

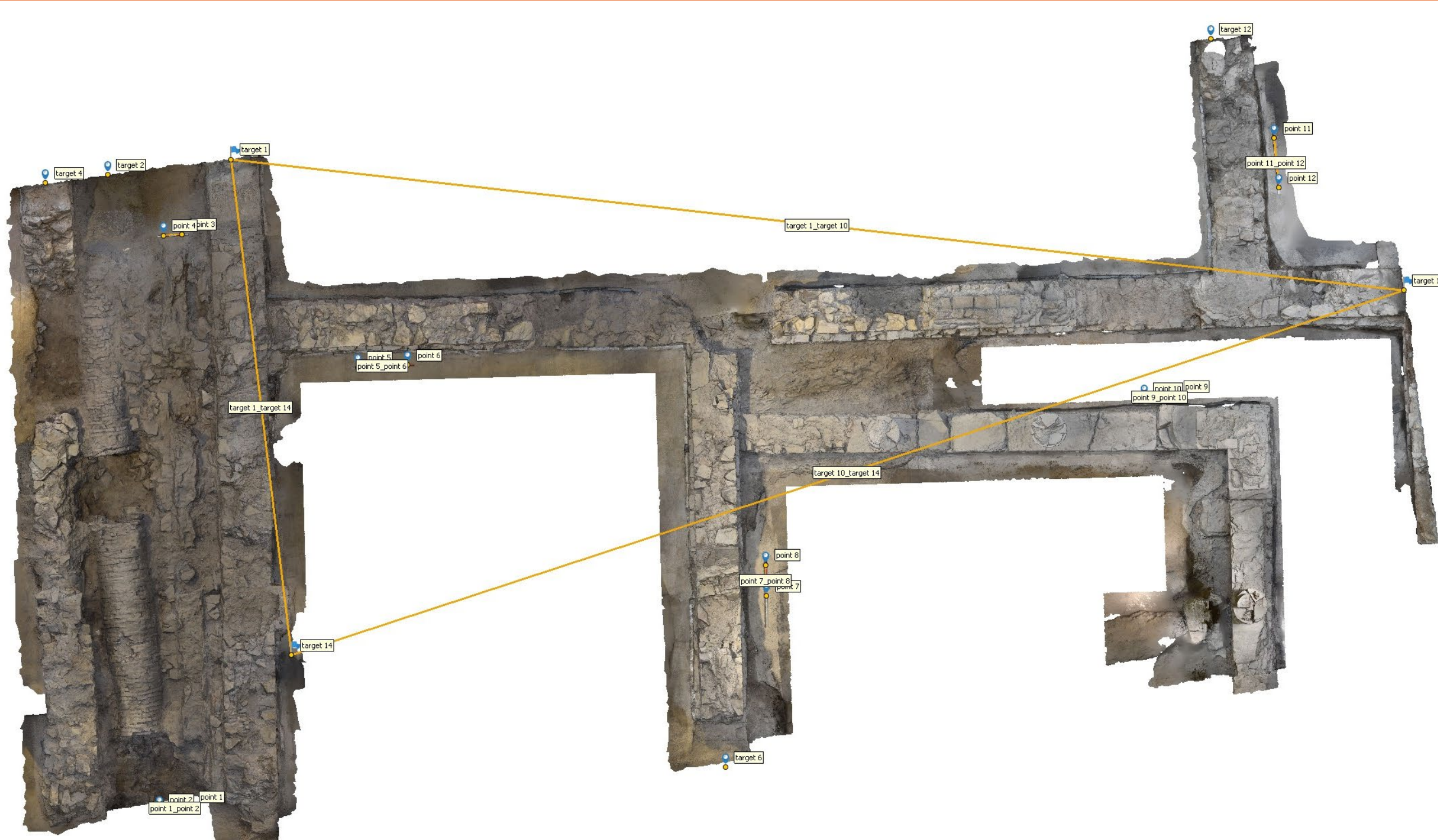
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Archaeological background

The remains are situated beneath the central district of Augusta Traiana, a Roman city within the modern boundaries of Stara Zagora, Bulgaria. They consist of three rooms of Late Antiquity buildings and a water system dating from the 4th to 6th c. AD. The walls are built straight on the bedrock with foundations of stones and mortar. At some places, the walls are preserved up to 2 m. There, a construction of bricks is present. A corridor with stone slabs divides two of the rooms, where a colonnade of bricks is documented on one of them. The archaeological site was uncovered during rescue excavations, located in the basement of a multi-storey apartment building [1]. Due to its significance, a conservation and restoration programme was developed and implemented to ensure its preservation for future generations.

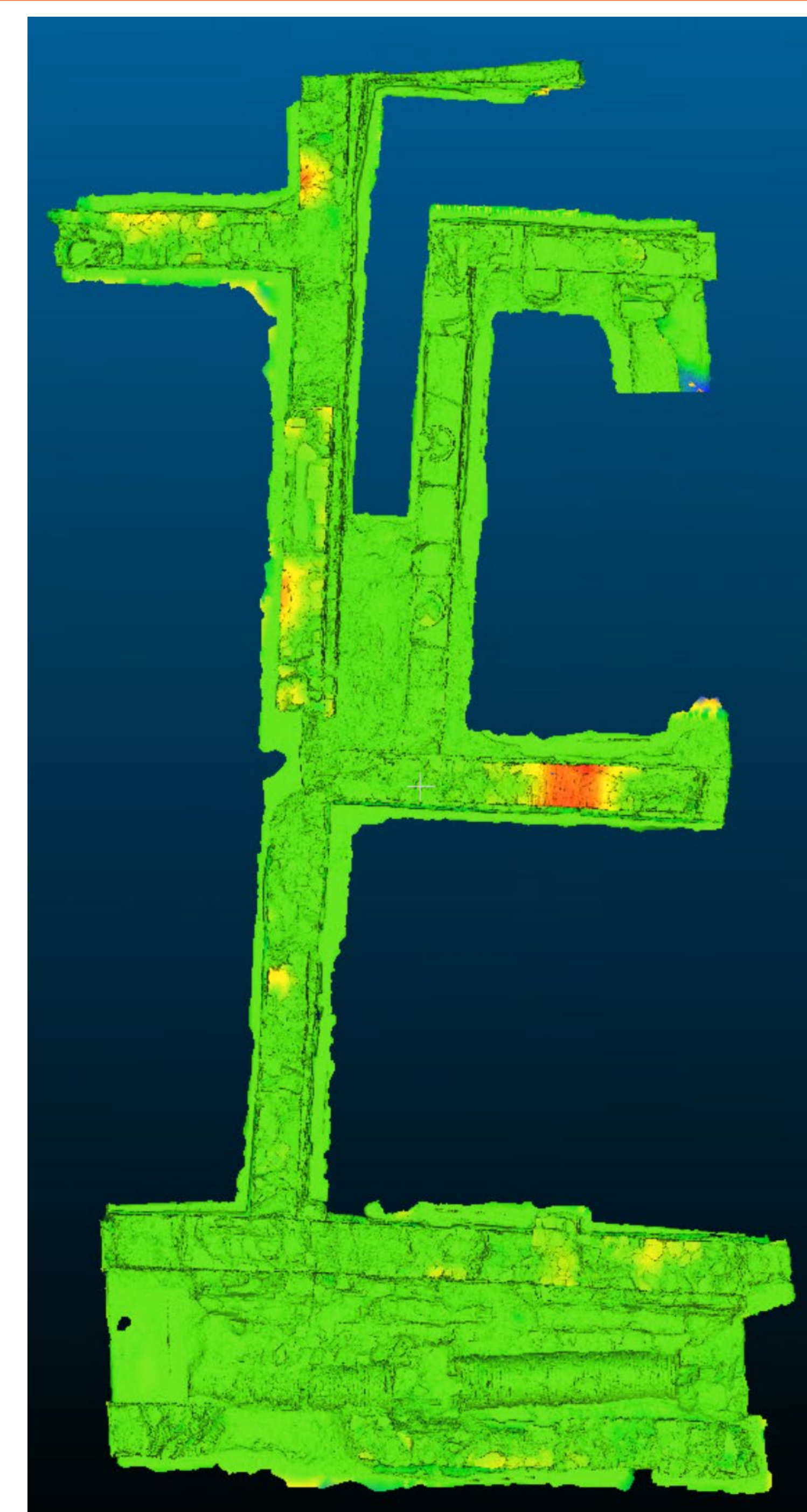


Methodology

The site was surveyed using a handheld Nikon D3500 with an integrated strobe flash before and after conservation and restoration, yielding more than 3,000 images in total. Coded targets and scale bars were placed for accuracy and positioning. The images were processed in Agisoft Metashape® with the standard workflow. Manual refinement and cleaning of the models were performed to remove unwanted objects. To overcome the challenge of being located in a basement, a local coordinate system was devised via CAD software, as presented by Yamafune [2]. The created models were imported into CloudCompare® for comparative analysis and dissemination.

Conclusion

The photogrammetric digital twins provide a valuable tool for long-term high-resolution monitoring of cultural heritage. Whether by analyzing single elements in great detail or by running quantitative calculations, it is a cost-effective method. Furthermore, it aids the post-restoration monitoring of the site via the identification of new destructive factors or changes in the optimal conditions in which the restoration and the cultural heritage itself are in an optimal state. It is a coherent and important part of the conservation-restoration documentation, providing accurate data regarding the implementation of different interventions.



References

- [1] Kamisheva, M. & Kalchev, P. 2019. Archaeological research in Augusta Traiana, 106 Hadzhi D. Asenov str, Stara Zagora, Archaeological Discoveries and Excavation in 2018, 323-325 pp.
- [2] Yamafune, K., Torres, R. & Castro, F. 2016. Multi-Image Photogrammetry to Record and Reconstruct Underwater Shipwreck Sites, Journal of Archaeological Method and Theory, 24, 703-725 pp.