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Falerii Novi: *further survey of the northern extramural area*

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Introduction

This paper presents the results of field-survey work undertaken between September 2002 and May 2008 immediately outside the walls on the northern side of the Roman town of *Falerii Novi* (Santa Maria di Falleri, Lazio). This work was designed to complete the geophysical survey of this part of the extramural area, where a pilot study was undertaken in 1998 (Keay *et al.*, 2000: 64–9). The aim was to map the full extent of subsurface archaeological features between the extant amphitheatre to the east and the aqueduct to the west. It was undertaken as part of the Tiber Valley Roman Towns Project, which investigated a range of sites (Fig. 1) using non-destructive methods of archaeological surface survey in order to contribute to our understanding of the nature and variety of Roman urbanism (Keay *et al.*, 2004). It included work on larger towns at *Falerii Novi* (Keay *et al.*, 2000), *Ocriculum* (Hay *et al.*, 2008; Hay, Keay and Millett, forthcoming) and *Portus* (Keay *et al.*, 2005), as well as at the smaller sites of *Baccanae*, *Forum Cassii* and *Castellum Amerinum* (Johnson, Keay and Millett, 2004) and at the archaic centres of Capena (Keay, Millett and Strutt, 2006) and Vignale (Carlucci *et al.*, 2007). This research formed part of the British School at Rome's Tiber Valley Project, which coordinated a number of research initiatives in the area (Patterson and Millett, 1998; Patterson *et al.*, 2000; Patterson, 2004; Coarelli and Patterson, 2008).

A consistent methodology was used throughout the Tiber Valley Roman Towns Project, the application of which has been discussed previously (Keay *et al.*, 2004: 226–8). In essence, the project deployed techniques of geophysical survey (magnetometry and resistivity with targeted ground-penetrating radar and geochemical analysis) in combination with topographic survey and surface collection in order to derive the maximum possible information without recourse to excavation.

The background to *Falerii Novi* has been discussed as part of the publication relating to the earlier intramural survey (Keay *et al.*, 2000: 1–5), which revealed extensive details of the layout of the Roman town and its development (Keay *et al.*, 2000: 82–91). Between the completion of the intramural survey and of the present study, other information about the site has come into print. The important excavations of Roman structures in and around the medieval

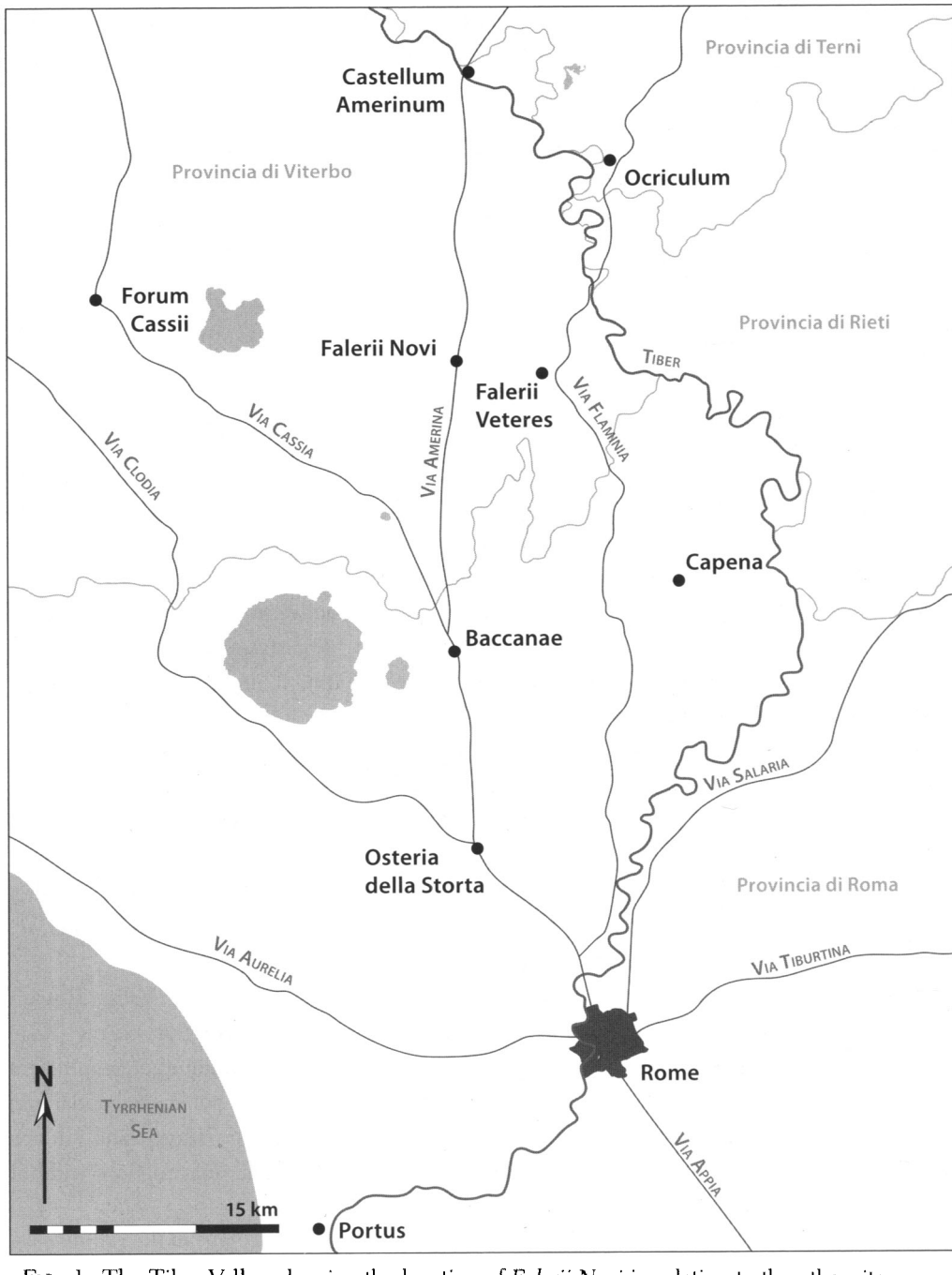

FIG. 1. The Tiber Valley, showing the location of *Falerii Novi* in relation to the other sites surveyed as part of the Tiber Valley Roman Towns Project.

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church had been published previously (De Lucia Brolli, 1995–6), while plots of aerial photographs of the town were included in a major exhibition catalogue (Scardozzi, 2003). Fieldwork on the Republican wall-circuit was included in Walter McCall's Ph.D. thesis (2007), while a LiDAR survey of the landscape in a region encompassing the town was included within Rachel Opitz's Ph.D. (Opitz, 2009a). Opitz's research led to a paper that provides new key information about the topography of areas immediately outside the town walls, especially on the southern side (Opitz, 2009b). A marble head found in the town has been published (Downes, 2005). Finally, a discussion concerning the relationship of the plan of *Falerii Novi* to its predecessor, *Falerii Veteres*, has appeared (Millett, 2007).

Methods

The 2002–8 survey broadly followed the methods established during the original investigations at the town, which were subsequently used on other sites (Keay *et al.*, 2004). A network of survey points was established across the site using a Leica TC805 or TCR307 total station. This provided a framework from which the geophysical survey grids could be set out and to which the local structures and topography were referenced. Visible topographical features, exposed archaeological remains and modern structures were surveyed in relation to this arbitrary grid. As part of this survey, the total station was also used to record elevation data, enabling a close-interval contour model to be produced. This involved taking a series of spot heights along *c.* 5 m traverses across the site, with an increased number of readings taken in areas showing significant variations in elevation. LisCAD software was employed to produce contour models of the site. This survey was then tied into maps of the Carta Tecnica Regionale to provide 'real-world' coordinates and elevations for the survey.

Magnetometer survey was undertaken using Geoscan Research FM36 and FM256 fluxgate gradiometers. Readings were triggered automatically, thus allowing the survey to be conducted rapidly, as the area was largely free of obstructions. In accordance with the standard practice of the project, readings were taken at 0.5 m intervals along parallel traverses of 1.0 m spacing. Although newer equipment does enable a higher sample density, the commencement of work at *Falerii* pre-dated such technology and the decision was taken to maintain methodological consistency on those sites where work already had begun. With a site of this type, and with the scale and nature of expected responses, a higher sampling density would probably have made little discernible difference to the results obtained. Grids of 30 × 30 m were set out over the area of the intended survey using the total station (Fig. 2). Although the grids were oriented to ensure that the survey traverses crossed the line of potential archaeological features at an angle of approximately 30°, this was not uniformly possible as the alignments of archaeological features were not consistent.

Data were logged in the internal memory of the geophysical survey instruments and downloaded at the end of every session to a portable computer. The data were then reconstituted and processed for viewing using Geoplot 3.1 software. The results have been collated and

FIG. 2. Plan of *Falerii Novi* showing the location and topography of the area surveyed.

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presented for this publication using a range of software packages, including ArcView GIS 3.2, AutoCAD 2004, Adobe Illustrator CS4, Geoplot 3.1 and LisCAD 7 and 8. The use of digital media to process and present these results has allowed us to retain a high degree of precision across the site and through to the production of the published images. Interpretative plans were produced using AutoCAD and exported, along with the geophysics images, to Adobe Illustrator for presentation. The final published images are based on the collated information from the survey and related work.

Topography

The survey covered an area of *c.* 14 ha to the north of the Roman walls. It encompassed the bulk of the extramural area around the city suitable for geophysical survey. Further open fields do lie to the east of the town and there is also an arable field immediately to its west: these have less apparent potential for survey, although they would repay attention in the future. In contrast, the deep valley to the south and southeast of the city contains ancient quarries, which are masked by woodland, but have been investigated successfully using LiDAR (Opitz, 2009b: 9–17).

The area covered by the current survey comprises arable fields, which were fallow or ploughed and rolled at the time of the survey. To the north, the survey was bounded by a fence beside the modern road from Civita Castellana to Fabrica di Roma (the Strada Provinciale Falerense or via Falerina). To the west the field is defined by the line of a Roman aqueduct, the stone piers of which survive in a hedge (Fig. 2). This aqueduct runs north-northwest for *c.* 250 m from its intersection with the Roman city wall, before turning through approximately 120° and continuing to the west-northwest. The northwest corner of the field surveyed reached as far as the fence next to the junction of the via Falerina with the via Faleri Novi, a side road that runs immediately to the west of the site. The field narrows to the east, and our survey was limited to the area up to and around the extant remains of the amphitheatre. At its north, undergrowth covering the Roman structures merges with that beside the road. To the south, the crop changed in line with the short axis of the amphitheatre. In the eastern part of the survey area there were also patches of undergrowth covering the standing remains of a series of mausolea (di Stefano Manzella, 1979: pull-out plans nos. 73, 75–7) and piles of rubble from field clearance, especially in the area along the line of the Via Amerina just outside the North Gate of the town.

The Roman town wall, which defines the southern limit of the survey, is heavily overgrown, so work could approach only as close to it as the edge of ploughing. The wall stands to a height of more than 4 m and there is a series of rectangular external towers (McCall, 2007: 85–91). Adjacent to the intersection between the walls and the aqueduct there is a gap in the wall-circuit (Fig. 2), although it is not clear whether or not this is ancient. Di Stefano Manzella (1979: pull-out plan no. 69) showed it as a possible ancient entrance, but its location does not correspond with any of the ancient streets located in our previous survey (Keay *et al.*, 2000: figs 9–10). The gap has been accepted as a gate by McCall (2007: 98), although he has identified no

evidence to support this. The main North Gate of the town lay within this stretch of walls, with the Via Amerina heading northwards from it across the area surveyed (FIG. 2).

The ground covered by the survey is generally relatively flat. Our topographic survey (FIGS 2 and 3) reveals that it was very gently undulating, with a slope from just over 205 m above sea level in the west down to about 195 m in the east. This subdued topography masks several significant variations in level. First, there is a slight rise running north-northwest from the North Gate that marks the route of the Via Amerina. Second, there is a marked reduction in the ground level immediately outside the walls along part of their circuit. East of the North Gate, an overgrown mausoleum lies just outside the opening on a slight rise. A little beyond this to the east, *c.* 60 m from the gate, the ground begins to fall away to a broad hollow bounded to the south by the walls and to the north by a slope that marks the southern side of the amphitheatre. This feature continues to the east, beyond the area of our survey. To the west of the North Gate similar, although less pronounced, troughs can be detected. Immediately to the west of the gate the first of these runs parallel with the walls for *c.* 130 m. There is then a gap of *c.* 30 m before a further trough continues for *c.* 130 m, ending a little short of the aqueduct. The ground in the gap between these two lower-lying areas thus forms a narrow ramp or causeway running up to the walls; it is notable that this feature coincides with the northwest corner of the street around the primary street-grid in the intramural area (Keay *et al.*, 2000: 85; Millett, 2007: fig. 2B; see below, p. 31).

These features beside the walls not only emphasize the difference in level between the interior and exterior, but also mask a more general difference in elevation between the intramural area and the wider landscape outside the walls. Two elevation transects (FIG. 3) illustrate this topography. They show that the northern extramural area is essentially flat, with a distinct rise in elevation at the walls. Within the city, the land slopes gently upwards to the south to a ridge that runs along the main east–west axis of the town. The marked contrast between the slope of the interior, the steep gradient along the line of the walls, and level ground immediately outside supports the hypothesis that the ground here has been sculpted, with quarrying lowering the external ground surface and levelling it in order to emphasize the apparent height of the walls (Keay *et al.*, 2000: 86–7).

MAGNETOMETRY SURVEY RESULTS

The results of the magnetometer survey from the areas with the highest density of features are presented as a series of 1:1000 scale plans, located as shown on FIGURE 4. An overall image of the magnetometer results is also provided for context and to show the results of the survey in areas where there were fewer features (FIG. 5). Pairs of plans for each area provide a greyscale plot of the gradiometer data alongside an interpretative plan (FIGS 6–14).

The overall plan (FIG. 5) shows that the results are dominated by underlying geology, best demonstrated in the central-northern part of the field by a pattern of anomalies giving a crazed effect, reflecting formations in the volcanic tufa, probably caused as the rock quickly

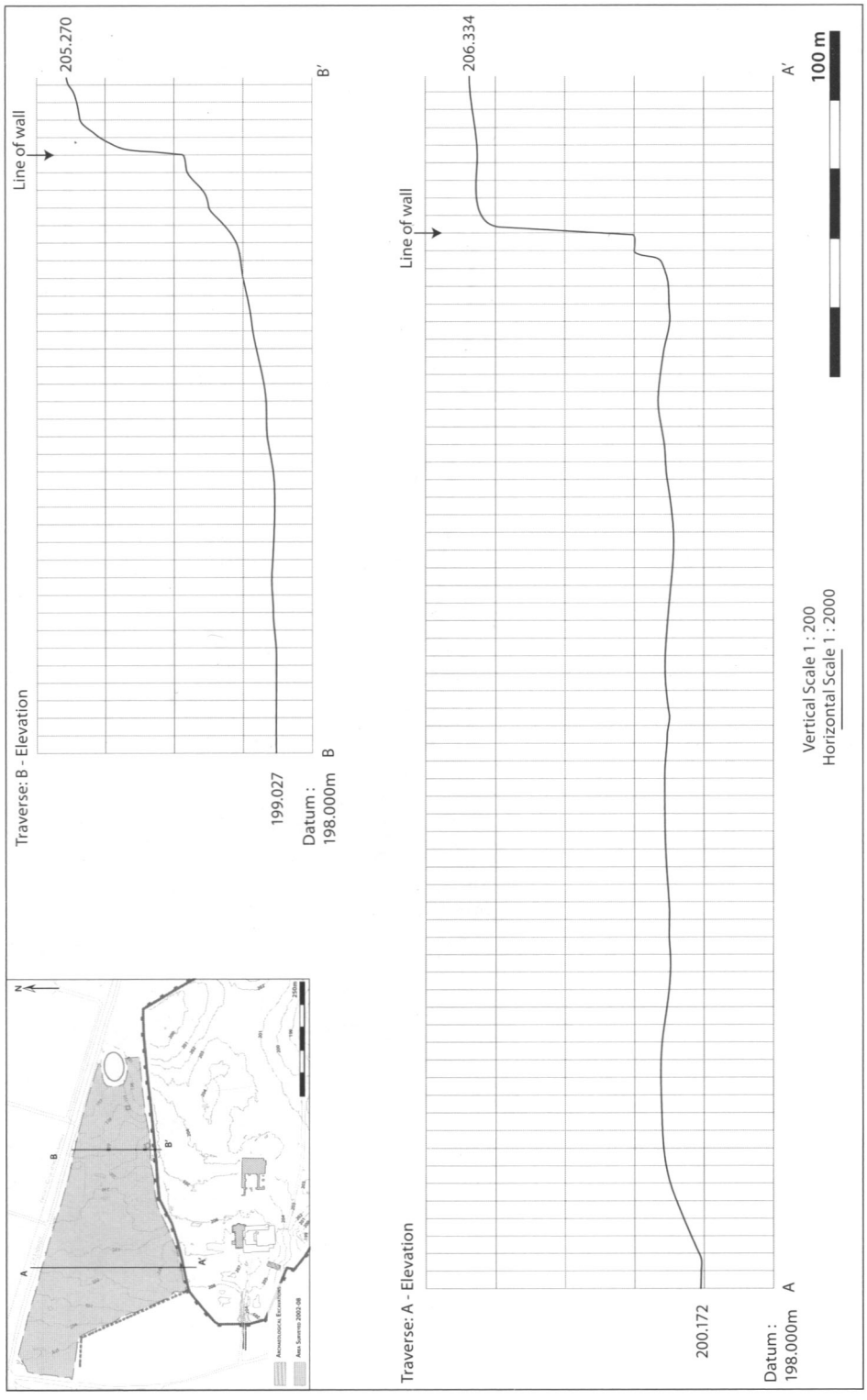

Fig. 3. Levelled transects across the survey area, illustrating the Roman levelling of the extramural area.

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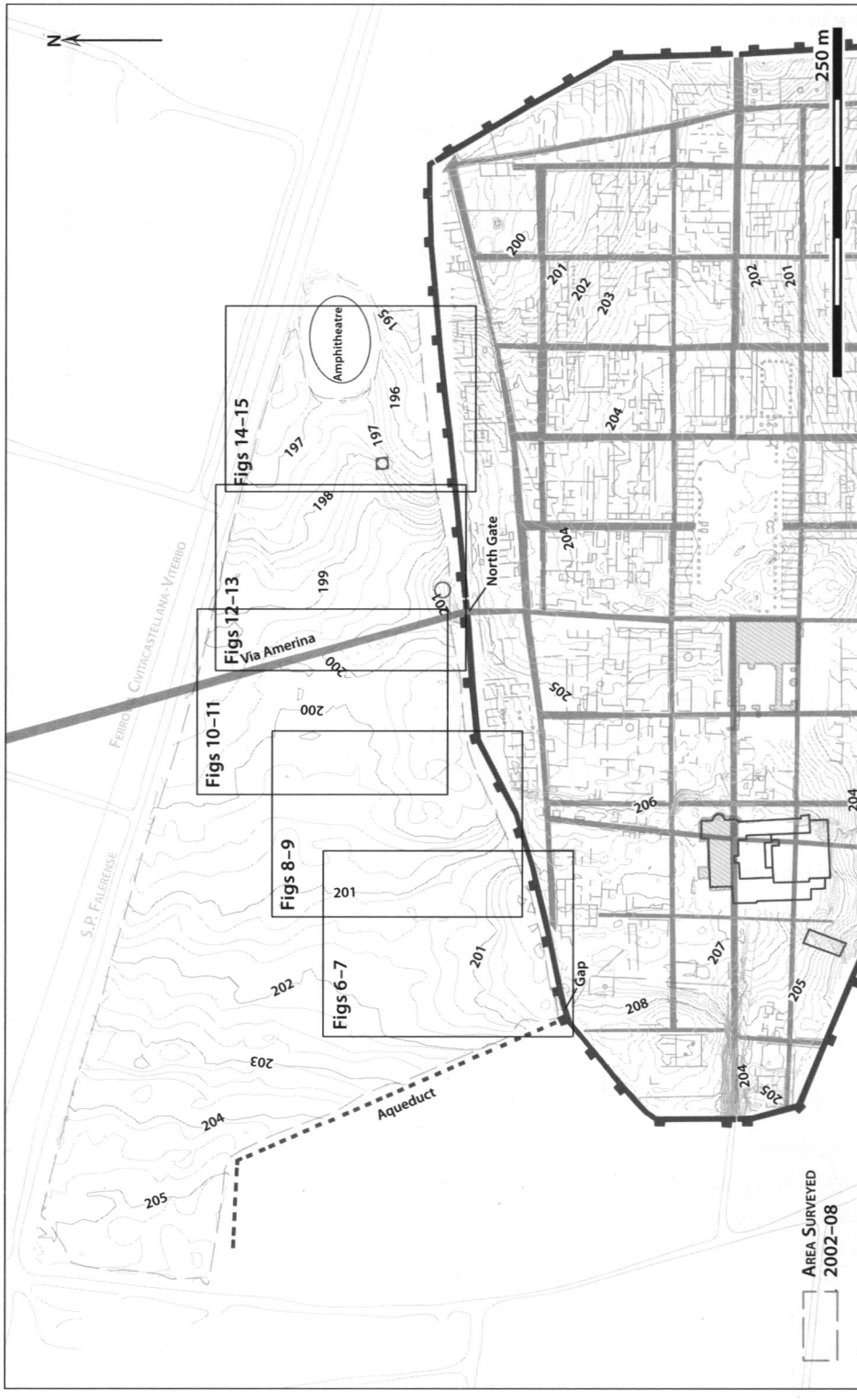

FIG. 4. Plan of the survey area showing the location of the detailed area plans (FIGURES 6–15).

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Fig. 5. Overall plan of the results of the magnetometer survey (scale 1 : 5000).

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cooled. These features are less evident to the northwest and southwest, where they appear masked by deeper topsoil.

In the westernmost part of the field (FIGS 6 and 7), a long linear anomaly (1) runs *c.* 130 m, from the aqueduct in the west, continuing eastwards parallel to the city walls 15 m to the south. This feature marks a significant change in the background magnetic response. While the striations of the underlying geological formation can be seen clearly to the north, a much more uniform signal is present in the area to the south, between the linear anomaly and the Roman city walls. The nature of the anomaly suggests that it represents the northern edge of a large feature cut through the bedrock, best interpreted as a quarry immediately outside the walls. Natural colluviation and agricultural erosion of the land to the north infilling the feature have produced the more uniform magnetic response of its fill. Similar features continue beside the walls to the east, each coinciding with one of the troughs noted in the topographic survey (above, p. 6). The presence of this quarry may call into doubt whether the gap in the walls just east of the aqueduct represents an ancient gate (above, pp. 5–6). Certainly, once this quarry was excavated any gate would have been difficult to access from outside unless the quarry were bridged. However, it should be noted that other certainly ancient gates also exited over steep cliffs (as shown by di Stefano Manzella (1979: pull-out plans nos. 80–1) at the northeast corner; and the so-called Abby Gate located by McCall (2007: 97–8) in the south wall at the tower adjacent to Insula LXI), perhaps supporting the idea that the walls pre-date the extramural quarrying.

Where the quarry edge (1) ends at the eastern side (FIGS 8 and 9), it intersects another strong linear anomaly (2), which runs for *c.* 65 m perpendicular to the walls and to feature 1. There is comparatively little differentiation between the background magnetic responses on either side of this feature but it is also apparently contiguous with a slightly more ephemeral aligned feature (2a) running *c.* 30 m to the north, which disappears into the dense geological responses to the north. The anomaly probably represents a ditch cut into the bedrock, forming a boundary respected by the quarries to the west and east; its location accounts for the survival of the natural slope of the bedrock forming a ramp up towards the walls. This implies that the boundary must pre-date the quarries and the lowering of the ground outside the walls, yet it must have been maintained after their excavation, suggesting that the stretch to the north (2a) may represent a re-establishment of the line after the ground was lowered. We may note also that this boundary is broadly parallel with the Via Amerina and the aqueduct.

To the east of the boundary (2), another linear anomaly (3) running *c.* 35 m to the north of, and parallel to, the Roman city wall represents the edge of a further quarry, similar to that described to the west. It continues for *c.* 160 m to the east, terminating just to the west of the North Gate (below, FIGS 10 and 11). The strength of the anomaly marking the quarry edge varies, and yet the quarry edge remains parallel with the city walls as they curve around (FIG. 5). As in the quarry to the west, the evidence suggests a substantial feature infilled by later deposits, masking any deeper archaeological or geological magnetic responses.

In the area to the north of the quarry there is a series of anomalies visible against the background of the geology. These include a series of linear features that stretch for some distance

across the landscape. The first of these (4) runs east-southeast to west-northwest across the western part of this area and, beyond it, continues westwards for *c.* 230 m to an intersection with the line of the aqueduct at the point where it changes direction (Fig. 5). This strongly suggests that the two were both present in the landscape contemporaneously. This feature runs on a converging path with another feature (5), *c.* 20 m to its south, which runs for *c.* 200 m to the east and terminates at the line of the Via Amerina just outside the North Gate of the town (below, Fig. 11). These two features perhaps represent boundaries associated with a trackway running to the northwest from outside the North Gate, and perhaps of post-Roman date. A comparatively recent date might be suggested, as the two features are roughly parallel with the modern road to the north. This interpretation is perhaps undermined by the presence of a third boundary feature (6), which runs on a southwest–northeast axis, the southern end of which is apparently continuous with the western end of feature 5, turning through 135° and then apparently overlying feature 4. Feature 6 continues to the northeast for *c.* 90 m, before turning through *c.* 20° to the north and continuing for *c.* 80 m to the edge of the survey area (Fig. 5). The intersection between features 4, 5 and 6 is made more complex by their relationship with the other boundary, feature 2A.

To the north there is a series of parallel anomalies (7), on the same alignment as feature 2 to the southwest and as the Via Amerina to the east. These roughly parallel, linear anomalies are between *c.* 40 m and *c.* 65 m long and cover an area of *c.* 150 m west to east; twelve of these features are visible on Figures 8 and 9, while four more lines continue to the east (below, Figs 10 and 11). These exhibit a low negative response, the ephemeral nature of which may be consistent with shallow cutting of the underlying rock; they are apparently cut by feature 6. They appear to be strip fields, with ditches marking their boundaries, and a perpendicular linear anomaly (8) appears to be part of the same system. The fields vary in width up to about 18 m, with most being *c.* 10 m wide. Except in the area immediately adjacent to the Via Amerina, their southern limits are obscured by the depth of the topsoil; beside the road the maximum length of the fields appears to be *c.* 80 m. Their layout and relationship with the Via Amerina suggest that they are Roman in date. Further to the north is an area of natural igneous rock, where a greater depth of overlying deposits probably accounts for the lower visibility of features.

Figures 10 and 11 also show a series of other very clear anomalies in the geophysical survey data. The line of a low-response band (9), *c.* 5–10 m wide, can be discerned running south-southeast to north-northwest across the extent of the area surveyed, from the North Gate of the Roman city to the fence bordering the modern via Falerina. The nature of this anomaly, its partial masking of underlying geological features along its length (particularly in the north), its relationship to the intramural street-grid and gate, and its alignment all confirm its interpretation as the surface of the Via Amerina as it runs north from the city. The contours (Fig. 2) show that the road also can be seen as a rise in the ground surface, more than that usually associated with the agger of a road, especially towards the south of the area. This is a result of the lowering and levelling of the ground on either side, leaving the road following the original ground surface and confirming that the Via Amerina pre-dates this work.

Two large rectilinear areas of reduced magnetic response (10 and 11) dominate the features in this area. The southern of these (10) is aligned east–west and measures *c.* 38 × 20 m. It has a clear

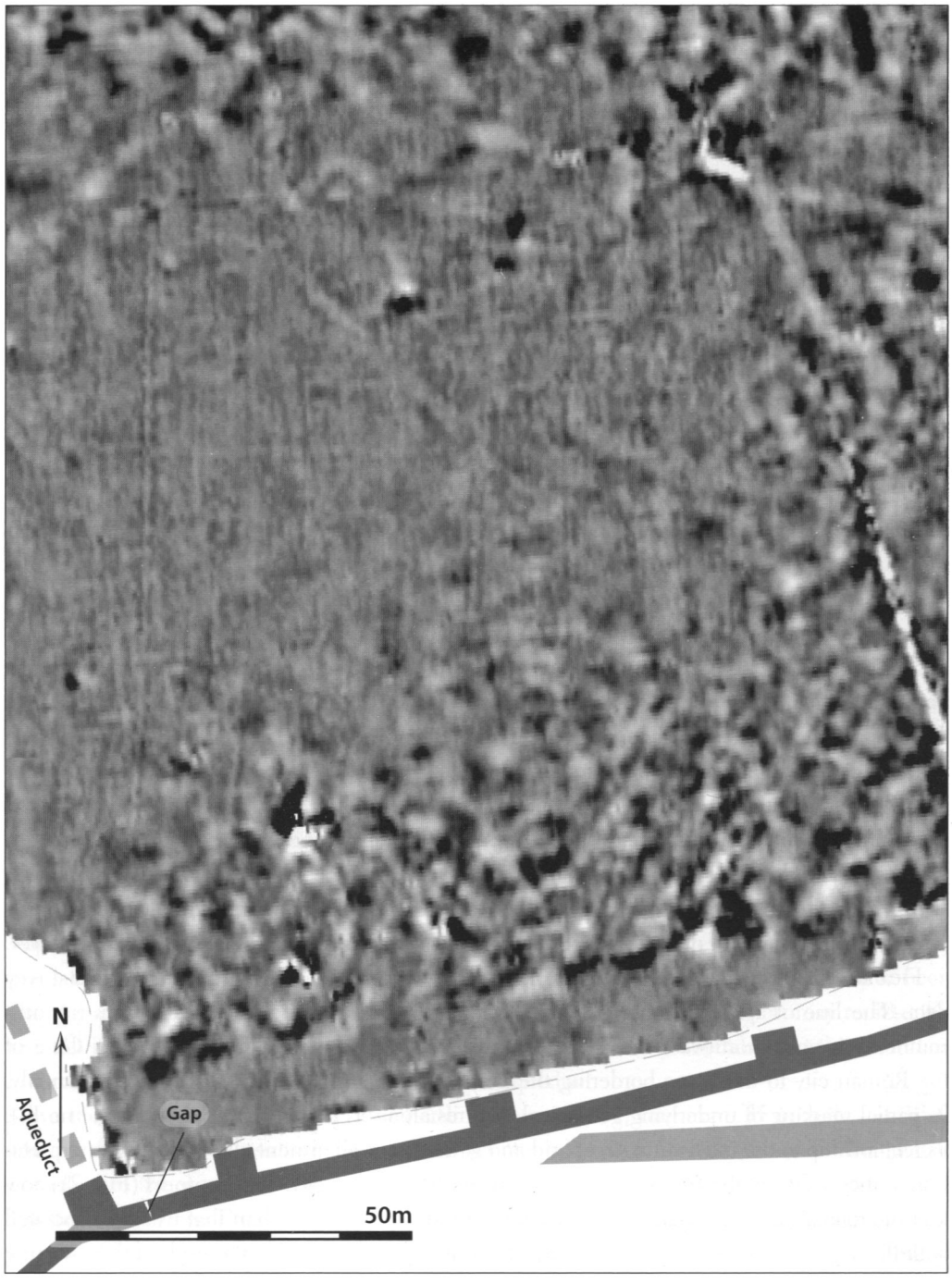

FIG. 6. Detailed plan showing the magnetometer survey results from Area 1 (scale 1:1000). For location, see FIGURE 4.

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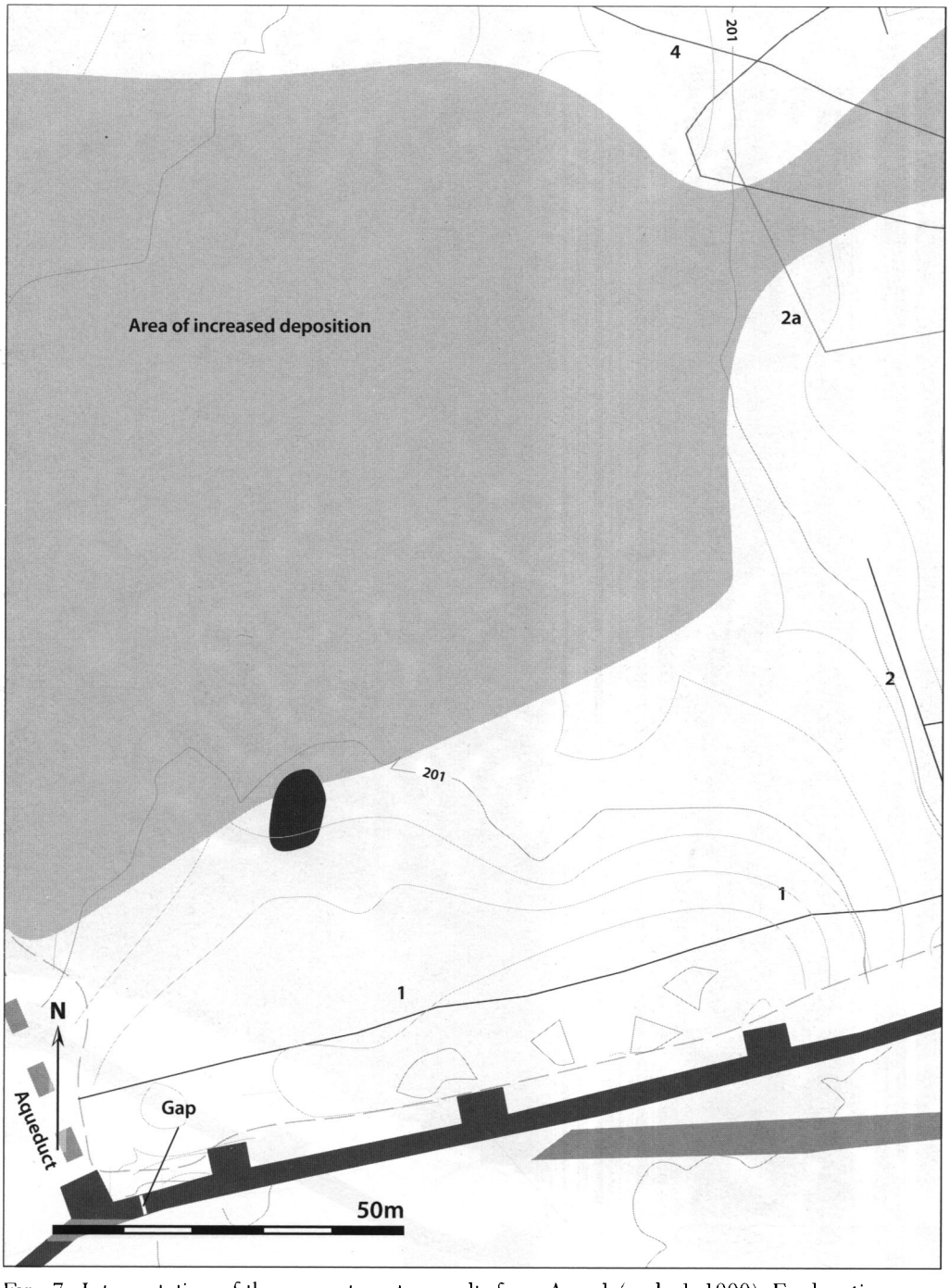

Fig. 7. Interpretation of the magnetometry results from Area 1 (scale 1:1000). For location, see Figure 4.

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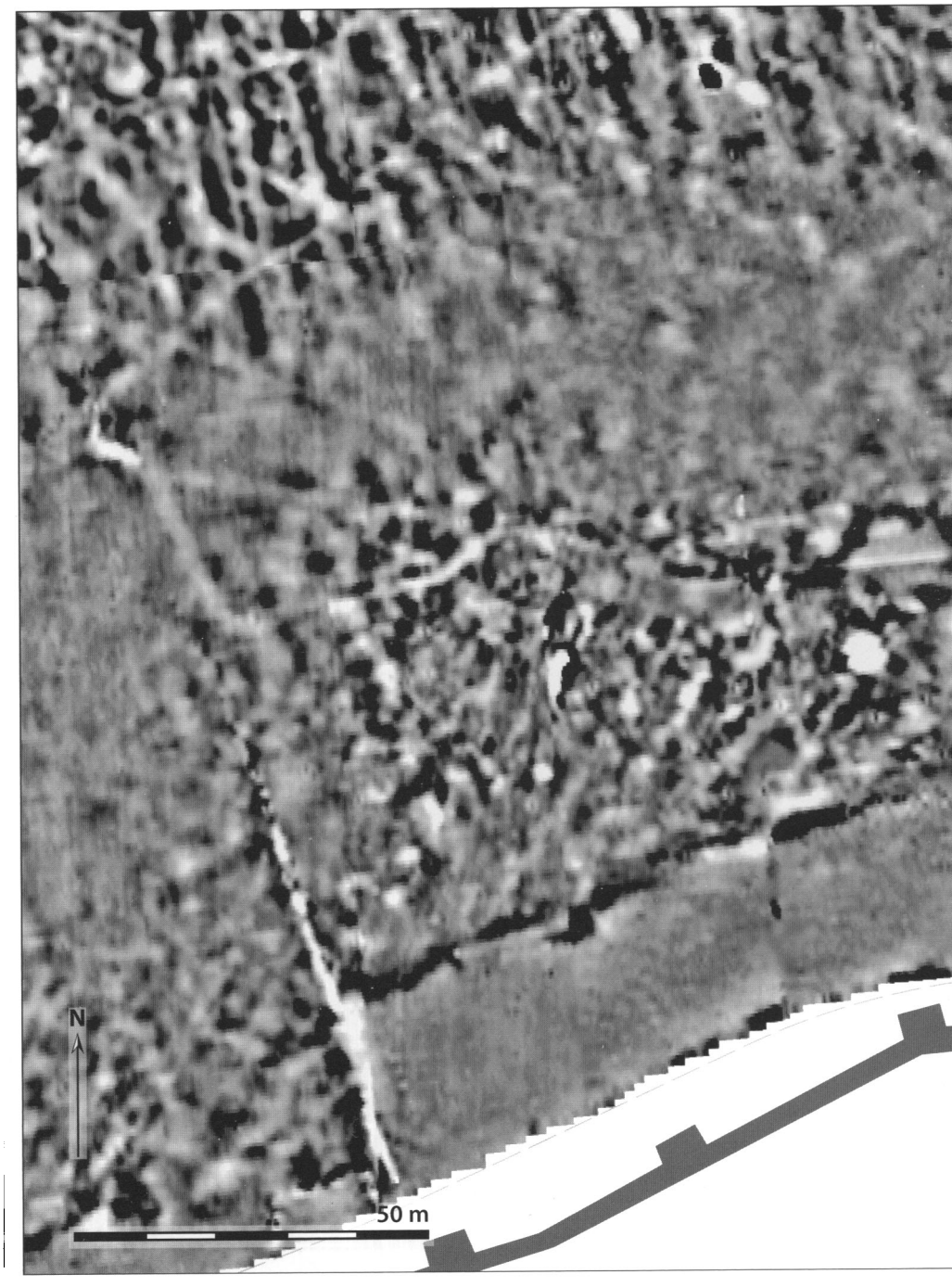

FIG. 8. Detailed plan showing the magnetometer survey results from Area 2 (scale 1:1000). For location, see FIGURE 4.

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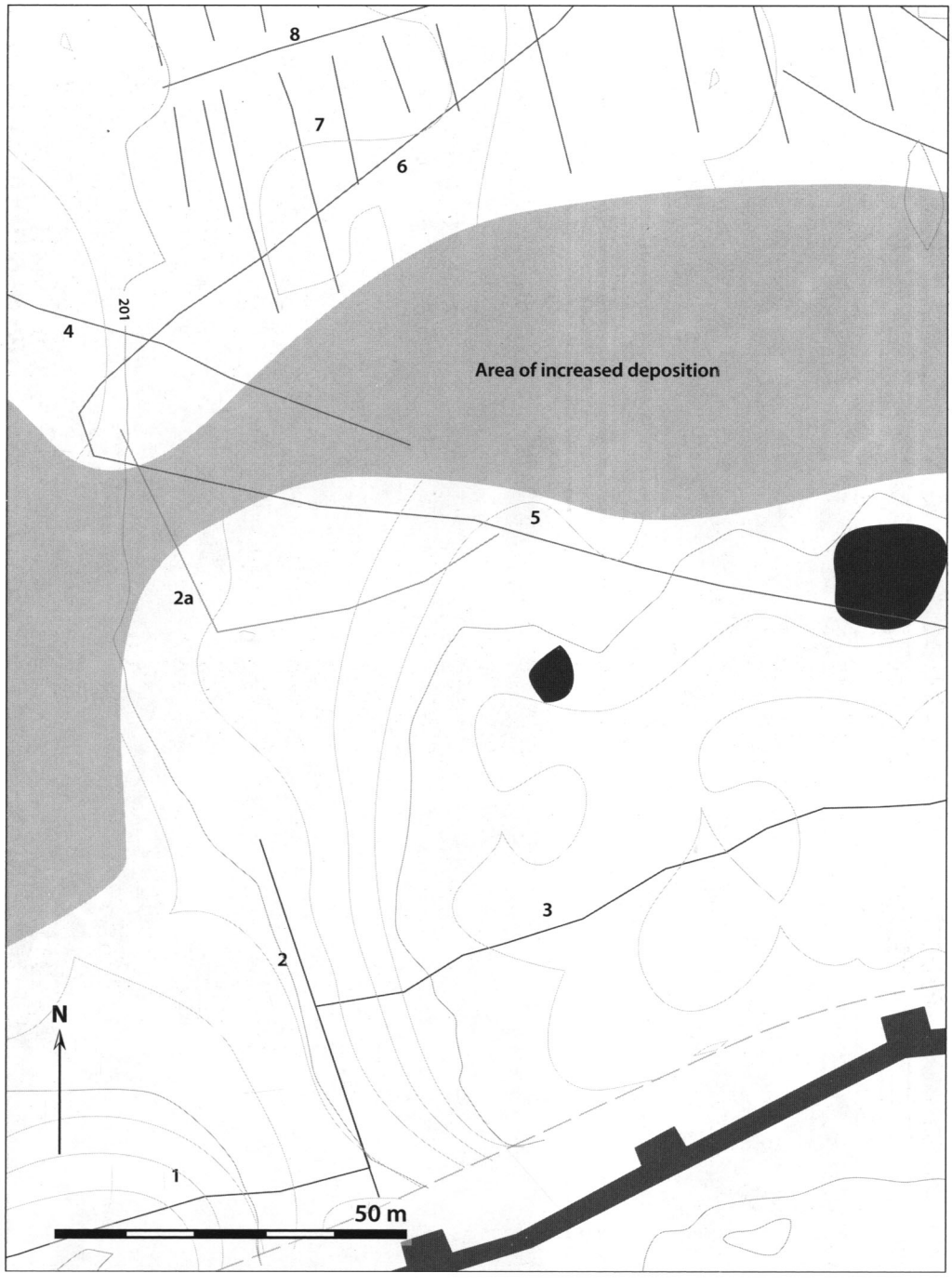

Fig. 9. Interpretation of the magnetometry results from Area 2 (scale 1:1000). For location, see Figure 4.

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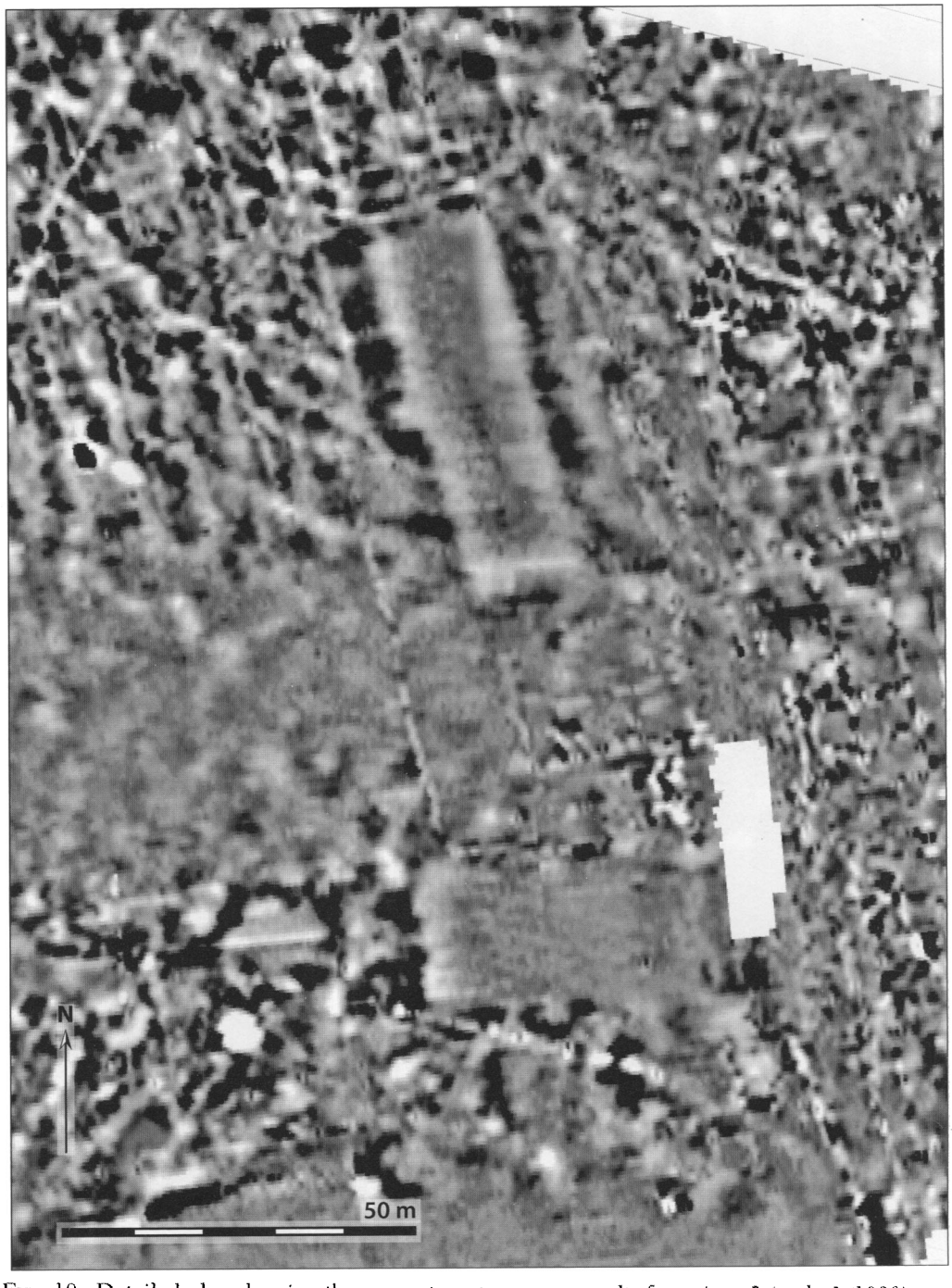

FIG. 10. Detailed plan showing the magnetometer survey results from Area 3 (scale 1:1000). For location, see FIGURE 4.

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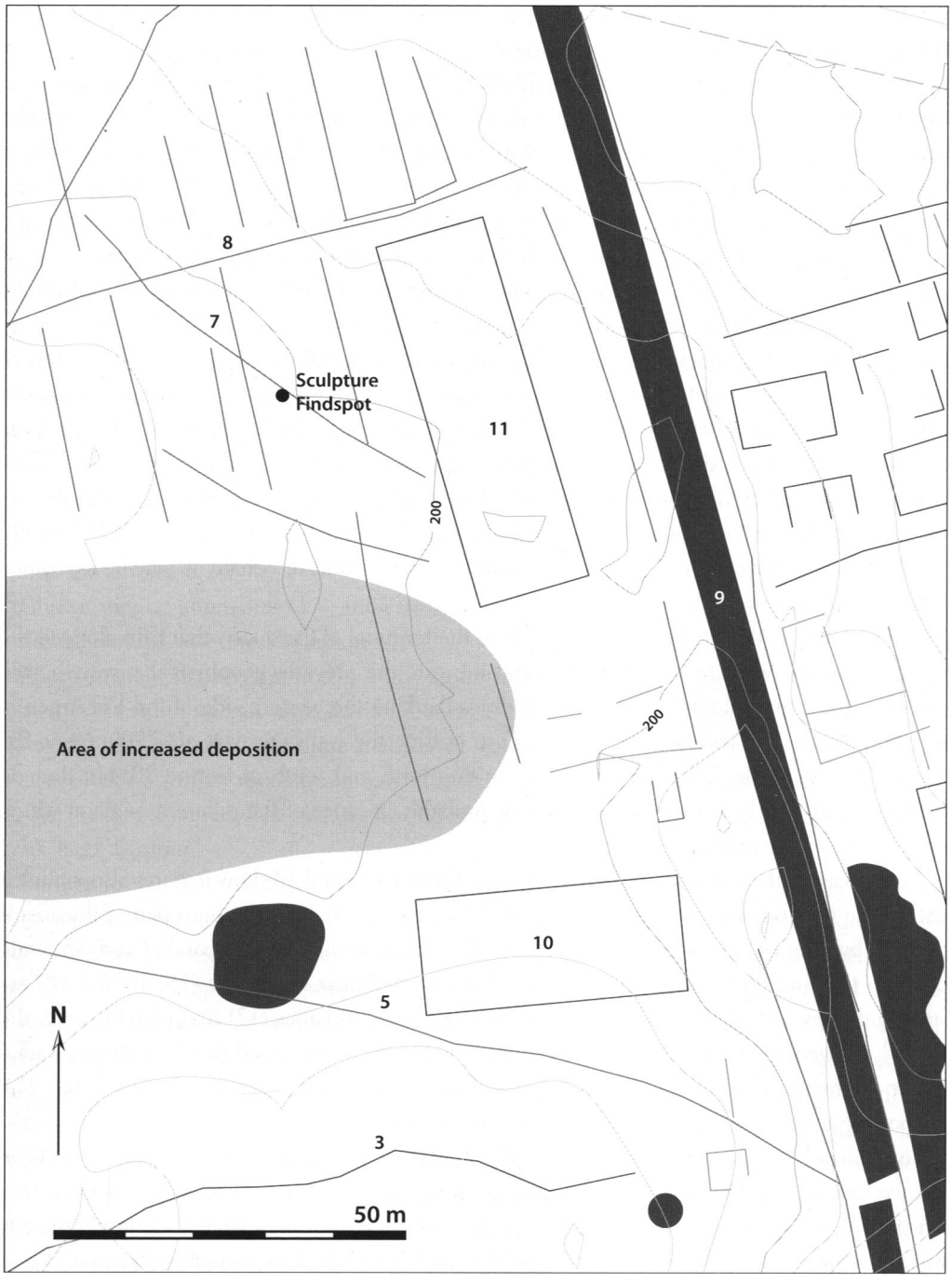

Fig. 11. Interpretation of the magnetometry results from Area 3 (scale 1:1000). For location, see Figure 4.

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linear edge between the geological striations around it (especially to the west) and an area of reduced magnetic response within it, suggesting that it represents a major feature cut into the natural rock. Its edges, as well as the striations of the underlying rock formation, are less clear to the east, probably because of a greater depth of overlying deposits that obscure the magnetic response of the cut. The interior of the feature has a uniform and low response, which suggests a deep and homogeneous deposit within a substantial cut feature. The second of these rectilinear features (11) is slightly larger (*c.* 52 × 18 m), but exhibits similar geophysical characteristics and would also appear to be a substantial cut feature filled with deep, essentially homogeneous deposits. It is, however, aligned with its long axis parallel to the Via Amerina, and apparently laid out within the field system previously described, suggesting broad contemporaneity. Both features originally would have been large, sunken, open rectilinear spaces. In the context of this extramural area, near to the road and in association with known, extant funerary monuments, these two features might be subterranean funerary courts or hypogea (see below). It should be noted that di Stefano Manzella found a fragment of a carved relief from a victory monument *c.* 20 m to the west of this feature in 1975. This fragment can be related to other pieces, including that now in the narthex of the duomo in Civita Castellana (di Stefano Manzella, 1979: 98–9). Whilst this may have been deposited far from its original context, equally it may be associated with nearby structures.

Immediately to the west of the North Gate is the terminal of the quarry that runs along to the north of the city walls (3). Between this and the gate the previous geophysical survey showed evidence for a mausoleum, a range of buildings flanking the western side of the Via Amerina for about 60 m, and an east–west street *c.* 22 m outside the walls (Keay *et al.*, 2000: 64–9, figs 43–4). Vestiges of the buildings are visible to the north and south of feature 10, but they do not appear as clearly as in the earlier survey, probably because of the different angle at which the current survey crossed these features.

To the east of the line of the Via Amerina (9), FIGURES 12 and 13 show features also included within the previous survey (Keay *et al.*, 2000: 64–9, figs 45–6). The southern part of the area is covered by a series of rectilinear negative and dipolar anomalies aligned parallel and perpendicular to the line of the Via Amerina. These three rectilinear anomalies (15, 16 and 18) are surrounded by narrow, *c.* 3 m wide, linear, low-response anomalies (12) that partially mask the underlying geological responses and must represent areas of increased depth in the sediment. Their characteristics are similar to the intramural street-grid (Keay *et al.*, 2000: fig. 17), supporting interpretation as a grid of unmetalled, minor roads.

Immediately adjacent to the walls is a *c.* 20–30 m wide area (13) of low magnetic response, at the western end of which are the standing remains of a mausoleum. This area is defined by a street to the east (12), beyond which the ground falls away to form a trough alongside the city walls. An area of low magnetic response in this area (14), like those noted to the west (1 and 3), seems to represent quarrying beside the wall. The edge of the quarry is defined very clearly on its north side (except where overlain by the rubble of feature 23, below), whilst at the west its edge is less evident. Comparison with the topography (FIG. 2) suggests that here the floor of the quarry may slope gently upwards rather than being defined by a rock-face.

The magnetic response of feature 13, together with the surface topography that falls away gently to the east and north away from the gate, distinguishes this zone from quarries to the west (1 and 4) and east (14). Instead, it bears comparison with the rectilinear area defined by streets and measuring *c.* 25 × 45 m (15) immediately to its north. This feature is delimited by clearly defined linear dipolar anomalies, suggesting the presence of narrow bands of igneous rock or highly fired ceramic material, distinct from the responses seen in the other large rectilinear features to the west of the road (10 and 11). As such, it suggests a walled enclosure rather than a rock-cut feature. In addition, there is much less distinction between the magnetic response outside the feature (the natural volcanic rock) and inside the feature. Indeed, the natural bedrock striations can be seen faintly on the interior of this feature and within feature 13 to the south. This suggests a pair of enclosed courtyards facing onto the Via Amerina. Immediately to the north, and on the same alignment as feature 15, is a pair of rectilinear anomalies (16 and 18), each *c.* 20 × 20 m, exhibiting similar geophysical characteristics to feature 15 — clearly defined linear dipolar anomalies forming the outline of a rectangle, with the striations of natural bedrock faintly visible on the interior. Within the eastern part of feature 16 there is a series of linear negative anomalies, suggesting structures set back from the road within the boundary of the enclosure. Immediately to the northwest is a further group of rectilinear dipolar anomalies (17), indicating an L-shaped building, the main range of which is aligned parallel with the Via Amerina.

Approximately 10 m to the north of this group is a linear dipolar anomaly (19), which runs from the Via Amerina eastwards for *c.* 150 m to the edge of the survey area. It interrupts the geological background in the same manner as feature 8 to the west of the Via Amerina and intersects with a further dipolar anomaly (20) that runs perpendicular to it from the northern edge of the area surveyed. The alignments and nature of these features suggest that they represent major land divisions.

Further to the north of the area, along the eastern side of the Via Amerina, is a series of low-response, negative, linear and sub-rectilinear anomalies (21, 21a and 21b) aligned with the road, which range in size from *c.* 4 × 5 m to *c.* 10 × 15 m. Whilst these all appear to be part of the same complex, the group at the north (21a) seems most clearly to represent a series of rectilinear structures or rooms running perpendicular to the line of the Via Amerina (9), and arranged along a central spine. The sub-rectilinear anomalies at the east (21b) are partially obscured by the strong magnetic response of the volcanic rock striations, but enough detail can be discerned to suggest shallow foundation trenches cut into the bedrock. Given the context, they are likely to represent tombs. One of them, at the eastern side, has a particularly strong magnetic response and was interpreted as a masonry plinth in the previous survey (Keay *et al.*, 2000: 65).

A large, amorphous dipolar anomaly (22), *c.* 10 m in diameter, can be seen to their south. Its nature is uncertain, but it probably results from archaeological material in the upper 0.5 m of plough-soil. Another similar anomaly (23), *c.* 15–20 m in diameter, in the southeast of the area, appears in the results as a dispersed positive response surrounding an area *c.* 5 m in diameter, where survey could not be conducted because of the remains of a partially destroyed and overgrown mausoleum. Brick on the surface in this area supports the conclusion that both anomalies

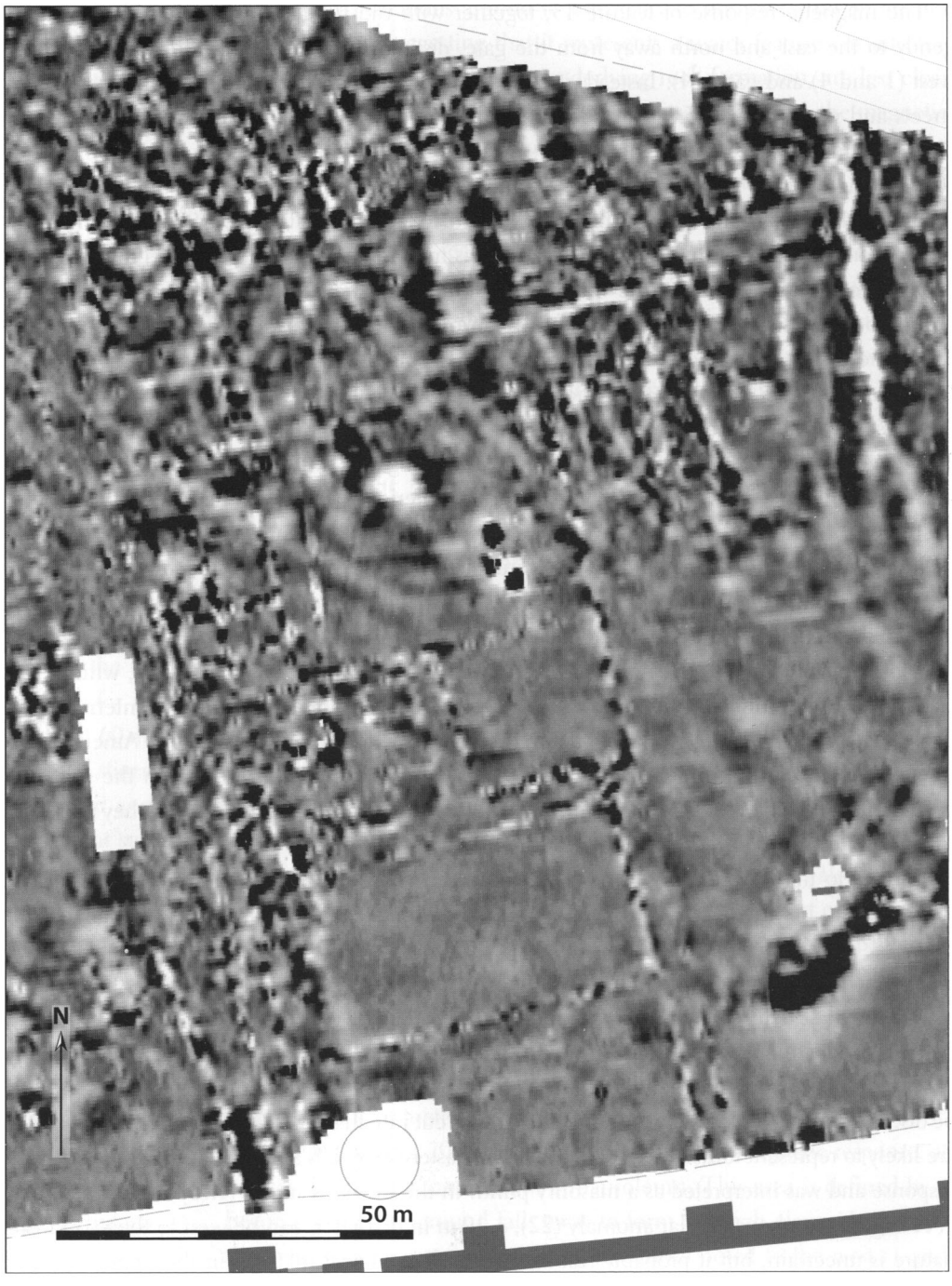

FIG. 12. Detailed plan showing the magnetometer survey results from Area 4 (scale 1:1000). For location, see FIGURE 4.

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Fig. 13. Interpretation of the magnetometry results from Area 4 (scale 1:1000). For location, see Figure 4.

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result from the presence of ceramic building material derived from the foundations of mausolea just below the ground surface.

Adjacent to the mausoleum (23) there is a continuation of the low-response anomalies interpreted as minor roads (12a), running northeastwards at an angle of *c.* 45° to the insula beside the Via Amerina. This street runs for *c.* 100 m, disappearing towards the edge of the survey area. A further short stretch of road (12b) diverges eastwards from it and continues for about 35 m. Between the mausoleum (23) and this junction there is a small negative, or possibly dipolar, rectilinear anomaly (24) that completely obscures the underlying rock formation, suggestive of a solidly built feature, probably a further funerary monument. To the north of the side road is a series of ephemeral, negative, rectilinear responses (25) probably representing further similar structures.

In the final area (FIGS 14 and 15) the archaeology is dominated by the extant remains of the rock-cut amphitheatre, the seating banks of which are largely overgrown. Our survey came up to the edge of the undergrowth around its western end. The striations of the underlying volcanic rock are clearly visible across this part of the area, and most of the anomalies show distinctly against it. The continuation of the quarrying (14) is clear towards the southern edge of the area surveyed, with its northern edge showing as a very strong but irregular line.[1] Immediately to the north is a series of five strong dipolar anomalies of *c.* 5–10 m in diameter (26). Interpretation is difficult due to the amorphous appearance of the features in the geophysical data. Their context and strength would suggest strongly that they represent relatively small structures consistent with the brick- or tufa-faced concrete mausolea seen elsewhere at *Falerii Novi*. To the west, the extant remains of a substantial and overgrown mausoleum support this interpretation.

The southwest to northeast side street (12a) continues across this area, with a further low-response linear feature probably representing a side street (12c) leading to the amphitheatre. Adjacent to feature 12a are two similar, rectilinear, negative anomalies. The first of these (27) is extremely clear against the background and measures *c.* 5 × 5 m. It exhibits few defining characteristics but is probably a funerary structure. The second (28) is less clear, but larger, measuring *c.* 8 × 8 m, and it may represent a similar structure.

The clearest anomalies relate directly to the remains of the amphitheatre. A group of curvilinear, dipolar anomalies (29) is located at the limit of the area surveyed, aligned on the long axis of the amphitheatre and defining a semi-elliptical area *c.* 12 × 10 m with a clear central gap in the straight eastern wall at the entrance to the arena. These features completely obscure the underlying rock formation, suggesting the presence of substantial built features; as the extant remains of the amphitheatre are of *opus quadratum* using tufa blocks, they are most likely to be of the same material. This structure is evidently the western entrance to the amphitheatre arena, as its axis is aligned with the street (12c), suggesting that it was monumental (see below).

[1] In the publication of the previous survey (Keay *et al.*, 2000: 65, figs 45–6), the line of this quarry edge was mistaken for a continuation of the street (12) to the west, a similar interpretation being shown on Scardozzi's plan (2003: fig. 721). With the broader magnetometry coverage, this interpretation now can be discounted.

Immediately adjacent to the northern edge of this is a pair of negative rectilinear anomalies *c.* 5 × 5 m (30). These features contrast clearly with the volcanic rock striations, and because of their character probably represent the remains of stone structures. Whilst broadly aligned with the street approaching the amphitheatre, they are set back at some distance from it. To the east of these features is a high-response, linear, negative anomaly (31), running northeast for approximately 50 m, to the northern edge of the area surveyed. The strength of this anomaly would suggest a significant feature, possibly bounding the northern side of the amphitheatre complex. To the south of the amphitheatre entrance (29) is a 30 m long, curvilinear negative anomaly (32). This exhibits similar characteristics to the feature previously discussed and may represent a boundary defining the approach to the west of the amphitheatre. Approximately 20 m to the west of the amphitheatre entrance (29) is a long linear feature (33) that runs north–south for approximately 60 m, cutting the line of the approach road to the amphitheatre (12c). At the north, this feature intersects the main road leading northeast (12). From this point a further linear feature (33A) continues in a broadly easterly direction to the edge of the survey area *c.* 30 m to the north of the amphitheatre. This appears to be a continuation of the same feature and suggests a substantial boundary defining the area immediately around the amphitheatre. At the point where it intersects with the road (12), there is also a large circular feature (34), which appears as a negative anomaly *c.* 5 m in diameter. The exact relationship between the two features is unclear, but it may represent a mausoleum subsequently incorporated into, or influencing, the alignment and positioning of the linear boundary feature (33 and 33A).

Integration: aerial photography

The results of our magnetometer survey should be viewed in the light of the recently published aerial photographic study of the area surrounding *Falerii Novi* based on photographs taken in 1958 and 1961 (Scardozzi, 2003). The published interpretative plan of the features identified on the aerial photographs (Fig. 16) shows a number of the structures in greater detail than in our magnetometry results. The combination of the results from the two survey methods allows a robust interpretation of the archaeological remains to be developed (Fig. 17), whilst the more extensive magnetometer coverage also provides a broader context (Fig. 18).

The differences in the detail of the evidence revealed by aerial photography and by the geophysical survey are themselves instructive. They are partly a product of different surface conditions, with the margins of the fields and standing monuments being more overgrown now than when the aerial photographs were taken in the late 1950s and early 1960s. Perhaps more important, the crisp lines of some of the walls visible as crop-marks on the aerial photographs suggest that the structures were close to the surface and have thus probably suffered considerably from plough damage in the intervening period. The ploughing of the structures has contributed to the presence of rubble in the topsoil that has a masking effect in the geophysics, especially notable immediately to the east of the Via Amerina. A comparable effect has been seen at *Portus* (Keay *et al.*, 2005: 135–56). Finally, we may note that the difference

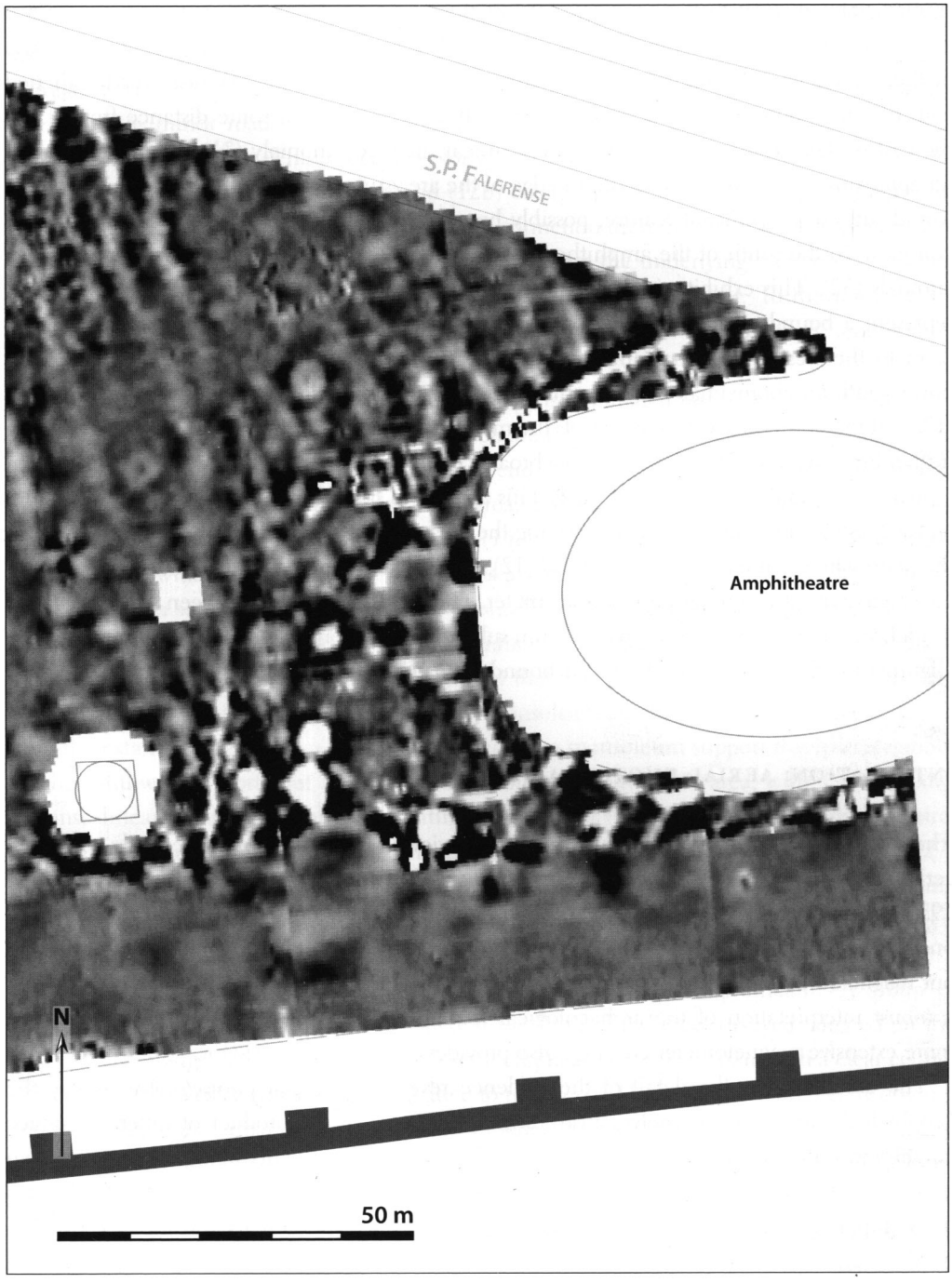

Fig. 14. Detailed plan showing the magnetometer survey results from Area 5 (scale 1:1000). For location, see Figure 4.

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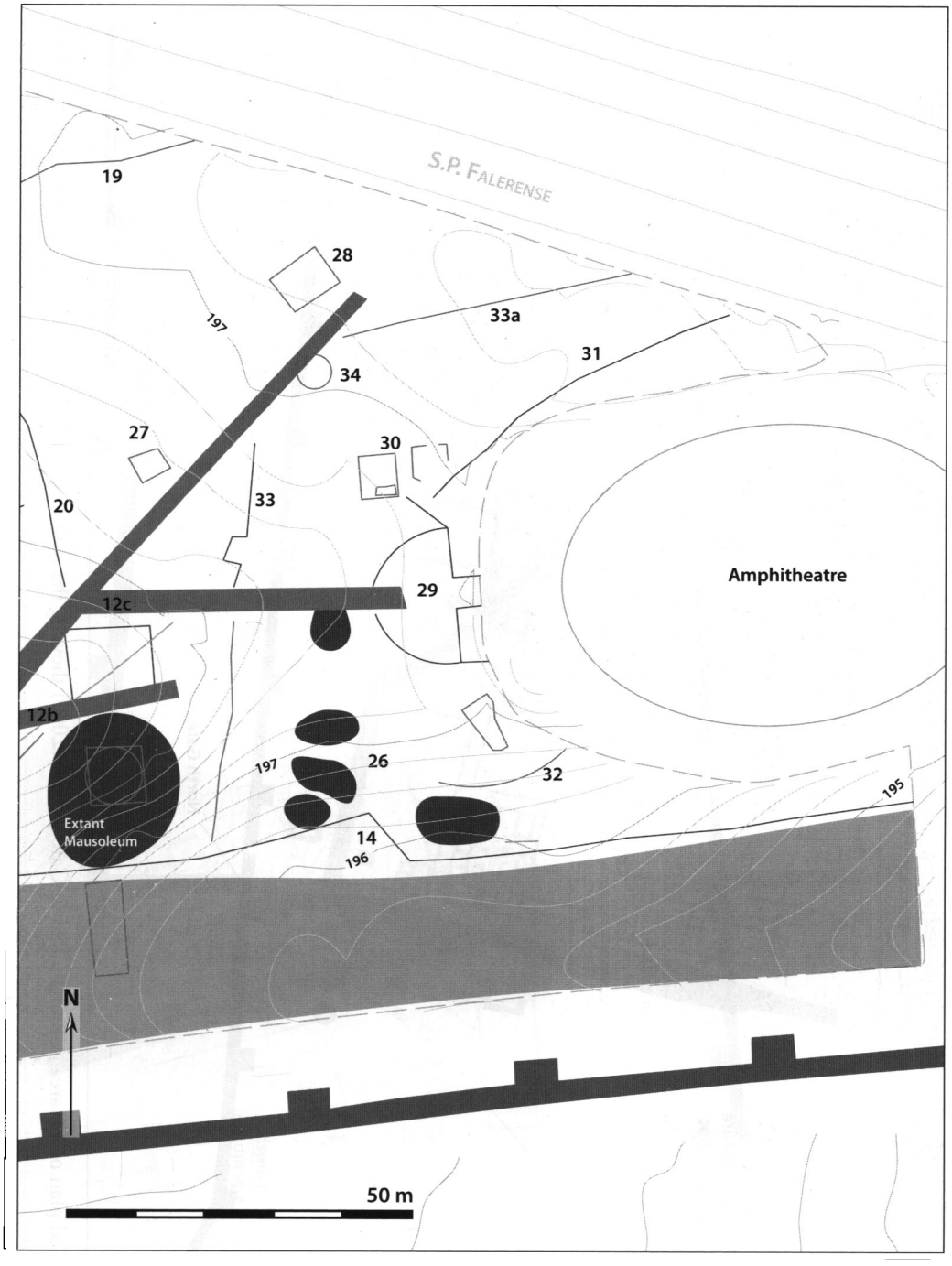

Fig. 15. Interpretation of the magnetometry results from Area 5 (scale 1:1000). For location, see Figure 4.

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FIG. 16. Detailed plan of the area outside the North Gate (scale 1:2000) showing the features recorded on aerial photographs. (*After Scardozzi, 2003: fig. 721.*)

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Fig. 17. Interpretative plan of the area shown in Figure 16 showing the results of the magnetometry survey combined with those of the aerial photographic plots (scale 1:2000).

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FIG. 18. Interpretative plan of the survey area showing the results of the magnetometry survey combined with those of the aerial photographic plots (scale 1:5000).

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in orientation of the magnetometry grids used in the current survey and in that of 1998 has resulted in differential visibility of structures (compare Figures 12–15 with Keay *et al.* (2000) figures 43–6): this clearly illustrates the importance of the well-known point that grids ideally should run across known features at an angle, rather than being parallel with them.

The principal complementary evidence of aerial photography (Fig. 16) relates to the area on the eastern side of the Via Amerina. The structures discussed above (Fig. 13, nos. 15–18, 21) are revealed in greater detail in the plots of the aerial photographs. At the north, feature 21 is shown in greater clarity as one wing of a building with two ranges of rectangular rooms running perpendicular to the street frontage. A second wing to its south flanks the road with a principal structure, almost central, *c.* 17 × 18 m, surrounded on three sides by probable porticoes. The plan, internal divisions and structural elements of features 16 and 17, which form the southern wing of the complex, also are revealed much more clearly. Scardozzi (2003: 401) has interpreted the building nearer the road as an atrium house, with its *fauces* opening onto the Via Amerina. This interpretation is clearly reasonable, but in this context and given its relationship to the structures to the north, one alternatively might suggest that it represents a funerary *schola*. The absence of parallels for such buildings, partly a product of the limited exploration of extramural areas of towns, leaves this as no more than a speculative suggestion. Further to the south the enclosure (15) can be seen to contain a series of smaller structures along its west side. Structures 15 and 16 both apparently had porticoes along the road frontage, with that in front of 16 represented by a colonnade. There is a small rectangular structure blocking the colonnade at its southern end on the corner of the street leading to the amphitheatre. It is also of considerable interest to note that this portico appears to be aligned with the pedestrian gate in the north wall immediately to the east of the main North Gate.

On the western side of the Via Amerina the aerial photographs also provide some additional information, most notably revealing details of apparent funerary structures close to the North Gate, and between the possible hypogeum (Fig. 11, no. 10) and the road — an area now covered by rubble and undergrowth. Finally, because of the quality of the aerial photographs, they provide much clearer evidence of the plans of several of the mausolea that now survive only as overgrown mounds of rubble.

General discussion

by Martin Millett

The developmental sequence

The evidence from the new geophysical survey combined with information from the recently published aerial photographs and previous fieldwork provides important new information both about the overall development of *Falerii Novi* and about individual structures. In the discussion of the previous magnetometry work on the site (Keay *et al.*, 2000: 82–5) we tentatively suggested five stages of evolution of the intramural plan.

A. Layout of the Via Amerina and the street-grid comprising a block of insulae (IV–X, XIX–XXV, XXX–XXXVI and XLI–XLVII) along the east–west axis of the site.
B. Development of a route on a different alignment around the western, northern and eastern sides of the early grid.
C. The probable *capitolium* (Insula I), which occupies the highest point on the site, lies outside the boundary established in the previous phase but presumably must pre-date the construction of the walls. This would suggest that the extension of the street-grid to the west also dates to this phase.
D. Construction of the town walls, which involved cutting through some of the tombs. This necessitated the realignment of part of the Via Amerina and led to the formalization of the intramural road along the north and east sides of the town.
E. Expansion of the street-grid up to the walls in the southern part of the walled area.

Several scholars have questioned aspects of this proposed sequence (McCall, 2007; J. Sewell, pers. comm.; A. Wallace-Hadrill, pers. comm.) although no full alternative has been published. A fuller discussion of the town is planned for another publication (Millett, in preparation), but for the present we may note two particular areas for uncertainty in the sequence: first, whether the walls should be considered primary or secondary (raised by both McCall and Wallace-Hadrill), and, second, the relationship of the probable *capitolium* in Insula I to the sequence of development (noted by both Sewell and Wallace-Hadrill). The results of the current work have some relevance to some of these debates.

The results of the survey of the area to the north of *Falerii Novi* provide clear evidence for the broad organization of the landscape based on the axis defined by the Via Amerina as it runs northwards from the North Gate. The alignment of the road diverges to the east inside the northern part of the town (Keay *et al.*, 2000: 83), then changes direction again as it exits the North Gate to continue on a course *c.* 15° west of north for several miles (Frederiksen and Ward-Perkins, 1957: 108; Scardozzi, 2003: 397, pl. 716). Whatever the reason for the change in its course within the walls, the way in which its route to the north is set at the gate implies that the gate, or a boundary on which the walls lie, must have been in place when the road was laid out, indicating either that the sequence suggested above with the walls post-dating the Via Amerina is wrong, or that the Via Amerina itself was constructed in two different phases, with the stretch to the north of *Falerii* being the later (cf. Frederiksen and Ward-Perkins, 1957: 190–1). Hypothesizing an earlier boundary beneath the walls does nothing to resolve the problem but raises further questions.

However this is resolved, the broad alignment of this stretch of the Via Amerina is reflected in other features of the ancient landscape, although it should be stressed that there is some variation, perhaps 5°, in the exact orientation of these different features. To the west the boundary (2) separating the two extramural quarries (1 and 3), which can be traced further north across the landscape (2a), is aligned similarly, as are the long, narrow fields (7). The course of the aqueduct immediately outside the wall is not quite parallel, running slightly more to the west than the other features. To the east of the Via Amerina the street (12) and a further boundary to the east (20) also share the same axis. The distances between the features do not conform to any standard system of

Roman land division, although, allowing for the inherent imprecision of this type of survey, several of the distances do approximate to round numbers in Roman feet:

Aqueduct – boundary (2)	*c.* 140 m (*c.* 473 Roman feet, perhaps 470)
Boundary (2) – Via Amerina	*c.* 170 m (*c.* 574 Roman feet, perhaps 570)
Via Amerina – side street (12)	*c.* 64 m (*c.* 216 Roman feet, perhaps 220)
Side street (12) – boundary (20)	*c.* 60 m (*c.* 203 Roman feet, perhaps 200).

Major boundaries perpendicular to this axis — 8 to the west of the Via Amerina and 19 to its east — reinforce the impression of landscape organization.

None of these features is aligned sufficiently closely to imply a single period of land allotment; instead, they appear to suggest that land divisions developed after the establishment of the road and were determined by it. However, there is one important indication that the origin of this axis might be earlier in date. Boundary 2, which divides the two quarries outside the walls in the western part of the survey area, survives in an unquarried section, so the present ground surface forms a ramp leading up to the wall. It is aligned in the intramural area with the northwest corner of the road that surrounds the primary street-grid (Fig. 19). Although this may be coincidental, it seems unlikely; in which case the alignment only makes sense if the boundary pre-dates the wall but is later than both the primary street-grid and the road around it. This supports our hypothesis that the grid was earlier than the walls and, given the change of direction of the Via Amerina at the North Gate, it lends weight to the suggestion that this stretch of the road is secondary to that to the south of the city.

However, the early existence of boundary 2 in this sequence also raises the question of how its axis relates to that of the northern stretch of the Via Amerina, which we have shown to be later. We tentatively suggest that the road line was determined by a pre-existing boundary, parallel with 2, and perhaps part of a limited system of land division associated with the primary street-grid. The existence of such a boundary also may have determined the position of the North Gate (somewhat to the east of the axis of the Via Amerina in the southern part of the city), which is otherwise difficult to understand. Once the Via Amerina was established, it determined the organization of most of the rest of the landscape, with the majority of the buildings and other features sharing its alignment. Those with a different alignment may be argued to be later in date. The insula immediately to the east of the Via Amerina, defined by a side road (12), may have been planned as part of the same scheme as the road and walls, since the pedestrian portal seems integral with it. Further to the east, the amphitheatre shares the east–west orientation of the main intramural street-grid, whilst its access road (12c) and the other streets in this area (12a and 12b) clearly post-date the planned layout to their west (12). On the opposite side of the Via Amerina, the boundaries defining a trackway that leads northwest from the North Gate and passes beside the further stretch of the aqueduct (4 and 5) reasonably may be seen as post-Roman.

On this evidence, the organization of the landscape to the north of the walls may be seen as primarily Republican in date, pre-dating the construction of the amphitheatre. We can offer the following tentative overall sequence, bearing in mind that some of the phases may be nearly contemporaneous (Figs 19 and 20):

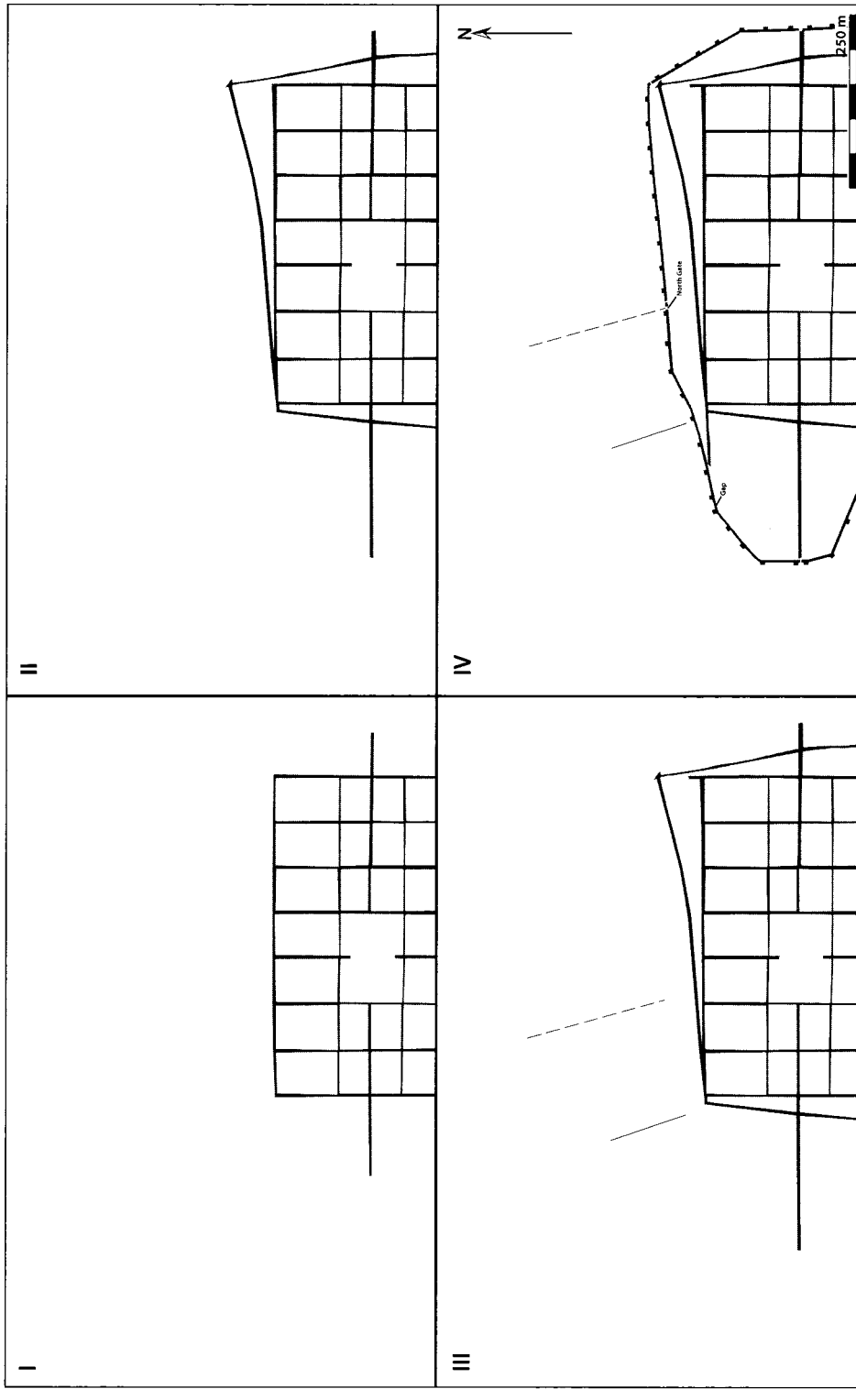

FIG. 19. Schematic plan of the survey area illustrating the phasing of the principal landscape features.

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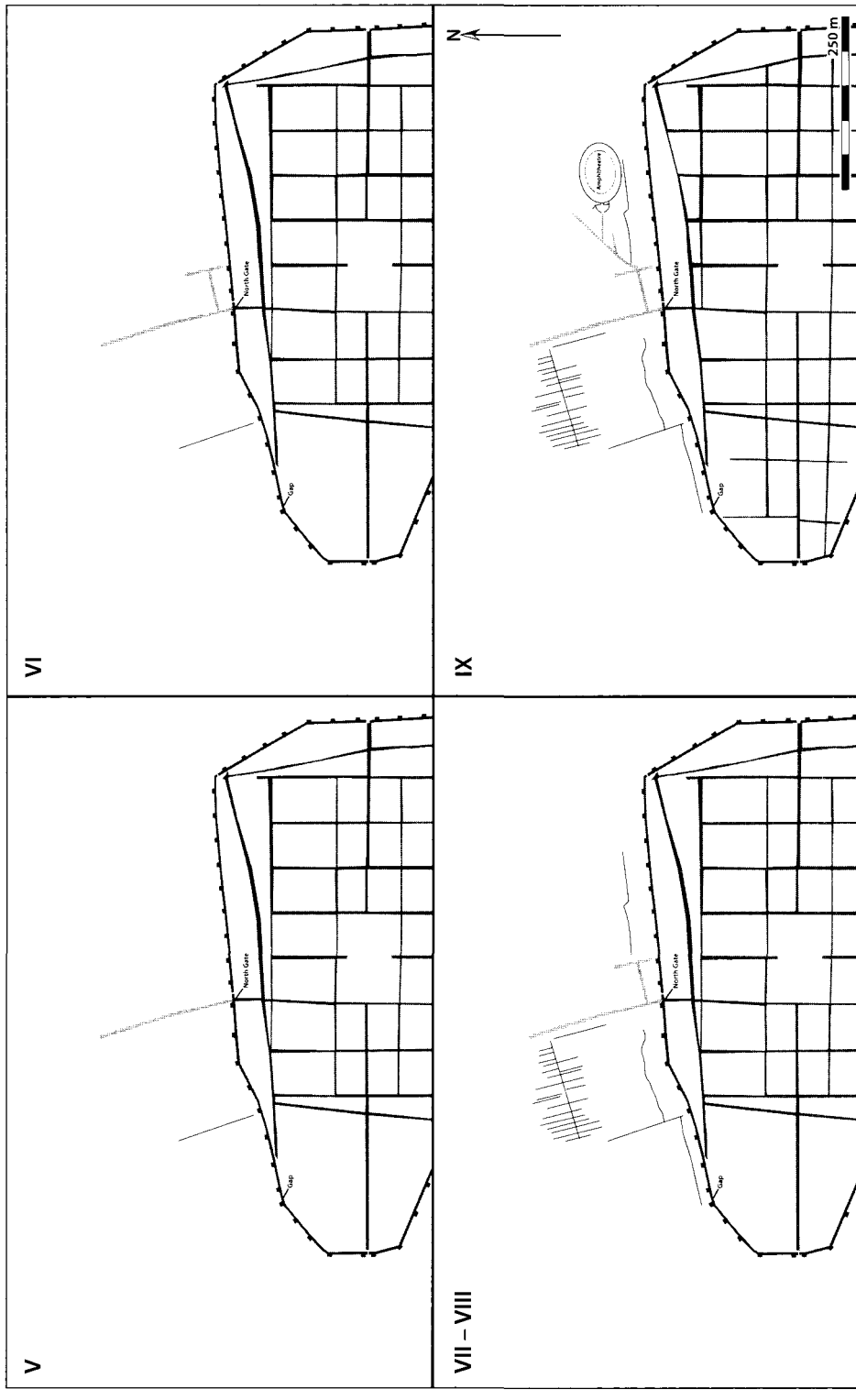

Fig. 20. Schematic plan of the survey area illustrating the phasing of the principal landscape features.

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I. Primary street-grid of the intramural zone.
II. Road around this grid.
III. Boundary (2) and postulated boundary on the line of the Via Amerina.
IV. City walls.
V. Via Amerina.
VI. Roads to the east of the Via Amerina (12).
VII. Lowering of the ground surface outside the walls.
VIII. Quarries (1, 3 and 14) and fields (7).
IX. Amphitheatre.

Other features can be related to this outline sequence only in general terms, with the main landscape boundaries and streets pre-dating the construction of the mausolea, possible hypogea, and buildings. Further definition of the sequence and dating now depends on more analysis of plan typologies, and will need to be refined by future excavation.

Individual structures

The evidence for the individual buildings revealed by the survey is not of sufficient resolution to offer anything more than some general interpretative comments about their character and their planning. The majority of the structures is beside the Via Amerina, and many of these are funerary. Of particular note in terms of the overall planning of the area is the block of structures on the eastern side of the Via Amerina. This layout, defined by tracks in the area immediately outside the walls, is notable for several reasons. Firstly, the width of these insulae is similar to those within the intramural area, although there is no evidence for regular east–west subdivision. Secondly, the planned layout runs right up to the line of the city walls, indicating that the layout must pre-date both the lowering of the ground surface outside the walls and the excavation of the quarry (14) to the east. Finally, the alignment of the portico along the western façade of the buildings facing the Via Amerina, with the pedestrian gate through the city walls just to the east of the main North Gate, indicates that the extramural layout was planned when the walls were constructed, implying that phases IV–VI were nearly contemporaneous and perhaps represent a single planned operation. Whether this was intended originally as a funerary area or for other purposes remains uncertain, although the presence of a series of mausolea of presumed Imperial date illustrates its main function by this period.

The architectural evidence for the mausolea is insufficient to offer any detailed commentary here, largely because most are now entirely overgrown. The majority appears to be either rectangular or cylindrical concrete structures with a variety of different facings. There are two more unusual structures that deserve some comment here. These are the two rock-cut features (10 and 11) tentatively identified as hypogea. The geophysical evidence certainly indicates that both are substantial rectangular features cut into the tufa bedrock and subsequently infilled with material significantly different to that bedrock. They are therefore very similar to the quarries just to the north of the walls, and indeed this may well have been their function, although once the

rock had been extracted they may have had a secondary use for burial. They also share some similarities with the rock-cut cisterns identified at Vignale (Carlucci *et al.*, 2007: 101), although they are considerably larger in size and do not appear to be well placed for water storage. Their location suggests funerary use, but it is difficult to document hypogea in this part of Roman Italy, although examples do occur elsewhere in the Roman West, for instance in Sicily (Wilson, 1990: 140) and at Carmona (in southern Spain) (Trillmich, 1993: Taf. 86). A characteristic that does support the suggestion that they were designed as hypogea is their regularity of plan, a less likely feature of quarries (unless their extent was strictly limited by existing property boundaries). Both also exhibit features apparently cut into the rock-faces, perhaps recesses. Ultimately, however, their interpretation as funerary monuments will remain speculative unless they are excavated.

As noted above, the amphitheatre is oriented east–west, parallel with the intramural street-grid. Its relationship to the roads (12) and related structures to its west, and to the quarry (14) to its south, indicate that it was built after they had been established. Its location in a funerary area is entirely consistent with what is known of other amphitheatres, although recently Katherine Welch (2007) has demonstrated the key relationship between gladiatorial games and military service during the Republic. The *Falerii* amphitheatre was partially cleared by Angelo Sebastianini in the nineteenth century (di Stefano Manzella, 1979: 24, 53), but its date remains uncertain. Jean-Claude Golvin (1988) was ambiguous, favouring an Augustan date in places (pp. 168 and 220) while preferring a Julio-Claudian date elsewhere (p. 217). He provided architectural reasons in support of the earlier date, but mentioned (p. 168) the evidence of a monumental inscription from the western axial entrance to favour a Julio-Claudian date. Although he did not cite a reference number for the inscription, it is clearly *CIL* XI.1 3112, which records a dedication by a *primus pilus* of *Legio IX Hispana*. Di Stefano Manzella (1981: 119) redated this text to the later first century, after AD 89, suggesting significant building work at this period, perhaps renovating an earlier structure.

Although largely overgrown, it is clear that it is partially rock-cut, with the arena below the surrounding ground level and its earth banks revetted with *opus quadratum* blocks in tufa. Its overall dimensions are *c.* 80 × 60 m, with the arena floor measuring *c.* 60 × 45 m. It invites comparison with two other rock-cut, or partially rock-cut, amphitheatres in the region: that at *Sutrium* is closely similar in size and probably dates to the first century BC (Welch, 2007: 246–9), whilst that at *Ocriculum* is also closely similar in size on the basis of our own survey, and probably dates to the earlier first century AD (Golvin, 1988: 166). These parallels suggest that the *Falerii* building is probably of comparable date. The magnetometry survey provides important new information for a semi-elliptical courtyard outside the axial west entrance. The only close parallel for this feature, which here may be accounted for by the need to create access down to the level of the arena, comes from the eastern end of the late first- to early second-century amphitheatre at *Aventicum* (Golvin, 1988: 127, 142, pl. XVI, 4). At *Ocriculum* there are also rock-cut areas outside both entrances to the arena. Their form is less clear because of undergrowth, but seems less elaborate as the practical requirements for access are different, the amphitheatre being cut into the edge of a tufa plateau. Equally, at *Sutrium* the amphitheatre is cut into a slope so there is no step down to the arena.

Conclusions

This survey has provided important information to complement that of the previous intramural survey. Areas outside the walls of Roman towns too often have been neglected, yet the current paper shows how their survey can contribute to a fuller understanding of urban planning as well as to the elucidation of particular building types. The complexity of the landscape revealed by our survey definitely supports its value, although it also points to the need for further work. Some aspects of the site would certainly benefit from targeted small-scale excavation in order to resolve issues of sequence and chronology, as well as to clarify the interpretation of individual buildings. The most notable issue remains the date of the walls, and their relationship to both the initial planned street-grid and the probable *capitolium*. Other issues could be explored with further survey, especially the extent of the land allotment discovered in the present work. The temptation to extrapolate the boundaries we have identified and to approximate the distances between them in order to hypothesize large-scale centuriation certainly should be resisted. Further sound evidence is needed before the character of the system is understood fully. This is definitely a key issue, as the identification of any more extensive system of boundaries associated with a reallocation of the territory of *Falerii* would have far-reaching consequences for our understanding of the status of the town and treatment of the Faliscans by Rome after 241 BC.

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References

Carlucci, C., De Lucia Brolli, M.A., Keay, S., Millett, M. and Strutt, K. (2007) An archaeological survey of the Faliscan settlement at Vignale, *Falerii Veteres* (province of Viterbo). *Papers of the British School at Rome* 75: 39–121.

Coarelli, F. and Patterson, H. (2008) (eds) Mercator Placidissimus: *the Tiber Valley in Antiquity. New Research in the Upper and Middle River Valley*. Rome, Edizioni Quasar.

De Lucia Brolli, M.A. (1995–6) *Falerii Novi*: novità dall'area urbana e dalle necropoli. *Rendiconti della Pontificia Accademia Romana di Archeologia* 68: 21–68.

di Stefano Manzella, I. (1979) *Falerii Novi negli scavi degli anni 1821–30* (*Memorie della Pontificia Accademia Romana di Archeologia* XII, 2). Rome, 'L'Erma' di Bretschneider.

di Stefano Manzella, I. (1981) *Falerii Novi*. *Supplementa Italica* (nuova serie) 1: 101–76.

Downes, S. (2005) Head of an athlete from *Falerii Novi*. *Papers of the British School at Rome* 73: 265–72.

Frederiksen, M.W. and Ward-Perkins, J.B. (1957) The ancient road systems of the central and northern *Ager Faliscus*. (Notes on southern Etruria, 2). *Papers of the British School at Rome* 25: 67–204.

Golvin, J.-C. (1988) *L'amphithéâtre romain: essai sur la théorisation de sa forme et de ses functions* (*Publications du Centre Pierre* 18). Paris, Diffusion de Boccard.

Hay, S., Keay, S. and Millett, M. (forthcoming) *Ocriculum: an Archaeological Survey*.

Hay, S., Keay, S., Millett, M. and Sly, T. (2008) Urban field-survey at Ocriculum (Otricoli, Umbria). In F. Coarelli and H. Patterson (eds), Mercator Placidissimus: *the Tiber Valley in Antiquity. New Research in the Upper and Middle River Valley*: 797–809. Rome, Edizioni Quasar.

Johnson, P., Keay, S. and Millett, M. (2004) Lesser urban sites in the Tiber valley: *Baccanae*, *Forum Cassii* and *Castellum Amerinum*. *Papers of the British School at Rome* 72: 69–99.

Keay, S., Millett, M. and Strutt, K. (2006) An archaeological survey of Capena (La Civitucola, provincia di Roma). *Papers of the British School at Rome* 74: 73–118.

Keay, S., Millett, M., Paroli, L. and Strutt, K. (2005) *Portus: an Archaeological Survey of the Port of Imperial Rome* (*Archaeological Monographs of the British School at Rome* 15). London, British School at Rome.

Keay, S., Millett, M., Poppy, S., Robinson, J., Taylor, J. and Terrenato, N. (2000) *Falerii Novi*: a new survey of the walled area. *Papers of the British School at Rome* 68: 1–94.

Keay, S., Millett, M., Poppy, S., Robinson, J., Taylor, J. and Terrenato, N. (2004) New approaches to Roman urbanism in the Tiber Valley. In H. Patterson (ed.), *Bridging the Tiber. Approaches to Regional Archaeology in the Middle Tiber Valley* (*Archaeological Monographs of the British School at Rome* 13): 223–36. London, British School at Rome.

McCall, W.F. (2007) Falerii Novi *and the Romanisation of Italy During the Mid-Republic*. University of North Carolina at Chapel Hill, Ph.D. thesis.

Millett, M. (2007) Urban topography and social identity in the Tiber Valley. In R. Roth and J. Keller (eds), *Roman by Integration: Dimensions of Group Identity in Material Culture and Text* (*Journal of Roman Archaeology Supplement* 69): 71–82. Portsmouth (RI), Journal of Roman Archaeology.

Opitz, R. (2009a) *Lidar Survey for Archaeology*. University of Cambridge, Ph.D. thesis.

Opitz, R. (2009b) Integrating lidar and geophysical surveys at *Falerii Novi* and *Falerii Veteres* (Viterbo). *Papers of the British School at Rome* 77: 1–27, 335–43.

Patterson, H. (2004) (ed.) *Bridging the Tiber: Approaches to Regional Archaeology in the Middle Tiber Valley* (*Archaeological Monographs of the British School at Rome* 13). London, British School at Rome.

Patterson, H. and Millett, M. (1998) The Tiber Valley Project. *Papers of the British School at Rome* 66: 1–20.

Patterson, H., Di Gennaro, F., Di Giuseppe, H., Fontana, S., Gaffney, V., Harrison, A., Keay, S.J., Millett, M., Rendeli, M., Stoddart, S., Roberts, P. and Witcher, R. (2000) The Tiber Valley Project: the Tiber and Rome through two millennia. *Antiquity* 284: 395–403.

Scardozzi, G. (2003) *Falerii Novi*. In M. Guaitoli (ed.), *Lo sguardo di Icaro. Le collezioni dell'Aerofototeca Nazionale per la conoscenza del territorio*: 394–402. Rome, Campisano Editore.

Trillmich, W. (1993) Carmona. In W. Trillmich, T. Hauschild, M. Blech, N.G. Niemeyer, A. Nünnerich-Asmus and U. Kreilinger (eds), *Hispania Antiqua: Denkmäler der Römerzeit*: 308–11. Mainz, von Zabern.

Welch, K.E. (2007) *The Roman Amphitheatre from its Origins to the Colosseum*. Cambridge, Cambridge University Press.

Wilson, R.J.A. (1990) *Sicily under the Roman Empire*. Warminster, Aris and Phillips.