Chapter 3

The changing face of the eastern Caelian in the 1st–4th centuries AD: work by the Rome Transformed Project

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3.1. Introduction: Rome Transformed

Situating Rome within wider debates on Classical Urbanism is notoriously challenging. It cannot be ignored; the city was the point of reference for a civilization built on urban centres. Rome's resilient power to absorb, adapt and re-present itself underpinned its longevity. Yet while this rightly ensures Rome has a profound significance in discussions of the Classical and Late Antique city, the pulse that sustained the *urbs Roma aeterna* was also very much its own. No urban centre in the Mediterranean world could match its sustained dynamism, and as Purcell (2007) observed in his discussion of the *horti* of peri-urban Rome, the drivers that underpinned its evolution were often particular to the circumstances of the city itself. The European Research Council-funded 'Rome Transformed' Project https://research.ncl.ac.uk/rometrans/ (grant agreement No. 835271, Haynes *et al*. 2020; 2021; 2022) seeks to understand better this dynamism and its implications, through detailed study of a neighbourhood on the periphery of the Late Republican city, outside Rome's *pomerium*, which went on to become the centre of western Christendom for a millennium. The project's focus is on the eastern Caelian, and most particularly, on the eight formative centuries that ran from the Principate of Augustus to the Pontificate of Leo III. This paper concentrates on the first four of those centuries.

Before proceeding, we would argue that the word 'transformation' needs to be reclaimed. In one of the biggest debates in the study of Classical Urbanism, discussion of the 'end' of ancient cities, the term has become baggage laden. For some, notably Ward-Perkins (2005, 4) it is too neutral to apply to what befell Rome and her empire. While for others, amongst them participants in the European Science Foundation's wide ranging 'Transformation of the Roman World Project' (https://brill.com/display/serial/TRW), it seems the best term to cover a raft of

political, economic, religious, and military changes that reshaped society in between the 4th and 8th centuries AD. We see Rome's transformation differently; Rome was repeatedly transforming itself from its earliest days. The form of the city thus understood, while intimately bound up with shifts of power and ideology, is reshaped in terms not only of buildings added and removed, of expansion and of contraction, it is also a transformation in depth: of earth, debris, and subsurface infrastructure, built-up and, sometimes, excavated away. The dynamic remodelling of the city has produced a depth of archaeological deposits which present both remarkable opportunity and profound challenge. Accessing the evidence is one part of the challenge, synthesising and integrating it is another.

A key consideration is, therefore, the ongoing need to develop systems that facilitate analysis in three and four dimensions, visualising not only plans and structural elevations, but also subsurface infrastructure, and the interconnected nature of changes through time. As students of Rome, we are indeed fortunate to work with a rich body of topographical research (Coarelli 1997; 2012; 2014; Steinby 1993–2000), but such research is constrained by the imaging of spaces and structures in two dimensions.

What is true of the historiography of Rome's topography in general is no less true of our area. The research synthesised in Colini's magistral study of the Caelian (1944) and its updates (Pavolini 2006; Consalvi 2009), and further explored by Liverani (1999; 2020), has been augmented by excellent studies of individual monuments and locations (Krautheimer 1937; Colini 1955; Pavolini 1993; Englen 2003; Guidobaldi 2004; Brandt & Guidobaldi 2008; Pavolini & Palazzo 2013; Englen *et al.* 2015), which have also proven essential in our work.

The challenges confronting researchers in the Caelian, as throughout Rome, and indeed in many of the world's great cities, are all linked to the need to work in multiple dimensions simultaneously. Centuries of development mean that elements of earlier buildings have been destroyed or are so deeply buried that their recovery is largely impossible. The same forces have obscured the natural topography to a degree that even the very contours of the hills which shaped the antique city are only very partially known. Yet for those who drove those developments, the locations of pre-existing buildings, together with the underlying contours, will have been of fundamental concern. As with every great city, there are multiple instances in the history of Rome when dramatic programmes of demolition and earth moving changed both the built and natural landscapes out of recognition: building programmes did not emerge in a vacuum. What existed before could be co-opted for symbolism, convenience and often with regards to both. Roads and city walls framed evolving spaces, of course, but less obviously – particularly when viewed through the prism of so many two-dimensional plans – terracing and the installation of water supply and drainage networks played a central and ongoing role in determining what can be developed successfully where. Subsurface engineering lay at the heart of what made many Roman cities distinctive, but its implications are still often underappreciated in much discussion of Roman urbanism.

3.2. Non-intrusive methodologies

With these considerations in mind Rome Transformed has sought to develop a suite of integrated non-intrusive methodologies, many first trialled in the Lateran Project (Haynes *et al.* 2017; 2018; 2019; Piro *et al.* 2020), to allow the changing form of the research area to be modelled. These were developed to allow integration of work above ground with that undertaken in subterranean areas, surrounded by complex exposed archaeology. With some twelve areas of what we call Open Historic Excavations in the Rome Transformed area, most inaccessible to the public, and many requiring special safety measures to enter, this experience proved invaluable. It has also proved essential in advancing research in otherwise undocumented pozzolana quarries. In addition to being of more general archaeological interest, these quarries sometimes reveal further structural evidence.

Data capture consists of four strands: structural archaeology, geophysical survey, archival analysis and borehole survey. For ease of reference, the research area was divided into nine areas, on the basis of structural and functional coherence in property development. To aid readers these area codes are given in parentheses in this paper (Fig. 3.1).

In addition to the depth challenge, a major consideration when undertaking structural analysis of the surviving archaeology is its scale. Amongst other buildings

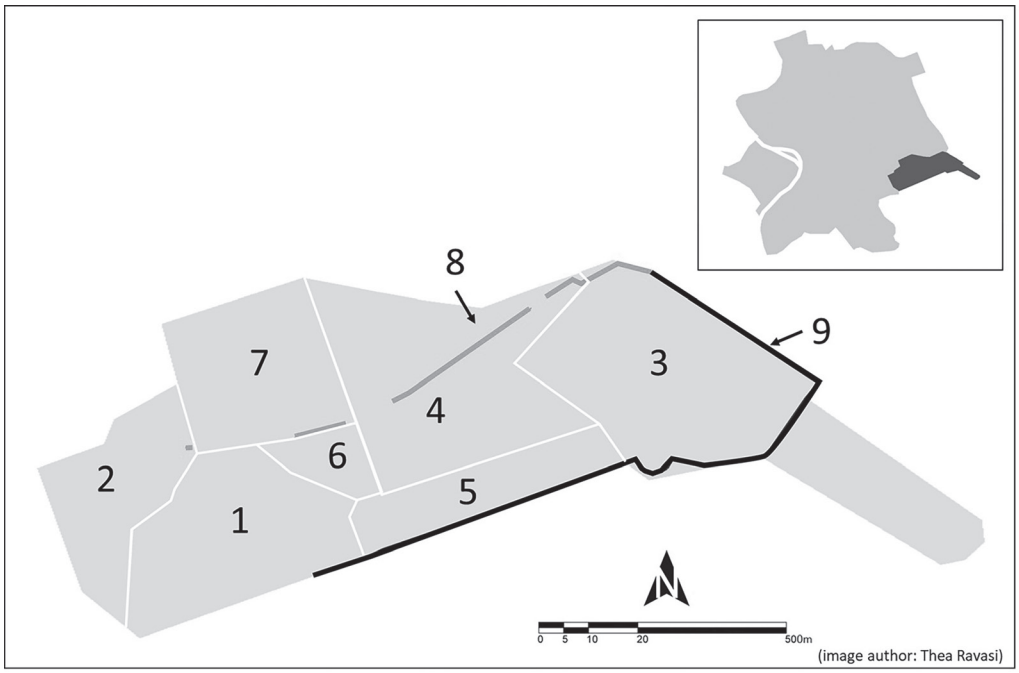

Figure 3.1. Simplified plan of the Rome Transformed research area.

under investigation, for example, are two basilicas (1, 3), an amphitheatre (3), the Varian Circus (3) – the largest circus ever built in Rome – a particularly complex stretch of the Aurelian Wall (9), and extended elements of the Claudio-Neronian aqueduct (8). This, and the commitment of the project to largely non-intrusive approaches, guided the selection of methods used. Mindful of the need to integrate all data within the same geospatial framework, the team generated digital clones through a comprehensive terrestrial laser scanning (TLS) and structure from motion (SfM) photogrammetry programme of all archaeology accessible above and below ground. Above ground, the surviving height of many of the structures necessitated the use of SfM based on UAVs, a complex task particularly in a busy urban area such as Rome. At ground-level and below, comprehensive TLS survey posed its own problems, requiring registration of chains of interlocking scans through often narrow passageways with limited lines of sight. On site before, during and after these surveys, and in the latter case also drawing further insights from the desk-based analysis of the resultant digital models, was the structural analysis itself. Employing the project's standardized recording method, and informed by existing research on these complexes, this took place wherever possible in an integrated fashion alongside colleagues with a research track record at the sites concerned. Thus, for example, work in the S. Croce archaeological area (3) took place alongside an established team, led by Anna De Santis, which had already studied the complex array of buildings found there for over a decade. The overall work programme is also augmented by minimally intrusive testing of key structures. These tests largely focus on the characterisation of mortar, to allow further insight into the comparative dating of major public works.

Thea Ravasi developed the Structural Analysis programme and coordinated the teams working across the project area. Results from the programme have allowed for the development of phased 3D models of each complex, and in the process have driven the reinterpretation of several sites, together with the generation of markedly more accurate plans and elevations than previously available. In some areas, most notably in the area (2) now occupied by the Azienda Ospedaliera San Giovanni - Addolorata, this work exposed fundamental errors in reports published by previous excavators. There it allows the formulation of new hypotheses on the incorporation of private properties in the imperial domain and on their transformations until the 4th century AD (Ravasi *et al.* 2020). Assisting the analytical process by generating digital clones of the archaeology repeatedly proved invaluable in understanding structural transformations, especially in underground spaces where a comprehensive viewing of coeval structures is often made impossible by later interventions. Furthermore, the resulting models will, we believe, open up all these areas to fresh approaches long after Rome Transformed has concluded.

A concurrent programme of geophysical survey was undertaken deploying electrical resistance tomography and ground-penetrating radar, the latter variously deploying 70, 80, 200 and 400 MHz antenna, and on modern road surfaces a multi-frequency, multi-channel towed system. This programme, the largest single

geophysical survey to be undertaken for archaeological purposes in Rome, was conducted by three teams, provided by the British School at Rome, the Consiglio Nazionale delle Ricerche (CNR) and Geostudi Astier. Where appropriate a mixture of geophysical methods was deployed over the same areas.

Clearly the use of archaeological geophysics in urban areas presents multiple challenges. Of these, perhaps the most obvious is the depth of investigation. Radar signal attenuation is inevitably an issue, but the project attempts to mitigate this limitation by the comparative testing of innovative methods of data processing, with the use of multiple GPR antenna arrays, ERT, borehole survey, archival sources and observations from the structural analysis programme. Unmapped modern services and pipes (for example water, electricity, telecoms, sewerage, gas), access routes, and anomalies generated by traffic, bus routes and tramlines, the Metro, and urban furnishings, trees, and plant beds, must all be considered. Complicating matters include the implications of various weather conditions (though this of course applies to most geophysics surveys), gaining access to areas under diverse jurisdictions and owners, electromagnetic disturbance, and the passage of pedestrians and tourists.

In addition to cartographic sources, the histories of individual properties require investigation, together with details of both published and unpublished excavations. Accordingly the archival analysis programme, led by Francesca Carboni (Carboni & D'Ignazio 2023), has drawn on resources from the *Archivio Apostolico Vaticano/ Biblioteca Vaticana,* the *Biblioteca di Archeologia e Storia dell'Arte* at Palazzo Venezia, the *Archivio Storico Capitolino*, the *Archivio di Stato di Roma*, the *Archivio di Documentazione Archeologica* at Palazzo Altemps, the *Archivio Storico e Disegni* of the Sovrintendenza Capitolina and the *Archivio Centrale dello Stato*. An imperative is to source data from *ArcheoSITAR Project* (https://www.archeositarproject.it/) and *Forma Romae* databases (http://www.formaromae.it/), and to ensure that project data can in turn be uploaded into these systems.

The last main source of data is that derived from the project's borehole programme, targeted drilling at sixteen locations across the project area. Location is determined by the need to avoid unnecessary replication of work at areas where such data is already available (for example, that undertaken as part of the Metro C line works), but also by other factors. First, the need to avoid services of any sort, or to drill through highly sensitive areas. Second, selection of sites likely to have better organic preservation. The drilling campaign's main priority is to elucidate the natural topography of the project area, but reconstructing ground cover is of vital importance too. The final major consideration has been to see how data from the borehole campaigns can best enrich, and in turn be informed by, the results of the project's geophysical survey. Here the project draws on pioneering work undertaken at Portus, where the examination of cores alongside the reading of ERT profiles harvested at the same locations enhanced understanding of subsurface deposits (Kay *et al.* 2019). The cores are subjected to geological, micro-botanical and archaeological analysis, and samples submitted for radiocarbon dating.

3.3. Methods of data integration

Data capture is, of course, only the first part of the research process. Rome Transformed has developed a series of systems to enable the integration and synthesis of different data types. These systems consist of three main elements: RT 3D, RT SCIEDOC and the project's own 3D GIS.

Given the, often dramatic, shifts in ancient and Late Antique land surfaces during the period under study, the project team identified the requirement for an enhanced system to model successive landscapes. Early indications were that at least six different Digital Surface Models (DSMs) needed to be generated if the physical transformation of the eastern Caelian was to be understood, and accordingly, a system had to be developed to deliver those models. The result is RT 3D, produced by a project team led by Margherita Azzari and Vincenzo Bologna (Bologna & Azzari 2023). Working from a high-resolution DSM of the contemporary ground surface, the system draws upon an array of source material. Thus, existing geological maps, borehole data (both extracted by the project and from legacy sources), georeferenced historical cartographic data, geophysical data and the height point data recovered from the project's structural analysis programme can all be incorporated. In the latter case, there is a special emphasis on noting the level of ancient road surfaces, thresholds to exterior spaces and, in structures built into hill slopes, the height of windows. These data points then allow DSMs to be generated which can then be incorporated into the project's 3D GIS.

Integral to the project's interdisciplinary approach to the built landscape is RT SCIEDOC (https://rometrans.ncl.ac.uk/rtsciedoc/). The exercise of developing such 3D models has multiple advantages over the long-established practice of generating 2D images. Perhaps the most obvious strength of the approach lies in the fact that it is harder to conceal unresolved aspects of the structural interpretation. While a single angle, or the artistic addition of figures and shadows may obscure important detail in a 2D image, digital models can be viewed from multiple angles and their basic structural integrity tested. But the advantages of such models go beyond this, for their production readily facilitates interdisciplinary collaboration, as colleagues can connect and exchange information in visual form, something that allows greater precision than knowledge of one another's technical vocabularies may otherwise permit. Structural analysis of accessible fabric, archival images, and geophysics results can all feed into the model. In the latter instance the team seeks to progress what are variously termed three-tier visualisations, or full-data set models, based on an integration of geophysics anomaly interpretation with TLS/SFM-aided structural survey.

The risks of misrepresentation inherent in visualising cultural heritage, were set out by those who framed the original London Charter (Beacham *et al.* 2006; Denard 2012). Various responses have evolved, notably that developed by Marc Grellert and his colleagues at Darmstadt Technical University. Their system, SCIEDOC 'Scientific Documentation for Decisions' was conceived to make clear the source material that

each stage of the generation of 'reconstruction' images (http://www.sciedoc.org/). With the generous collaboration of Dr Grellert, colleagues on the Rome Transformed team have developed their own variant, RT SCIEDOC (Haynes *et al.* 2023). RT SCIEDOC seeks to turn the risks of digital visualisation into assets, an approach that starts with the argument that such images should be regarded as arguments, or better still 'provocations'. Rather than suggesting that what is generated is in some sense a digital rebuilding of a past structure, the term provocation is used to solicit a constructive critical response from the viewer. Within the team, and it is hoped continually without, the generation of provocations is seen as essential to weighing evidence openly, justifying claims transparently, and equipping others to join in and develop the discussion more easily. Following a series of internal and open public sessions presenting provocations, the project team move on to completion of technical reports on individual structural reports and subsequently to the population of project's 3D GIS.

Critical to the development of the project's GIS, and with a view to maximising its capacity to address key questions about the transformation of the Caelian, is ensuring that the underpinning system adopted is both capable of managing 3D shape files and yet accessible to as large a range of users as possible. This question of accessibility is, we would argue, too often lost in complex projects where the interrogation of spatial data ends up the province of only a small number of team members. Rather than developing a new system from scratch, it is important to employ one which a wide range of professionals within and beyond the project can use. Accordingly, therefore, the project makes use of ESRI ArcGIS Pro. It has, however, sought to innovate in its use of this package. Alex Turner, geomatician on the project, has emphasised the importance of relating good GIS use to good practice in metadata management (Turner 2023). Metadata is recorded in an easily accessible format and linked to the visual spatial data generated by the project GIS. This ensures that it not only produces something with immediately tangible results, thus motivating team members to deliver on the otherwise unpopular task of detailed metadata management, but also makes a thorough ongoing exploration of data integrity much easier.

Fuller discussion of the efficacy and implications of the harmonised use of these systems of data integration will follow, but key themes when attempting to appreciate the transformation of the southeast Caelian are emerging. Rome Transformed has as a stated aim to consider the role of the area in developing, illuminating, and in many cases promoting and projecting powerfully influential ideas about politics, security, and religion. While these can, and should, be explored in terms of specific architectural forms, the approach of the project is to go beyond this and to integrate architecture, with topography, in a dynamic environment. Our systems therefore aim to situate all these spaces and places within models of movement. Crucially all these themes can also be studied in 3D through simulating movement, the movement of people and animals, of water and of sound. The first theme of these is linked to access, not just in the sense of doorways and roadways, of paths and barriers, but also in terms of walls, heights and hills. A particular aspect here, sometimes archaeologically visible even

when key sections of path or road cannot be readily recovered or observed, is the use of terracing. Also, relevant here is the occupation of space in a way that transforms access, such as the appropriation of areas for burials. Second in the discussion is water. Here again there is a need to go beyond the, undoubtedly important, matter of the course of major water supply infrastructure – aqueducts and sewers – and to look at water holistically. An approach truly informed by hydraulic engineering brings these macro systems, and the micro systems at the level of homes, baths and backyards, not only into contact with one another, but with the wider landscape. Flow modelling systems have a role to play here and adapted to the incomplete nature of the archaeological record, have the further benefit of enabling more refined hypotheses about the use of space than would be otherwise possible. Sound carries too, carrying with it signals about activity and the identity of different parts of the urban fabric. Accordingly, it warrants careful attention. Thus far most of the work undertaken by the project has involved the modelling of sound within buildings, but the project also sees the application of ODEON software for the interrogation of exterior spaces and streetscapes in this landscape of hills and valleys.

3.4. Transforming the eastern Caelian

The eastern Caelian was not a single administrative entity in antiquity. The hill was divided in two separate administrative regions by Augustus (*regio II* to the north and west and *regio V*, the Sessorian, to the East). It became part of the ecclesiastical *regio II* in the 4th century AD (Spera 2013). As noted above, the project seeks to focus in particular on a succession of key episodes in the physical transformation of the eastern Caelian. In broad terms, each episode is selected on the basis of developments which have profound implications both for the general character of the neighbourhood at their time, and for its capacity to illuminate through detailed analysis big themes in the political, military and religious life of the Roman world. The project's point of culmination comes with the transformations that marked the area in the late 8th and early 9th centuries AD, a time when new architectures not only articulated Leo III's synthesis of religious and secular rulership, but also – in the form of his development of the Lateran Palace – inspired the most powerful king of the era, Charlemagne, to emulate his achievement in the building of his own royal residence at Aachen.

This paper will, however, focus on a narrower chronological range. It covers key transformations from the early imperial period through to the 5th century AD, focussing more specifically on the project's own archaeological and geographical contribution to our understanding of these changes. As mentioned, to assist the reader in navigating through the different parts of the eastern Caelian, each location in question will be referred to in relation to the project's area codes (as shown in Fig. 3.1).

From at least the 4th century BC, elements of the eastern Caelian had been given over to cemeteries (Scrinari 1968–69a; La Rocca 1973; Coates-Stephens 2004). By the end of the 1st century BC, areas of high ground were marked by a striking density

of burials. Close study of the tombs on the via Statilia (4), for example, shows how successive funerary monuments were squeezed into the spaces left between their predecessors, all projecting onto the so-called *via Caelemontana*. This is an area where radical changes in ground surface in antiquity is particularly marked, for not only does it account for the standard of preservation of the via Statilia group, but it is also vividly conveyed in the remodelling of the 1st-century AD *columbarium* of Tiberius Claudius Vitalis (4), unearthed in the 1860s (Bergau 1866). The latter lies within the grounds of the Villa Wolkonsky, West of the via Statilia, but it clearly belongs to the same necropolis. Here successive phases of the tomb show how builders had to raise the entry of the building to keep pace with rising ground levels. Such indications are proving invaluable in developing RT3D-generated DSMs for the ancient landscape.

Here we see too the importance of height, not just for the area itself, but for the entire city of Rome. Traces of a Republican underground aqueduct are visible within the excavations at the via Statilia, and these appear, for the short stretch that can be followed, to take much the same line as that subsequently traced by the *Arcus Neroniani* (8). During the imperial period, the eastern Caelian was to emerge as a crucial point in the city's hydraulic system, ultimately seven out of Rome's eleven aqueducts passed through, converging at *ad Spem Veterem*, near the Porta Maggiore. For those with interests in the neighbourhood, this clearly had fundamental implications for the supply and development of an array of activity, but it is important to note that it was not the only way in which water shaped life here.

In the lower-lying land immediately the south of the research area, water represented both an opportunity and a liability. The scale of the opportunity has been made most clear through the archaeological research that has accompanied Metro C works for San Giovanni station. Here the assiduous and sophisticated channelling of water from the Marrana was integral to the development of the *horti*. The advanced horticulture practiced here in the early 1st century AD, evidenced by the discovery of peach pits in the excavations, was enabled by careful hydraulic management (Rea 2011; 2016). As noted below, however, later changes to the area, and in particular the construction of the Aurelian Wall, were to disrupt some of this management and, in time, to create their own problems. Certainly, the course of the waterlogged valley now concealed deep below the raised ground of the gardens on Via Carlo Felice (5), would have discouraged all but the most ambitious, and well-resourced building projects. The project team's own drilling in this area permits a still more nuanced picture of the range and evolution of this water course.

It is within this undulating landscape that we must place the buildings that completed the *horti*, providing facilities for rest, relaxation and hospitality. Surviving traces of these buildings indicate, unsurprisingly perhaps, that high ground was particularly desirable, but more than that, that there was great investment in terracing the slopes. Here then were rooms with views, mere minutes from the *forum* complexes to the northwest, but with a prospect that looked to the south and east. This configuration is particularly noteworthy in the luxurious series of properties that lie today underneath the Lateran Basilica (1). Here, and in sharp contrast to the

later remodelling of this location for the *Castra Nova* (1), the buildings wrap around the slopes of the Caelian, permitting the occupants views out beyond the city to the delicately managed countryside beyond. That this was a significant and ongoing engineering effort is further evidenced by the addition of buttresses within one of the passages within the house here. The passage had been built up against the hillside, and this passage had been in use for some time before buttresses were added; sometime in the first half of the 2nd century AD the whole scheme was then overlain with painted wall plaster. When the passageways were first constructed is difficult to determine, but earlier excavations at the site yielded quantities of decontextualised wall plaster of a calibre and style that stands most direct comparison with imperial properties of Julio-Claudian date elsewhere (Moormann & Mols 1998). This observation, coupled with clear evidence that other walls within the complex were covered in marble up to a height of at least 5 m indicates very luxurious properties indeed, certainly consistent with the quality of imperial palace decoration. This need not indicate that the Lateran property was already part of the imperial *patrimonium*, as elite properties in Rome at this time could clearly be of the very highest quality, but the possibility should not be ruled out.

A short distance from the Lateran Basilica, in the grounds of what is today the *Azienda Ospedaliera San Giovanni – Addolorata* (2), lie the remains of the *Horti* of Domitia Lucilla, an identification affirmed by stamped fistulae (Liverani 2004). This was the childhood home of the future emperor Marcus Aurelius. A far-reaching reappraisal of the original excavations of Santa Maria Scrinari (1995) has enabled the project team to reassess the structural sequence here, which stretches back well before the 2nd century AD. Appropriately, the picture here is of sophisticated terracing and of production: the project research led by Thea Ravasi suggests that a *doliarium* discovered here, which may have been part of the imperial property, remained in use into the 3rd century AD.

The precise configuration of the building(s) that underlie what is today the *Scala Santa* complex (6) will likely never be known, but surviving evidence points strongly to the presence here of another lavish property. Here too terracing provided height and prospect to the house. Access to what would once have been south-facing rooms is possible in the crypt of the *Oratorio dell'Arciconfraternita del Ss.mo Sacramento* (6), where alongside stretches of intact wall plaster, again from the first half of the 2nd century AD, still earlier architectural elements can be observed. Indeed, the team recorded the presence here of a Corinthian capital, dated on stylistic grounds to between the late 1st century BC and early 1st century AD. Ground-penetrating radar survey south of this area (Fig. 3.2), and immediately East of the façade of the Lateran Basilica, may indicate the presence of a further contemporary structure, but these results are still being reviewed in the light of new dating evidence, and core data.

Turning now to the eastern extremities of the project area, it is difficult to characterise what is today the S. Croce archaeological area in the 1st and 2nd centuries AD (3), but new evidence from this area, from both geophysical survey and structural analysis, indicates that the massive building programmes of the

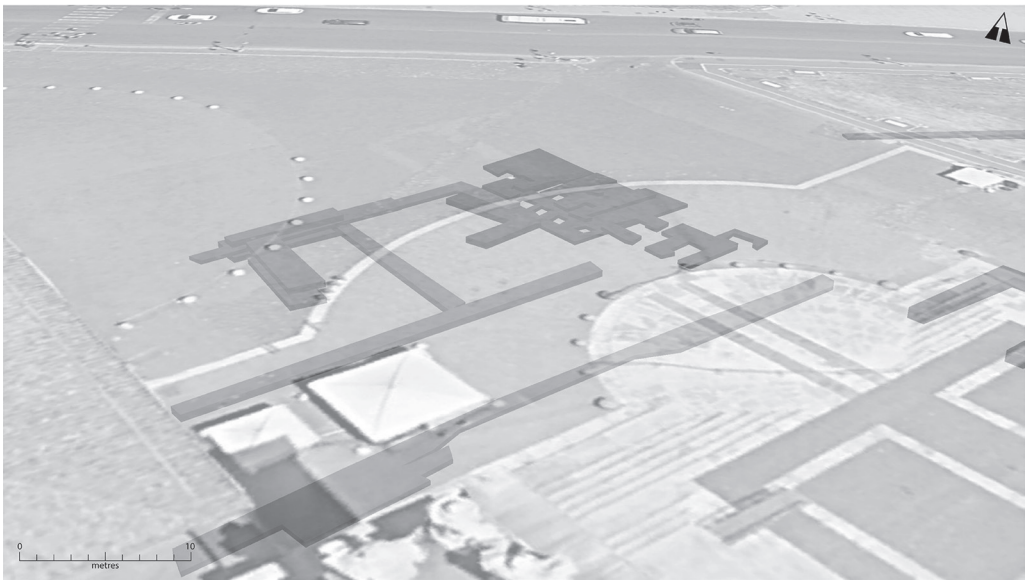

Figure 3.2. Visualisation of anomalies identified adjacent to the Lateran Basilica in Ground Penetrating Radar survey by Salvatore Piro and modelled by Alex Turner.

Severan period led to its wholesale redevelopment. The advantage of large, elevated surfaces, so obviously important in parts of the Caelian already, were to take on a new significance here at the turn of the 2nd–3rd century AD.

Archaeologically, the changes associated with the Severans are very striking indeed. These are most notable in the area beneath the Lateran Basilica (1) (Haynes & Liverani 2020). Thanks to epigraphic evidence (AE 1935, 156; 157) we now know the period in which the *Castra Nova*, the New Fort of the *equites singulares* (the emperor's guard cavalry) was constructed. As its name suggests, the *Castra Nova* was not the first military foundation in the area, and indeed, Lanciani documented the discovery of great hall at nearby Via Tasso (Lanciani 1897, 338), complete with multiple altars dedicated by *equites singulares* stationed at another base (CIL VI 31138–31187), the *Castra Priora* (7) (Buzzetti 1993). The current consensus dates the foundation of the *Castra Priora* to Trajan, but it remains uncertain exactly what area the fort itself occupied. Thus far, work by the project team has yet to identify compelling evidence for the precise location of the *Priora,* and a possibility remains that the fort itself lay further north than Lanciani's site. What we can reasonably say, though, is that the addition of the *Castra Nova* here substantially augmented a strong body of horseguards in the area. The implications of this for daily life in this part of the city, and for other imperial initiatives, warrant careful consideration.

Both the date of the foundation of the *Castra Nova*, in operation by AD 197, and the location also speak to broader themes in the city of Rome and beyond.

First, Septimius Severus presented himself in his coinage as *Restitutor Urbis* (RIC 167, 168): as is increasingly evident, this was more than just rhetoric. Though one particular feature of Rome's urban pulse and dynamism was that successive emperors boasted of their own programmes to 'restore' the city, the scale of Severan work remains remarkably extensive (Lusnia 2014). Reconstruction after substantial fire damage to Rome took place alongside the creation of an array of remarkable monuments. What gets lost in much of the discussion of this work, however, is the timeline. The *Castra Nova* was amongst the first construction projects and must accordingly reflect the emperor's priorities.

The selection of the location of the *Castra Nova* (1), which was to have multiple consequences, also attests to certain priorities. At one level, it lay outside the *pomerium*, respectful in theory of long precedent, but at another, it was extremely close, mere minutes by horseback, from the Senate House and *fora*. But there is surely more to the location than that, for as our modelling of the setting indicates, standing on a purpose-built platform elevated above the higher slopes of the Caelian, the fort dominated the high ground and the approach of anyone entering Rome from the southeast. This is a textbook location for a Roman fort, recalling the tactical strictures in *De Munitionibus Castrorum* (56, 57) on the positioning of campaign bases in hostile territory. When seen in the context of the ongoing use of the *Castra Priora* (7), the likelihood that detachments of guardsmen were present elsewhere within the city (Coulston 2000; Busch 2011), and imperial estates beyond, as at *Ad duos lauros* where many were buried in the *via Labicana* cemetery, the military aspect of this transformation is at once apparent. That the area repurposed at Albano to make way for the *Castra Albana* fortress of the *Legio II Parthica* at the same time was itself previously an imperial property makes this transition still more interesting.

There is a further consideration here, water. Interestingly the Severan enhancement of the Claudio-Neronian aqueduct post-dates by a few years the construction of the *Castra Nova*. This might seem surprising, but in fact it is likely that the hydraulic system could already deliver the volumes of water required without augmentation. The restoration of the aqueduct must therefore be seen in a wider setting, both in terms of Rome's needs, and secondarily perhaps, as something that could then sustain the bath complexes restored or added to the eastern Caelian in the Severan period. Amongst these we must include reference to the building of the bath complex now under the Lateran Baptistery (1), an enterprise team members believe was completed in the reign of Caracalla, but which was ideally suited to serving the *equites*, and the addition of another separate one, a few metres away, but most likely for an entirely separate clientele. Further to the East, other substantial baths were added, notably the so-called 'Baths of Helena', were in operation from this time. Water was also integral to the military/security dynamic of the city. As noted above, seven of the eleven major aqueducts ran through the eastern Caelian. The capacity to cut the supply of water to large parts of Rome will have been apparent to the city's occupants. Indeed, in AD 238 precisely this strategy was deployed by the Praetorians

(SHA *Max. et Balb.* 8.4; Hdn. 7.12.3–7). Though the camp itself lay north of the eastern Caelian, its water supply originated here, at the Porta Maggiore (Evans 1997, 126).

Security and plentiful water are both essential assets for Imperial palaces. The development of the large imperial complex known as *Horti Spei Veteris* (SHA *Heliogab.* 13.5), much of which is now contained within the S. Croce archaeological area (3), must be understood in these contexts (Colini 1955; Colli 1996; Borgia & Colli 1998; Borgia *et al.* 2008a; 2008b; Bottiglieri *et al.* 2016). Our knowledge of the S. Croce complex has benefitted greatly from ongoing collaboration with the established team of researchers working there, and a fuller analysis will be published in due course. It is nevertheless important to note the following themes, all of profound relevance to the study of Roman cities. First, here, on the very outskirts of the city, there is clear evidence for another colossal programme of monumental construction, a programme that once again, as with the Lateran hill, only on a still greater scale, requires a radical elevation and levelling of the ground. Second, this initiative, the creation of what later becomes known as the Sessorian Palace (3), foreshadows an important trajectory in Roman urbanism. Looking particularly at later developments under the Tetrarchy, Dey (2014, 33) has noted the phenomenon of the palatial quarters (for example at Antioch, Thessaloniki, Trier) that are 'veritable "new cities" annexed to the older urban nuclei'. Many of these features (*circus*, reception halls, baths, and porticoes) appear in the Sessorian in the Severan period.

The circus and main reception hall are quite connected, along with its associated and well-preserved amphitheatre, the *Amphitheatrum Castrense*, by a lavishly appointed *porticus*. This connectivity was assuredly part of the original design of early Severan date and represents, therefore, an interesting conceptual step to Dey's 'veritable new city' model, but it also clearly underwent significant change within a few decades. This is most evident in the Varian Circus, the largest monumental circus ever built in Rome. While the circus form was to endure for centuries at other sites around the Roman world, the Varian Circus had a life measured only in decades. Even before the Aurelian Wall cut across its circuit, other buildings had rendered the complex unsuited to chariot racing. A structural analysis team, led by Francesca Carboni from the Rome Transformed team with Laura Bottiglieri, has demonstrated that there was an intermediary structural phase, sandwiched between the construction of the circus and the building of the Wall.

Lest we imagine that this means the impact of the Aurelian Wall on this southeast corner of ancient Rome was therefore somehow less important than it might otherwise appear, it is important to acknowledge that the balance of evidence rather points the other way. The Wall now embraced an area that had previously lain beyond the city's traditional boundaries. Access to some buildings, notably the *Amphitheatrum Castrense* (3), was transformed. While previously its arcades were open on all sides, the construction of the Wall led to their blocking, though the overall form and function of the amphitheatre endured. The same appears to apply to many of the buildings within the S. Croce archaeological area, and if anything, the sense of a 'new city' now walled

to the south and east, and indeed partially to the West, was only further enhanced. An intensification of occupation is suggested by the reuse of the passageways beneath the seating banks of the circus, now repurposed as part of a new structure within the palace complex.

Further West, the construction of what becomes known as the 'Porta Asinaria' (1) provides a new monumentalised and fortified entry point to the city, albeit one still overlooked by the *Castra Nova*. As elsewhere on the Aurelian Wall circuit, the original height is approximately half that of what it later becomes when Honorius reworks the city's defences. Excavation work underneath the Asinaria, conducted by Lucos Cozza (Gatti 1954, 97–104), and further contextualised by survey and borehole drilling by the Rome Transformed team in association with Marianna Franco, demonstrates that the original ground surface and entry portal lay much lower than envisioned by earlier researchers, a realisation that further enhances our appreciation of the monumentality of the entryway from its earliest phase. This observation is of particular interest in the light of Ian Richmond's own observations. Richmond (1930, 245), whose comment 'The world was not to know that its greatest City had become a fortified castle... The essential part of the plan was to build a wall which was strong, but inconspicuous', was perhaps partially influenced in this by his own study of the gate.

Contributing to the ground-level changes here, as elsewhere on the southern edge of the research area, were flood deposits from the Marrana (Capelli 2015; Rea 2016; Liverani & Haynes 2022, 153–154; Figs 3.3 and 3.4). Structural analysis led by Francesca Carboni with Marianna Franco further East along the Wall (5) has

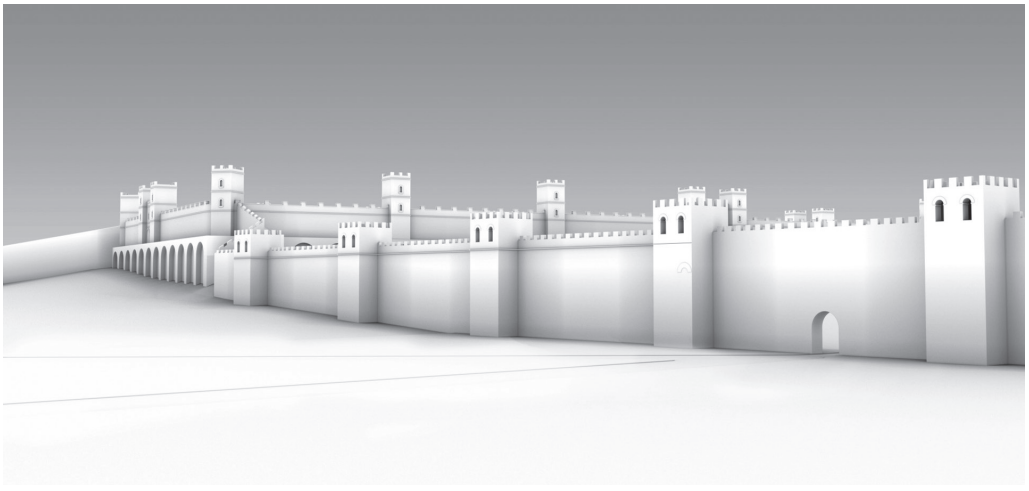

Figure 3.3. Project visualisation ('provocation') showing views into the city looking northwest at the time of the construction of the Aurelian Wall in the AD 270s (Francesca Carboni & Iwan Peverett).

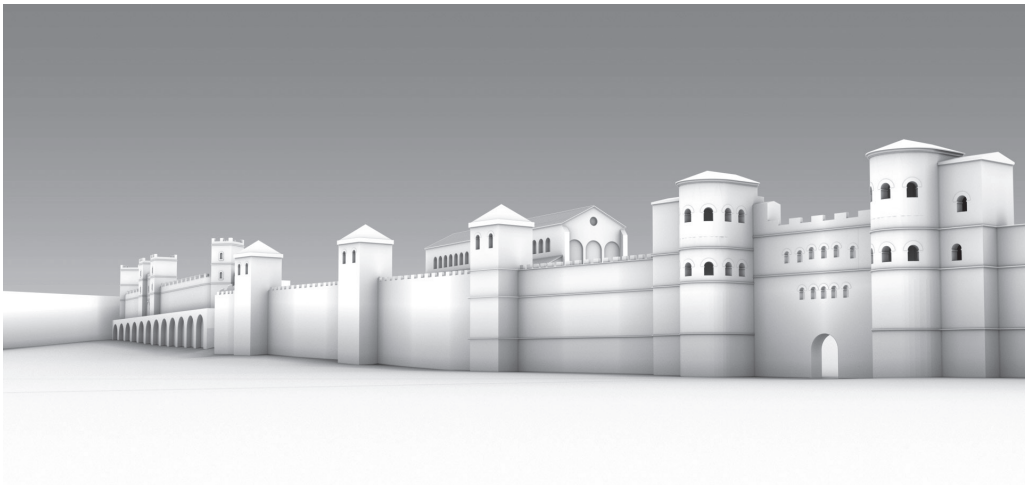

Figure 3.4. Project visualisation ('provocation') showing views into the city looking northwest following the Honorian rebuilding (Francesca Carboni & Iwan Peverett).

demonstrated that the waterlogged and thus unstable nature of the ground between the Porta Asinaria and the S. Croce archaeological area, meant that when Honorian works on the Wall took place, much of the curtain wall had to be replaced from the ground level up.

Returning to the early 4th century AD, however, the next substantive transformation of the eastern Caelian came with Constantine. While the building work associated with this will have been spread over several years, it is not unreasonable to conclude that within days of his victory at Milvian Bridge on October 28, AD 312, Constantine's impact on the area was palpable. The destruction and/or dissolution of the *equites singulares* on that day meant that large areas previously under military occupation, would have become vacant. There is no surviving archaeological evidence for what happened to the base of the *equites singulares* of the *Castra Priora* (7) at this time, but the *Castra Nova* (1) was demolished. As our modelling work makes evident, the Lateran Basilica, consecrated most probably in AD 318, was built over the central range of the fort, dwarfing what were once the largest and most magnificent buildings of the cavalry base. Builders were able to take advantage of the massive platform constructed for the fort, and by adding to it, ensured that the emperor's cathedral, seat of the Pope, towered over those entering the city from the south. A new religious foundation at the heart of Constantine's new model of rulership therefore obliterated, both literally and figuratively, a complex that formerly had exemplified the military strength and vulnerability of his predecessors (Fig. 3.5).

Imagining the world's first cathedral was a major step with far more implications than the standard discussions of repurposing the remarkably adaptable basilica plan would suggest (Bosman *et al.* 2020). Its internal architecture, with its ceremonial

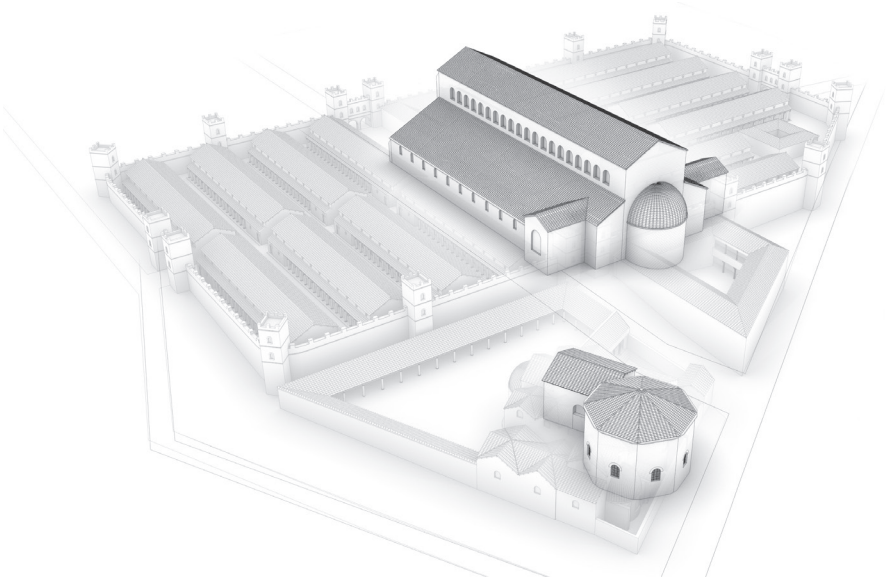

Figure 3.5. Project visualisation ('provocation') showing the Constantinian Basilica's spatial relationship to the Castra Nova *that previously occupied the same site (Iwan Peverett and Ian Haynes, incorporating a visualisation of the Constantinian Basilica developed by Lex Bosman, Paolo Liverani, Iwan Peverett & Ian Haynes, and work on the baths/Baptistery by Thea Ravasi).*

adaptations – a *solea* fencing the route from the entrance, through towards the apse, aligning most likely on the centre of the basilica's ornate *fastigium* and centre altar – marked a new synthesis of procession and audience with a new idea of the divine. Exciting new work by Gianluca Foschi is demonstrating the acoustic force of this architecture. As evolutions in liturgy informed architectural form, so the Lateran Basilica shaped and articulated new ideas about worship. Furthermore, it is also now possible to demonstrate conclusively, thanks to work by Elettra Santucci and Thea Ravasi, that the repurposing of other buildings previously associated with the *Castra* also served the new order. Thus, elements of the water supply system of the baths of the *Castra* were pressed into service for the new baptistery (1), itself an innovative architectural form which was to be widely emulated. In the direct context of the Lateran though, the location was assuredly partly selected to exploit purely local factors, namely the ready availability of good drainage close to the cathedral. Cathedral and baptistery forms were both to play an important role in Roman urbanism from the early 4th century AD onwards. Here in Rome, they served as the nexus of a growing array of religious buildings that were ultimately to manifest themselves in ideas of palatial architecture that would influence guest kings and inspire them in turn.

The Lateran area was not, however, the only site in the research area where the long-term impact of the Severan transformation was to shape 4th-century AD topography. The Sessorian complex (3) endured and was embellished under the

Constantinian dynasty, and the great hall at its centre retains its importance as the Basilica of S. Croce today. Existing features were similarly enhanced and transformed at this time, notably the elaborate bath complex, the Baths of Helena (3), that lay nearby. The presence of baths such as these pose their own questions about the peculiar nature of urbanism in the southeast of the city: who did such extensive baths serve – staff from the Sessorian or a wider public? Further work may hope to resolve this question.

In the following centuries, the Lateran Basilica and, to a lesser but still significant extent, the Basilica of S. Croce, were to remain key foci. Where there was ongoing monumental construction, it coalesced amongst the former. At the Lateran lay the home of the Bishop of Rome, but there were other high-status buildings too, the precise significance of which remains unclear. The remains of a substantial structure now located beneath the INPS building on Via dell'Amba Aradam (1) (Scrinari 1991), has attracted widespread interest on account of its megalographic frescoes, interpreted by McFadden (2013) as a Constantinian image programme, must be understood in its topographical context (Liverani 1993). Further work on the setting and architecture, now being undertaken by project team member Thea Ravasi in association with Simona Morretta (*Soprintendenza Speciale Archeologia Belle Arti e Paesaggio di Roma*), problematises previous interpretations, but also highlights the significance of the structure's setting. This needs to be seen, once more, within a context of hillside terracing on the extremities of the city. Here the elements of the building, notably the main corridor, are of Severan date; the celebrated frescoes added a century later.

Houses of antiquity, such as the *domus* complex excavated beneath the *Ospedale di S. Giovanni* (2) at Corsia Mazzoni (Scrinari 1968–69b) and now substantially reinterpreted by the project team in work led by Thea Ravasi, remained in use into Late Antiquity and beyond (Plate 3.1). Evidence from the Ospedale's Corsia Folchi site, shows how even as the ground floor was raised, spaces were retained; what had been a heated apsidal room at ground level, was retained as an underground chamber. Some buildings were adapted to accommodate the needs of the Christian religious communities now drawn to the area. An important example of an early oratory, with frescoes dating to the second half of the 4th century AD, was also uncovered in the hospital's grounds, a mere 80 m West of the Corsia Mazzoni *domus*. It remains the focus of a major Italian-Japanese research project (Cerrito & Yamada 2019).

This intensity of ecclesiastical activity coalescing around a cathedral building was, as is well known, to be repeated at many major urban centres in the Roman world. The Lateran operated as a point of reference for those other centres in Italy and across much of the empire, not of course in a simple aping of form, but undoubtedly as exemplars for new uses of architecture and rite. That is, however, another story, and rather than plot its ongoing evolution here, we direct readers to further publications by the Rome Transformed team.

3.5. Conclusions

In addition to arguing that advances in digital technologies can facilitate step changes in how we visualise and debate the dynamics of Roman urbanism, we would suggest that the experience of Rome Transformed offers some other general lessons. At a generalised level, the ebb and flow of development in the eastern Caelian accords with the well-attested phenomenon of the 'fringe belt', a dynamic area as integral to the story of large cites as any of other aspect of the panoply of urban infrastructure (Liverani & Haynes 2022). The applicability of the 'fringe belt' concept to Rome more generally has already been explored by Mandich (2015; 2019). More specifically, though, we can see in this area the playing out of what are clearly key themes in evolution of the Roman empire's cities, notably in the nuanced adaptation of sophisticated engineering strategies, here deployed on monumental scale, to landscape transformation. Without its hydraulic engineers, without its terraces, without its concrete substructures, the city could never have undergone the pattern of transformation it did. This has multiple implications of course, and opens areas for new experimentation such as, for example, the palatial complex of the Sessorian, the design of which arguably pioneers its own model of urbanistic enclave. By the late 3rd century AD, the eastern Caelian has acquired – within wider Rome – what has become an essential urban characteristic, an enclosing wall, and, in the course of time, this is adapted to situate the pomp and procession of Late Antique ceremonial. The capacity of ecclesiastical centres to generate new forms of growth is also a dominant theme emulated across much of the empire, fostering a new kind of urban life, as the pulse of Classical cities weakened.

There are also features that are more particular to Rome. As has been argued, the Severan transformation plays a key role in the longer-term evolution of the area, and while the fundamental role of the military in this may seem at a variance with general trends in Italian urbanism under the empire, it connected with currents elsewhere, notably urban development on the Danubian frontiers, and with the particularities of Rome itself. At one level, seen especially from the perspective of changes in land ownership, it can be seen as a successor to a process specific to the power play of the City of Rome's peripheries from the Principate onwards. The uniquely dynamic nature of Rome's *horti* is intimately linked to Roman power politics, as places where wealth might be displayed and influence pedalled. In such an environment, it is scarcely surprising that sometimes through inheritance, and sometimes through outright brutality, successive imperial proprietors and agents acquired steadily more land requiring, and facilitating, a new environment open to new forms of development.

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