

The First 21st Century Comprehensive Restored Plan of Hadrian's Villa and its Metrological Analysis

Michael Ytterberg¹

¹ *Drexel University, 3431 Midvale Avenue, Philadelphia, PA 19129, mry22@drexel.edu.*

Abstract – This paper presents the first comprehensive restored overall plan of Hadrian's Villa in the 21st century. It is based on the best available plan for all known structures. No other published plan includes them all, not even the last such comprehensive plans, published as long ago as the 1980's by Salza Prina Ricotti.[1] "La pianta del centenario" of 2006, for all its good points, was a disappointment in this regard.[2] For the current proposed plan over 300 plans of individual structures, as well as the overall site, have been examined for the approximately 70 structures and gardens of the villa. With this complete plan in hand, hypotheses for geometric planning principles are proposed for the site that reveal underlying metrological organizational structures that are an alternative to recent scholarly consensus.

I. INTRODUCTION

Hadrian's Villa is one of the major monuments of the history of Western architecture, yet in spite of its preeminent stature, the accessibility of its site, and its much attested power and allure, available information on the villa remains frustratingly vague as to the specific configuration of its overall architectural schema. This is not due to a lack of scholarly attention. The villa is one of the most studied monuments in archaeology. Roman archeology could be said to have begun at the villa. There have been over five and a half centuries of scholarship since 1461, when Pope Pius II and his retinue visited and recognized the site. Research on the site gained speed in the 20th Century, and the 21st Century has seen an explosion of research and publications on Hadrian's Villa. Far from exhausting the villa as a subject for study, recent scholarship has now laid the groundwork for a provisional attempt at a synthesis that explains the workings of the whole. Laser scans of most of the buildings and of the whole have been conducted over the past 20 years that have increased the accuracy of documentation of what is visible, but not all that is known to exist is currently visible. This paper presents the first comprehensive restored overall plan of the 21st century that includes the best available plan for all known structures. No other published plan includes them all, not even the last such

comprehensive plans, published as long ago as the 1980's by Salza Prina Ricotti.[1] "La pianta del centenario" of 2006, for all its good points, was a disappointment in this regard.[2] For the current proposed plan over 300 plans of individual structures, as well as the whole, have been examined for the approximately 70 structures and gardens of the villa. With this complete plan in hand, hypotheses for geometric planning principles are proposed for the site that intend to reveal underlying metrological organizational structures. (Fig. -.)

The visitor to the site sees an impressive collection of brick ruins continuously succumbing to a verdant green landscape. But to stop at the bookstore on the way home there remains available little concise, explanatory material that defines the whole. The single most effective visualization tool created for Hadrian's Villa has been the model created by Italo Gismondi, which has oriented generations of visitors to the complexity of the place. Originally conceived a lifetime ago, the accuracy of the details of the model are long out of date. When will there ever be a convincing replacement? Perhaps never, but any attempt requires, as its first step, a comprehensive plan and an understanding of how and why the plan was made. This is an attempt at such a plan and analysis.

II. PRINCIPLES

The reasonable reticence of archeologists to speculate is well placed. Yet one result is that plans created with the latest technology tend to be reductive, not showing the work of earlier researchers that can no longer be verified. And if they do show older bits, they tend to reach back to famous, but wildly outdated sources. Such plans end up showing less and less, postponing a complete understanding of the whole until sometime in the distant future, when every square meter has been dug up and documented. Given the size of Hadrian's Villa, the desired result may be indefinitely postponed. This plan attempts to accurately describe the whole by making judicious choices according to the following series of guiding principles, for the configuration of the plan and for its metrological analysis.

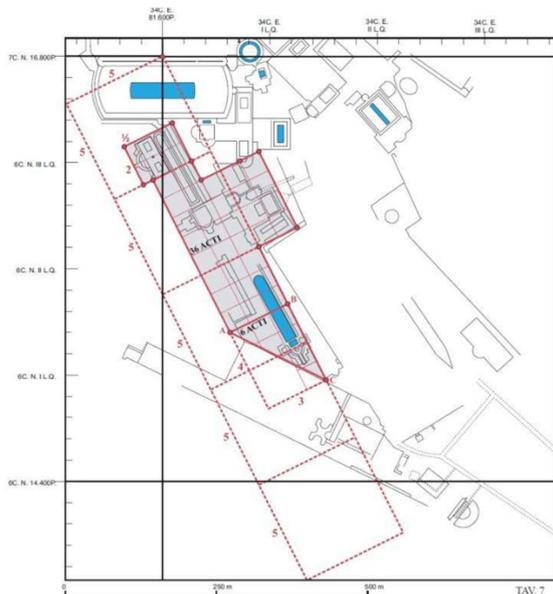


Fig. 1. Villa metrological analysis by Di Tondi using the actus quadratus.[3]

A. Ongoing research

Make use of information from the latest excavations and scans to continually update the plan. It is and will be a continuous work in progress. Each week brings new revelations and realizations. The plan as shown includes recent revelations such as the fountain off of the garden in front of the Greek Theater, the ongoing excavations in the Machiozzo, east of the Piazza d'Oro, and the corrected plan of the Plutonium, among other recent discoveries.

B. Historical documentation

Do not leave out the discoveries of earlier researchers that are no longer visible. As recent excavations have shown, in the case of Contini and Piranesi there is much still to learn. With the possible exception of the "Latin Theater" they showed east of the Palestra, contemporary archeologists continue to find structures in locations they indicated, even if the precise configuration and geometry are different. And even in the case of the Latin Theater there are said to be visible remains in that location. Clearly documented structures no longer visible should continue to be tentatively represented, if necessarily adapted to the geometries that are now known to exist.

C. Show primary plan levels

Show the main level of each structure, with levels above and below shown dashed as necessary. Given the changes in the level of the site this has not always been the case, though Piranesi did follow this principle.

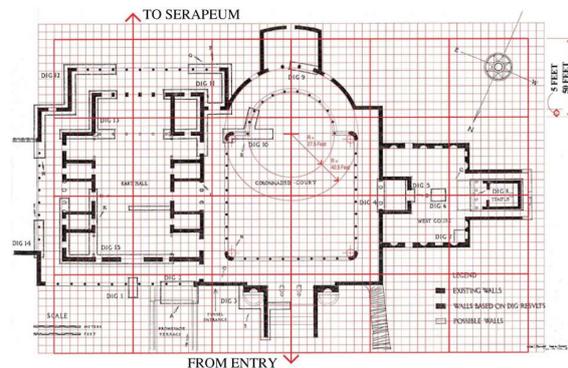


Fig. 2. Author's metrological analysis of Central Vestibule plan of W.L.Reichardt.[9]

D. Speculative landscape for clarity

Though this is speculative, the indication of suggested hypothetical landscape edges and paths serves to explain the relationships between building complexes that otherwise seem to float in space.

E. Planning units, current research

Recent scholarship has focused on the use of the actus quadratus, the square of the Roman actus (a linear unit of 120 Roman feet) and the clima (an area unit of 60x60 Roman feet) as planning units for the analysis of the plan. This is reasonable when surveying large tracts of land as did the Roman agrimensores. The dissertation of Sergio Di Tondi in 2007 may have been the first to base a systematic analysis on these measures.[3] (Fig. 1) A number of scholars have subsequently used these measures in their metrological analyses.[4,5,6] Though the layout of the land according to ancient Roman planning principles seems reasonable, none of these attempts result in diagrams that convincingly locate centerlines and modular dimensions of individual buildings. The planning principle of Hadrian's Villa may have had more to do with architecture than with land planning.

F. Proposed planning unit

Going back to the work of earlier researchers, there is general agreement on a five foot planning grid. This can be found in Rakob and Ueblacker.[7,8] At the center of the dominate axis of the Villa, that of the Canopus, one finds the Central Vestibule. The survey of one of the earliest excavators, Reichardt, rather perfectly is organized on a five foot grid.[9] (Fig. 2) According to this survey, the distance between the parallel axes of the Canopus and the Central Vestibule Forecourt is exactly 100 Roman feet. This plan might suggest the use of gridded paper in the planning process, highlighted at fifty foot intervals.

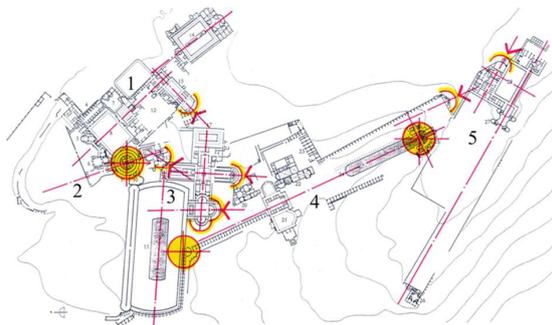


Fig. 3. Villa plan with curved structures indicated acting as visual "pivots" and "bumpers," author.

G. Accuracy of analysis

The graphic scale on the plan of Reichardt seems to suggest a Roman foot of 30.0 cm instead of the generally accepted value of 29.6 cm. The plans of Rakob and Ueblacker, seem to follow suit. 30.0 cm is within 1.5% of 29.6 cm. Given construction tolerances (surely not better in antiquity than they are today), the depredations of age and ruined conditions of the buildings, and the difficulties of measurement, even with lasers, it is unlikely that one can ever assume an accuracy of greater than 1-2 % or so. This must be taken into account in any analysis. Excessive accuracy is the enemy of conceptual rigor in such a situation. According to McDonald, "although a grid or dimensional ratio imposed today on a measured plan of a villa structure may not exactly fit either the inside or the outside walls of the room or building in question, a near fit is a strong indication of the designer's working method." [10]

III. RESULTS

A. Proposed planning grid

We therefore propose a fifty foot planning grid for the analysis of the villa. (Fig. 14) This emphasizes the defining characteristic of the villa as a series of internally symmetrical complexes that are angled one to the other in order, presumably, to fit onto a minimal adaptation of the existing landscape as well as to align with distant landscape features that have meaning for the experience of the place.

B. Pivots and bumpers

What is suggested by this plan is a plausible design process whereby individual complexes were designed on gridded paper, then adapted to the terrain when laid out in the field. The fifty foot grid is a planning device, not a quasi-religious conviction. In addition the forms of the architecture on the ground seems to respond formally to this process of planning. One can identify in the plan curved structures which function graphically as pivots around which the individual complexes were moved. Then

there are curved structures at the points in each complex where they meet adjacent complexes in a hinging process, functioning graphically like "bumpers." (Fig. 3) One can easily imagine a "unhinged" plan of the individual complexes, (Fig. 4) A recent paper outlines a procedure whereby the individual complexes may have been hinged to align with existing landscape features. [11]

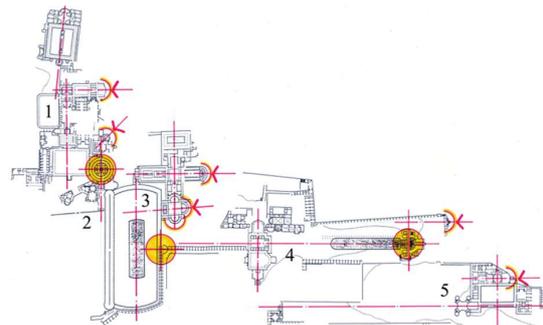


Fig. 4. "Unhinged" villa plan, author.

C. 120 foot vs. 50 foot planning grids

For the 50 ft. grid to have relevance, repeated correspondence with centerlines and edges in individual complexes need to be shown. Powerful examples result from comparison of the results of the application of the 120 ft. module of the *actus quadratus* with application of a 50. ft. module. At the center of the villa lies the complex composed of the Building with Three Exedras, the Stadium Garden, and the Building with Fishpond. The analysis according to a 15 ft. grid, a subdivision of the *actus quadratus* and *clima*, does not align with any centerlines other than that of the Stadium Garden where it starts. [5] (Fig. 5) The 50 ft. grid, however, falls on the center line and perimeter of each complex. (Fig. 6)

At the Canopus Block an analysis based on the *actus quadratus* depends upon the rounding of the actual dimensions and the use of a smaller than normal estimation of the Roman foot. In addition, this plan ignores the grounding breaking excavations of the authors that revealed an unknown rear wing to the building (circled in red on the plan). [6] (Fig. 7) A reconstruction of the plan based on their excavations overlaid with a 50 ft. grid, beginning at the bottom of the plan with the columns of the restored mezzanine walkway, reveals an ordering process that conforms neatly to the entire plan. (Fig. 10)

D. Teatro Marittimo

Many of the complexes at Hadrian's Villa are noticeably shoved off of their desired alignments, presumably by unforeseen site conditions, most noticeably at the Piazza d'Oro. A 50 ft. grid overlaid over the Teatro Marittimo shows that the Greek Library and Baths with Heliocaminus, on either side, more or less align with this

grid, while the Teatro Marittimo itself has been shoved off axis. (Fig. 8) This suggests an initial design at the drawing board where all three structures neatly aligned with a 50 ft. planning grid, the Teatro Marittimo being offset 15 ft. from the grid. (Fig. 11)

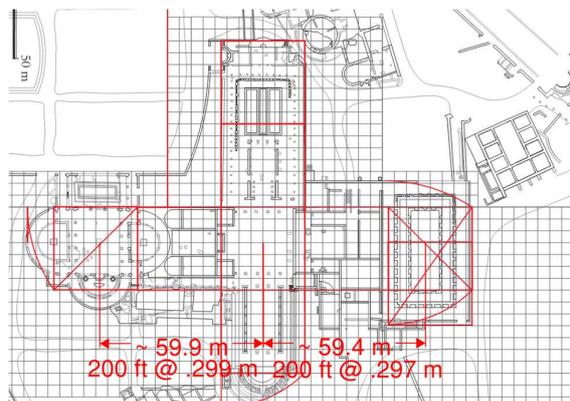


Fig. 5. Metrological analysis of the Building with Three Exedras, the Stadium Garden, and the Building with Fishpond with a 15 ft. grid according to Cinque and Lazzeri, with notations by author.[5]

E. Demonstrations of the fifty foot planning unit

Drilling down into greater detail, there are three large rooms of similar size that a crowd of visitors would encounter when traversing the villa from the visitor accommodation at the Canopus Block on their way to an audience with the emperor in the Hall with Doric Piers. The Central Vestibule and the Hall with Doric Piers conform both to a plan proportion of 5 to 8, with a module of 10 Roman feet and a width of 50 Roman feet. (Fig. 9) The central hall of the Building with Three Exedras, though skewed, conforms approximately to the same proportion and module. Another, even larger, hall in the so-called Palestra, this time intended perhaps for the security forces of the villa, conforms to the same plan proportion, this time with a module of $12 \frac{1}{2}$ Roman feet. A $\frac{5}{8}$ proportion (.6) is the first approximation of the Golden Section in the Fibonacci series (.618...).

Throughout the villa the 50 ft. dimension can be shown to have controlled the size of significant spaces, again, not according to esoteric beliefs, but simply as a convenient scaling rule of thumb. (Fig. 12) Shown, staring at the upper left, are the Piazza, d'Oro, the Vestibule of the Academy, the Temple of Venus, the Roccabruna, the Teatro Marittimo, the Sudatorium of the Large Baths, the Temple of Apollo in the Academia, a groin vaulted room in the Palestra, and the Greek Theater. This is not an exhaustive list.

IV. CONCLUSION

This work suggests both an ordering principle and a

procedural method for the design of Hadrian's Villa. On this basis it is possible to proceed with an attempt to provide provisionally both a description of the conceptual structures implicit in the evidence as well as a comprehensive reconstruction of the villa as it was intended to be experienced, and which is no longer visible to the visitor of the ruins today. An understanding of the intended experience of the various parts of Hadrian's Villa, integrated into a totality, which, given the ruined state of the villa can only be accomplished in text and image, has yet to be systematically described.

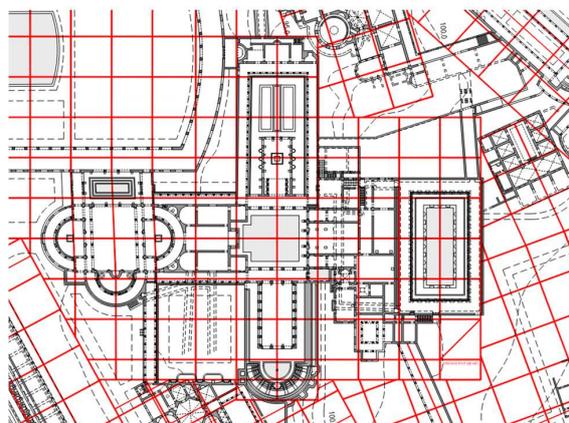


Fig. 6. Metrological analysis of the Building with Three Exedras, the Stadium Garden, and the Building with Fishpond with a 50 ft. grid, author.

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Fig. 7. Plan of the Canopus Block overlaid with the actus quadratus according to Ottati, Bertacci, and Adembri. Notations by author.[6]

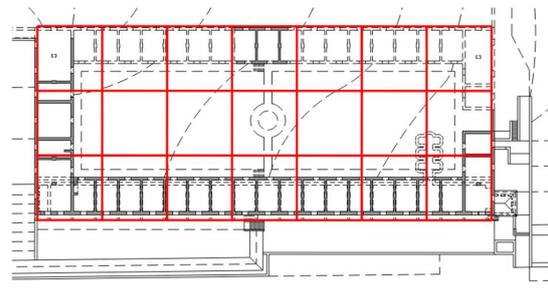


Fig. 10. Restored plan of the Canopus Block according to recent excavations overlaid with a 50 ft. grid, author.

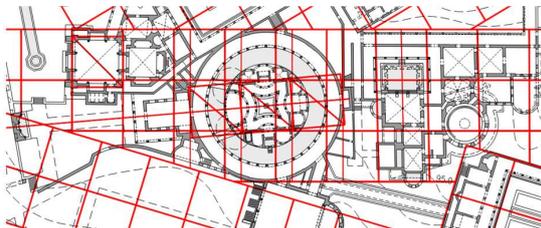


Fig. 8. Plan of the Greek Library, Teatro Marittimo, and Baths with Heliocaminus as existing overlaid with a 50 ft. grid, author.

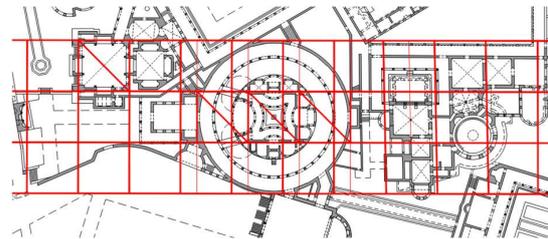


Fig. 11. Plan of the Greek Library, Teatro Marittimo, and Baths with Heliocaminus as possibly planned originally according to a 50 ft. grid, author.

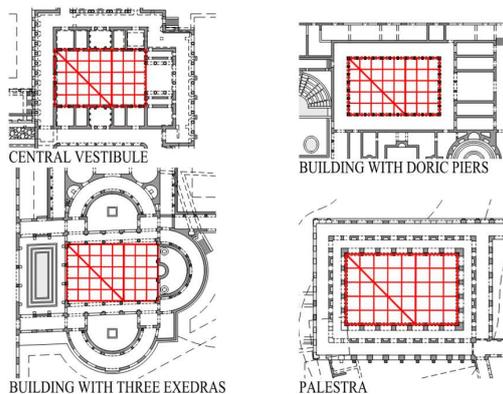


Fig. 9. Gathering rooms with a 5/8 proportion, author.

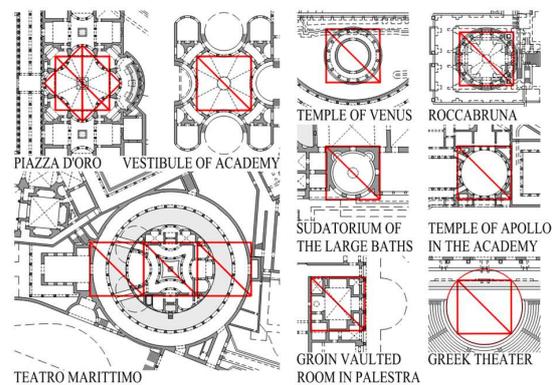


Fig. 12. Spaces planned around or within a 50 ft. square, author.

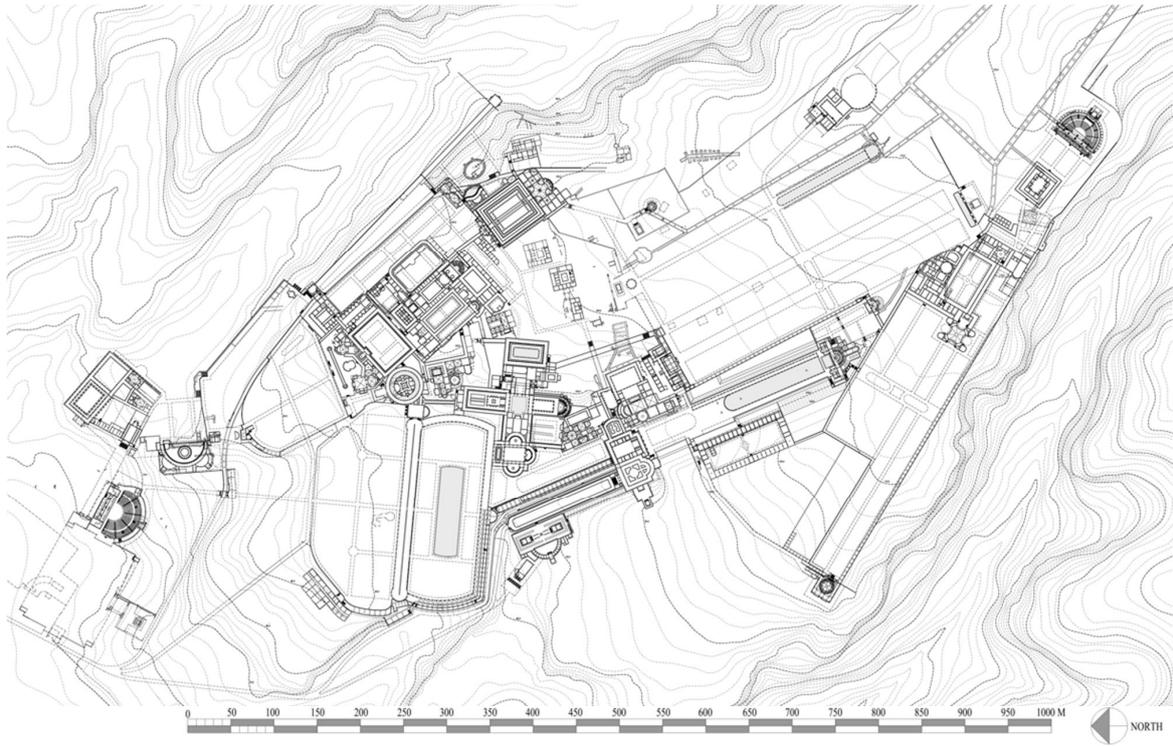


Fig. 13. Restored plan of Hadrian's Villa, author.

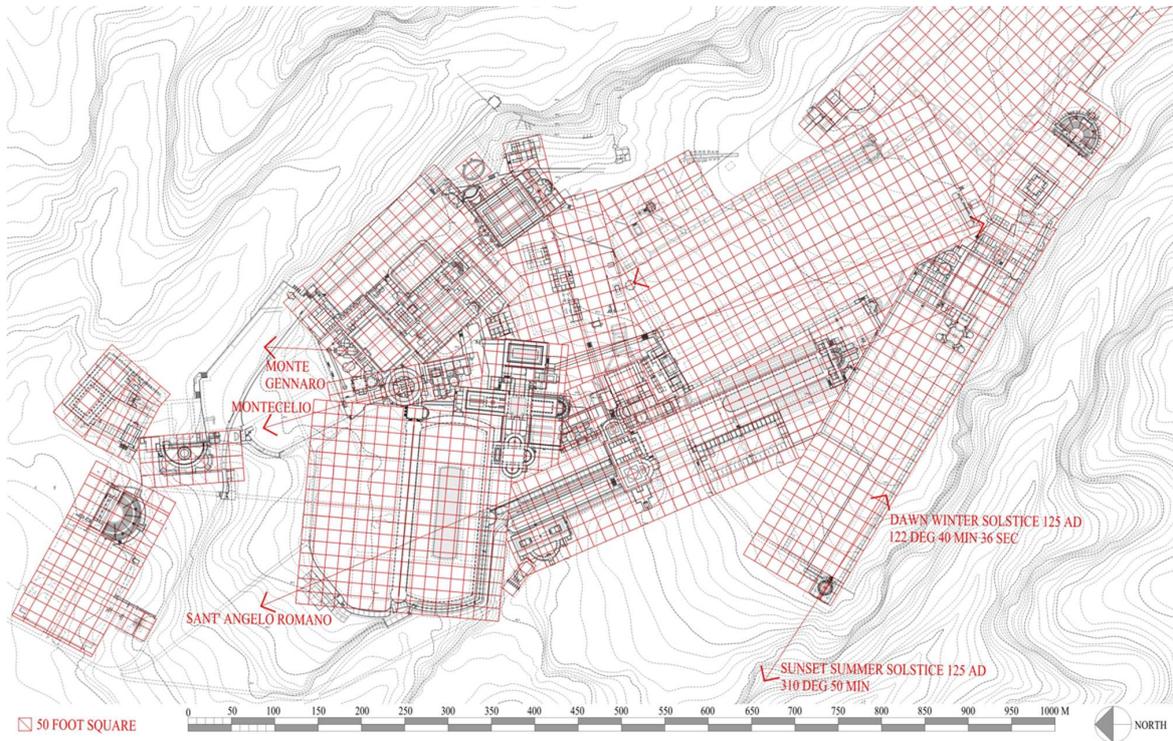


Fig. 14. Restored plan of Hadrian's Villa with fifty foot grid overlay, author.