

Iron Age Settlement Patterns and the Urbanism of Roman Britain

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Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

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Abstract

The expansion of Rome into Western Europe and the creation of urban settlements with distinct Roman features and relatively high occupation densities has led to an expectation that towns in Roman Britain with the same features, such as a forum and a fortification wall, would have been behaving in the same way. A recent analysis of the Roman town of Silchester, undertaken by Scott Ortman and Jack Hanson has shown that for this to be the case, the surveys of that settlement must be missing a substantial number of buildings. This would have considerable implications if it applies to all towns in Roman Britain (Ortman and Hanson 2022).

An alternative interpretation is that towns in Roman Britain may have had a different residential spatial format compared to those in Continental Europe. This thesis considers what that alternative may have been. The analysis investigates the relationship between Roman urban form and the settlement practices of the local, British people to assess whether features of the preceding, lower density '*oppidum*' occupation pattern persisted in the behaviour of the towns of Roman Britain. An example of this can be seen by looking at the blocks within the towns in Britain which are not as densely filled with built structures as those in Continental towns.

The study assesses built-area density gradients within the towns and *vici* for which spatial data is available and the regional trends in the aggregate built-area densities of the settlements. The internal density gradients of the towns appear to be quite consistent, with low density occupation at the periphery. In the comparison of the aggregate densities for all the settlements there appears to be two density trends, one from higher to lower density with increasing settlement size and another which may be the reverse, perhaps suggesting that there was an '*oppidum*' pattern of occupation intermixed within the Roman urban framework. Several alternative models will be outlined along with a brief comment on their implications. Detailed remote sensing and sampling excavation will be needed to assess the alternatives to identify whether a) several buildings have not been identified or b) whether occupation within the towns of Roman Britain was sparser than has been envisaged.

Key words - *Iron Age, Europe, Oppida, Roman Britain, settlement size, spatial behaviour, occupation density, urbanism*

Preface

The development of this thesis has been a bit convoluted. Initially, it was my goal to provide an overview of the current debates around the spatial organisation of urban settlements in Roman Britain. The thesis was intended to be a literature analysis which would provide an overview of the current debates about urbanism in Continental Europe and Britain in the Iron Age and Roman periods. The aim was to develop a perspective on the apparently lower density of occupation in Roman towns in Britain from an initial observation that they resembled the patchy or sparse occupation pattern of the Iron Age *oppida*.

However, quite recently I became aware through my supervisor, Roland Fletcher, that Scott Ortman and Jack Hanson had carried out a detailed, quantified analysis of private built space in Silchester and had proposed that the recorded buildings were only a small proportion of the original private buildings in the town. We concluded that I would need to incorporate a basic numerical density analysis into my thesis in order to engage the proposition which I was making, that Roman towns in Britain may have been operating on a lower-density *oppida* pattern of occupation - with the implications of the new quantified analysis of Silchester which suggested that a Roman town in Britain had actually been more densely occupied but many of the buildings were not readily visible. As I was doing an MA thesis, and was not going to do any fieldwork, due to the pandemic, and could not, in any case, empirically test the Silchester proposal, the appropriate research path was to study the visible built space of a selection of Roman settlements in Britain to see if there was any pattern to their visible occupation densities. The result is this thesis in which I present the data and comment on the alternative interpretations of those patterns and on their implications.

Chapter 1 – Towns in Roman Britain: opinions and issues

1.1 Introduction

The internal organisation of Roman towns in Britain differed from the usual model seen in other areas of the Roman Empire. While there were substantial elements of Roman urbanism present in those towns, the spatial organisation of the whole settlement appears to have had more in common with the lower density occupation patterns of the larger Iron Age British settlements (*oppida*). The open/unbuilt space that has been identified within Roman towns in Britain may suggest a continuation of localised patterns of settlement spatiality and organisation. Because Roman towns are considered by convention indisputably urban, it is not within the aims of this thesis to define what urbanism is or is not but rather to investigate patterns of occupation density within a variety of different settlement forms. The debate about whether or not the *oppida* were 'urban' is also not pertinent to the analysis in this thesis.

1.2 Context

Before the Romans began to impose their own settlement forms in the late 1st millennium BCE, the settled landscape of Continental Europe was complex and sophisticated in terms of its own settlement practices. One of the first large scale Iron Age settlement forms which developed in Continental Europe between the 6th and 5th centuries BCE north of the Alps were the *Furstensitze* (Figures 1.1, 1.2) (Fernández-Götz 2018, 117-149). These settlements were operational during the Hallstatt cultural period which spanned most of central and northern Europe (Figure 1.1) and took its name from the lakeside village of the same name, located south-east of Salzburg in Austria. These settlements were fortified, could be situated on prominent hilltop locations, and saw the intensification of smithing workshops, in which gold, silver and bronze were worked. The *Furstensitze* were also characterised by elite residences, rich burials, and other economic and social institutions (Cartwright 2021; Fernández-Götz 2018, 117-149). The formation of these settlements was associated with changing conditions and processes that emerged towards the end of the Hallstatt period such as improvements in farming, metal working, increased trade links, especially with the Mediterranean and increased social hierarchies (Cartwright 2021; Muller 2016) (Figure 1.4).



Figure 1.1: Main settlements/central places north of the Alps and Mediterranean Europe in the 6th and 5th centuries BCE, Fernández-Götz 2018

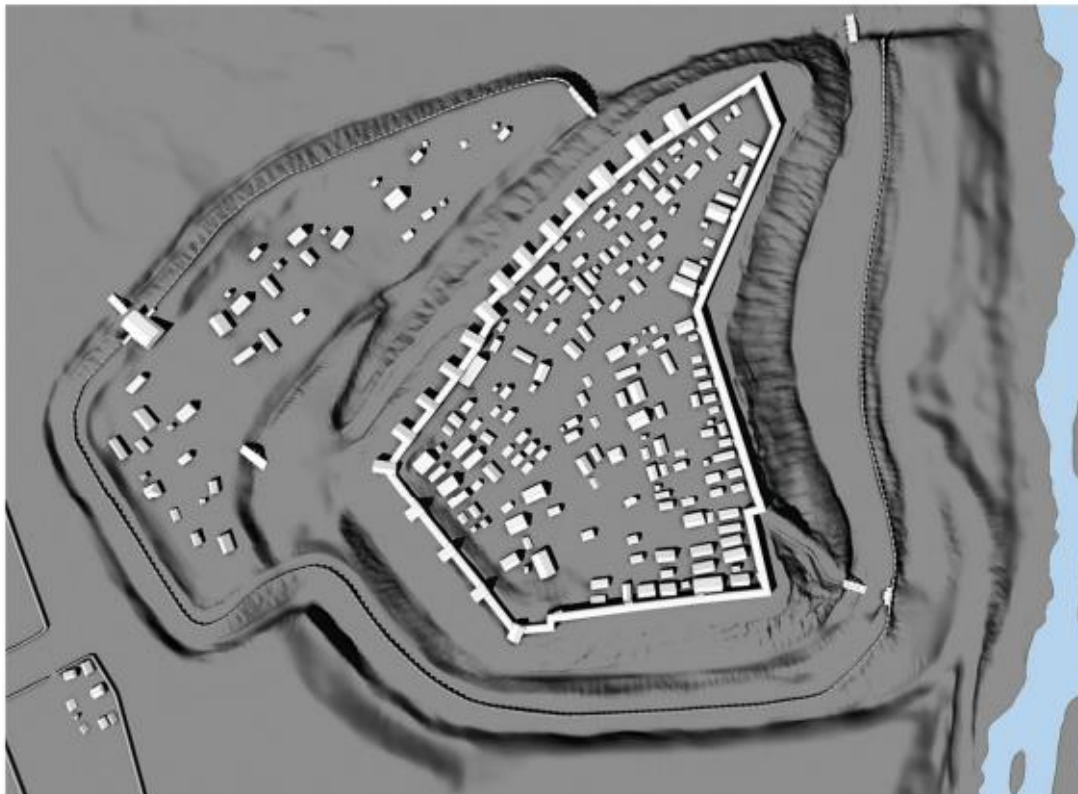


Figure 1.2: Plan of Heuneburg hilltop settlement, Fernández-Götz 2018

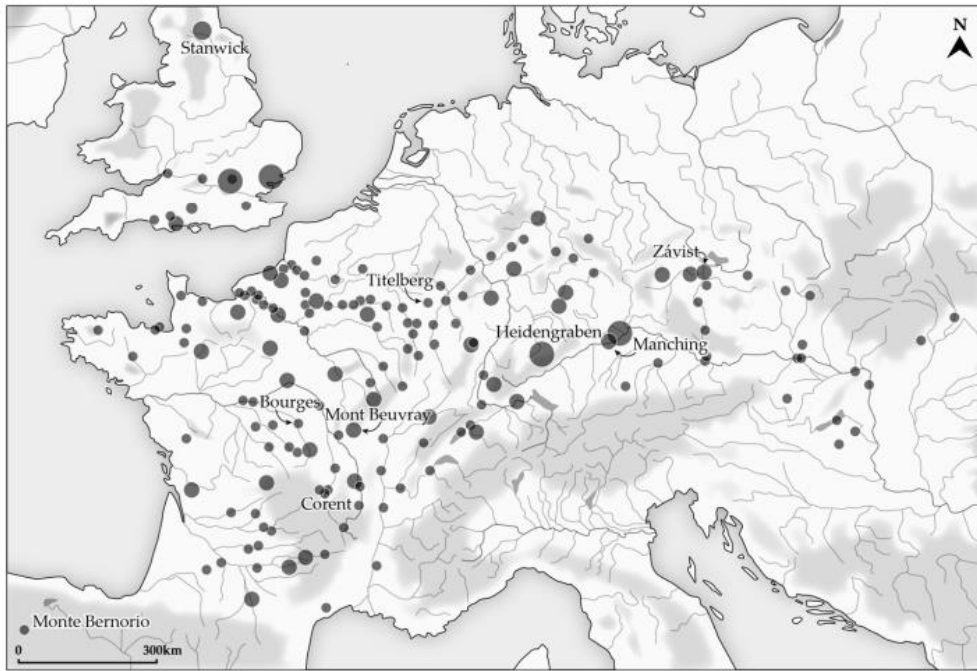


Figure 1.3: Distribution of fortified *oppida*, second-first centuries BCE, Fernández-Götz 2018

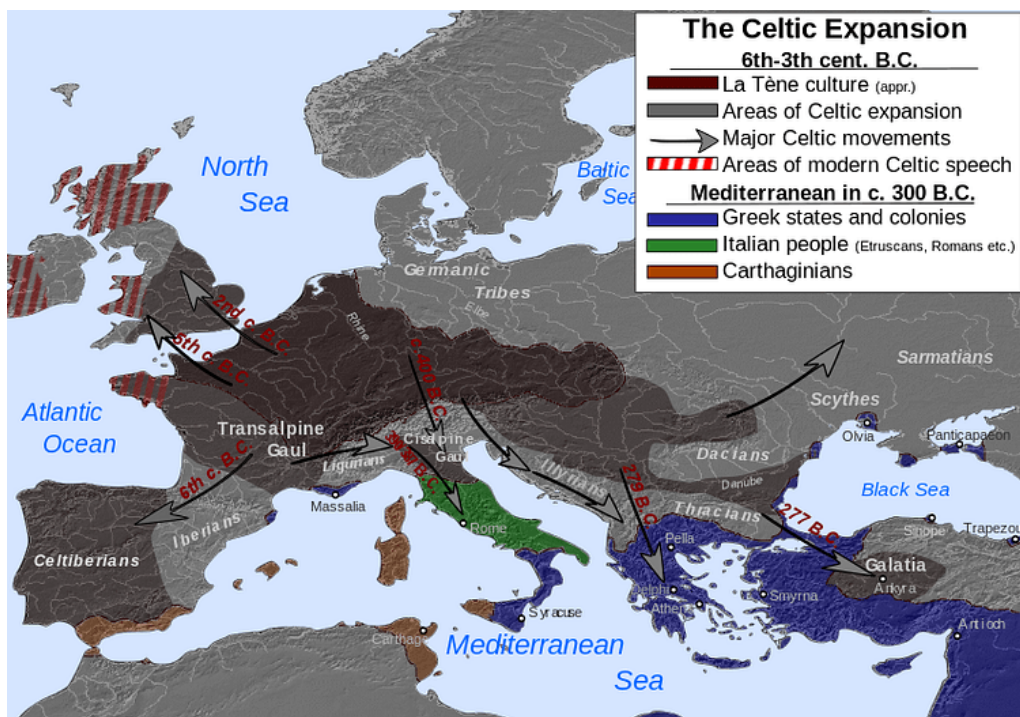


Figure 1.4: Celtic Expansion 6th-3rd centuries BCE, Alexikoua 2016

The end of the Hallstatt saw increasing levels of decentralisation of settlements and the beginning of the La Tène cultural tradition, developing in Gaul, where people began living in much more open, unfortified, and lower density sites. The hillforts as a settlement form continued and somewhere between the 4th and 3rd centuries BCE the *oppida* emerged (Figures 1.3, 1.5, 1.6) (Fernández-Götz 2018, 117-149).

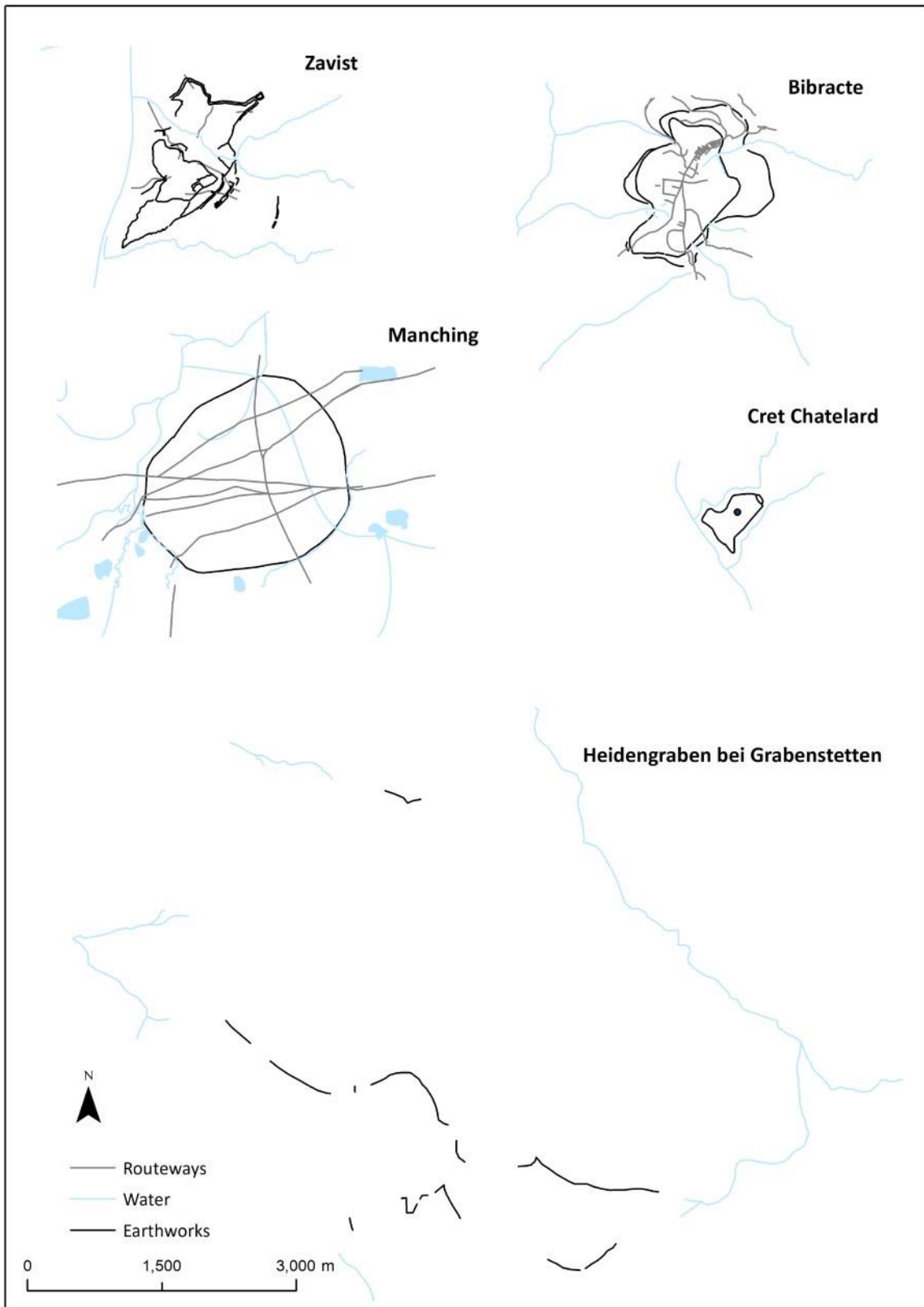


Figure 1.5: Some Continental European *oppida*, White 2022

During the late Iron Age, Britain was also home to a wide array of settlement forms. On the smaller end of the spectrum were the small, nucleated farmsteads and villages (Cunliffe 2005, 248). One size up from these were the hillforts (Cunliffe 2005). These are presumed to have represented localised centres of authority that often exercised influence over the surrounding landscape (Cunliffe 2005, 347-406). The largest sites in Britain were sprawling complexes known as territorial *oppida* and polyfocal complexes (Moore 2012, 2017) (Figure 1.6). Due to their political, economic, and social influence, they were highly effective in the organisation of late Iron Age Britain as well as in the early Roman period (Moore 2017, 402-414). Continental Europe had an impact on settlement trajectories as well with evidence suggesting cross cultural interaction between ethnic groups from both sides of the channel, especially Belgic and La Tene cultural practices, many of which have been uncovered in the *oppidum* of Calleva Atrebatum (Silchester) (Fulford 2021).

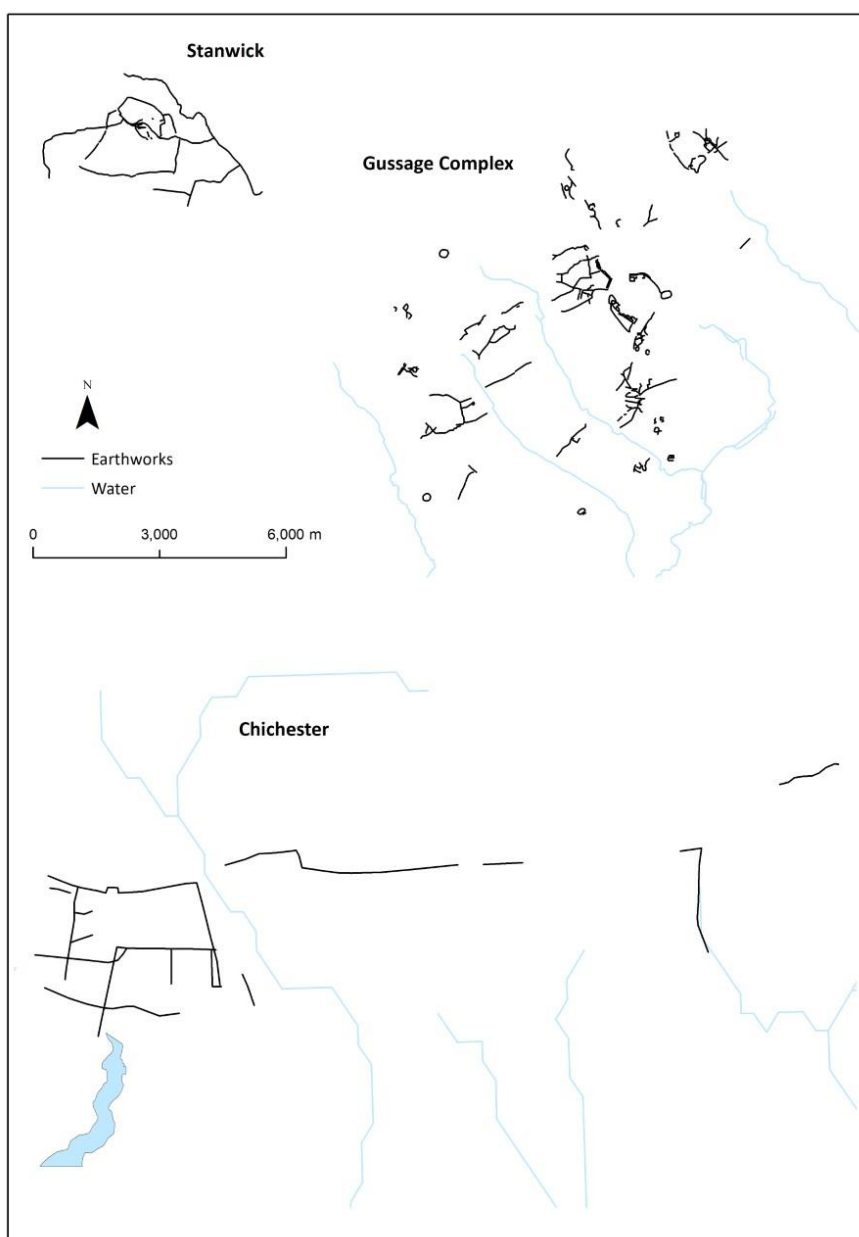


Figure 1.6: Some British *oppida*, White 2022

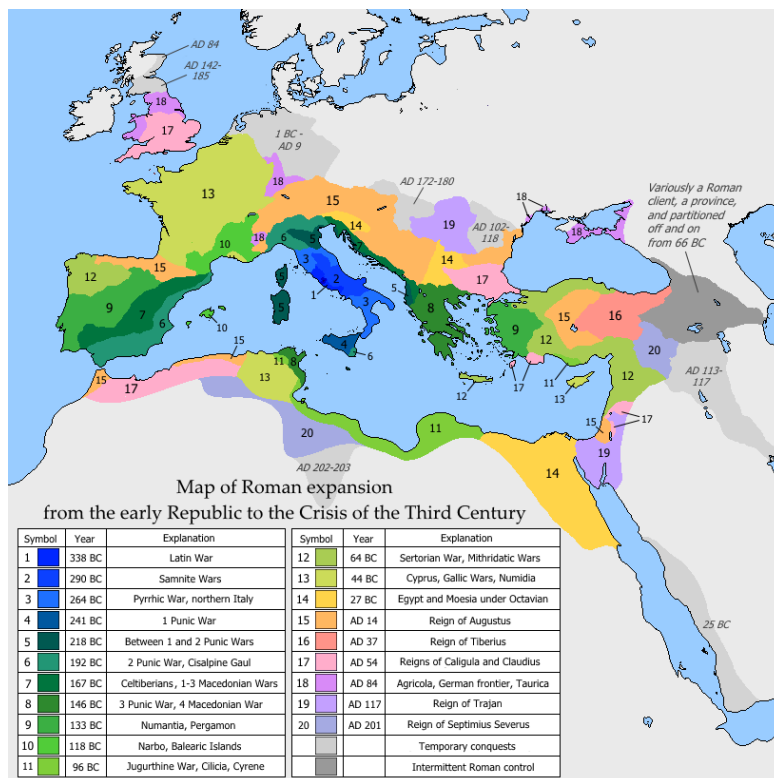


Figure 1.7: Roman expansion from the early Republic to the third century CE, Jasiński n.d.

1.3 The Roman Expansion

The Roman presence in north-western Europe began with the expansion into Gaul, modern day France, beginning in the 2nd century BCE. The process of the consolidation of Roman power in these regions followed a common pattern (Figure 1.7). The north-western provinces of Gaul and Germania were divided into a number of *civitates* or tribal territories, each with their own administrative capital (Pellegrino 2020, 51-74, 123- 171). Differing kinds of *civitates* existed that gave a tribe or groups of tribes, particular rights and privileges based on their standing with Rome. By separating each of these regions into governable areas, the *civitates* ensured administrative and economic stability within those regions (Pellegrino 2020, 123-171). The tribal communities in Temperate Europe were organised more in line with larger 'tribal states' in comparison with the Mediterranean where the territorial areas were significantly smaller and based around the polis (Pellegrino 2020, 51-74).

While the Romans had operated out of southern Gaul, particularly from the city port of Massalia since the mid-2nd century BCE, the rest of Gaul was still independent at this time. The first territorial expansion of Rome into the north-west was in 122 BCE in order to protect the Mediterranean settlements on the coast that were being threatened by Gallic tribes such as the Allobroges (Pellegrino 2020, 51-74). Several other major expeditions were launched over the next century but in that time, much of Gaul remained predominately independent. This changed in 58 BCE when Julius Caesar who was governor of Cisalpine and Transalpine Gaul decided to conquer the Gallic tribes and integrate them into the Roman sphere of influence (Pellegrino 2020, 123-171). One of the better-known events of the Gallic

Wars was the battle of Alesia in 52 BCE which marked the defeat of the Gallic leader Vercingetorix and his armies by Julius Caesar. As a result of this battle, Caesar was able to seize the *oppidum* of Alesia, paving the way for its conversion into a Roman town, a practice that the Romans employed many times both during and after the Gallic Wars (McMahon 2015, 11-20).

The first attempt by Rome to embark on a military conquest of Britain was during the 50s BCE under Julius Caesar. The first in 55 BCE and then the second a year later in 54 BCE. They were mildly successful in that they ensured that several of the tribes in the southern part of Britain became client kingdoms of the Romans (Pellegrino 2020, 123-171). When the Roman Empire invaded Britain in AD 43 they cemented their foothold. Their success in consolidating territory was due in part to the alliances offered to them by the local British elite, many of whom considered the arrival of Rome to be advantageous to themselves and their communities (Todd 2004). Adminius, son of Cunobelin, leader of the Catuvellaunian tribe of southern Britain was one such member of the local elite to welcome the Romans into Britain (Figure 1.8)

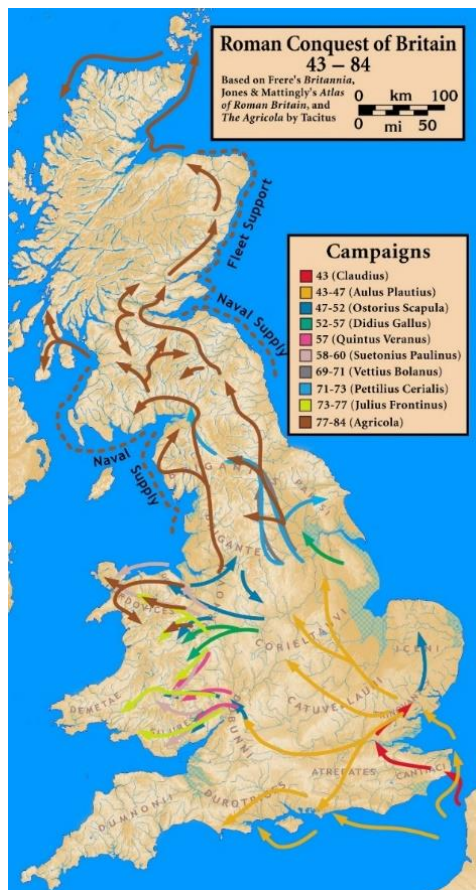


Figure 1.8: Roman conquests of Britain including the tribal territories/client kingdoms of the British, https://en.wikipedia.org/wiki/Roman_conquest_of_Britain.

The army had perhaps the most impact in the initial process of Romanisation following the Roman conquest of Britain. As they moved westward and northward, they built a series of forts and fortresses which ensured that both the immediate territory was able to be controlled by the Roman authorities but also as a reminder to the local population that the

Romans held power in that region (Todd 2004). The erection of these military installations also acted as a deterrent for rebellion (Todd 2004, 42-59).

1.4 Roman Settlement Form

Within the regions of Britain which were brought under Roman control, a variety of settlement forms were established ranging from towns up to 80-90 hectares in extent, to small settlements covering only a few hectares called *vici* next to or in the vicinity of military forts/fortresses. The Roman administration implemented settlement practices that conformed to a set organisation and which gave the appearance of transforming the way in which local settlements operated. The kind of structures expected to be seen would be a forum, bathhouses, temples, defined street-grids, *insulae*, *tabernae* (shops), *macella* (markets) and perhaps an amphitheatre. Towns also tended to have a surrounding wall though these were often built sometime after the towns were established (Figure 1.9, 1.10) (Sewell 2014, 7554-7567). Towns in Continental Europe and the Mediterranean also tended to be of a higher occupation density. Sites such as Pompeii (Figure 1.9) were particularly dense and operated at a highly interconnected level. The social and economic processes were inextricably linked at both the level of individual buildings all the way up to settlement wide processes (Cornell and Lomas 1995, 185-201).



Figure 1.9: Reconstruction of the Roman town of Pompeii, Van De Ven 2015



Figure 1.10: Reconstruction of Silchester from University of Reading, Bird 2019

In Britain by contrast, towns whose total surface area can be mapped, such as Silchester (Figure 1.10), one of the *civitas capitals*, apparently displayed much more open space both within the *insulae* and next to the walls.

One way in which the Romans succeeded in occupying Britain was through the establishment of the *civitas capitals* - 'tribal capitals'. The reason they were successful for the four centuries of Roman occupation is because they gave the local population a role in self-governing themselves and for forming local government. A practice that had been utilised for a long time in Gaul, the Romans built these centres in areas that held significance for the local population. The *civitas capitals*, according to Rogers, appear in many cases to have been planned from the onset (Rogers 2014, 741-776). That is not to say that they did not embark on new building programmes over their history but the decision to do so was preceded by a plan. It seems that the *civitas capitals* while providing a modicum of autonomy to the local tribal elite, still remained largely modelled on Rome in terms of the infrastructure (roads, *insulae*, bathhouses, amphitheatres etc.) (Rogers 2014, 741-776; White, and Barker 1998, 79-83).

One of the best-known examples of a *civitas capital* was Verulamium. As mentioned previously, this settlement began as an Iron Age *oppidum* under the Catuvellaunian leader Adminius, son of Cunobelin. While it is possible that Adminius could have been the leader of Verulamium, associated coinage points more towards him being leader of Canterbury. In the years that followed the establishment of a Roman fort on the river Ver, the settlement became a *civitas capital* before its eventual status as a *municipium* (Todd 2004, 28, 63-64) (Figures 1.11, 1.12).

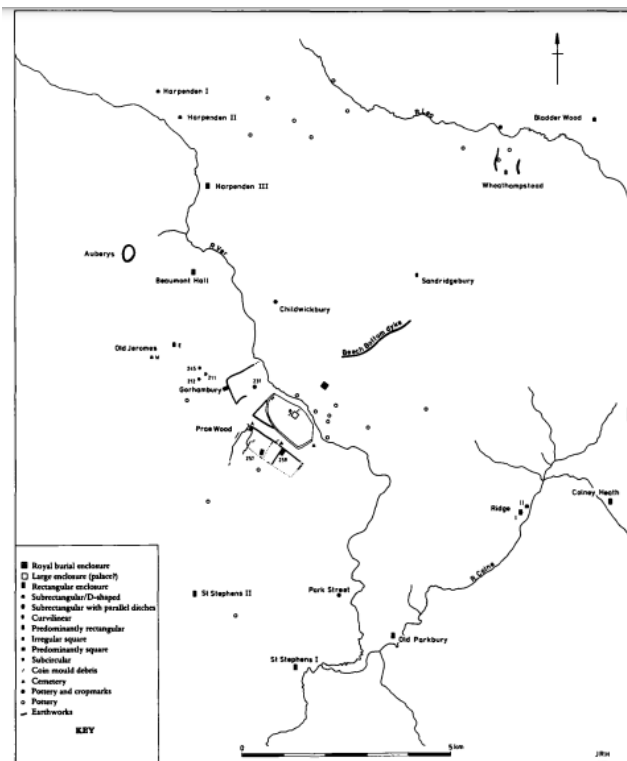


Figure 1.11: Verlamion *oppidum* within the Iron Age landscape, Hunn 1992

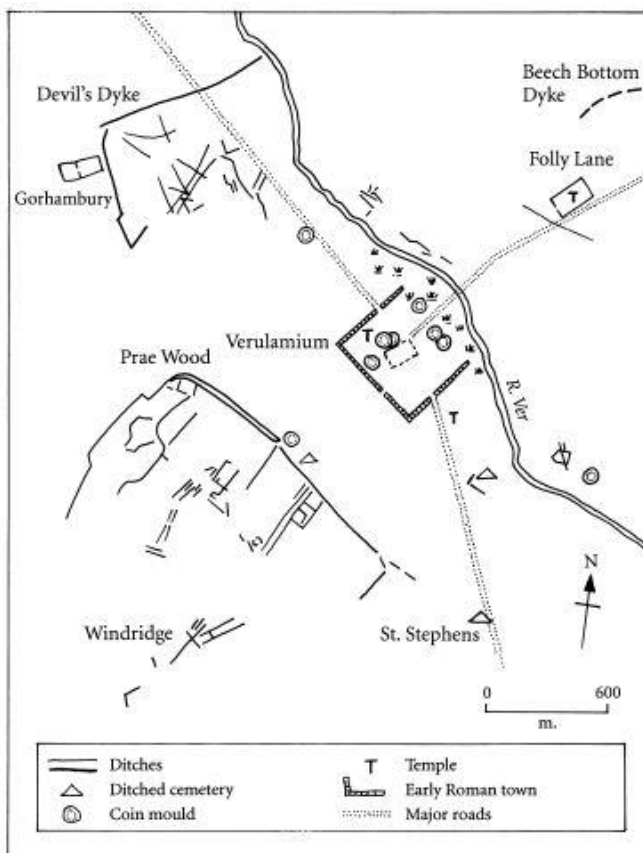


Figure 1.12: Plan of Verlamion *oppidum* earthworks including the Roman town of Verulamium and other Late Iron Age features, <https://erenow.net/postclassical/britainadaquestforarthur/4.php>

Larger sites like Londinium and capitals like Colchester and Verulamium were perhaps the most 'Roman' out of all the urban settlements in Britain. Their infrastructure followed a model that could be seen on both the Continent and in the Mediterranean and the individual buildings reiterated an ideology of Romanisation (Rogers 2014, 741-776). One complication that arises is that most of the larger towns are now located underneath modern cities/towns and therefore the information about their overall spatial organisation, as distinct from their major buildings, is not as well understood. This creates issues, especially for the interpretation of the largest town, Londinium, which will be addressed in the concluding remarks of this thesis.

Over time the military installations that had been established throughout Britain and particularly around the frontier areas gave rise to small, civilian settlements known as *vici*. Because they were built next to the military fort or fortress, they both had the protection of the military as well as providing an area for soldier families to reside whilst their partners were stationed at the military installation. Perhaps most importantly of all, these *vici*, in comparison with the *civitas capitals*, according to Wachter 1974, created a civilian economy, one that the army could partake in, and which usually evolved in an organic/unplanned way (Wachter 1974, 17-32). They also, together with other *vici* created a network with the rest of the province that strengthened other aspects of Romanisation (Todd 2004, 42-59; Rogers 2014, 741-776).

1.5 The Issue of Roman Settlement Forms in Britain

The significance of the British narrative is that while individual buildings and infrastructure may have been present in towns in Roman Britain, the broader spatial organisation appears to have been operating differently than on the Continent (Sewell 2014, 7554-7567). Sewell states that while Roman towns contained elements that could be seen throughout the empire such as a forum or bathhouse, there was a level of regionality between different areas of the empire where variations to the norm could be seen. He argues that the local traditions had an influence on the spatial layout of sites, but he states that establishing how these differences manifested themselves is difficult. It is the aim of this thesis to explore how these regional variations manifested themselves in Britain through the basic characteristic of spatial behaviour and its expression in terms of occupation density.

Furthermore, this thesis will deal with 'visible' occupation density only. 'invisible' occupation density will not be the focus of this thesis. The sites chosen for this analysis may have had higher occupation densities than what has been shown here but the hypothetical modelling that has, in some cases shown higher occupation densities will not form the basis of this thesis.

1.5.1 Spatial behaviour

The analysis of the ways in which space is arranged within settlements is predicated on the characteristics of human spatial behaviour and the uses of space. The reality is that humans inherently pattern space in consistent ways but how this manifests itself can be different between a variety of societies and communities. For example (Clark 1951; Clifton, Ewing and Yan Song 2008). As has been made clear in this work, the Iron Age occupation of settlement space in Britain operates differently from the Roman Continental pattern.

The *oppida* pattern that is referred to in this thesis is representative of a large settlement with a sparse or patchy occupation. This is compared with the small sites which are quite densely occupied by structures (see Chapter 2). Iron Age *oppida* on the Continent, of which more work has been done to map occupation, display the patterns mentioned here which are represented in a reconstruction of Manching (Figure 1.13).



Figure 1.13: Reconstruction of the *oppidum* of Manching,
<https://twitter.com/wrathofgnon/status/1056732673689841666>

What is important to note is that the way that a society or a community arranges itself in space is behaviourally stable and that the population at an interpersonal level is not at all aware that they do this. It is a tacit behaviour and colonisers do not alter the spatial behaviour of the communities of an indigenous population (i.e., First Nations Australians and African communities). We can, therefore, expect that the people who lived in the regions of Britain that had been influenced by the La Tene, *oppida* pattern continued with their own spatial patterning despite the Roman incursion. This is not to say this was a form of resistance *per se* but rather that it was the continuation of a traditional tacit pattern of behaviour.

This raises the possibility that the local populations of Britain may have been retaining this behaviour and that as a consequence they may have had a preference for lower density occupation patterns even when they were living in towns with Roman infrastructure such as a road grid, *insulae* and *fora*.

1.5.2 Settlement density-trends and cultural patterns

What is also needed is a discussion of density trends which are represented by population density relative to settlement and community size which is a manifestation of consistency in spatial behaviour within societies or regional communities. Why this is needed is that analyses of Roman towns in Britain are based on extrapolations of estimates of trends taken

for population density relative to the size of Roman cities in other areas of the Empire, especially trends in Continental Roman towns.

There are two major settlement density trends apparent in the Roman British settlements chosen for this analysis. The less common of these trends is from higher/denser smaller settlements to less dense, larger settlements. The classic example of this occurs for low-density, literate urbanism in South-East Asia between 500 and 1500 CE, particularly when Greater Angkor developed. A plot of estimated populations for these settlements' trends downward to lower densities of about 5-7 persons per hectare for the 1000 square kilometre Greater Angkor inserted below (Fletcher, White, and Dharmendra 2022). What is interesting about this is that Greater Angkor has a visibly patchy and overall low-density occupation pattern (Fletcher 2022) (Figure 1.14).

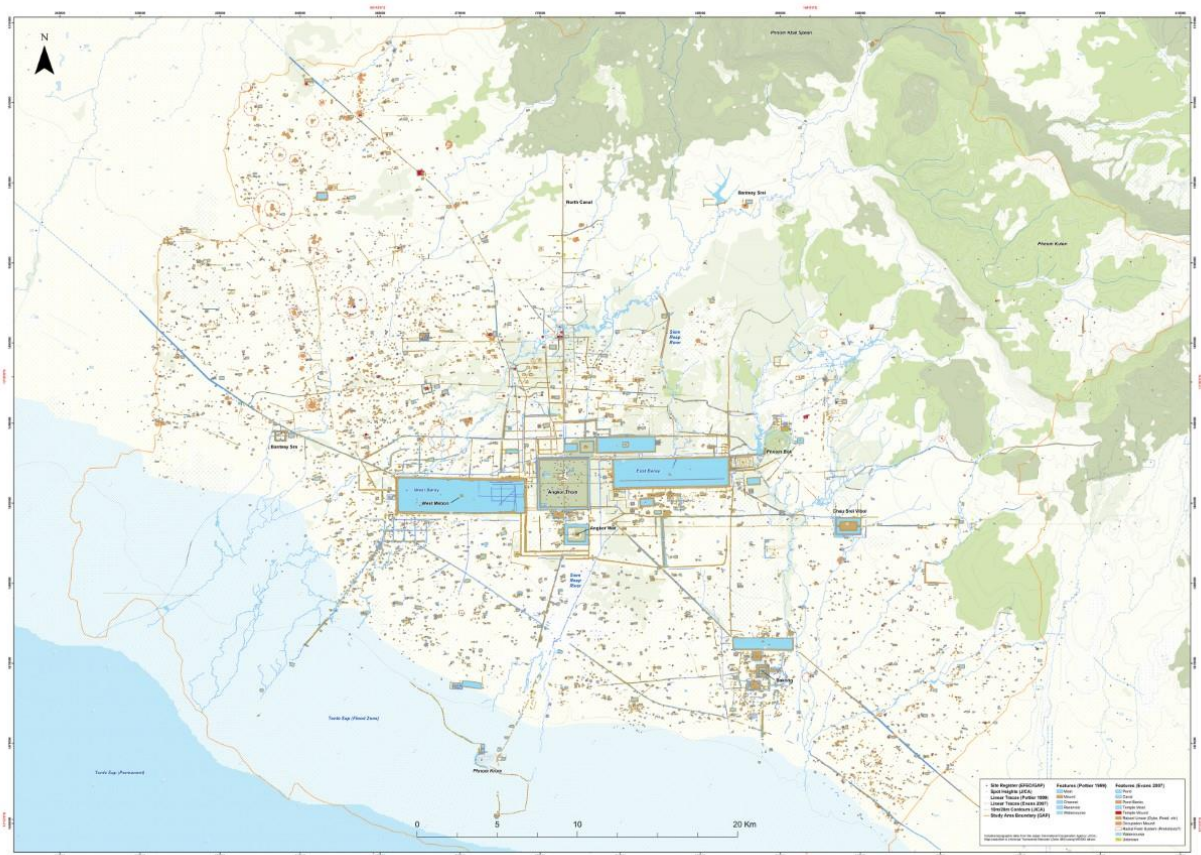


Figure 1.14: Plan of lower-density Greater Angkor, (after Evans and Pottier for the Greater Angkor Project) Fletcher 2022

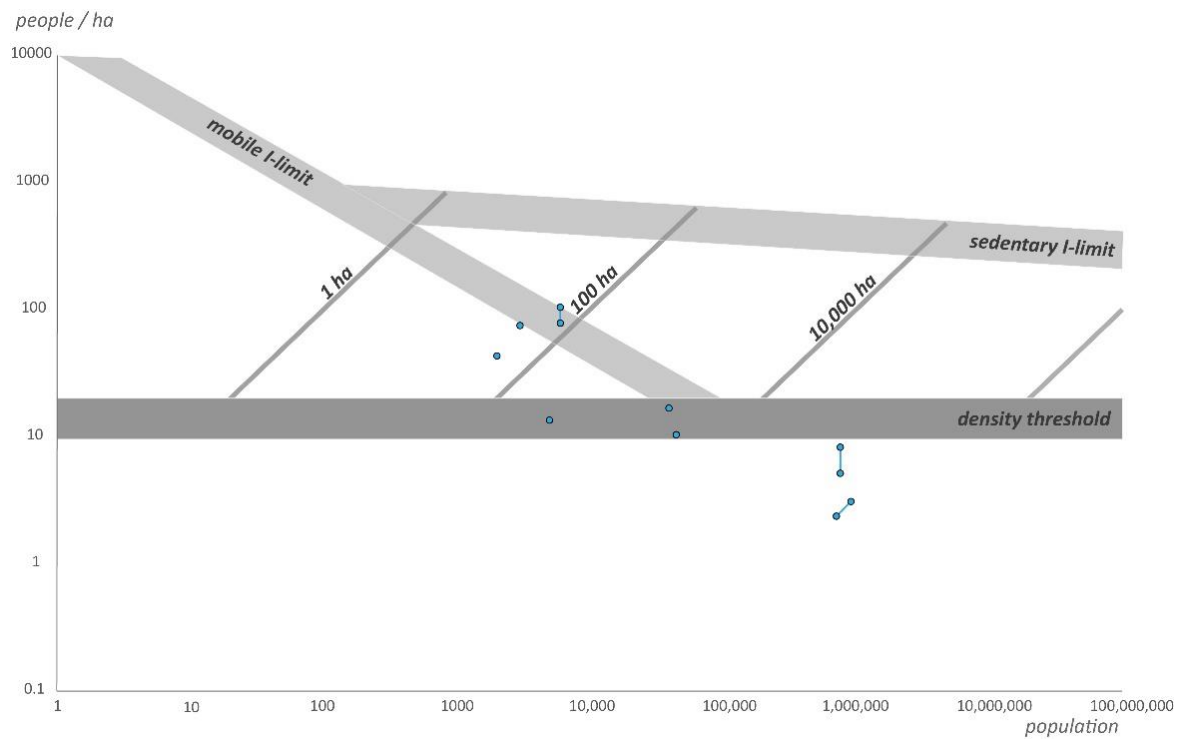


Figure 1.15: I-C matrix diagrams for South-East Asian settlements, Fletcher, White, and Dharmendra 2022

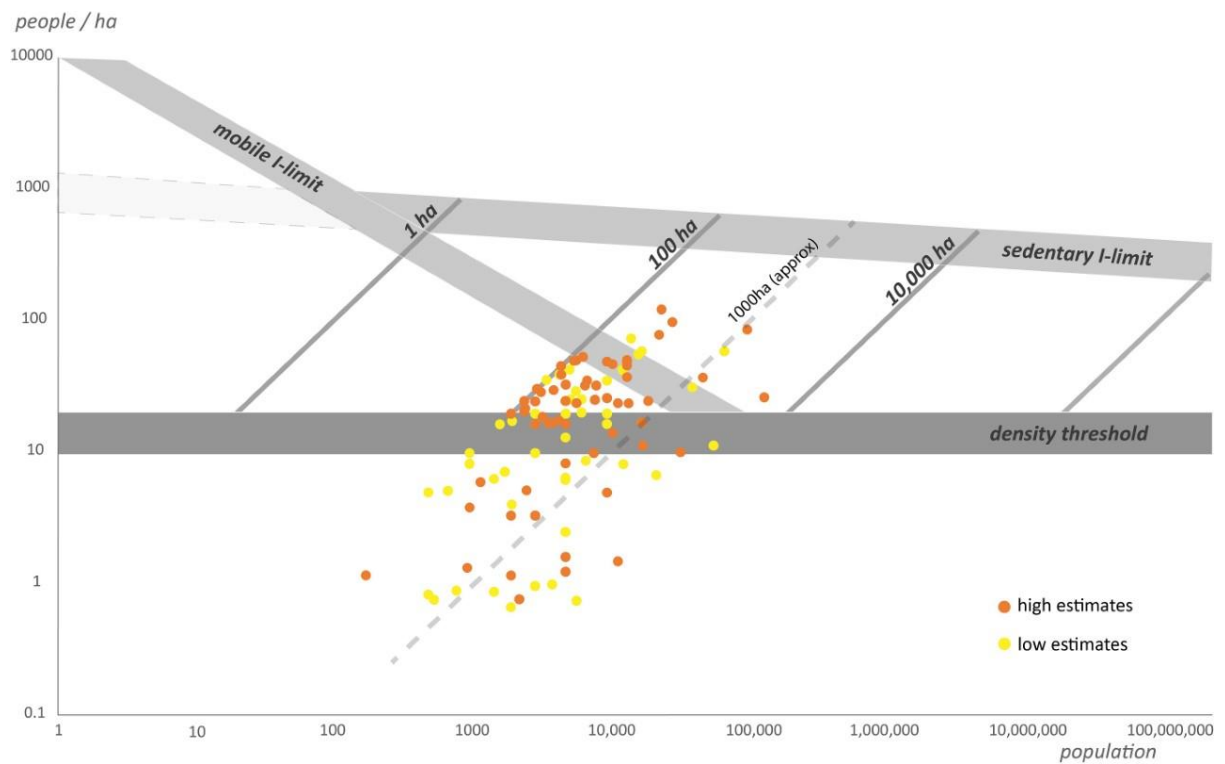


Figure 1.16: I-C matrix diagram for low-density Anomalous Giants, Fletcher, White, and Dharmendra 2022

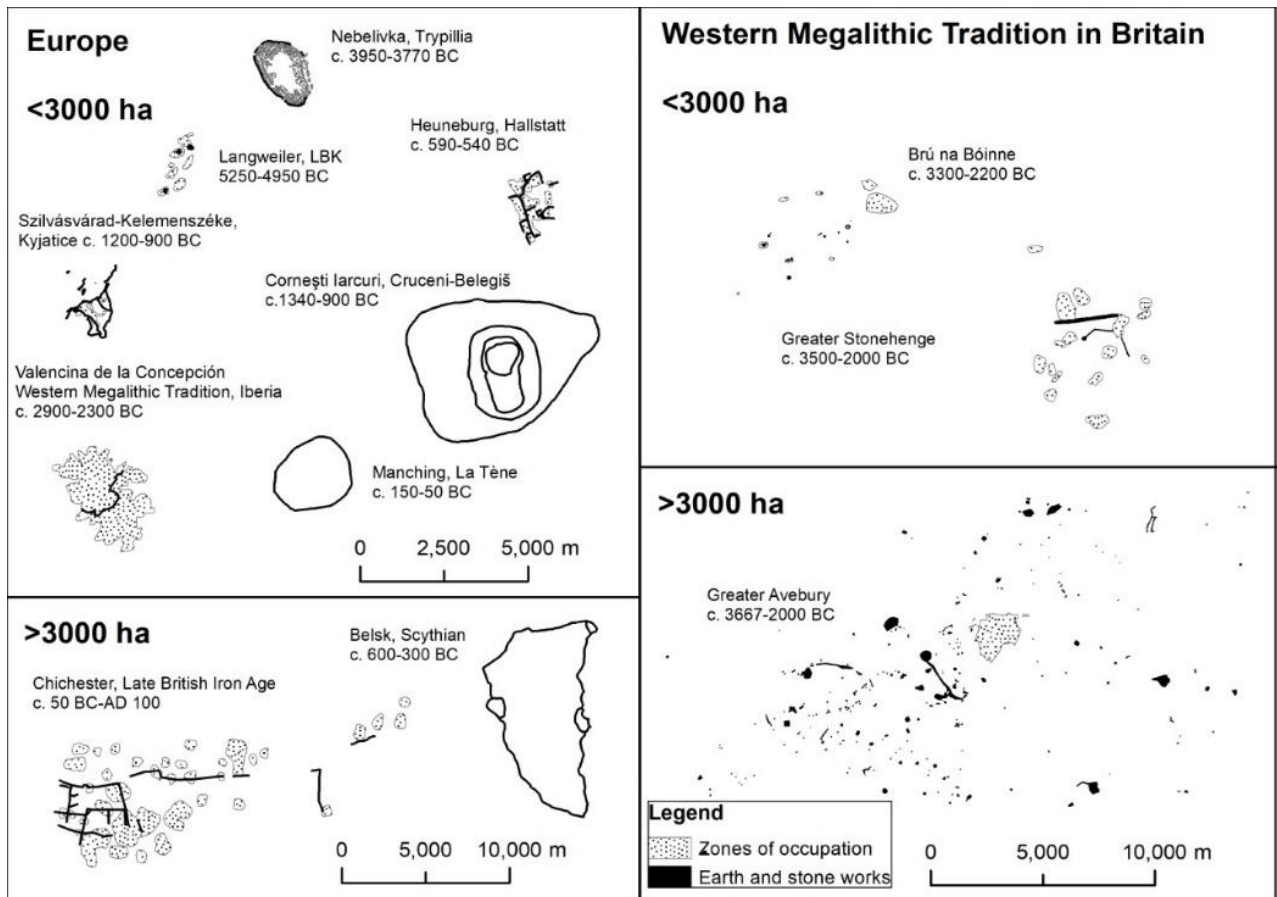


Figure 1.17: Variation in the kinds of Anomalous Giants, White 2022

Late Iron Age settlements in Europe were part of a global collection of low-density settlements, studied by White (2022 PhD) and (see Fletcher, White, and Dharmendra 2022) with trends down to low population densities for large settlements with their patchy/sparse occupation patterns (see Moore 2017; 2012) (Fletcher 2019; 2020; 2022; Hawken & Fletcher 2021; Hanson and Ortman 2017; Ortman and Hanson 2022) (Figures 1.15, 1.16, 1.17). The observable archaeological pattern is that the amount of built space would be lower for the lower-density settlements.

In contrast, most settlement networks trend towards lower densities for smaller settlements and higher densities for larger settlements. This is the pattern for the conventional compact urban settlement form seen in the towns of the Classical-Roman World and in Medieval Europe (see Figure 1.18) (Hanson and Ortman 2017; Ortman and Hanson 2022; Cesaretti, Lobo, Bettencourt, Ortman, and Smith 2016).

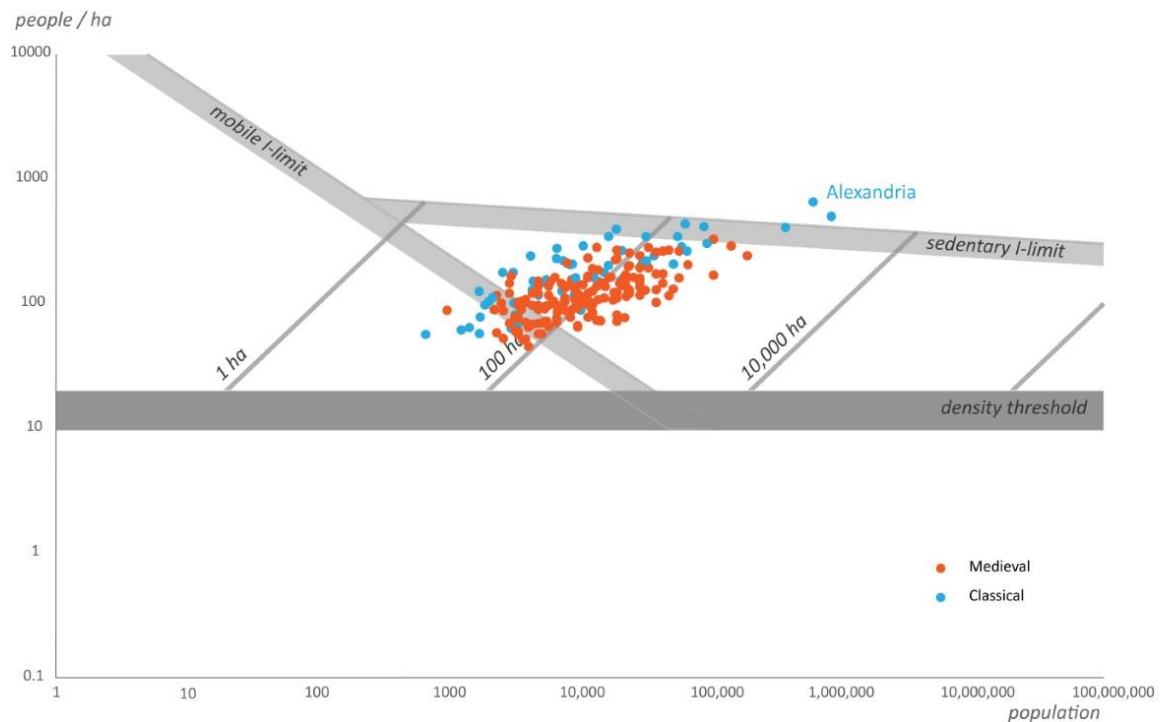


Figure 1.18: I-C matrix diagrams for Medieval and Classical cities, Ortman et al and Cesaretti, Lobo, Bettencourt, Ortman, and Smith 2016

1.5.3 Opinions

Around the mid-20th century academics such as Shepherd Frere and Robin Collingwood both recognised that the formation and spatial organisation of Roman towns in Britain differed from the normal configuration of those towns in other areas of the Roman Empire. Frere states that, “Romano-British society was in the main a Celtic society Romanised, not a Roman society imported or imposed.” (Frere 1959, 1-9). Collingwood also supports this idea, stating that, “...this, at any rate, is certain, that the Britons of the fourth century had given up their earlier belief in, and desire for, the kind of civilization which they had inherited from the Graeco-Roman city-state. The first attempt to Romanise British life, by imposing upon it the civilization of the town, had failed. It was when its failure was most complete that the second attempt, based on the spontaneous development of the country house, began to display its most brilliant successes.” (Collingwood 1937, 207). Both were aware that while the Roman occupation had significant ramifications for the internal formation and organisation of urban settlements, the local Iron Age pattern would have persisted.

The way that Roman towns in Britain are perceived has changed over time. Throughout the 19th century, scholarship tended to focus on major structural characteristics such as the forum, bathhouse, amphitheatre, and surrounding fortification walls. For example, in the 1850s attention was focused on the bathhouse ruin at Wroxeter (Buteux, Gaffney, White and Leusen 2000, 72-79) through to the Londinium *mithraeum* in the 1960s. This is in part due to the fact that larger Roman towns have been built on and many, including Londinium, now sit below modern cities making access to their occupation areas difficult. This has meant that access to Roman levels could only be gained in limited places.

For most medium to large Roman towns in Britain, the overall plan was not accessible and careful analysis, e.g., Dominick Perring’s work on Londinium has been required to piece

together the distribution of occupation, however vague - within the walls (Perring 2022; 1991) (Figure 1.19). While attention to the whole plan of a site did develop from the turn of the 20th century with the increased use of aerial photography of greenfield sites such as Wroxeter and Silchester and more recently remote sensing such as gradiometry in the late 20th century, this was only feasible on sites where Medieval and modern urbanism had not developed.

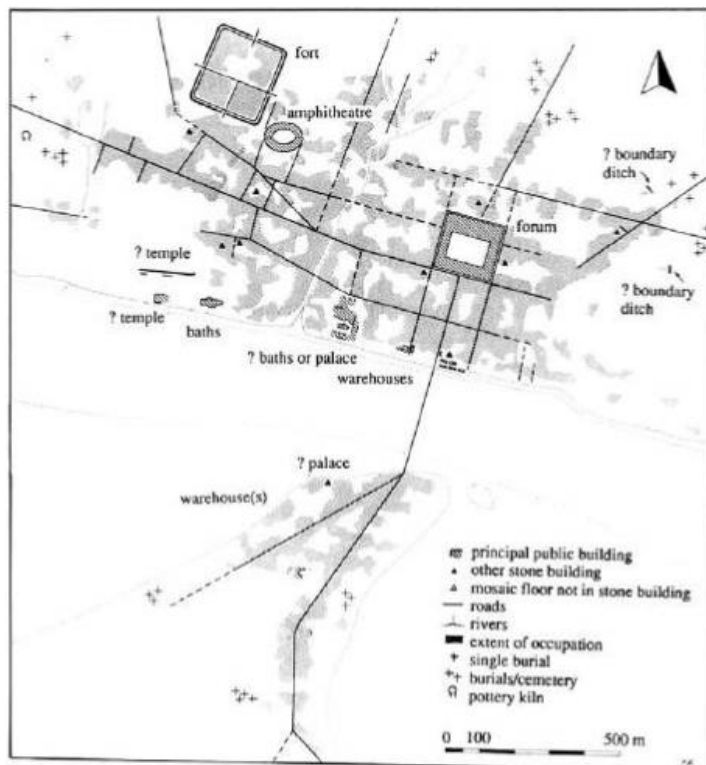


Figure 1.19: Plan of Trajanic-Hadrianic London (130 CE), Perring 1991

Up until quite recently, there has been the largely accepted expectation that settlement organisation and spatial patterning in Roman Britain was similar to that of Continental Europe. This expectation has also influenced the way in which the internal spatial pattern of settlements in Britain are treated in regard to their density of occupation.

As noted previously, the default tendency has been to assume that towns in Roman Britain were like towns on the Continent (see Cirencester) and to envisage them with a denser configuration across the site (Figures 1.20, 1.21), despite few excavations within the settlement area. Wroxeter, for example, was once thought to be very thinly inhabited and rather abnormal in that regard (White, Gaffney and Gaffney 2013). After significant surveys, several more structures were discovered which showed that the settlement was more densely occupied. That being said, the overall occupation density still seemed low, compared with Roman towns in other parts of Romanised North-Western Europe (White, Gaffney and Gaffney 2013).

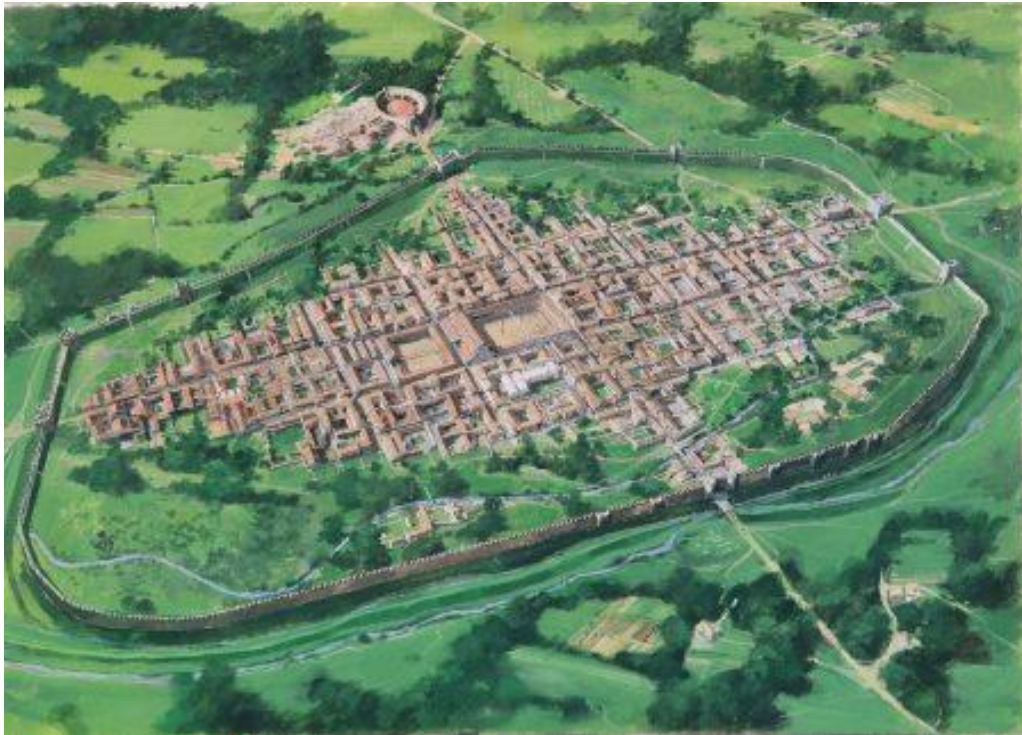


Figure 1.20: Reconstruction of Roman Cirencester, Jones 2019

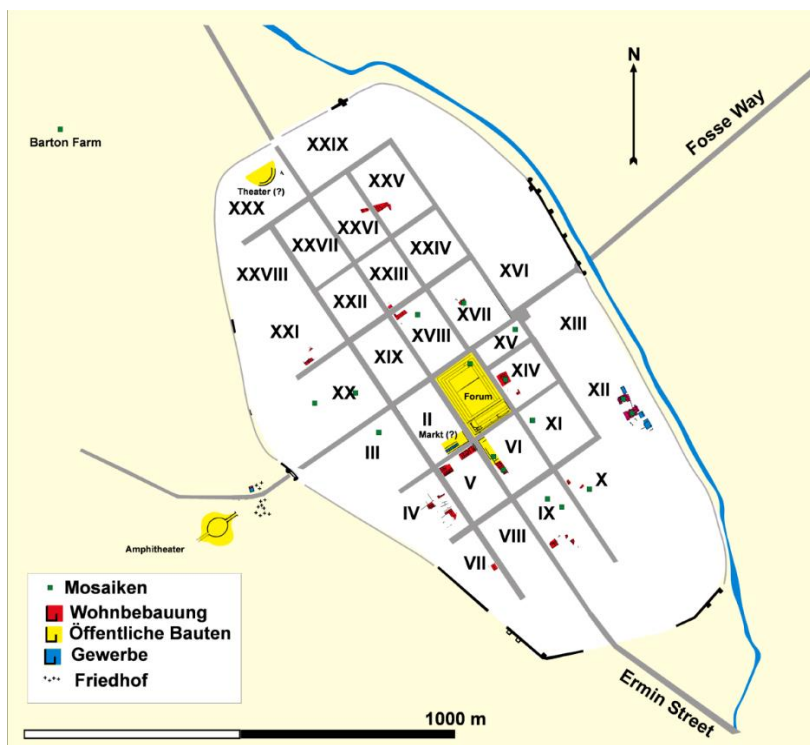


Figure 1.21: Map of Roman Cirencester (Corinium Dobunnonum), https://commons.wikimedia.org/wiki/File:Corinium_Dobunnonum.png

The images below of some remote sensing carried out at Verulamium (Lockyear and Shlasko 2017) (Figures 1.22, 1.23) illustrate this pattern, that larger settlements in Britain had significant areas which appear to have been devoid of built space. The image below (particularly 1.21 A) shows that there was open space surrounding a congregation of buildings in the middle of the image. The lack of built space in certain areas of Verulamium after recent, extensive remote sensing will be further elaborated on in Chapter 8.

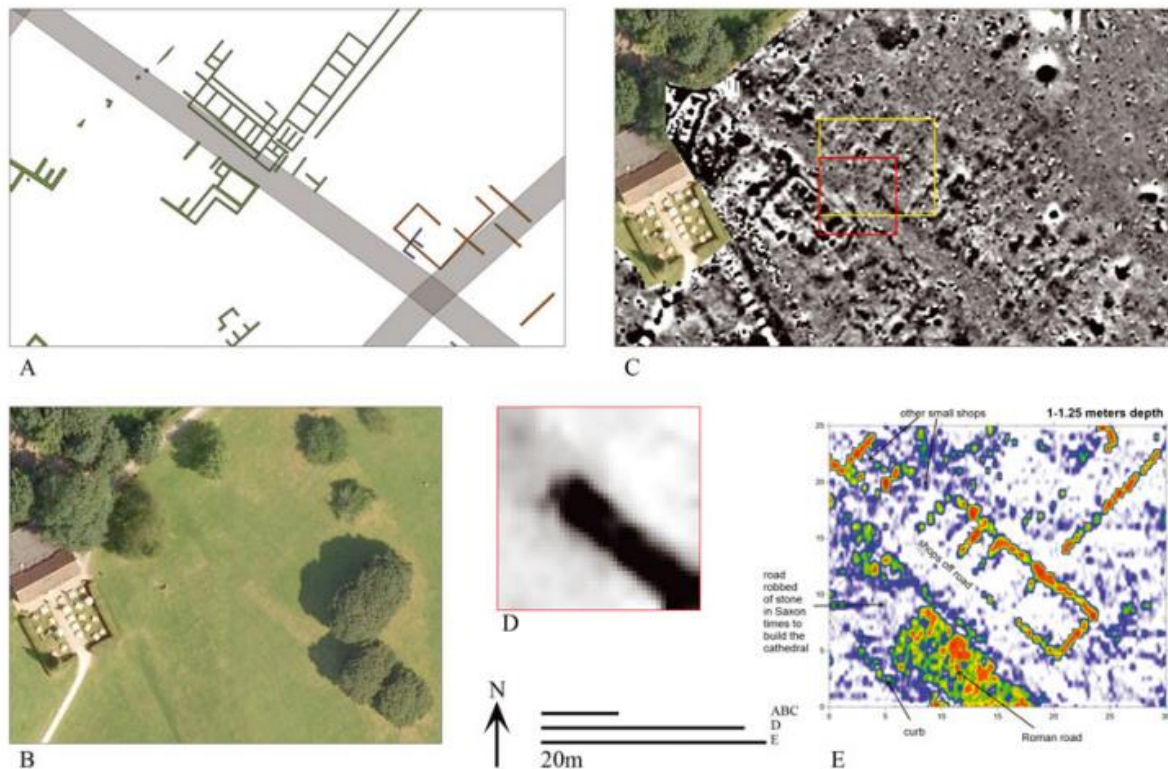


Figure 1.22: (A) St Albans UAD plan, (B) Google Earth image, (C) Magnetometry image, (D) Resistance image, (E) GPR image over buildings XXXIX. Red square show location of resistance survey and yellow rectangle the location of the GPR survey, Lockyear and Shlasko 2017



Figure 1.23: GPR image of Blacklands Field after 2021 excavation/surveying season, <https://hertsgeosurvey.wordpress.com/tag/verulamium/>

1.5.4 Ortman and Hanson's analysis of Silchester

The expectation that British and Roman towns would have had similar density patterns has recently been systematically pursued by Scott Ortman and Jack Hanson. They have sought to analyse patterns of organisation in Roman settlements across the empire with the goal of estimating population numbers for particular towns. Their analyses of occupation density have relied on the scaling model which stipulates that towns underwent an increase in occupation density as they grew in size. As such, small sites were of a lower density and large sites were of a higher density (Ortman and Hanson 2022; Hanson and Ortman 2017, 301-324). By utilising the scaling model for towns in Britain, Ortman and Hanson have indicated that a number of buildings are missing from the record based on their analysis of the Roman British town of Silchester (Figure 1.10). Silchester represents, in the words of Hanson, "...an anomalously low-density town and should not be considered as a typical or canonical example of Romano-British urbanism." (Ortman and Hanson 2022, 11). They have identified that based on modelling, over 80% of the expected structures in Silchester are missing (Ortman and Hanson 2022). One of the reasons why these buildings could be missing may be due to their being constructed out of timber, their organic composition resulting in poor preservation and difficulties in identifying such structures through excavation, remote sensing, and surveying. If that is the case and there are structures that are 'missing' then this has serious implications for other Roman settlements in the UK more generally. The best course of action to resolve this issue is the continued use of remote sensing and excavation to find these buildings.

Recent surveying conducted on the Roman town of Wroxeter has also revealed that a significant amount of internal space was open/unbuilt and that there is the possibility that this open space could have been filled with timber buildings constructed for the lower classes. As of yet though, these timber buildings have not been detected (White, Gaffney and Gaffney 2013).

The fact that Hanson and Ortman have come to the conclusion that over 80% of the expected buildings in Silchester are missing, based on scaling theory, does not make their proposal inherently unlikely. Just as in the scientific community there is the known fact that only 5% of the universe is known (Lewis and Barnes 2019, 141) the same can be said here, where further analysis, either through excavation or surveying, may reveal very extensive, previously unknown spatial features.

It is also important to note that this work is not about refuting Hanson and Ortman's own analyses - as that requires empirical appraisal, but rather to offer up another model of occupation density that may have had a bearing on the growth, decline and internal spatial organisation of Roman towns - which also would need empirical appraisal.

The expectation that settlements in Roman Britain were following the same pattern of occupation and spatial layout as those in Continental Europe has meant that the overall density and populations for Roman towns in Britain may be overestimated. The alternative and one that seems likely based on the analysis conducted for this thesis is that the 'missing' buildings are not actually missing and large areas within Roman British towns may, in fact, have been left empty of built structures. This has significant implications and leads to a hypothesis that Roman towns in Britain may have behaved more like the Iron Age *oppida* than Continental/Mediterranean towns.

1.6 Conclusions

In summary, this thesis will discuss settlement organisation within Roman British towns with a focus on occupation density. This will produce trends between settlements of assorted sizes which will provide greater insights into the behaviour of Roman towns in Britain.

The thesis will begin with an overview of processes of settlement organisation during the Iron Age and Roman periods on the Continent and in Britain and outline the relevant literature that has been used in gathering information on the organisation of settlements and information on occupation density. The work of Tom Moore and Manuel Fernández-Götz in particular will elucidate the internal processes and organisation of Iron Age settlements in Europe and Britain and will act as the backbone for the analysis that will be done. Previous work by Dominick Perring (1991, 2022), Shepherd Frere (1971, 1984), Jamie Sewell (2014), and Frida Pellegrino (2020) to name a few, provides the context for Roman settlement trajectories. For the key sites, excavation reports and other related field-based data will be used. There will then be an overview of the methods involved in conducting an analysis of occupation density. This will lead into the main part of the thesis which will focus on a number of settlements of different form as well as a number of different sizes, small, medium, and large. The first part of this appraisal in Chapters 4, 5 and 6 will provide relevant background information on each site, its history, and key parts of its internal organisation before analysing the density of occupation for that particular site. The thesis will conclude with an overview of trends between settlement forms in terms of their occupation density with the addition of several examples of small, medium, and large settlements. Gradients of density will be discussed in Chapter 7 while density trends will be

the focus of Chapter 8. Finally, there will be a discussion of the implications and conclusions that this research may have on the wider topic of settlement organisation and spatiality.

Chapter 2 – Iron Age and Roman Settlement Patterns in North-Western Europe: a context for towns in Roman Britain

2.1 Introduction

During the Iron Age, the way that people organised space underwent profound change. New settlements emerged that incorporated increasingly sophisticated forms of economic, political, and social institutions. On the Continent from the 4th to 2nd centuries BCE, a new form of low-density settlement superseded the *Furstensitze*. Named 'artisan sites' they dealt primarily with the economic needs of the community (Fernández-Götz 2018, 119-126). At the beginning of the 2nd century BCE, these were replaced by the *oppida*, often referred to as urban (see Moore et al 2017). They were also highly varied in their internal organisation and corresponded with lower occupation densities the larger a settlement became. Britain experienced different transformations in settlement hierarchy compared to the Continent. In the late 1st millennium BCE, the *oppida* in Britain became more common, and a few such as Camulodunum (Figure 2.1) grew into extensive and highly interconnected settlements with smaller satellite settlements located in their immediate vicinity.

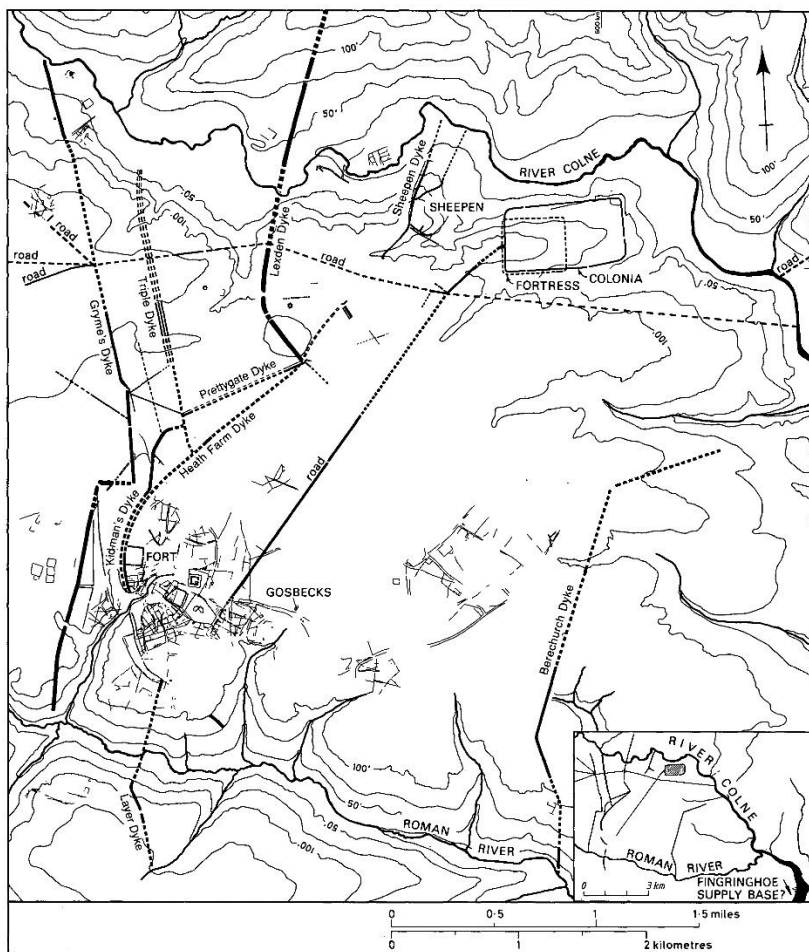


Figure 2.1: Plan of Iron Age Camulodunum, Cooper 1994

In the final centuries of the 1st millennium BCE and early into the first century of the 1st millennium CE, Roman settlements became dominant across the Mediterranean regions of Western Europe. In Europe and in particular Gaul, the formation of new Roman territories was linked with military conquest and the formation of new settlements were inextricably linked to this process. By the early to mid-first century CE, towns and cities on the Continent had become Roman in form. Those such as Trier and Lyon (Figures 2.2, 2.3) were enormous complexes that operated elaborate urban systems which ensured that Roman influence remained assured. The reconstructions of Trier and Lyon below (Figure 2.2, 2.3) as well as Pompeii (see Figure 1.9) illustrate the similarities between Continental Roman and Mediterranean cities.



Figure 2.2: Reconstruction of Roman Trier, Augusta Treveorum, https://en.wikipedia.org/wiki/Roman_Monuments,_Cathedral_of_St_Peter_and_Church_of_Our_Lady_in_Trier>

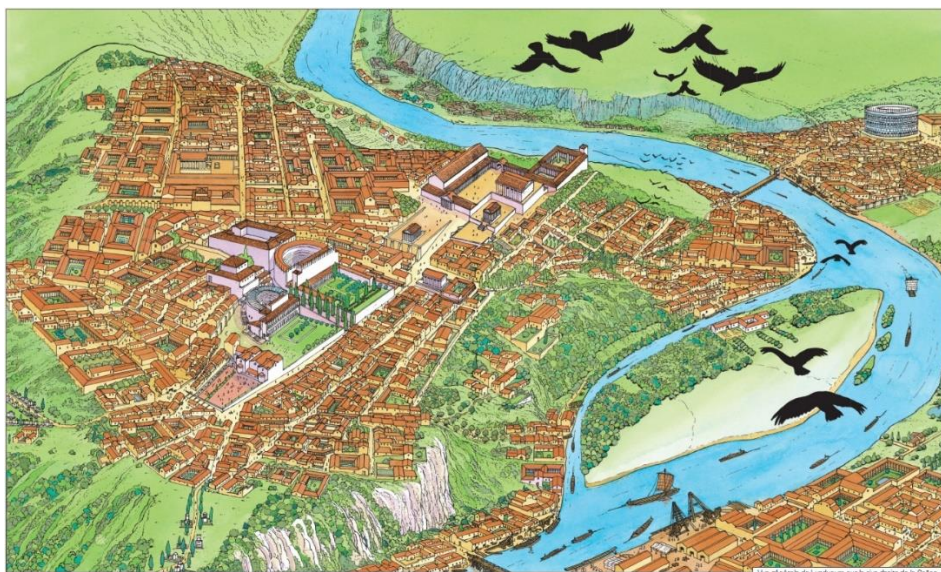


Figure 2.3: Reconstruction of Roman Lyon, Lugdunum, <https://i.imgur.com/cMIX3nw.jpg>

In Britain, the standard configuration of Roman towns is less straightforward (see Figure 1.10) though there has been an inclination to view the form of the Roman urban settlements in Britain in terms of the Continental spatial pattern (see assumptions about Cirencester) (see Figures 1.20, 1.21). In part this is because the major, distinctive Roman features such as civic buildings and town walls are present and sometimes still visible. But in contrast to the Continent, as noted previously, the larger towns in Britain appear to be less densely occupied than expected (Figure 2.4).

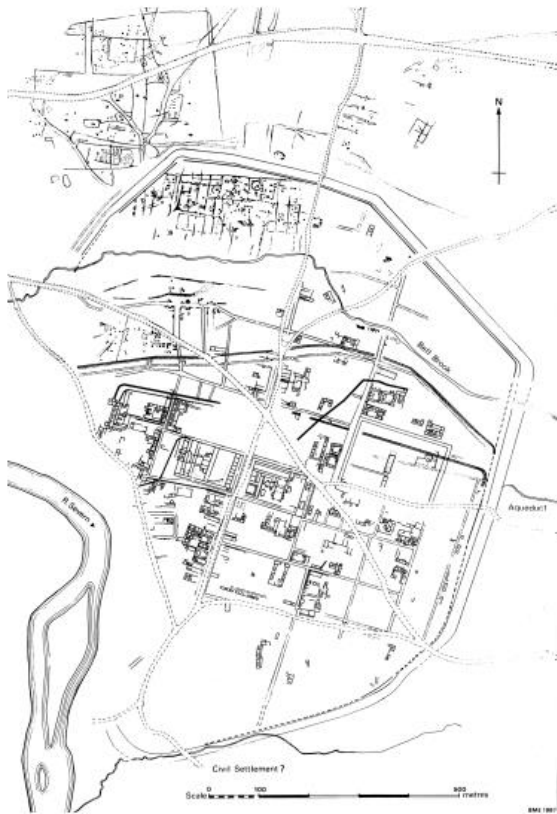


Figure 2.4: Town Plan of Wroxeter, White, Gaffney and Gaffney 2013

This suggests a somewhat different trend of overall occupation density in relation to increasing settlement size and that the occupation densities of smaller settlements will need to be examined further. The story of Roman urbanism in Britain seems to differ somewhat from the Continent and may suggest more of a hybrid system, one that incorporated elements of both the local cultures and Roman urbanism into something unique. The question is whether the Roman Continental form may have somehow co-occurred with the more local British form.

2.2 Iron Age Europe

From the late 4th to mid-2nd centuries BCE another form of settlement appeared, one that was largely unenclosed and whose areas could extend for hundreds of hectares. Known as 'artisan sites' (Fernández-Götz 2018, 117-149) they facilitated greater economic interaction within the community and were often situated along important trade and communication routes. Interspersed throughout these low-density settlements were settlements such as

Bourges in France (6th-1st centuries BCE) (Figure 2.5) and Manching in Bavaria (4th-1st centuries BCE) (Figure 2.7). The size variability of these sites was wide ranging with some as small as 10 hectares while others being bigger like the 35-hectare Roseldorf and the 380-hectare Manching (Fernández-Götz 2018, 117-149) (Figure 2.6). The degree in which these sites continued to be used from the 2nd century onwards when *oppida* became the prominent settlement form was also highly variable (Figure 2.5). Manching remained a site of significance into the 2nd century, with its inhabitants opting to build a large fortification wall (Fontes, Cruz and Alves Orgs 2018, 23-37).

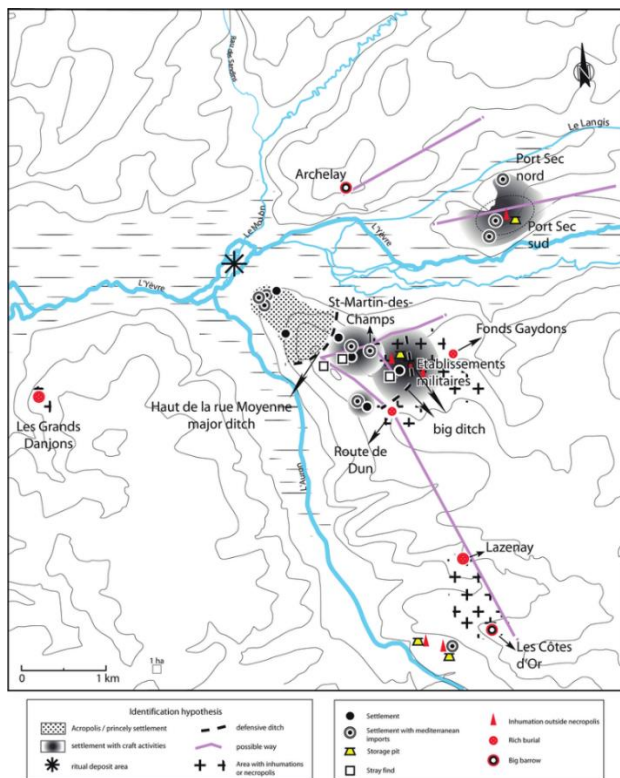


Figure 2.5: Plan/agglomeration of the 'artisan site' Bourges/Avaricum during the Hallstatt and La Tene periods (510-425BCE), Fernández-Götz 2015



Figure 2.6: Distribution of major open settlements, third-first centuries BCE, Fernández-Götz 2018

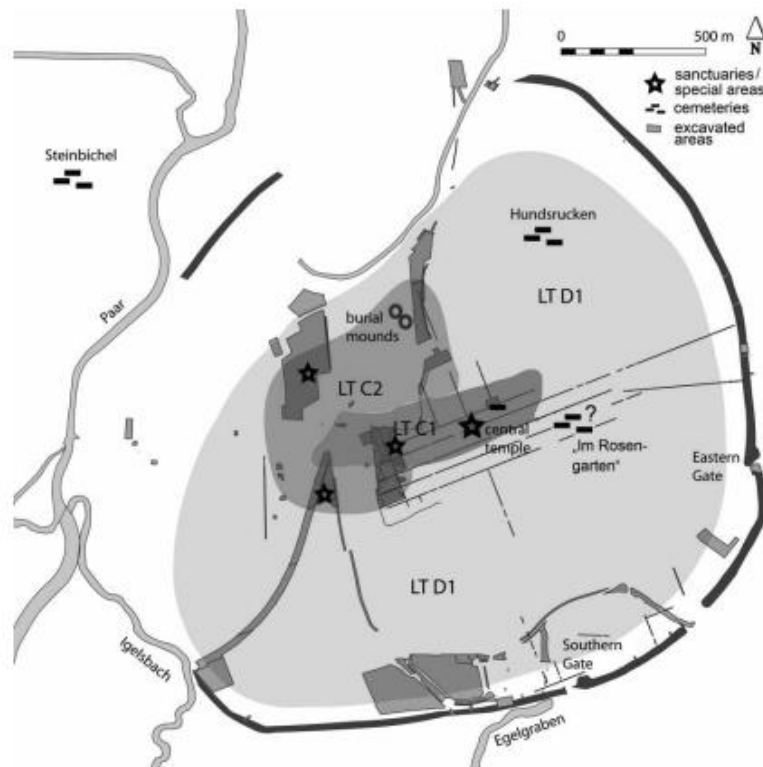


Figure 2.7: Schematic of Manching *oppidum*, Bavaria, Wendling 2013

The next major settlement form that emerged in Europe around the midpoint of the 2nd century BCE were the *oppida* (Figure 2.8). Just like the previous artisan low-density sites, *oppida* were extremely variable, and their size could be a function of many factors. The environment had a substantial impact on their size. For example, Mont Beuavray was on a hilltop site built on a rocky precipice which afforded greater protection (Fernández-Götz 2018, 117-149). This is compared with the lowland site of Manching, located of the Rhineland and situated where a greater amount of space could be utilised. Promontory and contour *oppida* were quite popular during this time and would also utilise the surrounding topography as a defensive asset (Cunliffe 2005). Many promontory forts such as those on the coast of the English Channel would rely on the cliff walls for defence while their eastern sides constituted a steep rocky hill that could also be utilised for *demesne* and to reduce the mobility of an attacking army. Over time these defensive characteristics were increasingly human-made and relied less on the natural landscape and topography (Cunliffe 2005).

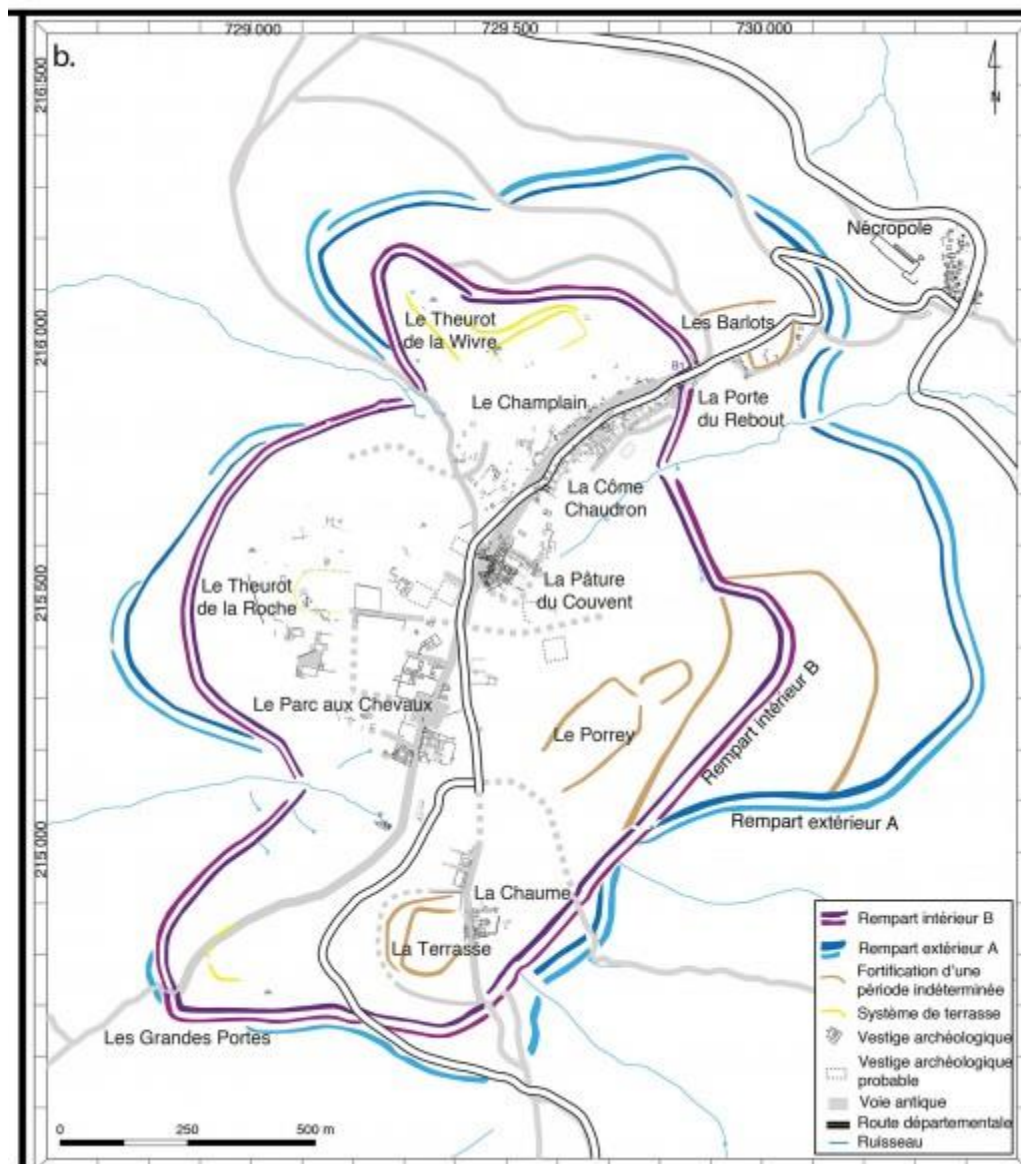


Figure 2.8: Internal view of Bibracte *oppidum*. After Fletcher 1981

Manuel Fernández-Götz has specialised in changes to settlement form across mainland Europe from the development of the *Furstensitze* to the growth of low-density unenclosed settlements/territories and the emergence of *oppida* towards the end of the Iron Age in the late centuries BCE. He refutes John Collis' view that *oppida* represented the first cities north of the Alps, suggesting that the *Furstensitze* should take that position (Fernández-Götz 2018, 117-149; Collis 1984). The move away from a Classical/Mediterranean outlook in regard to settlement formation and the rise of French and German archaeology in the last half of the 20th century and into the 21st century has done much to improve our understanding of south-western European settlements and their organisation. The complexity of these changing sites mean that urban 'perfection' is no longer recognised as important. Comparative studies based on site-by-site analysis is what is required to fully understand the factors that led to the creation of a particular settlement (Fernández-Götz 2018, 117-149; Stoddart 2017, 105-110; Fernández-Götz 2020, 39-58).

The connectivity of 1st millennium BCE cultures in Europe was highly fluid with the sharing of ideas and materials. Sites such as Zavist in Bohemia, Mont Lassois and Bourges in central France have received a lot of attention over the last couple of decades but the most famous is unquestionably Heuneburg, located on the upper Danube (Haselgrove et al 2018; Bradley, Haselgrove, Linden and Webley 2016, 213-259).

The size of these Iron Age settlements varied considerably. Particularly in the last half century there have been several revisions of the size of these settlements, *oppida* in particular (Figures 1.3, 1.5, 1.6, 1.11, 1.12, 2.8). Wolfgang Dehn proposed a minimum size of 30 hectares in 1962, Jean-Paul Guillaumet proposed a minimum figure of 50 hectares in 1982 and Paul-Marie Duval suggested that they could be as small as 10 hectares in size (Fernández-Götz 2020, 39-41, after Collis 1984). Other *oppida* covered a greater size such as Manching, Stanwick and Cumulodunum (see Figures 1.5, 1.6) and were also highly varied in their internal organisation. Sites such as Bibracte (Figures 1.3, 2.7) has provided evidence for the existence of thoroughfares and streets that linked major public spaces which were themselves linked-up with the various gated entrances throughout the settlement (Moore 2017, 281-298; Stoddart 2017, 5-10; Fernández-Götz 2014, 379-393). This can also be seen at Manching (Figure 1.3, 1.5, 1.13, 2.7) where these networks appear to have been broken up into allotment cadastrations well over 6000m² in size and containing multiple domestic enclosures and other structures with either agricultural, artisanal, or mercantile functions (Moore 2017, 281-298; Stoddart 2017, 5-10; Fernández-Götz 2014, 379-393; Bott, Grosse, Wagner, Wagner 1994, 560-562). The segregation of districts into economic nodes is a practice that was repeated at other sites. At Bibracte evidence of an artisan, aristocratic and religious district have all been uncovered. Their success and continued significance would have been due in part, to a combination of socio-political, economic, and religious practices, serving as central nodes for the surrounding landscape (Fernández-Götz 2018, 117-149). If one is to take Caesar's definition, then the *oppida* of Gaul were seen as the capital cities/towns of regions that he encountered during his conquests there. Whatever their role, they appear to have been a significant part of society during the latter Iron Age, even though they had a relatively short lifespan of around a century or so. With the arrival of Rome, many were abandoned but some such as Lyon was further utilised under a Roman guise.

2.3 Iron Age Britain

In Britain, small farmsteads, nucleated village settlements and hillforts were characteristic of the settlement landscape for the majority of the 1st millennium and an important activity associated with these settlements was localised subsistence farming (Figures 2.9, 2.10 & 2.11). Compared with the Continent, the evolution of settlement form in Britain was more gradual with small villages and forts being predominant. Hillforts had been a staple of the region since the Bronze Age and continued into the Roman period where they acted as areas in which Roman officials could assert influence over a particular area. The hillforts varied considerably in their function depending on their position in the landscape. Barry Cunliffe has identified several varieties. Promontory hillforts were particularly common and were usually located in areas around the coastal fringes. Their defences also varied, with some utilising the natural topography to act as a defensive structure.



Figure 2.9: Distribution of hillforts under 1.2 ha enclosed, Harding 2012



Figure 2.10: Distribution of hillforts 1.2ha-6ha enclosed, Harding 2012

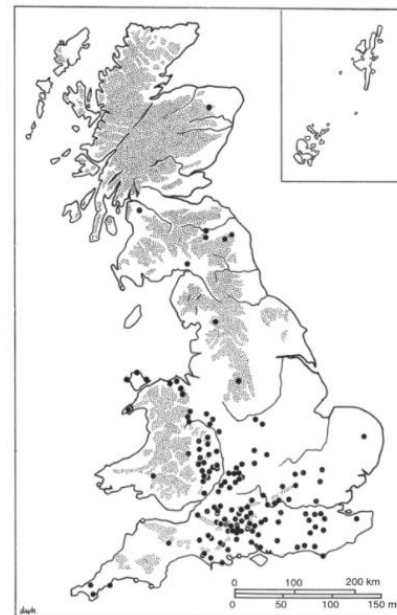


Figure 2.11: Distribution of hillforts over 6 ha enclosed, Harding 2012

The large hillforts such as Danebury (Figures 2.14) were some of the most developed not only in the British Isles but also the whole of Europe, with a high degree of structural complexity. According to Cunliffe, they acted as central places and as residential areas for the warrior elites who controlled the means of agricultural redistribution (Cunliffe 2005, 347-407). Their defensive capabilities were in the form of sophisticated multivallate constructs of gullies and ditches that were effective in repelling invasion and in installing an ideology of power and authority in the eyes of the local inhabitants. They occupied high/raised positions in the landscape which meant they had a distinct advantage over the low-lying settlements and usually housed high ranking members of a warrior tribal group. That being said, J. D Hill has questioned whether such large-scale hillforts such as Danebury really represented the existence of a warrior elite, pointing out that the storage space for

agricultural product did not surpass that of other settlements of a smaller size (Hill 1995, 47-98)

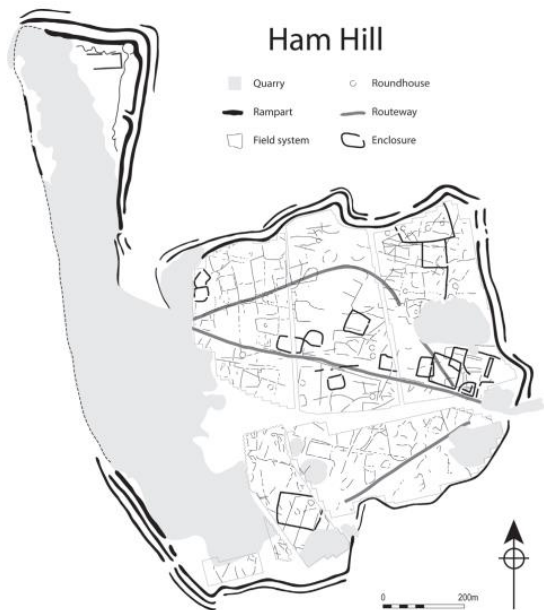


Figure 2.12: Plan of the internal occupation of Ham Hill, Cunliffe 2005

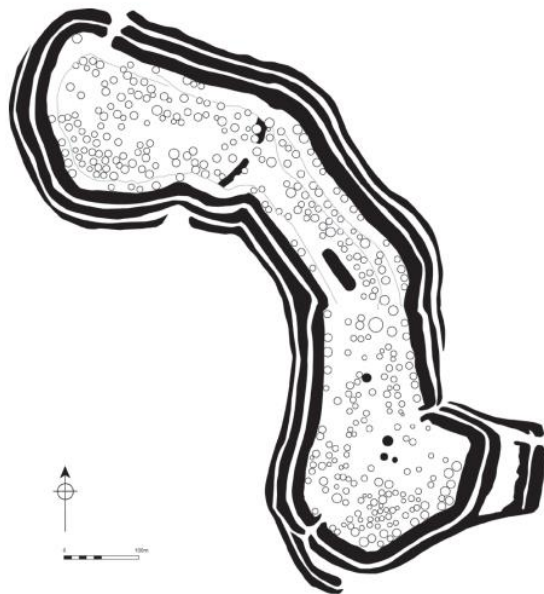


Figure 2.13: Plan of the Developed Hillfort of Hambledon Hill, Cunliffe 2005



Figure 2.14: Plan of the Middle Iron Age occupation of the Developed Hillfort of Danebury, Hampshire, Cunliffe 2005

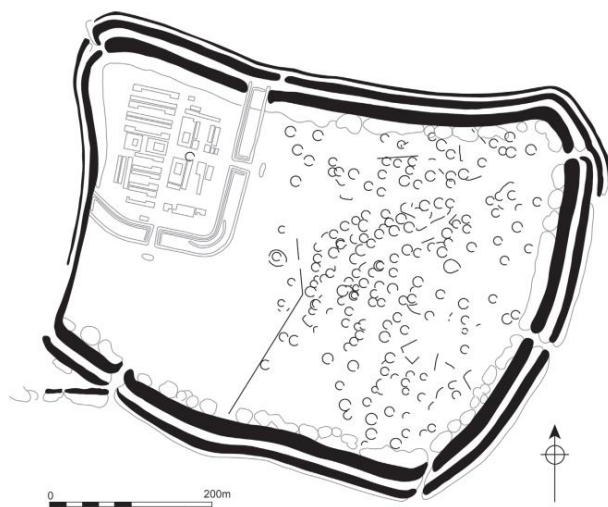


Figure 2.15: Plan of the Developed Hillfort of Hod Hill, Cunliffe 2005



Figure 2.16: Plan of Silchester *oppidum* and Bagendon *oppidum*, Moore 2020

Domestic structures in the late Bronze Age greatly surpassed those from middle Iron Age sites such as Danebury (Moore 2017, 1-16; Hill 1995; Moore 2007) and Tom Moore has suggested that due to changes in the social hierarchisation of Britain in the 1st millennium, sites of supposed elite residence could have instead been shared communal spaces, utilised by more of the community than has previously been thought (Hill 1995, 47-98; Moore 2007, 79-102). Smaller sites may also have been more connected and may have played a greater role in the social and political organisation of the landscape. Furthermore, Fernández-Götz has claimed that the area between these sites rests at around 8-11km on average, perhaps denoting some network of interconnection (Fernández-Götz 2018, 117-149). Harding has even noted that the word 'hill' is misleading in that there is evidence for multiple hillforts located in the lowland plains and near major rivers, perhaps suggesting that they constituted, as Fernández-Götz has claimed, a settlement network (Harding 2012) (Figures 2.9, 2.10, 2.11).

Perhaps one of the best-known analyses of the settlement variation across the different regions of the UK is Barry Cunliffe's 1976 'Iron Age Communities in Britain' which provides a good amount of detail in describing the variety of settlement types and their relationship with the surrounding landscape in which they lie.

The final settlement form to be discussed are the British *oppida*, highly complex settlement forms that developed within the last few centuries of the 1st millennium BCE. The main

difference between those in Britain and those on the mainland was that in Britain they tended to be larger, several hundred hectares in size and even more spread out. These were known as territorial *oppida* and were significant because they connected the landscape and amalgamated political, economic, and social processes. The incorporation of artisan, mercantile and agricultural practices, together with social processes and strong political hierarchisation, resulted in these highly complex settlements. The forms of settlements across Britain also varied geographically with Moore noting a high number of small, enclosed farmstead settlements in the west and in Wales, compared with much larger hillforts and territorial *oppida* in the south-east of Britain, an area that Hill sees as a culmination of longer-term local/Iron Age developments, population increases, settlement expansion and diaspora (Pitts, 2010, 32-56). Creighton sees those territorial *oppida* at Camulodunum and Verlamion (Figures 1.11, 1.12, 2.1) as a manifestation of the emergence of kingship (Pitts, 2010, 32-56), which formed out of a combination of local political situations and contact with either a Roman or Continental people from across the channel (Pitts 2010, 32-56).

Tom Moore has reviewed the background to the emergence of *oppida* in Britain, where he specialises in the Severn/Cotswold districts of south-western England. From the 4th BCE century onwards, Britain saw a retraction in the size of their settlements with smaller enclosures becoming the predominate form. These structures were often rectilinear in form and accommodated two or three families. There still appears to have been an increase in population and settlement numbers during this time though, a diversifying from a low number of large settlements to a high number of smaller settlements. With a move towards smaller settlements, there was also increased social privacy and independence between individual communities. The act of enclosing a previously unenclosed settlement heightened the social permanence of an area and acted as the bedrock for future Iron Age integrated and highly structured landscapes. Moore claims that this isolationism exhibited by family units in the rural countryside is incorrect, suggesting instead that the interchange needed to maintain a working society required the sharing of ideas, of economic products and cultural differentiation (Moore 2007; 2012; 2014; 2017).

The significant point about the illustrations of British hillforts above is that they were quite small, Ham Hill was 85 hectares in size, Hambledon Hill was around 12 hectares in size, Danebury was 39 hectares in size and Hod Hill was 22 hectares in size (Figures 2.12, 2.13, 2.14, 2.15), all of which had quite extensive and dense patches of occupation. This is in contrast with the larger British *oppida* such as Bagendon and Stanwick which were 200 and 300 hectares respectively and appear to have been of a much lower density, in keeping with the decreasing density with increasing size model (Moore 2012, 396; Welfare 1990), (Figures 2.16, 2.17).

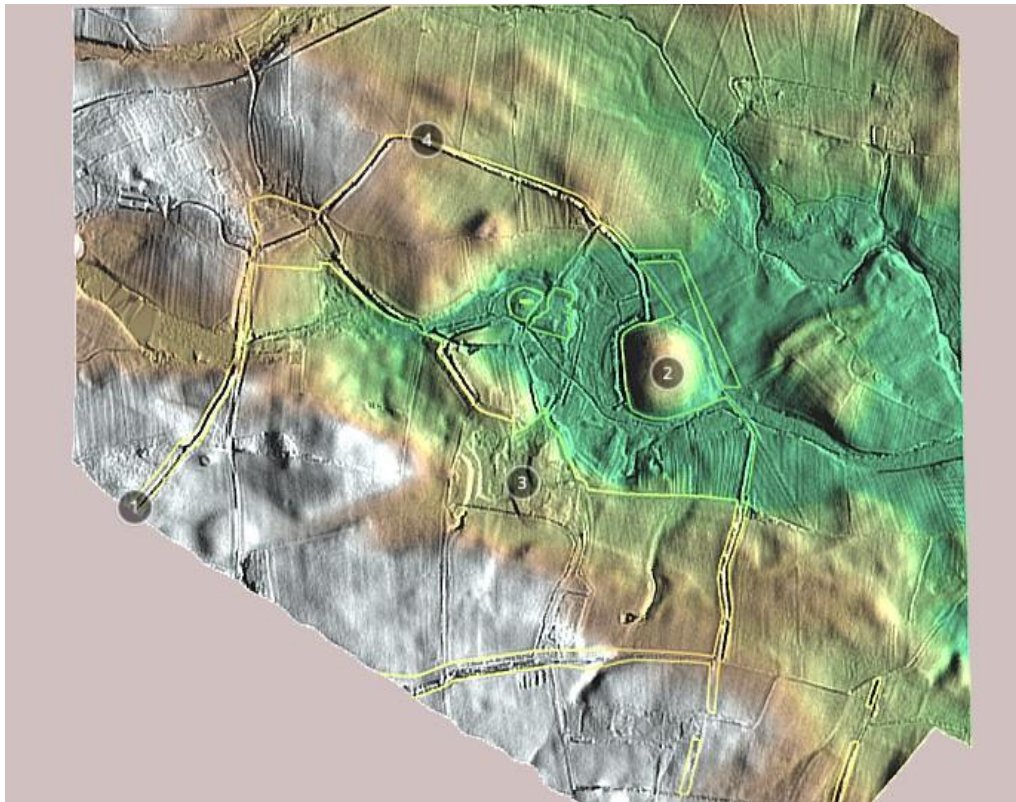


Figure 2.17: LIDAR of Stanwick Camp, Stanwick Late Iron Age *oppidum*, Iron Age and medieval settlement, early Christian church and sculpture and post-medieval embarkment, Aldbrough - 1016199 | Historic England, 2022

2.4 Roman Urbanism in Western Europe

2.4.1 Context

The Roman presence in Europe north of the Alps and into Gaul began in 154 BCE when the Romans came to the aid of the city of Antipolis against a tribe of the Ligures who were threatening Roman interests in the region (Pellegrino 2020, 123-171). The Romans took the opportunity to conquer southern Gaul between 125 BCE and 118 BCE and established the provinces of Gallia Transpadana, 'Narbonensis'. As a result, there was an increase in aggression towards Mediterranean (Greek and Roman) imperialism and an increase in the size and wealth of local settlements (Pellegrino 2020, 123-171). As a result of this instability the Roman colony of Narbo was founded in 118 BCE and other Roman strongholds were established at Arles, Aix, and Toulouse. Native settlements slowly withered away at this time to make way for new Roman settlements. The construction of Narbo meant that large scale agricultural and metallurgical processes were possible thanks to the centralisation of the economy. Because of changes that these centres introduced, new and significantly more wealthy villages began to develop along the main Roman roads (Pellegrino 2020, 123-171). As a result of these larger settlements, contact with the Mediterranean increased and older 'local' centres became more prosperous as well. These centres became increasingly influential and independent/autonomous and would often join local forces against Roman and Greek settlements (Pellegrino 2020, 123-171).

The processes that saw the formation of numerous *civitates* (local tribal administrative centres and or territories) can be grouped into two main stages. The main reorganisation of the settled landscape in southern Gaul that took place under Julius Caesar in the 50s BCE and the second under the Roman emperor Augustus. Before Caesar's subjugation of the settled landscape, and particularly during the late 2nd century BCE, Continental Europe (Gaul) was defined by the presence of numerous small settlements. The landscape at this time saw many independent communities operating underneath a larger set of rules and systems maintained by Rome (Pellegrino 2020, 51-74, 123-171; Drinkwater 1983).

The settlement landscape of Gallia Narbonensis changed significantly over time. The initial phase of Roman influence came in 125 BCE when the Romans came to the aid of the Greek colony of Massalia which was being threatened by a number of Gallic tribes. Rome permanently placed a stake in this area, and it became a province, Gallia Transalpina (Pellegrino 2020, 123-171). After some instability, a number of defeated tribes were bestowed with the status of *foederas* (allied state) and most likely maintained a degree of autonomy. Before Caesar's reorganisation, Gallia Transalpina was not politically integrated nor were its Roman inhabitants connected with the Roman heartland other than with some small-scale trade, notably of wine and slaves (pers comm. Tan 2022). A speech by Cicero from 70 BCE describes how the local inhabitants of the province were living in complete isolation and that Narbo, one of the only large-scale settlements in the area, was completely surrounded by enemies (Pellegrino 2020, 123-171). Before Caesar arrived, a number of settlements had been built including the well-known Lugdunum Convenarum. There were also a number of settlements located near to Marseille. Following Caesar's conquests in the 50s BCE, he set about establishing/re-establishing a number of *colonia*. Two are known to have been founded. One was the re-founding of Narbonne and the other was Arles (Pellegrino 2020, 123-171). These settlements along with others founded later developed over time into an extensive *civitas* network (Figure 2.18).



Figure 2.18: The territory of the *civitates* of Gaul and Germania Inferior. In red: the territory of the *civitates* as reconstructed by scholars on the basis of historical and epigraphic evidence; in black: the territory of the *civitas* as predicated by the Thiessen polygons, Pellegrino 2020

Germania inferior/superior also became Roman provinces, having been carved out of the existing Gallia Belgica during the 1st century BCE (Figure 2.19). The expansion into what became known as Germania coincided with the establishment of three legionary camps and *civitates* to oversee the provinces. The earliest settlement to emerge in Germania Inferior that had civic urban planning was Colonia Claudia in around 38 BCE (when it was still a part of Gallia Belgica) (Pellegrino 2020, 123-171). In 50 CE, Claudius established the colony of Colonia Claudia Ara Agrippinensium as well as a series of forts along the lower Rhine. The *castrum* or military fort of Castra Vetera became a veteran colony in 98-96 CE and Noviomagus, which had been for some time the local capital of the Batavians, became a *municipium* in 102-104 CE. Both these settlements had originally been legionary fortresses when Rome initially expanded into Germania in the 1st century BCE. During the reign of Claudius, two other *civitates* were founded. Important to note is the fact that all *civitates* with the exception of the *regio* of the Fisiavones tribe became either a *colonia* or *municipium* (Pellegrino 2020, 123-171) (Figure 2.19).

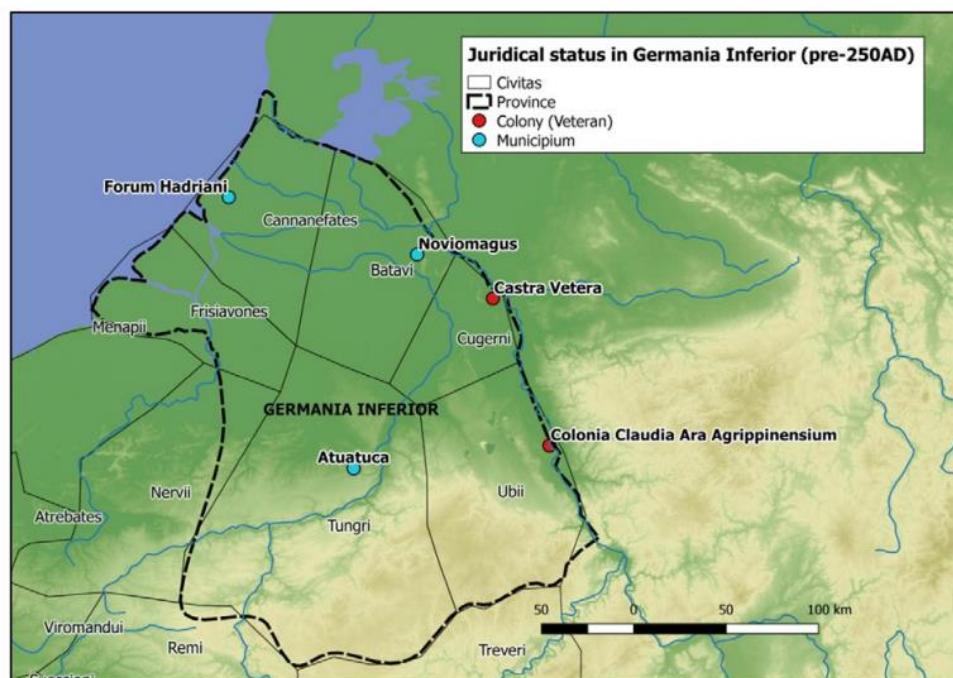


Figure 2.19: Cities' juridical status in Germania Inferior, Pellegrino 2020

Several forms of Roman settlement were operational in Continental Europe during the late centuries of the 1st millennium BCE. They were the *civitates*, the *municipia* and the *colonia*. The most common were the *civitates*. The translation of the word can most simply be stated as a citizen body or community which represented a territorial area. That being said, individual sites may take the word *civitas* in the name of that particular settlement (Pellegrino 2020, 51-74). The territorial areas of these *civitates* differed depending on geographical location. For the north-west provinces, the territories were often large and all settlements within that *civitatum* were often dependent on the '*civitas capital*'. A community could also receive *ius civitatis* or the right to govern themselves. The connection between Rome and the *civitates* operated on different levels and in different forms. Depending on the relationship, the *civitates* were offered certain rights and privileges that

befitted their relationship with the Roman state. For example, the highest ranking of these *civitates* were the *civitates foederatae* or 'allied states' (Pellegrino 2020, 51-74). Tribes such as the Remi and Lingones received such a status which gave them separate rights and privileges compared to everybody else. Another kind were the *civitates liberae* or 'free cities'. Tribes such as the Treveri received this status which granted them privileges such as tax immunity and being exempt from interference by the provincial governor. The third kind were the *civitates stipendariae* or 'tributary states' which could keep their autonomy but were obliged to pay taxes (Pellegrino 2020, 51-74) (Figure 2.18).

The other main settlement was the *coloniae*. These settlements can be further described by distinguishing between the veteran *coloniae* and the honorary *coloniae*. The veteran *coloniae* were founded for the purpose of settling discharged veterans who held Roman citizenship. Their role was also as a deterrent against conflicts and as a source of continued pacification of a particular area (Pellegrino 2020, 51-74). According to Potter, "In the western provinces *coloniae* were crucial centers of Roman culture, and desire to attain their status led to the progressive spread of Roman institutions into stipendiary communities. The title of *coloniae* was taken as a mark of communal *humanitas*, or the quality of civilization that Rome represented." (Potter 2014, 48). They were particularly necessary in areas deemed geographically strategic such as coastlines and next to major rivers, areas which enabled them access to other areas within the province. Because they were often built in areas that had previously seen major preceding local occupation, they may also have been a punitive means of reminding the local people who was in charge (Pellegrino 2020, 51-74; Potter 2014, 40-82). The honorary *coloniae* in comparison, were bestowed only on the most wealthy and influential of cities such as York and Trier and as such were incredibly rare (Pellegrino 2020, 51-74).

The third kind of settlement were the *municipia*. The *municipia*, or chartered town, did not initially bestow Latin rights such as citizenship. One particular type was the *municipium latium* which first emerged around AD 73-74 during the reigns of Vespasian and Titus and particularly in Spain. This new form did bestow Latin rights *ius Latii* on all settlements of this type in Spain (Pellegrino 2020, 51-74).

The internal organisation and layout of Roman towns often followed a well-known pattern, although some variations in form were common depending on regional and geographic factors. Generally, the most recognisable aspect of a Roman town was its orthogonality with some being further regularized into well-defined road grids. These roads separated *insulae* or square/rectangular blocks. The orthogonal towns would often have their forum/basilica complex located towards the middle of the town with the main streets running from the town gates and converging at the middle (Sewell 2014, 7554-7567). The *fora* themselves were often square or rectangular in shape and in areas of uneven topography/terrain and would often be located on level ground at the most elevated position within the settlement. Over time, the forum/basilica complex developed to have buildings related to economic and commercial activities located within (Sewell 2014, 7554-7567). Infrastructure such as *tabernae* (shops) and *macellum* (markets) sprang up in the centre of the town. There was also an increased political function of the *fora* complex and often a curia or senate house could be located within the complex. Over time, the increased political and economic

importance of the forum/basilica complex meant towns which had them were seen to be able to run their own affairs (Sewell 2014, 7563; Rogers 2014, 741-776). Other kinds of infrastructure you would expect to see within a Roman town were temples, located again on prominent and elevated positions within the town to mark out their importance to that community and to reflect the Roman ideology more broadly. There may also have been an amphitheatre, bathhouse and *mansiones*, depending on the location of the town (Sewell 2014, 7554-7567). Another aspect of visible space within Roman towns was zoning where one would expect to see clearly delineated areas (Sewell 2014, 7561). For example, one portion of the town could be designated for domestic buildings, while another could be for industry and industrial production.

2.5 Roman Urbanism in Britain

In Roman Britain, urban settlements were initially laid out in a way that conformed with the standard model. That being *colonia*, *municipia* and *civitates*. Each of these settlement types performed a specific role within a Roman province. The *colonia* were the most 'Roman-like' settlements in terms of appearance. They were the highest ranking of settlement forms and were often occupied by veteran soldiers and other individuals who held Roman citizenship (Rogers 2014, 741-776). The next settlement type was the *municipia* that only offered citizenship to its administrative representatives such as magistrates. The most populous settlement type were the *civitas capitals*. These sites were significant in that they oversaw a particular governable area. Adam Rogers' view seems correct in that while they were small in size, their value was more in how they interacted with other *civitas capitals* within their own *civitates*/territories. Furthermore, Rogers believes that while they did conform on some level with the standard Roman model (laws, town councils and magistracies), they were also surprisingly unique and varied in their makeup, both in their infrastructure and demographics (Rogers 2014, 741-776). The patterns of occupation in settlements during the Iron Age also warrants attention and the impact of this on the formation processes of Romanised settlements.

In Britain, the larger Romanised settlements had standard features which followed set plans that were replicated in other areas of the empire, particularly Continental Western Europe (Gaul, Germania). These plans included infrastructure such as forum/basilica complexes, bathhouses, amphitheatres, and markets '*macellum*', all of which were connected by a series of intersecting streets which funnelled people into areas considered important by the urban planners and administrative officials. The street networks demarcated the area of a settlement into several areas, the *insulae* or blocks, and created a potentially unifying ideology in its inhabitants, one that presented Roman settlements as preferred living spaces (Revell 2007, 127-151, Kaiser 2011). Public infrastructure such as theatres, bathhouses and temples tell can reveal a lot about the makeup of the local population and can provide an estimation of the number of people serviced by said infrastructure (Allen, et al 2018; Hanson and Ortman 2017, 301-324; Ortman and Hanson 2022) (Figures 2.20, 2.21, 2.22).



Figure 2.20: Location of *insula* IV of Wroxeter showing the forum, White, Gaffney and Gaffney 2013

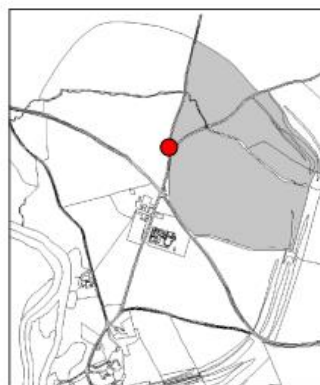
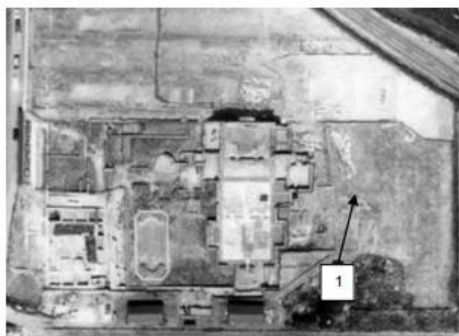


Figure 2.21: Location of *insula* v of Wroxeter showing bathhouse, White, Gaffney and Gaffney 2013



Figure 2.22: Plan of *temenos* and temple in *insula* VII, Silchester, Fulford 2021

The *civitas capitals* of Britain were much smaller in size than settlements such as Londinium, Verulamium and Colchester but had a greater connection with the rural countryside and most likely had less imperial oversight. The *civitates* were overseen by local magistrates and operated as areas in which local economic and social practices could be carried out in an urban setting. The smaller, rural sites had a much more profound impact on the landscape. Their relationship with agriculture and with an economy fuelled by agricultural pursuits meant that they persevered a lot longer than the larger urban capitals like London. The role that the local inhabitants of Britain had in ensuring that these sites remained functional cannot be understated. Simon Clarke has said that he, "...rejects the suggestion that the form of the Roman town can be explained solely as the imposition of an alien culture. Indigenous social forces must be considered primarily responsible for the maintenance and adaptation of an institution which survived for over three hundred years within the province." (Clarke 1993, 49). This is in contrast to the Roman politician and historian Tacitus who claimed that the formation of towns had more to do with encouragement from Roman administrative officials (Tac. Ag. 21, Birley 2009, 17). Private engagement has been a popular view taken by academics with those such as Martin Millett focusing on the role of official policy in encouraging the construction of *civitas capitals*. The role of the army in town construction has also been raised by (Millett, Revell and Moore 2016) (Frere, 1984, 11-17) and (Wacher 1974). The socio/political importance of these sites is also worth noting, particularly in relation to the larger towns, built on areas of significance to the preceding Iron Age populations.

For example, Silchester provides good evidence for local ritual practices and infrastructure that was implemented concurrently with Romanised elements of town building. A number of wells, many of which contain Iron Age material have been uncovered as well as several temples that were an amalgamation of the two cultures (Figures 1.10 & 2.22). Colchester (Camulodunum) located in Essex was chosen as the capital of Roman occupied Britain as it was located within the much larger *oppidum* of Camulodunum (see Figure 2.1) which held

regional authority under the Catuvellauni tribe. Areas of this *oppidum*, such as Sheepen and Gosbecks had been important hubs of manufacturing and trade (Jackson 2017). The presence of these industries as well as the socio-political and economic institutions within the *oppidum* presumably had a bearing on the development of Roman Colchester as the main Roman centre in Britain, at least until it was overtaken by Londinium in the latter part of the 1st century CE.

Roman authority introduced into the landscape, distinct urban elements that were new to Britain. Somewhat surprisingly, this process was not as clear-cut as it had been on the Continent with Britain appearing to display an amalgamation of Roman and local settlement patterns that resulted in a unique landscape of Roman urban centres of varied sizes with central facilities that were distinctly Roman and, in many cases, had the characteristic Roman masonry and brick walls around them. One key distinction that should be made is the degree to which blocks were infilled. On the Continent and around the Mediterranean, individual blocks were heavily occupied (refer to Figures of Pompeii, Lyon, and Trier, 1.9, 2.2, 2.3). Those in Britain, however, appear to have been far less densely occupied by visible buildings (Sewell 2014, 7554-7567). The arrangement of the occupation space has more in common with the *oppidum* pattern of spatial organisation, especially in the larger *civitas capitals*.

2.6 Conclusions

The internal organisation of settlements changed throughout the 1st millennium BCE and into the 1st millennium CE. This was seen through changing internal characteristics, new infrastructure and changing social, economic, and political processes. Occupation density also saw transformation over time. The *oppida*, which immediately preceded the Roman towns, operated on a model of density that saw decreasing density per settlement size increase. This differed from the Roman towns which saw increasing density per settlement size increase. In Roman Britain, there is an issue of which of these two models prevailed or whether two models of occupation density operated concurrently, which resulted in unique spatial layouts.

Chapter 3 – Methodology: issues of the interpretation of occupation density

3.1 Introduction

The analysis of occupation density in this thesis proceeds from the measurement of visible built space. Spatial software is used to detect and measure this built space. An occupation density can be discerned by measuring built areas throughout a defined settlement area and by calculating the amount of built space relative to the various areas, such as the *insulae*, into which the settlement can be divided, or relative to the total area of the settlement. This allows identification both of the internal organisation of settlements and the spatial patterning of settlements across Britain during the Roman period. The aim is to assess whether two separate density trends may have been operating at the same time, one which saw decreasing occupation density with increased settlement size and one which saw increasing density with increased settlement size, and then to consider whether there are potentially significant implications associated with different density patterns, especially at the regional scale.

3.2 Context

Roman Britain was home to a number of settlement forms. They ranged from small *vici* to larger complexes such as the *civitas capitals* and the much larger capitals like Colchester and Verulamium. The issue is whether there are differences in occupation density in the space within settlements and also differences in overall density within various sizes of settlements. As such, in order to understand the potential range of spatial patterns, a number of sites of differing sizes have been selected to reveal any differences in occupation density across the various settlement forms.

A major issue when it comes to finding detailed information on larger Roman settlements is that they are often located underneath modern towns and have therefore been difficult for archaeologists to study. While this does tell you whether a particular settlement was successful and survived into the modern period, it also means that broad information about the occupation density throughout the settlement has not been accessible (e.g., Cirencester Figures 1.20, 1.21) and is therefore not well known or understood. Where excavations have occurred within present day cities is largely due to happenstance because of commercial development and does not provide either a consistent or a comprehensive insight into the Roman settlement.

An additional issue has been the priorities of investigation. There has been a tendency to focus on specific, distinctly Roman aspects of a settlement such as the forum, defensive walls, amphitheatres and other key buildings and infrastructure, while excavation of domestic features such as the spatial configuration of the *insulae*, industrial and commercial activities or the form of houses has been more limited and tend to be piecemeal. The clarity of information in regard to individual aspects of a settlement is strongly influenced by the

type of excavation carried out and the available locations. Excavation in redevelopment projects is more likely to be in the central area of the modern and Roman settlement.

In contrast, research archaeology, in principle, does not have the same restrictions, can focus on other areas of the Roman settlement, or can survey the entirety of the site which can help to create a more substantial, potentially comprehensive, and better picture of the internal organisation of the settlement. Places where this can be done are limited, essentially to 'greenfield' sites i.e., places which have been largely or completely abandoned since the Roman period.

It is important to note however, that until recently there has still been a tendency to give more attention in excavation to the internal organisation and structures that occur in Roman towns on the Continent and in Britain such as the forum, bathhouses, amphitheatre, and surrounding fortification walls. i.e., on the larger and more notable buildings as well as the elements of a town that are the most visible in the archaeological record, rather than focusing on other more nuanced differences in terms of spatial organisation. There are some exceptions such as the *insula* excavations in Silchester (Fulford 2021) and in Wroxeter (White, Gaffney and Gaffney 2013). This has made studies of occupation density and spatial patterning difficult and limits cross-comparability to a small number of suitable sites of the Roman period in Britain.

Furthermore, several illustrations of Roman settlements in Britain that have been selected for this thesis reflect a much higher internal built space density than the archaeology has so far been able to identify. This is perhaps due to a tendency to view classical Roman settlements in the Mediterranean and Continental Europe as the same as those in Britain.

The information required in order for an assessment of occupation density to be carried out is first and foremost a series of settlement plans which contain data that has been gathered from both archaeological excavation and surveying. This study will be an initial assessment of sites for which plans can be obtained and which are comprehensive enough to enable an overall estimation of visible occupation for the whole of a settlement rather than just one limited part of it. This is important because fragmentary information would indicate that a site which is under-excavated/surveyed was operating at a low occupation density even though it may actually have been more densely occupied. The available information for Verulamium illustrates this problem and is used as a test case in Chapters 7 and 8 to show what can be obtained about selected parts of the settlement and what must be treated cautiously for the whole settlement. As has been discussed in Chapter 1 (see pp 19-20), the ongoing remote sensing surveys of Verulamium continues to suggest that it contained substantial open areas (Lockyear and Shlasko 2017). Part of the on-going issues concerning the density of Roman settlements in Britain, as Ortman and Hanson have noted (Ortman and Hanson 2022), is the problem of whether a settlement had a visibly low-density occupation because it was actually configured that way, or whether the site is under-excavated/surveyed or only partially examined. Assessment must necessarily commence with sites whose settlement plan is extensively known rather than fragmentary so that alternatives can be considered.

It is also important to note that the occupation density descriptions can only describe an overall pattern which is a palimpsest of patterns of spatial organisation over time. The plans that have been used in this thesis have to be accepted as they are because there is no way (other than detailed and comprehensive excavation) to date the buildings to different construction periods of the settlement's history and to sort out how long they were in use. This study therefore offers an estimate approximating the occupation in the peak period of the settlement's extent and occupation within the 2nd - 3rd centuries CE. The general assumption on which the analysis in this study is based is that most of the buildings which can be recognised in the settlement plans were durable structures such as those constructed out of masonry and brick. They could be expected to have persisted for relatively long periods of time in urban contexts and as such may provide an index of the density of occupation at the peak of the settlement's history and as such is a 'through time' occupation density (pers comm. Roland Fletcher). It is important to note for the topic of this thesis that dividing up the built space over time would either produce much lower overall densities or also require analysis of different areas for each period of the settlement's existence.

A range of site sizes have also been selected so that the analysis can assess whether there exist any trends of density relative to the size of a settlement. As such, for an initial analysis, two greenfield sites have been chosen that represent small, medium, and large size settlement categories. These are sites that have not been built on since the Roman and early Anglo-Saxon periods and so enable access to most of if not all of the settlement plan. The larger ones have been mapped by aerial photography, gradiometry and other remote sensing procedures which have provide detailed plans while some of the small settlements (*vici*) have been extensively excavated.

The analysis will be based on measuring occupation density and will later consider (in Chapter 8) whether density patterns had a bearing on the continuity of Roman-British settlements. Only a relatively small number of sites – six in the initial analyses in Chapters 4, 5 and 6 are available at this level of detail to provide the necessary comprehensive data for the analysis of built space/density. Another six -including one, Verulamium, which has a less comprehensive coverage, are added for additional analyses in Chapters 7 and 8. As the study can only be carried out on this small sample, the analysis therefore only seeks to illustrate the trends and discuss alternative interpretations and their implications. Statistical appraisal has not been included in the study.

3.3 Methodology for Analysis

3.3.1 Settlement data

The sites that have been used for this analysis fall into pragmatic categories of small, medium, and large size. The smaller sites used are predominantly *vici*, or civilian settlements that were built adjacent to a Roman fort or fortress. They are located throughout Britain but particularly in those areas that were at the time of their construction, the frontier. The decision has also been made to only include the occupation density of the *vicus* and not the fort. This decision has been made because the spatial patterns and internal densities of forts and the *vici* were different enough that they should be treated as entities in their own right. Furthermore, the occupation density of a fort was on average, likely to be quite high due to

the strict and highly organised nature of the military, which enabled a higher density pattern of living. Combining the density of the fort and the *vicus* is liable to give a figure that does not represent the actual density at which ordinary i.e., non-military, daily life could function and would tend to inflate the densities for the smaller settlements.

The other settlement forms are medium and large sized *civitas capitals*. These were settlements which were overseen by the local inhabitants and acted as administrative nodes for the surrounding landscape and were managed by a particular tribe under the direction of the Roman authorities. The data used for these sites has been a combination of surveying data and excavation reports from which regional specialists have compiled the settlement plans that have been used in the density analyses.

A map of where the chosen settlements are located in Britain in relation to the major Roman roadways (Figure 3.1) shows the dispersal of the selected sites throughout the interconnected province.

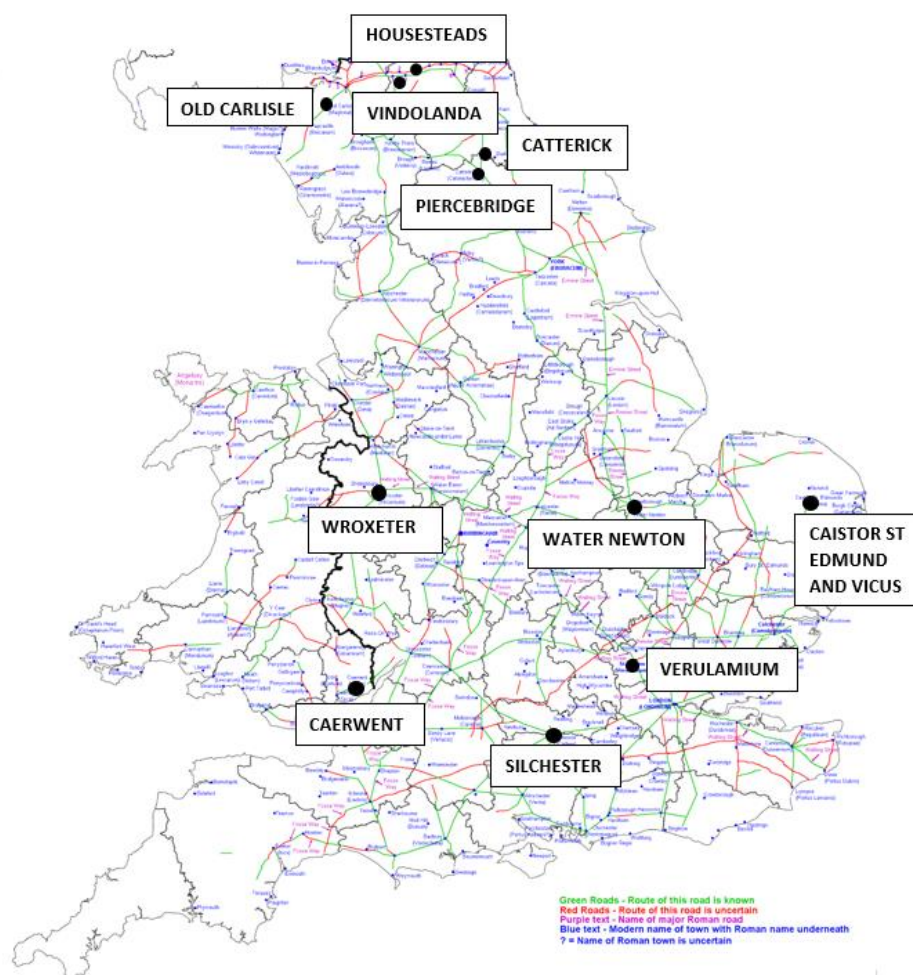


Figure 3.1: Location of settlements chosen for analysis including major Roman roadways including Caistor St Edmund town and Caistor St Edmund *vicus* which are represented by a single point, https://www.romanobritain.org/7-maps/map_romans_roads_in_britain.php

The plans of the selected sites are provided under the sections on the small, medium, and large settlements (Figures, 3.2-3.13). The plots of the sectors into which the *vici* are divided

3.3.2.3 Catterick *vicus*:



Figure 3.4: Plan of Catterick *vicus*, (Cataractonium). <https://greatnorthroad.co.uk/roman-catterick-cataractonium>

3.3.2.4 Housesteads *vicus*:



Figure 3.5: Plan of Housesteads *vicus*, (Vercovicium). <https://www.u3ahadrianswall.co.uk/guides-to-the-wall-sites/housesteads-roman-fort/>

3.3.2.5 Old Carlisle *vicus*:



Figure 3.6: Plan of Old Carlisle *vicus*, (Olenacum).

<https://www.u3ahadrianswall.co.uk/wordpress/old-carlisle-roman-fort-and-civil-settlement-maglona/>

3.3.2.6 Caistor St Edmund *vicus*:



Figure 3.7: Plan of Caistor St Edmund *vicus*, Grimmer 2016

3.3.3 *Civitas Capitals* - medium

Caistor St Edmund and Caerwent will be discussed as case studies in Chapter 5. Water Newton will be added in the analysis of density gradients (Chapter 7) and density trends (Chapter 8) overviews.

3.3.3.1 Caistor St Edmund:



Figure 3.8: Plan of Caistor St Edmund and *vicus*, Grimmer 2016

3.3.3.2 Caerwent:



Figure 3.9: Plan of Caerwent, <https://medievalheritage.eu/en/main-page/heritage/wales/caerwent-roman-town/>

3.3.3.3 Water Newton (Durobrivae):

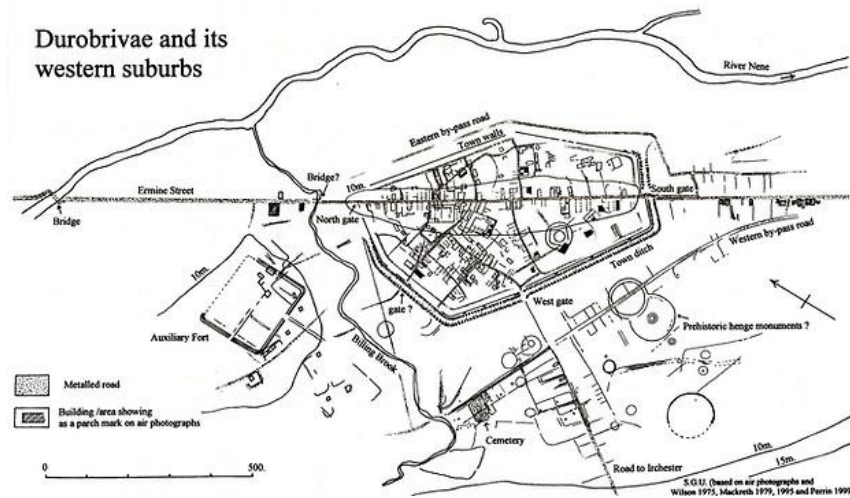


Figure 3.10: Plan of Water Newton, <https://www.nenevalleyarchaeology.co.uk/durobrivae-1>

3.3.4 *Civitas Capitals* - large

Silchester and Wroxeter will be discussed as case studies in Chapter 6. Verulamium will be added to the density gradient and density trend overviews in Chapters 7 and 8.

3.3.4.1 Silchester:

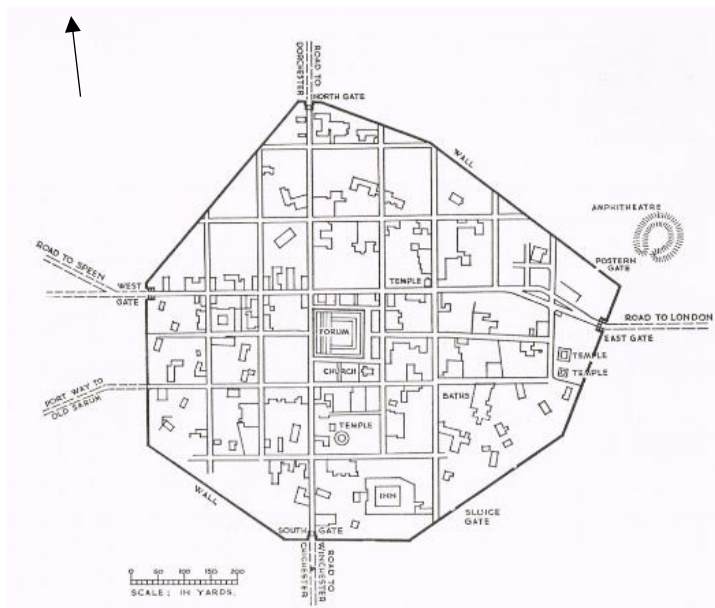


Figure 3.11: Plan of Silchester, <https://www.wilcuma.org.uk/wessex/a-history-of-hampshire/1576-2/>

3.3.4.2 Wroxeter:

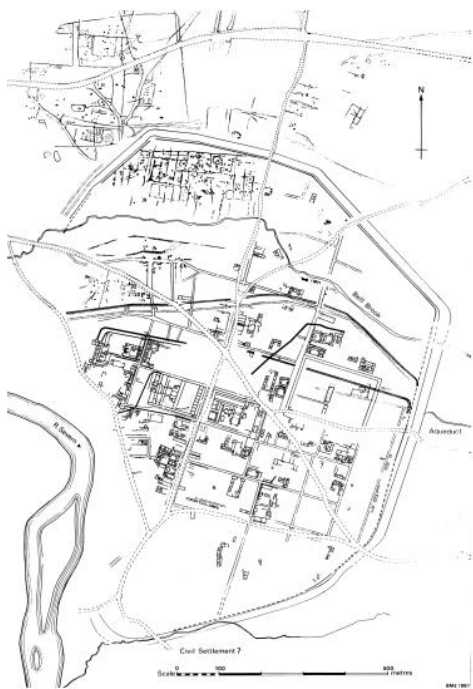


Figure 3.12: Town Plan of Wroxeter, White, Gaffney and Gaffney 2013

3.3.4.3 Verulamium:

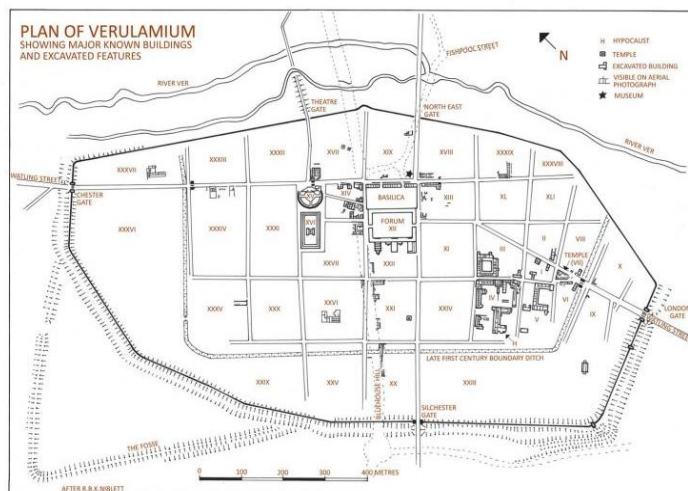


Figure 3.13: Plan of Verulamium, Niblett 2022

3.3.4 Calculating areas

To begin, the area of the total settlement was required. For sites that had clearly delineated walls this was not an issue. Through ImageJ you could select the relevant scale and then trace the outer walls to find the settlement size. Some rare structures such as amphitheatres are usually located outside the boundary walls (Figure 3.14). If these isolated buildings and all their adjacent space was included in the total settlement area, then the occupation density of the main area where people lived within the walls would be misrepresented. All settlements with any formal structures, even one, outside the walls would be quantified as a settlement containing a proportionately large amount of open

space and they would all tend by default to be designated as low or lower density. The decision has therefore been made to exclude extramural structures except where a *vicus* is present which is treated as a separate settlement for this analysis.

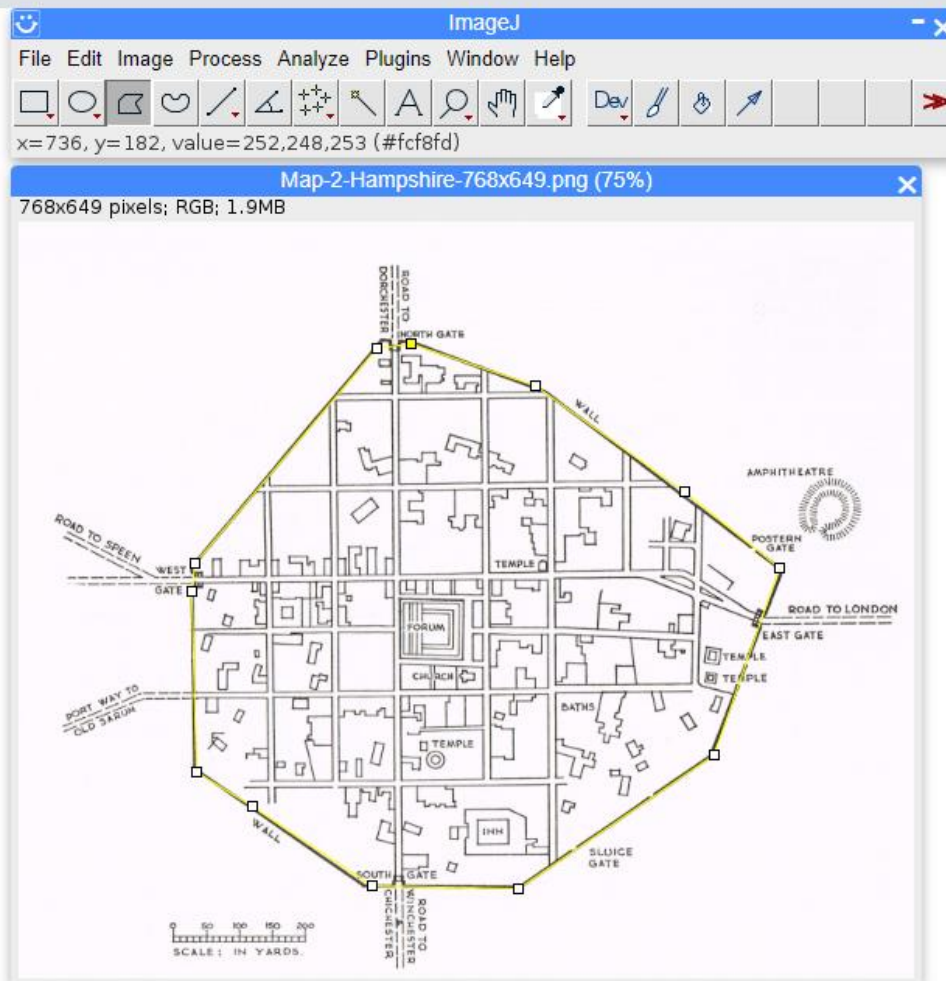


Figure 3.14: Silchester with selected area around town walls, ImageJ

For the *vici*, which do not have clearly defined walls, an estimation was required in order to specify the size of that settlement. Pragmatically, this involved tracing around the major built areas and leaving out the open, unbuilt areas.

The *vicus* of Vindolanda further illustrates the issues of designating the size of a site. Most of the built space for Vindolanda sits immediately west of the military fort. This immediate area is roughly one to one-point-five hectare in size. That being said, there is a far more sparsely built area further to the west that contains a scattering of buildings including a temple-like building to the north-west of the main built area located immediately next to the fort (Figures 3.15, a, b, c, d).

The area to the west of the main built section of the *vicus* was significantly lower in occupation density. This was due in part to heavy agricultural activity in the modern era which has caused significant damage to Roman period structures (Reece, 1980). That being said, the area does appear to have had relatively few structures. The density of occupation

during the 3rd century CE appears to have been significantly low with only a scattering of buildings, including a religious precinct. This together with evidence for religious structures to the north-west of the *vicus* suggests that these areas may have had a symbolic/ritualistic significance, and which could have been a unique entity in comparison with the domestic structures closer to the fort (Blake 2014, 42-46).

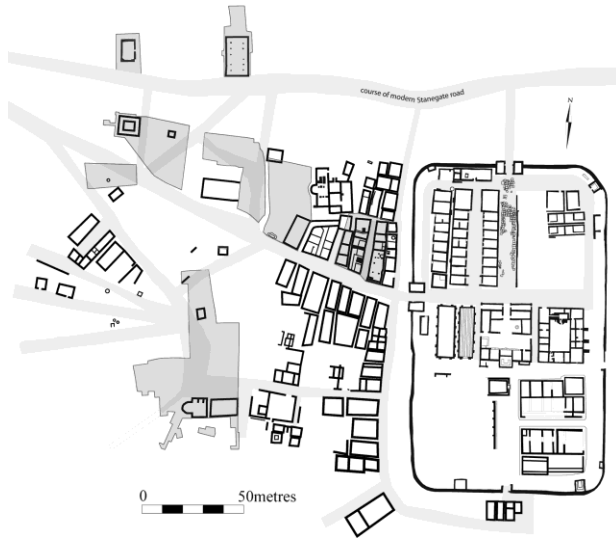


Figure 3.15a: Plan of Vindolanda *vicus*, Birley, Meyer and Greene 2016

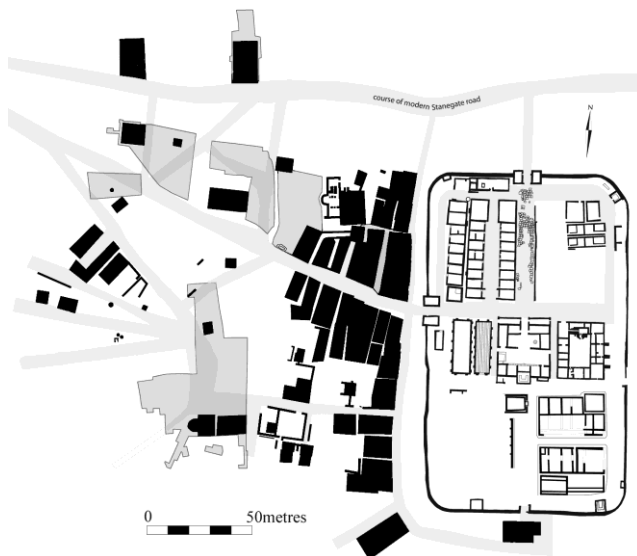


Figure 3.15b: Vindolanda *vicus* blacked-in



Figure 3.15c: Potential alternative site size of *vicus* in comparison with larger site size with area further to the west, Birley, Meyer and Greene 2016



Figure 3.15d: Potential alternative site size of *vicus* in comparison with larger site size with area further to the west, blacked-in

The two images above provide an alternative edge to the settlement area, focusing more on the conglomeration of buildings directly to the west of the fort rather than the more expansive area to the west as evident in the other plans (Figures 3.15 a, b).

Another issue that has had to be addressed are the roads. Because ImageJ calculates pixels to white space, many of the roads needed to be removed so that the software did not mistake them for built space. One way to fix this issue was to trace just within the individual

blocks to ensure that the road lines were not included. This left only the built space within that particular block.

3.3.5 Occupation density data

As mentioned in Chapter 1, the analyses carried out in this thesis will deal principally with ‘visible’ occupation density and will only discuss what is currently ‘invisible’ density in the conclusions of the thesis. The interpretive issues of potentially present but ‘invisible’ occupation will be discussed in Chapter 8 as several alternative models may apply which will in future need to be assessed by field research.

Spatial data software will be utilised in this thesis, particularly in relation to the occupation and residential densities of a number of Roman settlements in Britain. Existing occupation data that has already been collated for Roman settlements in Britain in combination with data collated through independent data analysis from the utilisation of the software ImageJ provides the necessary insight into the occupation density of a number of Roman British settlements. This software (ImageJ) allows one to calculate the area of binarized particles, measuring the area of selected space, in this case, measuring built space relative to unbuilt space which will give a clearer picture of trends in occupation density.

As mentioned in Chapter 1, this analysis is one that measures occupation density, or the density of built structures within an urban settlement. It is not a population density analysis. As population numbers are garnered from textual sources, and because Britain has no textual sources which offer population numbers, this thesis will not be dealing with population densities. That being said, population estimates have been made for some Roman British towns, which have been based on the scaling theory which presumes that settlements increased in density the larger the settlement became. This is in line with patterns of settlement density seen in Roman towns in other areas of the empire including Western Europe and the Mediterranean. As such, issues to do with population density will be addressed only when it directly pertains to the occupation density analysis that is the focus of this thesis (Wilson, 2011).

Jack Hanson and Scott Ortman (Hanson and Ortman 2017; Ortman and Hanson 2022) have compiled a list which provides an estimate of population in many Roman towns (Figure 3.16). While these figures may be useful in, according to Jack Hanson, revealing patterns of consumption and production of resources, the size of the market and the size of elite/non-elite groups within an urban community, the figures are predicated on a model that refers to other areas of the Roman Empire. This thesis does not argue that the density trend did not take this form. Instead, it seeks to draw attention to alternative trends, to assess their consequences and to consider which of them may have been operating, either singularly or collectively.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Primary Key	Ancient Toponym	Province	04 Sizes (Over Time) (Areas).Max	04 Sizes (Over Time) (Populations).Max	Longitude (X)	Latitude (Y)	p/ha							
2	383	Aquae Sulis //	Britannia	12	1157	-2.357454	51.3814	96							
3	384	Caesaromagus (Britannia) //Chelmsford	Britannia	16	1700	0.469708	51.7358	106							
4	385	Calleva //Silchester	Britannia	45	6767	-1.082817	51.3571	150							
5	386	Camulodunum //Colchester	Britannia	48	7376	0.899031	51.891	154							
6	387	Corinium Dobunnonum //Cirecenester	Britannia	93	17849	-1.966753	51.7136	192							
7	388	Corstopitum //Corbridge	Britannia	16	1700	-2.029155	54.9781	106							
8	389	Durnovaria //Dorchester	Britannia	39	5589	-2.440504	50.7109	143							
9	390	Durobrivae (Britannia) (1) //Water Newton	Britannia	18	1989	-0.34821	52.559	110							
10	391	Durobrivae (Britannia) (2)	Britannia	10	907	0.503732	51.3898	91							
11	392	Durovernum //Cantebury	Britannia	59	9718	1.080503	51.2787	165							
12	393	Eboracum //York	Britannia	40	5782	-1.082286	53.9577	145							
13	394	Glevum //Gloucester	Britannia	52	8209	-2.245843	51.8653	158							
14	395	Isca //Exeter	Britannia	37	5210	-3.530026	50.7224	141							
15	396	Isurium //Aldborough	Britannia	28	3590	-1.371971	54.0913	128							
16	397	Lindinis //Ilchester	Britannia	9	788	-2.687138	51.0036	88							
17	398	Lindum //Lincoln	Britannia	41	6034	-0.538436	53.2349	147							
18	399	Londinium //London	Britannia	160	36851	-0.086632	51.5109	230							
19	400	Luguvallium //Carlisle	Britannia	28	3590	-2.938982	54.8953	128							
20	401	Moridunum //Carmarthen	Britannia	15	1559	-4.296705	51.862	104							
21	402	Noviomagus (Britannia (Inferior et Superior))	Britannia	42	6171	-0.779196	50.8365	147							
22	403	Petuaria //Brough	Britannia	5	359	-0.572933	53.732	72							
23	404	Ratae //Leicester	Britannia	46	6969	-1.139808	52.635	152							
24	405	Venta Belgarum //Winchester	Britannia	58	9498	-1.316504	51.0629	164							
25	406	Venta Icenorum //Caistor St Edmund	Britannia	18	1989	1.290907	52.5834	111							
26	407	Venta Silurum //Caerwent	Britannia	18	1989	-2.768088	51.6112	111							
27	408	Verulamium //St Albans	Britannia	90	17084	-0.357277	51.7522	190							
28	409	Viroconium //Wroxeter	Britannia	82	15086	-2.644025	52.6743	184							
29															

Figure 3.16: The areal extent and population density (people per ha) for Roman British towns, Ortman, Hanson 2022

3.3.6 Identifying built space

The analysis uses numerical data provided by the program ImageJ, developed at the National Institute of Health and the Laboratory for Optical and Computational Instrumentation. As mentioned above, this software is useful for the calculation of the area of a site or particular areas within a site. This analysis has required calculating site size, block and sector size and individual building size. To begin, a settlement plan is selected that depicts the blocks and buildings which are currently known due to excavation and survey evidence (Figure 3.17 a, b).

The software can extract selected space within binarized images. Photoshop was utilised initially as it allowed (through the filler application) for individual buildings to be filled in black compared to open space that remained white. Photoshop ensures that the image and the individual pixels that make up that image are clear and crisp so as to eliminate the possibility of over or underestimating the area of a particular settlement. The time it took to complete this task varied greatly, depending on the size of the site and the number of blocks/ buildings that needed to be filled in (Figures 3.17 a & b 3.18, 3.19, 3.20). ImageJ could then discern how much built space existed within a particular settlement and as such, the occupation density could be calculated (Figure 3.17 b).

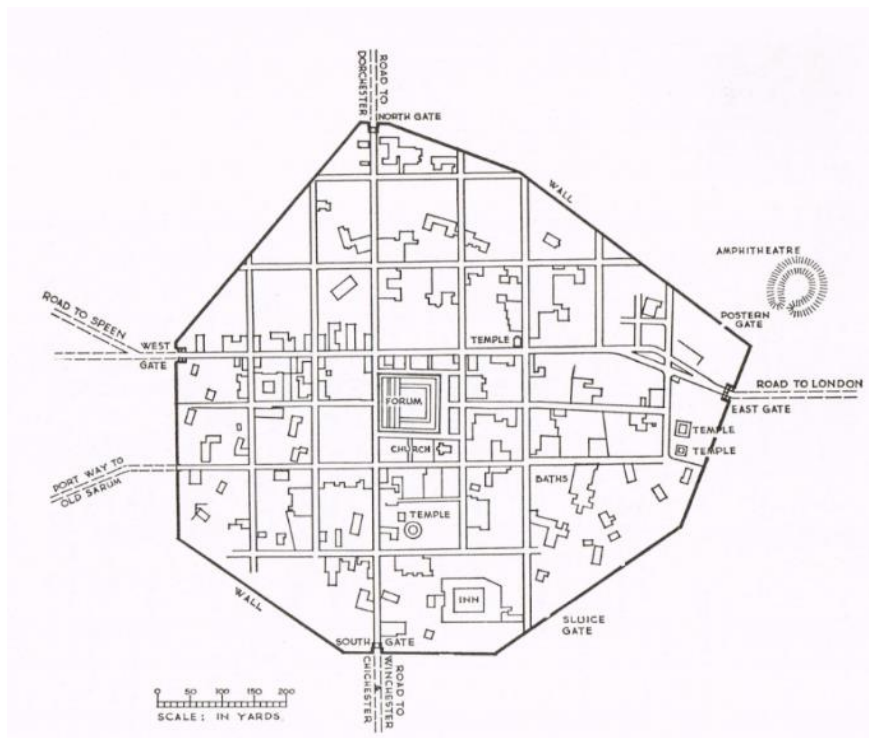


Figure 3.17a: Plan of Silchester, <https://www.wilcuma.org.uk/wessex/a-history-of-hampshire/1576-2/>

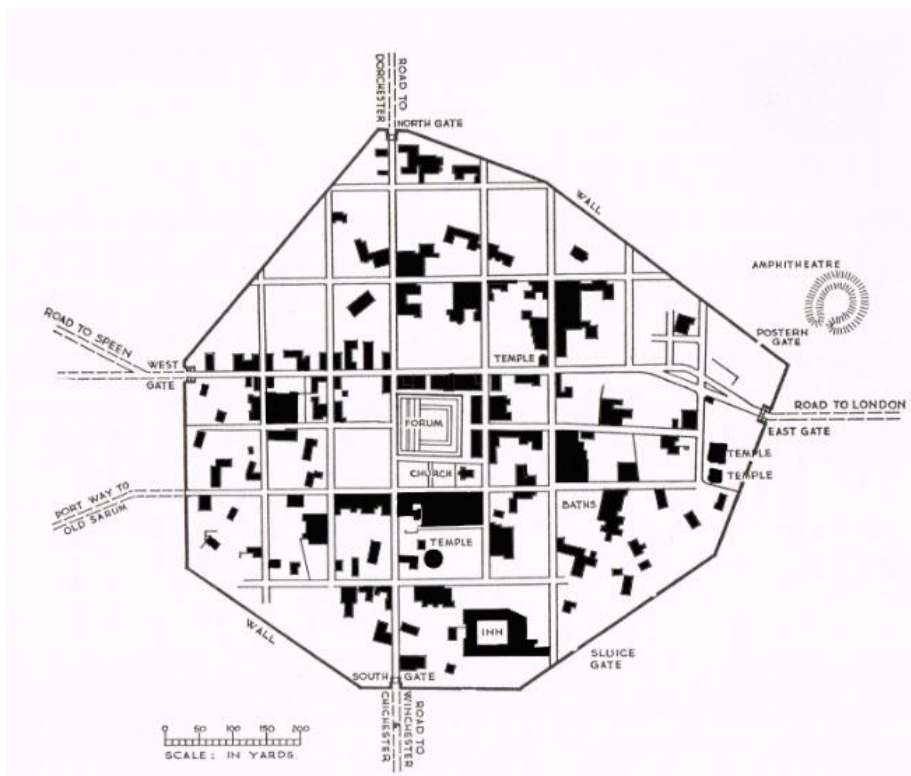


Figure 3.17b: Plan of Silchester blacked-in

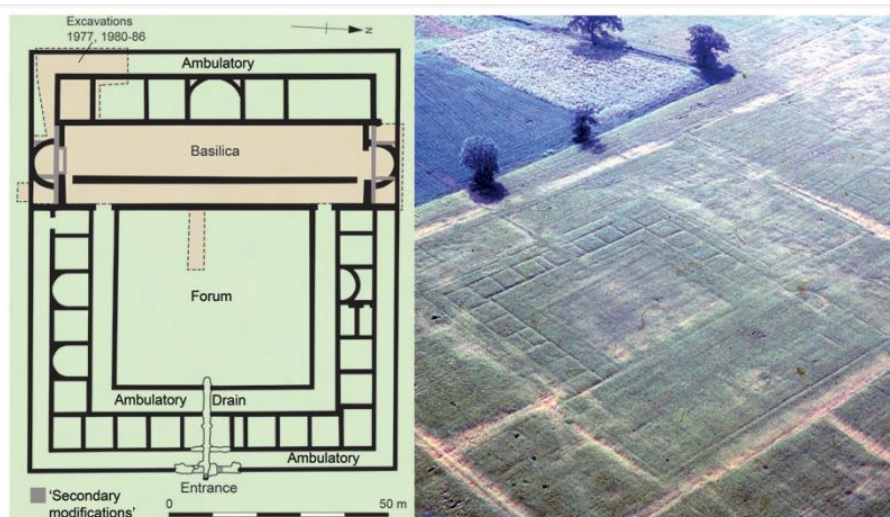


Figure 3.18: Aerial view of early 2nd century masonry forum basilica, Silchester, (from north-west), Fulford 2021



Figure 3.19: Aerial view of *insula* 9, Silchester, looking north-east, Fulford 2021



Figure 3.20: Plan of House 2 located in Silchester, *insula* 19, Fulford 2021

The built space that is dealt with here covers both public and private structures and so is slightly different than Ortman and Hanson's analysis which is based on built (private) structures not public ones. The key thing to recognise is that the visible occupation densities that are presented here will represent a somewhat higher overall density than the densities dealt with by Ortman and Hanson because of the added public structures that are included as part of this work, and which are discussed further in Chapter 8.

3.3.7 Density analysis

Following these procedures, the actual density analyses can take place. The analyses were fourfold. The main process was to calculate the area of built space to unbuilt space within the settlements chosen as case studies. The first round of calculations involved measuring the entire size of the settlement. From here the built space within the settlement could be measured. This was done through an application within ImageJ called thresholding. This tool extracts selected space from within an image and gives it an area value. Because the built space was previously filled in through the use of Photoshop, ImageJ was able to extract this space and give it an area value.

The second round of calculations involved measuring the amount of built space in each block per settlement with the goal of providing a clearer view of occupation density, or a more nuanced view of the density within each block and the relationship between them. The way this was done follows the same process as the preceding total site size vs total built space calculation. After measuring the size of each block, the image was thresholded to reveal the built space value for each structure within each block.

The third round of calculations involved creating a density gradient for each settlement. This was done by first measuring the distance between the middle of the settlement (visually identified as the forum/basilica complex) and each of the blocks within the settlement. These figures would provide the x axis of the graph. The second step was to convert the amount of built space within each block to a percentage. These calculations provided the y axis of the graph. The resulting graph represents the density gradient, i.e., the way density changed across a settlement. Generally, the trend showed higher density towards the centre and lower density moving outwards towards the edges of the settlement. The density gradients within each settlement will be compared in Chapter 7 with the addition of some further case studies to illuminate the patterns of density gradients.

The final round of calculations involved measuring the density of built space for whole settlements i.e., built space in square metres relative to the number of hectares in the settlement. The calculation required is to take the total built space in square meters and then divide it by the total settlement size in hectares, to produce a density description in terms of square metres of built space per hectare of space within a settlement. This calculation is important in that it shows an average density for each settlement and allows one to consistently plot the density of settlements on a bivariate graph.

Below is a selection of schematic graphs which illustrate the measured data acquired for this analysis of occupation density (Figures 3.21, 3.22, 3.23 & 3.24).

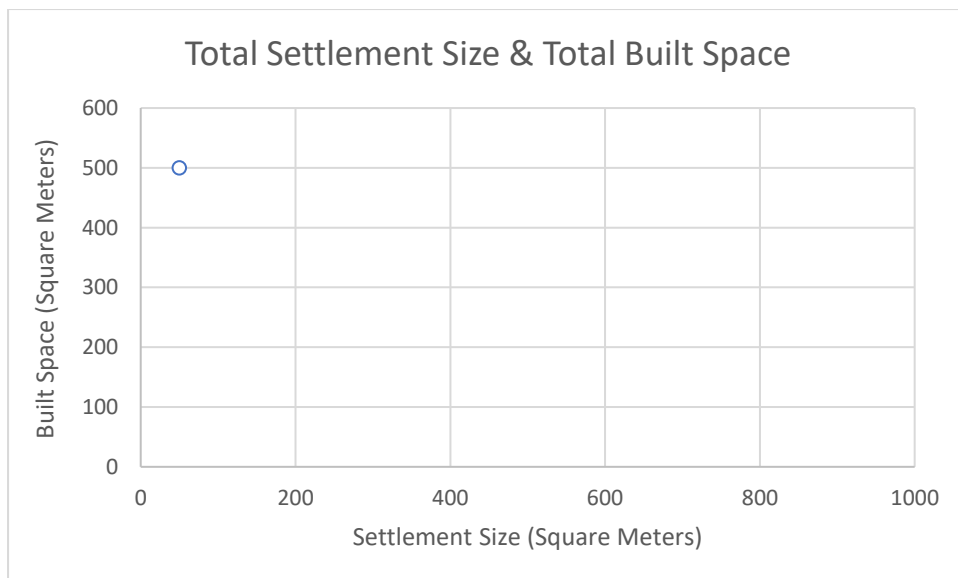


Figure 3.21: Total built space (in square meters) schematic

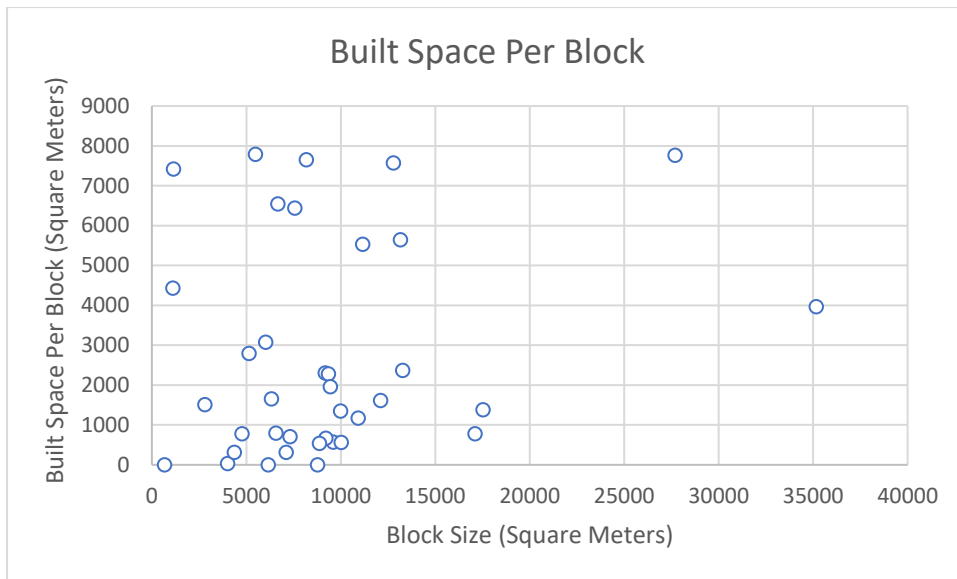


Figure 3.22: Built space per block (in square meters) schematic

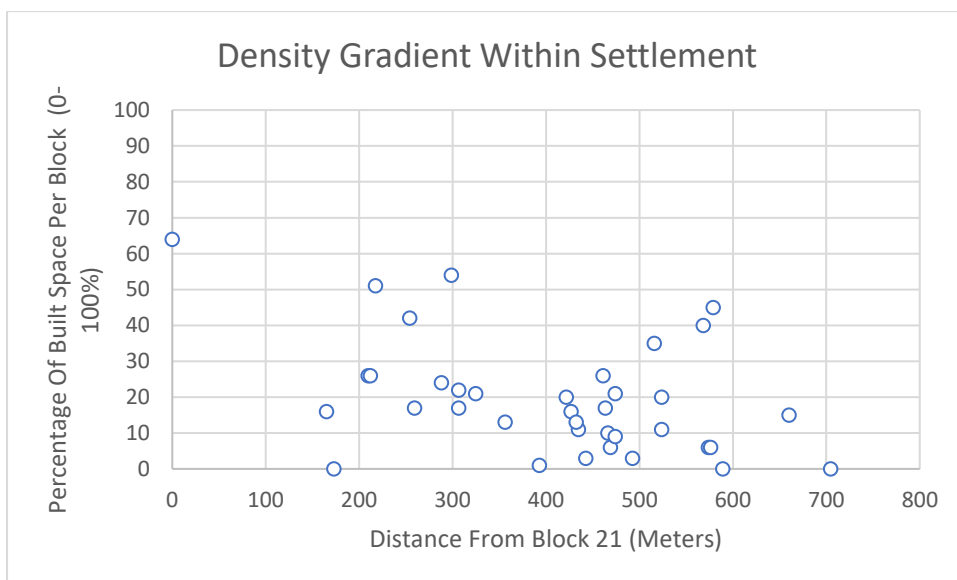


Figure 3.23: Gradient of density (%) schematic

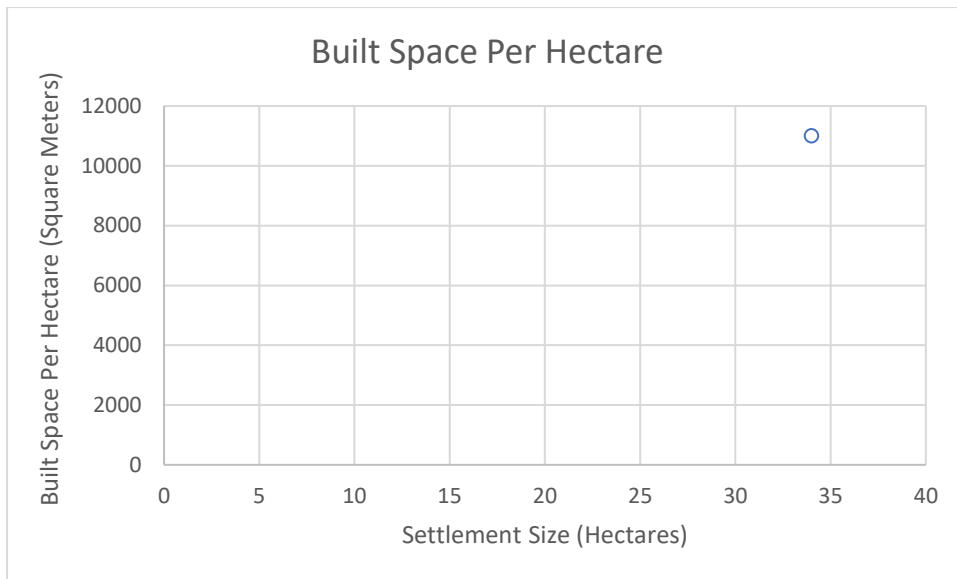


Figure 3.24: Density of built space (in square meters per hectare) schematic

The two alternative density trends are best illustrated in the diagrams below. The first graph (Figure 3.25) represents a trend of decreasing density with increased settlement size while the second graph (Figure 3.26) shows a trend of rising density with increased settlement size.

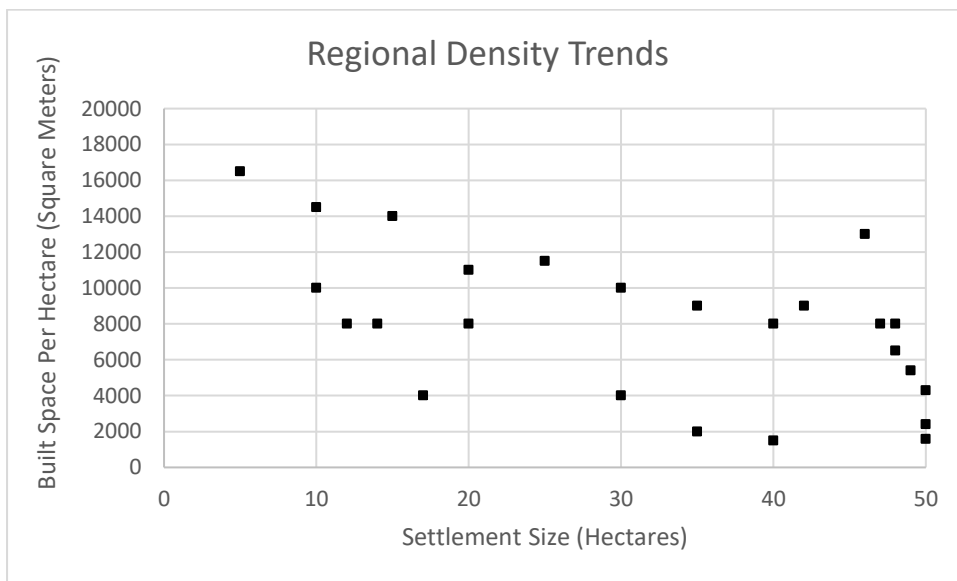


Figure 3.25: Decreasing density with increased settlement size schematic

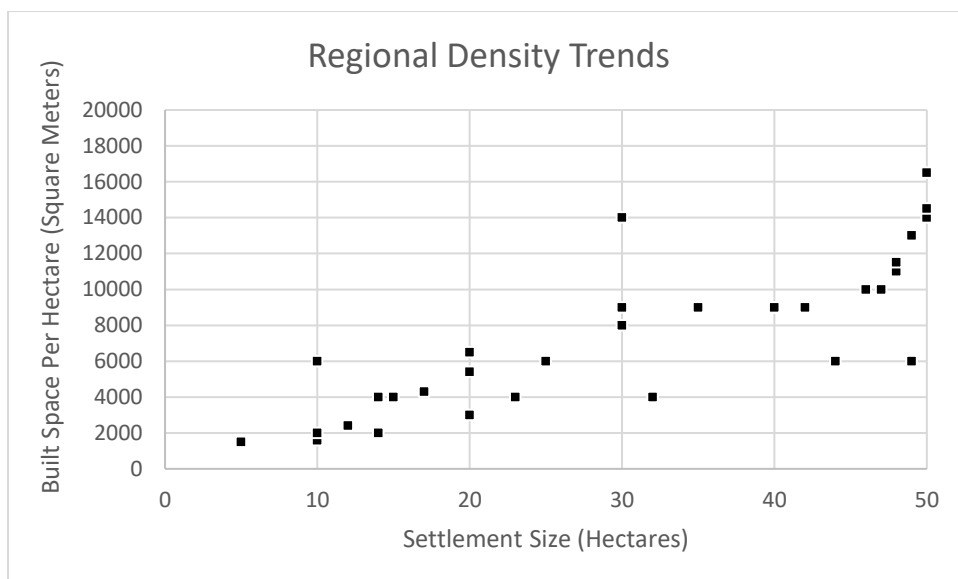


Figure 3.26: Increasing density with increased settlement size schematic

3.4 Introduction to Settlement Chapters

The following Chapters (4, 5 and 6) focus on the spatial layout and occupation density of a range of settlement forms in Britain during the Roman period. Occupation density refers to the 'built space' of urban settlements so the following chapters will allocate some space for identifying and remarking on how that built space influenced the internal character of a site, what its impacts may have been on the residents and how the residents were known to be behaving, e.g., the degree of continuity in local behaviour.

The examples that have been chosen, represent three size categories. These particular sizes were selected as they give an indication of the range of settlements that were present in Britain during the Roman period. The smallest are roughly 1-5 hectares, the medium sites are between 18-50 hectares and the large sites are between 60-85 hectares in size. Each chapter will describe two settlements of each size category, small, the *vici*, medium and large, *civitas capitals* and will provide a brief history of the site, and a discussion of key internal characteristics, predominately types of durable public and private structures that had a bearing on the site's organisation, density, and spatial layout. Each chapter will contain a discussion of the intended sites and will conclude with a summary of the diagrams. The chapters will then analyse the data that has been obtained using the methods which have been presented in the methodology (this chapter). Due to the high degree of variability when it comes to information concerning each of these sites, the chapters will deal with separate sets of information that do not form a running series of linked arguments. A comment will be made on whether one or more aspects have not received the same attention as others and a reason will be given for this decision in the following discussion and analysis chapters that precede the conclusion. For example, sites such as Caerwent and Verulamium have not been given the same attention from archaeological enquiry as Vindolanda and Silchester and as such some aspects of the internal characteristics of these settlements are not as well understood. In consequence they do not receive the same degree of discussion.

The information for settlement Chapters (4, 5 and 6) will be grouped under a number of headings (introduction, history, layout and structures, role and functions, additional information, local engagement, and a summary of the occupation density data). These headings will provide the relevant background to each settlement. Layout and structures will give an overview of the built area for each part of the settlement while role and functions will provide an insight into the activities, whether they be industrial, economic and/or religious that had a bearing on the internal organisation and potential continuity of that particular settlement. Local engagement is vital as it provides detail of whether aspects of local subsistence were present within the Roman settlements and whether those local practices had an impact on the organisation of the settlement space.

3.5 Conclusions

The goal in conducting this density analysis is to identify whether there were differences in the organisation of sites in Britain compared with other areas of the empire and whether local patterns of behaviour, in particular the *oppidum* pattern which saw a trend from higher to lower density with increased settlement size, could have had an impact on the formation and organisation of the Roman settlements. The utilisation of several types of software including ImageJ and Photoshop have allowed for the calculation of occupation density. This software has made it easier to select built areas within settlements and to separate this from the whole settlement, providing a density figure. The different kinds of analysis (total built space per settlement size, density gradient and built space per hectare) have provided different ways of making sense of the built space within settlements. They have allowed for a better understanding of the internal organization and spatial patterning of settlements across Roman Britain. The next 3 chapters will provide an in-depth analysis of 6 settlements, or three sets of 2 that represent three size categories (*vici*, medium *civitas capitals* and large *civitas capitals*). Each chapter will conclude with an analysis of density gradients and density trends. In the final two chapters of the thesis the results of the density analysis will be integrated, the issue of missing data on density of built space will be addressed as well as the implications of the alternative interpretations.

Chapter 4 - *Vici*: case studies

The *vici* were chosen to enable for an assessment of the occupation densities in smaller settlements in the Roman urban network. In this chapter two cases, Vindolanda and Piercebridge will be discussed. They have been chosen to illustrate the range of occupation densities that were in use and to give some sense of the places where people lived. As there is good spatial data for several more *vici* (4) these will be added to the analysis in Chapters 7 and 8 where the occupation density data for a range of Roman period settlement will be brought together for a more detailed discussion.

4.1 Vindolanda

4.1.1 Introduction

Vindolanda was a military fort and *vicus* complex located in Hexham, just south of Hadrian's Wall in northern England. This site was chosen as a case study because of the amount of excavation and remote sensing that have been carried out over the years and as such, the formation of much of the site is known, which allows for a summary of the form and inner workings of the *vicus*. The plan of the settlement has come from the Vindolanda Charitable Trust which oversees the site and whose aims are geared towards archaeological research and conservation as well as making the site accessible and available for the general population (Figure 4.1).

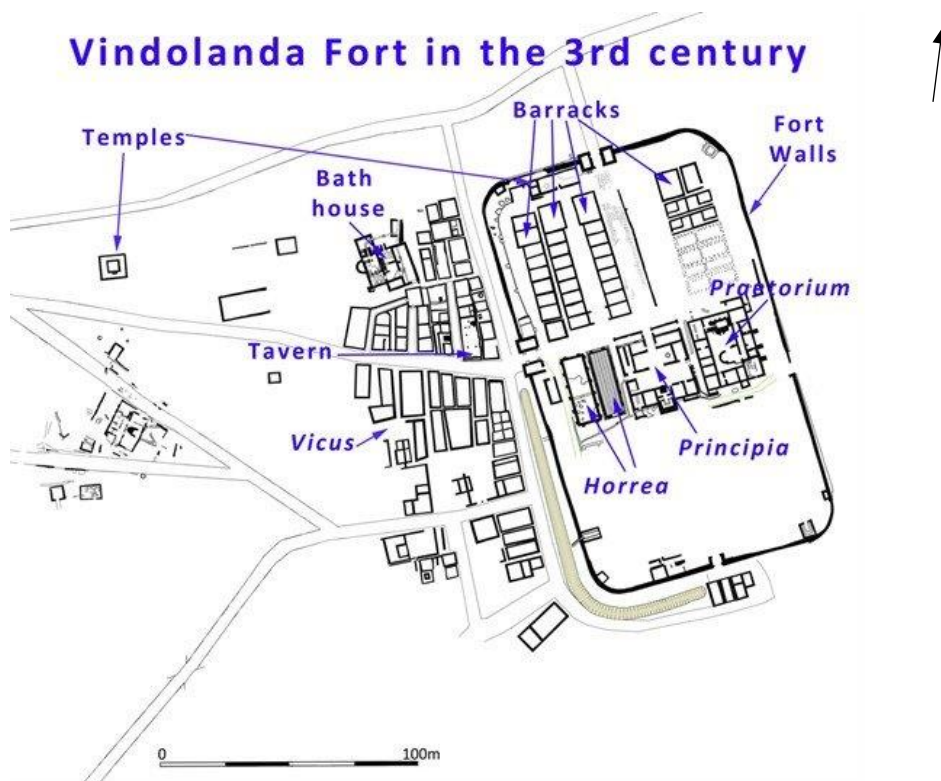


Figure 4.1: Plan of Vindolanda *vicus*, FACT FILE: Roman Fort 2019

The section below will begin with the history of the main periods of occupation of the fort and the *vicus*. This will be followed by a discussion of the changes in the structure and organisation of the site in each time period before some comments will be made about the internal characteristics of the *vicus*, many of which were discovered as a direct result of the excavations. After this there will be a brief comment about issues of dating material from the *vicus* before discussing the interaction between civilian and military and the effects of this on the growth and decline of the fort and *vicus*. The role of elements of the internal organisation of the site in perpetuating systems of health, politics, and economic processes will be reviewed. Finally, there will be some comments about key excavations and surveys that have been carried out before concluding with a review of evidence of local engagement at the site and finally an overview of the density analysis of Vindolanda.

Vindolanda began as a small fort built in the latter part of the 1st century CE. A decade later the fort was expanded. In 105 CE the fort was largely abandoned until building projects carried out between 105 CE and 122 CE saw a revitalisation of the area. The construction of the *vicus* was not embarked upon until the early 200s CE and housed soldier families, travelling merchants and tradesman as well as foreign dignitaries.

The settlement of Vindolanda changed many times throughout the century of its life. Beginning as a smaller fort which oversaw the northern parts of Britain and to protect against invasion, it grew steadily, incorporating new institutions and infrastructure of military and civilian make. As the threat of invasion declined, the site was refashioned and included civilian styled occupation with a growing economic scene made up of artisans and merchants as well as the families of the soldiers posted there (Blake 2014, 13-55). Vindolanda was an integral part of the settlement network of Roman Britain and of the empire's continued control of the province by ensuring that the southern portion of Britain could remain free from the threats, warranted or otherwise from the north.

The *vicus* of Vindolanda also illustrates how soldiers and civilians lived and interacted with each other on a daily basis in two distinct residential arrangements, one that was highly regularised and reliant on military discipline and the other that was more organic and reliant on economic factors. While there operated two residential arrangements, both were mutually valuable to each other.

4.1.2 History

Vindolanda began as a small fort built late in the 1st century CE by the 1st cohort of Tungrians. This fort was a turf rampart construction, erected during Agricola's governorship and after he had consolidated the northern frontier in 85 CE. By the mid to late 80s CE, it was a permanent fort utilising timber and turf and arranged in a Roman playing card shape, aligned along an east-west axis with a headquarters, officers house and a small bathhouse on the eastern slope of the site (Birley, Blake 2007, 1-16, 17-100). A decade later the fort was expanded by the 9th cohort of Batavians, a mixed infantry, cavalry unit of about 1000 men (Birley, Blake 2007, 1-16-17-100). In 100 CE the fort was repaired under the directorship of Roman prefect Flavius Cerialis. The 9th cohort left in 105 CE and the fort was largely abandoned until the arrival of the Tungrians who built a much more extensive fort

and remained stationed at Vindolanda until the construction of Hadrian's Wall in 120-122 CE (Birley, Blake 2007, 1-16, 17-100). The fort built during Hadrian's era was after a time demolished and a new structure was fashioned facing north-south. It was during this phase that a *vicus* was built to the west, within the remains of the old rampart (Birley, Blake 2007, 1-16-17-100). Following the construction of the Antonine Wall in 144 CE, Vindolanda was again abandoned until later in the century when a stone fort was built by the 2nd cohort of Nervians. This iteration of the fort was also associated with a set of army-related buildings to the west of the main fort/*vicus* area as well as an unusual array of round stone huts which were built where the old fort had been (Driel-Murray, ET AL 1993; Friendly, 1975).

Following a rebellion in the early 200s CE, the fort was again rebuilt, and a *vicus* or civilian settlement was enlarged, construction having begun in the late 100s CE. The *vicus* accommodated both soldier families and travelling merchants and tradesman as well as any foreign dignitaries. After the rebellion, the 4th cohort of Gauls constructed a larger stone fort and increased the size of the *vicus* to the west. The *vicus* that emerged around this time contained infrastructure such as shops, butcheries (with elaborate drainage) and other private and public buildings. The *vicus* operated until the end of the 3rd century when it was abandoned. This seems to correspond with the abandonment of the *vicus* in the 2nd half of the 3rd century CE. There appears to have been precedents in other areas along the Hadrian's Wall corridor, (saving a few) perhaps suggesting a change in policy or circumstances along the northern frontier. The continuation of the fort passed the expected abandonment date of the *vicus* and the evidence of greater material culture found inside the fort as well as a change to its infrastructure and housing would seem to suggest that the population of the *vicus* had moved inside the fort by the 4th century CE.

In around 300 CE the fort was again rebuilt but the *vicus* remained unoccupied potentially as the area remained unsafe for civilian residents. The fort remained in use until the 5th century CE when it was eventually abandoned (Collins 2012, 95; Friendly 1975).

4.1.3 Layout and Structures

As mentioned earlier, the earliest structure at Vindolanda was a turf rampart construction, erected after the northern frontier had been consolidated in 85 CE. By the mid to late 80s CE, it was a permanent fort utilising timber and turf and arranged in a Roman playing card shape, aligned along an east-west axis with a headquarters, officers house and a small bathhouse on the eastern slope of the site (Birley, Blake 2007, 1-16, 17-100). During Hadrian's era this fort was demolished, and a *vicus* was established to the west (Birley, Blake 2007, 1-16, 17-100). During the early 3rd century all of this was enlarged and rebuilt in stone.

Some basic infrastructure that one would expect to see within a *vicus* would be strip-houses, bathhouses and *mansiones*. The third century saw these features become more common throughout the *vicus* following a large building/rebuilding programme (Blake 2014, 13-55). Strip-houses and bathhouses have yielded a tremendous cache of data about the *vicus*. Strip-houses usually operated as both residential and commercial structures (street-front shops), usually two storey and facing the main street to ensure ample sales. Bathhouses were usually located just outside the fort, and in Vindolanda's case its main role was to serve the army (Blake 2014, 13-55). The bathhouse boasted the successes of

Romanisation. Its role in promoting cleanliness and good health was considered a major part of Roman society and so acted as a pivotal part of the running of the *vicus* (Vindolanda & the Roman Army Museum 2022). Often elaborately decorated and with complex water supply and heating technology, their presence within the northern settlements attests to the reach and influence of Rome in these areas. While Vindolanda began as a series of military installations, civilian-led building programmes in the third century did much to improve their effectiveness by incorporating economic and cultural institutions and practices.

The third structural element that could be seen from these sites were the *mansiones*, located at strategically chosen locations as housing for visiting dignitaries and other significant individuals who chose to travel to and around Britain. The *mansio* at Vindolanda is of particular significance as it provides some of the best-preserved organic items in Britain. Furthermore, several rebuilding programmes were carried out in the third century which provided housing for some 108 married soldiers (Birley 1977, 38-47). In terms of Vindolanda, this *vicus* shared many of its internal characteristics with other northern *vici* but over time, they grew more economically, politically, and socially autonomous and unique as a direct result of their particular contexts, particularly in the early part of the 3rd century CE when the *vicus* appears to have become more self-sufficient and successful (Coates 1985, 74-123). Immediately after or during this period, structures just outside the Severan fort that had previously been used to house a garrison of soldiers was revamped with residential, industrial, and commercial infrastructure (Blake 2014, 13-55). This distinction made between military and civilian is important and emphasises that the *vicus* was an occupation area distinct from the fort (Figure 4.2).



Figure 4.2: Photograph of excavated Vindolanda *vicus*, FACT FILE: Roman Fort 2019

4.1.4 Role and Functions

The site of Vindolanda was occupied for roughly 300 years and had at least 9 successive forts and military settlements built in the same small area. The number of times it was abandoned and rebuilt demonstrate that its location amongst other factors was valued.

The relationship between civilian and military inhabitants made this particular kind of settlement (*vicus*) vital. A reason for this was that it kept market forces functioning on the outer edges of the Roman Empire. The *vicus* also ensured that military outposts remained connected to the rest of the province and wider empire, ensuring that both civilian and military personnel had the comforts of both (Blake 2014, 13-55). The *vicus* also combated the difficulties of living so far away from the comforts of the south. Compared with other settlement styles such as the *canabae* which were located beside legionary fortresses and were used to store goods for those legionary fortresses, the *vicus* was a self-governing unit.

The function of the buildings in the *vicus* is reasonably well understood, being a mixture of commercial, industrial, religious, and domestic structures. Zones and groupings of particular buildings has also been detected which point to at least some administrative oversight of the *vicus'* construction. The placement of the *vicus* along the Roman road that lies beneath the modern A1 roadway which linked the western gate of the *vicus* and the Stanegate to the north. The high concentration of movement along this route enabled economic establishments to develop in these areas (Blake 2014, 13-55). Within the *vicus* most residential buildings were located to the north while the industrial area was located to the south. This appears to represent an awareness of the impacts of fumes on residential areas.

The industrial sections of the *vicus* were situated in areas that maximised their effectiveness, those being close to the fort walls and away from the residential areas of the *vicus* (Blake 2014, 13-55). One section was located just under the southern tip of the fort and seems to have dealt in iron and copper alloys. Whether they were being utilised by the army or by civilians is still a mystery. Storehouses were placed near the south of the fort and the religious buildings were clumped near the far western side of the *vicus* (Blake 2014, 13-55). The apparent zoning of areas inside the *vicus* seems to suggest that there had been some degree of planning in the layout of the infrastructure and the allocation of spaces for functions within the settlement (Figure 4.3).



Figure 4.3: Reconstruction of Vindolanda *vicus*,
<https://thesilicontribesman.tumblr.com/post/171319559857/vindolanda-roman-fort-reconstructed-model-layout>

4.1.5 Additional Information

At this point the Vindolanda *vicus* is one of if not the most excavated site of its kind in Britain (Blake 2014, 13-55). Of particular interest was excavations conducted in 2007-2012 by Justin Blake and team. The purpose of these excavations was to understand the development of the whole site and particularly the *vicus*. As a result of these excavations, evidence relating to its infrastructure, spatial layout, forms of its structures and their functions were found. From the evidence gathered it is now possible to provide a broad chronology for the foundation, expansion, and eventual abandonment of the site (Blake 2014, 13-55) as well as the role of local tradition in its functioning.

The level of preservation at Vindolanda is thanks to the chemical composition of the soils. The first five layers of Vindolanda are located in anerobic soils and therefore have provided some of the best evidence for occupation. Timber structures as well as thousands of leather shoes and wooden tablets detailing the life of the fort pre-130 CE have been uncovered which is remarkably rare for a settlement of this period. From 150 CE to about 300 CE stone was the predominate building material and various construction techniques were used for the fort walls and for the houses, workshops, and bathhouses.

One of the best ways of dating archaeological features is coinage. Coinage found during excavations in the 1970s suggested that the *vicus* had been founded in conjunction with stone fort 2 and that it had thrived for nearly 60 years before being abandoned. Coinage found since then has done nothing to refute this (Blake 2014, 13-55). Evidence collated

during the 2007-2012 excavations also strengthened arguments made by Sommer (1984) and Margaret Snape (1991) that the construction of a fort and military *vicus* would be established usually contemporaneously. Discussing how it spread and the factors involved in this spread is more difficult to make out. While coinage has been useful, the short time span of the *vicus* has made other chronological markers of a limited value (Blake 2014, 13-55).

4.1.6 Local Engagement

Some of the best evidence for the presence of a local populace in and around the *vicus* of Vindolanda comes from a series of roundhouses that were uncovered through excavation. While several were dated to the very earliest period of Vindolanda (about the same time as the construction of the first fort) many have been dated to the reign of Septimius Severus (193-211 CE). The discovery of several roundhouses points to the continuation of local patterns of occupation as well as an active involvement of the local population in the affairs of that settlement. Their function was most likely as domestic quarters, built to accommodate families of local farmers and other inhabitants of the area (Blake 2014, 11, 55, 61, 62, 107, 110, 111). This is consequential for the proposition that local factors were involved in the spatial patterning of settlements in Roman Britain.

4.1.7 Summary of Density Data

The set of diagrams refer to both the 1.2-hectare (the area closest to the fort) and 2.7-hectare (the area closest to the fort plus the area further to the west) settlement sizes (Figures 4.4, 4.5, 4.6, 4.7, 4.8, 4.9).

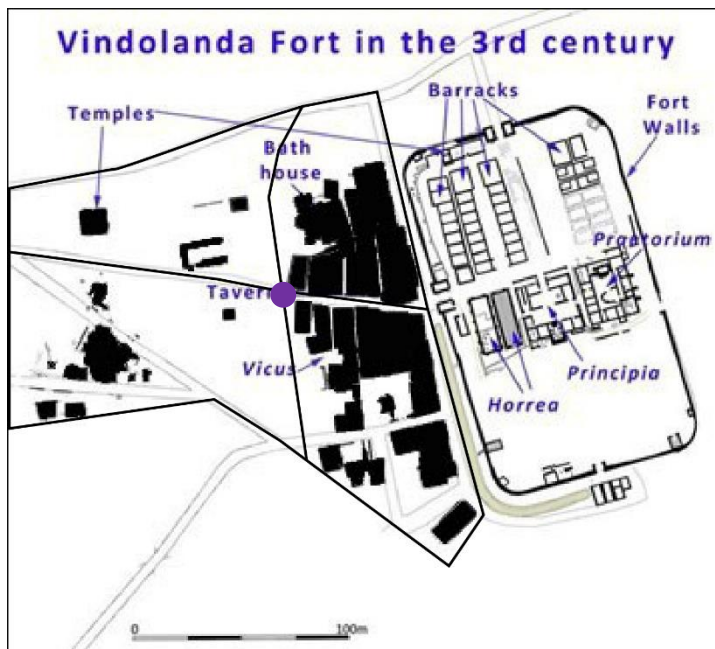


Figure 4.4: Sectors of *vicus* referred to in text including central point marked in purple

The first three figures (Figure 4.5, 4.6 and 4.7) show the amounts of built space in Vindolanda. As can be seen in the first diagram, the entire settlement area of Vindolanda including the area further to the west was 2.7 hectares in size and contained nearly 7000 square meters of built space.

The second and third diagrams show that both the north-east sector and the south-east sector contained much more built space than sectors 3 (north-west) and 4 (south-west). This is because the first two sectors cover the area immediately to the west of the fort, an area that had most of the built structures. Sectors 3 and 4 further to the west of the fort only contained a scattering of buildings and may have been interspersed with agricultural land. The diagram also shows that sectors 3 and 4 were larger in size than sectors 1 and 2.

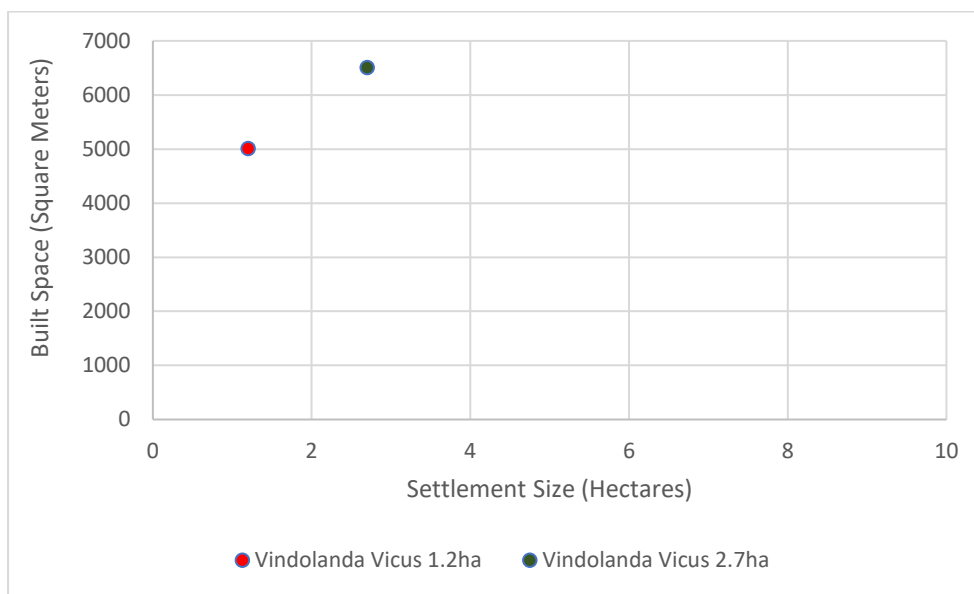


Figure 4.5: Total built space (in square meters) for Vindolanda

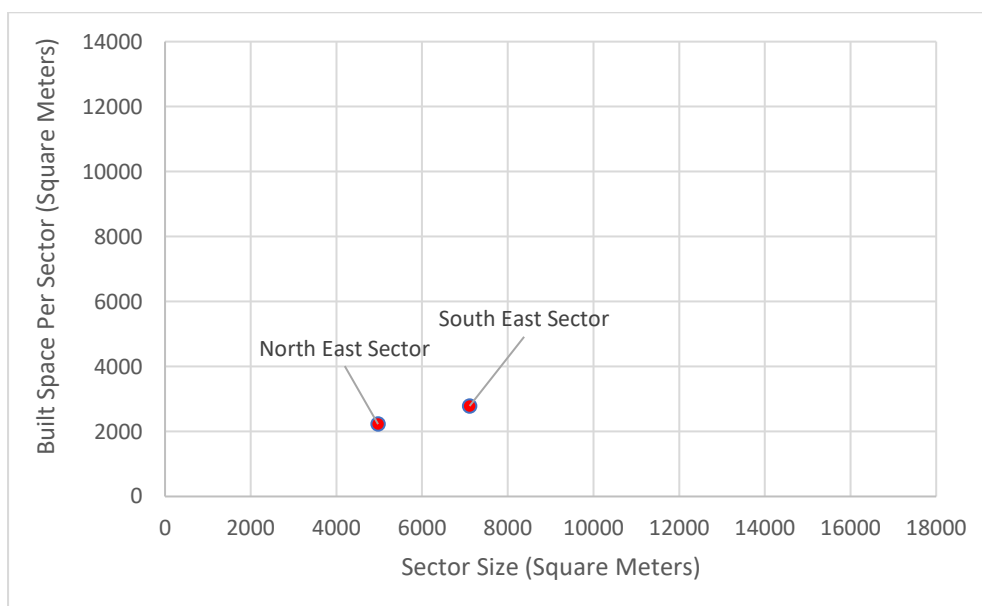


Figure 4.6: Built Space Per Sector (in square meters) For Vindolanda 1.2ha

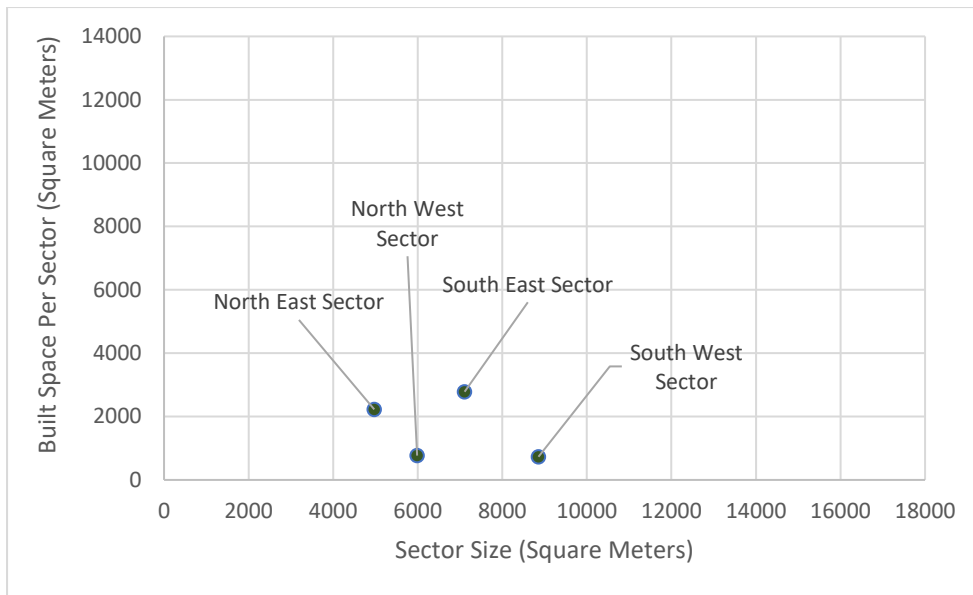


Figure 4.7: Built space per sector (in square meters) For Vindolanda 2.7ha

4.1.7.1 Density gradient

Vindolanda has a maximum coverage of around 60% in the core area, or the area immediately to the west of the fort but only around 30% when the whole area is measured, including the low-density space further to the west of the fort. The immediate area to the west of the fort was quite dense, with very little space separating individual buildings. The higher density areas are closer to the fort, which is quite different to the larger area which has a very low occupation density with only widely separated structures, including a temple/shrine. There is a weak indication of a density gradient away from the centre of the settlement (Figure 4.8).

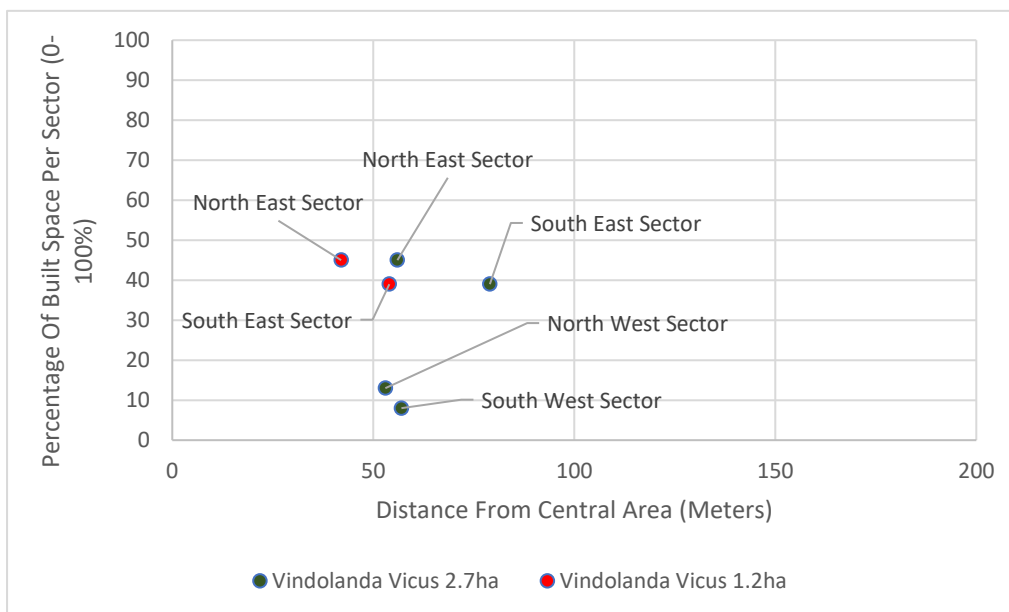


Figure 4.8: Gradient of density (%) for Vindolanda

4.1.7.2 Density trend

The main residential area of the Vindolanda *vicus* was small and quite densely occupied. Almost all of this area of the settlement was taken up by built space and produces a pattern of higher density for a small occupation area which is the reverse of the usual Roman trend. As noted above, there is also a lower density area further west which appears to have had a different function.

The next diagram (Figure 4.9) shows the amount of built space per hectare. As can be seen there is just over 4000 square meters of built space per hectare for the core area and just over 1300 square meters of built space per hectare for the whole of Vindolanda. Vindolanda is unusual because the detailed excavation and mapping of the site shows that it incorporated two very different occupation density patterns, one that is high where most people lived in sectors 1 and 2, suggesting a habitual adjustment to close proximity with most of the people in the settlement in marked contrast to the dispersal of structures further west (Figure 4.4).

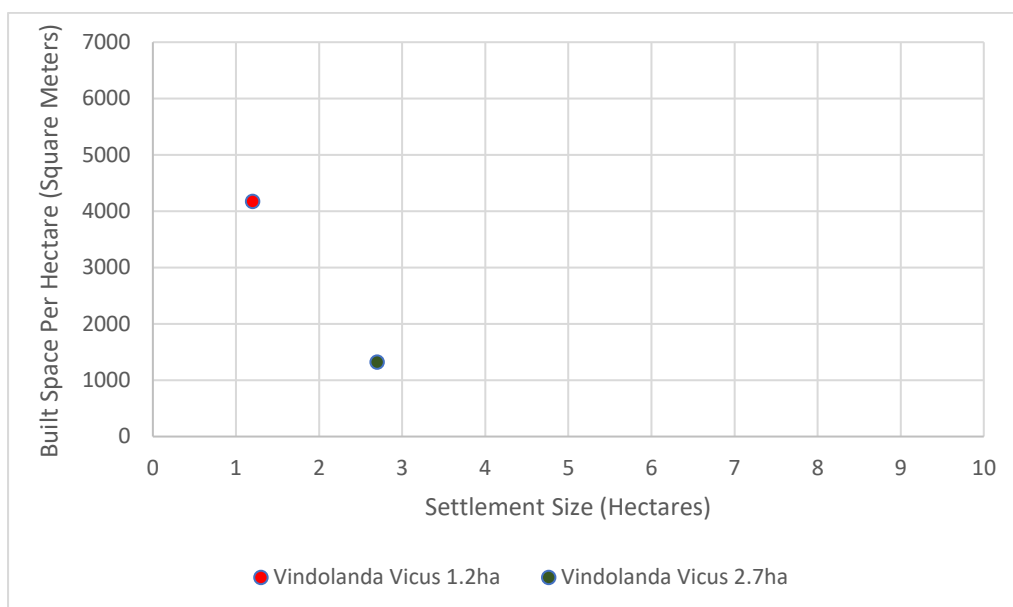


Figure 4.9: Density of built space (in square meters per hectare) for Vindolanda

4.2 Piercebridge

4.2.1 Introduction

The site of Piercebridge consists of a main fort and civilian settlement located north of the river Tees in the borough of Darlington in county Durham. A large bridge connected the site to the north and west of the settlement (Fitzpatrick and Scott 1999, 111-132; Cool 2008). The settlement was chosen as a case study because there has been a significant amount of work done over the years to reveal its internal organisation either through excavation or remote sensing, particularly aerial photography (Cool 2008).

The overview begins with the history of the site and in particular changes to the civilian settlement in the 2nd century CE which saw increased wealth and prosperity. The layout of the structures and the spatial organisation will then be discussed along with some comments on whether the site was formally planned or was developed by social agglomeration. Major excavations and the elements of the internal organisation that these excavations have elucidated will be followed by a comment about local engagement at the settlement. The section will conclude with a discussion of the density analysis of the Piercebridge *vicus*.

Successive iterations of both fort and *vicus* were built over the course of the site's history. The *vicus* of Piercebridge was built around 80 CE and preceded fort 1 which was built south of the river sometime in the 2nd century. The fort visible in the *vicus* plan was not built until around 250/260 CE, while both fort and *vicus* were in use until around the 5th century CE after which the fort continued to act as a local garrison (Figure 4.10).

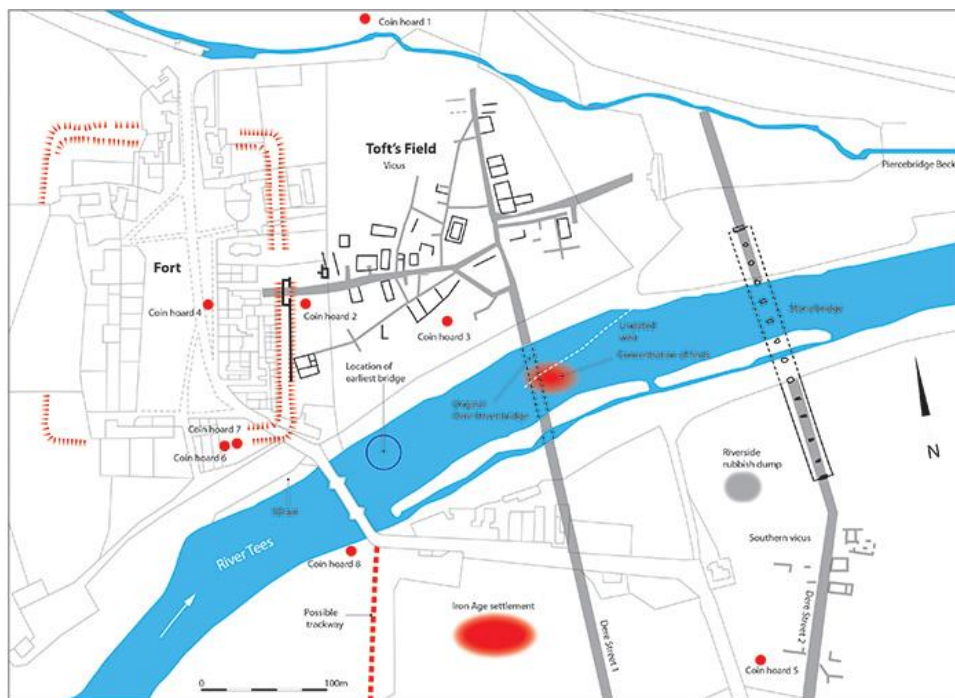


Figure 4.10: Town Plan of Piercebridge, <https://archaeology.co.uk/articles/features/bridge-over-troubled-water.htm>

4.2.2 History

The first signs of occupation in this area were at a nearby local villa whose occupation spans the 1st and 2nd centuries CE. The other area of note is the Tofts Field east of the main fort north of the river where the main civilian establishment was located and which was occupied from the end of the 1st century CE (80 CE) (Fitzpatrick and Scott 1999, 111-132; Cool, 2008). The emergence of the civilian settlement and its early successes was due to its ability to foster mercantile and trading activities which strengthened the economy of the settlement. By 100 CE it had become fully functional, with its town social and economic autonomy (Cool 2008; Mason 2019, 20-38).

Throughout the 2nd century the site expanded gradually and overtime more and more of its structures were rebuilt in stone as the site became increasingly wealthy and autonomous. Several bridges were also built in the 2nd century, one in around 130-150 CE and another in 200 CE. The former coincided with the construction of several private and public buildings as well as rebuilding programmes which aimed to rebuild several structures out of stone. The latter bridge is considered to have had ritual significance due to the large amounts of votive offerings found in the riverbed below (Mason 2019, 20-38).

In the 180s CE there were disturbances where a number of Romans were killed. Due to the location of the site on a major river crossing and on the main road into Scotland, these disturbances were to be expected and this is possibly why a fort was built at this location, to protect the interests of the civilian community nearby and control the crossing (Walton 2016, 191-194; Eckardt and Walton 2021, 111-132; Mason 2019, 20-38).

Between 180 CE and 220 CE there was a sizeable military presence at Piercebridge. The impetus for such a large-scale military presence may have been the result of campaigns launched by the emperor Septimius Severus against the Scottish tribes in the years 208-211 CE (Walton 2016, 191-194; Eckardt and Walton 2021; Mason 2019, 20-38). Evidence of several Roman items that denote the presence of the military were discovered at the site, including under the main bridge.

Around the year 250 CE another fort was built, perhaps as a replacement of the earlier iteration. This new fort conformed to the general Roman model with a playing card configuration and all the usual forms of military infrastructure such as a headquarters building, commander's house, soldiers' barracks, workshops, granaries, and a hospital (Cool, 2008, 286-293; Mason, 2019, 20-38). A stone wall and a number of watchtowers interspersed around the periphery was also built as part of this iteration of the fort. Following the withdrawal of Rome in the 5th century, Piercebridge appears to have operated as a garrison for the local inhabitants (Cool 2008, 283-293; Mason 2019, 20-38).

4.2.3 Layout and Structures

Cropmarks that were detected through a number of aerial surveys in the late 20th century showed that the civilian settlement that had adjoined the later iteration of the fort (constructed in around 250 CE), consisted of around 30 buildings. The inhabitants of these buildings were most likely involved in trade and the settlements' location next to a major

river seems to suggest that trade was an important economic activity at the site (Fitzpatrick and Scott 1999, 111-132; Cool 2008, 283-293). As mentioned previously, the civilian settlement was built quite some time before the fort and as such would have been an autonomous entity by the time of the fort's construction. The distance between fort and *vicus* was around 10-15m and it appears that the fort was built next to the civilian settlement as a means of both protecting it and also as a means of utilising the economic resources it could provide.

In the early years of the civilian settlement, the buildings were constructed out of timber and were positioned facing both Dere Street, which ran north-south, as well as the main road running east-west towards the fort. These were strip-buildings and would often have a shop at the front and manufacturing and living quarters to the rear. As it was built along the main road from York to Hadrian's Wall, it was located in an area where the inhabitants would be best able to engage in commercial activities. Over time, several side streets, especially to the west were built that spread outwards from Dere Street. These buildings were also the 'strip' type and excavation has revealed blacksmith and pottery workshops among the domestic and commercial structures (Mason 2019, 20-38) (Figure 4.11).

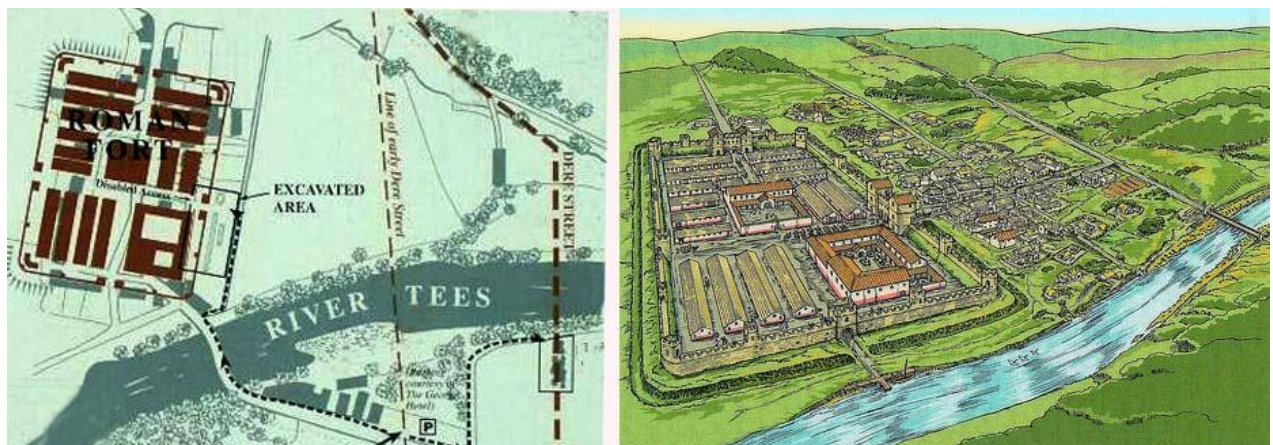


Figure 4.11: Town Plan and reconstruction of Piercebridge,
<https://www.u3ahadrianswall.co.uk/wordpress/piercebridge-roman-fort-and-bridge/>

4.2.4 Role and Functions

As has been mentioned previously, it appears that the *vicus* actually predated the military installation and so the terminology of *vicus* is misplaced. It might be more accurately referred to as a *canabae*, or a town of civilian origin that was built in close proximity to a legionary fortress. For this section though, the use of the term *vicus* has been kept because of its long-term usage in the archaeological community.

As the civilian settlement was built before the construction of the fort, the activities and occupation patterns of the inhabitants would have been influenced by civilian, not military factors. The community who inhabited the site would have been traders and merchants who sold their wares to travellers who frequented the site (Mason 2019, 20-38). Because of Piercebridge's position at a crossroads between Roman-held territory and Scotland to the

north, it would have also acted as an area where people could find temporary accommodation. Because of the position of Piercebridge within the landscape it probably also acted as a market town for the surrounding farming communities (Mason 2019, 20-38). The heightened military presence in the early 3rd century CE would have given a major boost to the local economy of the *vicus* with the prospects of new opportunities for local merchants and entrepreneurs (Mason 2019, 20-38).

4.2.5 Additional Information

The main excavation of Piercebridge was carried out by Dennis Harding and Peter Scott, commencing in the 1960s and being carried through to the 1980s. They uncovered several areas of interest. The main fort and civilian settlement to the north of the river Tees and the bridge that connected to the south of the river where several other structures both military and civilian in nature were found (Fitzpatrick and Scott 1999, 111-132; Cool 2008, 283-293).

The images below detail the series of excavations carried out over the years. Refuse located some distance away from the main roads inside the civilian settlement suggests that people may have been dumping on the outskirts and boundaries of their properties. Large quantities of Roman material were found in the south-east corner which could mean more intense occupation in this area or larger buildings that had a higher turnover of material refuse. The lack of slag also suggests that metal production was not a prominent activity at the site (Cool 2008, 283-293) (Figure 4.12).

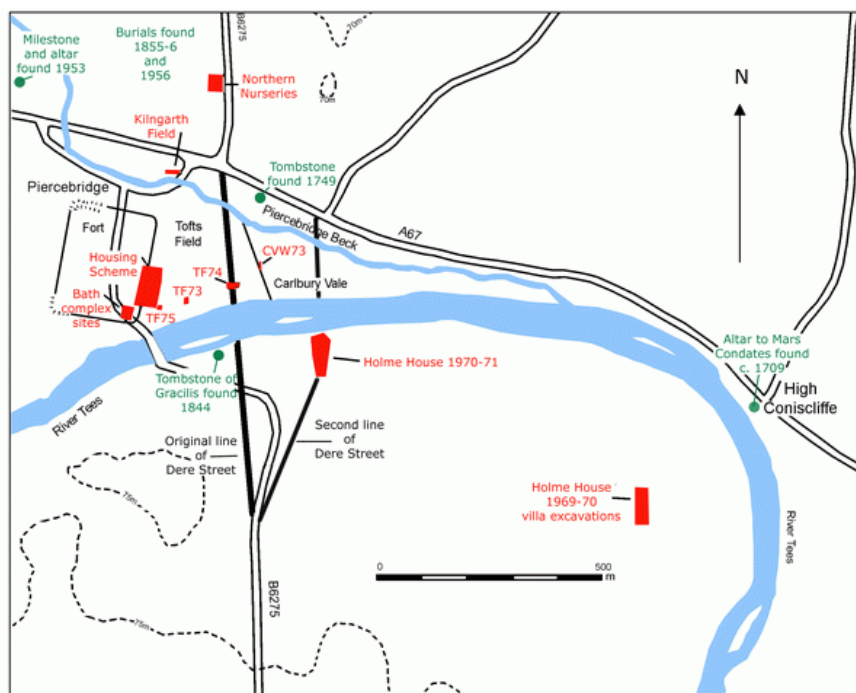


Figure 4.12: Plan of Piercebridge, H. E. M. Cool (2008)

At the turn of the 2nd century (170-180 CE) there was an influx of wealth into Piercebridge, demonstrated by the large number of coins as well as precious metals, jewellery, lead candleholders and Campanian pottery discovered in several areas across the site. Many of the objects found within Piercebridge from this date rival those in quantity of those found in

nearby York. Those living or operating out of Piercebridge at this time could obviously afford to indulge themselves (Mason 2019, 20-38). This points to either a militaristic or official presence which gave rise to a quality and quantity of goods (Figure 4.13).



Figure 4.13: Reconstruction of internal organization of Piercebridge, Mason, 2019

4.2.5.1 Excavations on the bridges:

One of the most interesting aspects of Piercebridge are the series of bridges that connected the north and west sides of the river Tees. The bridge is also important archaeologically due to the amount of material culture that has been excavated from the riverbed underneath it (Mason 2019, 30-33; Walton 2009, 286-293; Fitzpatrick and Scott 1999, 111-132).

Excavations began in the 1930s and unearthed foundations for a timber bridge along the alignment of Dere Street. In 2009 samples taken from these foundations provided a date of 130 CE and 260 CE. The wide range of dates suggest that the bridge was rebuilt and strengthened over the years and that it remained an important piece of infrastructure for the running of the settlement (Mason 2019, 30-33; Walton 2009, 286-293; Fitzpatrick and Scott 1999, 111-132).

Remains of a much earlier river crossing have also been detected in close proximity to the other bridge remains. This iteration gave a date of 10-100 CE and could have been the original river crossing that was built by the Roman army when they marched north in the early 70s CE. There is also the possibility that it was constructed by the Romans as a gift to Cartimandua, Queen of the Brigantes. This practice has precedent in other areas of Britain where the Romans would construct infrastructure for tribal states that had allied with Rome (Mason 2019, 30-33; Walton 2009, 286-293; Fitzpatrick and Scott 1999, 111-132).

A third bridge has also been detected. Located 200 meters downstream from the first iteration of the bridge. This bridge was uncovered in the 1970s through excavations carried out under the direction of Peter Scott. It is believed that this bridge was built in around 200 CE as a direct response to changing river conditions which meant the pressure exerted on the bridge could damage it. At a downstream location though, the water entered a

floodplain and the pressure exerted would not have been as severe (Mason 2019, 30-33; Walton 2009, 286-293; Fitzpatrick and Scott 1999, 111-132).

As mentioned previously, the river Tees has yielded a large amount of material culture, much of which points to the wealth experienced by the residents of Piercebridge especially in the mid to late 2nd century CE. The findings from the river also have the potential of elucidating Roman British religion and votive practices as well as the interaction between military and civilian populations throughout the Roman occupation of Britain (Mason 2019, 30-33; Walton 2009, 286-293; Fitzpatrick and Scott 1999, 111-132).

4.2.6 Local Engagement

The Iron Age occupation of the Tees Valley saw a number of settlements constructed, particularly in or around where Piercebridge would be built. The settlements took the form of smaller farmsteads containing several roundhouses and surrounded by a ditched enclosure and substantial bank. Holme House near Piercebridge was one example of this settlement (Mason 2019, 7-18)

Worth noting is that while no large settlements existed within the Tees Valley, the large hillfort/*oppida* of Stanwick was located just 3km south of Piercebridge. Stanwick was large, several hundred hectares and so would have undoubtedly had an impact on the settlements and their inhabitants in and around Piercebridge and the Tees Valley more broadly (Mason 2019, 7-18; Welfare 1990).

Evidence for the presence of a local population at Piercebridge can be seen through a local aristocratic roundhouse/villa to the south of the river (Holme House) which was constructed concurrently with the civilian settlement. The decision to build a villa in this location was perhaps due to the significance of the immediate landscape for the local inhabitants of that area. The argument for this was the discovery of a large roundhouse which predated the construction of the villa (Mason 2019, 7-18). The villa was also occupied well after the construction of a civilian settlement and after Romans had decided to build a fort in the area.

Occupation in the Tees Valley predated any Roman military or civilian settlement. Whether this meant that a local people still resided in or near to Piercebridge is not entirely known. The military campaigns of governor Petilius Cerialis in the 70s CE against the Brigantes would have taken a toll on the local inhabitants of this region. Whether the military activities forced them out or not is again, not known (Mason 2019, 7-18). Evidence of local wares were found in the river Tees which suggests the continued occupation and presence of a local population during the Roman period.

The second piece of evidence was the discovery of native wares in the river to the east of the fort and civilian settlement. It was mixed in with other Roman wares which suggests the presence of a local population during the Roman period and along with Holme House, suggests that the native people were residents of Piercebridge throughout its history (Walton 2009, 286-293).

4.2.7 Summary of Density Data

The set of diagrams below are all based on a settlement area of 3.9 hectares, excluding the Tofts Field to the north-west. The first three figures (Figures 4.14, 4.15, 4.16) show the amounts of built space within Piercebridge. The first diagram shows that of the entire settlement area of 3.9 hectares, just over 4000 square meters of it was built space.

The second diagram shows that the north-west and south-west sectors contained the most space, while the third diagram shows the gradient of density throughout the entire settlement (Figures 4.15, 4.16).

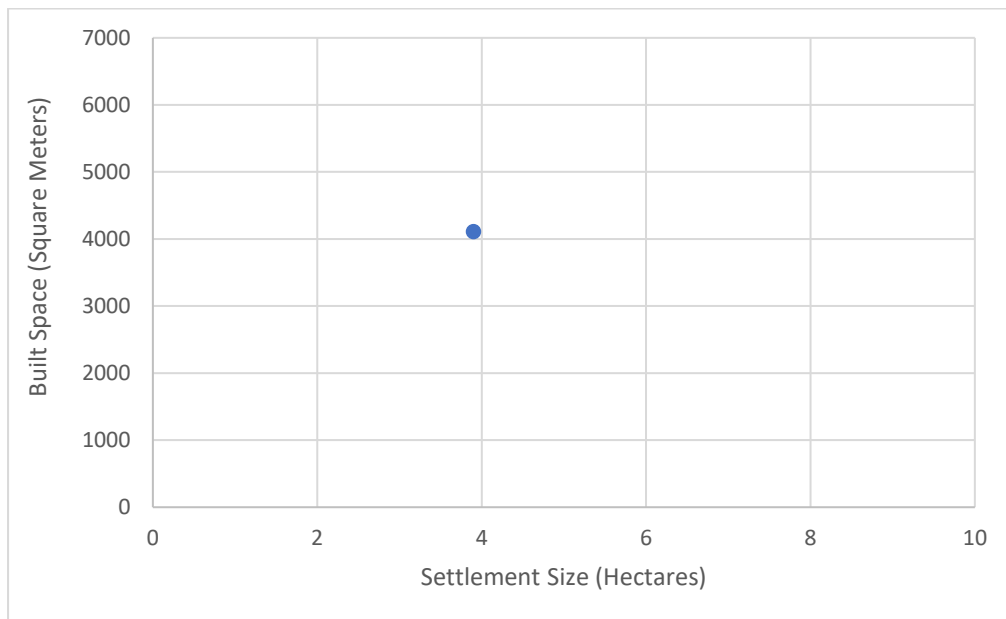


Figure 4.14: Total built space (in square meters) for Piercebridge

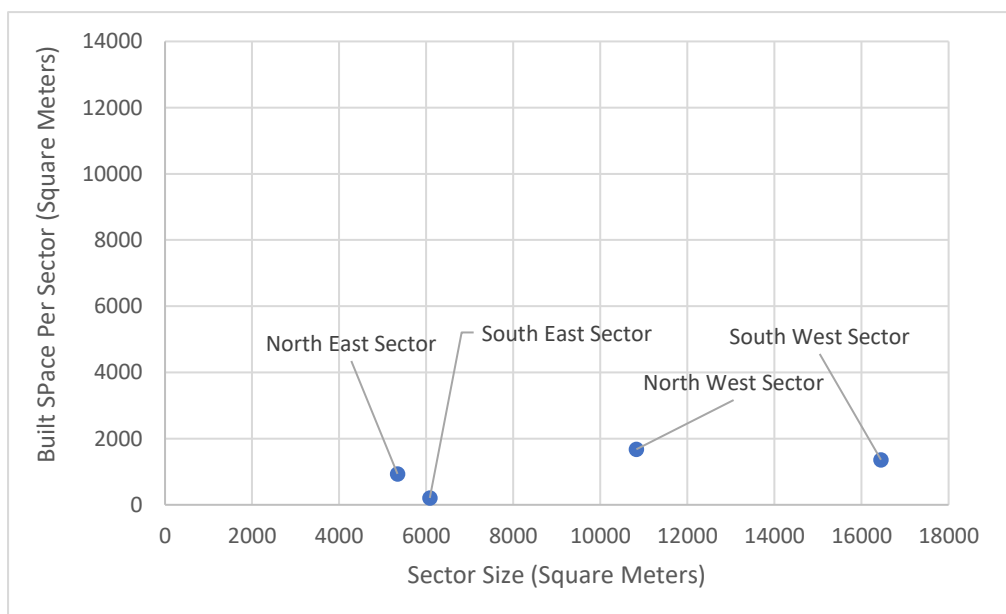


Figure 4.15: Built space per sector (in square meters) For Piercebridge

4.2.7.1 Density gradient

Piercebridge has a maximum coverage of around 10%. The density gradient diagram also shows that no sector was more than 20% filled with built space and that each of the sectors were within 100-200 meters of each other. As such, the density is quite low for Piercebridge due to the amount of open space within each sector.

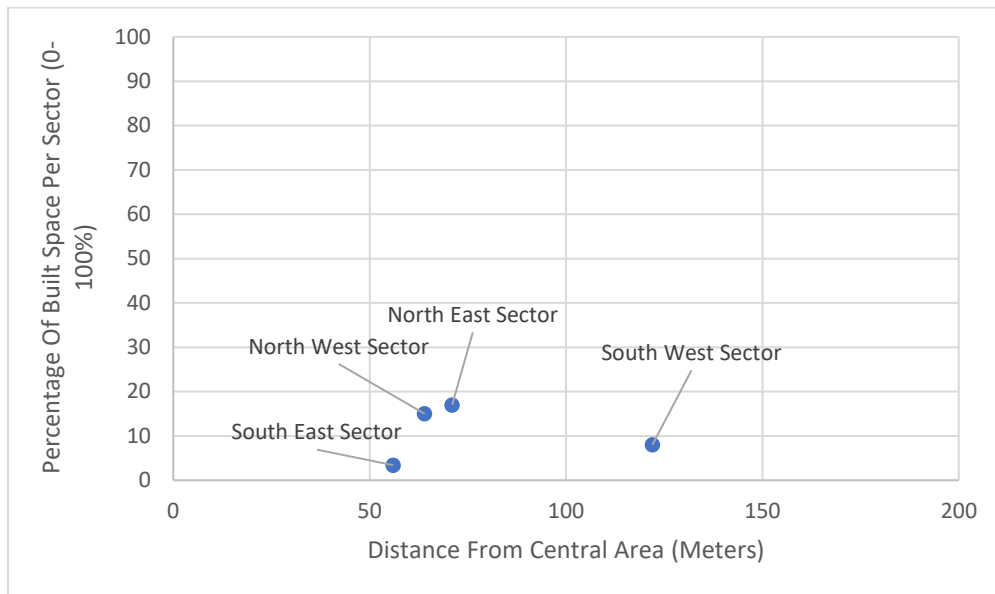


Figure 4.16: Gradient of density (%) for Piercebridge

4.2.7.2 Density trend

The final diagram (Figure 4.17) shows the amount of built space per hectare. For Piercebridge this is just over 1000 square meters per hectare, much lower than Vindolanda. Note that the decision to include as the boundaries of the site, the contours of the road, (excluding the Tofts Field) meant that the density is slightly higher than if a larger geographic area was chosen as the boundary (Figure 4.17).

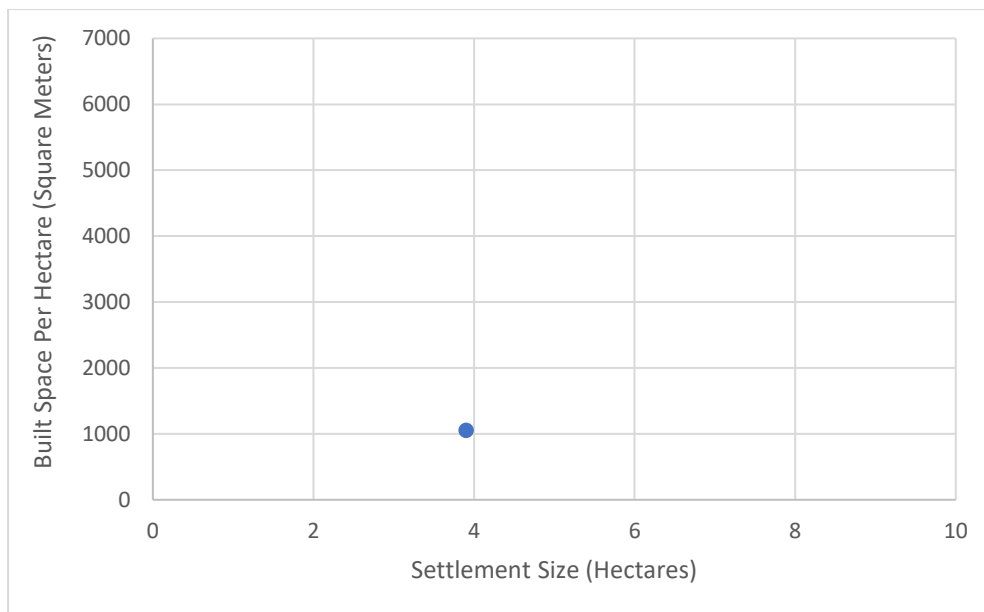


Figure 4.17: Density of built space (in square meters per hectare) for Piercebridge

4.2.8 Conclusions

Two overall densities can be specified for Vindolanda. The first is a rather high occupation density for the core area of the *vicus* which does not include the more open space to the west. Densities are just over 4000 square meters of built space per hectare for the smaller settlement area of 1.2 hectares while it is 1325 square meters per hectare for the larger settlement area of 2.7 hectares which includes the more open space to the west. For Piercebridge, just over 1000 square meters density relates to the 3.9-hectare settlement, suggesting that a trend from higher to lower density with increased settlement size was present. These two *vici* indicate that a range of densities were in use and that the residential areas of *vici* could operate on relatively high densities – a matter to investigate further (see Chapter 7).

Local engagement in the settlement pattern is known. At Vindolanda, the local engagement comes from the series of roundhouses that have been detected which point to a continuation of local patterns of occupation throughout the history of the settlement. As for Piercebridge, the local engagement stems from the series of farmsteads that would have littered the area (Tees River valley) and for the large hilltop *oppidum* of Stanwick which would have created a densely occupied and utilised environment. The aristocratic villa/roundhouse also suggests that the area held local importance before the arrival of the Romans.

Chapter 5 - Medium *civitas capitals*: case studies

Medium sized *civitas capitals* were chosen to illustrate the patterns of occupation density in that size range in order to reveal, alongside small and large sites, trends that may be visible which are related to the size of a settlement. For this chapter, Caistor St Edmund and Caerwent will be discussed. Their occupation densities are similar than the *vici*, in that there is a wide variation between the two settlements. As they were tribal capitals, they may have corresponded more to the lower density '*oppidum*' pattern rather than the Continental Roman pattern of increased density per increased settlement size.

The work of John Wacher (1974) has been utilised throughout this chapter and has been a vital source for compiling key information regarding the internal organisation and spatiality of sites.

5.1 Caistor St Edmund

5.1.1 Introduction

The town of Caistor St Edmund, (Venta Icenorum), was a *civitas capital* of the Iceni tribe located in Norwich in the east of England and was built next to the river Tas during the 60s CE. The decision to build next to a major water source would have been a significant factor in the establishment of the town. The river would have allowed for a greater trading economy as well as a means of transportation. It also appears that the emergence of the town may have been in response to the *Iceni* revolt against Rome, carried out by Boudica (Wacher 1974, 243-255; Sorrell 1976, 73).

The site has been chosen because of the amount of survey work that has been carried out. Because of its position as a greenfield site, the internal spatial organisation of the buildings is well known. Caistor St Edmund is of interest because it has a well-recorded *vicus* which will be further discussed in Chapter 7.

This section begins with a brief overview of the history of the settlement, which includes information about the 2nd century regularisation, the construction of public buildings such as the forum during this period and its history in the final years of Roman occupation. There will then be a discussion of the layout of the town including the presence of open space within the settlement and an overview of the public infrastructure and buildings that were constructed over the course of Caistor St Edmund's history, followed by a review of health institutions and infrastructure such as running water as well as fortifications that were built in the 3rd century CE. An overview of the changing use of public buildings over time will be commented upon and the excavations that have been carried out to find such buildings, followed by a comment on the local inhabitants of the settlement and evidence for cross-cultural interaction between them and the Roman authorities. Finally, there will be a discussion of the density analysis of the site (Figure 5.1).



Figure 5.1: Town Plan of Caistor St Edmund, Grimmer 2016

5.1.2 History

The formation and processes involved in the growth and decline of this settlement are not well known. While no large-scale settlements have been detected below the *civitas capital*, it is still expected that the landscape held some degree of significance for the local Iceni tribe before the arrival of Rome. Prehistoric features have been detected at the site but as of yet, evidence for Iron Age structures and deposits of other material have been lacking (Wacher 1974, 243-255; Sorrell 1976, 73).

The settlement was founded in around 60 CE and was occupied throughout the Roman period until the 4th century CE. The town had several phases of development. The discovery of a number of defensive ditches appears to have been part of a prior military installation, which had been filled in by the 2nd century CE. The early town would only have had a few streets linking a dozen or so houses (Wacher 1974, 243-255; Caistor Roman Town - The University of Nottingham 2022). The administrative use of the site appears to have already been in place by the end of the 1st century CE with evidence of timber buildings, including a forum which dates to the last part of the 1st century CE (Wacher 1974, 243-255).

Only at the beginning of the 2nd century during the reign of Hadrian was the town furnished with grander public and private buildings. A forum was built during this time but over the course of the second century was rebuilt due to a number of fires that destroyed areas of the town. Other important structures of a Roman town were built around this time and into the 3rd century, including a number of public buildings such as a bathhouse and a number of temples. From the early second century onwards, the streets which had previously been organised rather haphazardly, were regularised with the addition of clearly defined road boundaries and *insulae*. William Bowden from the University of Nottingham who has specialised in the Roman settlement of Caistor St Edmund argues that while the early second century saw an increase in the regularisation of the street grid layout and organisation of the town, particular areas still remained underdeveloped until the late second and into the early third century CE. For example, the street grid in the north-west of the site was not formalised until the end of the second century CE (Bowden 2017, 2-7; 2013) (Figure 5.2).



Figure 5.2: Reconstruction of Internal Organisation of Caistor St Edmund, <https://www.nottingham.ac.uk/humanities/departments/classics-and-archaeology/research/research-projects/current-projects/burials-caistor-st-edmund.aspx>

As for defensive structures, it probably was not until the 3rd century when the defensive walls, ditches and ramparts were built to fortify the town. The settlement that these walls would have fortified is believed to have been constructed in the 1st century CE but was still being expanded and rebuilt throughout the 2nd and 3rd centuries CE (Wacher 1974, 243-255). These more substantial fortifications in the 3rd century CE enclosed a smaller area than the earlier settlement and would have contained several bastions and watch towers, in a move that suggests there was a risk of external threats (Wacher 1974, 243-255).

This settlement, compared with other well-known greenfield sites like Silchester and Wroxeter, is much less well known. Evidence for the 3rd century CE is still being gleaned and further work is needed to uncover more information for this period (Hutcheson 2009, 10-15). The town walls for example have not been given a precise date of construction. They

were likely constructed between 275 CE and 280 CE most likely due to economic pressures empire-wide and the increased unpredictability that this fostered in Britain (Bowden 2017, 2012, 2008). This also seems to have coincided with the rebuilding of the forum which had been demolished or destroyed by this time. In the early 3rd century CE, a fire appears to have destroyed several buildings including the baths and forum. The forum was not immediately rebuilt until late in the 3rd century when a series of rebuilding projects were launched (Wacher 1974, 243-255).

Evidence of coinage shows that the town survived into the 5th century in a much-reduced capacity. Burials of an early to middle Anglo Saxon date were found to the north and east of the site which suggests that it was occupied through the 6th century into the 8th century CE (Hutcheson 2009, 10-15). The site continued to be used in an albeit reduced way until the 8th century CE when nearby Norwich became the main administrative centre in the area and Caistor began to be abandoned (Figure 5.3).



Figure 5.3: Reconstruction of Caistor St Edmund,
https://www.reddit.com/r/papertowns/comments/6ay1pf/the_roman_town_venta_icenorum_located_in/

5.1.3 Layout and Structures

The street grid of Caistor St Edmund would have extended beyond the later defences in the north which suggests that there was a contraction in size over time, particularly when the fortifications were built. There appears to be a conglomeration of streets in the north-east corner of the site which could have been the earlier town before subsequent extensions and retractions over the course of its history. The earlier street network suggests that the site was meant/intended to be much bigger than it became. Up until the Flavian period the only buildings, public or private would have been constructed out of timber because the Iceni

were too poor to pay for any substantial buildings, particularly those crafted out of stone (Wacher 1974, 243-255).

An open space would have been adequate for a centralised administrative meeting place during the earliest years of the site, and it was not until the era of the emperor Hadrian that a forum-like building was constructed on the site. A forum that was more in line with those in other towns throughout the Roman Empire was not built until the Antonine period and seems to have replaced the Hadrianic structure that preceded it (Wacher 1974, 243-255). The baths, which were located in *insula* 17 were located near to the west gate and appear to have been constructed at the same time as the Antonine forum (Wacher 1974, 243-255).

From the early 2nd century onwards, the street grid that had previously been organised haphazardly, was regularised more intensely with the addition of clearly defined road boundaries and *insulae* in line with other Hadrianic developments at this time. William Bowden has argued that while the early second century saw an increase in the regularisation of the street grid layout and organisation of the town, particular areas still remained underdeveloped until the late second and into the early third century CE, seen through the street grid in the north-west of the site which was not formalised until the end of the second century CE (Bowden 2017, 2-7).

5.1.4 Role and Functions

The civic structure of the town and its administrative processes do not seem to have been as robust as in other towns in Britain. Caistor's forum appears to have been used as a rubbish dump for predominately domestic waste by the 3rd century CE. That being said, the basilica within the forum continued to be utilised in the following centuries, suggesting that it remained and subsumed the role of the forum as the administrative hub for that community (Frere 1971, 1-26).

The town of Caistor in the 3rd century is little understood, particularly the date of the construction of the defensive wall. Shortly after the construction of this wall the forum seems to have been rebuilt, its predecessor having been completely destroyed or demolished. Evidence has also been detected of glass working including glass furnaces within the first iterations of the buildings in *insula* 9 (Wacher 1974, 243-255).

Evidence of bronzeworking has been detected at the site but as of yet no indication of the types of items that were manufactured have been discerned. Several kilns have also been found in *insula* 7. There has also been the suggestion that Caistor's location next to a grazing area for sheep meant that one of the sites' main industries could have been the storage and packaging of woollen goods for export. Evidence for this comes from an iron wool comb which was found at the site (Wacher 1974, 243-255).

It seems that by the 4th century CE, the purpose of the forum as a place local elites and others could partake in civic processes was on the decline and was anachronistic. It may have functioned as a military *praetorium*, (residence of a military governor). In Caistor's case, the 4th century saw an increase in strategic and political importance when other towns in Britain were witnessing a decline (Caistor Roman Town - The University of Nottingham 2022).

5.1.5 Additional Information

As a greenfield site, having not been built over in later centuries, Caistor St Edmund provides archaeologists an opportunity to explore how the site changed over time and its impact on the inhabitants (Caistor Roman Town - The University of Nottingham 2022).

Several major features of the towns' infrastructure make it distinct. One of these was the amphitheatre which lies 90m south of the main early town defences. It is interesting as it appears to have been in a style different from the classic amphitheatre seen in other areas of the empire because of a perimeter wall on the east and not on the west side as well as the fact that it would have been deeply excavated to form seating banks. It is therefore more in line with a Romano-Celtic theatre rather than a classic Roman amphitheatre (Wacher 1974, 243-255).

Several Roman-Celtic temples have also been detected at the site with two lying just north of the forum. Both appear to have been built in the last half of the 2nd century CE. Another temple that was located outside the walled town appear to have had antecedents in the Iron Age. A religious shrine/temple was also located south of the town walls (Wacher 1974, 243-255).

There is also evidence for a water supply and sewerage system that would have improved the hygiene of the towns inhabitants. Close to the original iteration of the town in the north-east was found a wooden water pipe that seems to have fed from an aqueduct. Aerial surveys including aerial imaging has revealed several faintly dark lines that travel along the streets. These appear to have been pipes that could have flushed sewage out of the town (Wacher 1974, 243-255).

5.1.6 Local Engagement

Most of the residents of the town would have been of local, particularly Icenian descent. This is known due to the localised traits that have been detected in the archaeological record. Practices such as the preparation of the dead appears to have followed a local pattern. The act of burying a body seems to have been relatively uncommon within the town and the surrounding landscape. The minimal evidence for burials points to cremation as possibly the predominate form of end-of-life practice. The lack of burying a body from the pre-Roman period as well as Roman period and beyond suggests that there was a degree of cross-cultural synchronicity between local and Roman practices (Wacher 1974, 243-255). As mentioned previously, there also existed a Roman-Celtic shrine and a local theatre, both suggesting that the site held a local population during the Roman period.

The presence of olive oil is also limited in comparison with other Roman towns in Britain, suggestive of a greater reliance on local British cuisine. As previously stated, the disuse of the forum suggests that civic life was much reduced in Caistor St Edmund. That being said, smaller objects such as coinage and ceramic wares from the Continent have been found. It is also likely that a major industry in the town could have been the collection and distribution of wool. As the site of Caistor St Edmund rested in a sheep-grazing landscape, it isn't a stretch to suggest that a local population would have undertaken such work due to their connections with agricultural and animal husbandry activities (Wacher 1974-243-255).

Caistor was therefore a town that fostered a vigorous interplay between entrenched Iron Age patterns of living and introduced Roman elements of Romanisation (Caistor Roman Town - The University of Nottingham 2022; Peterson 2003).

5.1.7 Summary of Density Data

The set of diagrams below refer to a built area of 13 hectares (Figures 5.4, 5.5, 5.6, 5.7). The settlement is bounded by a fortification wall (Figure 5.5) and was laid out on a road grid, so this analysis refers to those clearly defined blocks not to sectors as are referred to in Chapter 4.

The first figure (Figure 5.4) shows that the entire settlement measured was 13 hectares and of that, around 37,000 square meters was built space. It can be seen in the next diagram (Figure 5.5) that of the blocks which made up Caistor St Edmund, half were between 4000 and 5000 square meters in size and the other half were between 8000 and 11,000 square meters in size. It also reveals that the first group of blocks of the 4-5000 square meter range held built space ranging from 0 to 2500 square meters. The next group of blocks are much wider, with built space ranging from 0 all the way up to 5500 square meters. Diagrams 3 and 4 (Figures 5.6, 5.7) refer to the density gradient and for the density (built space per hectare) for Caistor St Edmund.



Figure 5.4: Total built space (in square meters) for Caistor St Edmund

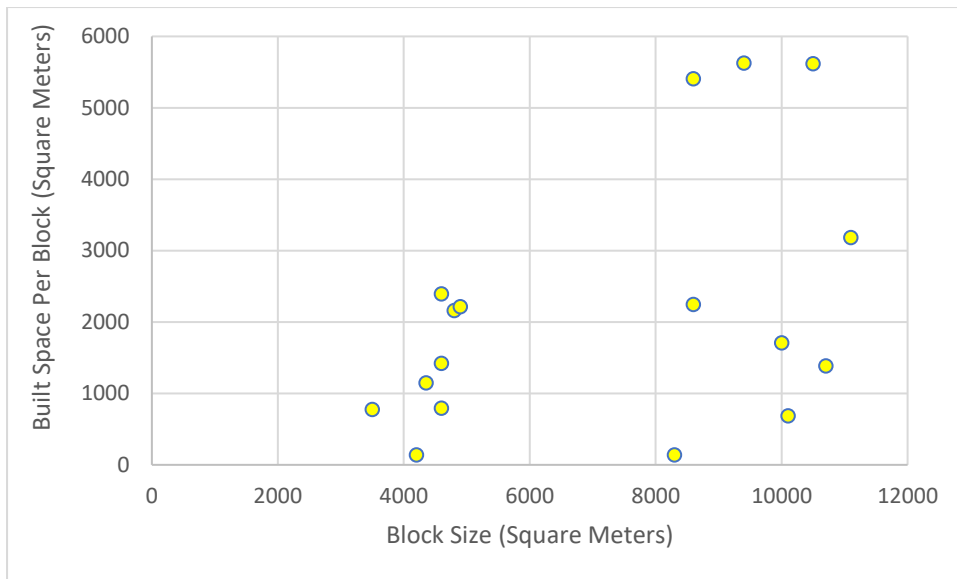


Figure 5.5: Built space per block (in square meters) for Caistor St Edmund

5.1.7.1 Density gradient

This diagram (5.6) shows the density gradient within Caistor St Edmund. The site was around 28% filled with built structures and most of the blocks within Caistor St Edmund were about 0-45% built with a few in the 50%-60% range. There is an outlier block with 50% built space about 300m away from the centre of the town.

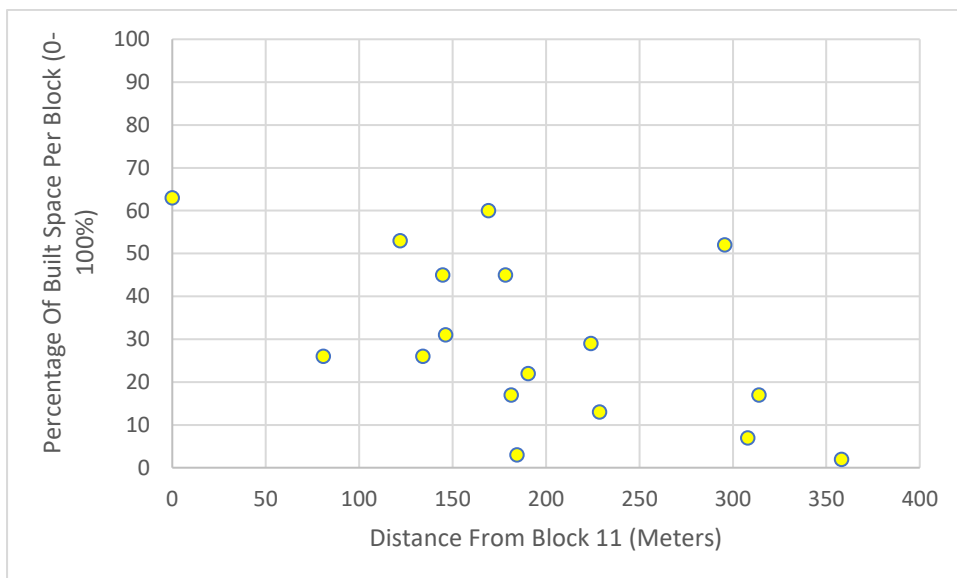


Figure 5.6: Gradient of density (%) for Caistor St Edmund

5.1.7.2 Density trend

The final diagram (Figure 5.7) shows that while Caistor St Edmund had blocks which were up to 70% built, the amount of built space per hectare still remained quite low, just shy of 3000 square meters per hectare (Figures 5.4, 5.5, 5.6 and 5.7).

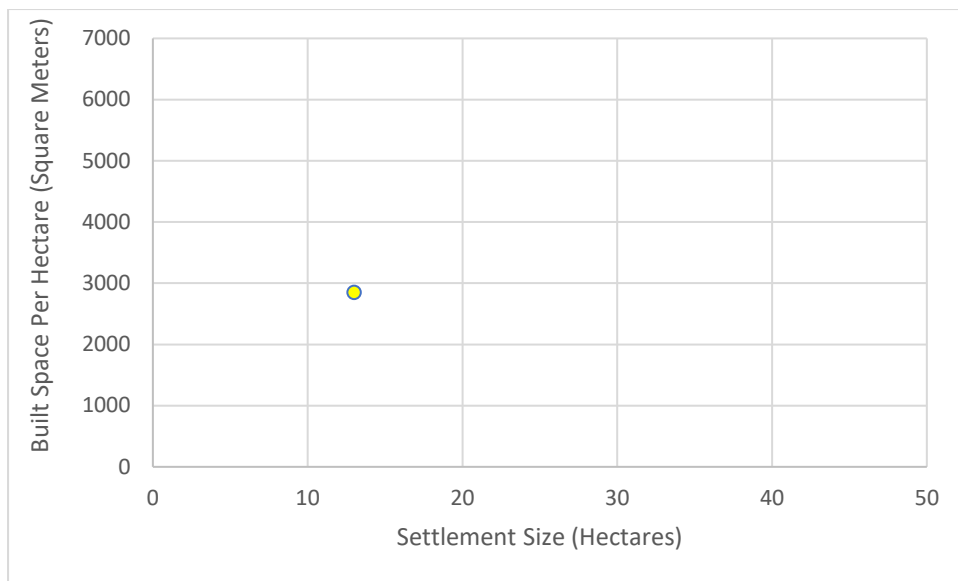


Figure 5.7: Density of built space (in square meters per hectare) for Caistor St Edmund

5.2.2 History

The Roman settlement of Caerwent, (*Venta Silurum*) located in Monmouthshire, Southern Wales was established about twenty years after the arrival of Rome in 43 CE. It acted as an administrative centre after the defeat of the Silures tribe, following a war waged against the tribe by the Romans under the leadership of Publius Ostorius Scapula (Wacher 1974, 378-391). The landscape in which Caerwent was built was highly interconnected and would have been within the political sphere of several tribes, the Silures being the most well-known. While there doesn't appear to have been an Iron Age *oppidum* preceding the Roman town, the interconnected Iron Age landscape meant that the subjugation of the area by the Romans took quite some time. The Romans applied the tactic of establishing a number of strongholds and supply lines across the Welsh landscape, which ensured that the Roman presence in the area was strong.

At the beginning of its history the town consisted of only a small number of houses with a forum in the centre. Its growth at this stage was organic and irregular and it wasn't until the 2nd century CE that it became more regularised and included over 20 *insulae* surrounded by a large fortification wall (Crummy 1982, 131-133; Wacher 1974, 378-391). It was also during the 2nd century CE that the Silures were granted Caerwent as a *civitas capital* and with this administrative change, the settlement saw the instigation of a number of building programmes including a new forum-basilica complex, bathhouse, and a number of other public and private buildings (Guest 2022, 1-37). During the 2nd century the *civitas capital* had also invested heavily in its position as a market town and was increasing its influence in the local governance of the area. In tandem with the increased focus on market economics, other buildings were constructed such as shops, and industrial workshops.

Perhaps due to concern over the effectiveness of the nearby fort of Caerleon, the 3rd century saw Caerwent making efforts to strengthen its fortification walls. The fortifications began with the construction of an earthen rampart in around 130 CE. A large stone wall was added in front of this rampart in the early part of the 4th century and there is evidence that on the northern and eastern sides of the town the wall was built more over the ditch. The wall survives to this day, especially on the south side of the town and would have enclosed an area of roughly 18 hectares. The earlier ditch and rampart is thought to have been about 10 meters in width and 1.6 meters in height. The stone wall on the other hand was roughly 3 meters thick and 5.2 meters high.

In the late third century there was an added economic boost when the population of Caerwent increased and new building programmes were commenced. Caerwent continued to be successful due to its connection with the rural hinterland which provided it with ample agricultural produce that supported the local urban economy (Frere and Millett 2012; Wacher 1974, 378-391).

By the late 4th century, the town was in decline but was likely still occupied as evidence for Anglo-Saxon burials dating from the 5th to 9th centuries have been uncovered and the existence of a late 5th/early 6th century CE monastery inside the town attests to the continuity of the site in the post Roman period (Frere and Millett 2012; Wacher 1974, 378-391). There is also evidence that a bishop may have been based in the town during that period as well. One important aspect of Caerwent's history is its continued utilisation in the face of large-scale abandonment of other towns in the late 4th and early 5th centuries CE (Wacher 1974, 378-391).

5.2.3 Layout and Structures

As mentioned previously, early Caerwent consisted of only a small number of houses with a forum in the centre (Wacher 1974, 378-391). Over time, the quality of domestic structures improved with the addition of new facilities built from stone as well as the construction of new economic infrastructure such as shops and workshops.

Caerwent remained small over the course of its history, more so than other towns in Britain, especially in the east. This did not impact on its success and influence in the region, which remained strong. While the site was small, it appears that some of its individual *insulae* were more densely packed than in other Roman towns of a similar size in Britain. This should of course be seen in the context of Roman towns throughout the Roman Empire which had during this time, a much denser configuration within individual *insulae*. Some of the buildings located closest to the forum were shops, occupying both sides of the main streets that ran through the centre of the town. Almost the entire east-west main streets were lined with buildings, including several shops. There also seems to have been less large-scale businesses demonstrated by the narrow alleys separating the individual stores, in comparison with other businesses which would incorporate several structures into one large complex (Wacher 1974, 378-391).

Many of the buildings surrounding the forum were found to be of the curial class, i.e., larger, and more opulent and a few examples of peristyle buildings point to a connection with the Continent - Gaul in particular - where John Wacher has argued that Trier and Caerwent may have shared some trade links (Wacher 1974, 378-391). This connection with the Continent perhaps went further with Wacher claiming that the site of Caerwent was more Roman than it was British, an odd assertion for a self-proclaimed *civitas capital*. The view is that Caerwent, which housed several large-scale, opulent domestic residences meant that the community were used to money being spent, whether public or private. Furthermore, the apparent readiness of the local populace of the Silures to adopt Roman elements seems odd since they had previously been hostile to Roman rule. They appear to have had less of an input in the formation of the town, with a greater input coming from the Romanised Continent (Wacher 1974, 378-391).

The forum of Caerwent took up the whole of the central *insula* but this *insula* appears to have been smaller than the rest of the town. The bathhouse was at the north-east corner of the *insula* opposite the forum. Both were built to a modest scale, perhaps due to the local Silures being unable to construct or have constructed, anything more than a modest set of buildings (Wacher 1974, 378-391). Unfortunately, only the northern part of the bathhouse is known and consisted of a *palaestra*, covered hall, *frigidarium* and a cold plunge. From the evidence, it appears that the bathhouse during the 3rd and 4th centuries saw significant alterations and coinage found inside tells that it was utilised until the 5th century. It also seems that the town had a *mansio* which lay immediately to the left of the south gate of the town. First excavated in 1904, little is known of its history or use. Because of its proximity to the wall, it may have served a military purpose or held those in a military position, perhaps visiting dignitaries and individuals in the military (Wacher 1974, 378-391), (Figure 5.9).



Figure 5.9: Reconstruction of Caerwent, <https://medievalheritage.eu/en/main-page/heritage/wales/caerwent-roman-town/>

5.2.4 Role and Functions

The construction of Caerwent and other *civitas capitals* was one way in which the Romans could exert imperial control while providing a modicum of autonomy to the local population. Peter Guest has suggested that a model whereby Rome would establish a patchwork of *civitas capitals* based on pre-existing Iron Age territories was a tried and tested method that had paid off in the Romanisation of Gaul and other Continental territories (Guest 2022; Aldhouse-Green 2016; Aldhouse-Green and Webster 2002; Wachter 1974, 378-391). Caerwent seems to have acted in such a way, not only as an important economic node but also as an administrative capital that would oversee the territory of the Silures. During the 2nd century, this self-autonomy was strengthened with the establishment of the *ordo respublicae civitatis Silurum* or the ‘council of the community of the *civitas* of the Silures’ which met in the curia, located in the forum/basilica complex in the centre of town. This administrative body would have been responsible for the day-to-day running of the site, its political and economic processes, and the ways in which the internal population as well as the rural population interacted (Guest 2022, 1-41; Wachter 1974, 378-391). Open areas also existed within the town that were used for gardens, and other elite residences appear to have utilised such open spaces.

Several industries are known to have operated out of Caerwent. Some of these were, an oyster bar in the east wing of the forum as well as carpentry and masonry workshops evidenced by the discovery of several tools linked to these professions. A carding comb was also found, pointing to the practice of silk milling. The large number of agricultural tools found throughout the site also emphasises that the town had an association with farming.

Perhaps some may have existed within the confines of the town. A blacksmiths shop has also been found which points to iron working (Wacher 1974, 378-391).

5.2.5 Additional Information

The growth and decline of Caerwent appears to have been dependent on the Roman fort of Caerleon, located 14km to the west, which ensured that the region of Wales was pacified enough to allow civilian settlements to emerge (Wacher 1974, 378-391).

A large part of the town has been excavated but unfortunately this was done before strict archaeological records were kept and therefore the history of many of the areas is not clearly known (Wacher 1974, 378-391). That being said, the recent archaeological excavation carried out by Wessex Archaeology in tandem with the programme Time Team (broadcasted by Channel 4 on the 25th of January 2009) uncovered several previously unknown features. They found remains in *insula* 1, located in the north-west of the site, a large multiphase building complex, a winged corridor house as well as a structure which may have surrounded a courtyard. One structure may have been a bathhouse, perhaps more than one storey in height and of a substantial Roman character with oak beams, painted, plaster walls and sandstone tiles. That being said, more excavation is required in order to properly ascertain its status as a bathhouse. It seems that the structure was built sometime in the 4th century CE and the discovery of charcoal suggests fire may have damaged it. The excavation team argue that a bathhouse would not be out of the ordinary. Aspects of the building suggest that wealth in the town was not unusual in other areas including the courtyard house in *insula* 1 and buildings located in *insulae* 11 and 16. Remnants of buildings were also found in *insula* 14 suggesting that the area represented a series of strip-buildings which formed a major part of the heart of the town (Wessex Archaeology, 2009). The evaluation carried out in 2009 revealed characteristics of the town that had previously been unknown and demonstrated the effectiveness of remote sensing, in particular, GPR for detecting buried structures in these urban environments (Wessex Archaeology 2009).

One of the more interesting aspects of the town of Caerwent is evidence for the worship of native deities. This was done in temple structures that resemble the Celtic style. This 'Romano-British' temple had a trapezoidal enclosure and was built in the early 4th century CE. The deity that was often worshiped at this building was Mars Lenus. Interestingly, this deity also makes an appearance in Trier at a major sanctuary near the river Mosel (Ingate 2019, 155-156).

5.2.6 Local Engagement

As mentioned previously, Caerwent has evidence for religious practices and a number of temples have been unearthed at the site. As well as the trapezoidal building and enclosure, other buildings have been found including a timber-framed workshop that was attached to the enclosure and would most likely have been associated with the temple enclosure. The street to the east of the temple also contained several shops and it has been theorized that all of these structures were part of a religious complex (Wacher 1974, 386).

Interestingly, a number of significant items were found within these structures including a broken head of a bronze serpent and a bird's head carving on bone, both of which point to Celtic deities. What this suggests is the engagement of a local population who still kept certain elements of their local faith. The later date of the temple structures also suggests that the presence of local practices continued throughout the Roman period (Wacher 1974, 386-387) (Figure 5.10).

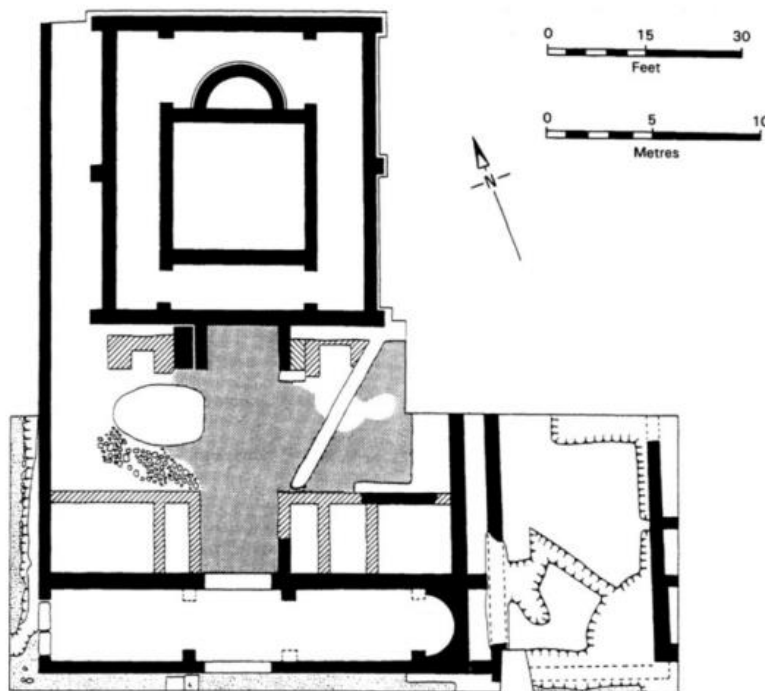


Figure 5.10: Temple and enclosure at the south-western corner of the *insula* immediately east of the forum, Wacher 1974, 387

5.2.7 Summary of Density Data

The diagrams below (Figures 5.11, 5.12, 5.13, 5.14) refer to a settlement size of 16.5 hectares for Caerwent. The first diagram (Figure 5.11) shows that of the 16.5-hectare settlement size, nearly 30,000 square meters was built space.

The next diagram (Figure 5.12) shows that the built space per block for Caerwent was between 0 and 3500 square meters of built space, quite low. There also seems to be a pattern where most the blocks are between 6 and 9000 square meters in size. There are no blocks below 6000 square meters and only one above 9000 square meters.

The next two diagrams (Figures 5.13, 5.14) show the density gradient and density (built space per hectare).

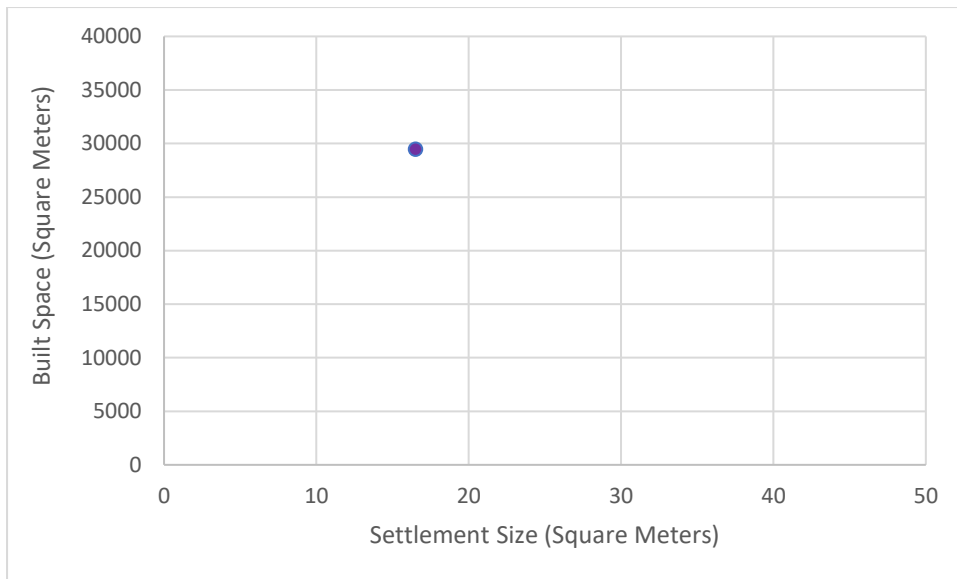


Figure 5.11: Total built space (in square meters) for Caerwent

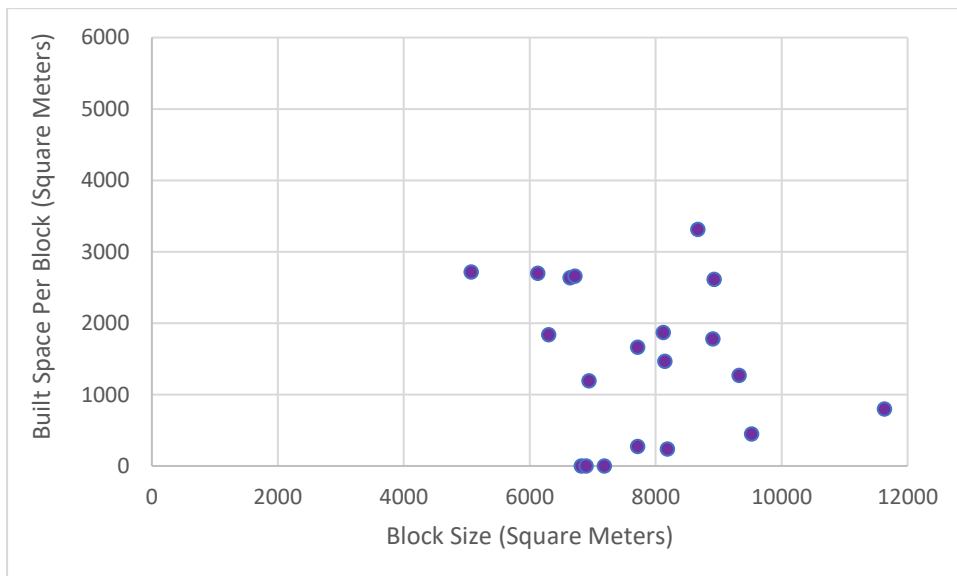


Figure 5.12: Built space per block (in square meters) for Caerwent

5.2.7.1 Density gradient

The density gradient diagram (Figure 5.13) for Caerwent shows that the central block has around 55% built space for that settlement with lower densities further out below about 40% down to 0%. Furthermore, all blocks are within 150 meters of the forum with around half being found within 100 meters of the forum, and the other half between 100-150 meters of the forum. The percentage of built space for the blocks show that the majority sit below 30%.

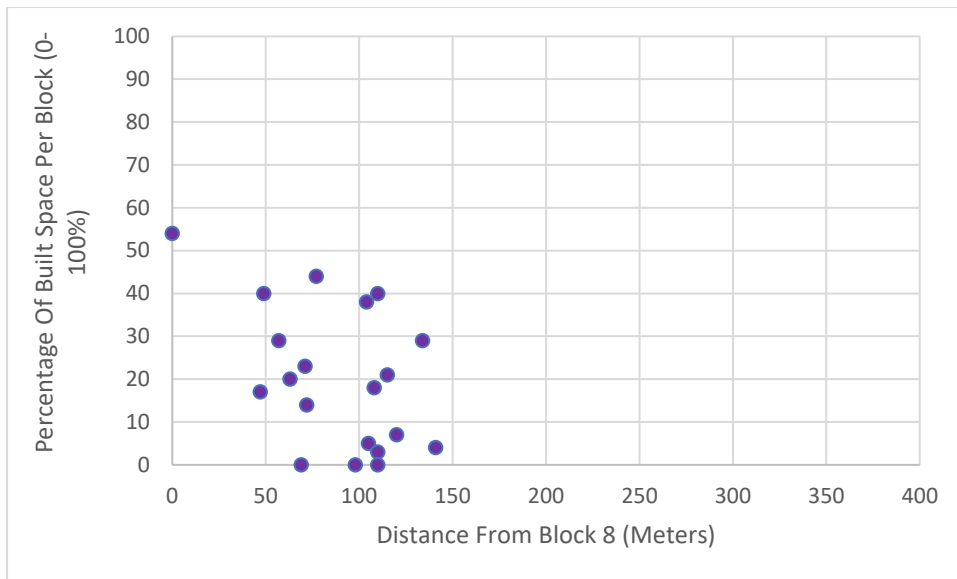


Figure 5.13: Gradient of density (%) for Caerwent

5.2.7.2 Density trend

The final diagram (Figure 5.14) shows that the built space per hectare for Caerwent is around 1800 square meters. In contrast with Caistor St Edmund, which has around 3000 square meters of built space per hectare, Caerwent has a much lower density (Figures 5.11, 5.12, 5.13 and 5.14). While this density may have been higher if the early excavations did not provide a comprehensive record.

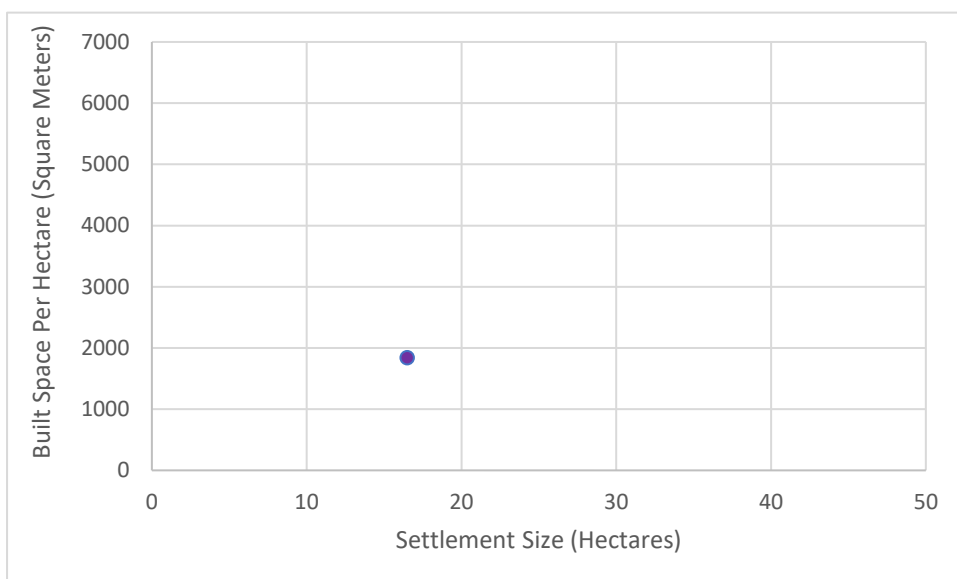


Figure 5.14: Density of built space (in square meters per hectare) for Caerwent

5.2.8 Conclusions

The density gradients are what would be expected with higher density in the middle of the settlement in the administrative area and then falling away towards the edges. Interestingly, there is a similarity with the density gradient among the two settlements, both containing around 50-60% in the administrative/centre of the settlement.

The density trend data for the medium sized *civitates* seems to strengthen the impression that settlements decrease in overall occupation density with increased settlement size. For Caistor St Edmund, at 13 hectares and Caerwent, at 16.5 hectares the built area per hectare figures are similar. For Caistor St Edmund the figure is 3000 square meters per hectare while for Caerwent the figure is 1800 square meters. The overall densities apparent for the medium size *civitates* were very similar to those of the *vici* and may be consistent with a decreasing occupation density with increased settlement size.

As for the local engagement in Caistor St Edmund, Wacher (Wacher 1974) remarks on the absence of inhumation in the Iron Age in this area and the continuing absence in the Roman period with the complication that the Roman's also practiced cremation. There has also been evidence detected for a Roman-Celtic shrine and a local forum for the theatre. A lack of olive oil may suggest a greater reliance on British foodstuffs. As for Caerwent a significant trapezoidal religious sanctuary was found among other shrines with evidence suggesting that local deities may have been worshipped.

Chapter 6 - Large *civitas capitals*: case studies

Large *civitas capitals* were chosen as they appear to have lower internal occupation densities than the smaller settlements and have extensive, seemingly open/unbuilt space within the boundaries. For this chapter, Silchester and Wroxeter will be discussed as case studies because they are both open-field sites and their plans are substantially recorded. There appears to be a regularisation of occupation density as the Roman towns become larger, particularly over 40 hectares. The 80-hectare site of Verulamium, which also corresponds with this internal occupation density trend will be discussed further in Chapter 7 while the 135-hectare Londinium will be discussed in Chapter 8.

The work of John Wachter (1974) has been utilised throughout this chapter and has been a vital source for compiling key information regarding the internal organisation and spatiality of sites.

6.1 Silchester

6.1.1 Introduction

The site of Silchester (Callewa Atrebatum) was chosen because it represents one of the best recorded settlements in Roman Britain. It also has a history as an Iron Age *oppidum* and evidence for cross cultural interaction between local and Roman traditions.

The settlement of Silchester developed into an *oppidum* during the latter Iron Age, (late 1st century BCE) and then into a Roman town in the first century CE, acting as a centre of political and economic influence for the surrounding area. Located 8km north of Basingstoke, Hampshire, the site remained a vital part of the landscape after the arrival of Rome (Fulford 2021, 28-47; Clarke and Fulford 2011, 1-8; Creighton and Fry 2016, 339-357). Roman settlements were built adjacent to the preceding *oppidum* and the actual area of the *oppidum* was also reused for the Roman town. It would appear that Silchester's position next to a major road known as the 'Devil's Highway' gave it a stronger and more robust link with the rest of Britain (Clarke and Fulford 2011; Creighton and Fry 2016 388-406).

The section will begin with a discussion of the settlement's history from the Iron Age into the Roman period as well as changes to the site over the next four centuries. Both the local (Iron Age) and Roman features of the layout and main structures will be reviewed along with the role of the urban infrastructure before commenting on the key excavations that have been carried out, particularly the 'Town Life Project' of the University of Reading. Finally, local habitation and engagement in Silchester will be considered followed by an overview of the density analysis for the settlement (Figure 6.1).

6.1.2 History

Situated on the edge of a gravel plateau, the *oppidum* of Calleva Atrebatum was built in circa 1 CE with earthworks covering a much wider area than the Roman fortifications would when the Roman town was established nearly half a century later (Fulford 2021, 1-8, 28-47; Clarke and Fulford 2011, 1-8; Creighton and Fry 2016, 285-329).

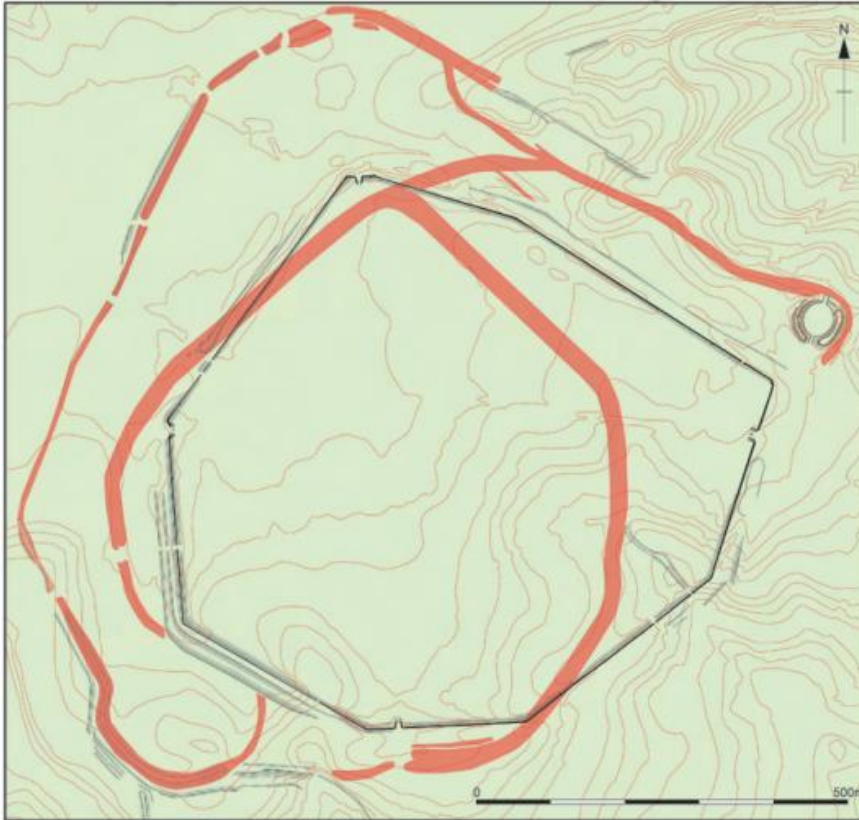


Figure 6.1: Plan of Iron Age defences (red) relative to Roman walls (black), Fulford 2021 (After Creighton with Fry 2016)

Coinage found at the site has revealed that *Calleva Atrebatum* (Silchester) was inhabited by the Atrebates tribe during the late Iron Age, a tribe that decided on amicable relations with the Romans, which perhaps bettered its new position as an appointed Romano-British *civitas capital* (Fulford 2021, 28-47). Some coins have been found to depict Commius, the leader of the Atrebates who is known to have had links with Gaul, attesting to the close connection that Silchester had with the European mainland and with architectural forms such as rectilinear domestic infrastructure and pre-planned street-grids that were already commonplace in Roman occupied Europe (Fulford 2021, 28-29).

The name of the settlement, Calleva Atrebatum translates roughly as ‘woody area’ and points to the natural geography of the area before Roman arrival. The location of the settlement next to a wooded area as well as timber constructs from within the town hewn from nearby forests seems to suggest a conscious decision to build in this particular location (Fulford 2021, 1-47; Clarke and Fulford 2011, 1-8, 326-350; Creighton and Fry 2016, 339-357). Pre-Roman Iron Age roundhouses have been found under the Roman Basilica and at

least one that dates to the earliest history of the site, perhaps seeing occupation immediately prior to and during the Roman occupation of the site (Fulford 2021, 97-99).

After the Roman invasion of 43 CE the *oppidum* became a Roman town and as a capital for the Atrebates. During the 1st century CE, the dominance of Rome continued and there were several changes to the internal layout of the town. These included the Iron Age street plan being replaced by a Roman one and the formal setting out of the *insulae*. The forum and basilica were also built during the 1st century in the centre of the settlement and other public and administrative buildings began to appear including an amphitheatre and bathhouse. The mercantile and economic nature of the site also changed during this time with the emergence of shops.

During excavations carried out in 2008, traces of Roman period 1, (conquest period) were uncovered (Clarke and Fulford 2011, 9-52, 326-350). These structures appeared to have been burnt in areas (Fulford and Clarke 2006-2009, 7). Fulford has argued that this burnt layer in period 1 as well as deliberate backfilling of the numerous wells in the town suggests a large-scale fire that may have been the result of the Boudican uprising (Fulford and Clarke 2009, 7). The only issue is that no classical sources have mentioned Silchester's destruction at the hands of Boudica (Clarke and Fulford 2011, 9-52, 326-350). Furthermore, the large-scale building programmes carried out in period 2 appear to have been in response to the fires which had damaged the first iteration of the town. Fulford and Clarke have suggested that the destruction of the period 1 infrastructure, much of which was built from timber, may represent a fresh start, one that saw the need for more regularisation and the utilisation of stone over timber (Fulford and Clarke 2009, 11).

It was not until the mid- 2nd century that the town was fortified with a rampart and ditch defensive enclosure. The 2nd century also saw further development including much wealthier forms of private housing, shown through several richly decorated mosaics that were uncovered through excavation. During the 3rd century, the wall that is most visible today was built and was constructed out of stone. As in the previous century, there were several demolition and rebuilding programmes carried out and the layout of the town and the streets became increasingly Romanised. The 4th century CE saw the flourishing of the town and the construction of new buildings, many of which were more modest than those of the 2nd century. The final centuries of Silchester (5th - 6th centuries CE) saw the abandonment of several areas of the town and the deliberate infilling of several wells, which suggests a decision on the part of the town's inhabitants to move elsewhere (Fulford 2021, 1-8, 28-47; Clarke and Fulford 2011, 1-8; Creighton and Fry 2016, 285-32).

The town of Silchester between the arrival of Rome in 43 CE and its decline in the late 4th century CE became a major centre in the area, facilitating economic and political processes both internally and externally in the immediate landscape as well as fostering an interplay between local and Roman inhabitants. Silchester was unique in that the Roman town was built on top of an existing Iron Age *oppidum*, in stark contrast to the majority of Roman sites built in close proximity to an *oppidum* (Fulford 2021, 28-47). Because each phase of Silchester's history is so well-known (from the 1st to 6th centuries CE), it has given researchers a valuable repository of knowledge about changes to urban systems over time (Clarke and Fulford 2011, 9-52) (Figure 6.2).



Figure 6.2: Reconstruction of Silchester, Fulford 2021

6.1.3 Layout and Structures

There were several phases of development and retraction in the internal layout of the site and the structures within it. As for the forum/basilica complex, the forum began as a timber-framed structure with the basilica being slightly larger. This iteration of the basilica consisted of a nave and an aisle, and both were divided by a large entrance lobby about 8 meters wide. The timber-framed complex was replaced by a stone forum and basilica in the second quarter of the 2nd century CE. The forum was built around a large piazza and on the north, east and south sides it gave access to a number of rear rooms (Wacher 1974, 276-277).

As for domestic structures, the houses in Silchester followed a pattern of construction that truly resembled Roman dwellings. That being said, the first domestic structures which were built in Silchester were roundhouses. These seem to have declined in use soon after the arrival of Rome, being replaced by rectilinear structures (Clarke and Fulford 2011). In the earliest iteration of the town, these structures were constructed out of wattle and daub with a timber frame. When they were given a masonry frame is not entirely clear. In other Roman towns in Britain, it appears that masonry installations, including frames for pre-existing houses began to appear around the early to mid-2nd century CE. It also appears that early on in its history, Silchester was home to more opulent houses, a number of which had their own courtyards which were often used as gardens or orchards as indicated by the discovery of plant remains (Wacher 1974, 286-287). Over time these were replaced by more modest dwellings. Therefore, the number of housing units early on in Silchester's history would have been low and over time, a higher number of smaller, less opulent buildings would have emerged (Clarke and Fulford 2011).



Figure 6.3: *Insula IX*, looking north-east, aerial view, Fulford 2021

Another form of domestic building were the shopfront houses and *tabernae* which consisted of the main retail area at the street front, a workroom behind the shop and domestic living quarters at the rear of the property. According to Creighton and Fry, these types of buildings are most common on the main east-west street between the London and Western gates while being largely absent along the roads that led to towns like Winchester and Chichester (Creighton and Fry 2016, 407-409).

The street-grid for Silchester was not laid out until after the construction of the timber forum and basilica complex due to the discovery of alterations made to the complex which ensured the street network followed the correct alignment. It has been postulated that the construction of the initial Roman street network began somewhere between 90-120 CE.

Another important piece of infrastructure in Silchester was the *mansio* which were established in the very earliest stages of development, when the road network was being laid out, one of which was located in *insula 8*. The *mansio* was large and took up almost the same amount of space as the forum. It had a bathhouse in the south-east corner and a large courtyard which ran the whole length of the eastern side of this structure. While it has been suggested that it could have been an elite residence, its early date and size has indicated a public status (Wacher 1974, 277-278).

Another structure that can be dated to the earliest part of Silchester's development was the amphitheatre, from the late Neronian to early Flavian periods. It was located in the north-east corner of the site, just outside the 2nd century defences. Its earliest iteration would have been constructed out of timber and enclosed a circular area with raised seating. The

outer wall of the amphitheatre was stacked with turf to act as a strengthening device. During the 2nd century CE there were large-scale alterations made to the amphitheatre whereby the circular shape was transformed to an oval one. During the 3rd century the amphitheatre was finally rebuilt in masonry and was extended. (Wacher 1974, 279-280).

Silchester also had good access to water. Because of its position, wells could be constructed and sunk into the clay bed to extract water. Several of these wells have been uncovered and seem to have been able to supply most domestic needs. There was also piped water. A pipeline made of wood has been discovered which would have served several residences and businesses within the town. While there has been the suggestion that a *castellum* existed to deviate water throughout the town, the original source would have come from elsewhere, perhaps a spring (Wacher 1974, 280).

Several religious structures were present within the town including temples and some possible shrines (Wacher 1974, 281-282). The main religious structure was located in *insula* 30 and two Romano-Celtic temples lay nearby. Both of these temples were aligned on the first town plan which suggests they were constructed early on in the town's history. One temple lay near the west side of *insula* 35 and was much smaller than the other two Romano-Celtic temples. The other was located in *insula* 8 and was polygonal in shape, surrounded by a large open area with a wall on the north, east and south sides. Three other buildings have been found in Silchester that were most likely local/Iron Age temples or shrines, as well a number of smaller private shrines within individual domestic buildings. The nature of the pagan deities or the ritual inclinations of the populace are still not entirely known.

6.1.4 Role and Functions

During its history, Calleva Atrebatum (Silchester) had multiple functions. These included industries such as tanning, ceramic production and dyeing but also more common activities that are visible in other Roman towns such as Caerwent, including the marketing of livestock. From its earliest history, Silchester was a hub of trade and had a lively shop scene. The early development of the town appears to have been influenced by traveling traders and merchants, including several from Continental Europe (Creighton and Fry 2016, 406-423; Fulford 2021).

Before the forum was built, a tannery had been set up which was situated near the north-west corner of *insula* 6. Evidence for a number of ox jaws is indicative of a practice seen in other areas of the Roman world whereby skins with the heads attached were hung (Fulford 2021; Creighton and Fry 2016, 406-423; Wacher 1974, 271-291). Evidence has also been uncovered of cobblers lasts/anvil which point to the existence of a leather workshop. A number of hearths, located in *insulae* 10 and 11 may indicate heating of vats that were used by dyers. Several pewter moulds have been unearthed in the forum which point to the presence of a pewter workshop in the later centuries of Silchester's history when the forum was being utilised as a metal workshop. Silver refining was occurring as well as the operation of bronze working and blacksmithing. This has been supported by the discovery of hoards of iron which contained several smithing tools such as tongs, farrier tools, hammers, an anvil as well as an iron smelting furnace. The presence of carpentry in the town is assumed due to a large supply of carpenter's tools in the iron hoards. Agricultural activities

were also detected amongst these hoards with the discovery of coulters and ploughshares (Fulford 2021; Creighton and Fry 2016, 406-423; Wachter 1974, 271-291). Other industries located just outside the main town walls were tileries, potters' workshops and kilns. Some of these have been uncovered, including tileries located in the north-east in a small enclosure near the amphitheatre. The pottery kilns and workshops were also located nearby but evidence for these is meagre, and more work is needed to discern the true extent of these industries within or next to the town. The development of these industries and retail outlets illustrates the vital importance that these towns and businesses had and the services they provided for their districts.

6.1.5 Additional Information

The Town Life Project (Clarke and Fulford 2011) which began in 1997 and which has focused attention on *insula* 9 has revealed much about the organisation of the settlement. It began 25 years ago in 1997 and *insula* 9 was chosen for several reasons. The most important for the researchers being that it has a greater concentration of buildings compared with other *insulae*. Its location next to the forum-basilica complex was also adjacent to both the major east-west and north-south roads (Fulford 2021; Creighton and Fry 2016; Shannon 2011) (Figure 6.3).

The 'Town Life Project' has uncovered a series of Iron Age structures including a substantial boundary ditch dated to 40-20 BCE, a rectangular hall dated to 25 BCE-10 CE and the laying out of roadways along with property divisions around 10-40 CE. It would appear that unlike many other Iron Age sites across Britain, Calleva Atrebatum was already quite familiar with Belgic, Gallic, and Roman styles of subsistence before the Roman conquest of 43 CE.

The apparent pre-planned nature of these roads suggests that the inhabitants were engaged in town planning almost a whole century before the arrival of Rome. A series of buildings dating from the Claudian and Neronian periods were also uncovered, the majority being rectilinear in design though a number of roundhouses dated to those periods were also found which denote shared architectural practices persisting beyond the initial contact period (Fulford 2021, 28-50).

6.1.6 Local Engagement

Evidence for Iron Age occupation has been discovered on the south side of the inner earthworks and around the south gate of the settlement. Further evidence of this Celtic occupation was found below the forum-basilica complex. Other structures such as roundhouses, wells and post-hole pits were found towards the north-east, south-west alignment which have been dated to around 25 BCE-15 BCE (Clarke and Fulford 2011; Shannon 2011, 1-39). From 15 BCE to 40 CE rubbish pits, well aligned streets and palisaded enclosures point to a Belgic influence from across the channel.

Calleva Atrebatum seems to have maintained a connection between the local patterns of the preceding *oppida* and the incoming patterns of Roman urbanism. This is seen through the temples that incorporated Roman and local styles (Fulford 2021, 88-89; Shannon 2011, 21-28). There are also several wells located throughout the town and in particular *insula* 9

which have yielded votive offerings in line with local ritual practices dated to the Roman period, indicating Roman and local coexistence in the town throughout much of the Roman period. Interestingly, local patterns of burial which was customary for the local populace persisted. The Romans usually cremated their dead. So far, no evidence of cemeteries or large-scale burials have been found either inside or outside the town suggesting that both the locals and the Romans shared cremation as an end-of-life practice (Fulford 2021, 88-90, 180-182; Clarke and Fulford 2011; Shannon 2011, 21-29).

6.1.7 Summary of Density Data

The diagrams below (Figures 6.4, 6.5, 6.6, 6.7) refer to the total settlement area of Silchester of 43 hectares.

The first diagram (Figure 6.4) shows that of the 43 hectares that make up Silchester, around 81,000 square meters was built up. The next diagram (Figure 6.5) shows the built space per block. the majority of the blocks within Silchester were 3-13,000 square meters in size, with a scattering of larger blocks at around 27,000 and 35,000 square meters in size. the majority of built space is between 0 and 4000 square meters and are within the blocks that are between 5000 and 13,000 square meters in size.

The final two diagrams (Figures 6.6, 6.7) show the gradient of density and overall density (built space per hectare) for the density trend analysis which will be applied to Silchester in Chapter 8.

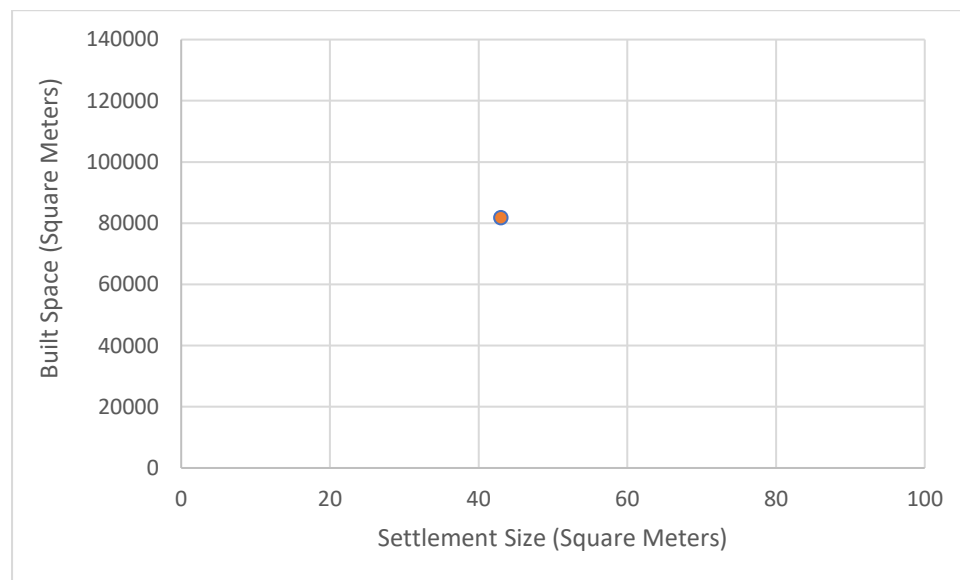


Figure 6.4: Total built space (in square meters) for Silchester

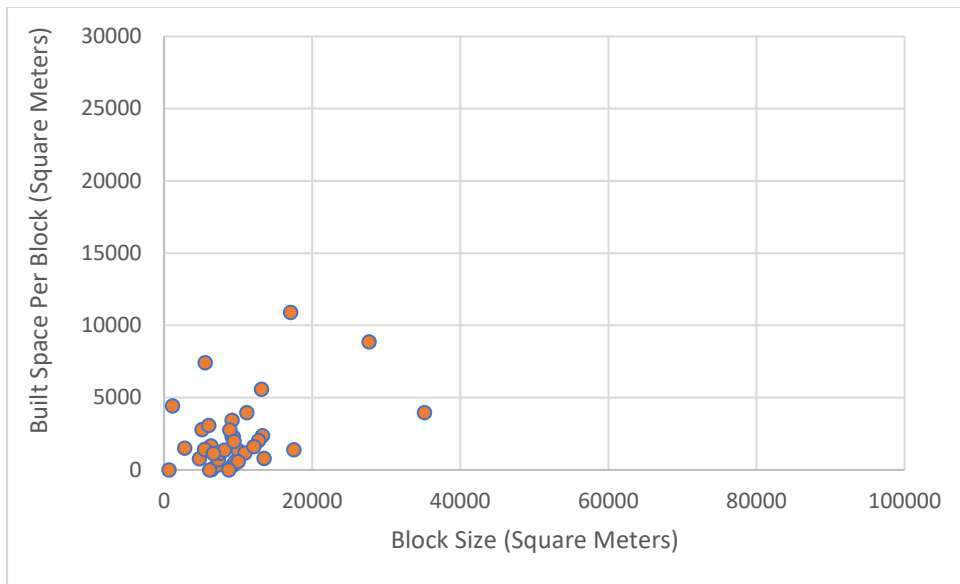


Figure 6.5: Built space per block (in square meters) for Silchester

6.1.7.1 Density gradient

The total density percentage of the settlement was around 19% while the density gradient diagram below (Figure 6.6) indicates that the densest part of the settlement only reached about 65%, in this case for a block which happens to be the central forum-basilica. The majority of the blocks are between 0 and 20% built space and the other half have about 20-40%.

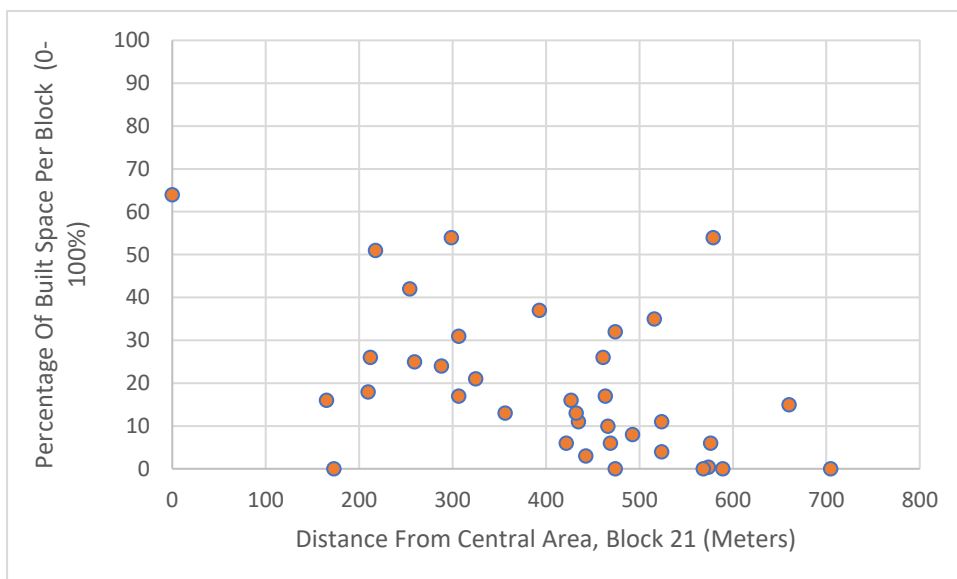


Figure 6.6: Gradient of density (%) for Silchester

6.1.7.2 Density trend

The final diagram (Figure 6.7) shows that there was just under 2000 square meters of built space per hectare for Silchester, which is at a lower density and is consistent with Ortman and Hanson's assessment based on private space only.

It appears that as the urban settlements in Roman Britain increased in size, there was a commensurate drop in overall occupation density.

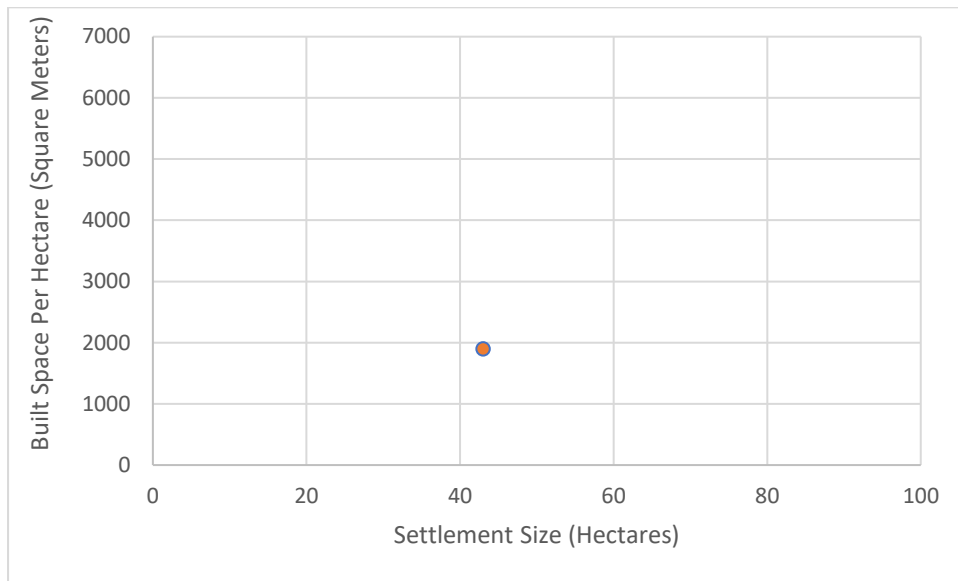


Figure 6.7: Density of built space (in square meters per hectare) for Silchester

6.2 Wroxeter

6.2.1 Introduction

The settlement of Wroxeter (*Viroconnium Cornoviorum*) was the *civitas capital* of the Cornovii (Figures 6.8, 6.9) and is located in Shropshire, about 8km to the east of Shrewsbury near the Severn River. Its location near a major river would have fostered trade as well as a means of transportation. The settlement was built on a low plain away from the local Iron Age hillfort on top of the Wrekin, on land which had a long history of agriculture including mixed farming (White, Gaffney and Gaffney 2013, 157-160; White and Barker 1998, 9-32).

Wroxeter was chosen as a case study because of the history of excavation and comprehensive surveying at the site, especially the gradiometry remote sensing carried out by Vince and Chris Gaffney. The settlement is also one of the few that saw habitation after the Roman administrative withdrawal from Britain in the 5th century CE (White, Gaffney and Gaffney 2013; White and Barker 1999, 102-118).

The section will begin with an overview of the history of the site when it was first established as a settlement in the 80s CE before moving onto the historical changes to the site over the course of the next 4-5 centuries. From there comment will be made on the layout, key structures, and the function of the site. This will be followed by a commentary on the key excavations and remote sensing work carried out on Wroxeter. Then the local habitation in the *civitas capital* will be reviewed. Finally, there will be a commentary about the density analysis for this particular site (Figure 6.8).

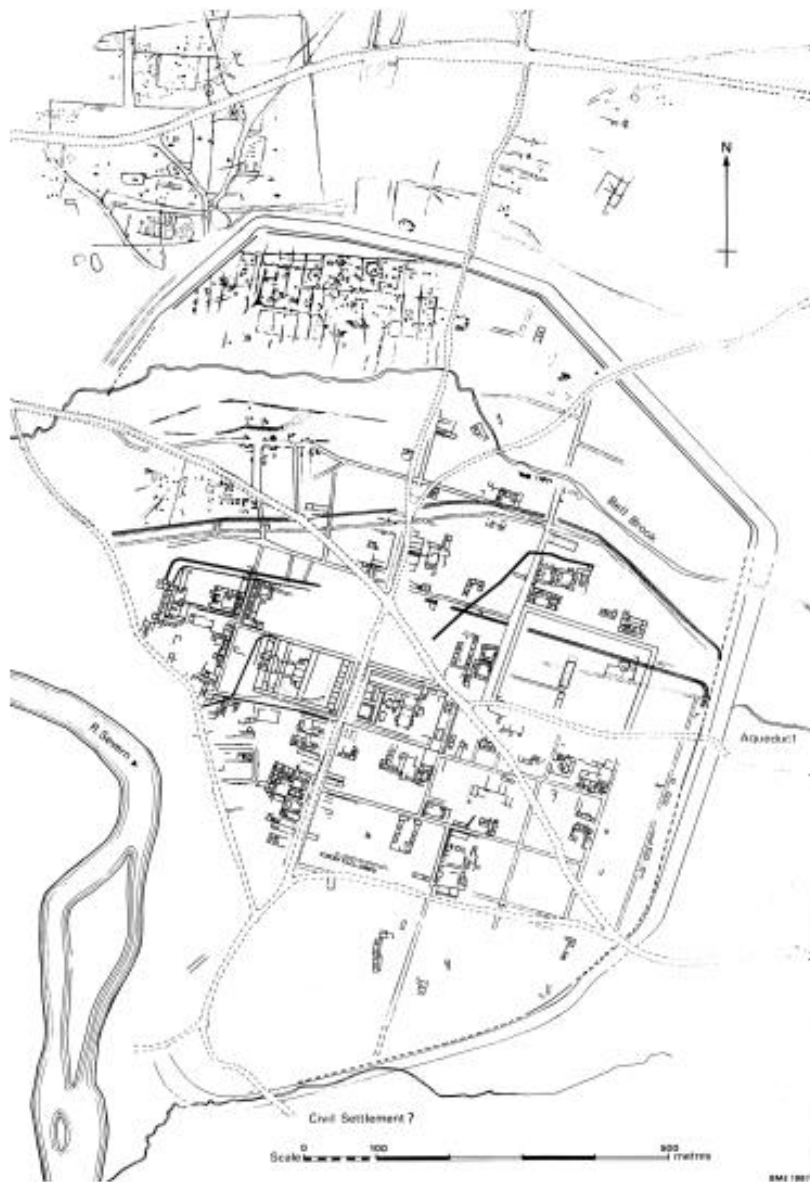


Figure 6.8: Composite map of the aerial photographic evidence for the several phases of Wroxeter, White, Gaffney and Gaffney 2013

6.2.2 History

The area in which the Roman legionary fortress and civilian town of Wroxeter was established lay in the geographic/territorial area of the Cornovii tribe. It has been suggested by Wachter that a deal had been struck between the emperor Claudius and the Cornovii that allowed Roman troops the freedom to move throughout the territory. Issues with other Welsh tribes such as the Ordovices and Silures resulted in extensive military expeditions under governor Ostorius Scapula. The resultant expeditions meant that the Romans saw justification in establishing a number of military installations along the frontier, including at Wroxeter, particularly to protect the major rivers of the Severn and Dee (White 2017; White and Barker 1999; Wachter 1974, 362-377).

The Roman history of Wroxeter can be summed up in terms of several phases of occupation. The site began as a legionary fortress in the very first years of Roman occupation, sometime around 47 CE. It is likely that a cohort of Thracians were the first to occupy a fort in the area. The military installation was garrisoned by about 500 men and was established within a 2.3-hectare boundary on the east bank of the Severn River. The second phase of occupation which coincided with the establishment of several additional military buildings began in the mid-60s CE as well as the transition to a military fortress. Initially occupied by the 14th legion followed by the 20th legion, this fortress was located between a number of streams running east-west that cut off approaches to the fortress from the north and south and to the west the fortress was protected by the river Severn. The main gate to the fortress faced westward and inside were located a number of granaries and barrack like blocks. The fortress was expanded in 78 CE at the same time that the governor Gnaeus Julius Agricola was leading campaigns against the northern Welsh. In 80 CE Agricola took the 14th legion north to quash the Scottish Picts, leaving the control of the site in the hands of the 20th (White, Gaffney and Gaffney 2013, 157-171; White and Barker 1999, 70-84).

The legionary fortress remained active until around 90 CE. During this time, a small civilian settlement was established to the south of the main legionary fortress. Several items including coinage and pottery suggest that the inhabitants of this small settlement may have had their origins in the Worcestershire area and that they had travelled up the Severn River to Wroxeter. A smaller settlement, under the control of the army and more formal in its organisation may have developed north of the fortress during the military phase of the site (White, Gaffney and Gaffney 2013; White and Barker 1999, 70-84; Wachter 1974, 362-377).

In 90 CE, following the withdrawal of the legions, the street grid and several buildings from the fortress were repurposed and used to form the nucleus of the first town. It also appears that the town was the seat of government for the local Cornovii tribe who inhabited the area. Over time, the fortress was slowly dismantled, and the boundaries of the town expanded, taking in the area of the fortress to the east and the Bell Brook valley to the west. In the very earliest phase, there were no defences and only a small number of buildings (White and Barker 1999, 32-51; Wachter 1974, 362-377). However, the town would eventually have 48 *insulae*.

Though the area of the early town was large, there was no apparent civic centre. This was to change in the 2nd century CE when infrastructure such as a bathhouse and forum were established. By the late 2nd century CE, the settlement had grown to a size of around 78 hectares. At its height in the early to mid-2nd century, the town was the 4th largest in Britain and was also one of the wealthiest (White and Barker 1999; Frere and Millett 2012). The establishment of the bathhouse and forum in the middle of the 2nd century saw the transformation of the town into an urban settlement which had much in common with other Roman towns in the province. This also coincided with a visit from the emperor Hadrian in 122 CE, which appears to have been a defining moment in the history of the site in regard to the instigation of new building activity. It was also during the 2nd century that the boundaries (walls and banks) of the town were built, and which were still being refurbished in the 4th century CE.

After 410 CE Roman influence over the town declined and it was occupied by Welsh tribes in the period following Roman withdrawal (White and Barker 1998, 102-118). Interestingly, while many other Roman towns in Britain were seeing major decline and isolation from the rest of the province, Wroxeter saw a major revival in the 400s after successive periods of relative reduction in building activity in the 2nd, 3rd and 4th centuries. The town remained in use following the complete withdrawal of Rome. Evidence of a phase of timber buildings dated to about 600 CE attests to this. The population of the town at the time was most likely British and it has been suggested that the site was the centre/base of an Irish leader (White 2017; White and Barker 1999; Wachter 1974, 362-377).

As for the abandonment of Wroxeter, it seems either to have taken place during the late 6th century when a great plague swept across Britain or perhaps in the 7th century CE when the Anglo-Saxons took control of the region. The existence of a church (Church of St Andres) and in particular a northern wall built from Roman masonry demonstrates that Wroxeter was an important location even at this late date (7th – 8th centuries CE) (Lane 2014, 501-515; Slater 2000; White Barker 1999, 102-137).

6.2.3 Layout and Structures

There were several phases of occupation at Wroxeter and with those came particular infrastructure and buildings indicative of the changing nature of the town. At the small *vicus*/civilian trading settlement established during the military phase of Wroxeter, ceramics and coinage from neighbouring areas suggest that the inhabitants of the *vicus* may have utilised the river for trading and transportation, particularly to and from the Worcestershire area (Wachter 1974, 362-377).



Figure 6.9: Composite map of Wroxeter including aerial survey (red) and magnetometer sensing (green). Blue markings are considered pre-Roman, White, Gaffney, Gaffney 2013

The first iteration of the town saw a few structures, several of which had been constructed immediately before the withdrawal of the 14th legion. These were the legionary bathhouse which was left incomplete and the forum which was built atop the half-completed foundations of the bathhouse. The settlement initially operated out of the legionary *canabae* (see Figures 6.8, 6.9, 6.10) in the last part of the 1st century CE. Infrastructure such as a street grid had been laid out and there were also a number of private domestic residences whose occupants would have been responsible for the early economy of the town demonstrated through the shops to the south of the new town. It was not until the 120s CE that Wroxeter experienced its first large-scale surge in building activity.

Over time, the civilian settlement grew and subsumed the fortress as well as that area to the north and west next to the river Severn (see Figure 6.10). Initially, no defensive structures were built. A *mansio*, located at the southern part of the site has been excavated and dated to this period, suggesting a level of comfort the town could provide at this point in its history. It also does not appear that this initial period saw the construction of a forum.

A building programme to rectify this was taken up in the early part of the 2nd century CE (Wacher 1974, 362-377).

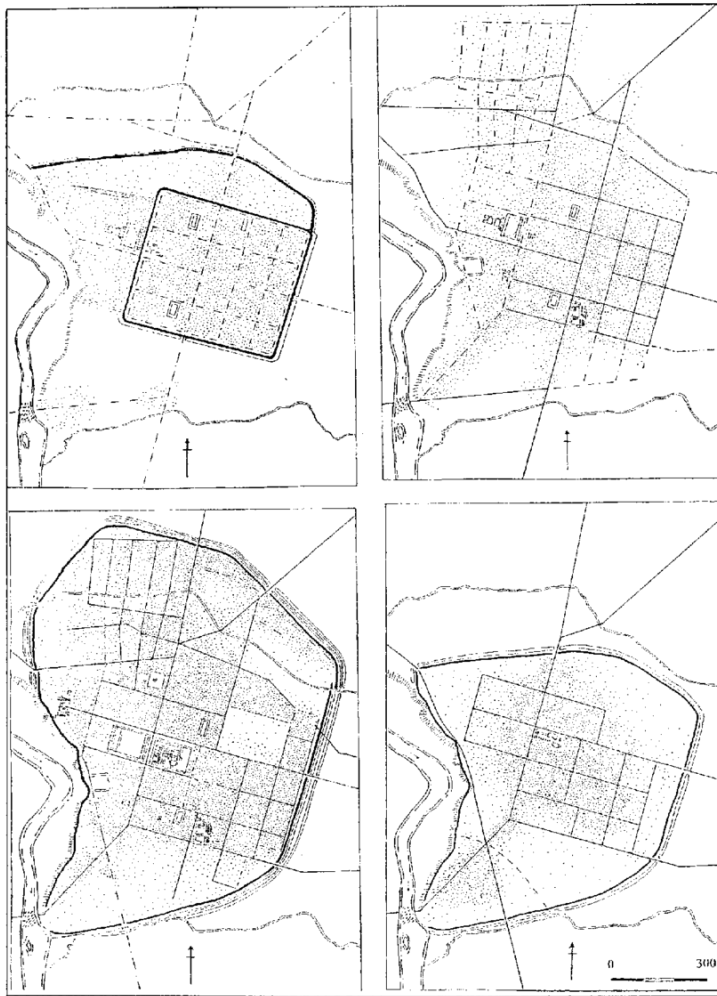


Figure 6.10: Stages in the development of Wroxeter: fortress in top left (57-90CE), early city on top left (90-150CE), mature city on the bottom left (150-500CE), the sub-Roman town in bottom right (500-650CE), Buteux, et al 2000

The forum followed a standard plan, similar to other *fora* in Britain with a series of shops along the street frontage, a courtyard behind which would have been colonnaded and on the far side of that courtyard would have been a large basilica. These rooms would have held the council chambers, the main town shrine, and the records office. The large courtyard would have held a series of statues of dignitaries, emperors and was presumably used as a periodic marketplace (White and Barker 1999; Wacher 1974, 362-377).

As for the basilica, it was first excavated in 1923 through to 1927 by Donald Atkinson. The basilica was located at the west end of the forum and the nave of the basilica was 11 meters wide, each aisle being about 4.6 meters in length. At the south end of the nave of the basilica was a raised tribunal platform with another at the north end. Changes to the internal organisation of this structure were numerous, especially after a fire which burnt several parts of the building in the middle of the 2nd century CE. Many items were found within this burnt layer including Hadrianic coins, styli, inkwells, counters, and glass jars,

dated to around 135 CE. Sometime between 165 CE and 185 CE, the forum as well as several shops and other domestic structures were also destroyed by fire (White and Barker 1999, Wachter 1974, 362-377).

The bathhouse on the other hand was not completed until around 150 CE (Wachter 1974, 366-368). It began at the same time as the forum but was not fully operational until 30 years later. The delay appears to have been due to the necessity of rebuilding the forum. An early stone building as well as several other timber framed ones have been identified at the site of the baths and may have been a part of this early bathhouse. Several larger masonry elements were detected that could have also been part of the original bathhouse (White and Barker 1999; Wachter, 1974 362-377). The presence of the forum and bathhouse in close proximity, as well as their construction being completed within a decade of each other suggests the high level of Roman administrative oversight as well as the local inhabitants desire to adopt features such as these (White and Barker 1999; Wachter 1974, 362-377).

Other infrastructure included a well-attested aqueduct. Water would have been taken from the Bell Brook to the east of the town before being carried by an open channel to the highest ground within the town, just north of the baths. Because of the extent of that channel, it has been suggested that over 2 million gallons of water could be delivered to the town on a daily basis. The open nature of the channel suggests that it was probably constructed before the fortification wall was built along with a tank located to the north of the baths which distributed water across the town. The discovery of a temple in the same location suggests that some religious significance may have been attached to the distribution building which supplied the town with its water. From this distribution point several pipes would have led to the baths as well as other public fountains and to private residences whose owners could afford it (White and Barker 1999; Wachter 1974, 362-377).

Other religious structures that were to be found in the town were two temple sites, one which was located to the north of the bathhouse and the other located in *insula* 8. Because this temple was located on top of the burnt remains of several shops, it has been dated to sometime in the 2nd century CE. It was constructed in a Mediterranean style with columns in front of the *cella* and several sculptures located within a façade, including naked figures and part of horse's head. The temple was in a derelict state by the early part of the 4th century CE. A suggestion has been made that *insula* 3 could have held a shrine as it was located at one of the highest points in the town and was surrounded by a stone wall which enclosed quite a substantial area. There is also the possibility that a piece of land to the north of the Bell Brook, just south of the main north defences could have been a sacred grove due to the apparent lack of domestic houses in the area (Wachter 1974, 362-377).

It does not appear that Wroxeter had an amphitheatre like several other towns in Roman Britain. That being said, there was an enclosure located behind the temple in *insula* 8 consisting of a pair of concentric circles which included a double entrance located in the north-east corner of the enclosure. It has been suggested that this structure could have acted in a similar way to an amphitheatre and may have held seats between the walls so that spectators could watch whatever was happening inside. There has also been a suggestion that the structure could have been associated with the nearby temple and was a place used for the enactment of religious ceremonies. Lastly, due to the nearby temples'

association with horses, there has been the argument made that the structure may represent the only known circus in Britain (White and Barker 1999; Wachter 1974, 362-377).

Wroxeter had many forms of domestic structure during the course of its history. One of the most common forms were strip-buildings, most of which were houses of craftsmen or artisans. The front part of the building would have contained the shop with the accommodation located behind and above for the family, including room for the storage of goods or finished products. The other frequent form was the larger courtyard houses. One example, a simple four-sided building with an internal courtyard, lying south of the bathhouse was built in the 2nd century in sandstone. Another of the same form was located some distance away in the eastern part of the town (White and Barker 1999, 70-109).

The largest of the domestic buildings were located on the western side of town away from the bad smells and fumes from the industrial area of town. Two buildings are of particular interest but neither have been excavated and are only known through remote sensing. The first, located north-west of the forum was a large courtyard house. The other is located further west, along the east-west road leading to the forum and had a good view across the plain of the Severn Valley to the west of the town. From remote sensing it is clear that the building had over a dozen rooms and a large veranda which traversed the edge of the property (White and Barker 1999, 70- 109).

6.2.4 Role and Functions

At least early on in its history, Wroxeter, doubled as a *civitas capital* and acted as a centre of local government for the Cornovii. Initially, local aristocrats and some veterans of the army would likely have made up the bulk of the population (White, Gaffney and Gaffney 2013, 199-206; Wachter 1974, 362-377).

Significant industrial and economic activity has been detected in Wroxeter. One of the predominate economic activities carried out in the town was commerce and small-scale production in the form of shops located towards the administrative centre of the town. One large set of buildings that have been interpreted as shops were located on the west side of the main north-south street running through the settlement and south of the forum-basilica complex.

Of particular note is the fact that many of these businesses had ovens, furnaces and traces of metalworking which suggests that these businesses conducted several trades at the same time. Evidence has been found for casting including bronze objects and also the manufacturing of silver wares using special moulds. A furnace was found where silver could be extracted from lead alloys indicating that these activities were a central part of the industrial makeup of the town (White and Barker 1999; Wachter 1974, 371-374).

To the west of the baths was another business which may have also been used as a metal workshop. It contained a significant amount of sand which may have been used to manufacture moulds for casting objects. Near the front of the house a small furnace was discovered with an anvil to one side. Traces of glass were found as well as items used for glass making and evidence for enamel production (White and Barker 1999; Wachter 1974, 371-374). To the east of the forum a slab of iron 285mm long and 82mm wide was found.

Both sides were embossed matrices which would have been used to produce patterns on bronze plates (White and Barker 1999; Wachter 1974, 371-374).

The amount of metal working detected suggests that this was a main industry in the town. Metal ore would need to have been located nearby in order for this kind of intensive metal working to take place. Wroxeter was built in an area with copper and silver deposits while lead and silver mines may have been under the control of the local elite of the town and in particular the *curiales* (White and Barker 1999; Wachter 1974, 371-374).

Other industries that existed in Wroxeter included fresco painting, evident through the discovery of several soap stones used to grind pigment. Tanning equipment appears to have been more widespread in the town in the later centuries. During the 4th century there was a pottery manufacturing business as kilns were discovered about 1km north-west of the town and a tile manufactory was also detected in the centre of the forum (White and Barker 1999; Wachter 1974, 371-374).

6.2.5 Additional Information

Excavations began in the 19th century with the work of Thomas Wright (1872) and was carried on by Joscelyn Plunkett Bushe-Fox in the early part of the 20th century (1913, 1914, 1916), as well as Donald Atkinson (1942) and Kathleen Mary Kenyon (1980). During this time the predominate areas of excavation were large public monuments such as the forum, the baths, and some residential areas. More intensive investigations into the bathhouses and the very earliest and latest periods of occupation have recently been carried out by Graham Webster and Philip Barker (Barker et al 1997; Webster 2002; Ellis 2000). However, less than 1% of Wroxeter has been excavated and disproportionally in respect to public buildings and other large structures. (White, Gaffney and Gaffney 2013).

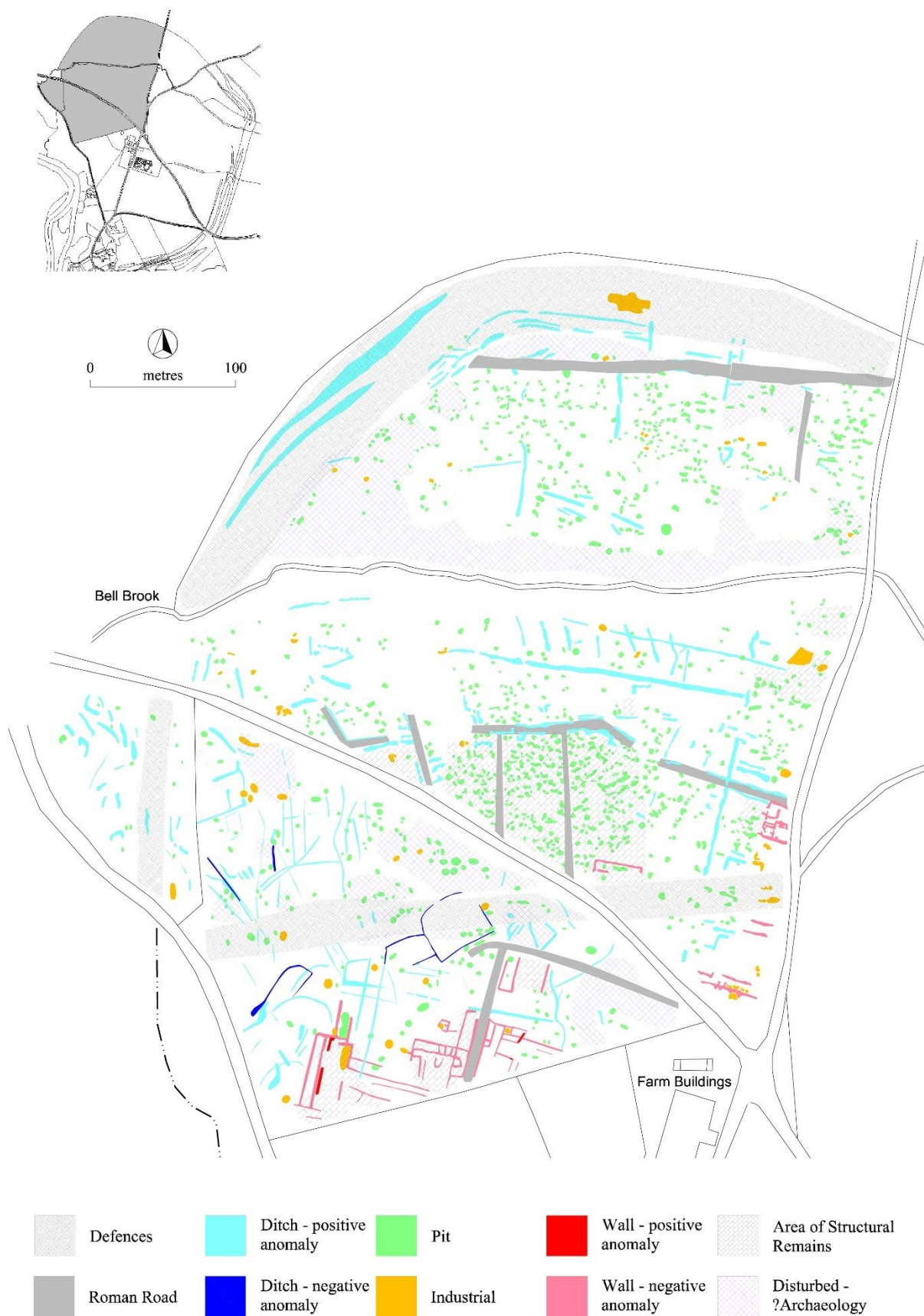


Figure 6.11: North-West section of Wroxeter depicting notable features including pits, White, Gaffney and Gaffney 2013



Figure 6.12: North-East section of Wroxeter depicting notable features including pits, White, Gaffney and Gaffney 2013

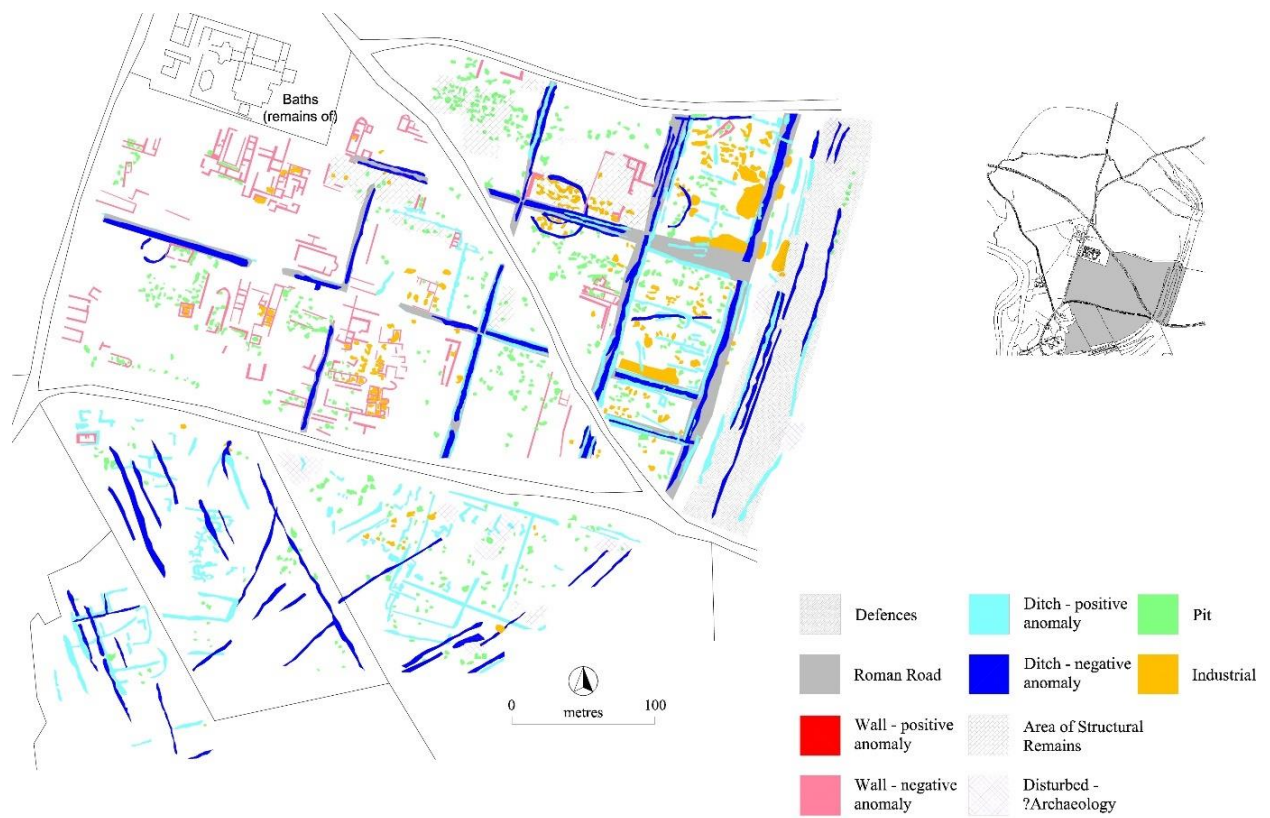


Figure 6.13: South-East section of Wroxeter depicting notable features including pits, White, Gaffney and Gaffney 2013



Figure 6.14: South-West section of Wroxeter depicting notable features including pits, White, Gaffney and Gaffney 2013

Now, a great deal is still known about the organisation of the town thanks to high quality and well-utilised remote sensing and geophysical surveying (Figures 6.11, 6.12, 6.13, 6.14). From this survey work, it appears that Wroxeter was zoned into particular/distinctive areas, like many other Roman towns in Britain. The location of the industrial areas within the confines of the town walls also represents a continuation of local/Iron Age practices seen in many hillforts and enclosed settlements, including those of the Cornovii (White and Barker, 1998). The remote sensing detected large wealthy town houses, including mosaics and underfloor heating while also detecting simpler, more modest dwellings with shopfronts and accommodation located behind them (Wilson 1984; Slater 2000; Nishimura and Goodman 2000; Barratt, et al 2000; van Leusen, Barratt and Gaffney 1999; Buteux, et al 2000) including extensive industrial areas and numerous pits across the entire settlement.

6.2.6 Local Engagement

At Wroxeter, the towns status as a *civitas capital* would have meant that the ruling elite would have been largely local and therefore more inclined to structure their town in ways that were familiar, to include housing, suburban development, and industry within the city walls, to define and protect the city (White and Barker 1999, 70-109).

The internal organisation of Wroxeter, whereby the town included all the suburban development within the walls, such as industrial areas and market gardens, appears to be a continuation of a long-held pattern of hillfort development and a deviation from the Roman model of how a town was to be organised (White, Barker 1999). The hillforts that were occupied by the local Cornovii tribe are well known because of their large size and additional enclosures that were used for the accommodation of livestock and areas for industrial activity. At the hillfort of Old Oswestry, there were a series of rectangular enclosures/compounds used for penning livestock and located attached to the defences on one side of the settlement (White, Barker 1999, 70-109).

It has been pointed out by Richmond (see Wachter 1974, 375) that by the 4th century, the military force around Wroxeter would have been in the form of a local militia which had been raised from members of the Cornovii who sought to protect their capital. Furthermore, as a testament to continued local engagement, by the mid-4th century CE, many parts of the local militia had been absorbed into the Coh. I Cornoviorum. This is significant as at this time, the regular army would have been withdrawing from Britain and so more onus was being placed on the local inhabitants to protect their own interests (Wacher 1974, 375).

Furthermore, the presence of the Roman army in and around Wroxeter for a considerable amount of time (around 40-50 years) would have meant that there was a need for a regular quantity of foodstuffs, as well as leather and cloth that most likely was provided by the Cornovii themselves. The intensification for providing these materials would have created a market that acted to strengthen agricultural activities along urban/pastoral lines. In so doing, it would have resulted in a greater number of local inhabitants interacting with the urban settlement (White and Van Leusen 1997, 141-142).

6.2.7 Summary of Density Data

The figures below (Figures 6.15, 6.16, 6.17, 6.18) refer to the total settlement area of Wroxeter, of about 78 hectares.

The first diagram (Figure 6.15) shows the total built space in square meters for Wroxeter in relation to the total settlement area. Of the 78 hectares, around 130,000 square meters was built up.

The next diagram (Figure 6.16) indicates that there were between 10 and 30,000 square meters in size and that there was between 0 to 7000 square meters of built space within that group of blocks. There were a few deviations to this pattern with some blocks being much bigger, two having over 20,000 square meters of built space within them as well as a block which was 80,000 square meters in size and had 10,000 square meters of built space within it.

The next two figures (Figure 6.17, 6.18) are the gradient of density and the (built space per hectare) density diagrams.

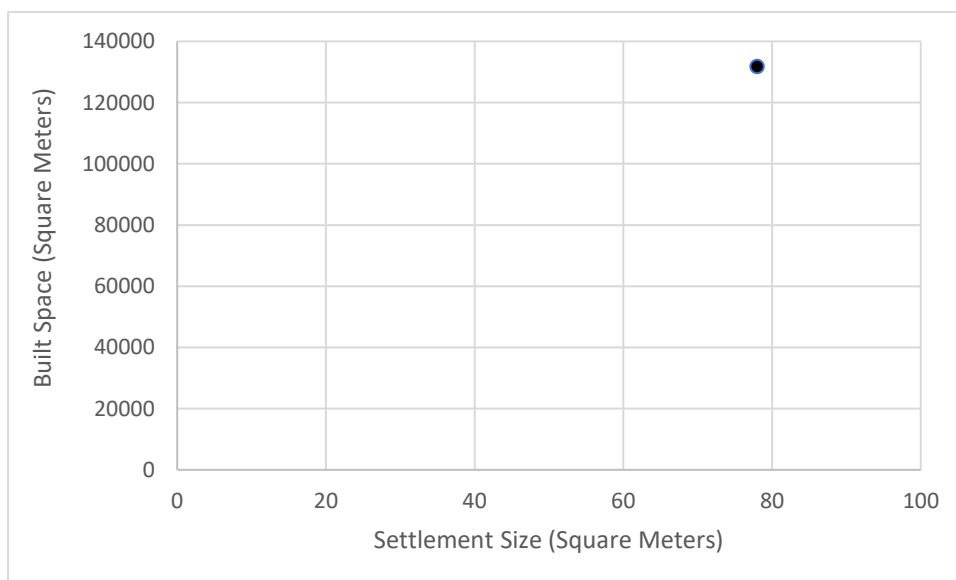


Figure 6.15: Total built space (in square meters) for Wroxeter

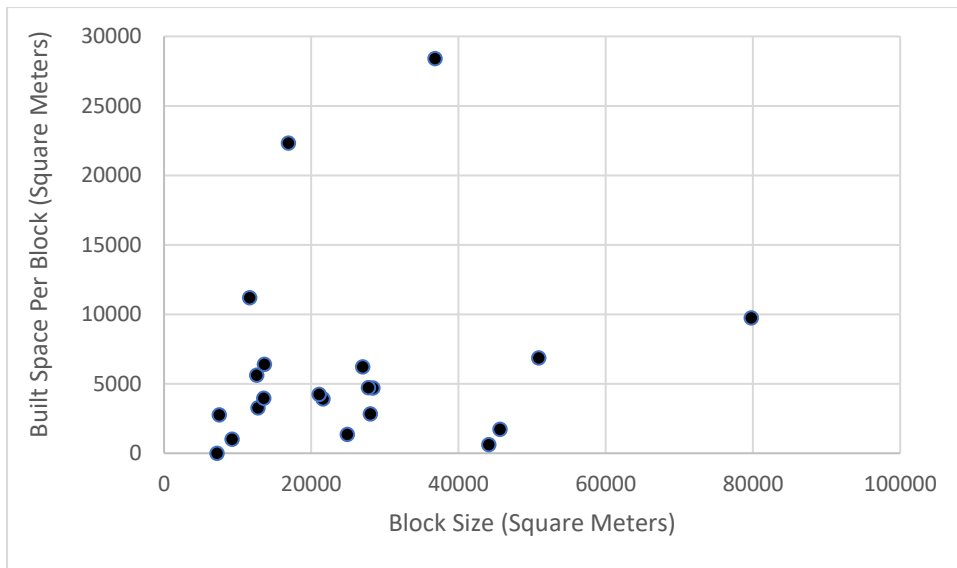


Figure 6.16: Built space per block (in square meters) for Wroxeter

6.2.7.1 Density gradient

The density gradient diagram for Wroxeter (Figure 6.17) shows that the majority of blocks with a lower density are between 100 and 300 meters from the central forum-basilica complex and that these blocks have up to 40% built space. There are then two blocks between 70% and 80% within 100-200 meters of the forum, and one block which is around 90-95% built. This block is the central forum-basilica. There is a density gradient down from those three rare high-density examples to lower and lower densities further away from the centre.

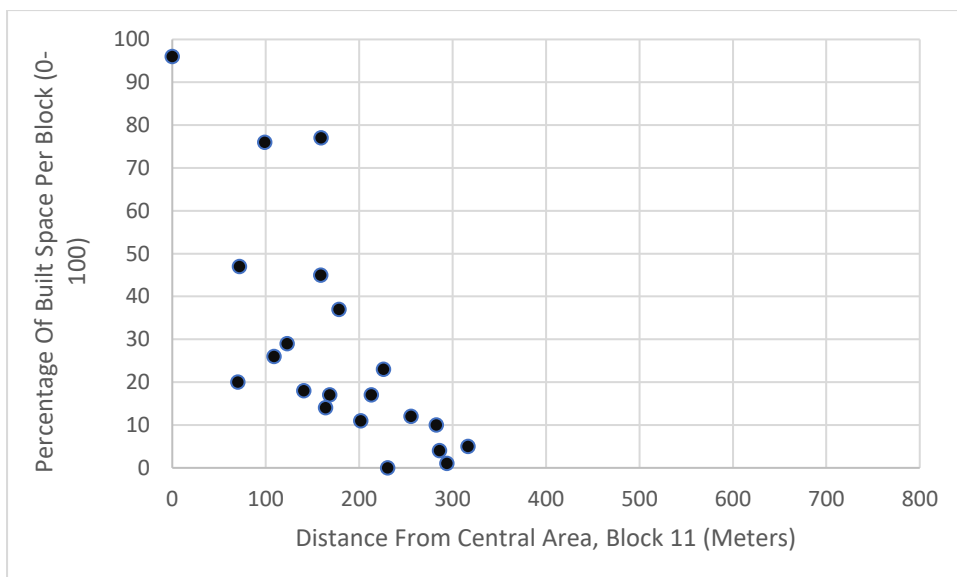


Figure 6.17: Gradient of density (%) for Wroxeter

6.2.7.2 Density trend

The final diagram (Figure 6.18) reveals that there is 1690 square meters of built space per hectare for Wroxeter. In comparison to Silchester which has a built space density of around

2000 sq m per hectare. It seems that the pattern of falling occupation density with increased settlement size is continuing.

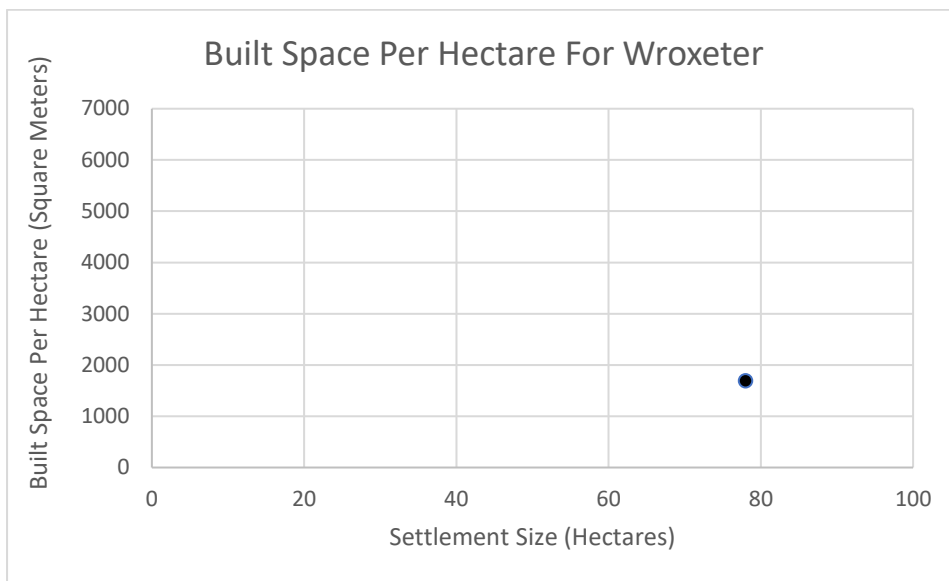


Figure 6.18: Density of built space (in square meters per hectare) for Wroxeter

6.3 Conclusions

The density gradient data for the large *civitas capitals* display the general pattern visible in other settlements of varying sizes, that being a dense centre with decreasing densities closer to the walls of the settlement. Most of the blocks within both Silchester and Wroxeter do not exceed 60% in overall occupation density with a few exceptionally dense central blocks, perhaps indicative of the wealth required to build rare, large buildings.

The density trend data indicates an apparent decrease in overall density, as the size of the settlements increase. Major surveying, especially for Wroxeter by the Gaffney's has revealed that significant portions of the internal space of the site especially around the periphery on the east (Severn side) had relatively few buildings. This may be evidence for a retention of the *oppidum* pattern of occupation present in other larger Roman towns across Britain. But it is alternatively an indicator of missing buildings as such a low overall density as part of a trend to lower and lower densities for larger settlements would ascribe an extremely low overall density to the 135-ha extent of Londinium. That issue will be reviewed in Chapter 8.

For local engagement in Silchester, several of the earliest iterations of the town were found to have housed Iron Age structures such as roundhouses, wells, and post-hole pits which all point to the fact that the Roman town was built upon an *oppidum* and the early history of the town was influenced by local practices. There has also been evidence for several temples and shrines which suggest an interaction between Roman and local practices.

As for Wroxeter, this settlement pattern included development that would usually be found in the landscape outside Roman towns and suggests a continuation of Iron Age models of settlement organisation. There has also been the suggestion that as Roman influence was

wanning, local militias began to form which were made up of local residents of towns, including Wroxeter. The fact that members of the Cornovii were seeking to protect their capital is a testament to continued local engagement.

The following two chapters will discuss the combined density gradients (Chapter 7) and density trends (Chapter 8), bringing together the individual analyses done on each site in Chapters 4, 5 and 6. Other settlements have been added to further elucidate the patterns of density for each settlement size and to consider the alternatives which have been outlined in this thesis.

Chapter 7 – Spatial Patterns in Settlements: density gradients

7.1 Introduction

The previous three chapters have indicated that on immediate inspection, there is some consistency to the distribution of density of occupation within the settlements which shows up both in the density ranges and the slope of the density gradients in the medium to large settlements. There also appears to be a broad regional density trend from higher to lower density for smaller to increasingly larger settlements amongst the case study sites chosen for this thesis. Because of the diversity in the data, especially for the smaller settlements, a few additional examples have been included in this chapter and in Chapter 8. Five additional sites have been added for which good spatial detail could be obtained. Four additional *vici* have been added to further assess the patterns in the smallest settlements as these have the most varied spatial patterns. Along with these smaller examples, one medium-sized settlement has been added - Water Newton - to assess how consistent the medium-sized settlements may be. As for the large settlements, Verulamium has been added, not because it is fully mapped but because it can be used to assess how much the density gradient pattern can be identified in partially excavated/recorded settlements of that size range and also to try and assess whether the trend to lower density as settlements increase in size is a straightforward feature of the data. 12 settlements in all are therefore discussed in this chapter and in Chapter 8.

7.2 Overview

The goal for this thesis was to conduct a spatial analysis of the internal organisation within Roman settlements in Britain to assess whether they displayed some degree of overall consistency of spatial patterning and whether they resembled Roman or local forms or some combination of both. Analyses of visible occupation density identifying differing densities for the various parts of a settlement and also differences between settlements, which are key markers of community-related spatial behaviour (see Chapter 1 & 3) are useful indices to expose key differences and to indicate the factors behind them. Doing so would help reveal the nature of overall spatial behaviour in the urban settlements and their associated smaller settlements, the *vici*.

7.3 The Analyses

The two main types of analyses of density are first the distribution of differing densities within settlements which are referred to as density gradients for simplicity and will be discussed in this chapter; and secondly, the analysis of the density trends occurring in groups of settlements, which will be discussed in Chapter 8.

There are internal spatial subdivisions within all the Roman settlements addressed in this thesis. In the small settlements, there are streets between buildings and these buildings form groups bounded by main roads. These are referred to as sectors. As there is no clearly

defined central building, the differing sector densities are compared to their distance from the centre of the settlement and are also reviewed in relation to their distance from the wall of the fort. For the medium and large settlements, the subdivisions are the blocks which are bounded by streets or by the walled edge of the settlement. These larger settlements also have substantial central structures, particularly a forum, which is used as the reference point for the analysis of the density differences between the centre and the edge of the settlement. The density gradient analysis of the medium and large settlements therefore works by measuring the distance from the forum block to the other blocks within the settlement.

The area of each sector and block was measured to calculate the amount of built space relative to the area in which it occurs. For each sector or block the built area is presented as a percentage of the sector or block area within which it occurs. This is a visually more informative figure for cross-comparison because the absolute amounts of built space inevitably varied substantially between settlements of very different sizes, whereas the percentage demonstrates the degree to which a given area was built up and gives a useable comparison for changes in occupation density within a settlement.

7.4 Internal Density Patterns for Each Settlement Size Range

7.4.1 *Vicus* Settlements - within sector density patterns

The smallest sites that were chosen as case studies were Vindolanda and Piercebridge. To assess whether there is a variety of densities within the *vici* and whether they form a pattern, the available plans for four more *vici* have been added for which a comprehensive plan is available. As noted in Chapter 3 (pages 43-65) these are the *vici* Catterick, Housesteads, Old Carlisle, and Caistor St Edmund, described below.

The *vici* (small civilian settlements), appear in all areas of Britain, particularly in frontier areas where a fort has been constructed, in contrast to the larger sites such as Silchester, Wroxeter and Verulamium which are in the centre and south of Britain. Though the *vici* are widely spread-out across Britain their internal density distributions are quite consistent. The key takeaway is that the smaller settlements have a greater variety in terms of built space than the larger sites. There is also a higher density component which overlaps with the density pattern of Caistor St Edmund, with the core densities for Vindolanda being higher.

These small sites were all under 10 hectares in size, most around the 5-hectare mark and tended to be more densely occupied.

7.4.1.1 Vindolanda and Piercebridge:

The amounts of built space per sector for Vindolanda shows that the densest part of the settlement lay immediately adjacent to the military fort (where the majority of structures both domestic, administrative, and industrial lay), while density decreased further away from the fort where there were fewer buildings, one of which was a temple/religious shrine. There is little density difference within the eastern *vicus* area but there is a gradient to a lower density away from the centre when the western area is included. In Piercebridge, again the gradient of density revealed that the densest part of the settlement was closest to the fort and that it decreased further away from said fort. That being said, the north-east

sector also contained a relatively high number of buildings (so far as the denser western sectors were concerned). There is somewhat of a density gradient going from not very dense but increasing in density further to the north and north-east of the settlement (Figures 7.1-7.4).

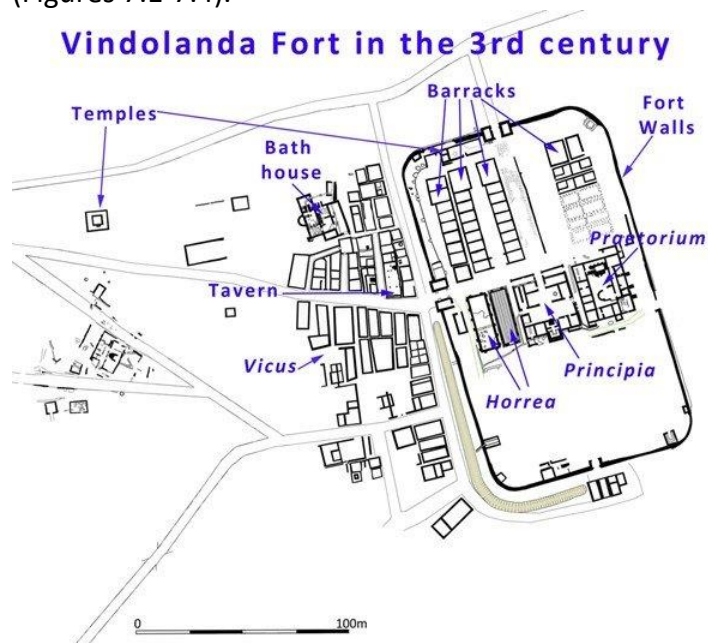


Figure 7.1: Plan of Vindolanda vicus. FACT FILE: Roman Fort 2019

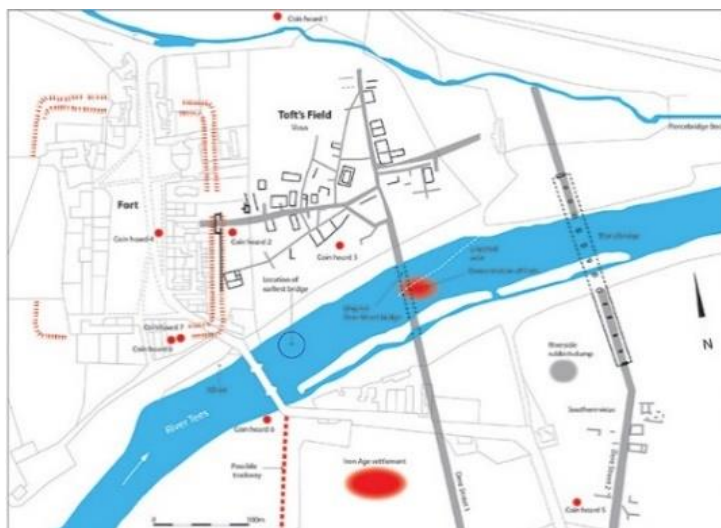


Figure 7.2: Plan of Piercebridge, <https://archaeology.co.uk/articles/features/bridge-over-troubled-water.htm>

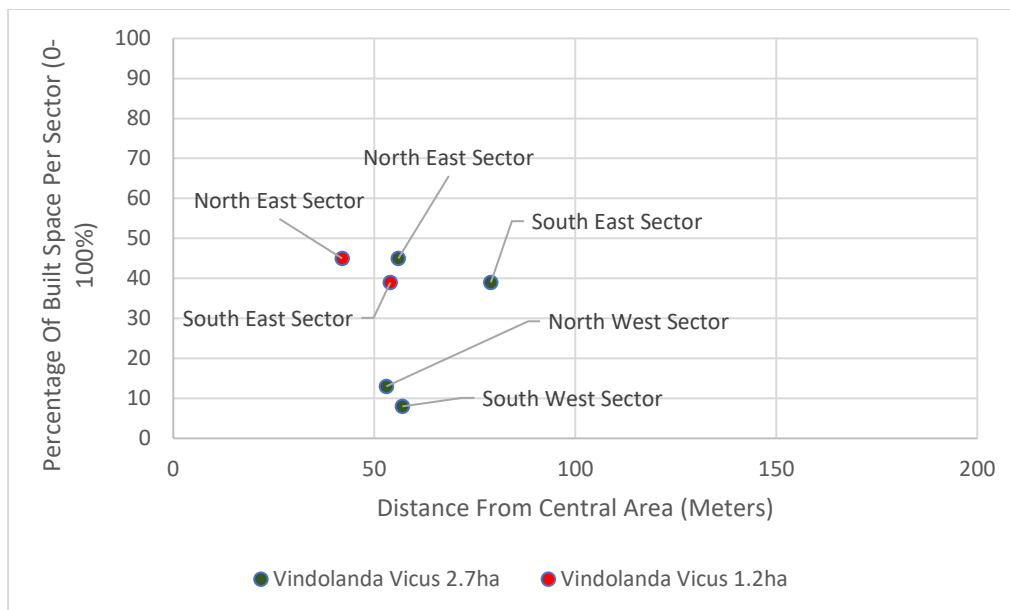


Figure 7.3: Gradient of density (%) for Vindolanda *vicus*

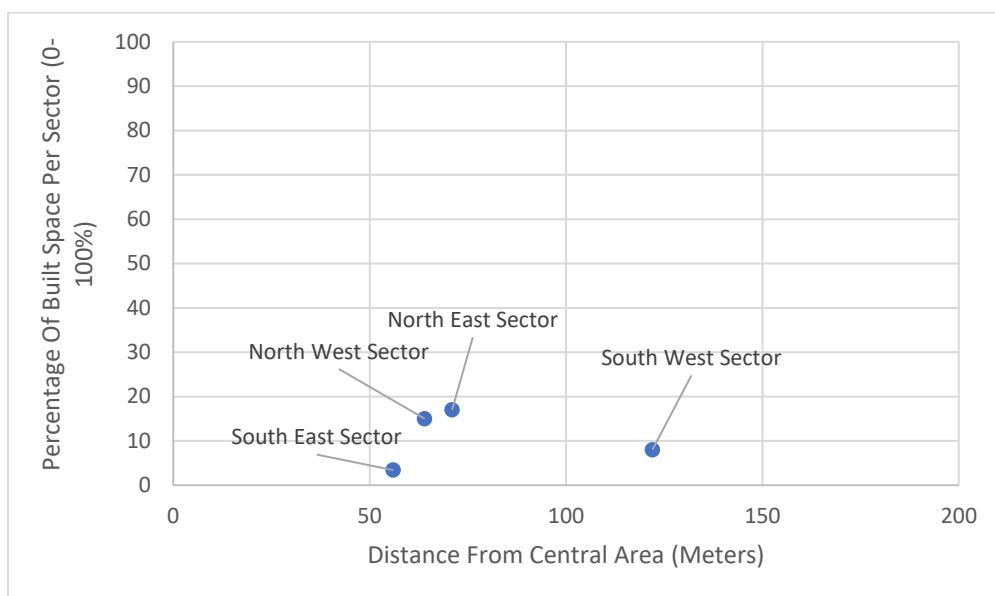


Figure 7.4: Gradient of density (%) for Piercebridge

7.4.1.2 Additional *vici*: descriptions

7.4.1.3 Catterick: Catterick or ‘Cataractonium’ located in north Yorkshire, began as a military fort which occupied a position above an important crossing over the river Swale by Dere street which was the main Roman transport route to the north. The *vicus* was established just outside the walls during the late 1st century CE and was occupied for over 400 years and in that time became a wealthy fortified settlement with important economic, administrative, and militaristic functions (Northern Archaeological Associates - NAA Heritage 2021). The density gradient for Catterick shows that the south-east and north-west sectors of the *vicus* were the densest (35% and 38% respectively). The other two sectors (north-east

and south-west) were much lower in their density gradients (27% and 6.5%) (Figures 7.5-7.8).

7.4.1.4 Housesteads: Housesteads or 'Vercovicium' began as a Roman fort located near Hexham, northern England between the Knag Burn to the east and the Bradley Burn to the west. Located on Hadrian's Wall during the Roman period, the site, along with the *vicus* as well as the surrounding temples and industrial sites meant that Housesteads was one of the most significant posts along Hadrian's Wall. The settlement complex was occupied for over 300 years and in that time, it underwent many changes. The highest point in the settlement's history was in the 3rd century CE (Roman Britain n.d.). The density gradient for Housesteads shows a higher sector density than Catterick. The densest part of the *vicus* was the sector 3rd from the west when measured from the central part of the settlement (62%) while the sectors on the far left and far right were of a lower density (27% and 22%) (Figures 7.5-7.8).



Figure 7.5: Plan of Catterick *vicus*, <https://greatnorthroad.co.uk/roman-catterick-cataractonium>

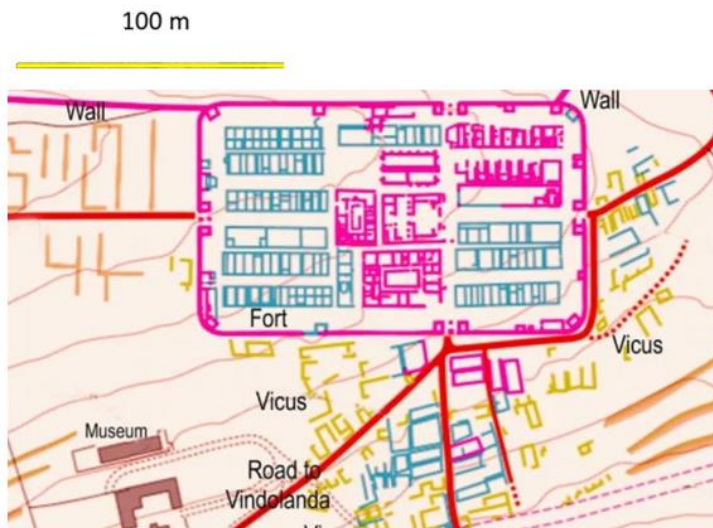


Figure 7.6: Plan of Housesteads vicus, <https://www.u3ahadrianswall.co.uk/guides-to-the-wall-sites/housesteads-roman-fort/>

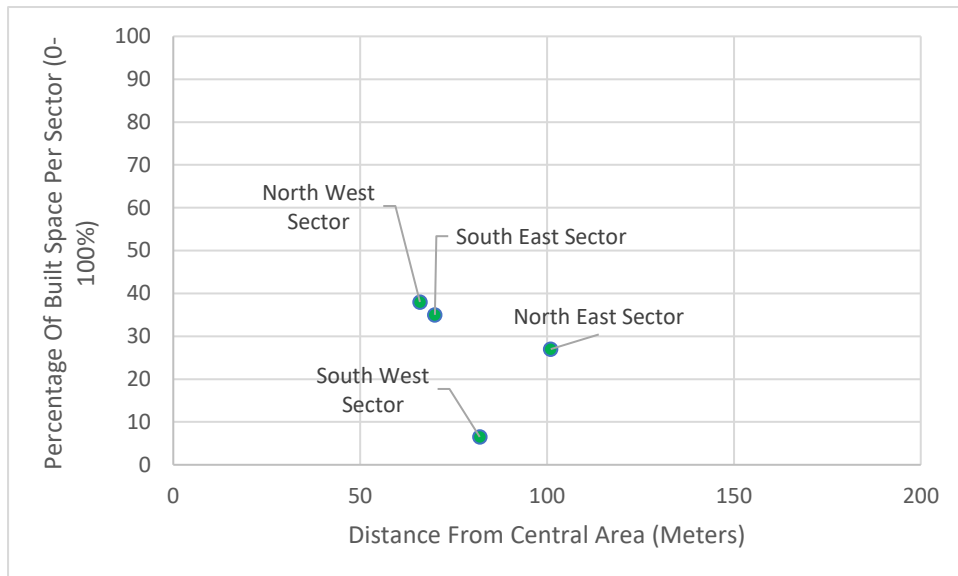


Figure 7.7: Gradient of density (%) for Catterick vicus

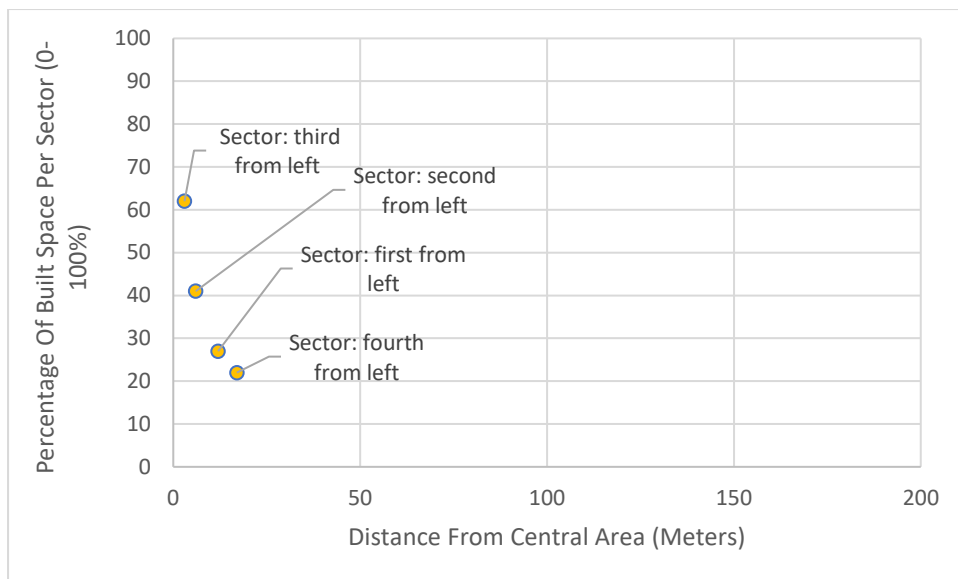


Figure 7.8: Gradient of density (%) for Housesteads *vicus*

7.4.1.5 Old Carlisle: Old Carlisle or 'Olenacum' began as a fort located in Cumbria. The fort was 550 feet from end to end and about 425 feet transversely. The fort was protected by ditches on the south-west side and around the southern part of the site. There has been evidence detected inside the fort for a *principium* as well as extramural civilian structures between the fort's defences and the marshland to the south-west. The site has been dated to around a decade or so after the Roman invasion (Roman Britain n.d.). The density gradient for the *vicus* shows that the densest part was in the southern sector with a density of around 61%. The northern sector was less at around 51%. While the sector with the highest density was located to the south rather than closer to the fort to the north, the majority of built space was actually located in the easterly portions of both sectors and to the east of the fort (Figures 7.9-7.12).

7.4.1.6 Caistor St Edmund *vicus*: The small settlement to the west of Caistor St Edmund or *Venta Icenorum*, capital of the *Iceni* tribe, appears to have been built concurrently with the rest of the settlement. It was built during the Flavian era, around 60 CE and emerged along with its larger neighbour (*civitas capital*) following the Boudican rebellion. The settlement appears to have seen very little construction before the 2nd century CE, perhaps due to the impoverished nature of its inhabitants. The density gradient for the *vicus* shows that the densest part of the settlement was the eastern sector which was around 18% for built space coverage while the western sector had just about 16% built space (Figures 7.9-7.12).



Figure 7.9: Plan of Old Carlisle *vicus*, <https://www.u3ahadrianswall.co.uk/wordpress/old-carlisle-roman-fort-and-civil-settlement-maglona/>



Figure 7.10: Plan of Caistor St Edmund *vicus*, Grimmer 2016

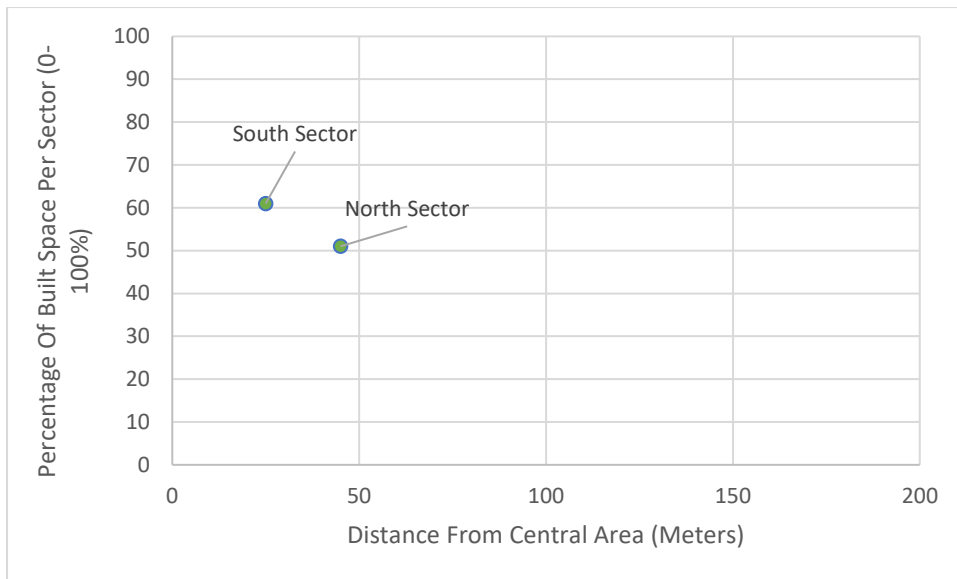


Figure 7.11: Gradient of density (%) for Old Carlisle *vicus*

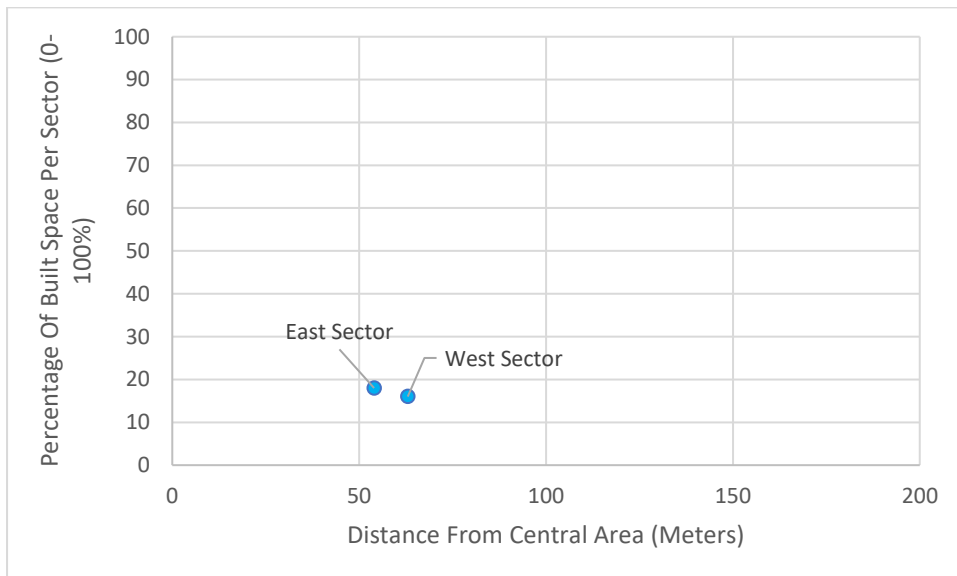


Figure 7.12: Gradient of density (%) for Caistor St Edmund *vicus*

7.4.1.7 Review

In terms of the internal spatial pattern of the *vici*, there were only a few sectors in each settlement. The settlements were, therefore, too small to display the density gradients which are apparent in the larger settlements. That being said, the densities of these sites do have aspects of similarity with one another. This is most clearly illustrated by some of the *vici* sectors, those located closest to the fort, having higher densities. This is as one might expect as there was frequent activity in and out of the walled area. This is not true of all the *vici* but such variations in density gradient may have to do with the spatiality of patterns of access and with connections with other areas. The peak built space densities are around 60%-70% of the sector areas and the majority are below 40%, suggesting some consistency of behaviour across the *vici*. For the entire group of *vici* analysed in this study, the sectors further away from the centres of the *vici* have lower densities than those which are most

central. There is some indication of a pattern of behaviour which looks like a general gradient spread across all the *vici*. However, the distances involved are quite small (Figure 7.13).

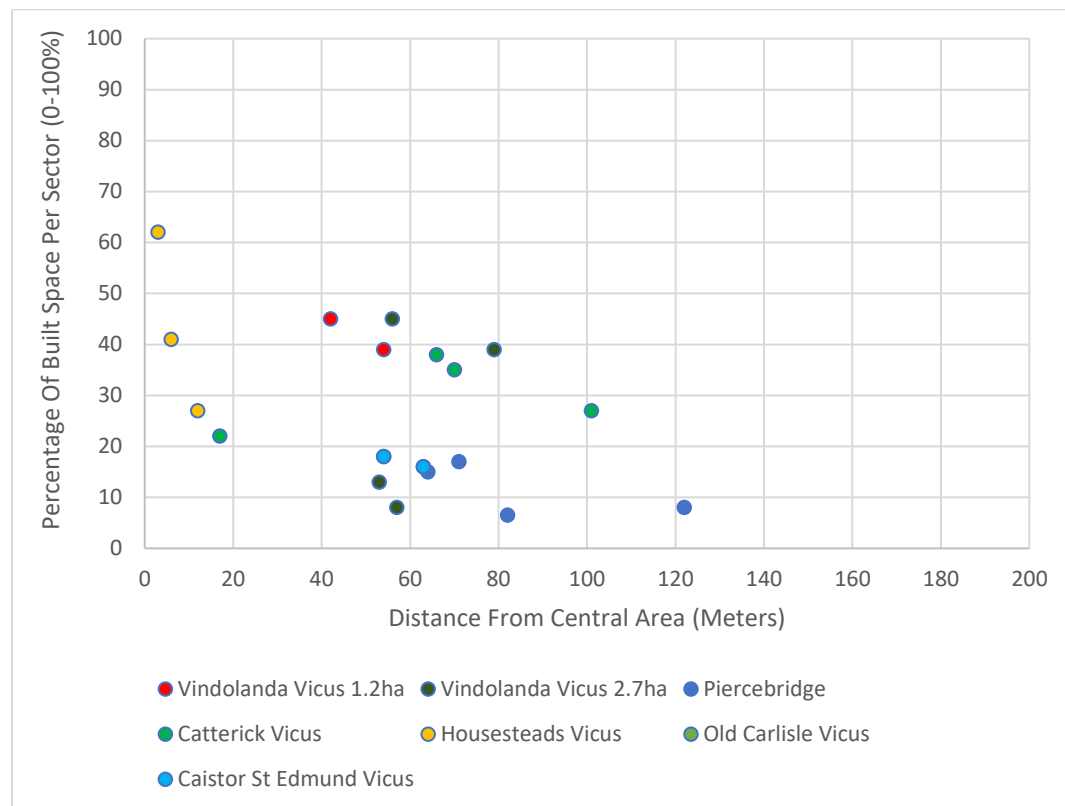


Figure 7.13: Gradient of density (%) for all *vici*

7.4.2 Medium Sized *civitas capitals* - within block density gradients

7.4.2.1 Caistor St Edmund and Caerwent:

The density gradient for Caistor St Edmund reveals a general trajectory of decreased density further away from the central administrative area with the lowest density blocks being located around 350 meters from the central administrative area. None of the blocks within Caistor St Edmund surpassed 70% in their density with the majority being under 40%.

The density gradient diagram for Caerwent is almost certainly an under-representation. Large open areas to the north-west and south-east were likely filled with buildings, but neither excavation nor surveys have so far uncovered the full extent of the site. As such, the density is relatively low. Throughout the settlement, most blocks remain around 20-50% built with certain blocks within the middle of the town giving the highest density. The blocks furthest from the centre are the least dense because they represent the north-west and south-east blocks previously mentioned.

The settlements of Caistor St Edmund and Caerwent show similarities in that there is a drop in density around 100m from the central area with the perimeter blocks, particularly for Caerwent, sitting at around 0-10%. Blocks within 100m of the centre for both settlements sit in the 20-60% range, while the built space, particularly for Caistor St Edmund shows blocks

in the 100m range from the centre exhibiting densities around 60% as well as around 20%. There does appear though to be a gradual reduction in density from around 90-100m from the centre of the settlements. This is much more apparent for Caerwent (Figures 7.14-7.17).

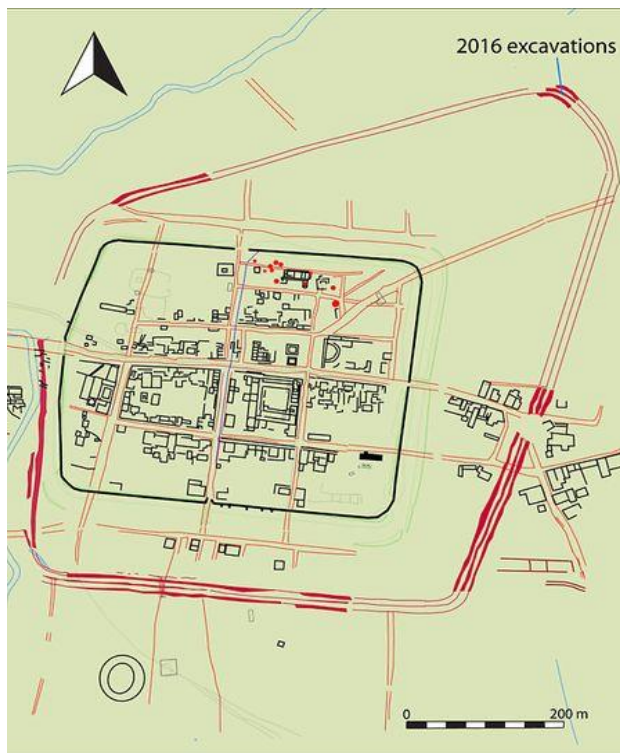


Figure 7.14: Plan of Caistor St Edmund, Grimmer 2016



Figure 7.15: Plan of Caerwent, <https://medievalheritage.eu/en/main-page/heritage/wales/caerwent-roman-town/>

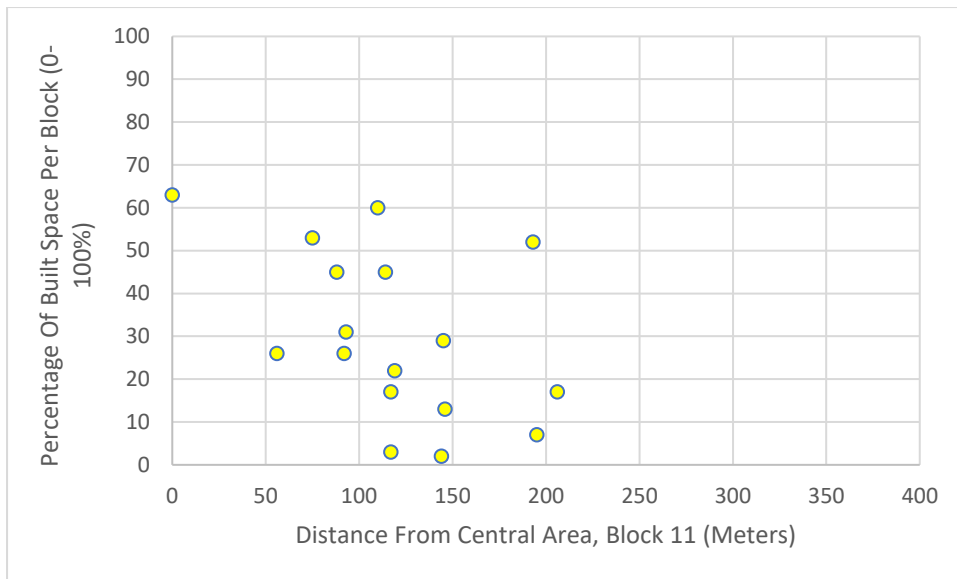


Figure 7.16: Gradient of density (%) for Caistor St Edmund

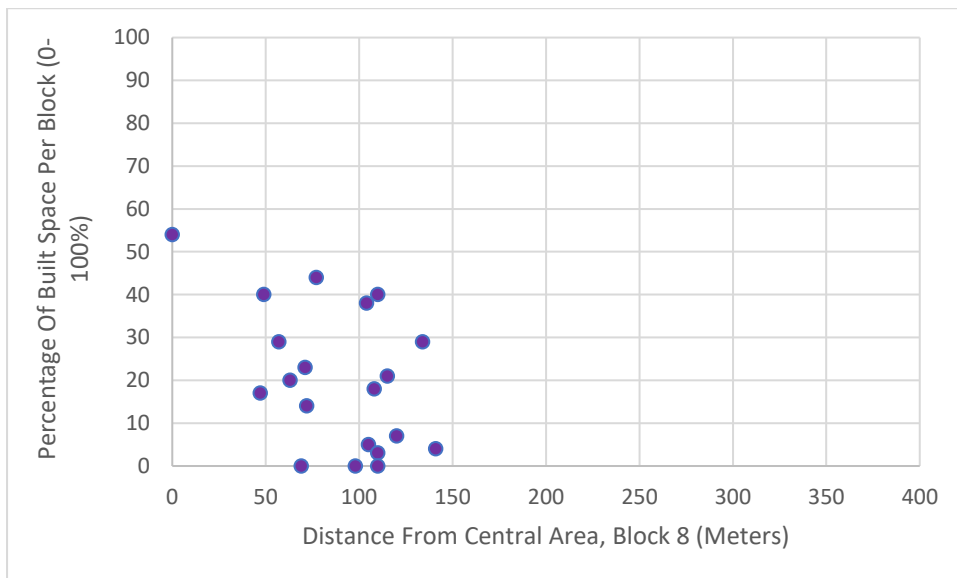


Figure 7.17: Gradient of density (%) for Caerwent

7.4.2.2 Additional Medium Sized *civitas capitals*: Descriptions

7.4.2.3 Water Newton (Durobrivae): Durobrivae was a significant Roman town located near the modern town of Water Newton. The settlement was originally a fortified garrison town which emerged next to a fort which was tasked with protecting the crossing of Ermine Street over the River Nene. Over time the settlement would grow into a *civitas capital*. The name of the town during the Roman period was Durobrivae which reflects the location in which it was built 'fort by the bridge' and appears to have been built from the late 2nd century CE onwards. The settlement was on the south side of the river Nene on a flat plain 2km long and 1km wide. The first excavations were carried out in the 1820s by Edmund Tyrell Artis who identified a number of structures as well as elaborate mosaics. Further work was carried out in the 1950s but since then very little excavation has been conducted. Aerial photography has provided the greatest information on the site. Ermine Street is especially visible as a raised feature running east-west through the town. Furthermore, a

number of buildings such as shops and domestic units have been detected along Ermine Street and on a number of side streets. The aerial photography has also detected substantial defences in the form of a triple ditch which has been dated to the late 2nd century CE (Wild 1974).

The density gradient for Water Newton (Durobrivae) reveals that the south-east and south-west sectors of the settlement were the densest and also that while the densities in the middle of the settlement are similar, there is some overall decrease to its outer edges. That being said, the overall density gradient remains in a low band, not surpassing 30% for any but one of the sectors. One striking feature is that the forum is located in a very large block containing a lot of open space and that central area is not therefore dense. An alternative definition of the blocks separating off the forum north of the large linear wall on its south side creates a built space density for the forum of about 70%, that is similar to the higher densities in other towns. The central area of the settlement may have more subdivision than is visible at present (Figures 7.18-7.19). The majority of the blocks in Water Newton have occupation densities which match the main band of mid to lower densities in other settlements.

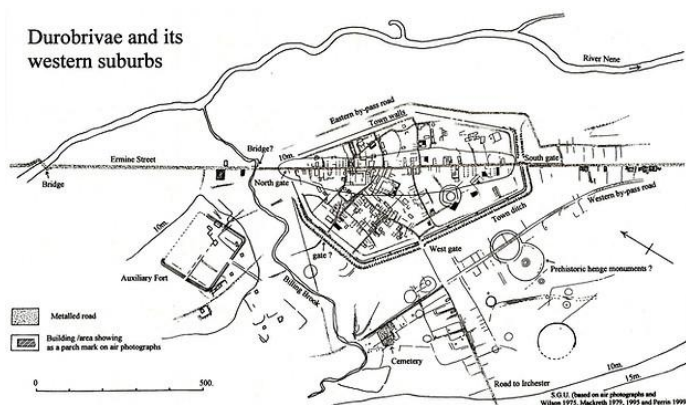


Figure 7.18: Plan of Water Newton, <https://www.nenevalleyarchaeology.co.uk/durobrivae-1>

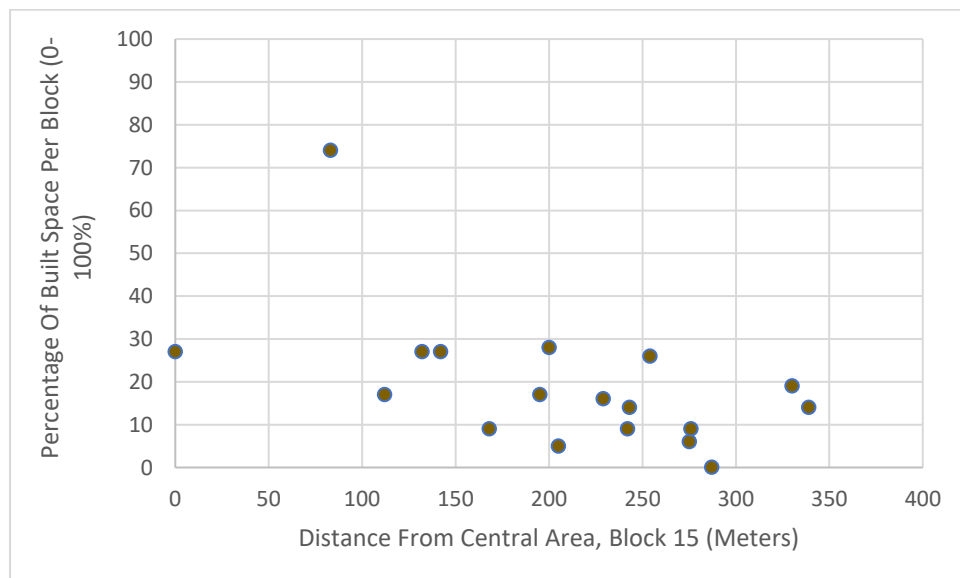


Figure 7.19: Gradient of density (%) for Water Newton

7.4.2.4 Review

In review, Caistor St Edmund, Caerwent and Water Newton have overall similar density range patterns to the *vici*. Caistor St Edmund is the smallest and has the steepest density gradient. Caerwent has some denser blocks towards the centre and is larger, and Water Newton is even larger and has a shallower gradient still. The layout of the built space within the regular blocks of Caerwent and Caistor suggests an equilibrium in block sizes of around 1.5-2 hectares supporting a stable density as revealed by the amount of built space. The density gradient for Caerwent is low due to the large seemingly unbuilt blocks in the top left and bottom right corners of the town plan. While there are distinct/different blocks within each settlement, the overall pattern is that the majority of the densities and the maximum densities are similar even though the settlements vary in size. The gradient slopes become shallower the larger the settlement i.e., the greater the distance from centre to edge (Figure 7.20) because the majority of the block densities are similar.

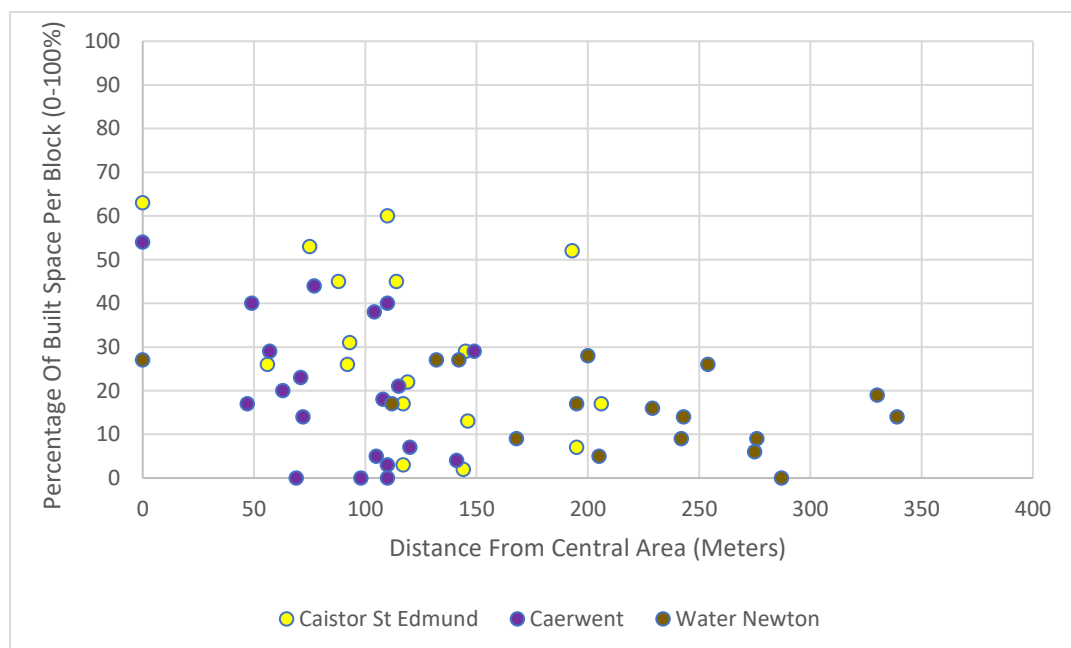


Figure 7.20: Gradient of density (%) for all medium settlements

7.4.3 Large *civitas capitals* - within block density gradients

The density gradients for the larger settlements show that the densest part was generally in the central area, though Silchester has two denser blocks 500-600m from the centre and above the overall density gradient.

For Silchester, the density gradient diagram only reached 65% as a maximum (for the central block) which corresponded with the usual pattern which saw a gradient of density falling from higher to lower from the centre to the edge of a settlement. The rest of the blocks within Silchester sat below this 65% figure, one set between 0-20% and the other set being between 20-40%. Overall, the density (%) for the entire settlement was around 19%.

As for Wroxeter, the density gradient reveals that the majority of blocks were below 50% in terms of built space and that there is a clear trend of falling density from the centre of the settlement, where there are a few blocks around 75% built, and one 95% built block being

the central forum, down to the outer-most areas of the settlement where the blocks are between 0-20% (Figures 7.21-7.24).

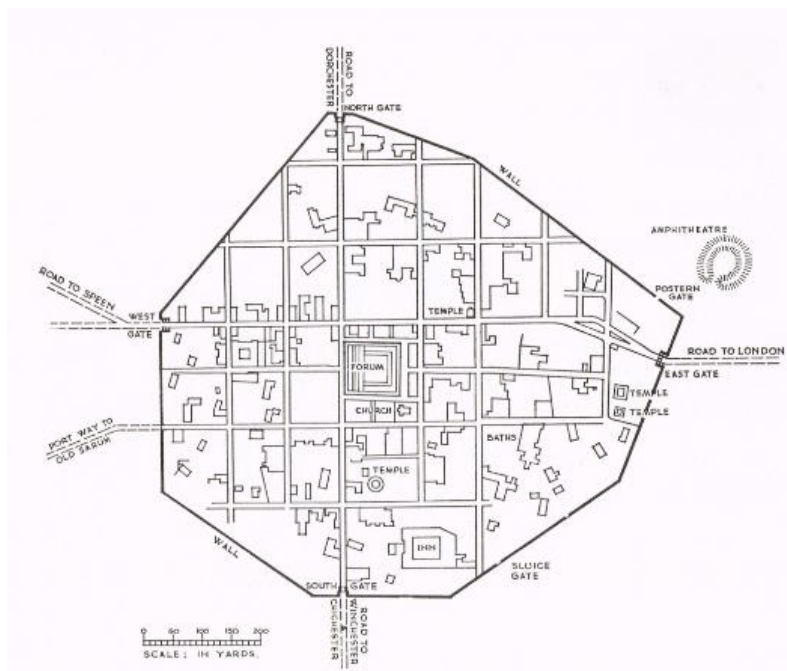


Figure 7.21: Plan of Silchester, <https://www.wilcuma.org.uk/wessex/a-history-of-hampshire/1576-2/>

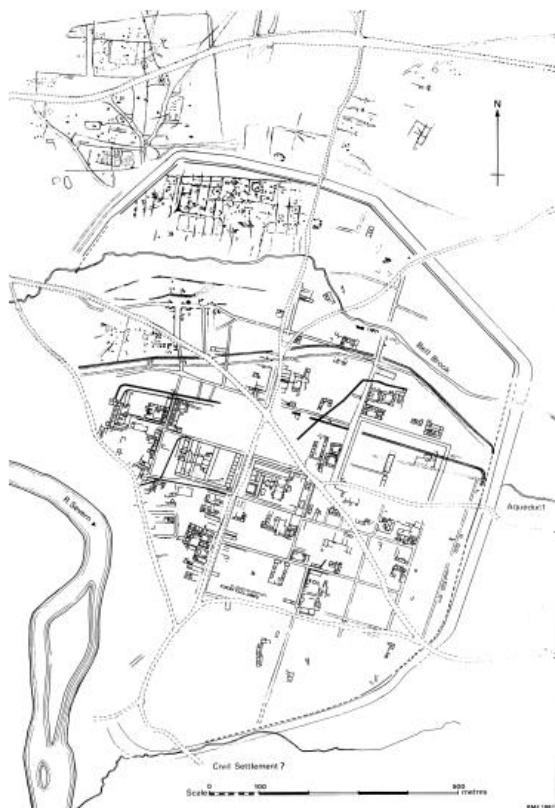


Figure 7.22: Plan of Wroxeter, White, Gaffney and Gaffney 2013

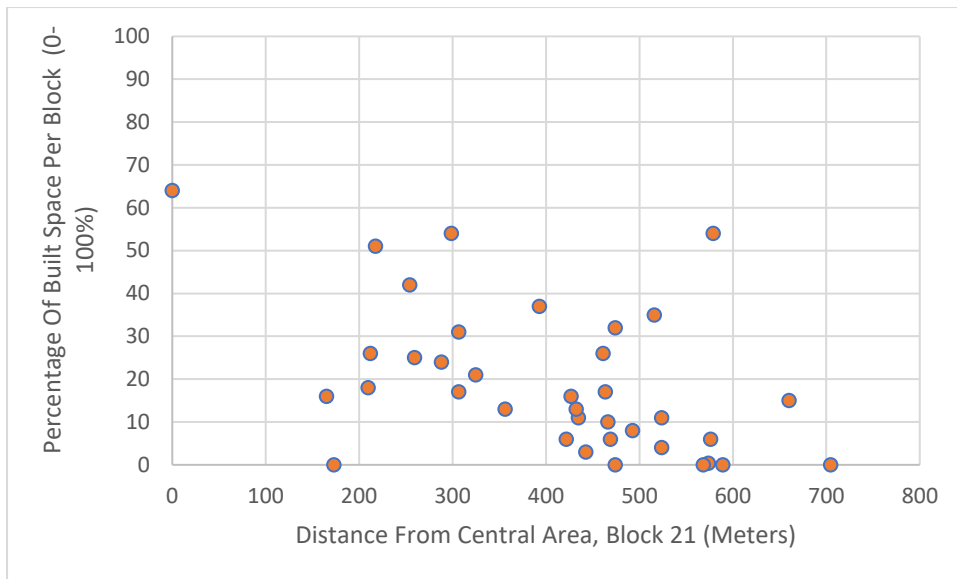


Figure 7.23: Gradient of density (%) for Silchester

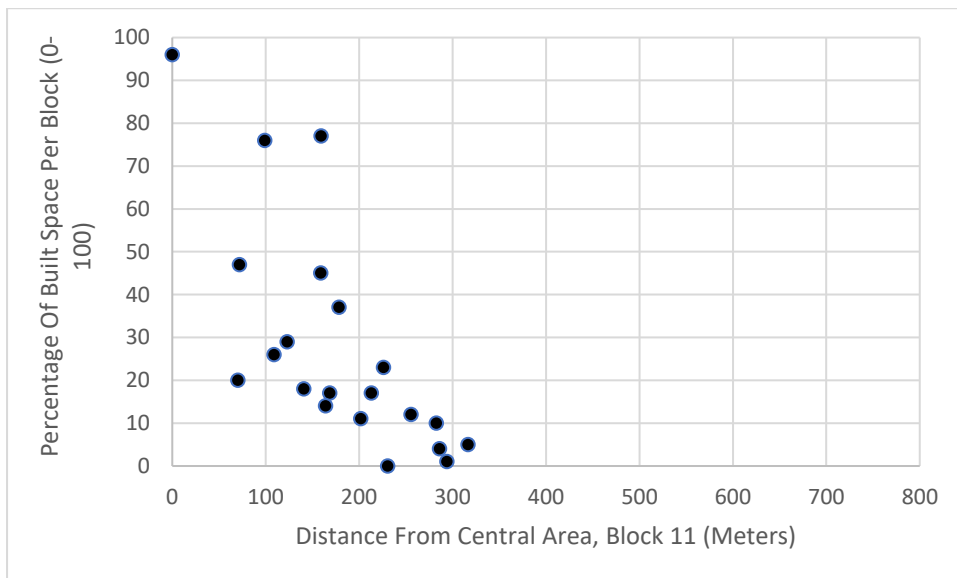


Figure 7.24: Gradient of density (%) for Wroxeter

7.4.3.1 Verulamium – an additional *civitas capital* and *municipium*:

The Roman *civitas capital* and then *municipium* of Verulamium was built during the first years of Roman occupation and in the same geographic area as the Iron Age settlement of Verlamion, an Iron Age *oppidum* belonging to the Catuvellauni tribe. Its strategic importance to the Iron Age inhabitants of the area was perhaps the reason it was awarded the title of *municipium* in 50CE, which gave some of its inhabitants Roman citizenship and recognised the identity of those inhabitants as part of the wider Roman Empire. While not as large as sites in the southern provincial areas of Britain such as Colchester and Londinium, it did hold enough strategic and political importance to fall victim to the Boudiccan rebellion in 60-61 CE. At its height, the site of Verulamium covered an area of about 80 hectares and was surrounded by a large fortification wall and ditch. Over the course of four centuries, construction of various forms of public and private infrastructure, first in timber and then in stone saw Verulamium become a significant centre in the operation of empire in Britain. In

Roman fashion the town contained a forum-basilica complex, bathhouse, and amphitheatre. The early design of much of this public infrastructure was heavily influenced by the military, with some arguing that the layout of these buildings was designed by military architects (Frere 1984). Within a few years of the town's construction, civic buildings could be seen as well as a small military fort on the bank of the river Ver to ensure stability in the area. There is also the possibility that the settlement was initially planned as a *civitas capital*, and that the local inhabitants remained a stable part of the overall population for its entire history, even after it was awarded the title of *municipium*. Following the Boudican revolt, rebuilding efforts were hampered, taking nearly a decade for construction to begin again (Frere 1984). For the next three centuries, Verulamium saw gradual expansion with some periods of contraction due to economic or political turmoil. When Rome departed Britain in the 5th century the site continued to be utilised albeit in a reduced capacity and over the next few centuries, the site of St Alban, (the location of the present town) became the primary settlement in the area (Frere 1984).

The reason that Verulamium has been chosen for this analysis is that it provides occupation density data for some blocks which allows a test to be made of the degree to which the density gradient is visible even in a partially known settlement. Furthermore, recent remote sensing undertaken by Kris Lockyear (2015) has provided data on more areas of the town and rather surprisingly has identified that the western zone of Verulamium was rather empty - particularly devoid of brick and masonry structures suggesting that it was not built-up (Lockyear and Shlasko 2017). This has implications for the occupation patterns of Roman towns in Britain showing either that occupation was sparse or instead that housing is currently not visible and was built in timber, as Ortman and Hanson have suggested for Silchester (Ortman and Hanson 2022). As can be seen in the diagram below (Figures 7.25, 7.26) while only a small amount of data is available for the occupation density of the town of Verulamium, the density gradient of Verulamium is equivalent to be in-line with both Silchester and Wroxeter, that being a higher density around 70% with even higher densities closer to the centre of the town in Silchester and Wroxeter. Verulamium does, however, apparently have an under-recorded central area which has seen only a few limited excavations over the years (Lockyear and Shlasko 2017) (Figures 7.25-7.26).

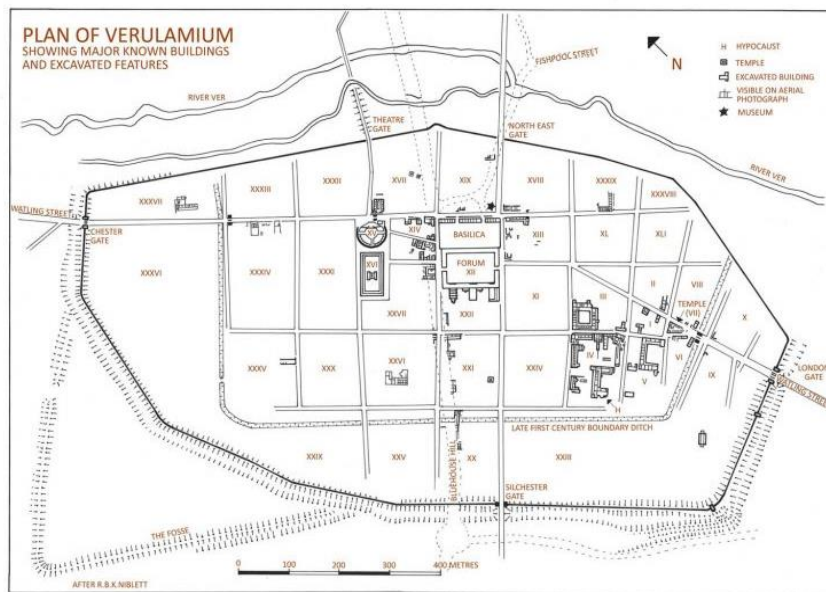


Figure 7.25: Plan of Verulamium, Niblett 2022

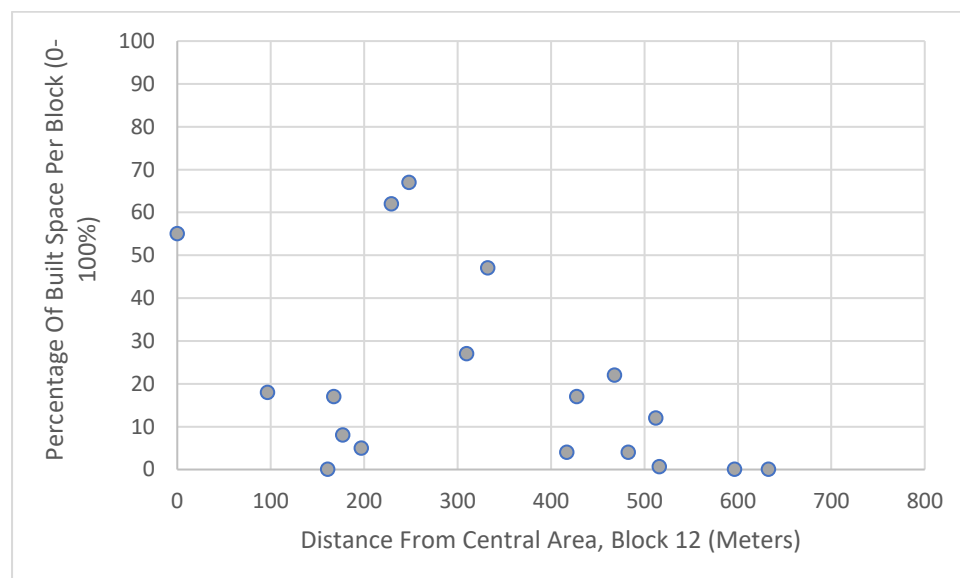


Figure 7.26: Gradient of density (%) for Verulamium

7.4.3.2 Review

The point to stress here is that there is a consistency in the internal pattern of space in Roman British towns in terms of what can be seen through the density gradient analyses, suggesting that we might expect some more general consistency in spatial behaviour in other settlements not dealt with in this thesis (Figure 7.27). The density gradients do consistently show that the densest parts of the settlements were towards the central areas of the larger settlements with high densities as far as 150-250m from the forum block, in line with the other settlements. While a few others were higher density, between 60-80%, the majority of the blocks remained of a lower density, below 40%.

The other feature of the spatial patterning is that there appears to have been open/unbuilt space surrounding the inside of the walls in the large, fortified settlements. That being said, the density gradients in settlements usually tend to show decreasing density to varying degrees further away from the centre (see Clark 1951) so this is not a unique characteristic in Roman Britain.

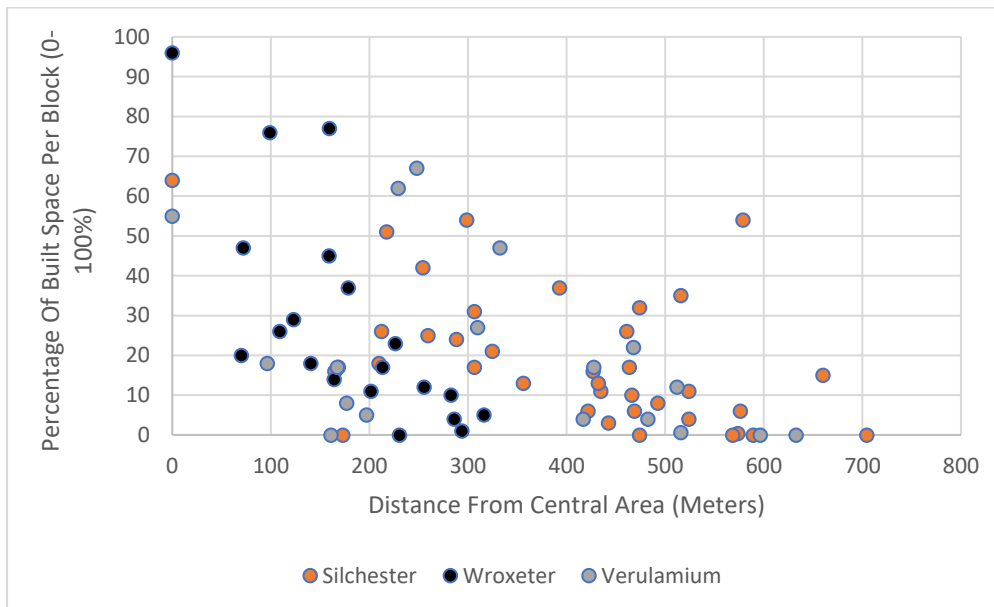


Figure 7.27: Gradient of density (%) for all large settlements

7.5 Integrated Comparison of Visible Occupation Density Gradients for All Settlements

The main difference between the smaller and larger sites in terms of density gradient is that the smaller settlements show a much steeper drop-off while the larger ones see a much more gradual drop-off (Figure 7.28). The internal densities of the *vici* show similarities with each other and also show steep decreases in density over distance because the middle densities are high and the distances across these settlements are small. As for the medium-sized settlements, these have more discernible density gradients as they have more blocks and therefore provide greater nuance in the detail about the gradient of density throughout the settlement. In the largest settlements there are somewhat higher densities in a few blocks, but the settlement areas are much larger and the tendency for the overall density gradient to be shallower across most of the blocks is still there. In summary, the most significant aspect of the density gradients for these settlements is that there is a similarity between the larger settlements and the smaller settlements in that the percentage of infill of the *insulae*/ blocks is similar to the densities in the 'between roads' sectors of the *vici* even though the distances from the centre of the settlement to their outer edges are larger. The steepness of the slope does not have to do with the overall density of the blocks/sectors but rather the areal extent of the settlements.

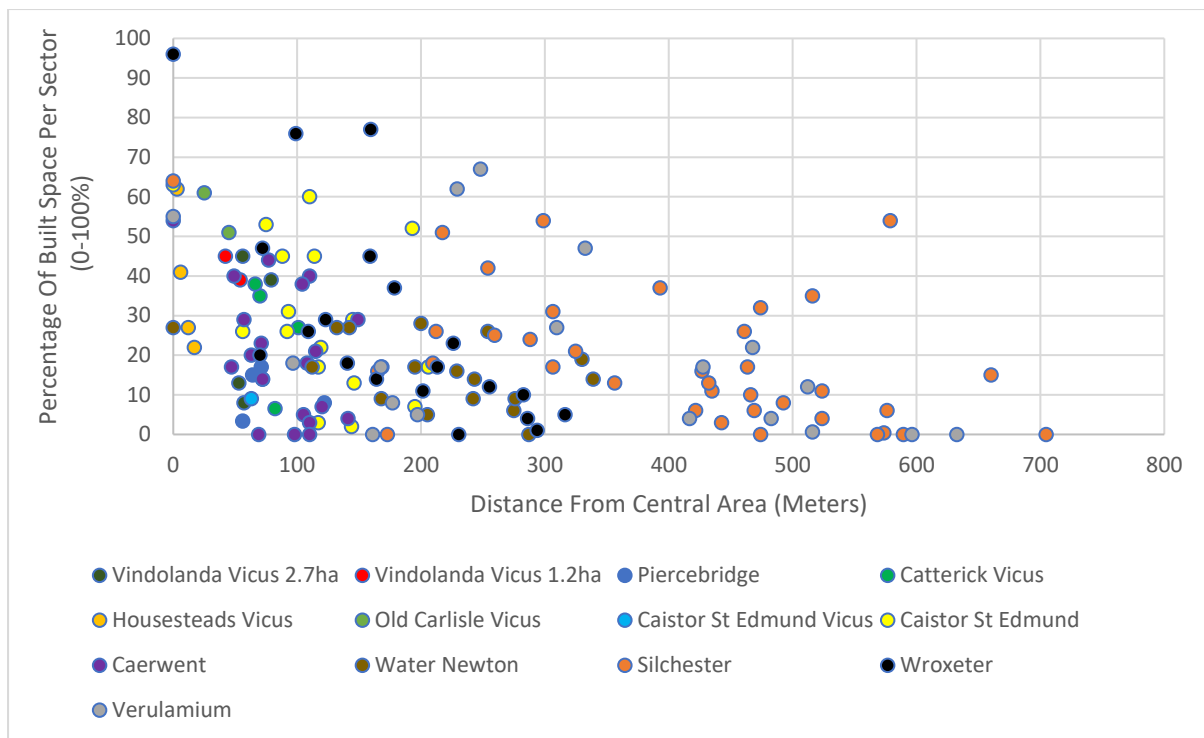


Figure 7.28: Gradient of density (%) for all settlements

7.6 Conclusions

The density gradients for visible occupation within a range of settlements in Roman Britain point to some degree of regional internal consistency in the spatial behaviour of the populace. In summary, the most significant aspect of the density gradients for these sites is that there is a general similarity between the patterning of space from small to large settlements. Most of the relatively rare densest areas of settlements are filled by about 60-75% built space. For the rest of the settlement, space in the majority of sectors and blocks, a similar density below 30-40%, is spread across larger and larger settlement areas with very low densities at the edges. The important issue here is that the visible occupation of the larger settlements in this study does not display a tendency to increase in overall density as one would expect from larger settlements while the smaller settlements tend to be dense. The issue is - was other occupation space in use as well as the masonry and brick structures? Also, was the residential behaviour consistent across the urbanism of Roman Britain? In Chapter 8 the trends in the overall densities of settlements will be examined to assess the conundrum of the pattern of residential density in Roman Britain across the spectrum of settlement sizes.

Chapter 8 - Urban Spatial Behaviour in Roman Britain: density trends and alternative models

8.1 Introduction

The density gradients for visible occupation within a range of settlements in Roman Britain point to internal consistency in the spatial behaviour of the populace. Similar ranges of densities of occupation for the sectors or blocks into which the interior of a settlement is divided occur in all the different settlement sizes. Even when the interior of a settlement is only partially known e.g., Verulamium, the blocks for which build space is recorded indicate a density gradient similar to the ones occurring in equivalent sized settlements, suggesting that the pattern was quite consistent and repetitious. As would be expected there is a decrease in density from the middle of the settlement to its outer edges with a few anomalies.

What is now required is to examine the overall occupation density trend by identifying the total amount of all the built space – public and private – within a settlement and the total area of the settlement. From these the density is calculated from the amount of built space in square metres relative to the total area of the settlement in hectares to provide an overall figure for the density of built space in square metres per hectare. This is the same procedure as calculating the population density of a settlement by dividing the total population by the total area of the settlement to obtain an overall number of people per hectare. Note that in both calculations of occupation density and population density there are known to be both lower and higher density areas within the settlement. This overall density figure is to enable entire settlements to be compared regionally.

As previously noted, there has been an expectation that Roman-based settlements in Britain were behaving like those in Continental Europe. The assumption has been that towns in Roman Britain had the same trend toward higher density with larger size as occurs in Roman towns in Continental Europe. However, the arrangement of the buildings in the *insulae* of the larger towns in Britain appear to be patchier and there seems to be more open space within the walls and around the edges of the built-up areas suggesting an alternative trend that the Roman towns in Britain may have been less densely occupied than those on the Continent. This also raises the question as to whether the density trend for Roman towns in Britain may have resembled the Iron Age, '*oppidum*' pattern with a decrease in density from smaller to larger settlements.

The Ortman and Hanson model by contrast, following the Roman Continental/Mediterranean trend predicts the presence of a sizeable proportion of buildings that have not as yet, been detected, perhaps made from wood. It, therefore, incorporates 'invisible' occupation density alongside the known 'visible' occupation density. The initial analyses in Chapters 4, 5 and 6 indicate that the visible occupation density data favours the '*oppidum*' pattern of a decreasing density trend with increasing settlement size. However, the amounts of open space could alternatively indicate large areas where structures used for occupation are present but have not, as yet, been recognised. Because both proposals require empirical testing by further remote surveying and excavation in order to elucidate

the occupation pattern or patterns which were occurring, the purpose of this chapter is not, therefore, to argue for one trend instead of another. Rather, the aim is to assess the relationship between alternative models of occupation density for Roman British towns and review whether more than one density trend pattern may have been present. The Roman Continental/Mediterranean trend and the '*oppidum*' trend also have varied ramifications and implications for our understanding of the behaviour of Roman settlement organisation within Britain and its transformations. These issues will also be briefly discussed.

8.2 Regional Density Trends

An assessment of the amount of 'visible' occupation density or the density that is apparent based on the town plans that have been compiled, is required to relate density to settlement area and produce regional trends for the densities of settlements relative to their size. Occupation density and specifically visible occupation density, is the necessary index, as noted in Chapter 3 because the conversion to population density in terms of numbers of people, requires additional premises and assumptions which are themselves major issues of research. This chapter discusses the regional trends of the overall occupation densities for all the case studies that have been studied in Chapters 4, 5 and 6 as well as the other examples for each of the three size categories - Catterick, Housesteads, Old Carlisle and the Caistor St Edmund, *vici*; Water Newton, medium *civitas capital*; and Verulamium, large *civitas capital* – which were introduced in Chapter 7 in order to clarify the density gradient patterns within settlements. The aim is to assess the degree to which the set of settlements was following the settlement form and density trends of either a proposed local high-to-low density trend with increasing settlement size or the Roman Continental/ Mediterranean trend of low-to-high density with increased settlement size as presented by Ortman and Hanson.

The overall trend in density for the studied settlements, chiefly shows a higher density in smaller settlements and a lower density in larger settlements, unlike the expected density trend in Classical Roman towns and cities in other areas of the empire. However, the overall densities for visible occupation in the largest settlements indicates that they do not lie on the same linear density trend as the smaller and medium-sized settlements. The density trend for urban and urban-associated settlements in Britain may therefore be interpreted in several ways, with one possibility being that the larger towns were all more or far more densely occupied than their visible structures would indicate. Further, this suggests that a major, systematic research program will, in due course, be needed to resolve the crucial alternative models whose divergent results would have substantial implications for understanding Roman Britain, its history and the relationship to the cultural world which followed it.

8.2.1 Density trends for *vici*:

The built space per settlement size diagrams for the *vici* (Vindolanda, Piercebridge, Catterick, Housesteads, Old Carlisle and Caistor St Edmund *vicus*) show that most of the *vici* (save Old Carlisle) had a total built space figure under 10,000 square metres and that almost all *vici* lay around the 5000 square meter range. For Vindolanda, the 1.5ha and 2.7ha figures both show a similarity in built space figures (5010 and 5609 respectively), but the differing settlement sizes has ramifications for the overall density (Figure 8.1).

The density trends visible for the *vici* conformed to the argument put forward in this thesis that smaller settlements could carry higher densities than larger settlements in Britain. For Vindolanda, two separate density values have been included. The immediate area of the *vici* to the west of the fort shows a very high occupation density, while including the wider settlement area to the west, which has much more open space that may have had functions in relation to the fort rather than the *vici*, lowers the occupation density of the total area (Figure 8.2).

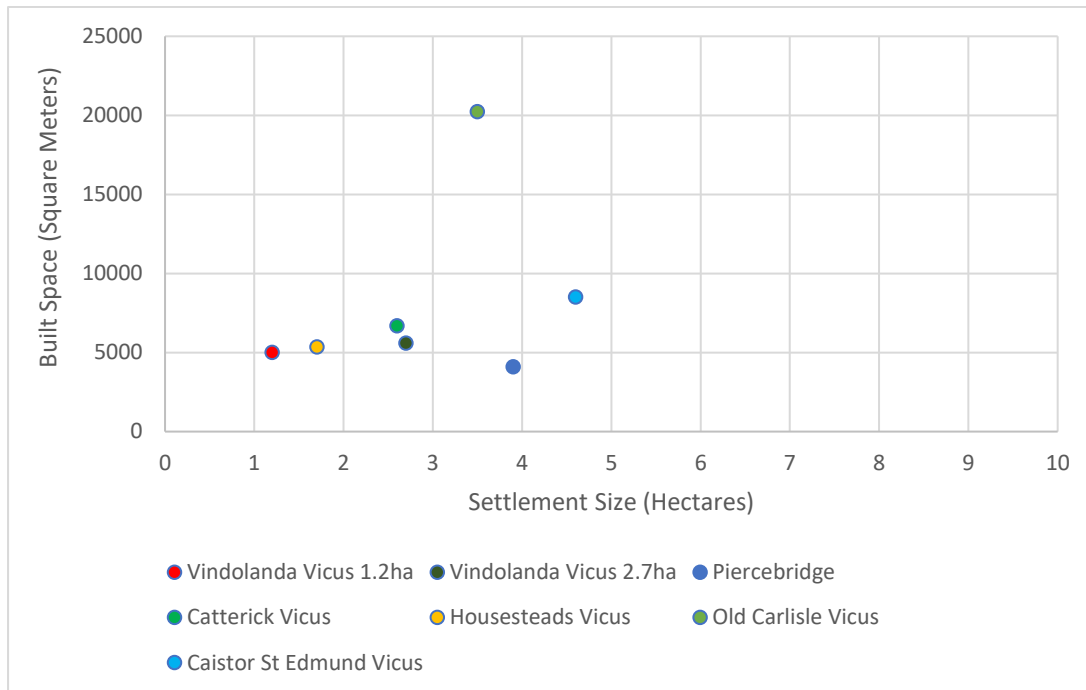


Figure 8.1: Total built space (in square meters) for all *vici*

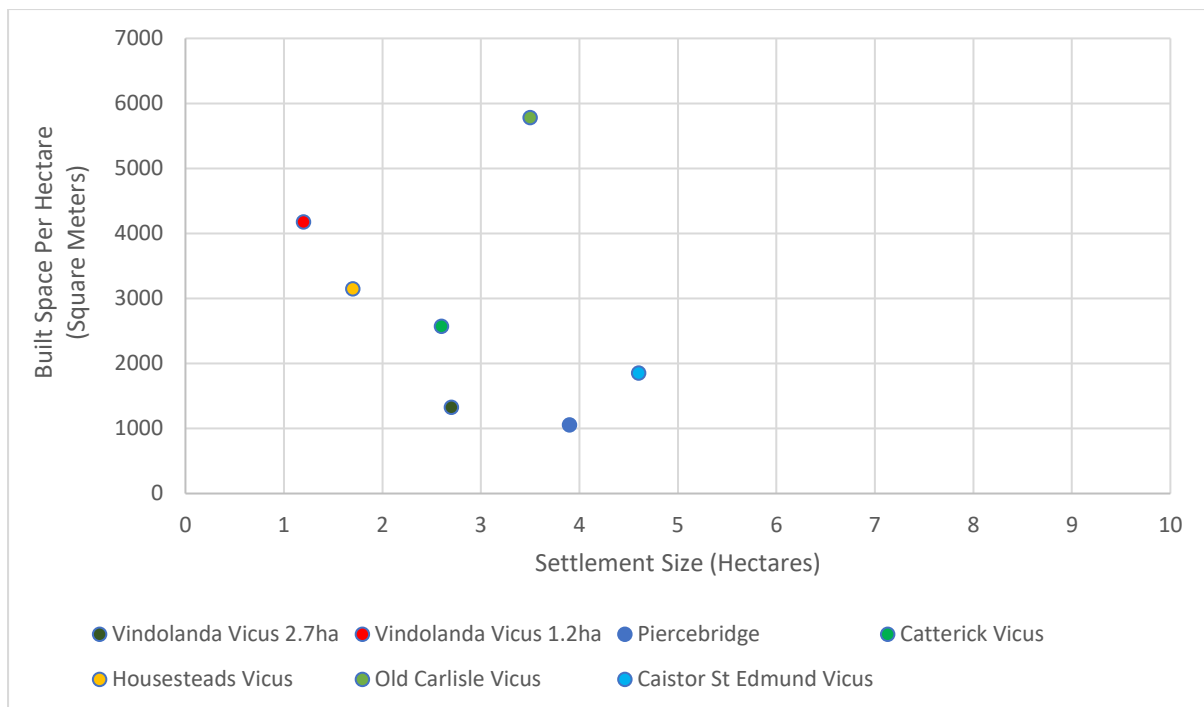


Figure 8.2: Density of built space (in square meters per hectare) for all *vici*

The first observable trend is a long band of settlements of a smaller size, under 5 hectares, that broadly decrease in the density of built space per hectare for whole settlements. The Old Carlisle *vicus* shows quite a higher occupation density on the upper edge of a broad, decreasing band of densities that contains many more settlements for which, as of now, we do not have occupation densities. By contrast the *vicus* at Caistor St Edmund, which is also large, lies within the band of lower occupation densities for the *vici*.

All values lay between about 1000 and 4000 square meters of built space per hectare (save Vindolanda 1.2ha and Old Carlisle). In other words, these figures reveal that some settlements had more open space and some had local higher densities in particular areas of the site.

8.2.2 Density trends for medium *civitas capitals*:

The built space per settlement size diagrams for Caistor St Edmund, Caerwent and Water Newton are similar (Figure 8.3). All three settlements contained between 29-41,000 square meters relative to their total settlement areas. As the overall areas of the settlements were between 13 and 25 hectares, the built space values are relatively low. The built space per hectare diagram for the medium sized *civitas capitals* points to a continuation of a lower density trend (Figure 8.4). The built space per hectare value for Caistor St Edmund is around 3000 square meters per hectare, while the figure for Caerwent is around 2000 sqm/ha. For Water Newton, this trend continues. The settlement is nearly 25 hectares in size and the built space is around 40,000 square meters or 4 hectares. For the built space per hectare diagram the figure is around 1700 sqm/ha suggesting that the settlement appears to be corresponding to the increased size, decreasing occupation trend that is visible in Caerwent. Because Caerwent is larger than Caistor St Edmund, these figures suggest that the occupation density is decreasing with increased settlement size. That being said, the

uniformness of density per hectare between Caerwent and Water Newton suggests a plateauing of occupation density between 15 and 25-hectare settlement sizes.

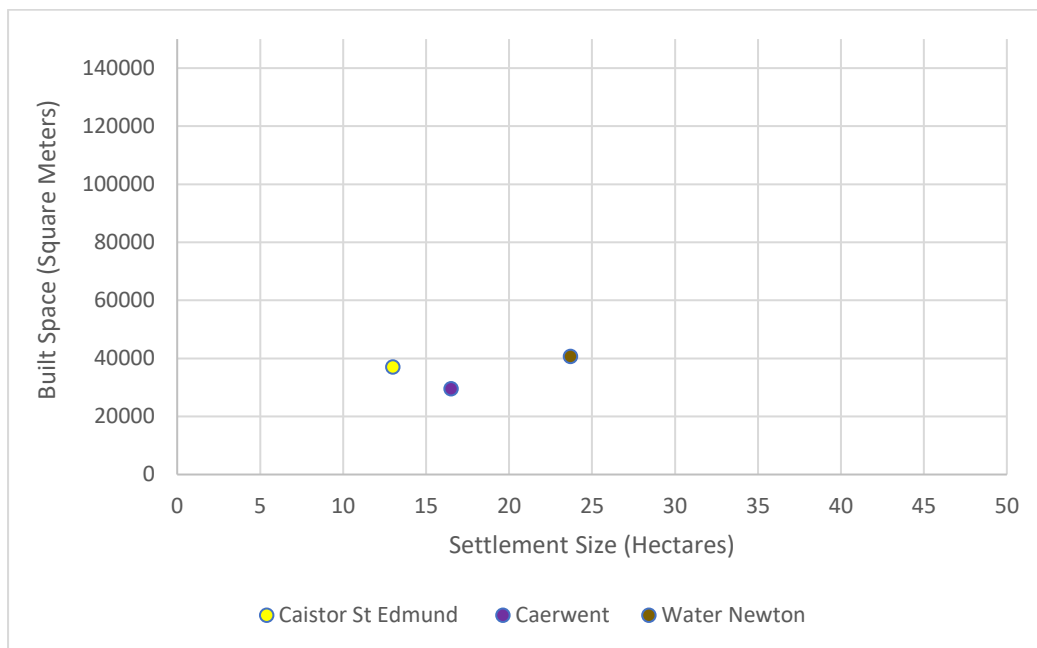


Figure 8.3: Total built space (in square meters) for all medium sized settlements

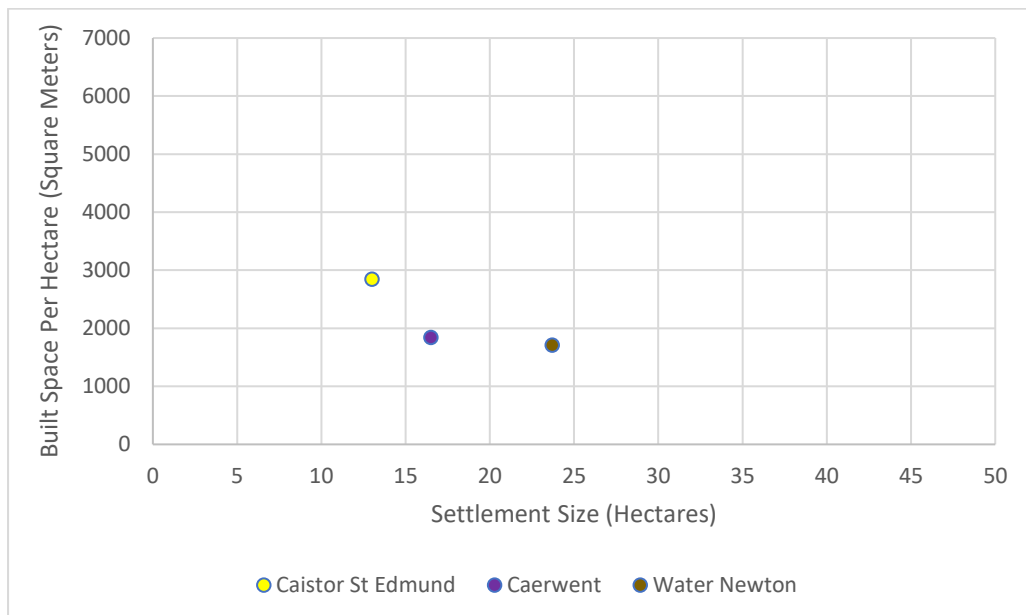


Figure 8.4: Density of built space (in square meters per hectare) for all medium sized settlements

In review, Caistor St Edmund, Caerwent and Water Newton all have similar density patterns to those of the *vici*. The sizes of the medium sized *civitas capitals* increase but the proportionate decrease in the amount of built space per hectare -remaining similar to the *vici* – suggests that there is a trend which illustrates decreasing density with increased settlement size, at least between the size range of the *vici* and medium sized *civitas capitals*.

8.2.3 Density trends for large *civitas capitals*:

The visible built space for the large *civitas capitals* is quite low in comparison with the total size of the settlements (Figure 8.5). Silchester is about 40 hectares while Wroxeter is about 78-80 hectares in size. The built space for Silchester is about 80,000 square meters of total visible public and private visible occupation while the built space for Wroxeter is about 130,000 square meters. Verulamium clearly has far less known occupation than the other two large settlements.

The built space per hectare diagrams also suggests a continuation of the density trend of lowering density with increased settlement size (Figure 8.6). For Silchester, the figure is about 2000 square meters of built space per hectare while for Wroxeter it is about 1700 square meters per hectare. These figures show a marked change when compared with the small *vici* and medium *civitas capitals*, showing a large-scale decrease in the overall density in comparison with the increased size of the settlement. The built space for both Silchester and Wroxeter is also quite similar with only a few hundred square meters of built space per hectare separating them. This suggests a level of consistency in larger settlements which shows a lower density for visible occupation than one would expect from these larger settlements, as Ortman and Hanson note (Ortman, Hanson 2022).

For Verulamium, the built space was around 50,000 square meters. This was very low as the total settlement size was around 80 hectares. As such, the built space per hectare density was roughly 500 square meters. However, this settlement has only been partially surveyed and excavation has been relatively limited. The arrow has been added above the built space per hectare figure for Verulamium on the diagram to indicate that the overall occupation density of the settlement would undoubtedly have been higher than is currently known. The issue is how much denser was it? It was expected that because much of the settlement was unexcavated, that the lower density may not have been evidence for a lower density settlement. However, remote sensing work on the settlement, around 2015 by Kris Lockyear, as mentioned previously, revealed that much of the open space was apparently devoid of visible occupation structures (Lockyear and Shlasko 2017).

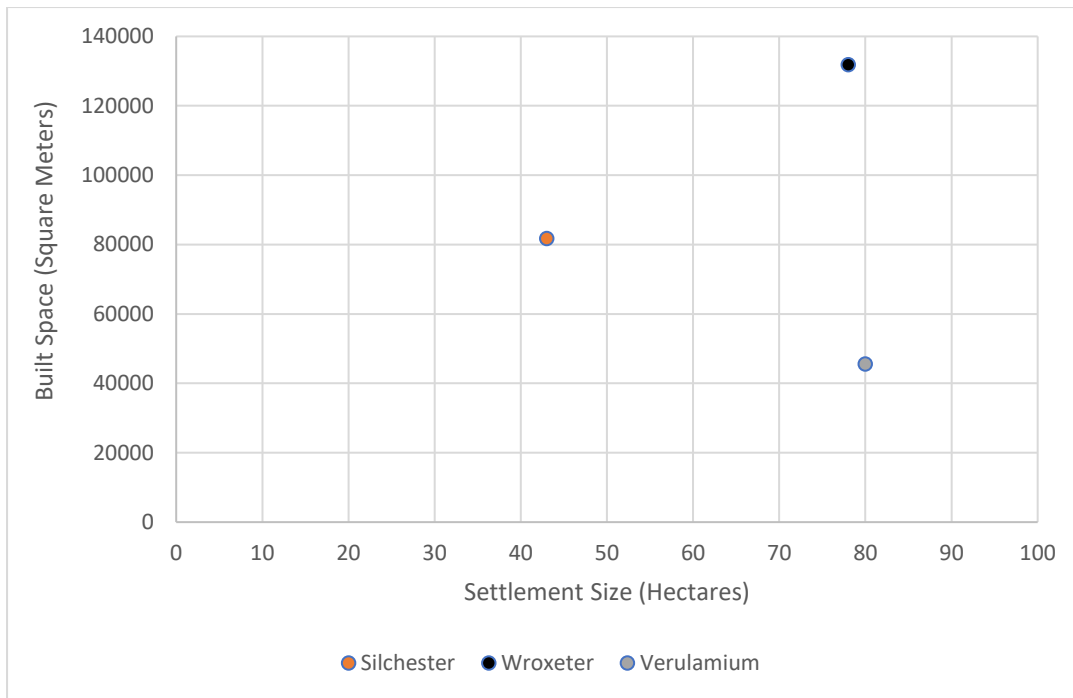


Figure 8.5: Total built space (in square meters) for all large settlements

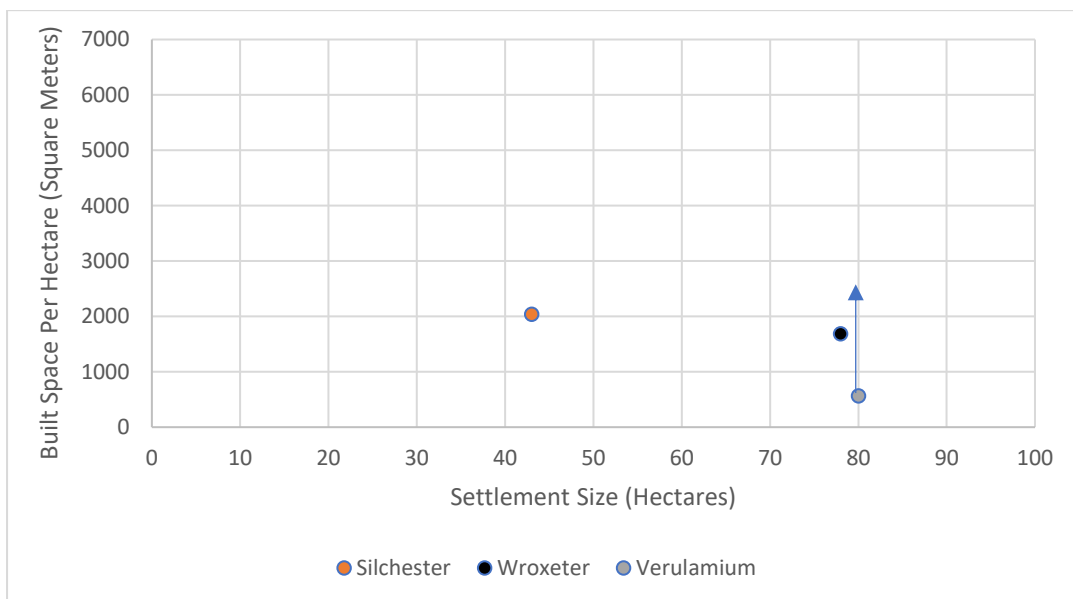


Figure 8.6: Density of built space (in square meters per hectare) for all large settlements

8.3 Review of The Regional Density Trend for Visible Occupation

The implications of the integrated total-built space diagram for all settlements are that there is a correlation between increasing settlement size and the amount of built space, which also increases. As per the diagram (Figure 8.7) Verulamium is an oddity and appears to be an under-representation of the actual amount of built space that should be in that settlement. This is potentially of some consequence.

The relative rate that the settlement increased in size and the built space within that settlement increased is the key (Figure 8.8). The overall trend is for the density to decrease with settlement size because the settlement areas are cumulatively far larger than the built space they contain. The implications of the integrated occupation density data in (Figure 8.8) are numerous. It indicates that these settlements were on the whole operating at lower, built-up visible occupation densities than are presumed for other towns on the Continent. That being said, most of the settlements chosen for this analysis in Britain were generally much smaller than the Roman towns illustrated for the Continent. The percentage graph shows that the British settlements sit below the 50% mark of built space with quite large amounts of open space for larger settlements. While elements of the internal organisation were shared, the actual space appears to have operated somewhat differently. Rather than one pattern, there is the possibility that there could have been at least two trends present.

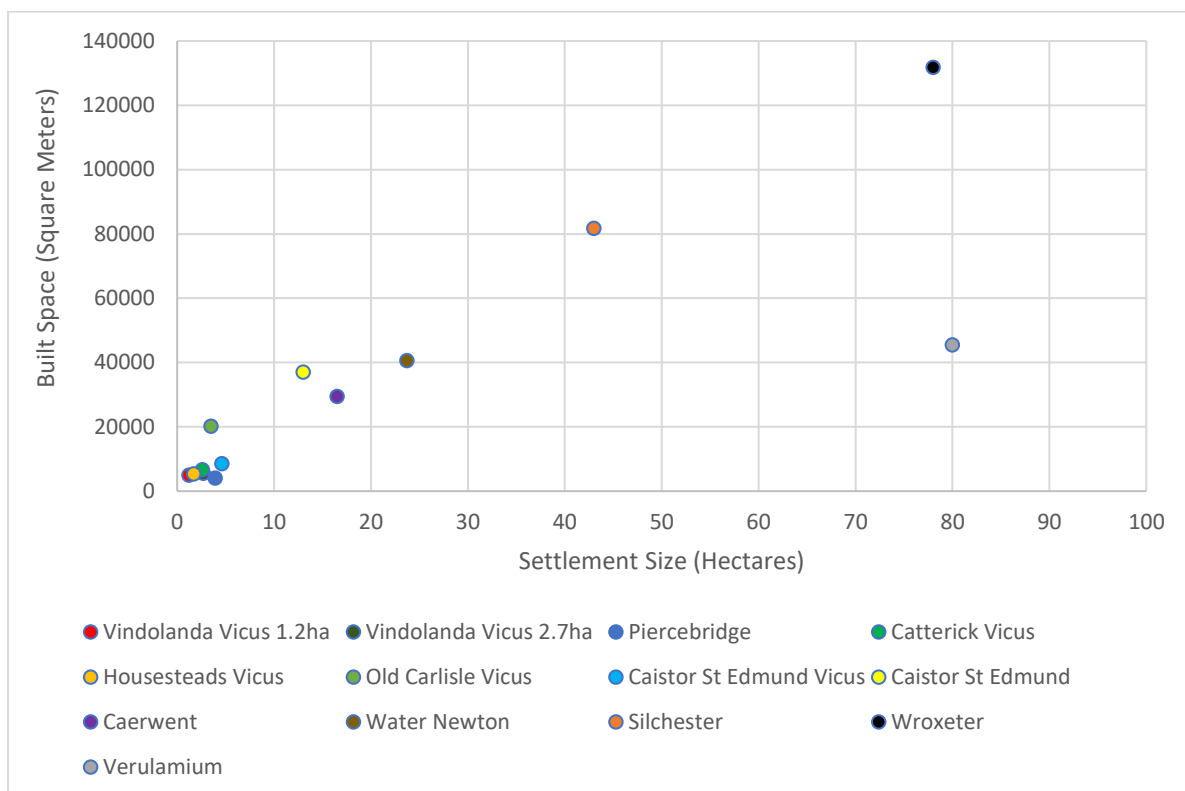


Figure 8.7: Total built space (in square meters) for all settlements

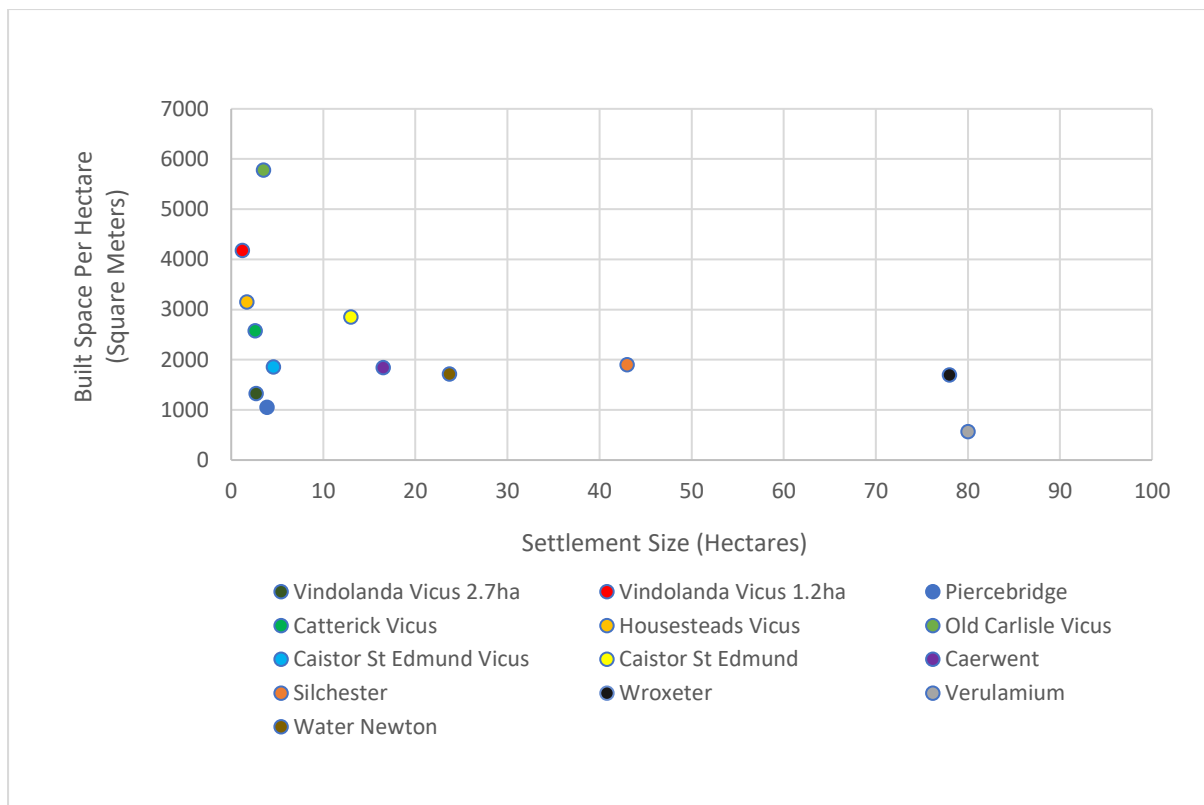


Figure 8.8: Density of built space (in square meters per hectare) for all settlements

Interestingly, the spatial pattern in the British settlements also appears to have its own internal consistency. But how that might have worked and how to identify changes between settlements of different sizes is not clear. On the one hand, a trend is apparent that produces denser smaller settlements and lower-density, larger settlements. But the three largest settlements, Silchester, Wroxeter and Verulamium do not display the same maximal rates of density decrease as the smaller ones. Their visible occupation may either have been constant with size or slightly rising in density, especially if, as appears likely from (Figure 8.7), there is much yet to be found at Verulamium. In addition, the issue of what Londinium was like, needs to be considered. That is problematic because Londinium's occupation pattern is hard to access. The concluding section of this chapter will therefore consider alternative interpretations and some implications. That being said, the issues can only be sorted out by substantial additional remote sensing and highly systematic excavation of domestic residential occupation areas within the settlements of Roman Britain.

Concerning the specific settlements in Roman Britain, the key point may be that Silchester represents a 'crunch-point' or junction between the two settlement trends that have been raised in this thesis, one which saw a steeply decreasing density for settlements smaller than about 30 ha and what currently appears be a shallow density decrease above 40 ha. Is the settlement behaving both like a local *oppidum* and a Roman town? And was it and its larger equivalent towns perhaps part of a different density trend to the decreasing one that is immediately apparent for settlement areas below about 30 ha?

Though the built space per hectare suggests that the larger the settlement became, the lower the density of occupation, this is problematic because Verulamium is incompletely

known, even for substantial buildings and may therefore have had a higher density. To what degree is not known. And at Wroxeter, extensive remote sensing was carried out by the Gaffney's in 1993-1994 to investigate what looked like lower density/unbuilt space within the town (White, Gaffney and Gaffney 2013). What was found were not substantial buildings but activities and functions, including a large number of pits, looking rather like Manching. There was open/unbuilt space within the town, suggesting a continuation of local settlement practices. Activity appears to have been quite substantial and the issue arises whether there was a greater occupation of buildings that are invisible based on their being built from less durable materials. Their frequency is not however, readily identifiable.

8.4 Implications and Conclusions

The patterns of density gradient for visible occupation density indicate internal consistencies (behavioural consistency) in the spatial behaviour of the populace in Roman urban settlements in Britain. The same can be said for the maximal densities within settlements and the general trend of regional density. They suggest that the spatial behaviour of the population in Roman settlements was, in some way, similar across Britain.

8.5 Alternatives and Implications

A number of alternative models of density trends can be proposed, any of which may have been operating during the Roman occupation of Britain. Their significance is that they are each associated with potential constraints and implications which resonate with the debates about Roman Britain - such as the degree of resilience of the urban establishments, aspects of the expansion of the villas in Britain, the meaning of the 'dark earth' and the presumed shift to predominately timber architecture in the 'post'- Roman world in Britain.

8.5.1 Alternative 1 - *oppidum* occupation linear density pattern

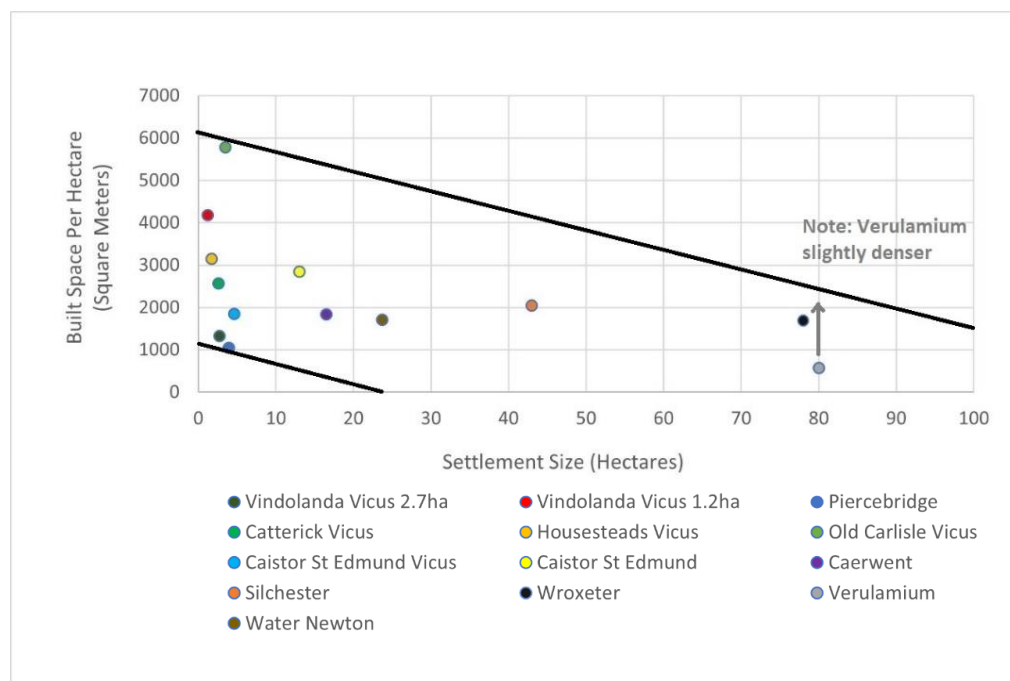


Figure 8.9: Alternative 1 - Density of built space (in square metres per hectare) for all settlements

One alternative (Figure 8.9) would be a general trend which would have seen settlements decreasing in overall occupation density as the settlement increased in size. This is unlikely in terms of the patterns of density in Roman towns throughout the empire, which do not follow this occupation density trend. A declining trend would specify very low populations for Verulamium (90 ha) and Londinium (135 ha) relative to their settlement areas - which is problematic. A higher density version of this declining trend might derive from there having been more timber buildings in all the settlements, particularly in areas that are 'visibly' open/unbuilt. For the downward trend to be maintained, there would have to have been timber buildings among and beyond the visible buildings of the *vici*. The overall density of medium-sized settlements could be higher with more infill but the pattern of dropping to lower densities would still apply if in the larger settlements the infill were not as great. The implications for the archaeology of Londinium will be considered further in Alternative 3.

8.5.1.1 Implications:

There appears to have been a local Iron Age component evident in the archaeology of the spatial organisation of the Roman British towns (as noted in Chapters 4, 5 and 6) which would have meant they may have been operating at lower densities than Roman towns in other areas of the empire such as the Continent and the Mediterranean. There is also the possibility that this local internal operation meant the populations of these towns could have been more mobile, as is indicated by the *oppida* (Moore 2017; 2012). With fewer occupants, less market activity, and less permanence of the residential population, would the Roman administration have been less able to collect taxes? If there was a struggle to sustain centralised wealth and other economic capacities that could only be ensured with a robust and dense urban way of life, then the towns may not have possessed the resilience to persist, resulting in a gradual break-down (Moore 2017; 2012). Winchester experienced decline at the beginning of the 4th century while Verulamium and London, for example, experienced a much sharper decline in the late 4th and early 5th centuries CE with decreasing habitation and the reduction in use of infrastructure and civic services (Crabtree 2018). Perhaps the emergence of villas in the latter part of the Roman occupation was a direct result of issues experienced within Roman towns in terms of operational integrity and the maintenance of an 'urban-rural' pattern of behaviour by descendants of the local elite (Reece 1980, 77-92).

This density trend is the simplest of the three alternatives and would be the most obvious expectation from the consistencies in spatial behaviour indicated by the density gradients. In addition, cultural regions usually only have one overall density trend to which all settlements broadly conform. That being said, it is not necessarily the most likely as it is strongly at odds with the Continental Roman urban density trend and the associated anticipated populations.

Curiously, like the Alternative 3 dominance of timber buildings, if this trend were operating, it also suggests a long tradition of behavioural consistency from the Iron Age, through the Roman period and into the post Roman world of Britain. The potential implications of the initial alternative trend suggest that the alternatives will specify very particular archaeological features to be located, such as proportions of timber buildings in particular locations in settlements of different sizes and will lead to very different longer-term implications.

8.5.2 Alternative 2 - *oppidum* – Roman occupation, dual density pattern

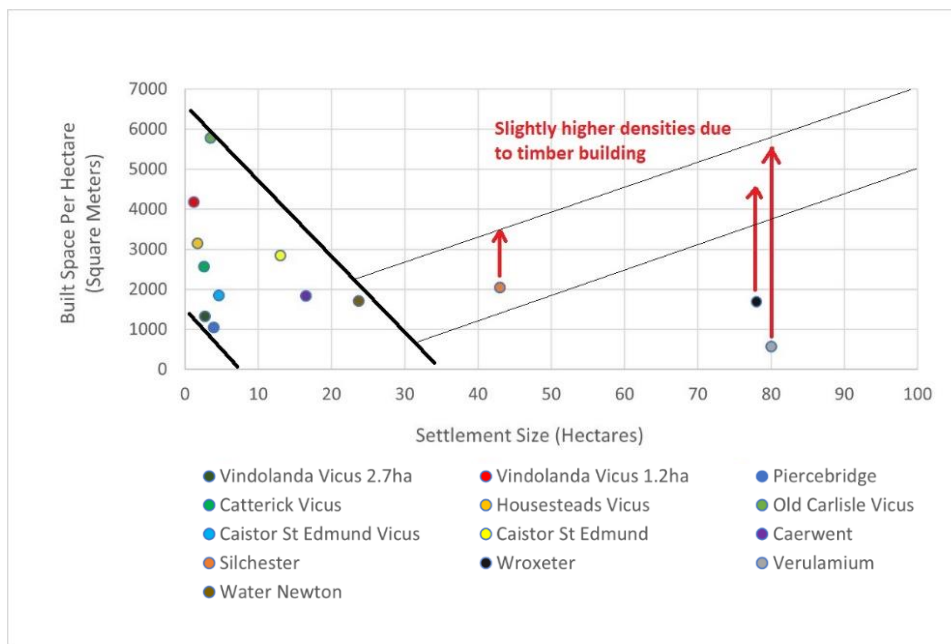


Figure 8.10: Alternative 2 - Density of built space (in square metres per hectare) for all settlements

The second alternative option (Figure 8.10) would be a dual-density trend incorporating both an *oppidum* pattern and a Continental Roman pattern, with occupation density dropping as settlements increased to the size of Silchester and Wroxeter and then rising in occupation density as settlements increase in size above the size of Wroxeter towards the sizes of Verulamium and Londinium and other larger towns like Cirencester and Colchester. Silchester would be crucial as a settlement at the junction of both trends. The apparent lower densities of the larger settlements analysed in this thesis would suggest that, as Ortman and Hanson propose, there existed so-far undetected timber constructs, which when added to the 'visible' density, would result in a much higher occupation density for the larger settlements. These need not have been very much higher to have created a trend to increasing density for the larger settlements but would have required much higher frequencies of such buildings in Verulamium, Colchester, Cirencester and especially Londinium. So, a model for Silchester with less than the 80% additional timber buildings proposed by Ortman and Hanson would be a part of this alternative.

8.5.2.1 Implications:

The implications of this are significant. If there were two density trends coexisting, then sites of which little is known, ranging from the sizes of 20-30ha to Wroxeter and Verulamium and to larger settlements such as Londinium, that sit underneath modern cities may have been operating either on the Alternative 1 or the Alternative 2 density trend model. Distinct differences in the frequency of occurrence of timber buildings would be predicted by the alternative models and rigorous sampling procedures would potentially yield substantial insights if a program of research could be carried out on Roman towns across the UK.

If this dual model does describe the particular situation in Roman Britain, it has broader implications. Such a dual density trend is unusual globally (pers comm. Roland Fletcher) and would be of great behavioural interest. If it occurred, it would suggest a marked divergence between behaviour in the smaller settlements compared to the quite rare larger ones. It would be highly significant for a reappraisal of urbanism in Roman Britain and would be a further factor to be considered in the issue of how the urban network set up in Roman Britain continued into the Medieval world.

The issue of the viability of the whole network may still be significant if the larger sites were denser than they now appear but would perhaps not possess the higher density economic returns from the scaling effect in the Continental towns which are part of the Ortman and Hanson model.

8.5.3 Alternative 3 – Roman occupation density trend

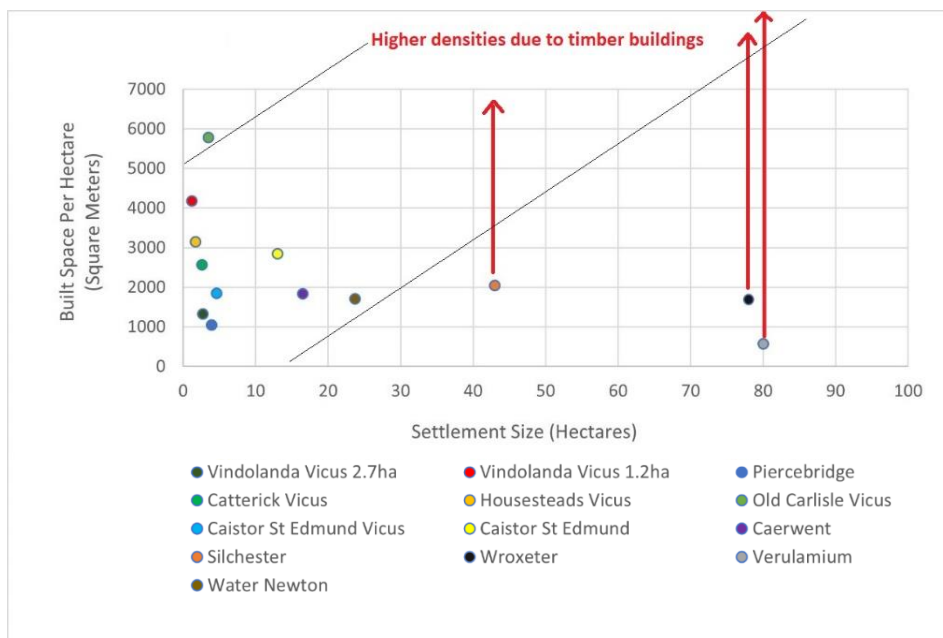


Figure 8.11: Alternative 3 - Density of built space (in square metres per hectare) for all settlements

The third alternative (Figure 8.11) would be a rising density trend encompassing all settlement sizes in Roman Britain, whereby the density was much higher in the larger settlements so that the densities in smaller settlements became the lower density range of that trend. This would demand that a significant number of timber buildings had to have been incorporated in the larger settlements which have not as yet been detected, as Ortman and Hanson argue for Silchester. Note that the *vici* and the medium *civitas capitals* need not have been much denser for this trend to be coherent and viable. Instead, the model indicates that only the larger settlements had substantially higher proportions of timber buildings. If the larger settlements contained the high percentages of missing buildings predicted by Ortman and Hanson they would create a density trend that subsumed the densities for the smaller settlements as a minor and partially anomalous component of the larger trend.

8.5.3.1 Implications:

Verulamium will be the crucial site as it would require a high percentage of wooden buildings to fit the Continental density trend. As much of it is an open-field site it would be a decisive test case as the difference from an equivalent analysis in Silchester would need to be substantial for the Continental density trend to be prevalent in Roman Britain. If the use of timber was substantial as Ortman and Hanson argue, then there was again, as in Alternative 1 - but for a different reason - far greater potential continuity of practise in the use of timber structures through from the Iron Age to the Anglo-Saxon period, than we have tended to envisage. So, if there was substantial timber in Roman towns throughout Britain, this would also suggest that local patterns of spatial definition were continuing. There are, it seems, two alternative Iron Age continuity models. In Alternative 1, the continuity is shown in open peripheral space and patchy occupation. In the other – Alternative 3 – a dominance of timber buildings can also indicate continuity though one presumes the buildings were rectangular rather than round or oval in the Iron Age form. The shape of the buildings is the strong index of Romanisation.

This is consequential for Londinium both for its occupation density and for the story of its post-Roman development. Recent detailed examination has produced maps of Londinium which are patchy and have extensive open areas around the edges within the later walls (Perring 2021; 1991) (Figures 8.12, 8.13, 8.14, 8.15, 8.16).

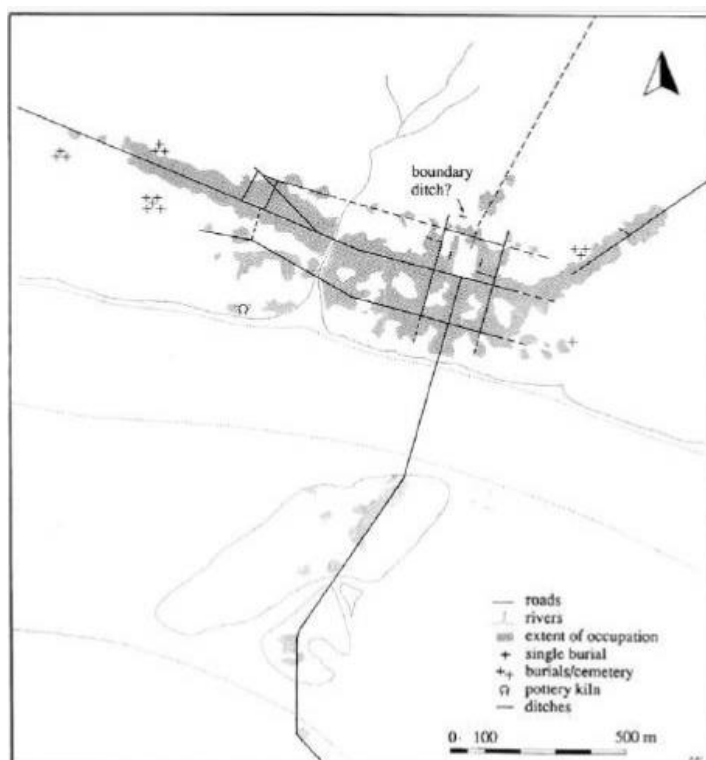


Figure 8.12: Plan of Pre-Flavian London (60 CE), Perring 1991

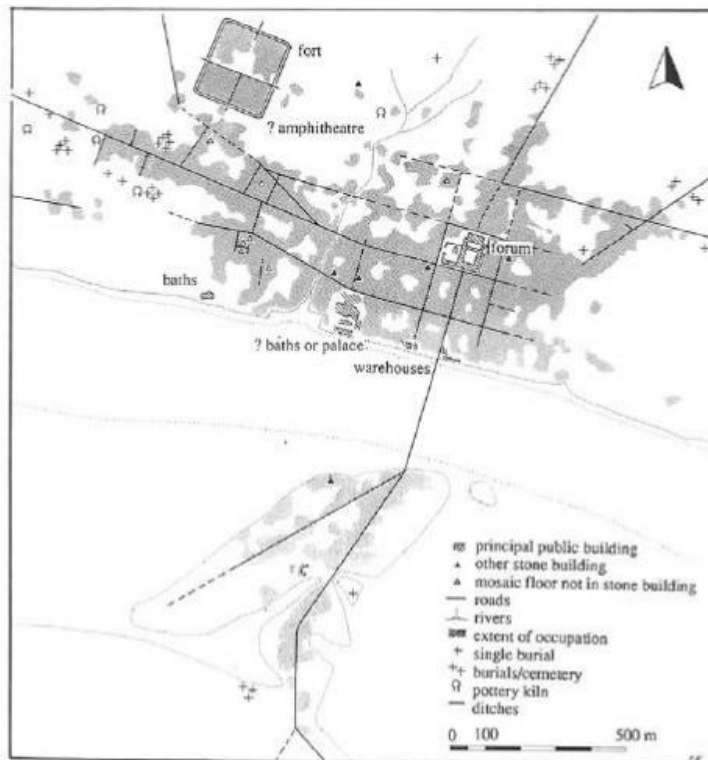


Figure 8.13: Plan of Flavian London (95 CE), Perring 1991

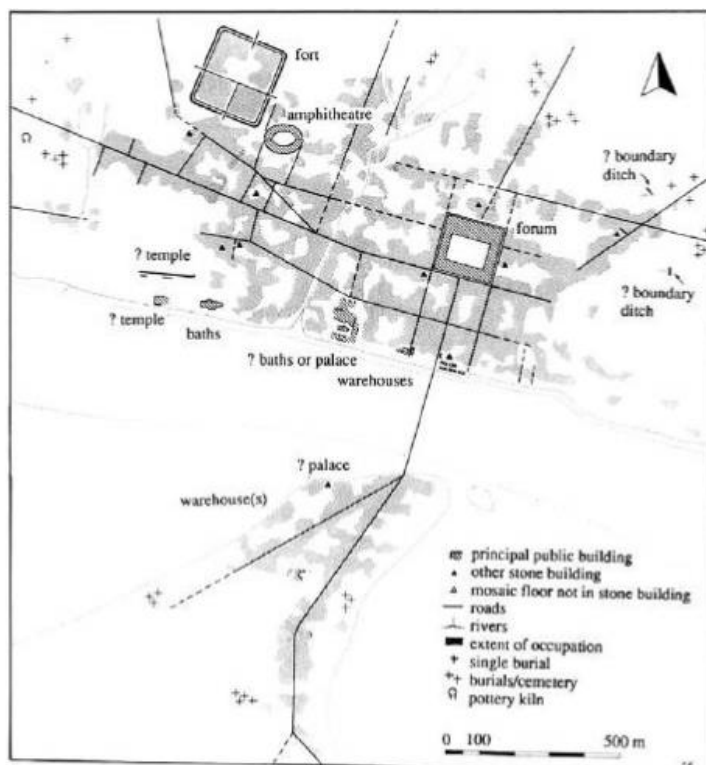


Figure 8.14: Plan of Trajanic-Hadrianic London (130 CE), Perring 1991

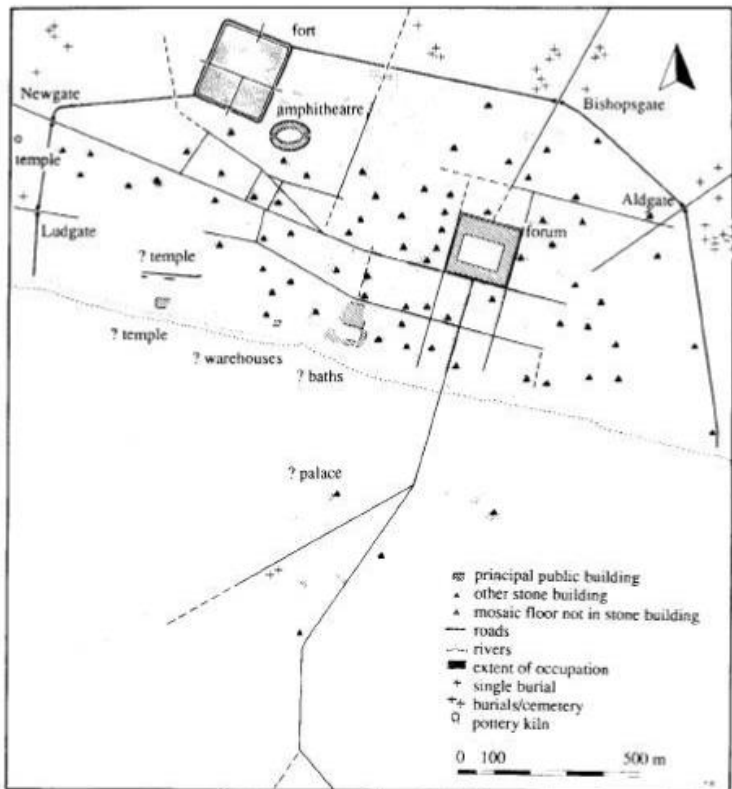


Figure 8.15: Plan of early 3rd century London (230 CE), Perring 1991

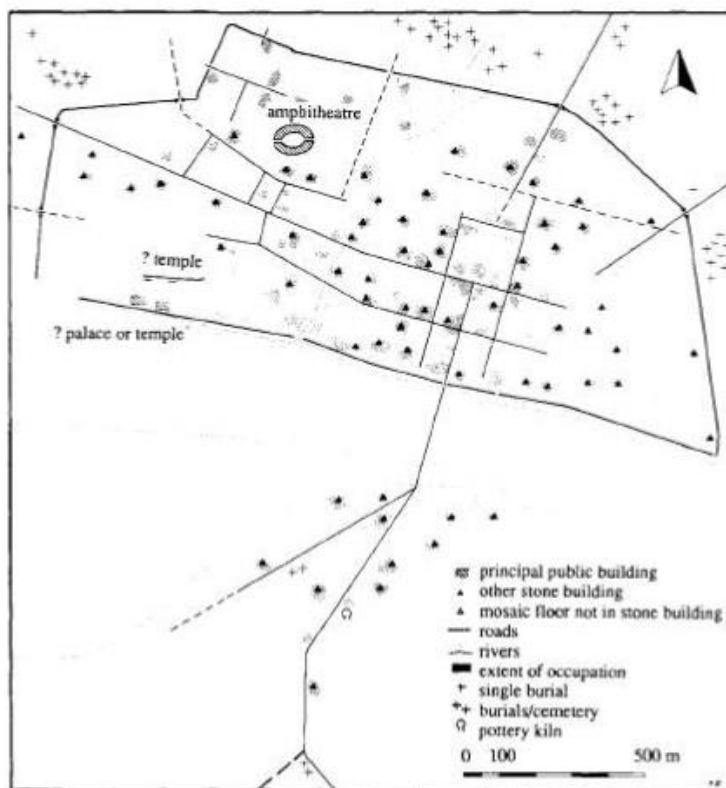


Figure 8.16: Plan of Late Roman London (300 CE), Perring 1991

If these were open on an *oppidum* model as in Alternative 1, then it is hard to see how Londinium's population could have been large. On the other hand, if the patches and open land indicate places where timber buildings were located then Londinium would have been on the Ortman-Hanson Continental model of Alternative 3.

Substantial timber construction in Roman towns has been previously proposed. Robin Fleming, notably, has argued that masonry structures only represented a minority of built structures in Roman British towns and that timber structures would have been dominant. She has also pointed out that the existence of brick and masonry structures within towns was associated with the state and with those whose positions and standing in society was most aligned to it, such as the army, tax collecting, elite landowners, and traders. When the fabric which held the Roman world in place began to break down in Britain, those institutions most closely interconnected with masonry structures began to fail as well (Fleming 2020). The timber housing of most of the population was more easily maintained and replaced and would not have been so vulnerable.

The 'dark earth' is then of particular consequence. There has been the expectation that the existence of dark earth in London was inextricably linked with the decline period during the 5th century and increased agricultural activity, i.e., farming within the confines of the town, which led to a layer of dark earth, high in organic material, which sat above the previous stratigraphic layers (Perring 1991; 2022, Hingley 2019; Yule 1990). In recent times though, there has been a revaluation of the processes that saw the emergence of dark earth, particularly by Dominick Perring and Richard Hingley. This re-evaluation recognises that the presence of dark earth could be a marker of structural decay of infrastructure and other buildings, including timber constructs rather than simply more intensive agricultural activity. The high amounts of dark earth in the last phase of Roman occupation suggests that there could have been a much higher number of timber/organic constructs in the later periods. That being said, the existence of dark earth in 6 previous layers of occupation could suggest that timber constructs were a part of the internal organisation of a settlement well before the 5th century. In that respect, the views put forward by Fleming would be significant (Perring 1991; 2022, Hingley 2019).

If the seemingly unbuilt spaces within the towns were to contain these timber buildings, then it would suggest that timber was a predominate building material throughout the Late Iron Age, Roman period and beyond and would correspond with Ken Dark's proposition that post Roman "Dark Age" Britain – the term he demolished - was "Roman in wood" (Ortman and Hanson 2022; Fleming 2020; Ken Dark 2000, pers comm. Roland Fletcher 2020 quoting Ken Dark). As of now, for example, we perceive a resurgence of timber use in Wroxeter in the 5th-6th centuries CE, or perhaps a continuity of Iron Age practices at a time when Roman practices may have been in decline into the 5th and 6th centuries, after the end of Roman occupation. What is interesting about this case is that the structures built after the Roman withdrawal were constructed out of wattle and daub and timber rather than stone or brick. In Britain, the urban network appears to have experienced a readjustment by the mid-5th century CE, only recovering in the 600s CE. Though the continuity was stronger in France, the urban network in Britain did substantially remain intact (Michaels and Rauch 2018, 9-11). For example, the larger settlements such as Londinium changed into new forms such as at Lundenwic (Naismith 2018). If we are missing substantial wooden domestic construction,

the reinterpretation of dark earth perhaps suggests then, that there may have been less disjunction than has been supposed between Roman and post-Roman urbanism in Britain.

8.6 Conclusions

The value of Ortman and Hanson's work is that through their analyses, they have provided a rigorous potential index of Romanisation where the index is a percentage of Roman format buildings in timber and the amount of filled space.

The key index is timber. If settlements, such as London, Verulamium, Wroxeter and Silchester were full of wood/ timber, at consistently higher occupation densities and therefore higher populations, then the Roman way of organising space superseded the local way, but also continued an Iron Age structural practice.

The proposed presence of timber within settlements in Britain and the implications of its existence in pre-Roman, Roman and post-Roman periods is significant, making a substantial and systematic research program extremely worthwhile across Roman urban sites in the United Kingdom because it leads to strong alternatives. One option is the use of a lot of timber buildings associated with high populations and somewhat paradoxically a marked continuity to the wooden post-Roman towns. The clear alternative is that the Iron Age continuity was marked by significant amounts of visible open/unbuilt space within the settlements. A possibility arises that the towns had smaller populations and therefore did not have the economic capacity to sustain themselves but did maintain another form of cultural continuity from the Iron Age to the Medieval world in Britain. That might offer a different path to urban continuity.

Quantities of timber buildings identified by rigorous excavation sampling and by enhanced remote sensing will reveal which of the alternative density trends were operating. Open/unbuilt space that is found to have been largely open even if used for transient activities will support the *oppidum* model as perhaps the numerous *oppida*-like pits of Wroxeter may suggest. At the other extreme, if space that appears to be open/unbuilt is found to have actually housed timber buildings, that will mean that the overall density of the towns was higher and may bring them into line with other classical Roman towns and cities. What may lie in between these extremes? The analyses will be consequential because the various alternatives suggest that the different amounts of timber buildings would be evidence for very different modes of urban life, for very different economies and degrees of sustainability and also for very different forms of continuity between the Roman and the post-Roman world in Britain.

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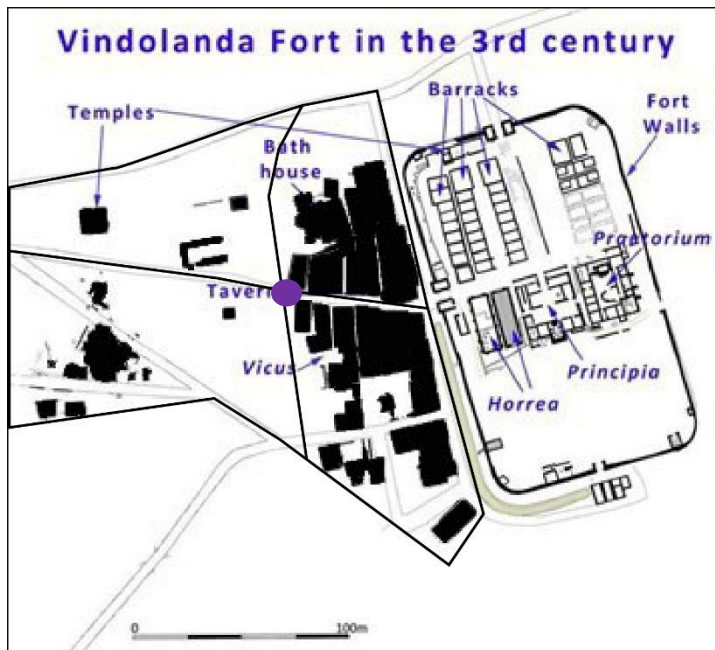
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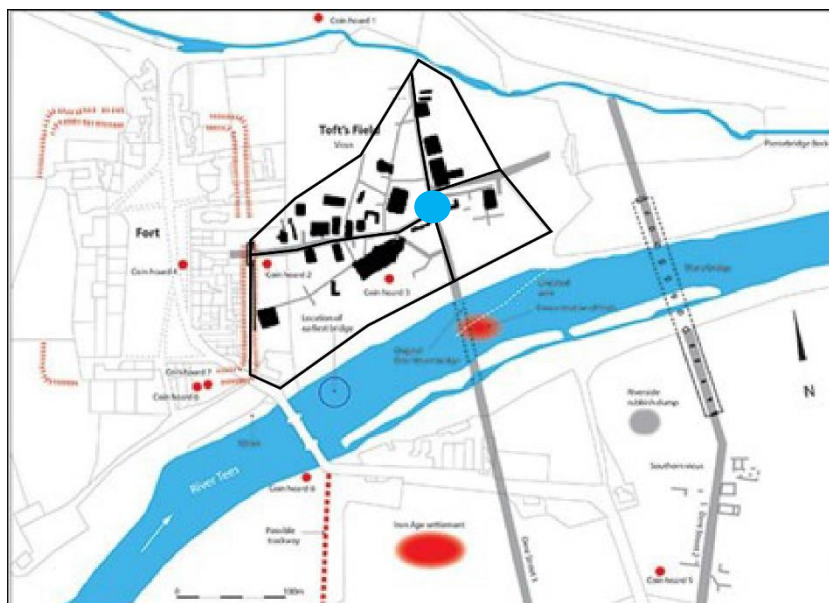
Appendices A – *Vici* settlement areas, sectors, built space (blackened-in area) and central points marked

The coloured dots represent the centre point for which the density gradient analyses for the *vici* are based.

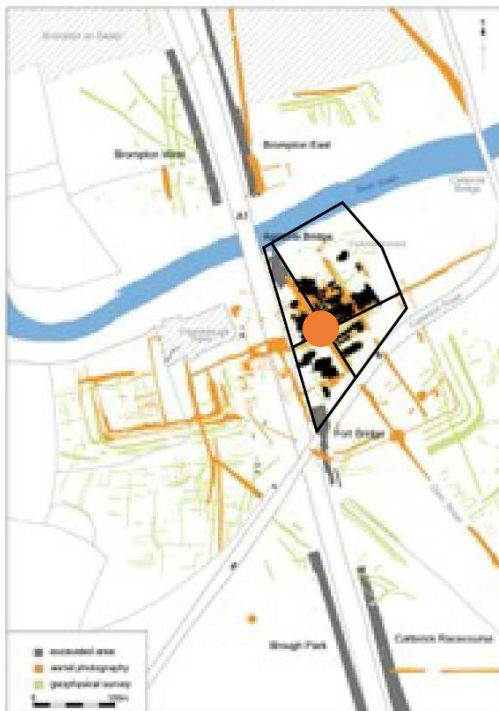
Vindolanda



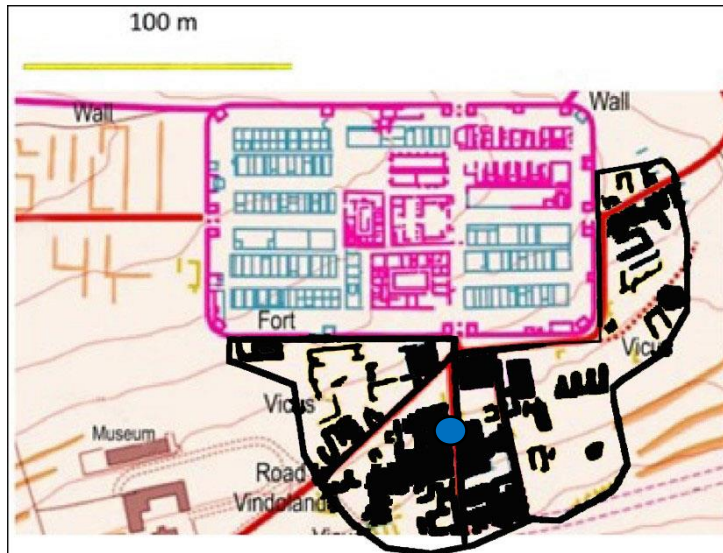
Piercebridge



Catterick



Housesteads



Old Carlisle



Caistor St Edmund Vicus



Appendices B –Table which records data for the sizes and densities of the settlements selected for analysis

Site Name	Total Site Size (ha)	Total Built space in Site (m2)	Overall Density of Site (Built Space Per Hectare)	Sector/Block Number	Location of Sector for <i>Vici</i>	Sector/Block Area (m2)	Sector/Block Built Area (m2)	Sector/Block Distance from Middle (m)	Percentage of Built Space Per Sector/Block (%)
Vindolanda	1.2	5010	4175	1	NE	4972	2226	42	45
				2	SE	7109	2784	54	39
Vindolanda	2.7	5609	1325	1	NE	4972	2226	56	45
				2	SE	7109	2784	79	39
				3	NW	5986	768	53	13
				4	SW	8856	731	57	8
Piercebridge	3.9	4107	1053	1	SE	6082	206.812	71	17
				2	NE	5340	934.181	64	15
				3	NW	10828	1677.999	122	8
				4	SW	16446	1360.732	56	3.4
Catterick	2.6	6689	2573	1	SE	4235	1500	70	35
				2	NE		3344.5	101	27
				3	NW	3989	1500	66	38
				4	SW	5300	344.5	82	6.5
Housesteads	1.7	5354	3149	1	1st on left	3966	1092	12	27
				2	2nd from left	3417	1405	6	41
				3	3rd from left	2206	1365	3	62
				4	4th from left	6867	1492	17	22

Old Carlisle	3.5	20233	5781	1	North	17174	8845	45	51
				2	South	18599	11388	25	61
Caistor St Edmund <i>Vicus</i>	4.6	8522	1853	1	East	27551	5089	63	16
				2	West	19354	3134	54	18
Caistor St Edmund	13	37037.396	2849	1		10100	686.506	195	7
				2		4600	2393.745	193	52
				3		4600	791.892	206	17
				4		10700	1385.059	146	13
				5		4800	2160.392	114	45
				6		9400	5624.547	110	60
				7		11100	3182.627	145	29
				8		3500	775.332	119	22
				9		4900	2213.084	88	45
				10		4356.002	1147.19	56	26
				11		8600	5406.248	0	63
				12		8600	2244.7	92	26
				13		8300	140.011	144	2
				14		4200	139.112	117	3
				15		4600	1421.192	93	31
				16		10500	5618.524	75	53
				17		10000	1707.235	117	17
Caerwent	16.5	29469	1842	1		11634	798	120	7
				2		9324	1269	72	14
				3		8910	1781	63	20
				4		8118	1871	71	23

				5		8144	1467	108	18
				6		9521	446	105	5
				7		6942	1194	47	17
				8		5068	2715	0	54
				9		6639	2635	49	40
				10		7184	0	98	0
				11		6715	2660	110	40
				12		6127	2697	77	44
				13		6301	1839	57	29
				14		6820	0	69	0
				15		8188	237	110	3
				16		8927	2614	149	29
				17		7715	1661	115	21
				18		8669	3313	104	38
				19		6897	0	110	0
				20		7711	272	141	4
Water Newton	24	40582	1712	1		11569	711	275	6
				2		4177	1170	200	28
				3		7131	1957	142	27
				4		3664	317	242	9
				5		16575	1452	168	9
				6		42936	6040	339	14
				7		15613	1403	276	9
				8		2224	0	287	0
				9		4283	1116	254	26
				10		8949	1428	229	16
				11		2641	370	243	14
				12		10483	1800	112	17

				13		9832	2626	132	27
				14		11152	1908	195	17
				15		29807	8012	0	27
				16		2748	150	205	5
				17		53318	10122	330	19
Silchester	43	81735	1901	1		2802.3686 4	1509.844506	578.852	54
				2		6411.4011 85	28.6841852	573.614	0.4
				3		1126.1857 94	0	568.375	0
				4		5554.9759 97	0	474.083	0
				5		9260.9123 58	310.3136194	442.652	3
				6		13519.465 36	792.7340223	421.698	6
				7		9604.0063 51	565.865913	468.844	6
				8		7105.4454 23	310.3136194	523.848	4
				9		667.85422 04	0	589.329	0
				10		7314.9689 06	707.5418417	466.225	10
				11		9996.8616 27	1350.777128	356.217	13
				12		9171.8656 3	2307.79429	259.305	25
				13		13278.514 36	2367.771378	209.539	18
				14		9339.4840 82	2281.71715	288.117	24

				15		10924.000 61	1168.239656	434.794	11
				16		10020.432 89	563.2580322	576.233	6
				17		8768.5336 78	0	704.576	0
				18		6332.8302 97	1650.659223	460.986	26
				19		5141.1682 05	2792.823411	298.594	54
				20		4777.1225 34	779.6954522	165.012	16
				21		17107.545 39	10888.92842	0	64
				22		5476.4051 09	1421.184905	212.159	26
				23		12788.754 43	2028.772737	426.936	16
				24		7569.0153 34	1152.593204	660.049	15
				25		8171.3932 57	1366.422743	463.606	17
				26		6675.9234 53	1126.516064	306.451	17
				27		6157.3547 56	0	172.87	0
				28		6023.7834 11	3074.452009	217.397	51
				29		12105.186 03	1616.760111	432.175	13
				30		11159.714 11	3958.454349	515.991	35
				31		9208.5314 87	3426.488383	392.886	37
				32		8865.4383 31	2774.568242	306.451	31

				33		13158.038 44	5575.21446	254.066	42
				34		9454.7216 63	1958.365797	324.786	21
				35		35173.658 12	3968.885874	523.848	11
				36		17521.353 18	1382.069195	492.417	8
				37		27685.833 26	8850.458273	474.083	32
Wroxeter	78	131828	1690	1		44135	615	293.776	1
				2		28038	2833	282.735	10
				3		79782	9737	255.374	12
				4		45655	1730	286.095	4
				5		28372	4701	168.489	17
				6		26978	6211	226.092	23
				7		21597	3922	140.648	18
				8		21083	4240	70.084	20
				9		12603	5611	158.888	45
				10		22317	16895	98.885	76
				11		11613	11194	0	96
				12		12785	3270	108.966	26
				13		27769	4716	213.131	17
				14		36803	28397	159.368	77
				15		13629	6391	72.004	47
				16		13535	3959	122.887	29
				17		9244	1000	201.611	11
				18		50885	6870	164.169	14
				19		7497	2767	178.57	37
				20		7218	0	230.412	0

				21		24887	1347	316.337	5
Verulamiu- m	80	45529.829	569	1		3199.704	538.11	427.563	17
				2		6048.664	231.198	416.84	4
				3		10137.996	2767.619	309.615	27
				4		15125.02	7048.166	332.4	47
				5		9949.858	2234.916	467.773	22
				6		4765.288	593.545	512.003	12
				7		15897.974	696.299	482.516	4
				8		19819.084	127.091	516.024	0.6
				9		11465.719	0	596.444	0
				10		7508.084	0	632.632	0
				11		16023.629	0	160.839	0
				12		16420.228	9000	0	55
				13		11645.588	919.385	176.923	8
				14		7648.694	1314.179	167.54	17
				15		2832.85	1912.639	247.96	67
				16		4367.739	2703.43	229.195	62
				17		9780.13	1728.705	96.503	18
				18		14938.511	764.592	197.027	5