

# PLATAIAI IN BOIOTIA

## A PRELIMINARY REPORT ON GEOPHYSICAL AND FIELD SURVEYS CONDUCTED IN 2002–2005

### ABSTRACT

Surface and geophysical surveys at Plataiai elucidate the development of the settlement through nearly five millennia. Pottery distribution patterns show that the site was first occupied in the Neolithic and continued in use through the Bronze Age, with a possible hiatus during the Dark Age. The settlement recovered in Archaic and Early Classical times, expanded during the 4th century B.C., and underwent further development in Hellenistic, Roman, Byzantine, and Early Modern times. Geophysical survey has located a previously unknown section of the town's largest fortification circuit and a probable gateway. Results allow a detailed reconstruction of the city grid and the internal structures of some of the blocks surveyed.

Since 1996 the Plataiai Research Project has been dedicated to providing a better understanding of this ancient Boiotian town's history and development.<sup>1</sup> Occupation is now firmly attested from at least the Late Neolithic, with further growth in the Early Helladic period and subsequently. The settlement's evolution can be followed for almost five millennia until its final demise in the 16th–17th century, in the Early Modern period. The general scheme of the site and the chronology of four consecutive

1. This project is a joint venture of the 7th Ephorate of Classical Antiquities at Thebes, Boiotia, the University of Vienna, and the University of Minnesota at Duluth, with the additional participation of the Fitch Laboratory at the British School at Athens. We wish to express our gratitude to the following institutions for permits, grants, and logistical support: the Greek Ministry of Culture, the Jubiläumsfonds der Österreichischen Nationalbank, the Austrian Archaeological Institutes at Vienna and at Athens, the Vienna city council, the

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see Waldstein, Tarbell, and Rolfe 1889; Waldstein, Washington, and Irving-Hunt 1890; Washington 1891; *RE* XX, 1950, cols. 2255–2332, s.v. Plataiai (E. Kirsten); Fossey 1988; Prandi 1988. Recent preliminary reports on the project, all with extensive bibliography, include Konecny 1998; Konecny, Boyd, and Whitbread 1999; Aravantinos and Konecny 2000; Boyd and Whitbread 2000; Aravantinos, Konecny, and Marchese 2001, 2003; Konecny 2005 and forthcoming. We are also grateful to the *Hesperia* reviewers and editor for their helpful advice.

fortification circuits of the town have been clarified with a high degree of certainty. Surface features within the Hellenistic fortification walls have provided a solid foundation for the reconstruction of the settlement's internal structures. Recently a detailed geophysical survey has been inaugurated in order to provide a nonintrusive analysis of subsurface features and to elucidate the internal structure and schema of the ancient town. Our purpose in this article is to report on how surface and geophysical surveys have greatly clarified our chronological, topographic, and architectural understanding of the site since 2002.

## ARCHAEOLOGICAL SURFACE SURVEY AT PLATAIAI

### SURVEY METHODOLOGY

The site of Plataiai covers over 80 ha of rolling terrain within the confines of the Hellenistic fortifications (Fig. 1). Surface surveys were undertaken between 2002 and 2004. Budgetary constraints and limited personnel prevented a complete sampling of the site. The survey was, therefore, designed to minimize cultural biases and maximize our limited resources.<sup>2</sup> Areas of examination were determined both by surviving physical features and a random selection of areas within the grid.

The pottery collected from the surveyed areas was analyzed in order to determine typology, chronological horizon, and distribution in specific areas. All surveyed areas were added to the general grid in an effort to reconstruct typological and chronological patterns of ceramic scatter at the site. Sherd density was determined by a modified subjective approach since an absolute numeric counting of sherds per area was not possible. Density was determined by surveyors walking in a zigzag pattern across the sampled area. Concentrations of ceramic data and physical features were noted and discussed at the end of each transect.

Random 1 m squares were also selected in which to determine the density of sherds and other artifacts such as brick fragments, roof tiles, worked stone, and metal. Artifact concentrations were assigned to rough numerical categories ranging from 0 to 6, with 0 indicating a lack of artifactual material, 1 with 2–3 artifacts per m<sup>2</sup>, and 6 indicating more than 100 fragments of material per m<sup>2</sup>. These densities are indicated in Figure 2. A density of 6 was observed on the acropolis, 5 in its vicinity, 4 and 3 toward the east and northeast, 2 and 1 generally toward the south of the site, and an even lower density south of the Hellenistic *diateichisma*. To be comparable across the site, the estimates were always established by the same person.

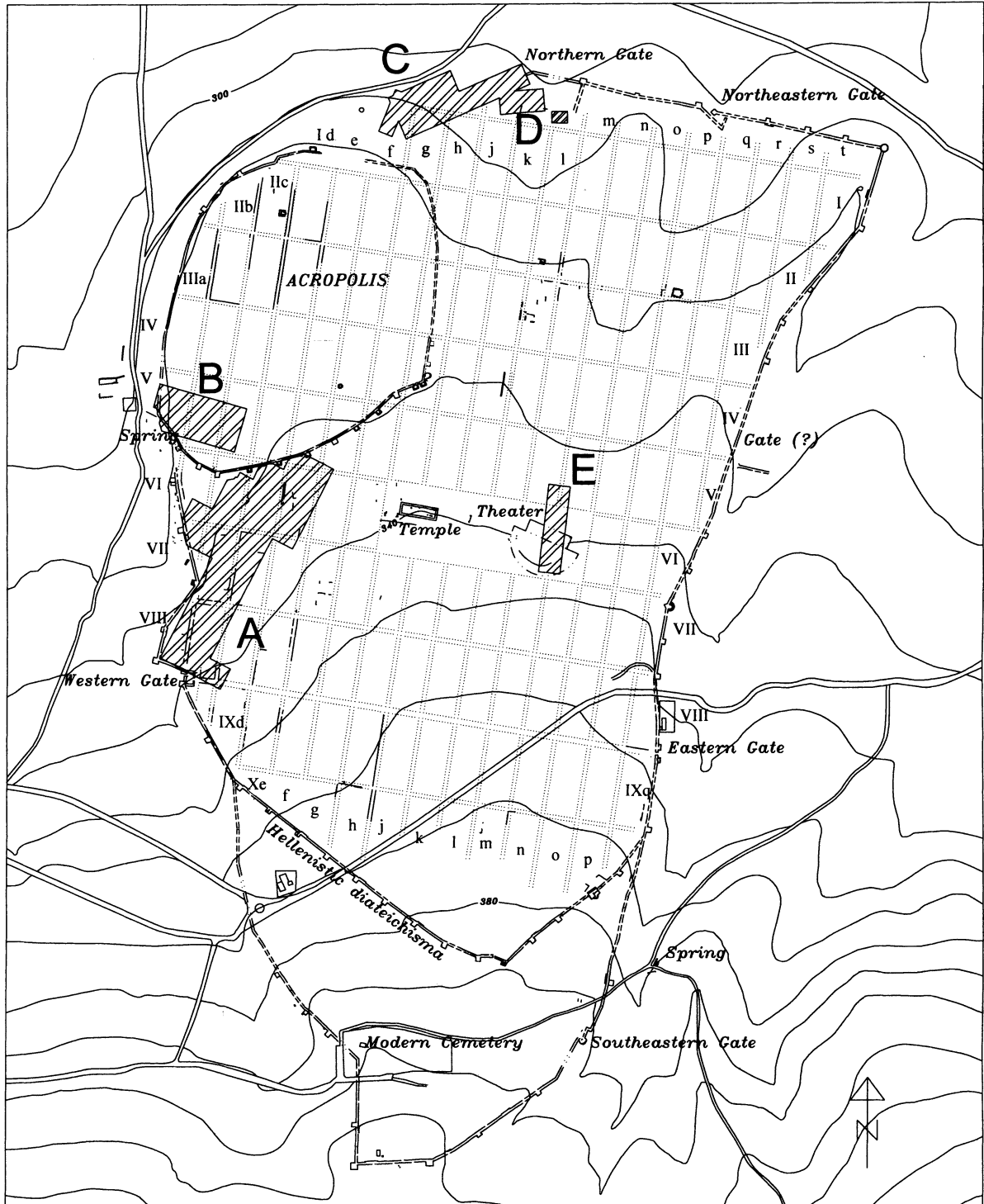
The distribution of ceramic types recovered from surface survey provides evidence for the date, location, and extension of the settlement during a number of periods in Greek prehistory and history. Plotting distribution patterns of surface pottery according to chronology and density of occurrence reveals trends in the growth, shrinkage, and intensity of occupation at Plataiai during different occupational periods.<sup>3</sup>

Figure 1 (*opposite*). Plataiai 2005, site plan showing major features and areas of geophysical survey (A–E).

A. L. Konecny

2. A strict metric approach (Bintliff and Snodgrass 1988; Bintliff 1992, 1997; Bintliff and Howard 1999) was not possible.

3. Sherd scatter density is subject to many external factors, such as later disturbance and erosion, that are not easily assessed. Nevertheless, scatter patterns and scatter densities can be regarded as a gross indicator of the relative intensity of ancient settlement activities in the parts of the site under scrutiny. While the methods employed at Plataiai are not as refined as other current methods of intensive survey, we believe the results are generally comparable. For the difficulties involved in the interpretation of the results of intensive ceramic survey, see Bintliff and Howard 1999. A more detailed discussion of survey methodologies employed at Plataiai is reserved for the final publication (Konecny, Marchese, and Aravantinos, in prep.).



0 100 200 300m

— in situ remains  
 - - - - - secure reconstruction

- - - - - tentative reconstruction      ..... road grid  
 ▨ areas of geophysical exploration

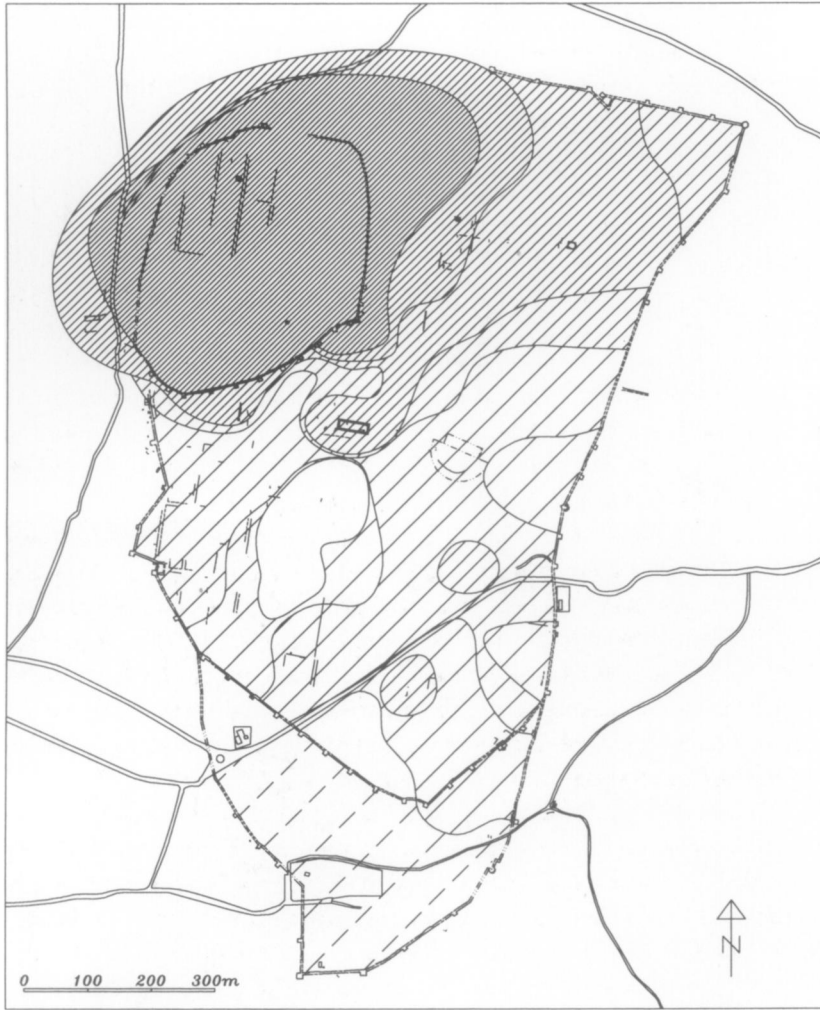


Figure 2. Varying artifactual densities represented schematically by hatching. A. L. Konecny

## SETTLEMENT DEVELOPMENT AND POTTERY DISTRIBUTION

Settlement activity at Plataiai is first attested in the Late Neolithic period. Situated at the foot of Mt. Kithairon in an area with a large amount of fertile soil, Plataiai's location would have offered a number of benefits to settlers. A plateau in the northwestern part of the site offered a position slightly elevated above the surrounding territory. This area, defined as Plataiai's acropolis, possessed a strategic advantage not duplicated in the immediate vicinity—the security of an easily defended locale. A good source of fresh water also exists at the base of the acropolis. The volume of water from this natural spring would have substantially exceeded present levels in the 5th–4th millennium B.C., when precipitation was more abundant than in today's Mediterranean climate.<sup>4</sup> At that time, too, Mt. Kithairon to the south would probably have been heavily forested, as it is now on its upper reaches, with the tree line descending at least to the edge of the plain. Subsequent deforestation in historical periods was a result of the growing prosperity of southern Boiotia in general and Plataiai in particular.

4. For climatic changes in the eastern Mediterranean, see Bottema and Woldring 1990; Eastwood, Roberts, and Lamb 1998 (both based on the results of pollen analysis), as well as the views of E. Kirsten (*RE* XX, 1950, col. 2257, s.v. Plataiai) and Pritchett (1985, pp. 95–96).

Neolithic pottery is found at the site all along the western limits of the plateau and to the east (Fig. 3:a). The absolute numbers and density of Neolithic sherds, however, are low.<sup>5</sup> This scarcity cannot be explained solely by the sealing of Neolithic strata through later accumulation, but indicates that the occupation of Plataiai remained moderate in size during the 5th–4th millennium B.C. The settlement was probably located adjacent to the natural spring and extended slightly toward the north and east of the plateau.

In the Early Helladic period (EH), a considerable increase in activity at Plataiai is indicated by the more abundant occurrence of ceramics on the surface and by the debris from later strata excavated in 2000.<sup>6</sup> The distribution of EH pottery is plotted together with the more or less coextensive Neolithic scatter in Figure 3:a. The EH material covers an area of 10 ha, the approximate limits of the acropolis of Plataiai. While it is doubtful that the entire acropolis was settled by the EH community, the surface density of EH pottery indicates heavy use of the area along the western fringe and into the center. Farther to the east and southeast, pottery densities decrease. Sporadic occupation may have occurred, but it is more likely that this area was beyond the limits of the EH settlement. Additional activities may have taken place along the northern part of a ridge running less than 1 km to the east of the acropolis. The half dozen EH sherds recovered there, however, hardly constitute solid evidence for settlement on this part of the site.

Middle (MH) and Late Helladic (LH) pottery concentrations are surprisingly low, and the material is of poor quality.<sup>7</sup> Plataiai's importance must have declined considerably at the onset of the MH period, with only a moderate increase in the Mycenaean age (LH). Due to the low density of the sherd scatter, the limits of the MH and LH settlements are very difficult to determine (Fig. 3:b). Settlement was probably confined to the acropolis. The discovery of a few Mycenaean sherds in the plain below the site is probably the result of continuing slope wash, or they may indicate Mycenaean graves in the immediate vicinity.

Pottery from the Protogeometric and Geometric periods is found along the northern and western slopes of the acropolis (Fig. 3:c). Scatter densities are again low.<sup>8</sup> The occupation of Plataiai apparently remained small, confined primarily to the area of its predecessor settlements, during the early centuries of the 1st millennium B.C. The picture changes significantly by the late 7th century B.C. Although Archaic sherds occur in low numbers on the surface,<sup>9</sup> the excavations of 2000 yielded a substantial quantity of late-7th- and 6th-century ceramics either in stratified levels of the Archaic period or from later debris.<sup>10</sup> The amount of Archaic pottery suggests that Plataiai achieved a higher level of prosperity at this time than in previous periods.

Imports from nearby Attica and the Corinthia indicate that Plataiai was a nodal point in the developing grid of Greek trading communities, especially in southern Boiotia. Considering the location of the site near the road that crossed Mt. Kithairon at the Dryos/Kephalai pass and above the Bay of Kreusis, this should not come as a surprise. According to the distribution of Geometric and Archaic pottery, the settlement was confined

5. Neolithic pottery amounts to 0.5%–3.0% of all the sherds collected and analyzed from surface transects in the acropolis area. The quantities noted may vary due to the difficulty of identifying Neolithic pottery from surface contexts. Total sample sizes ranged from 50 to over 500 sherds per transect. The reader is referred to the final publication of the project (Konecny, Marchese, and Aravantinos, in prep.) for further details.

6. Aravantinos, Konecny, and Marchese 2001, pp. 14–16; 2003, pp. 310–315. The survey samples from the area shown in Fig 3:a contained roughly 5%–10% EH pottery.

7. MH–LH pottery amounts to 1%–3% of the sherds from the distribution area plotted in Fig. 3:b.

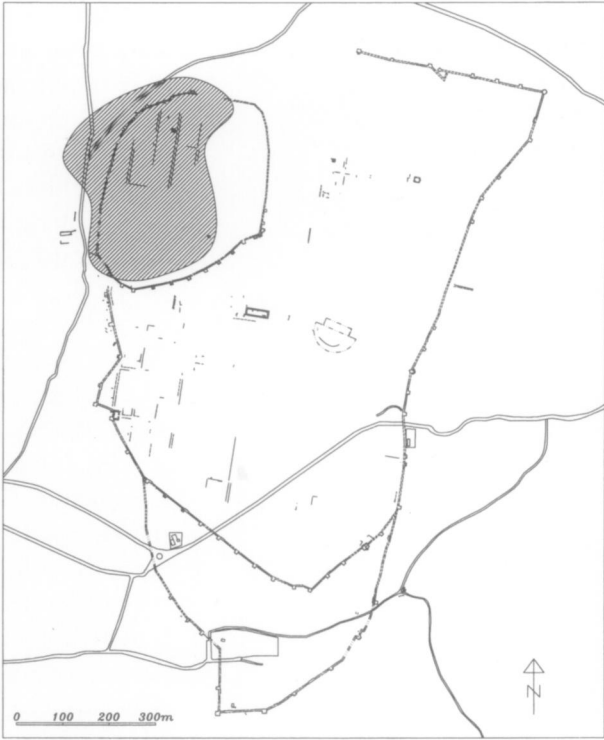
8. Protogeometric and Geometric pottery amounts to 1%–4% of the sherds from the distribution area plotted in Fig. 3:c.

9. Archaic pottery amounts to 3%–6% of the sherds from the distribution area plotted in Fig. 3:c.

10. Archaic pottery accounted for approximately 15% of the sherds from the later, disturbed strata.



a



b



c



d

Figure 3 (*opposite*). Development of settlement at Plataiai as shown by the distribution of pottery: (a) Neolithic and Early Helladic; (b) Middle and Late Helladic; (c) Protogeometric, Geometric, and Archaic; (d) Classical and Late Classical. A. L. Konecny

to the acropolis, except for one significant extension. Toward the southeastern part of the plateau there occurs a scatter of Archaic sherds around the site of a temple that was excavated in 1891.<sup>11</sup> This pottery suggests that the cult of the goddess worshipped at the shrine commenced not later than the 6th century B.C. The temple was originally built outside the town, but was integrated into the settlement after Plataiai's expansion in the late 4th century B.C. The location of the building supports the early excavators' identification of it as the Temple of Hera, situated, according to Herodotos, in a sacred precinct outside the confines of the Late Archaic and Early Classical settlement.<sup>12</sup>

Pottery of Classical date was found across the site (Fig. 3:d). The material collected from the surface was, in most cases, poorly preserved, making it difficult to differentiate 5th- from 4th-century ceramic types. Nevertheless, it may be stated with some certainty that material of 5th-century date is abundant on and around the acropolis, with secondary concentrations toward the southwest and the northeast. It is also evident that earlier Classical material was transported to the later site of the Western Gate in the large fortification circuit when this structure was built. The debris was used for terracing the site of the gate.<sup>13</sup> Excavations at the gate have yielded evidence dating the construction of the circuit to the last third of the 4th century B.C. It is clear that the town of Plataiai was still confined to the acropolis in the 5th century, with scattered occupation in the immediate rural districts of the community. The distribution of pottery dating to the Late Classical period also indicates that the area protected by the new city wall was settled, to a large extent, soon after 330 B.C.

Classical or Late Classical pottery was absent in a few locations. It was not found in the southwestern part of the site, a rocky outcrop that was not used for occupation or building. It was also absent from a number of smaller areas that were seemingly unused during the first decades of Plataiai's expansion. Generally, the density of surface finds outside the acropolis remained relatively low compared to the plateau and its vicinity, and they were concentrated in the northern and northeastern areas (Fig. 2). Although a substantial area was integrated into the newly extended settlement, buildings within the zone of expansion must have been scattered. Presumably the population was not sufficient to cover all or even part of the town with houses, public buildings, and an accompanying dense layer of occupational debris.

During the Hellenistic and Roman periods, the area of settlement enclosed by the circuit wall did not change in size (Fig. 4:a). Outside the southern cross wall, which, according to its masonry, should be dated to the 3rd or possibly the 2nd century B.C., no trace of building activity can be found. Pottery densities are also exceptionally low in this area. It is obvious that this part of the site was never occupied or used for settlement purposes. Even the southern apex of the triangle confined by the southern tip of the cross wall remained unused. Distributions of pottery indicate that the northern and northwestern parts of the town were more densely built up and remained under more intensive use than the southern and southeastern portions, where the scatter of sherds and roof tiles is nearly insignificant.

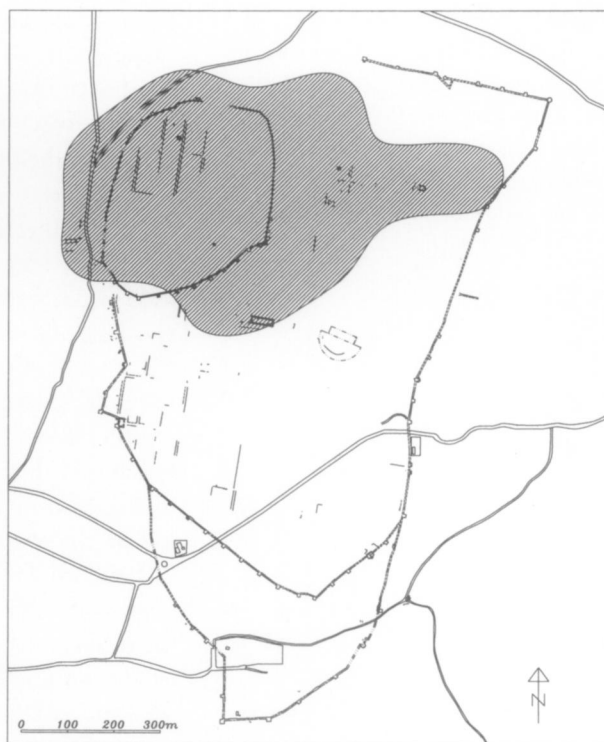
11. Washington 1891.

12. Hdt. 9.52; see also Washington 1891.

13. For details, see Aravantinos and Konecny 2000, pp. 9–12; Aravantinos, Konecny, and Marchese 2001, pp. 11–13; 2003, pp. 305–309; Konecny 2005.



a



b



c

Figure 4. Later settlement trends at Plataiai as shown by the distribution of pottery: (a) Hellenistic and Roman; (b) Late Roman; (c) Medieval.  
A. L. Konecny



In the Late Roman period Plataiai shrank in size (Fig. 4:b). The areas to the south, southeast, and northeast fell out of use and eventually lay barren. Pottery of Late Antique date indicates concentrated habitation on and around the acropolis plateau and along a line to the ruins of a church in the north-central region of the eastern part of the site. The area of scatter is, however, still substantially larger than the acropolis itself. The acropolis was refortified at an unknown date in the 3rd or 4th century A.D.<sup>14</sup>

Medieval pottery appears in four locations with various degrees of density (Fig. 4:c). It occurs (1) to the northwest of the acropolis plateau, (2) along its southern boundary, (3) astride its northeastern limits, and (4) atop the northern part of the eastern ridge on which the fortification line of the Late Classical town was situated. The first three locations yielded substantial concentrations of glazed pottery. Along the northeastern border of the acropolis, the scattering of walls observed may represent the remains of the village of Kato Kokla, known from later Ottoman tax records.<sup>15</sup> The fourth location yielded minimal ceramic remains, possibly reflecting a low intensity of habitation. The survey evidence indicates that the pattern of habitation changed in the Medieval period, as the settlement of Plataiai dissolved into several nucleated clusters within the still visible circuit wall. Later material is lacking. The site reverted to plowed land as settlement activity shifted toward the southeast and the modern village of Plataies.

## ARCHITECTURE AND URBAN TOPOGRAPHY: THE GEOPHYSICAL SURVEY

Previous geophysical surveys at Plataiai have already been reported in this journal and elsewhere.<sup>16</sup> Beginning in 2005 a new phase of geophysical study was initiated. The purpose of this work is to provide a large-scale and detailed analysis of a significant percentage of the site, elucidating the architectural features and general urban scheme of the ancient town. The models for this endeavor are the recent and highly successful surveys at the broadly analogous sites of Tanagra in Boiotia and Philippi in Macedonia.<sup>17</sup>

Survey was undertaken over three weeks in October 2005, immediately after the first rainfall had soaked the ground following the summer drought. Two geophysical techniques were employed: electrical ground resistance and magnetic survey. Resistance survey determines the moisture and electrolyte content of the earth immediately under the sample point by measuring its resistance to the passage of an electric current (measured in ohms,  $\Omega$ ). Abnormally dry features—stone, brick walls, or areas of concrete—appear as areas of greater resistance, while waterlogged regions—e.g., ditches or robbed wall foundations—appear as areas of lower resistance. Magnetic survey measures localized fluctuations in the strength of the earth's magnetic field (measured in nanotesla, nT). Such fluctuations may be strongly accented in areas of burning, areas where fired bricks are in use, or areas where the underlying material is of volcanic origin. Stone building material may create a slight magnetic contrast with the surrounding subsurface soil, and thus in some cases architectural features can be identified with a high degree of probability.<sup>18</sup>

14. See the discussion in Konecny 1998, col. 58; Aravantinos, Konecny, and Marchese 2003, pp. 299–301.

15. We are indebted to John Bintliff for drawing attention to the existence of the medieval Turkish village of Kato Kokla at Plataiai. See also Kiel 1997 and Sbonias 2004, especially the maps included.

16. Konecny, Boyd, and Whitbread 1999; Boyd and Whitbread 2000; Whitbread 2001; Aravantinos, Konecny, and Marchese 2003.

17. For Tanagra, see Bintliff et al. 2000, 2001, 2003; for Philippi, see Boyd and Provost 2002; Provost and Boyd 2003, 2005, forthcoming.

18. More extensive technical explanations can be found in Clark 1996; Scollar et al. 1990; Gaffney and Gater 2003.

Resistance survey was carried out using a Geoscan RM-15 resistance meter. Readings were taken in 30 m grids at a sample interval of one reading per square meter. A twin-probe array was used with probe separation set at 0.5 m, in general providing a depth penetration of up to 1 m. The magnetic survey was undertaken using a Geoscan FM-36 fluxgate gradiometer. Readings were again taken in 30 m grids, but with a sample interval of four readings per square meter. Data were processed using custom-designed software and the MapInfo/Vertical Mapper GIS package. Minimal manipulation of the data has taken place; rare outlying readings due to operator or instrument error have been removed, and in some cases background readings have been adjusted to obtain an even background between grids. In 2005 a total area of 48,137 m<sup>2</sup> (approximately 5 ha) was surveyed with the resistance meter, while 7,198 m<sup>2</sup> (approximately 0.7 ha) were covered with the magnetometer.

Data were gathered in four areas: the largest area was on the western side of the town, south of the acropolis (Fig. 1:A); a second area was situated on the acropolis (Fig. 1:B); a third area was situated at the northern end of the town, east of the acropolis (Fig. 1:C, D); and a smaller, fourth area was situated in and to the north of the theater (Fig. 1:E). Magnetic data were recorded in areas A and E only, and in Figures 5, 7, and 13 these data are presented overlain on resistance data to clarify the relationships of the two datasets and the continuity of detection of major features.

## AREA A

The largest survey area is situated on the western side of the town, immediately east of the fortification wall and south of the acropolis. Resistance survey covered a total area of 2.8 ha, of which 0.6 ha was also surveyed with the magnetometer. The data from area A are shown in Figure 5, with an interpretation drawing presented in Figure 6, and a pseudo-three-dimensional interpolation illustrated in Figure 7. The maximum extent of the survey area is 330 m on its longer, north-south axis and up to 150 m east-west.

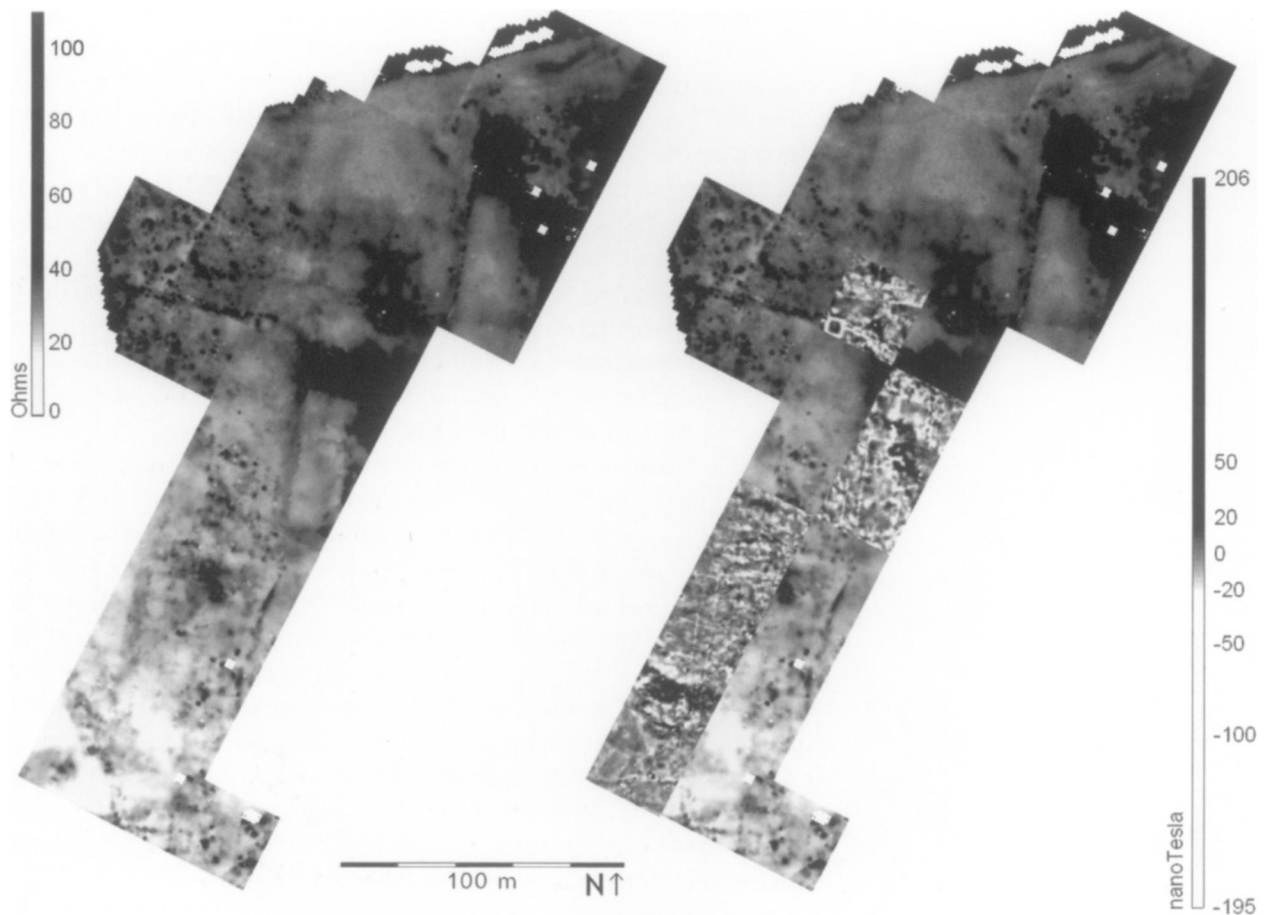
The resistance survey is characterized by background readings of approximately 20  $\Omega$  in the south, rising to about 30  $\Omega$  in the north, with much higher readings in the east. Much of this variation is probably due to the depth of bedrock below the surface, which was minimal in the eastern quadrant of the survey. Outcroppings of bedrock were noted throughout the entire survey area. The predominance of bedrock precluded survey farther to the east. On the western side, conversely, the presence of the fortification wall may have allowed a greater buildup of earth. Major features such as streets tend to exhibit readings about 10  $\Omega$  above background, while ephemeral features may be detectable at only 2  $\Omega$  or 3  $\Omega$  above background. Bedrock features, the fortification wall, and the area in front of the acropolis wall exhibited readings up to 100  $\Omega$  above background. In the magnetic survey significant features appear as negative anomalies about 5 nT to as much as 40 nT below surrounding values. Areas of bedrock tend to appear as positive anomalies; architectural features therefore contrast with those of the natural environment.

The layout of archaeological features in area A is defined by five securely attested streets. Three of these run north–south (Fig. 6:b/c, c/d, and d/e) and can be traced for 75 m, 166 m, and 88 m, respectively. The orientation is  $8.5^\circ$  east of north in the local geodetic grid. The insula width between streets b/c and c/d is 40 m, and the width between c/d and d/e is 43 m. Two streets run east–west ( $98.5^\circ$ ; Fig. 6:VI/VII and VII/VIII). Street VI/VII is detectable over 121 m on its north side, while VII/VIII can be detected for 51 m. Between them, streets VI/VII and VII/VIII create an insula length of 97 m. It is possible that a third east–west street, VIII/IX, has been partly detected at the southern limit of the survey area. There is almost no evidence of a north–south street to the west of b/c, and the north–south street that presumably exists some 40–43 m east of d/e is not attested in the data. Streets appear to be uniformly 6 m wide.

While roads are well detected and insulae clearly outlined, structural details within the city blocks are less well represented by the data. In general, more detail is apparent at the southern end of area A, whereas only general trends can be mapped to the north. It is possible that the greater depth of bedrock has helped to preserve features to the south, while features to the north have been more completely destroyed. A large area toward the northern end (Fig. 6:1) is currently plowed, also contributing to the lack of anomalies in this area. Overall, there are two notable features at the northern end of area A. One is a lack of evidence for major architectural structures, suggesting that small-scale occupation was the norm for this part of the town. The second is that areas best interpreted as bedrock features appear to have been cut or quarried, most likely both, in order to provide both level building platforms and building material.

A number of complex features were observed on the north side of street VIII/IX at the south end of the survey, as shown on Figure 6. These consist mostly of short east–west linear features that were probably internal or external walls of buildings. Block VIIIC, between b/c and c/d, is divided by an edge feature that marks the boundary between higher readings on the east side and lower readings to the west. Linear features on the east side indicate probable architectural divisions. These contrast with possible geological features on the west side, including feature 2, a high-resistance anomaly measuring about  $43 \times 20$  m, with an orientation not aligned with the town grid. The well-defined edges of this feature might have been produced by human action, ancient or modern, or they could be the result of natural processes.

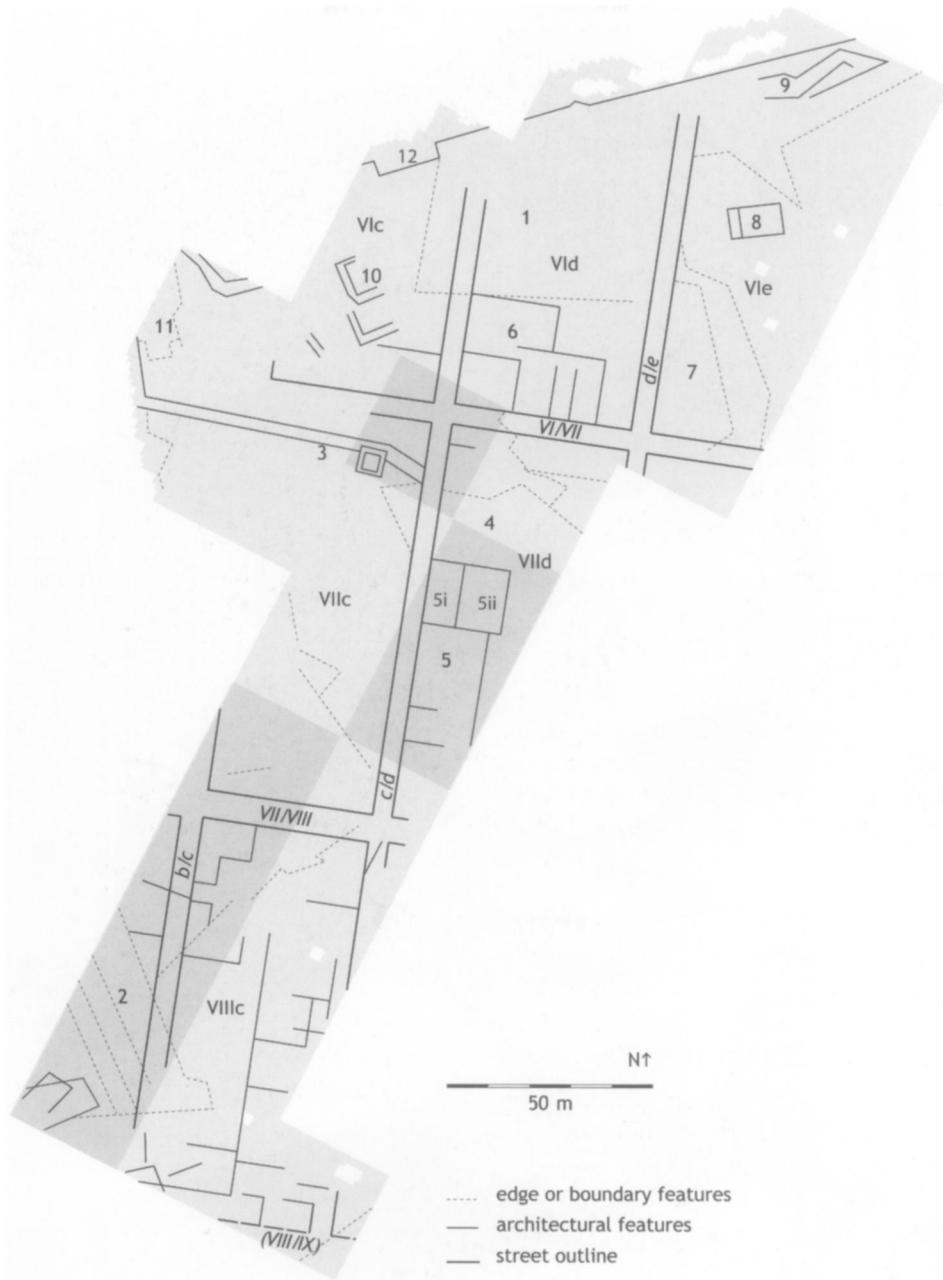
Farther north, block VIIc contains a major feature (Fig. 6:3) at its north end that is also not quite aligned with the town grid. The feature may predate—but more likely postdates—the grid. Feature 3 is linear, emerging from bedrock 4 at the north end of neighboring block VIId. It is oriented along a west–northwest axis for approximately 12 m, then turns west and runs to the edge of the survey area for approximately 63 m. This latter section is almost, but not quite, parallel with street VI/VII, 4–6 m to the north. The feature is consistently 3 m wide and 5–10  $\Omega$  above background, although at its western end it becomes 10–20  $\Omega$  stronger. It also possesses a strong magnetic reading, exhibiting a negative signature up to 20 nT below background. The magnetic data suggest a slightly narrower anomaly (2.5 m)



**Figure 5.** Area A: resistance data (*left*); magnetic data on resistance data (*right*). M. J. Boyd

with negative readings at its north and south edges, indicating a stone-built facing. At the point where there is a directional change, a clearly defined square feature is easily discerned. The magnetic data indicate a structure with walls measuring 1 m thick and 6.25 m in length on each outer side. It is probable that this structure is a tower, and it is likely, therefore, that feature 3 is part of a fortification wall.

The northern end of block VII d is dominated by a high resistance feature (Fig. 6:4; 30–70  $\Omega$  above background) covering much of the north end of the block and presumably representing an area of bedrock close to the surface. It is also detected by magnetic survey, where feature 4 appears as a high-frequency, largely positive, anomaly. This feature ends with the street c/d on its west side. The very straight edges on the north and south may have resulted from quarrying. The southern boundary forms the northern edge of feature 5, an area of low resistance 17  $\times$  46 m, with internal boundaries clearly defined in both the resistance and magnetic data sets. Feature 5 consists of a northern section about 20  $\times$  15 m, further subdivided into two rooms, 5i and 5ii. Room 5i is about 7  $\times$  15 m, while 5ii is about 12  $\times$  15 m. The subdividing wall appears to be 1–2 m thick, its width perhaps due to rubble from the collapsed wall. The southern section of feature 5 is about 16  $\times$  30 m. Although the data suggest internal subdivisions, these cannot be precisely defined.



**Figure 6. Area A: interpretation.**  
M. J. Boyd

Most of the area of insula VIId, to the north of VIId, is devoid of features, probably as a result of plowing. The streets are evident, but nothing else is visible (Fig. 6:1). Between the plowed area and the street VI/VII, the data exhibit varying higher values, although clear features are lacking. These observations (Fig. 6:6) may represent a building complex occupying the width of the block and its southern 27 m. The reconstruction of feature 6 is less secure than other features, but the data broadly suggest a building or buildings measuring 14–20 m east–west and 6–14 m north–south. It seems likely that these units were also subdivided.

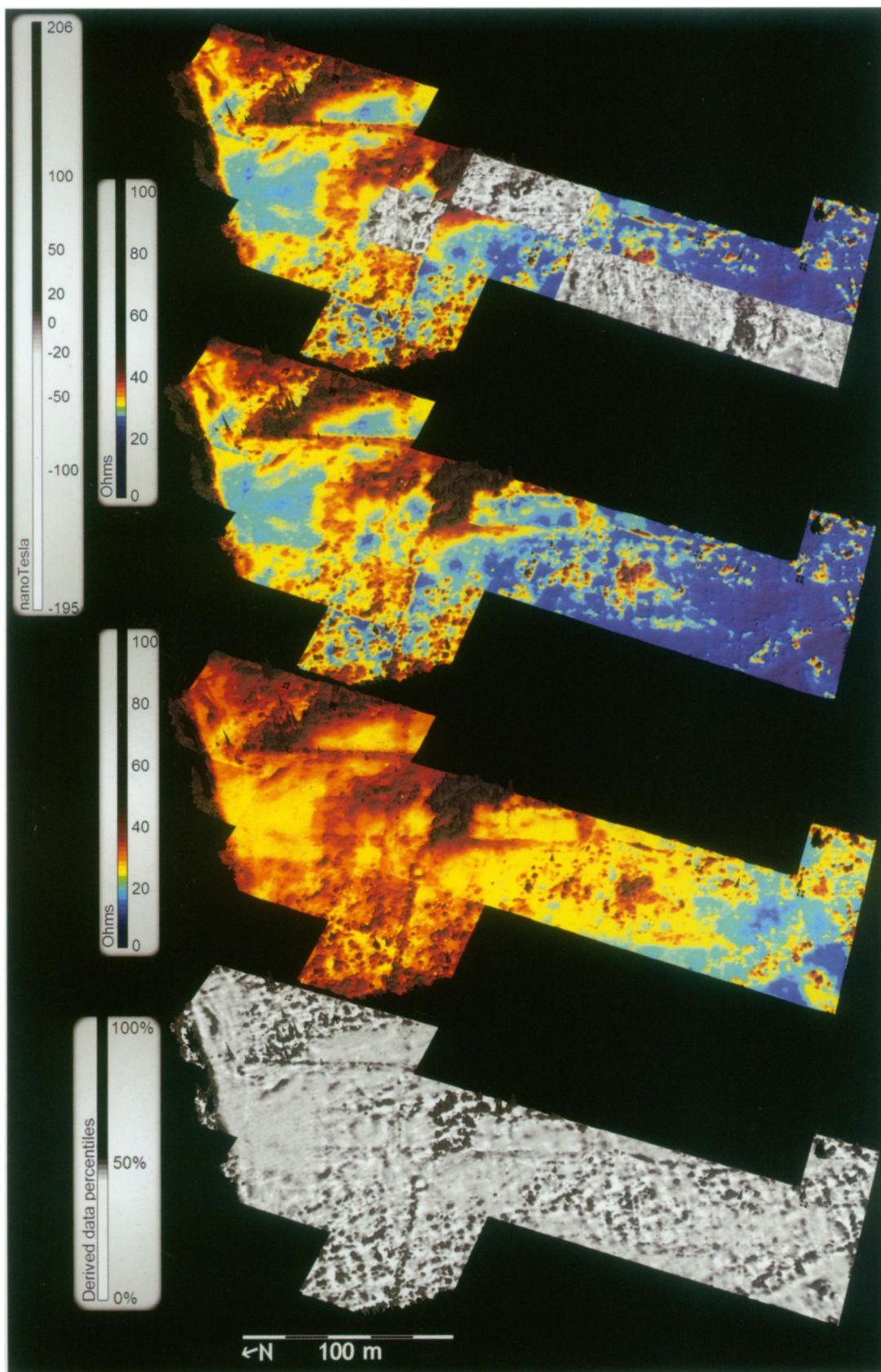




Figure 7 (*opposite*). Area A: pseudo-three-dimensional interpolation.

*Top to bottom*: magnetic data on resistance data; resistance data detailing high anomalies; resistance data detailing lower anomalies; resistance data after high-pass filtering. Note that scales are approximate due to three-dimensional distortion.

M. J. Boyd

Feature 7 in insula VIe is similar to feature 5: an area of low resistance, bounded to the west and south by streets and to the east and north by bedrock. In the case of feature 7, however, the irregular bedrock and lack of internal subdivisions are less suggestive of an architectural feature. Feature 8 may represent a rectangular or apsidal structure approximately  $13 \times 7$  m with an entrance or break in the wall to the southeast. This feature is not oriented to the town grid and is probably late. Feature 9 is an irregular linear anomaly approximately 27 m long with a peak strength of  $15 \Omega$  above background; it may be related to the acropolis wall to the north.

The northern fringe of the survey exhibits very high values related to the acropolis wall, which it abutted in places. It seems likely that these values result from a combination of the rapidly rising bedrock on which the wall itself was founded and the effect of the wall foundation.

In block VIc, two features with right angles have been noted in an area that is highly disturbed (Fig. 6:10). The features are massive, with walls as much as 2 m thick. They are not aligned with the town grid and presumably represent later habitation in this area. A number of features labeled 11, west of 10, are related to the town wall. Feature 3 appears to join the wall at this point. It is possible that feature 11 represents a construction immediately behind the town wall, measuring up to 10 m north-south and at least 20 m east-west.

## AREA B

Area B is situated in the southwestern corner of the acropolis, to the northwest of area A. Resistance survey covered a total area of approximately 0.7 ha, with a maximum extent of 120 m east-west and 60 m north-south (Fig. 8). Background readings fall in the range of  $40\text{--}50 \Omega$ , with anomalies of  $50\text{--}100 \Omega$ .

Anomalies on the eastern side of area B are aligned with the town grid. The principal detected feature is the northward extension of the street b/c (initially noted in area A). The feature is about 5 m wide. While it is strongly defined on its western side, its eastern side is less clear. Other features in this vicinity are linear in nature and aligned to the town grid. Although no individual buildings are clearly defined, numerous walls associated with densely packed architecture seem to be represented. The main outlines are illustrated in Figure 9.

Approximately 20 m west of b/c, incoherent linear features divide the hypothetical insula. These features exhibited readings of up to  $100 \Omega$  at the northern end, where they cover an area 8 m wide. Farther south they are much less intense. To the west there is an almost complete lack of conformity with the town grid. In this region the geophysical survey defined two features: high anomalies associated with the acropolis wall, lining the west and southwest edges of the survey area, and an anomaly projecting out from the acropolis wall, running south to north (Fig. 9:1). This anomaly is  $20 \Omega$  above surrounding readings for most of its length and much stronger at the south where it emerges from the acropolis wall. It may represent a built feature of irregular shape, probably related to the construction of the acropolis wall and postdating the features to the east.

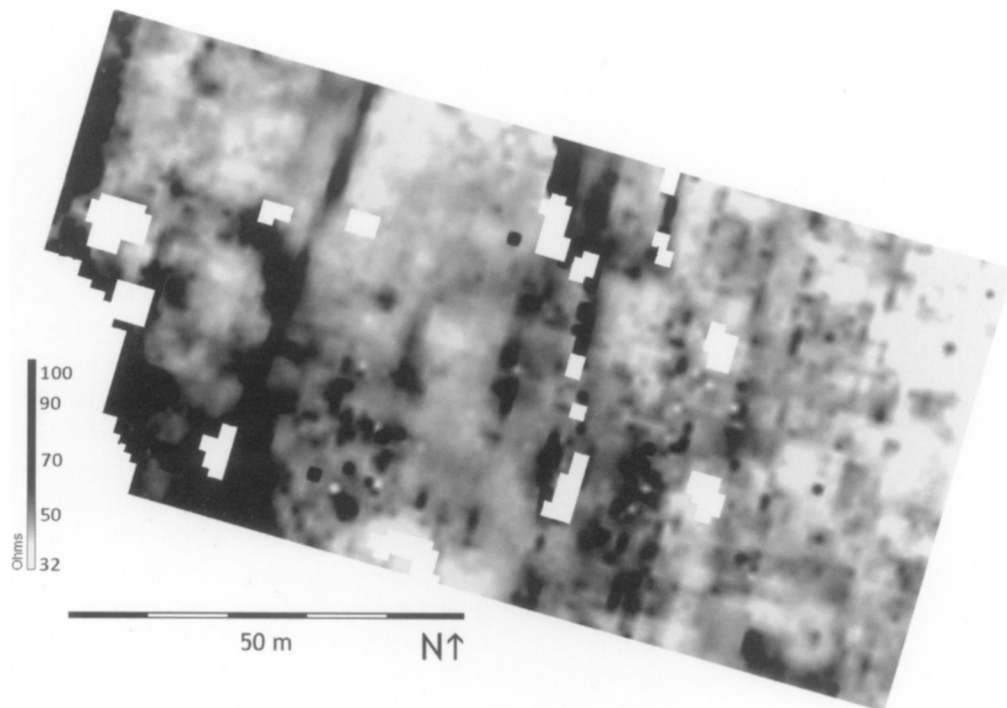


Figure 8. Area B: resistance data.  
M.J. Boyd

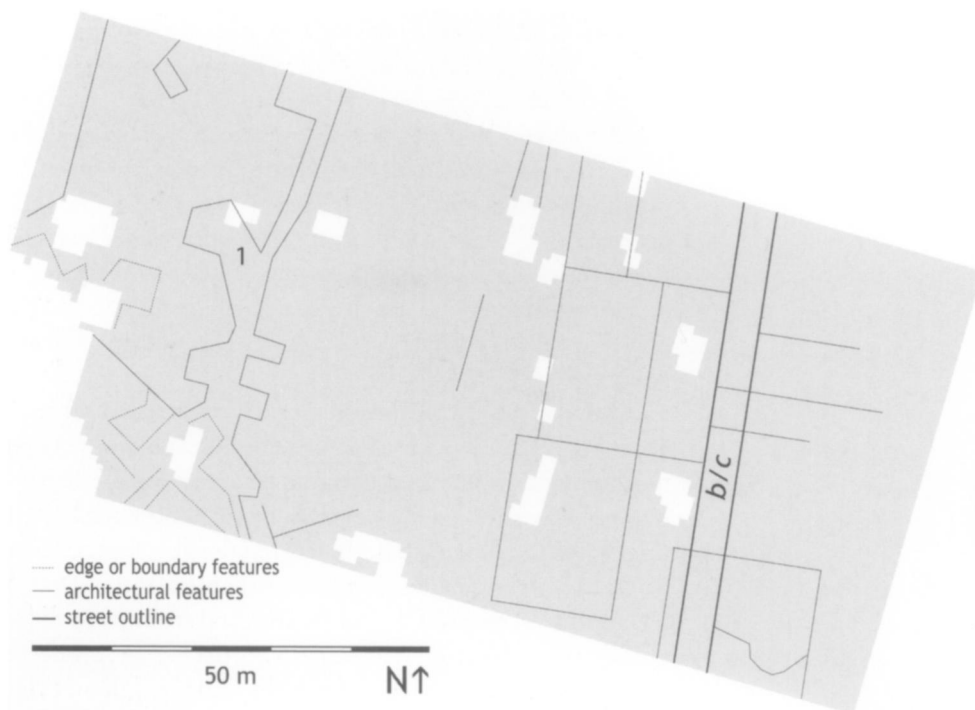


Figure 9. Area B: interpretation.  
M.J. Boyd



## AREAS C AND D

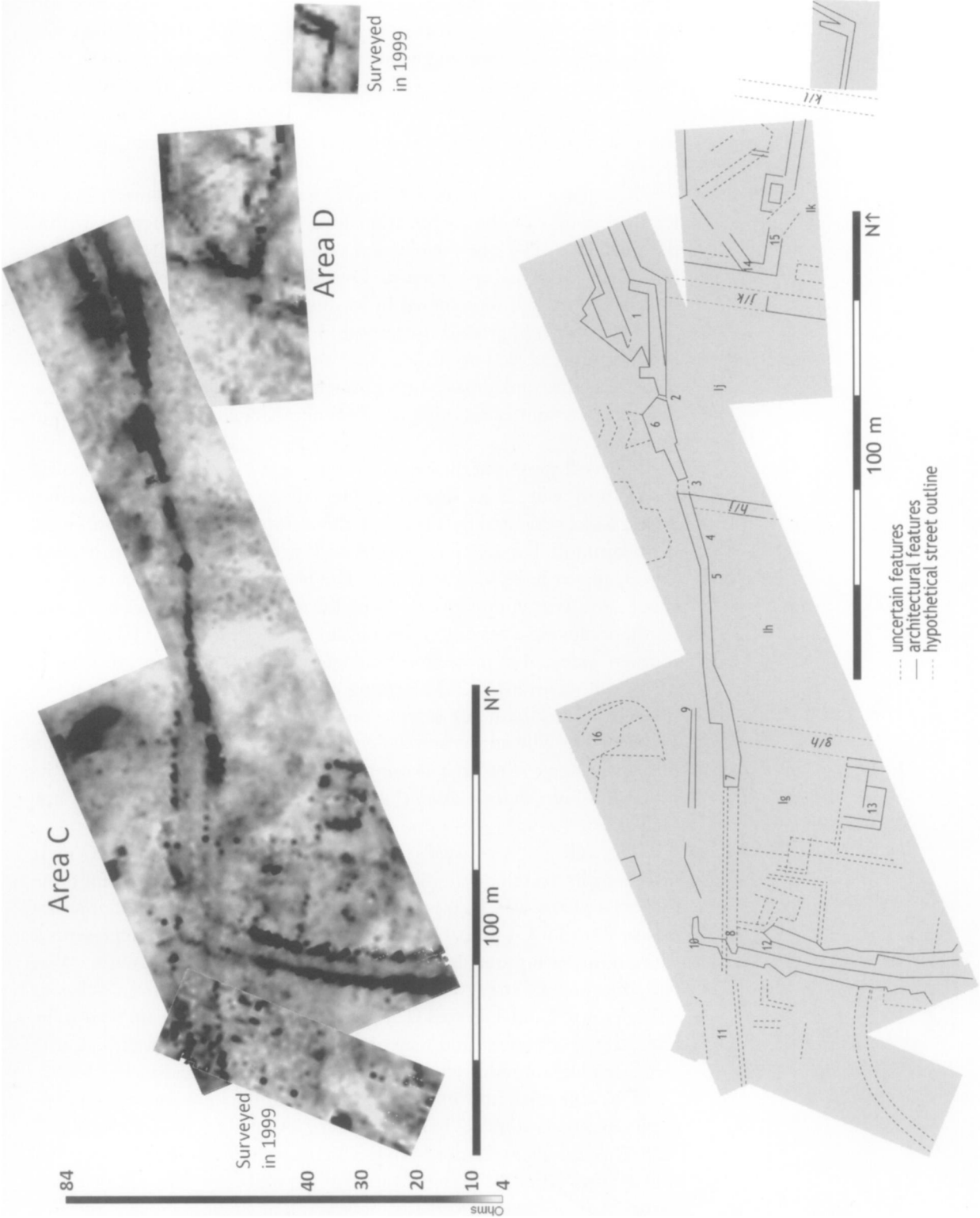
Areas C and D are located in the north-central section of the town northeast of the acropolis. Resistance survey covered an area 180 m long and up to 60 m wide, or approximately 1 ha (Figs. 10–12). Background readings in little-used or seemingly quiet areas fall in the range of 4–8  $\Omega$ , with backgrounds in clearly occupied areas in the range of 8–12  $\Omega$ . Architectural features measure between 15 and 35  $\Omega$ . Two small areas of survey from the 1999 campaign (west of C and east of D) have also been added for reference.

Resistance survey in areas C and D has revealed monumental architecture—a part of the fortification wall—and urban structures within the town (Fig. 11). The fortification wall is a dogleg feature dominating area C and is varied in structure. Overall, it can be traced for approximately 210 m. It is represented by an anomaly measuring approximately 5–25  $\Omega$  above background in strength. Its direction runs generally from east-northeast to west-southwest, with several minor shifts of orientation along its course and a major turn near the western end of the survey area. Several uncertainties regarding its form necessitate further exploration in the future.

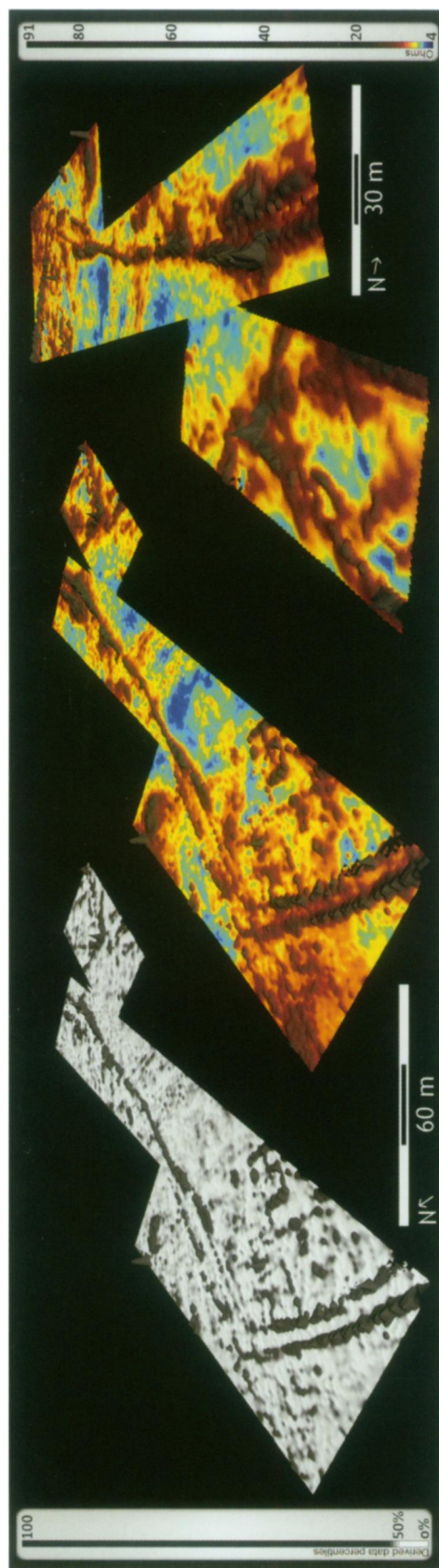
The wall appears at the east end of the survey area as a double anomaly about 10 m wide. It consists of parallel linear high-resistance anomalies 2–3 m wide, separated by a space of about 3 m where readings are closer to background. Two separate, parallel walls with space in between, perhaps a road, appear to be indicated here. The feature runs west at an angle of about 296°. After approximately 12 m, the feature widens to the north and south, occupying a maximum breadth of about 19 m (Fig. 11:1). On the southern side, a 4 m projection runs southward at about 190°, then turns 74° to run westward at 263°, forming a change in angle with the projection. On the northern side, a projection forms a probable tower measuring about 8 × 3 m. The northern wall does not appear to continue west beyond this tower, suggesting that feature 1 is a gateway. It is possible that its extent has been slightly exaggerated by collapse, but the general outline is clear.

The wall continues west as a single feature for approximately 83 m. It maintains its overall orientation with several minor shifts. At point 6 the thickness of the wall increases to about 6 m over a distance of approximately 8 m. This is probably another tower, and if feature 1 represents a gateway, tower 6 probably guards the western side of that gateway. West of 6, the anomaly strength associated with the wall ranges from as low as 3  $\Omega$  at points 2 and 3 up to 5  $\Omega$  at points 4 and 5. These are unlikely to be unprotected entrances, and may represent breaches in the wall that were serious enough to reduce the anomaly strength dramatically.

The wall apparently ends at point 7. Wall thickness increases to approximately 4 m about 23 m before point 7. At about 13 m before point 7, there is a clear jog in the northern face of the wall. The southern face is less well defined. After 7, the continuation of the wall can scarcely be detected. Close study of the data suggests, however, that slight anomalies run in a straight line between points 7 and 8, and these may mark the continuing



Figures 10 (top) and 11 (bottom). Areas C and D: resistance data and interpretation. M. J. Boyd



line of the wall. This section, about 28 m in length, was probably dismantled at some point to a lower level than the rest of the wall. The deeper burial of the extant upper surface has likely resulted in a much weaker geophysical signature for the feature at this point.

North of the faint anomalies associated with the wall, between points 9 and 10, a series of linear anomalies run parallel to the wall, coinciding with a miniscule ridge formation on the ground. These features are 10–15  $\Omega$  above the background level, and thus are probably also built features. The data are inconclusive, but one might conjecture the presence of some sort of *proteichisma* at this point, perhaps protecting the corner of the wall or forming a terrace that supported a road running parallel to the wall. The faint anomalies at 11, described below, continue this feature.

Between points 10 and 8, the wall makes a dramatic 78° turn southward to run south at 193°. This turn is apparently not protected by a tower, and the feature between 10 and 8 is difficult to interpret. The faint linear anomalies between 7 and 8 continue beyond 8, almost reaching the features at 11. The feature that turns at 10 is about 7  $\Omega$  above background. It gradually gains strength running south until at the edge of the survey area it measures 30  $\Omega$  above background. Running parallel with the outer line is a second, inner line, barely detectable at 8 but marked by a very clear anomaly at point 12 and to the south. In places it is stronger than the outer anomaly. This inner line is partly visible as a surface feature consisting of medium-sized, occasionally polygonal blocks characteristic of domestic construction at Plataiai. Its proximity to the surface may explain its strength.

These outer and inner features are 2–3 m thick, separated by a space of approximately 3 m. They do not run in a straight line, but turn slightly to the east. Their irregular orientation makes it unlikely that the inner feature represents a street running up to the wall. All the evidence at Plataiai indicates a strictly orthogonal street plan. Nonetheless, the interpretation of these anomalies remains unclear. The most likely explanation is that the outer feature represents the wall, while the inner feature is the edge of a city block. This fits very well with the reconstruction of the town grid for the area. Moreover, while architectural features are obvious to the east of the wall, no built features are apparent to the west.

The main features to the west of the wall are the faint parallel anomalies at 11. These were visible in the 2005 survey, but even clearer in the small 1999 survey carried out in the same area. They are almost on the same alignment as the features running from 7 to 8 and from 9 to 10, and they are, similarly, about 6 m apart. The anomaly strength is about 5  $\Omega$  above background, which is high in this area. The features at 11 may represent a road or a continuation of the *proteichisma*. Features to the north of the wall, such as 16, are amorphous and difficult to interpret.

Within the area enclosed by the wall, elements of the town grid are discernible but not as obvious as in area A. The block widths are all 40 m, and the street widths are 5–6 m. The street g/h is faintly but securely attested in the data. Street h/j is more substantially preserved, measuring about 7  $\Omega$  above background. Only 13 m of street j/k, located in area D,

may be detected. The position of k/l, outside the surveyed area, is entirely conjectural. Blocks Ih and Ij, which are only partially represented in the data, seem entirely devoid of architecture, in contrast to Ig and Ik, which preserve considerable architectural remains. In Ig some features representing walls and buildings are closely aligned with the town grid, while others are more closely aligned with nearby sections of the wall, as might perhaps be expected. A linear feature running north–south divides the block precisely in two, as noted for area A, block VIIIc, and area B. Feature 13 is a coherent area of walls bordering street g/h; it measures about  $22 \times 17$  m.

Major features closely aligned with the town grid are also present in area D. Area D includes three linear features with this orientation: features 14 and 15, forming a right angle, and street j/k. Features 14 and 15 measure more than  $30 \Omega$  above background. The small area to the east of D surveyed in 1999 contains a feature with the same orientation and with comparable anomaly strength. These may be interpreted as walls that are consistent with the town grid, but it is clear that further magnetic survey and extension of the resistance survey area will be required to resolve the problems of interpretation in this area.

### AREA E

Testing in area E was carried out above and to the north of the theater in order to see if geophysics could reveal further details about this important public building. Resistance survey covered about a third of a hectare; a quarter of this area was also surveyed with the magnetometer (Fig. 13).

The area to the north of the theater, including the cavea, has been plowed in recent times. This has undoubtedly caused damage to subsurface features and has led to the uniform results in the northern part of the survey beyond the orchestra. Resistance values fall within the range of  $4\text{--}9 \Omega$  with no clear evidence for archaeological features. At the south end of this half of the survey, a band of slightly raised values ( $6\text{--}10 \Omega$ ) is evident (Fig. 13: right, feature 1). Feature 1 might be aligned with the town grid, but the data are ambiguous. Immediately to the south, a band of lower values ( $4\text{--}6 \Omega$ ; feature 2) is present. It is difficult to assign any archaeological significance to these features.

Immediately south of this low band is the first significant feature (3) in area E. Feature 3 is a band of higher readings about 12 m broad with clearly defined edges. Readings in this zone measure between  $8$  and  $22 \Omega$ . This spot is clearly marked on the surface by a change in ground height (higher to the south) and by a substantial quantity of stone debris. The highest readings form a core  $4\text{--}9$  m in width, and  $14\text{--}22 \Omega$  in intensity. Feature 3 is approximately  $13^\circ$  out of alignment with the town grid. It is clearly detected on the magnetic survey, in which its northern edge appears as a positive anomaly with an angle at its eastern end. It seems reasonable to equate this feature with the northernmost extent of architectural features associated with the theater. It is aligned with a large block on the surface.

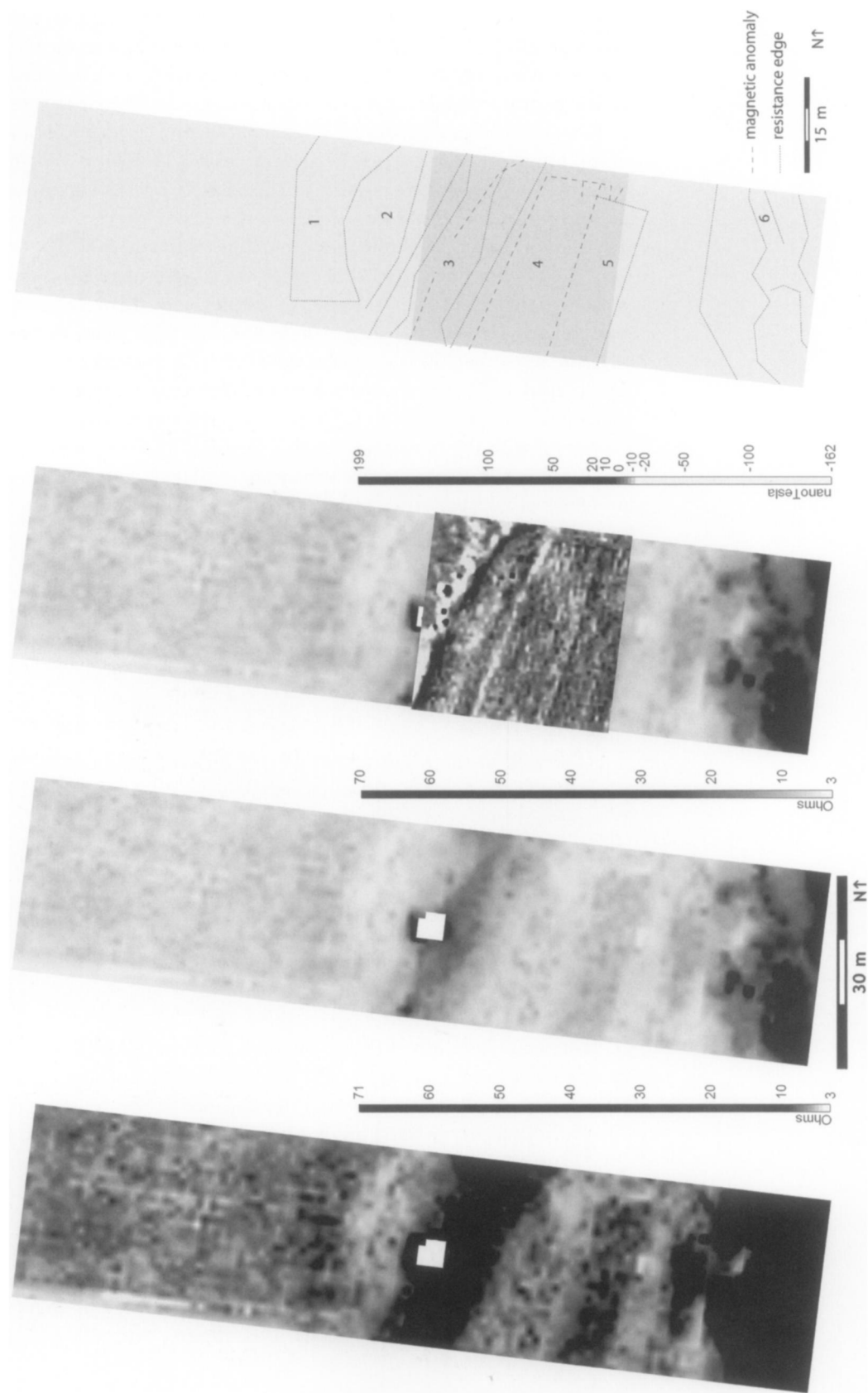


Figure 13. Area E (*left to right*): resistance data detailing lower anomalies; resistance data after high-pass filtering; magnetic data on resistance data; interpretation. M.J. Boyd

South of feature 3 is feature 4, an area of lower readings in the resistance data and an area whose outline is clearly delineated in the magnetic data. Feature 4 is 10 m wide at its western end and 8 m wide at its eastern end. The northern edge of 4 may be seen as forming the southern edge of 3 (it respects the 13° angle), while the southern edge may be viewed as forming the northern edge of feature 5, another broad anomaly of slightly elevated resistance values. Feature 5 is about 6 m wide and approximately 4 Ω above background in anomaly strength. Its west–east axis is turned roughly 7° clockwise from the orientation of the town grid. The interpretation of these alternating bands of low and high resistance is obscure.

In the southernmost quarter of the resistance survey measured values reflect the elements of the cavea close to the surface. Readings rise to about 45 Ω, and the overall width of the feature, which clearly extends beyond the 2005 survey limits, is about 16 m. One clear linear feature, 6, has been marked on Figure 13.

## ANALYSIS OF THE URBAN SCHEME

### THE FORTIFICATION WALL

During its long history, Plataiai suffered destruction on at least three occasions. The first of these occurred during the Persian Wars, the second during the Peloponnesian War. Then the town was destroyed by the Thebans shortly before the battle of Leuktra in 371 B.C., after which it was abandoned until the period immediately following the battle of Chaironeia in 338 B.C.<sup>19</sup> Subsequently, the new town of Plataiai was rebuilt and eventually encompassed seven times the space of the preceding settlements. Philip II of Macedon initially provided support for this extensive construction, and Alexander the Great contributed even more generous funding.<sup>20</sup>

The new town was protected by a large fortification circuit of which the western, southern, and eastern flanks can be traced as visible surface features. A substantial portion of the northern circuit is also visible, but not its entirety. One crucial part of the fortification circuit, the section that linked its northeastern flank to the northwestern plateau where the earlier settlements were located, is covered by silt. Consequently, its line is unknown. Without major excavations in this area, geophysical survey is the only logical method of locating the missing section of the circuit wall. Therefore, this part of the site was surveyed during the first season of the current geophysical project.

The results of this work were more than satisfactory. A major feature of substantial width running in a long, nearly uninterrupted line across area C would seem to represent the missing part of Plataiai's circuit. The wall crosses roughly from east to west and appears to turn sharply to the south when it reaches a point approximately 100 m north of the acropolis plateau. The evidence suggests that it was followed by a feature that might be interpreted as a road coming from the west. Further geophysical survey will be necessary to explore how the fortification line was connected to the acropolis.

19. Hdt. 8.50; Thuc. 3.20–24, 52–68; Xen. *Hell.* 6.3.1; Diod. Sic. 15.64; Paus. 4.1.1; 4.27.10; 9.1.5, 8.

20. Arr. *Anab.* 1.9, passim; Plut. *Alex.* 34.3.

At the eastern end of the newly discovered portion of the wall, the evidence provided by geophysical survey allows the reconstruction of a hitherto unknown gateway in the northern flank of the fortification line. The road detected along the fortification to the west of it might have led up to the gateway. The gateway seems to have had a rather sophisticated layout with a frontal entrance, flanked by two massive, rectangular towers or bastions, behind which the axis of access turned left into a long, narrow causeway flanked on both sides by overlapping extensions of the curtain walls.<sup>21</sup> The wider part of the southern wall may be interpreted as the foundation of a staircase which offered direct access to the battlement.<sup>22</sup> The eastern, inner section of the gateway is beyond the surveyed area and will have to be explored in the future.

Feature 3 in area A remains enigmatic. Considering its remarkable width and the integration of a rectangular, towerlike feature into its course, it might possibly be interpreted as part of a fortification line. The tower protrudes toward the south, indicating that this fortification line was intended to defend against threats from that direction. The feature is not detected farther east due to the proximity of bedrock close to the surface in that area. To the west it might join the flank of the large circuit wall of Plataiai. As currently reconstructed, feature 3 lacks any correspondence with the known fortification systems of Plataiai. Its incomplete documentation excludes any possibility of further interpretation at present.

## THE CITY PLAN

The rebuilding of Plataiai after 338 B.C. was substantial in extent. The urban scheme of the new town featured a number of modern characteristics, most notably a rectangular grid of main and secondary roads. These divided the town into perhaps as many as 140 blocks, each measuring approximately 40 × 95 m (Fig. 14). Traces of walls, rows of blocks, and general features of the terrain currently visible as surface elements provided the basic data for the initial reconstruction of the town grid. Those relatively scant features, however, were insufficient to define the overall scheme of Plataiai, especially with more than half the site currently under cultivation. Regular tilling of the soil has turned the earth into a uniform, featureless surface, making it difficult to delineate interior structures and general features within the grid of Plataiai's town plan. Many of the blocks are assumed to have contained houses as well as areas for public use. Areas A and B were surveyed in order to confirm the data provided by surface features and to gain a more detailed understanding of those areas.

Area A is located in the west central portion of the site, extending from the Western Gate northward to the late fortifications on the acropolis. In this area surface features had already led to the interpolation of a rectangular network of roads that delineated several uniform city blocks.

21. With very few exceptions, towers were typically employed all along the circuit; see Aravantinos, Konecny, and Marchese 2003, pp. 292–296.

22. Several similar foundations of staircases are evident along the wall; Aravantinos, Konecny, and Marchese 2003, pp. 292–296.





Figure 14. Geophysical survey areas with reference to the town plan. A. L. Konecny and M. J. Boyd

Geophysical survey confirmed that reconstruction. The results indicate that habitation blocks were partitioned into subunits that may represent individual dwellings, probably ten per block. Those were bordered by solid features that are likely to have been stone walls or stone foundations.<sup>23</sup> No uniform plan is discernible among the dwellings.<sup>24</sup> They appear to be of different designs, with open spaces or courtyards, and small, rectangular structures—huts and stables, perhaps—that occupied variable proportions of the available space. The existence of further interior partitions can only be supposed, as they could not be detected using current geophysical techniques.

Additionally, there appear to have been several large, unoccupied areas in blocks VIIc and VIId. The geophysical data suggest that a number of blocks, especially those truncated by the large circuit wall, were only partially built up, if at all. The later fortification of the acropolis plateau is accompanied by an empty strip that was approximately 30 m wide. The most likely interpretation of this anomaly is that it represents a *glacis*—a defensive feature formed by tearing down all existing houses in the vicinity of the wall in order to deprive a possible attacker of a secured position for siege.<sup>25</sup> A very insignificant feature following this supposed *glacis* might represent traces of a ditch in front of the wall.

Area B is smaller than area A and was located in the southwestern corner of the acropolis plateau. Geophysical examination in this area focused on the general habitation pattern. An effort was made to address the question of whether there were any discernible effects on the size and nature of buildings after Plataiai's occupation was once again restricted to the acropolis. The results of the geophysical survey proved that the orthogonal grid of roads continued to the north and is detectable on the acropolis.<sup>26</sup> The general subdivisions of the blocks seem to be quite similar in layout to those in the area south of the acropolis. Nevertheless, the structures identified appear to be smaller in size and more compartmentalized, almost certainly because the area inside the late fortifications continued in use for a much longer period than similar space to the south. It is obvious that the acropolis had a number of building phases that redefined the habitation pattern in this area in late antiquity.

Geophysical survey of areas C and D also contributed substantial data on the internal structure of the site. Traces of roads and adjacent buildings were detected, proving that the orthogonal grid of Plataiai extended into the northern part of the town beyond the acropolis plateau. The direction of the roads deviates slightly to the west, probably as a result of transferring their orientation across the northern edge of the acropolis. The data seem to indicate that the blocks in these areas were only partially built

23. Similar foundations were partially excavated in the eastern square of the trenches at the Western Gate; see Aravantinos and Konecny 2000, pp. 9–10; Aravantinos, Konecny, and Marchese 2001, p. 11; 2003, pp. 305–309; Konecny 2005.

24. For uniform house designs of

the Classical period at Olynthos, Kassope, and Priene, see Hoepfner and Schwandner 1986, pp. 42–60, 107–130, 169–180. Interestingly, at Olynthos there were 10 dwellings of approximately 300 m<sup>2</sup> to one block.

25. The construction of this wall probably took place during the 3rd or

4th century A.D., six centuries after the establishment of the town grid; cf. Aravantinos, Konecny, and Marchese 2003, pp. 299–301. The area to the south of the new wall was abandoned.

26. This is also indicated by conspicuous surface features farther north.

up, but it is unclear as to whether the results represent the ancient pattern of occupation or disturbance of the archaeological remains by intensive plowing with modern farm equipment. An extension of the survey area may clarify this issue.

### THE THEATER

The only visible remains of Plataiai's theater are a depression resembling a cavea and traces of walls that follow the depression on the ridge east of the supposed Temple of Hera.<sup>27</sup> This region, designated area E, was examined to gather more information about this important public structure. Unfortunately, the results of the investigation are ambiguous. One linear feature appears at a right angle to a short stretch of wall extant on the surface in front of the cavea. It coincides with a long, narrow concentration of rubble on the surface. This combination of features might be interpreted as part of the rear wall of the *skene* building. Two smaller features, parallel and to the south of this ostensible wall, may represent internal walls of the stage building.

The interpretation of a wide feature of slightly higher resistance, farther south in the area of the supposed orchestra, is uncertain. If it is indeed associated with any additional architectonic structures, it could be equated with a wide *pulpitum* of Roman type.<sup>28</sup> Surface and geophysical features are sufficient to prove that the theater of Plataiai was not oriented along the main axis of the town's grid of streets and avenues, but was instead placed at an oblique angle.

### CONCLUSIONS

Surface and geophysical survey have added considerably to our knowledge of Plataiai's development, expansion, and internal structure. Pottery concentrations make it possible to trace the establishment of the settlement in the Late Neolithic, growth during the EH period, and a contraction during the MH and LH periods that is contrary to what might be expected on the basis of the Homeric epics. After an expected low intensity of settlement activity during the Geometric period, Plataiai's revived importance as a local center in the Archaic and Classical periods is amply testified by pottery collected from the surface and from excavated strata on the acropolis plateau.

Together with evidence from historical sources, the distribution and concentration patterns of surface pottery attest to the reconstruction of Plataiai on a grand scale after its tumultuous history in the 5th and 4th centuries B.C. The data also indicate that the extended perimeter was too large to be occupied completely by the citizens of the town. In later times the perimeter was reduced considerably, providing security for the former nucleus of Plataiai but excluding large areas that were still inhabited. It is unclear as to whether Plataiai was occupied without interruption until the Medieval period, when it is evident that the residents had dispersed into two or more separate settlements.

27. See Washington 1891.

28. Bieber 1971, pp. 167–220.

Thanks to geophysical survey, the extension of an orthogonal grid of roads and blocks is now documented to have covered a major portion of the town after it was rebuilt in 338 B.C. It seems highly probable, as well as logical, that this grid still determined building patterns or land use after the perimeter of Plataiai was reduced in late antiquity. The previously unknown course of the northern front of the town's large circuit wall has been detected, along with the existence of a gateway with a sophisticated layout. A continuation of both surface and geophysical survey will increase our knowledge of the dimensions and changing design of Plataiai during the city's long history.

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### Andreas L. Konecny

UNIVERSITÄT WIEN  
INSTITUT FÜR KLASSISCHE ARCHÄOLOGIE  
FRANZ KLEIN GASSE 1  
A-1190 VIENNA  
AUSTRIA

andreas.l.konecny@univie.ac.at

### Michael J. Boyd

UNIVERSITY OF CAMBRIDGE  
MCDONALD INSTITUTE FOR  
ARCHAEOLOGICAL RESEARCH  
DOWNING STREET  
CAMBRIDGE CB2 3ER  
UNITED KINGDOM

mjb235@cam.ac.uk

### Ronald T. Marchese

UNIVERSITY OF MINNESOTA AT DULUTH  
DEPARTMENT OF HISTORY  
269 A. B. ANDERSON HALL  
DULUTH, MINNESOTA 55812

rmarches@d.umn.edu

### Vassilis Aravantinos

MUSEUM OF THEBES  
PLATEIA KERAMOPOULLOU  
32 200 THEBES  
GREECE

protocol@thepka.culture.gr