

Preliminary Excavations at Ba Ngo, A Possible 10th Century CE Suburban Settlement Locale at Hoa Lu, Northern Vietnam

Khai Quật Bước Đầu Tại Chùa Bà Ngô, Một Khu Cư Trú Khả Thi Ở Vùng Ngoại Ô Hoa Lư Thế Kỷ 10, Bắc Việt

Gyles Iannone¹, Nguyen Thi Hao², Scott Macrae³, Le Ngoc Han², Pham Tuan Luan⁴ & Jack Barry⁵

¹ Department of Anthropology, Trent University, Peterborough, Canada

² Institute of Archaeology, Vietnam Academy of Social Sciences, Hanoi, Vietnam

³ Department of Anthropology, University of Central Florida, Orlando, USA

⁴ Ninh Binh Museum, Ninh Binh, Vietnam

⁵ Independent Scholar

Correspondence:

giannone@trentu.ca

PEER REVIEWED

Received February 23, 2025

Accepted October 13, 2025

Published February 25, 2026

DOI:

<https://doi.org/10.26721/spafajournal.6297j8du8x>

Copyright:

©2026 SEAMEO SPAFA and author

This is an open-access article distributed under the terms of the [Creative Commons 4.0 Attribution Non Commercial-No Derivatives License \(CC BY-NC-ND 4.0\)](https://creativecommons.org/licenses/by-nc-nd/4.0/), which permits copying, distribution and reproduction in any medium, provided the original author and source are credited.

Abstract

Settlement archaeology has virtually untapped potential to expand our understanding of the Classic period (600-1400 CE) states and urban centers of Southeast Asia. Indeed, it is only through this mode of archaeological inquiry that we can hope to generate a nuanced understanding of the largest segment of the population, comprising a diverse collection of commoners exhibiting varying ranks, statuses, roles, and occupations. The challenge is that the residential sites and activity areas associated with these citizens are difficult to find, mainly because the domestic architecture and much of the material culture were made of perishable materials. Equally problematic is that the more visible and grandiose physical remains and textual records of royal elites and both temple and palace institutions have traditionally attracted most of the scholarly attention. That said, archaeological research in different parts of Southeast Asia has begun to focus greater efforts on the discovery, excavation, and analysis of commoner occupation sites and their associated quotidian activity areas. This discussion details the preliminary results of our settlement archaeology investigations in a waterlogged site situated in the suburban zone immediately surrounding the walled urban core of the 10th century CE Dai Co Viet capital of Hoa Lu, Northern Vietnam.

Khảo cổ học cư trú hầu như chưa được khai thác các tiềm năng để mở rộng hiểu biết của chúng ta về các Nhà nước và các trung tâm đô thị thời kỳ Cổ điển (600-1400 CN) của Đông Nam Á. Trên thực tế, chỉ thông qua phương thức điều tra khảo cổ học này, chúng ta mới có thể hy vọng tạo ra sự hiểu biết sâu sắc về bộ phận lớn nhất của dân cư, bao gồm một nhóm dân thường đa dạng thể hiện các cấp bậc, địa vị, vai trò và nghề nghiệp khác nhau. Vấn đề thách thức là các địa điểm cư trú và khu vực hoạt động liên quan đến những cư dân này rất khó tìm, chủ yếu là do kiến trúc nội địa và phần lớn văn hóa vật chất được tạo thành từ các vật liệu dễ bị hư hỏng. Một vấn đề tương tự là các di tích vật chất và hồ sơ bằng văn bản của giới tinh hoa hoàng gia và các tổ chức đền thờ và cung điện thường dễ thấy và hoành tráng hơn đã thu hút hầu hết sự chú ý của giới học giả theo một cách truyền thống. Nói như vậy, nghiên cứu khảo cổ học ở các khu vực khác nhau của Đông Nam Á đã bắt đầu tập trung nhiều nỗ lực hơn vào việc khám phá, khai quật và phân tích các địa điểm tụ cư của thường dân và các khu vực hoạt động thường ngày liên quan của họ. Thảo luận này sẽ trình bày chi tiết các kết quả sơ bộ về các cuộc điều tra khảo cổ học cư trú của chúng tôi tại một địa điểm ngập nước nằm ở vùng ngoại ô ngay cạnh vùng lõi đô thị có tường thành bao quanh của kinh đô Hoa Lư, nước Đại Cồ Việt, Bắc Việt Nam vào thế kỷ 10 sau Công nguyên.

Keywords: archaeology, classical states, settlement archaeology, Hoa Lu, Vietnam
khảo cổ học, nhà nước cổ điển, khảo cổ học cư trú, Hoa Lư, Việt Nam

Introduction

The IRAW@HOA LU project aims to generate an integrated socio-ecological history for residential patterning, agricultural practices, and water management at the 10th century CE Vietnamese capital of Hoa Lu (Figure 1). Located 90 km south of Hanoi, Hoa Lu's 3 km² walled urban core encompasses the eastern (Thanh Ngoai) and western (Thanh Noi) enclosures (Figure 2), the boundaries of which are still partially defined by remnants of the embankment walls that were used to span the gaps between the surrounding karst hills to create a defensible capital (Toi 2014:55; Vo et al. ND:5-6, 10, 45; Vo et al. 2021:345-346). Based on historic records and archaeological examinations, the eastern enclosure (Thanh Ngoai) appears to represent a walled inner-city zone with distinct palace (south) and imperial-administrative (north) districts divided by the east-west running Chem Wall (Nguyen and Cuong 2022:54-86, 95, 105). The same historic documents, augmented by some limited archaeological investigations, imply that the adjoining western enclosure (Thanh Noi) was a walled outer city zone containing mandarin houses and a military complex, including a barracks for marines (Nguyen and Cuong 2022:54, 101), but these conceptions await verification.

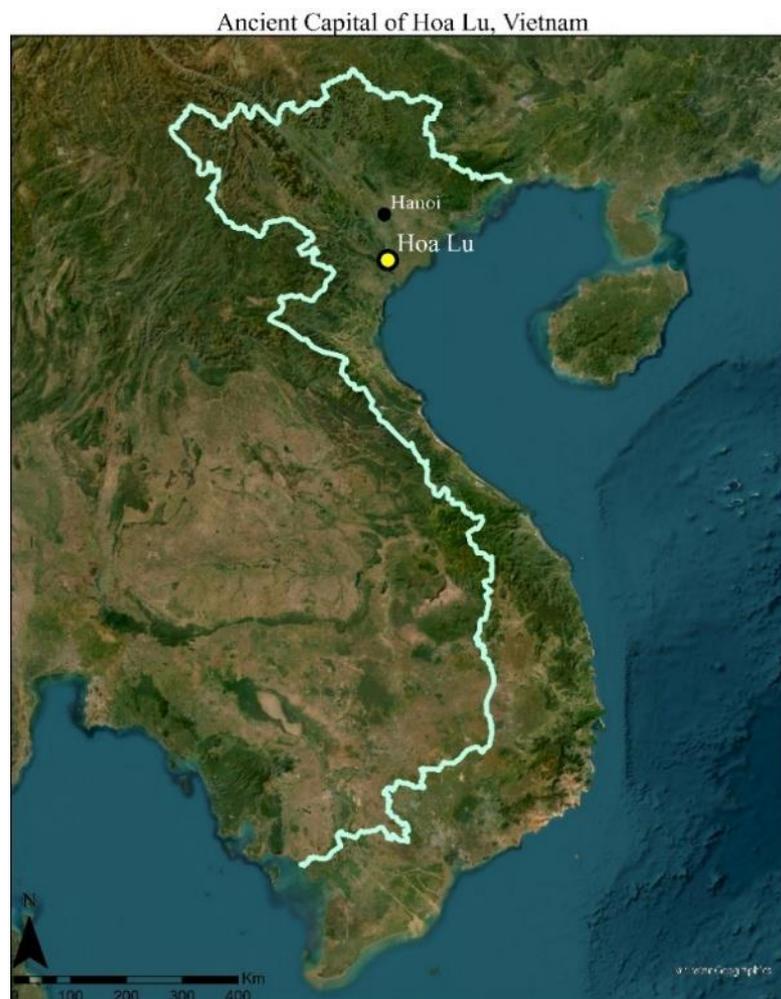


Fig. 1 Location of Hoa Lu ancient capital. Source: Map courtesy of Scott Macrae, 2024.

The Ba Ngo Suburban Settlement Site

Our fieldwork for the 2024 field season (May 3-June 3) involved test excavations in the area adjacent to the Ba Ngo Shrine (Figure 2), a location situated 1.5 km north of Hoa Lu’s walled urban core known to have occupation levels dating to the 10th century CE (Dang 2002; G. K. Nguyen 1970). In the past few years, test pitting by a team of Vietnamese archaeologists in the paddy field to the immediate south of the Ba Ngo Shrine cemetery confirmed the presence of 10th century pottery in stratigraphic context. We decided to focus our 2024 investigations in the same rice paddy field (Figure 3).

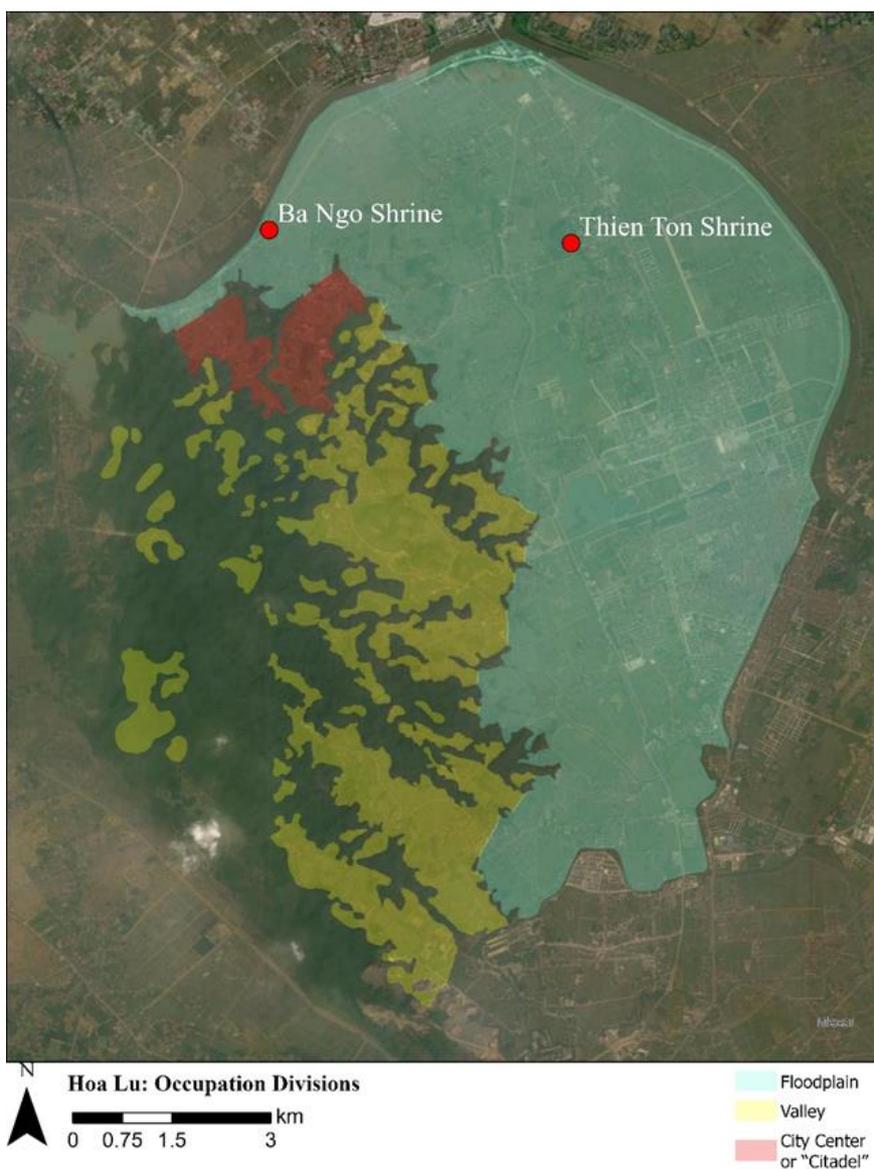


Fig. 2 The location of Ba Ngo shrine and the Hoa Lu “royal” enclosures (in red). Source: Map courtesy of Scott Macrae, 2024.

Sub-Operation 201a: The Pre-Excavation Process

After determining that we would focus our investigations on a single 2 x 4 m test unit, we selected a specific location for the excavations and worked with the People's Committee of Truong Yen Commune to secure permissions from the relevant landowner, Mr. Nguyen Dinh Khanh, and to establish compensation for the damage we would be causing to that section of the rice paddy field. We had previously determined that, in order to keep our 2 x 4 excavation unit dry, and to guarantee enough space to move around the excavation area, we should establish an 8 x 10 m area of investigations, with the paddy field's northern drainage channel – which was covered by concrete slabs – serving as the northern boundary and point from which we would enter and exit the work area (Figure 4). We also decided to take advantage of an open, flat area on the southwestern edge of the Ba Ngo cemetery for our screening location, as it was situated close to the excavations, and would thus limit the distance that we would have to carry our buckets.



Fig. 3 The rice field location for our 2024 excavations (pre-unit set-up). Source: Photo courtesy of Gyles Iannone, 2024.



Fig. 4 General location of the 2024 field operations. Source: Photo courtesy of Gyles Iannone, 2024.

We began preparing the area of investigations by plotting out the 8 x 10 m drainage trench circuit, after which we proceeded to remove the rice plants and their stalks (Figure 5). Excavation of the perimeter trench then began, with the thick, brick-shaped clay “chunks” that were produced through the trench digging being strategically positioned along the outer edge of the path of the trench to create a berm (Figure 6). This feature was required to keep the water from the surrounding paddy field out of the area of operations. Eventually, following a day of torrential rainfall, plastic sheeting had to be draped over the outside of the berm and covered by additional trench sediments to help keep the excavation area dry in the face of the rising waters of the paddy field.



Fig. 5 Removing the rice plants from the 8 x 10 m area of operations. Source: Photo courtesy of Gyles Iannone, 2024.



Fig. 6 Area of operations after the first stage of trenching and berm construction. Source: Photo courtesy of Gyles Iannone, 2024.

Once the berm had reached a suitable height, and the beginnings of the trench had been excavated around the entirety of its circuit, we began to pump out the water from the 8 x 10 m area of operations. The gas-powered pump was positioned just outside of the northwest corner of the now enclosed excavation area, on a section of the concrete slab covering the drainage ditch (Figure 7). The pump inlet consisted of a PVC pipe with a rudimentary screen wrapped around its opening. The outlet was fitted with a length of “fire hose” that allowed for the pumped water to be diverted some distance away from the work site. Once enough water had been pumped out to expose the ground surface in the center of the 8 x 10 m area, we proceeded to scrape off what amounted to a ~10-20 cm thick lens of viscous slurry to expose a more stable surface for unit setup (Figure 8). All the artifacts and ecofacts recovered during the rather haphazard trench digging and slurry clearing were associated with Level 1, paddy soil, and they were spatially logged as having been collected from the nonspecific 8 x 10 m area. Having pumped out the water and removed the more viscous upper level of paddy soil sediments, the team established the 2 x 4 m excavation unit (Unit 201a-1) and prepared for the initial pre-excavation depth measurements and photographic recording (Figure 9).



Fig. 7 Trench established; the pumping of water begins. Source: Photo courtesy of Gyles Iannone, 2024.



Fig. 8 Level 1 “slurry” associated with the paddy field soil. Source: Photo courtesy of Gyles Iannone, 2024.



Fig. 9 Unit 201a-1 formally established within the area of operations. Source: Photo courtesy of Gyles Iannone, 2024.

Sub-Operation 201a, Unit 201a-1: Summary of the Findings

For the remainder of this article, we focus on summarizing the key findings of our preliminary 201a-1 test excavation (see Figures 10 and 11). Analysis of the various stratigraphic levels and their constituent artifacts and ecofacts (e.g., animal bones and marine shells) has allowed for the recognition of three principal construction/occupation components dating to the Dinh-Early Le Phases (968-1009 CE), a subsequent occupation hiatus dating to the Ly Dynasty Phase (1009-1225 CE), and a reoccupation component dated to the Tran Dynasty Phase (1225-1400 CE). The dates for these components, and their constituent subcomponents, have been derived from the ceramic analysis conducted by Le Ngoc Han, the project ceramicist.

The basal component, **201a-1-C** (*Antepenultimate*), consists of two building subcomponents that together represent part of a raised, bilevel platform or a possibly a linear feature, such as an embankment or a levee. This raised feature appears to have served as either an occupation surface or activity area, or both, during the *Dinh-Early Le Phases* (968-1009 CE). The lower subcomponent (**201a-1-C/C2, Levels 5d, 5e, and 3m**) was covered in a well-preserved, relatively impermeable, reed matting, with its two raised areas separated by a north-south running swale (Figures 12 and 13). Taken together, these features suggest that this structural element was likely meant to help divert water away from the floor surface of the upper platform during periods of heavy precipitation. The presence of several partial vessels and/or clusters of exceptionally large sherds on the mat covered surface, or embedded in the floor surface matrix directly above it, may indicate that some type of commensal activities, such as a community feast, may have been held to mark the completion of this significant building subcomponent, the ceramic pieces representing the vessels for the shared food and drink that were deposited inside the platform construction as a part of the ritualized recognition of a job well done. Given time constraints, we were only able to excavate into this lower subcomponent in a 50 x 50 cm probe in the northeast corner of the unit. This probe extended ~1m below the mat-covered surface of Level 5d. The matrix, essentially a silty clay construction fill, contained few artifacts, suggesting that this substructural element was likely

associated with the initial occupation of the Ba Ngo locale. Our inability to reach the bottom of the lower substructural element means that we are currently unable to ascertain how high the raised platform was above the original ground surface.

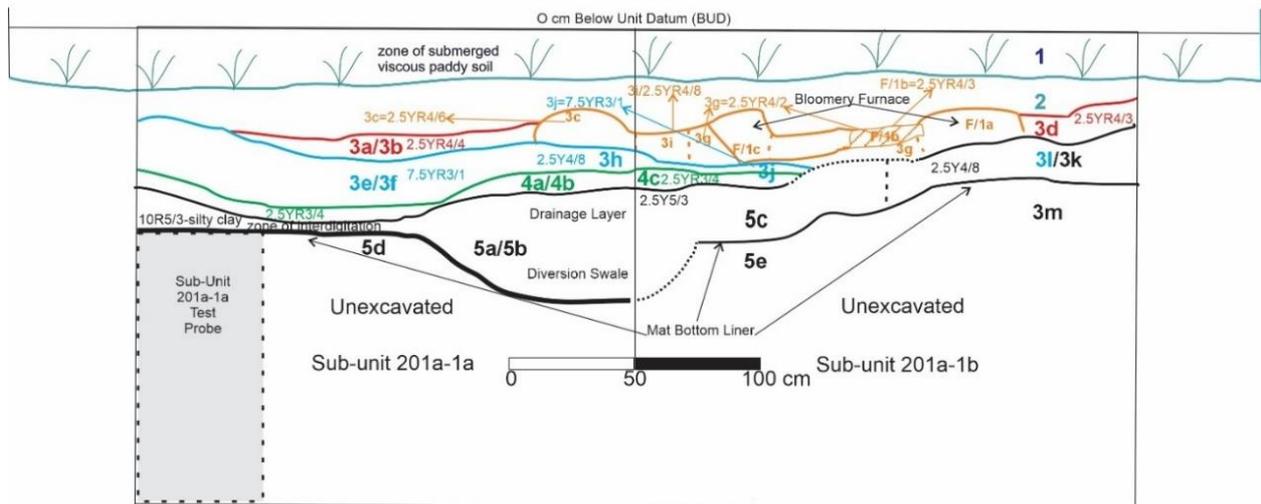


Fig. 10 Profile of Unit 201a-1, facing south. Source: Illustration courtesy of Gyles Iannone, 2024.

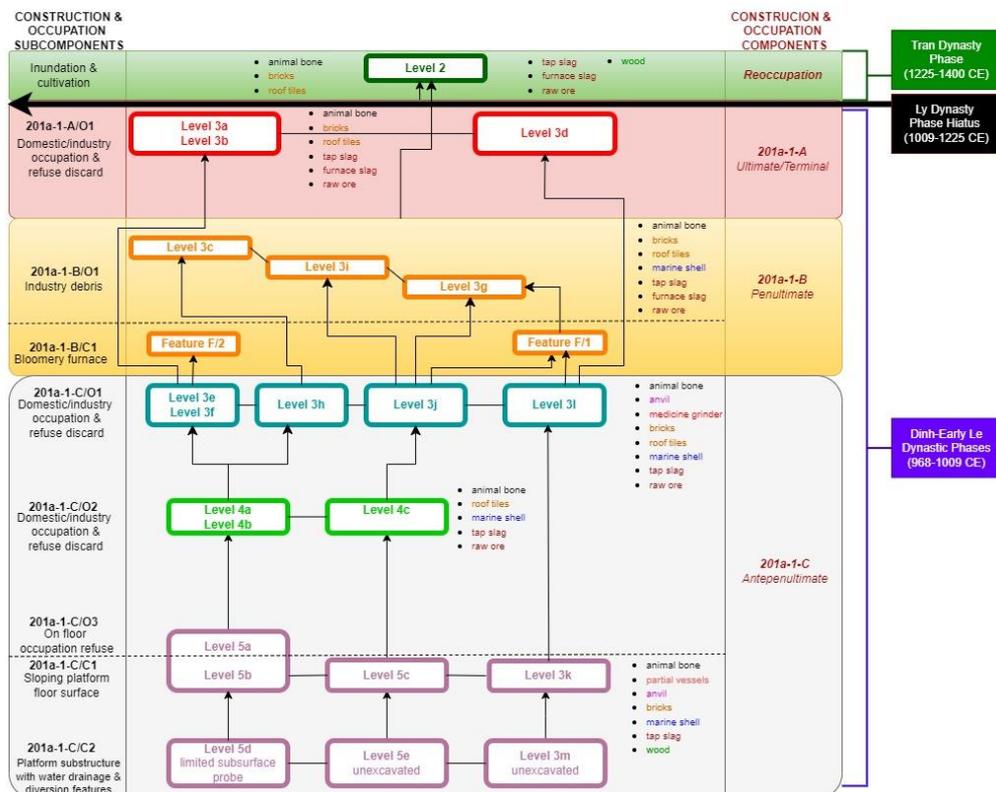


Fig. 11 Chronological schematic for excavation unit 201a-1 (with artifact inventories). Source: Illustration courtesy of Gyles Iannone, 2024.

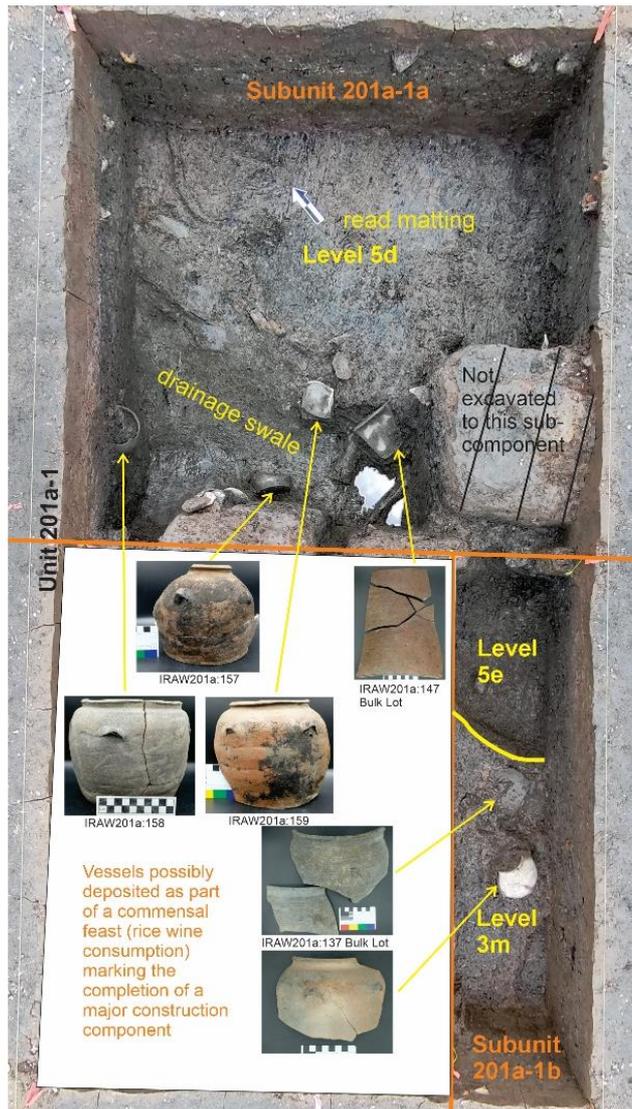


Fig. 12 The 201a-1-C/C2 mat layer and swale, with associated ceramic finds. Source: Illustration courtesy of Gyles Iannone, 2024.



Fig. 13 Close-up of the Level 5d grass matting layer. Source: Illustration courtesy of Gyles Iannone, 2024.

The upper substructural element associated with the initial construction component, designated subcomponent **201a-1-C/C1**, consisted of an approximately 50 cm thick, silty clay floor surface (**Levels 5b, 5c, and 3k**), the exposed portion of which would have served as a living surface designated **201a-1-C/O3 (Level 5a)**. A wide range of artifacts and ecofacts (animal bone, earthenware and stoneware, marine shell, wood, tap slag, anvil) were recovered during the excavation of this subcomponent (see Figure 11), attesting to its role as a surface that supported domestic activities and productive endeavours. A paucity of bricks (N=2) and roof tiles (N=0) confirm that this area was not the setting for more substantial constructions, such as those associated with high status housing, monasteries, or temple complexes.

Following initial construction and usage, additional domestic activities carried out atop the platform construct generated refuse deposits with similarly diverse artifactual and ecofactual inclusions, first as part of subcomponent **201a-1-C/O2 (Levels 4a, 4b, and 4c)**, and subsequently **201a-1-C/O1 (Levels 3e, 3f, 3h, 3j, and 3l)**. Both depositional subcomponents were largely concentrated on the lower section of the platform, in the eastern part of the unit. Once again, the artifact assemblages attest to both domestic and small-scale production activities (see Figure 11), with the latter emphasizing iron ore smelting. Although roof tiles and bricks were also present, these continued to be found in small numbers, suggesting that this elevated area was likely near to a more substantial construction – likely the Ba Ngo shrine itself, which dates to the 10th century – but that it did not serve as the actual substructure for such a building.

Evidence for iron ore smelting is more substantial for the subsequent **201a-1-B (Penultimate)** occupation component. The initial modification to the loci consisted of the construction of a small clay-walled furnace that likely served as a bloomery to extract iron from raw ore stone (**Features 201a-F/1 and 201a-F/2**). This feature, which comprised the **201a-1-B/C1** subcomponent, consisted of some low walls made of a light tan clay distinct from the rest of the matrices associated with the platform construction (Figure 14). A flow opening for the bloomery was located on its eastern wall, and the interior of the furnace consisted of reddish brown, ash rich sediments with abundant charcoal pieces (**201a-F/1b**). Although pieces of fired clay were found during our excavations, likely representing the interior walls of decommissioned furnace constructions from previous firings (Figure 15), the interior walls of the 201a-F/1 furnace do not appear to have been fired, suggesting that the furnace itself may represent an unfinished building project, or that during the decommission of this feature the fired portions of the interior walls had been pulled away and discarded elsewhere. **Feature 201a-B/2**, a large deposit of similar clay situated to the northeast of the furnace, may represent either a wall that had been removed to access the bloom after the firing, or a portion of wall material that had yet to have been put in place during a new furnace construction. The abundant raw ore stone and tap slag found during excavations lends credence to the idea that small scale iron smelting activities – likely those associated with the initial extraction of iron from ore-bearing stone – were carried out atop the Ba Ngo platform.

After construction of the furnace feature, the areas surrounding it witnessed the deposition of domestic and industrial debris containing a variety of artifacts associated with the **201a-1-B/O1** subcomponent (**Levels 3c, 3i, 3g**). The furnace feature itself, and the debris deposits directly associated with it, would eventually be incorporated in what appears to have been a purposeful construction level aimed at refurbishing the platform surface (component **201a-1-A, Ultimate**). Alternatively, this new “floor surface” may simply have formed through accretion and trampling (Iannone 2023:84). Once again, the

sublevels (Levels 3a, 3b, and 3d) comprising the occupation subcomponent (201a-1-A/O1) contained a range of domestic and industrial debris.

Following the aforementioned occupation episode, the Ba Ngo platform appears to have been abandoned for roughly two centuries – what we refer to as the *Ly Dynasty Hiatus* (1009-1225 CE) – after which time a comparatively ephemeral reoccupation was initiated during the *Tran Dynasty Phase* (1225-1400 CE, **Level 2**). This reoccupation does not appear to have been associated with any new construction activities, although it is represented by a range of artifactual and ecofactual evidence, including an abundance of furnace slag indicative of iron smelting.

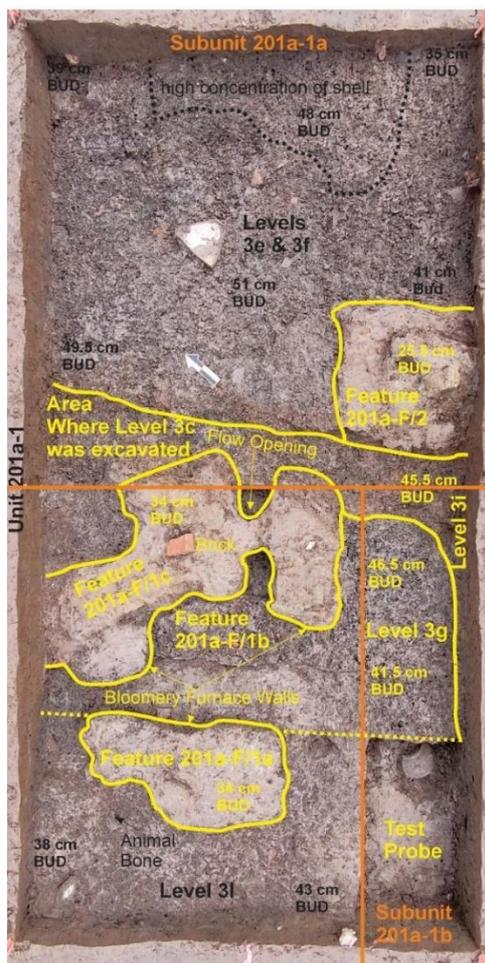


Fig. 14 Unit plan showing the Feature 201a-F/1 bloomery furnace components. Source: Illustration courtesy of Gyles Iannone, 2024.

Discussion and Conclusions

The excavation carried out at the Ba Ngo location in 2024 was highly successful. Not only did we discover intact architectural remains in close proximity to the surface that firmly date to the 10th century period of interest (Dinh-Early Le Dynasty, 968-1009 CE), the nature of the architecture, features, artifacts, and ecofacts encountered during our excavations (see Figures 16 and 17) also attest to a range of domestic pursuits and small-scale industrial endeavors (i.e., iron ore smelting), precisely the types of quotidian activities one would imagine to have taken place in the suburbs of

an imperial capital. The paucity of bricks and roof tiles implies commoner occupation, rather than high status residential or ritual/religious usage, although it is certainly plausible that the nearby Ba Ngo shrine would have served as a key feature of this residential neighborhood. The location of the Ba Ngo residential site, to the north of the eastern enclosure, and thus just outside of the walled inner city, certainly supports this suburban interpretation.



Fig. 15 Fired clay pieces, possibly emanating from deconstructed furnace walls. Source: Photo courtesy of Gyles Iannone, 2024.



Fig. 16 Madelyn Strongitharm and Caleb Johnson with a sample of artifacts recovered in 2024. Source: Photo courtesy of Gyles Iannone, 2024.



Fig. 17 JP Dos Santos and Le Ngoc Han with a sample of artifacts recovered in 2024. Source: Photo courtesy of Gyles Iannone, 2024.

Although most of the recovered pottery was of the more mundane earthenware and stoneware varieties used in the preparation and consumption of food and drink, the presence of sherds from both Vietnamese and Chinese porcelains implies that the inhabitants of this residential neighborhood had access to some status signifying wares. That said, our limited excavations do not allow us to determine whether this sector of Hoa Lu was inhabited by residents exhibiting the array of economic and political statuses, and diverse ethnic identities, expected of a mature suburban community, or if it was still in the early stages of development, characterized by a narrower range of identities and social groupings.

The raised platform partially exposed by our excavations revealed a complex building that included a significant water management substructural element (i.e., swale and reed matting combo) that would have helped keep the habitation surface dry and could have mitigated structural damage due to the heavy monsoonal rains that occurred on an all too frequent basis in the 10th century. Our local field assistants noted that the use of reed matting for this purpose continues to the present day. The 2024 test excavation at Ba Ngo only exposed a small section of the platform, so it is impossible to determine whether it represents a circumscribed sustaining surface surrounded by swampy lowlands or cultivated paddy fields, or whether it represents a linear embankment or levee that was part of a broader water management system associated with the city's transportation network and agricultural field system.

Finally, it is noteworthy that, following the Ly Dynasty ruler's movement of the imperial capital to Thang Long in the 2nd month of 1010 CE (Dutton et al. 2012:32), the Ba Ngo locale seems to have been largely abandoned for roughly two centuries (~1010-1225 CE). This hiatus is implied by the meager number (N=3) of typical Ly Dynasty ceramics recovered during our excavations. The Level 2 ceramic assemblage, which largely comprised of later Tran Dynasty (1225-1400 CE) types, supports the idea that a small-scale reoccupation of the area eventually took place, but given our current understanding, this does not appear to coincide with renewed construction at the Ba Ngo residential loci. Considered in unison, one can surmise that, given the economic prospects that proximity to the royal court provided, a significant segment of Hoa Lu's suburban population was simply "pulled" to Thang Long along with the Ly Dynasty in 1010 CE. Those that remained at Ba

Ngo may have continued to use ceramic types more characteristic of the early Dinh-Le Dynasty Phase, although if this is indeed true, it would imply that Ba Ngo had quickly transitioned into a deep rural community with limited access to the Ly Dynasty ceramic forms that would have been in vogue.

The transfer of the Dai Co Viet capital to Thang Long in 1010 CE must have been influenced by both economics and politics, and the desire on the part of the new Ly ruler to govern from a more established seat of power. Another factor that may have contributed to this shifting of the capital, and the concomitant suburban depopulation that occurred, was the watery landscape itself. Indeed, the 1st Ly ruler, Ly Thai To, stated that one of the main reasons that he chose to move the capital to Thang Long was because Hoa Lu's population was "oppressed by flooding" (Dutton et al. 2012:32). One is left to wonder whether the Medieval Climate Anomaly (~900/950-1250/1300 CE), which fostered economic growth and supported increased political complexity at dry zone Southeast Asian capitals like Bagan (Myanmar) and Angkor (Cambodia) – largely due to the higher volume and more regular precipitation that came with its stronger monsoon regime (Leiberman 2011; Leiberman and Buckley 2012:1064-1065; c.f., O'Donnell et al. 2020:17) – may have disadvantaged an already overly wet locale like Hoa Lu? Although the early Dai Co Viet imperial capital is known to have had an effective water management system (O'Donnell et al. 2020:17), it is still possible that its embankments and canals were simply overwhelmed by the sheer volume of water associated with the prodigious monsoon rains of the Medieval Climate Anomaly. Supporting this hydrological "push" theory is a recent study that provides a tighter chronology for the Medieval Climate Anomaly's effects in Asia, which are now assigned to the period between 1003-1210 CE (Shekhar et al. 2022:3, 13). This implies that the onset of the new climate regime, with its stronger Asian monsoon and increased precipitation, coincides almost exactly with the movement of the imperial capital from Hoa Lu to Thang Long in 1010 CE, and the transition out of this wet period closely aligns with the time of reoccupation, sometime around 1225 CE.

Acknowledgements

First and foremost, the authors wish to thank our amazing research team for all their hard work leading up to, and during our 2024 field operations. Without their energetic contributions, humor, and dedication, we would not have been able to accomplish what we did. We also extend our deepest gratitude to both Ms. Tran Thanh Huyen and the Xuan Truong Company, and the management and staff of the Bai Dinh Hotel, for not only providing a wonderful place to stay and delicious meals, but also for allowing a large group of often dirty archaeologists to thoroughly invade their serene environment. Permissions and valuable assistance was provided by various government bodies, including the Vietnamese Academy of Social Sciences (VASS), the Institute of Archaeology (VASS), the Department of Heritage Management, Ministry of Culture, Sports, and Tourism, the Department of Culture and Sports (Ninh Binh Province), the Department of Tourism (Ninh Binh Province), the Hoa Lu Ancient Capital Relic Preservation Center, and the People's Committee of Truong Yen Commune. Special thanks are also extended to the landowner, Mr. Nguyen Dinh Khanh, who graciously allowed us to excavate in his rice field. Finally, we extend our sincere appreciation to everyone associated with the Ba Ngo Shrine, for their hospitality, willingness to share their peaceful space, and for the many ways they supported our team during the excavation season.

References

- [Dang, C. N. \(2002\) *Kinh Do Hoa Lu Thoi Dinh - Tien Le \(The Hoa Lu Capital in The Dinh-Early Le Dynasties\)*. Vietnam: So Van Hoa Thong Tin Ninh Binh, Ninh Binh.](#)
- [Dutton, G. E, Werner, J. S., and Whitmore, J. K., \(Eds\) \(2012\). *Sources of Vietnamese Tradition*. New York: Columbia University Press.](#)
- [Iannone, G. \(2023\) Searching for Bagan’s Suburban Neighborhoods: Some Initial Results. *Asian Archaeology* 7:81-103.](#)
- [Toi, L. V. \(2014\) The Scheme and Structure of Co Loa, Hoa Lu and Thang Long Ancient Royal Capitals. *Vietnam Social Sciences* 22\(160\):53-61.](#)
- [Leiberman, V. \(2011\) Charter State Collapse in Southeast Asia, ca. 1250–1400, as a Problem in Regional and World History. *The American Historical Review*, 116\(4\): 937-963.](#)
- [Lieberman, V., and Buckley, B. \(2012\) The Impact of Climate on Southeast Asia, circa 950-1820: New Findings. *Modern Asian Studies*, 46\(5\): 1049-1096.](#)
- [Nguyen, G. K. \(1970\) Nhung Di Vat Lich Su Phat Hien O Hoa Lu Tu Nam 1963 Den Nam 1968 \[Artifacts Uncovered in Hoa Lu from 1963 to 1968\]. *Khao Co Hoc*, 5-6:19-23.](#)
- [Nguyen, N. Q., and Cuong, N. M. \(2022\) *Hoa Lu Capital of the 10th Century: A Historical Hallmark \(Sketches Based on Archaeological Records\)*. Hanoi: Nha Xuat Ban Dan Tri.](#)
- [O’Donnell, S., Nguyen T. M. H., Stimpson, C., Holmes, R., Kahlert, T Hill, E. Thuy Vo, T. P., and Rabett, R. \(2020\) Holocene Development and Human Use of Mangroves and Limestone Forest at An Ancient Hong Lagoon in The Trang An Karst, Ninh Binh, Vietnam. *Quaternary Science Reviews* 242, 106416.](#)
- [Shekhar, M., Sharma, A., Dimri, A.P., and Tandon, S. K. \(2022\) Asian Summer Monsoon Variability, Global Teleconnections, and Dynamics During the Last 1,000 Years. *Earth-Science Reviews* 230, 104041.](#)
- [Vo, T. P. T., Roland J. Fletcher, and Ying-San Liou \(2021\) Extensive, Low-Density Vietnamese Urban Settlements - 10th to 19th Century CE: Redefining Ancestry and Organization in a Southeast Asian Urban Tradition. *World Archaeology*, 53\(2\): 345-368.](#)
- [Vo, T. P. T., Fletcher, R.J., Liou, Y., Hao, N.T., Huong, N.T.M., Hang, N.V.H., ... Thao, L.T. \(2025\). The Urban Landscape of Hoa Lu, the Tenth-Century C.E. Capital of Vietnam. *Asian Perspectives* 64\(2\), 181-204.](#)