

# Pliska and Veliki Preslav: non-invasive research into the urban planning of two early medieval centers

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## Abstract

Geophysical surveys in Pliska and Veliki Preslav (Bulgaria) brought a breakthrough in our view of the appearance of early medieval centres in the Balkans. Urban planning on a scale of dozens of hectares has been documented for the first time. It has been found that wooden buildings massively accompany masonry architecture. Using a magnetic survey, we have been able to define the road network and functionally specific areas.

## Keywords

Bulgaria; central sites; early Middle Ages; geophysical survey; settlement structure

## Introduction

The two metropolises of early medieval Bulgaria – Pliska and Veliki Preslav, belonged to the largest cities of their time in the world. Their history and archaeology graphically illustrate the rise and fall of the First Bulgarian Kingdom as well as the re-occupation of the Eastern Balkans by the Byzantine Empire between the 8th and 11th centuries. Despite archaeological investigations spanning more than a century, fundamental questions concerning the nature, structure and settlement intensity of these cities remain unanswered. Our recent geophysical surveys (2019-2022) promise to shed new light not only on the functioning of these cities but also on the economic and socio-cultural lives of their inhabitants.

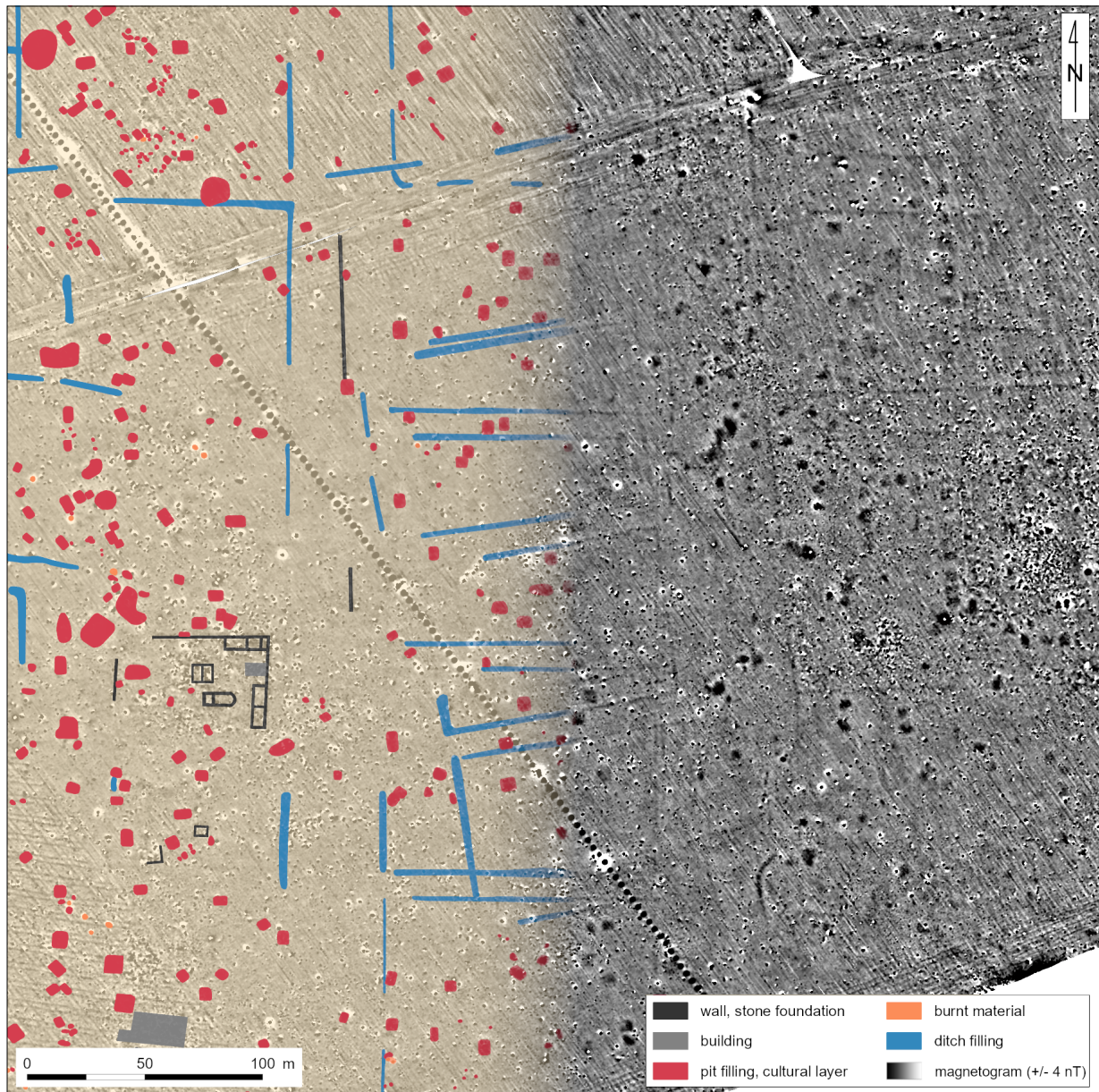
## Materials and methods

Combining geophysical survey with previous archaeological field walks and excavations proved to be adequate and valuable for expanding our knowledge of the researched sites. Given the nature of the archaeological structures ex-

cavated in Pliska and Veliki Preslav such as stone buildings and wood-clay features, we decided to conduct a magnetometer and GPR survey. While magnetometry investigates vast areas quickly and identifies a wide range of archaeological features, GPR can estimate the depth of the features.

The magnetic survey in Pliska covered an area of 775 ha. The surveyed area in Veliki Preslav reached 76 ha. The prospection was carried out with a fluxgate magnetometer LEA MAX (Eastern Atlas, Germany) with ten fluxgate probes (FEREX CON 650, Foerster, Germany). The instrument was designed as a gradiometer for measuring the vertical gradient of the local magnetic field. Sampling density was 0.5 m x 0.1 m. Data positioning was provided with an RTK GNSS (Real-Time Kinematic Global Navigation Satellite Systems), and gathered data were processed using the standard procedure in the LEAD2 programme.

The GPR survey covered only small parts of both sites. The surveyed area in Pliska was 1 ha, in Veliki Preslav it was 1.7 ha. The prospection was conducted using the multichannel georadar Raptor-45 (Impulse Radar, Sweden) with eight antennas with a central frequency of 450 MHz.



**Fig. 1:** Pliska: Results of magnetic prospection in the western part of the Outer City and archaeological interpretation of the survey.

The resolution of the measurements was 0.1 m x 0.1 m. The obtained data were processed using GPR Slice (Geophysical Archaeometry Laboratory/Screening Eagle) software.

The results of the geophysical measurements were processed and further visualised in the GIS environment (ArcGIS; ESRI). The identified anomalies were interpreted as features with archaeological potential and transformed into a digital vector format. Based on the physical properties of these anomalies, their shape, dimensions and the overall context or distribution in space, they were

further classified as settlement pits, trenches, burnt features, fortifications, stone architecture etc.

## Results

Pliska, the assumed first capital of early medieval Bulgaria (681-1018), consists of two components. The Inner City represents a stone fortification with dozens of monumental stone buildings such as palaces, administrative and



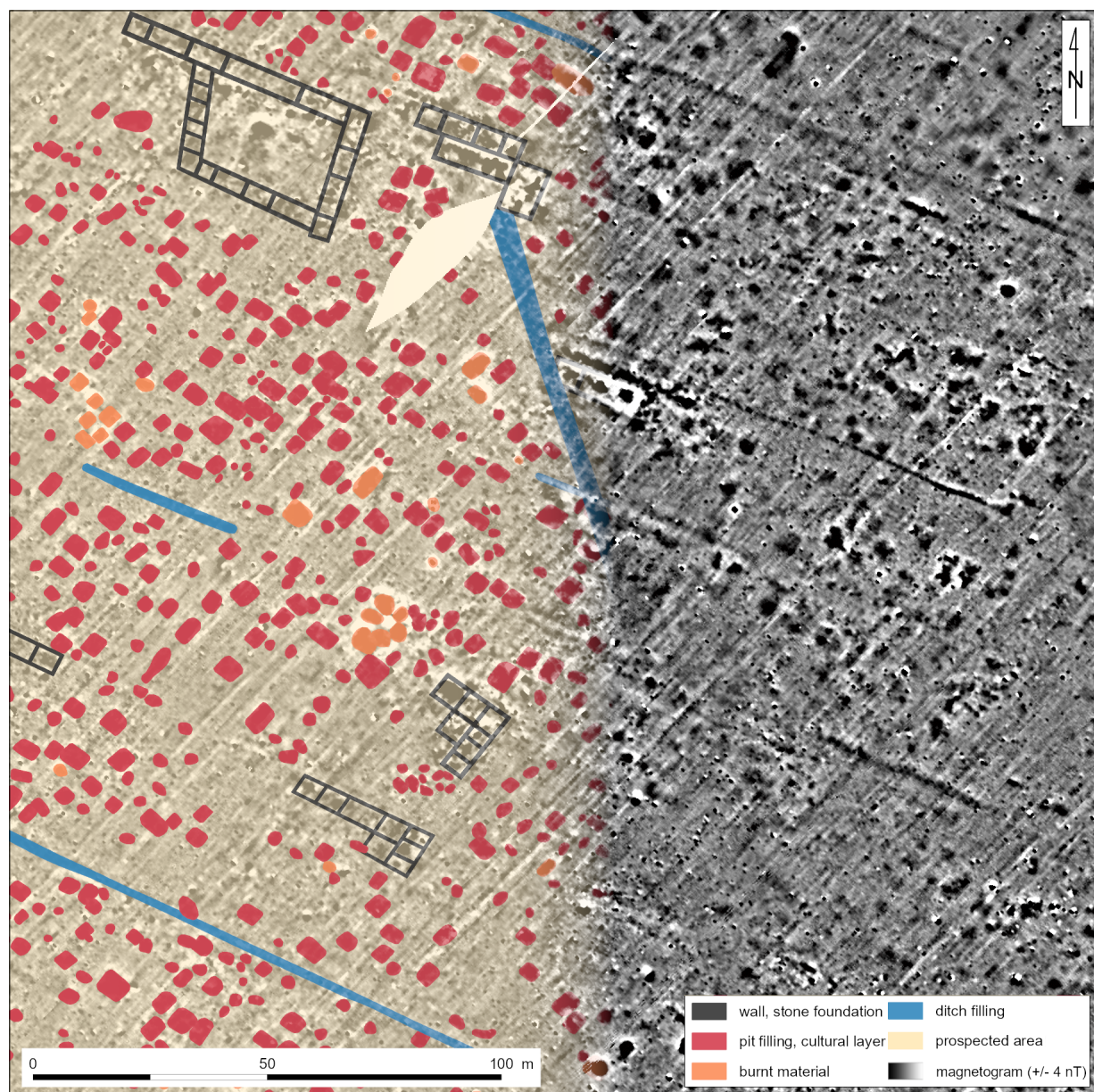


Fig. 2: Veliki Preslav: Results of magnetic prospection in the eastern part of the Outer City and archaeological interpretation of the survey.

aristocratic buildings, and churches. It is surrounded by the Outer City, a huge settlement complex protected by earthen ramparts. Together, the whole territory of Pliska covers an area of 2188 ha (Aladzhov 2013). After the Bulgarian ruler Simeon I moved his headquarters from Pliska to Veliki Preslav, this city grew in size enormously in less than 80 years (893-971). From a purely military fortress, Veliki Preslav developed into a “three-tier” agglomeration consisting of the Palace City spread over an area of 24 ha, an Outer City of over 300 ha and the suburbs (Totev 2001).

In terms of area, Pliska and Veliki Preslav were comparable to the megacities of the era such as Constantinople and Baghdad. Due to the rapid reduction of their occupied areas in the eleventh century and beyond, they also represent the best-preserved metropolises from the Middle Byzantine period in the Balkans. As a result, many important parts of both cities have been archaeologically excavated – the Ruler’s and Patriarchal complexes, aristocratic mansions, production and monastery ensembles, as well as numerous church buildings. However, after nearly 125 years


of archaeological excavations, several questions remain unanswered, especially about the Outer Cities and suburbs. It was generally assumed that the Outer City was in both cases sparsely built up, chaotic and without firmly set urban planning rules. Such an idea was also confirmed by a large-scale geophysical survey carried out in the field to the north of the Great Basilica in Pliska in 2016 (Filzwieser et al. 2019). However, the latest geophysical survey found that large parts of both sites show organised residential development. In Pliska, we discovered a regular settlement structure with a network of roads oriented in the north-south and west-east directions (Fig. 1). Some have the character of boulevards with a width of tens of meters. They are lined with fenced courtyards of regular rectangular shape with a size of 0.4 to 2 ha. The fences are mostly wooden palisades, but exceptionally, also stone walls. Our survey shows buildings of various kinds in individual courtyards, including multi-room stone houses or even large complexes with a square courtyard in the middle. The main buildings are often surrounded by a large number of simple sunken huts. Although the same features were identified in Veliki Preslav (Fig. 2), the character of the settlement structure there is diametrically different than in Pliska. The most interesting is one city district with a size of approx. 60 ha. It shows no fences like in Pliska. It is characterised by a regular network of narrow streets and extremely dense occupation. There are numerous stone houses and churches, but most objects are small wooden cottages with a square floor plan. Furthermore, we discovered two large building complexes – probably a monastery and military barracks – in the peripheral zones.

## Discussion and conclusion

The structure of the built-up areas in Pliska and Veliki Preslav reveals a system for which we do not know a direct analogy. Although sunken huts are a common type of house in the Balkans, as well as in Central and Eastern Europe, the sacral and profane stone architecture – despite its local antecedents – has its roots outside the territory of the Bulgarian state. The buildings and fabric of settlement we have so far recognised we can search both in the territory of Byzantium and in the steppe regions of the Black Sea and Central Asia. New information about the urban fabric in Pliska and Veliki Preslav obtained by geophysical survey significantly expands our existing knowledge, ob-

tained mainly through archaeological excavations. To truly understand the character and development at both sites, an additional large-scale geophysical survey is needed as well as the involvement of other non-invasive survey methods. Subsequent validation of the obtained data using precisely targeted archaeological trenches will also be necessary. Such research is already underway, and we can hope in a significant breakthrough in the knowledge of these important early medieval metropolises.

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