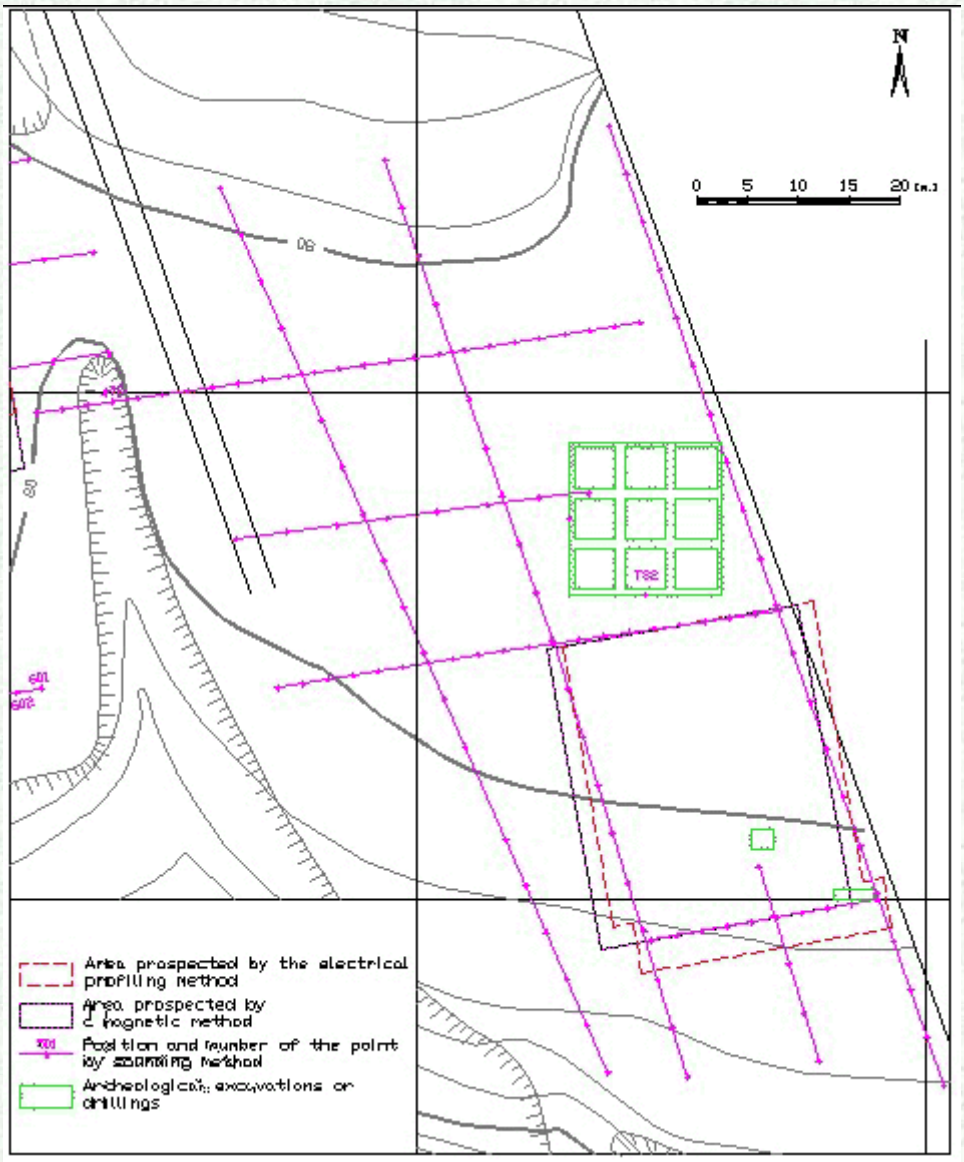

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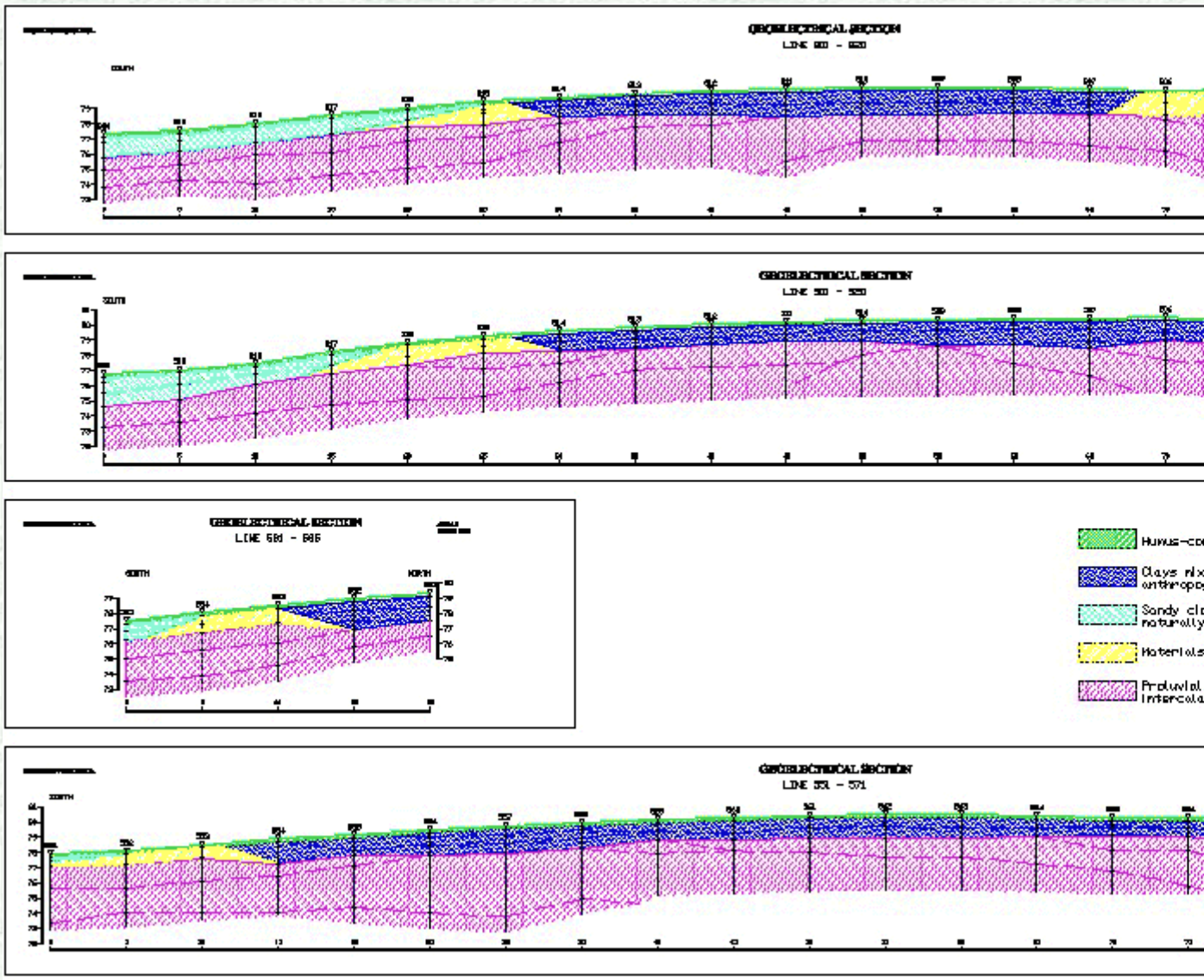

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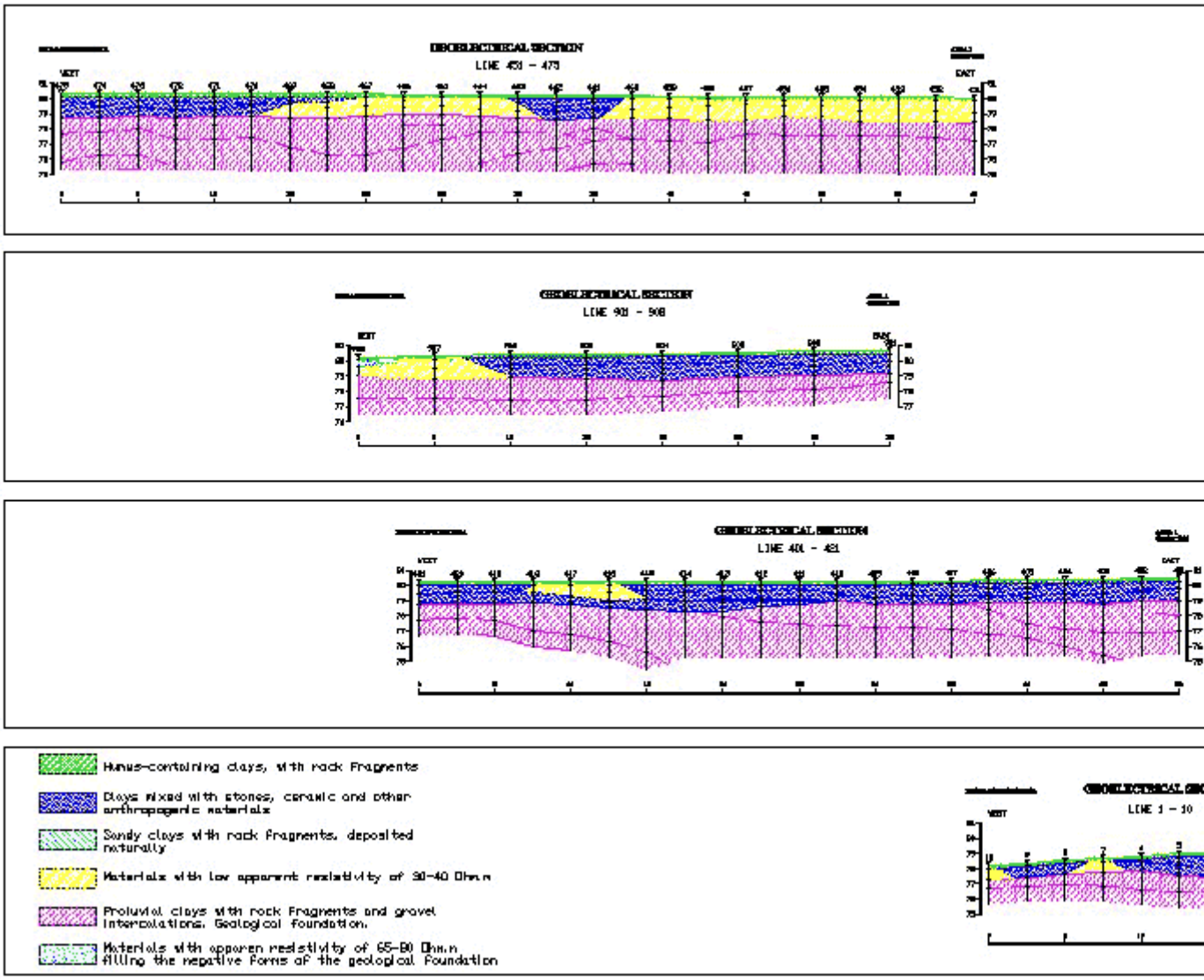

Fig 4. Map of the anthropogenic layer. Upper sublayer *[Content]* *[Previous]* *[Next]*

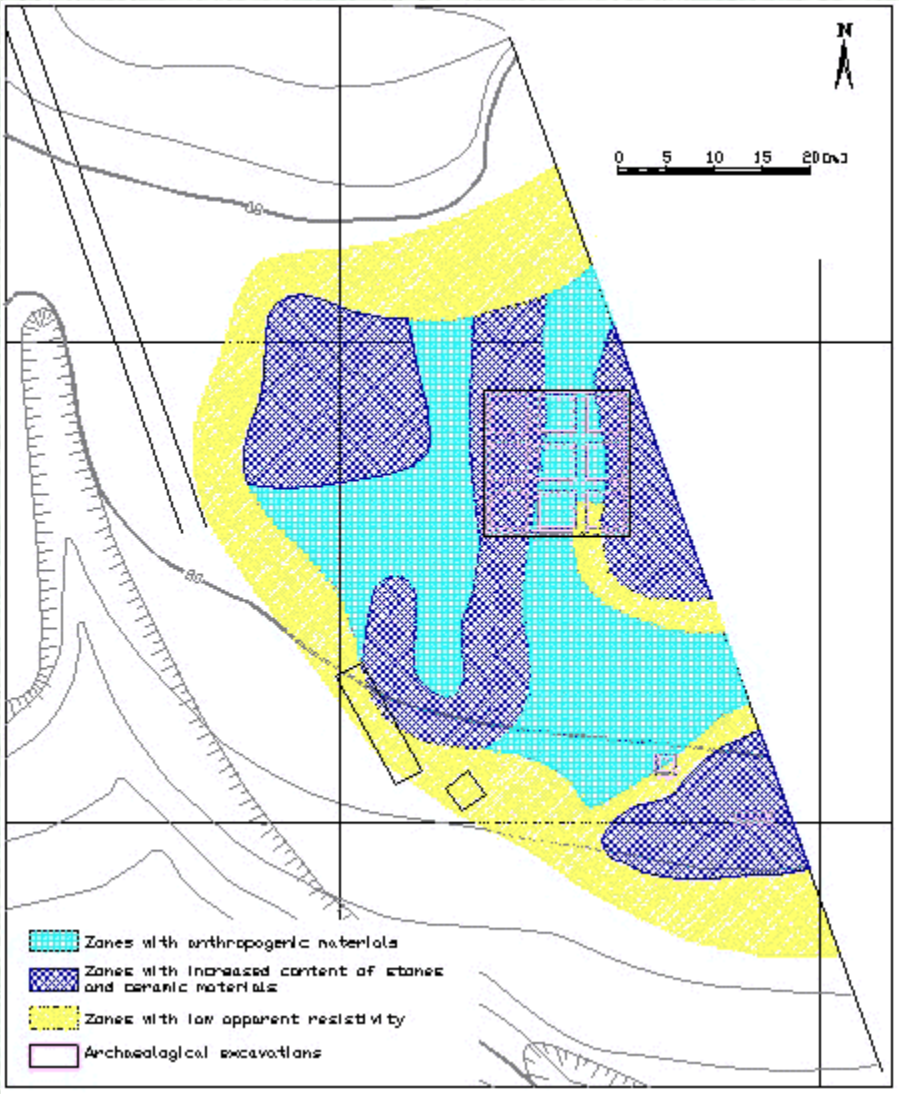

Fig 5. Map of the anthropogenic layer. Lower sublayer *[Content]* *[Previous]* *[Next]*

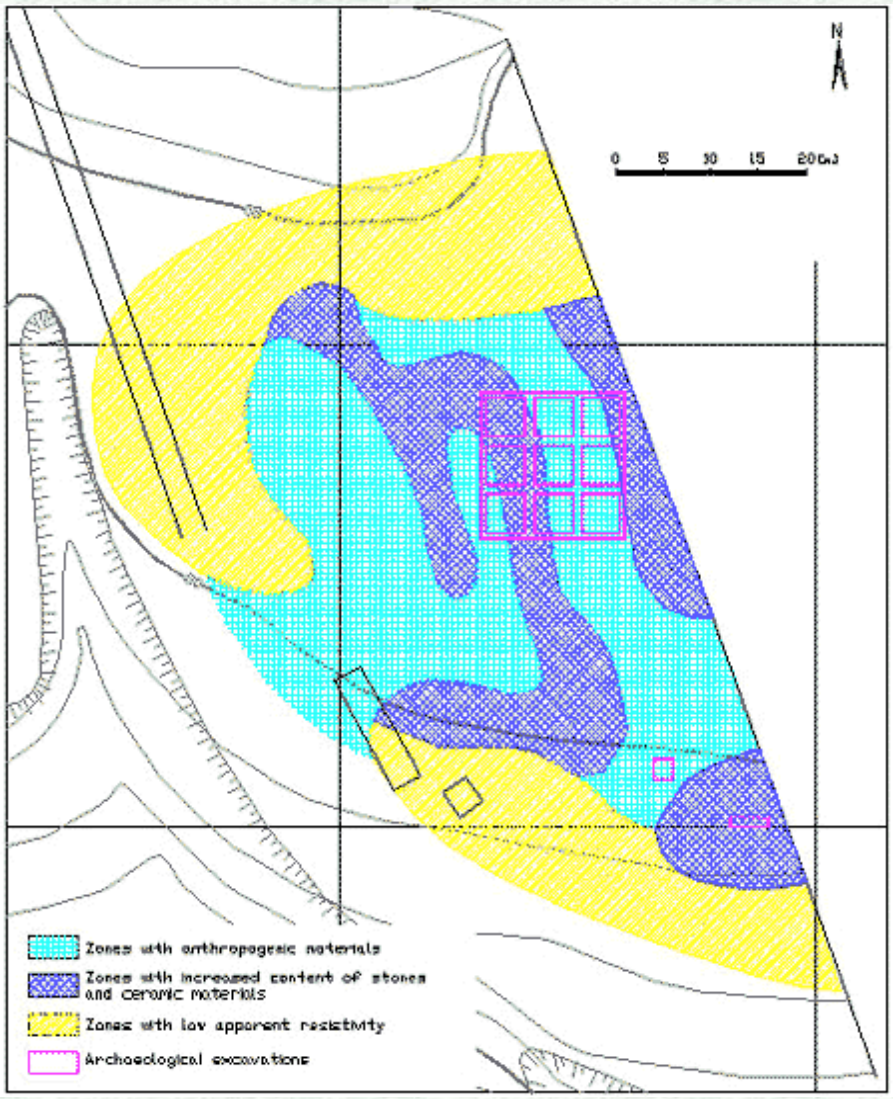

Fig 6. Three-dimensional reconstruction of the layers. Area 1 *[Content][Previous][Next]*

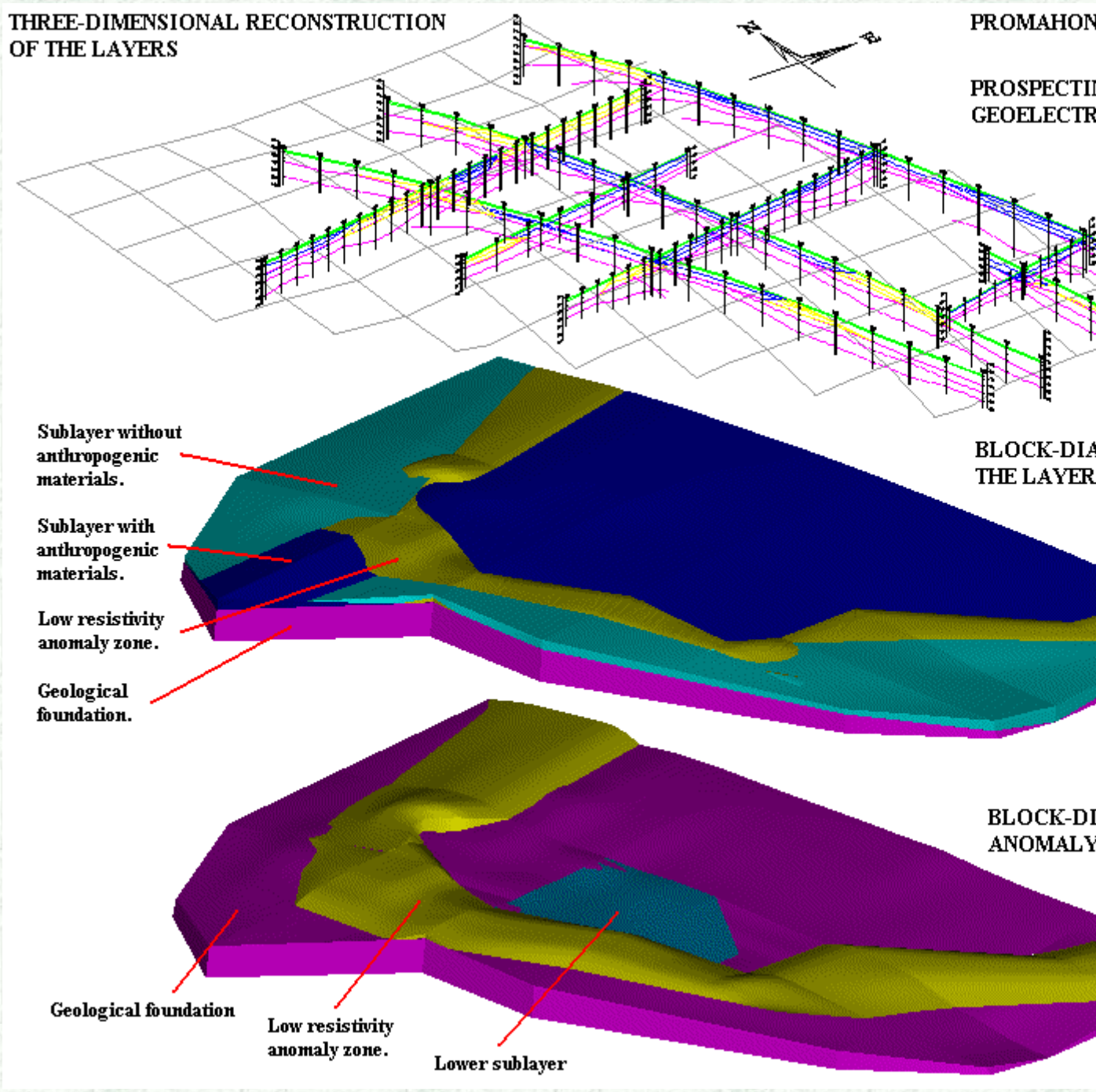

Fig 7. Plan of the geophysical explorations. Area 2 *[Content]* *[Previous]* *[Next]*

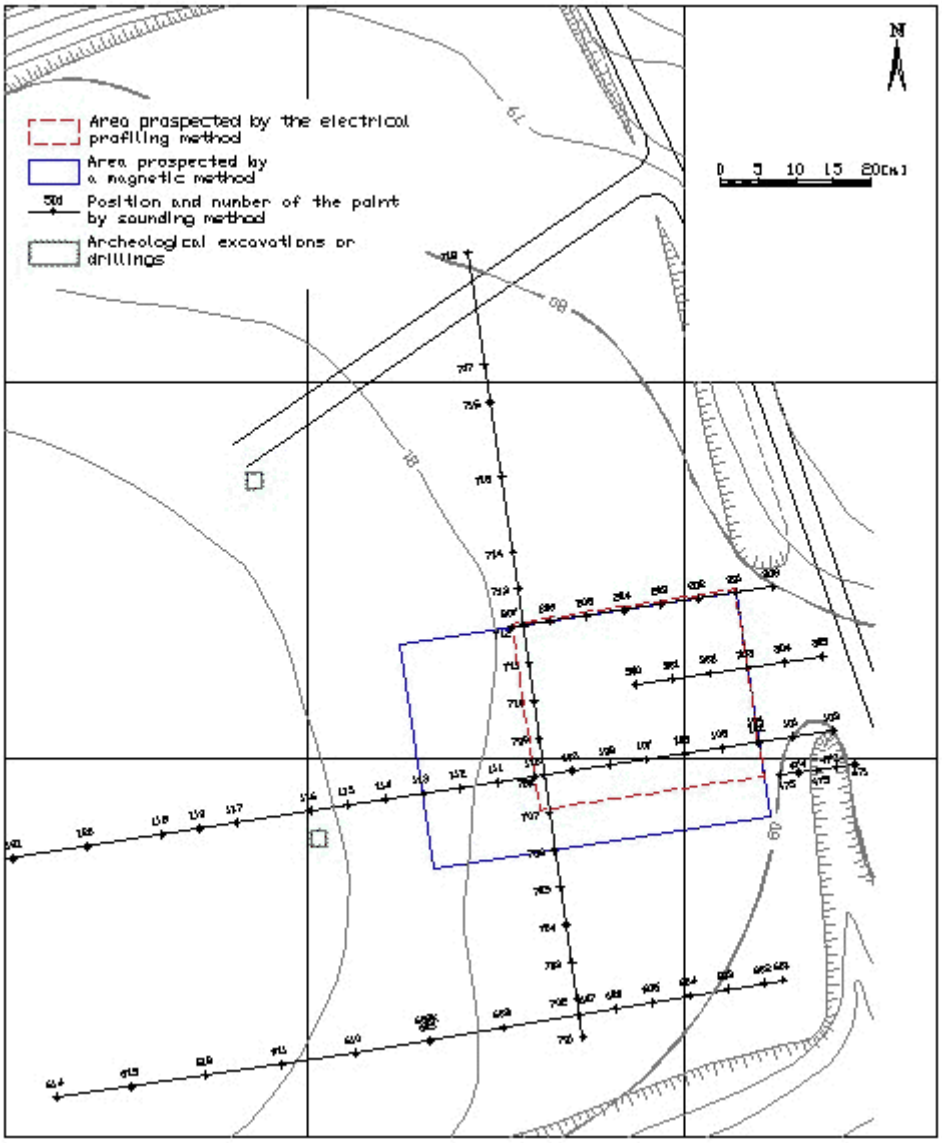

Fig 8. Geoelectrical sections. Area 2 *[Content]* *[Previous]*