Volume 3

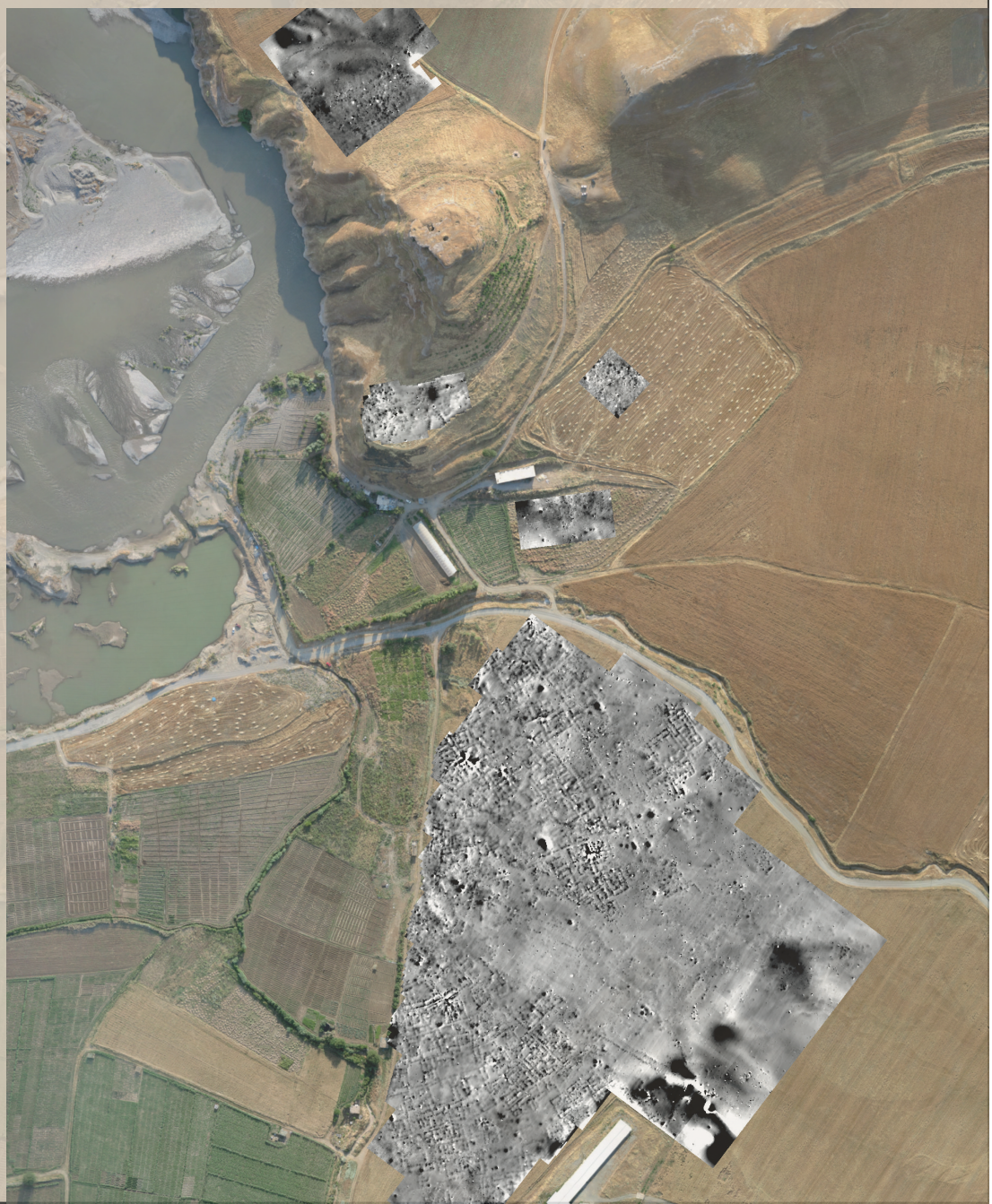
Peshdar Plain Project Publications

The Dinka Settlement Complex 2017

The Final Season at Gird-i Bazar and First Work in the Lower Town

edited by

Karen Radner, F. Janoscha Kreppner and Andrea Squitieri



PeWe-Verlag

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Preface

Karen Radner, F. Janoscha Kreppner & Andrea Squitieri

To Zuhair Rajab Abdullah al-Samarraee, in admiration

This book presents the results of the 2017 activities of the Peshdar Plain Project (PPP), just in time for the beginning of the 2018 autumn campaign at the Dinka Settlement Complex.

The publication of this third volume of the series Peshdar Plain Project Publications (4P3) was made possible by the support and help granted by the authorities of the Autonomous Region of Kurdistan: the General Directorate of Antiquities, the Sulaymaniyah Directorate of Antiquities and the Raparin Directorate of Antiquities and their individual members, named in Chapter A; the sponsorship of the institutions who provided generous funding: the Alexander von Humboldt Foundation, Ludwig-Maximilians-Universität München (LMU Munich) and the Gerda Henkel Foundation; and the hard work, the great expertise and the personal commitment – also and especially in time of the sudden political crisis in the aftermath of the Iraqi Kurdistan independence referendum of 25 September 2017 – of our international and interdisciplinary team of experts hailing from Austria, Canada, France, Germany, Iran, Iraq, Italy, the Kurdish Autonomous Region of Iraq, Romania, Syria, the UK and the USA, named with their respective areas of responsibility in Chapter A. We are especially pleased to welcome Eileen Eckmeier (Department of Geography, LMU Munich) and Kathleen Downey (Department of Anthropology, The Ohio State University, Columbus, Ohio) to the team. The preliminary results of their 2017 fieldwork and subsequent analyses regarding the soils and sediments in the Dinka Settlement Complex and the surrounding Bora Plain and the Sasanian cemetery at Gird-i Bazar, respectively, are presented in Chapters E and H of this book.

As ever, we are grateful to our cooperation partner Jessica Giraud, director of the *Mission archéologique française du Gouvernorat de Soulaimaniah* (MAFGS), whose generosity has made all aspects of our work easier. At LMU Munich, we owe thanks to Denise Bolton who patiently language-edited Chapters B to H and to Luise Tiemann and Nikola Wenner who assisted Andrea Squitieri in the preparation of the section drawings and other figures. In Gladbeck, we are enormously grateful to our publisher Peter Werner who expertly produced the volume and succeeded once again to have the printed book ready just in time for the autumn campaign in 2018.

As the first two volumes of the series Peshdar Plain Project Publications (4P1 = *Exploring the Neo-Assyrian Frontier with Western Iran: The 2015 Season at Gird-i Bazar and Qalat-i Dinka*, edited by Karen Radner, F. Janoscha Kreppner and Andrea Squitieri, Gladbeck 2016; Open Access download: https://epub.ub.uni-muenchen.de/29236/; 4P2 = *Unearthing the Dinka Settlement Complex: the 2016 Seasons at Gird-i Bazar and Qalat-i Dinka*, edited by Karen Radner, F. Janoscha Kreppner and Andrea Squitieri, Gladbeck 2017; Open Access download: https://epub.ub.uni-muenchen.de/40252/), this book is again very much a "work in progress", representing our current state of knowledge and understanding of the Dinka Settlement Complex. Further work and analyses may necessitate changes in our interpretations. But yet again, we have completed the stratigraphic analysis for all areas excavated and are pleased to present every single stratigraphic unit of the 2017 excavations at Gird-i Bazar and the new operation in the Lower Town of the Dinka Settlement Complex, dubbed DLT2. The results of the 2015 and 2016 excavations at Gird-i Bazar, published in 4P1 and 4P2, have been updated and merged with the 2017 findings.

We would like to dedicate this volume to Zuhair Rajab Abdullah al-Samarraee, Professor Emeritus of Archaeology at the College or Arts, University of Baghdad, and the long-time head of the Baghdad University archaeological mission to Sippar (Tell Abu Habbah) as well as the excavator of many other sites in Iraq, big and small. To our great pleasure, this *doyen* of Iraqi archaeology was able to join us in the field both in 2016 and 2017 and with his wealth of experience, unsurpassed speed in drawing pottery and endlessly good spirits greatly contributed to

the successful and timely processing and analysis of our pottery. Since 2010, Karen Radner in particular has frequently enjoyed his hospitality when in residence at the guest house of the Sulaymaniyah Directorate of Antiquities and owes him, among so many other things, a much improved appreciation of the finer points of the local patisserie (ah, those *znoud al-sit*, "Lady's upper arms"[1]) and patient instruction in the art of playing the skilful games of dominoes and backgammon. Thank you, dear Zuhair, for all your support and help over the years!

Munich and Berlin, July 2018

1 Delicious *phyllo* rolls filled with *ashta* cream; for a recipe see Timothy G. Roufs and Kathleen Smyth Roufs, *Sweet Treats around the World: an Encyclopedia of Food and Culture*, Santa Barbara CA *et al.* 2014, pp. 469-471.

A. The Peshdar Plain Project in its third year: the 2017 work programme

Karen Radner

The Peshdar Plain is located in the district of Peshdar (also Pishdar or Pizhder) of the province of Sulaymaniyah in the Kurdish Autonomous Region of Iraq, directly on the border with Iran (**Fig. A1**). From the second half of the 9th century BC onwards, the Assyrian Empire controlled the Peshdar Plain, which was situated right at its eastern frontier (**Fig. A2**), and little is so far known about the transformation processes that the annexation triggered in the mountain lands on the upper reaches of the Lower Zab. Since 2015, the Peshdar Plain Project therefore has conducted fieldwork in order to explore the history of this understudied region with a focus on the early first millennium BC. To this end, the project brings together international experts in history, archaeology, bioarchaeology, landscape archaeology, geography, geophysics, material science studies, physical anthropology, GIS, photogrammetry and 3D modelling.

Our activities focus on the Bora Plain, a sub-unit of the Peshdar Plain that stretches along the northern bank of the Lower Zab, very close to the Zagros main ridge that today constitutes the border between Iran and the Kurdish Autonomous Region of Iraq. Here, the ca. 60 ha

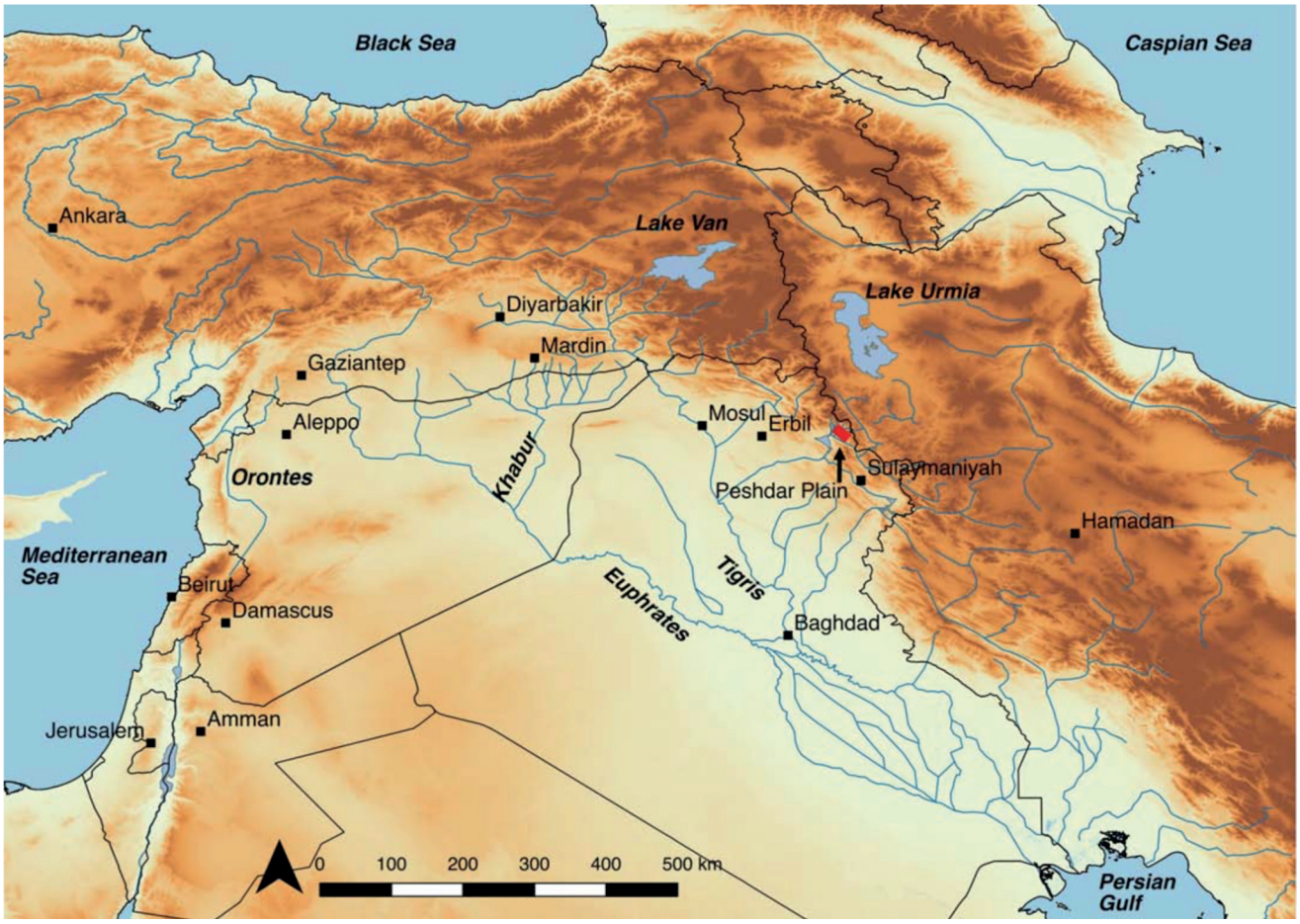


Fig. A1: The position of the Peshdar Plain in the modern Middle East, on the border of the Kurdish Autonomous Region of Iraq with Iran. Prepared by Andrea Squitieri.

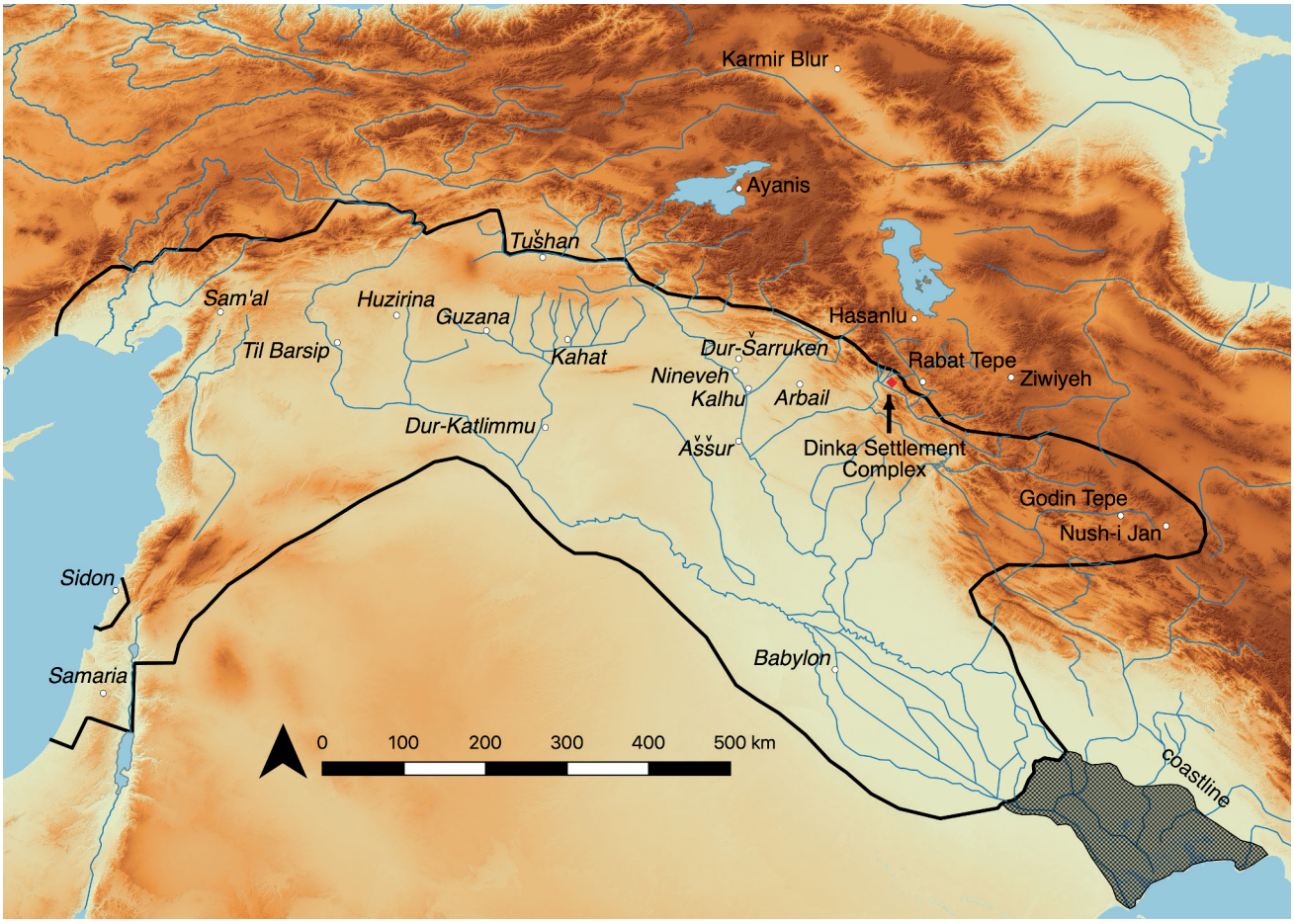


Fig. A2: The position of the Dinka Settlement Complex at the end of the 8th century BC, on the eastern frontier of the Neo-Assyrian Empire. Ancient place names in italics. Prepared by Andrea Squitieri.

large Dinka Settlement Complex was identified as the result of surface and geophysical prospection and excavation work in Gird-i Bazar and Qalat-i Dinka. "Dinka Settlement Complex" is our designation for the extended urbanised settlement, which includes the sites of Gird-i Bazar and Qalat-i Dinka and whose existence was conclusively proven by the results of the 2016 magnetometer survey and the excavations in its lower town in spring 2017 (**Chapter C**). Its ancient name is still unknown[2].

The project's dig house is based in Qaladze (also Qaladize), the district capital of Peshdar, and excavations take place in the village of Nureddin. As ever, we are indebted to the people of Qaladze and Nureddin for their hospitality, interest and practical help. We continue to enjoy the support of the General Directorate of Antiquities of the Kurdish Autonomous Region of Iraq, headed by Abu Bakr Othman Zenniddin, known as Mala Awad; the Sulaymaniyah Directorate of Antiquities, headed by Kamal Rasheed Raheem, under whose auspices the project is conducted; and the Raparin Directorate of Antiquities headed by Barzan Baiz Ismail. We wish to thank all of them and their staff for their trust and unfailing assistance in matters great and small. On 15 January 2017, the formal agreement between the General Directorate of Antiquities of the Kurdish Autonomous Region of Iraq and LMU Munich (Ludwig Maximilans-Universität München) was signed that lays out the parameters for our work at the Dinka Settlement Complex including Gird-i Bazar and Qalat-i Dinka, as well as at Gird-i Rostam in the district of Penjwin[3] (**Fig. A3**).

We are especially grateful for the moral and practical support that Kamal Rasheed Raheem and Hero Salih

2 Radner/Kreppner/Squitieri 2017b, 176.

3 After a mapping season in August 2017, the first excavation season at the multi-period site of Gird-i Rostam took place from 28 June to 24 July 2018 under the direction of our cooperation partner Daniel T. Potts (Institute for the Study of the Ancient World, New York University). The results will be published separately.

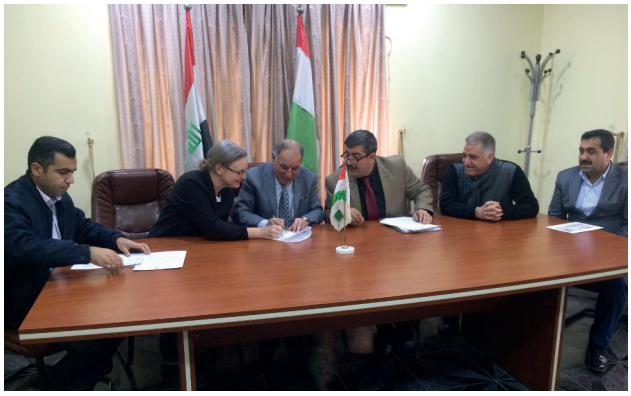


Fig. A3: Abu Bakr Othman Zenniddin, known as Mala Awad, General Director of Antiquities of the Kurdish Autonomous Region of Iraq (third from the left), and Karen Radner (second from the left) sign the agreement between the General Directorate of Antiquities of the Kurdish Autonomous Region of Iraq and LMU Munich in the presence of (from left to right) Rafiq Sofe (Head of the Excavation Department of the General Directorate of Antiquities), Kaifi Mustafa Ali (Legal Advisor to the General Director), Kamal Rasheed Raheem (Head of Sulaymaniyah Directorate of Antiquities) and Hewa Hamazyad (Head of Finance of the General Directorate of Antiquities) on 15 January 2017.

Ahmed offered to the team of the Gird-i Bazar autumn campaign in the aftermath of the Iraqi Kurdistan independence referendum of 25 September 2017 and the resultant closure of the airports of Sulaymaniyah and Erbil. We were able to conclude the excavation season as planned and the team left via Baghdad, unfortunately without the bioarchaeological samples that had to remain in Sulaymaniyah. This is the reason why this publication does not contain updates on the zooarchaeological and palaeobotanical research conducted by Tina Greenfield (now St. Thomas More College, University of Saskatchewan, Saskatoon, Canada) and Melissa Rosenzweig (Miami University, Oxford, Ohio)[4].

Excavating is expensive. As ever, we are enormously grateful to the Alexander von Humboldt Foundation and to LMU Munich, our main sponsors through the creation of Karen Radner's Alexander von Humboldt Chair for the Ancient History of the Near and Middle East at LMU. The Gerda Henkel Stiftung kindly continued to support Christoph Forster's development of the digital documentation system.

4 Cf. Greenfield 2017 for previous results.

A1. The 2017 activities of the Peshdar Plain Project

Exploring the Dinka Settlement Complex in its local environment within the framework of a wider study of the eastern frontier region of the Neo-Assyrian Empire remains the main goal of the Peshdar Plain Project. **Fig. A4** shows the extent of the excavations and the magnetometer survey, including the three trenches dug at Qalat-i Dinka in spring 2018[5].

Now that our gasoline powered percussion drilling set and soil sampler is back in action[6], we have initiated a programme of sediment coring that replaces the cruder sampling undertaken with a backhoe in 2015[7]. **Fig. A5** shows the position of the 2015 soundings (GA40-42) and of the 2017 corings (Coring Points 1-8; see **Chapter E: Appendix**). One goal is to substantiate the data of the geophysical survey concerning the extent of the Dinka Settlement Complex, another to investigate also those areas that are not "walkable" with the magnetometer. The coring programme will continue in autumn 2018.

In the excavation, particular care is given to the recovery of charcoal and carbonised seeds from floors and other key contexts in order to procure material for ^{14}C analysis, in addition to suitable human and animal teeth and bones. We are very grateful to Melissa Rosenzweig for identifying appropriate samples among the plant remains. In 2017-18, we obtained calibrated datings from a human skeleton, a donkey tooth and several carbonised seeds and legume fragments. **Fig. A6** shows the position and the calibrated date ranges (BC) with the highest probability of these and previous ^{14}C samples from the Iron Age layers of the Dinka Settlement Complex. The new results are discussed in **§C2.1** and **§D2.1**[8].

5 This work will be published in the 2018 report of the Peshdar Plain Project.

6 The original coring equipment was acquired in 2012 with UCL equipment funds awarded to Karen Radner (then History Department, University College London) for the Shahrizor Survey Project, which is gratefully acknowledged here. The central component of this equipment, the Cobra TT Percussion Hammer, broke in action in the Shahrizor in 2014. After UCL's History Department had agreed to transfer ownership of the equipment to LMU's History Department the percussion hammer could be replaced in 2016 with LMU funds. I am indebted to Claire Morley (UCL) for her help in this matter.

7 Altaweel/Marsh 2016, 23, 26-28.

8 For the previously obtained results see Altaweel/Marsh 2016, 27-28 (from the geoarchaeological sounding GA42); Radner 2016b, 52 (from Building A in Gird-i Bazar); Greenfield 2017, 173-174 (from a burial of the Sasanian cemetery).

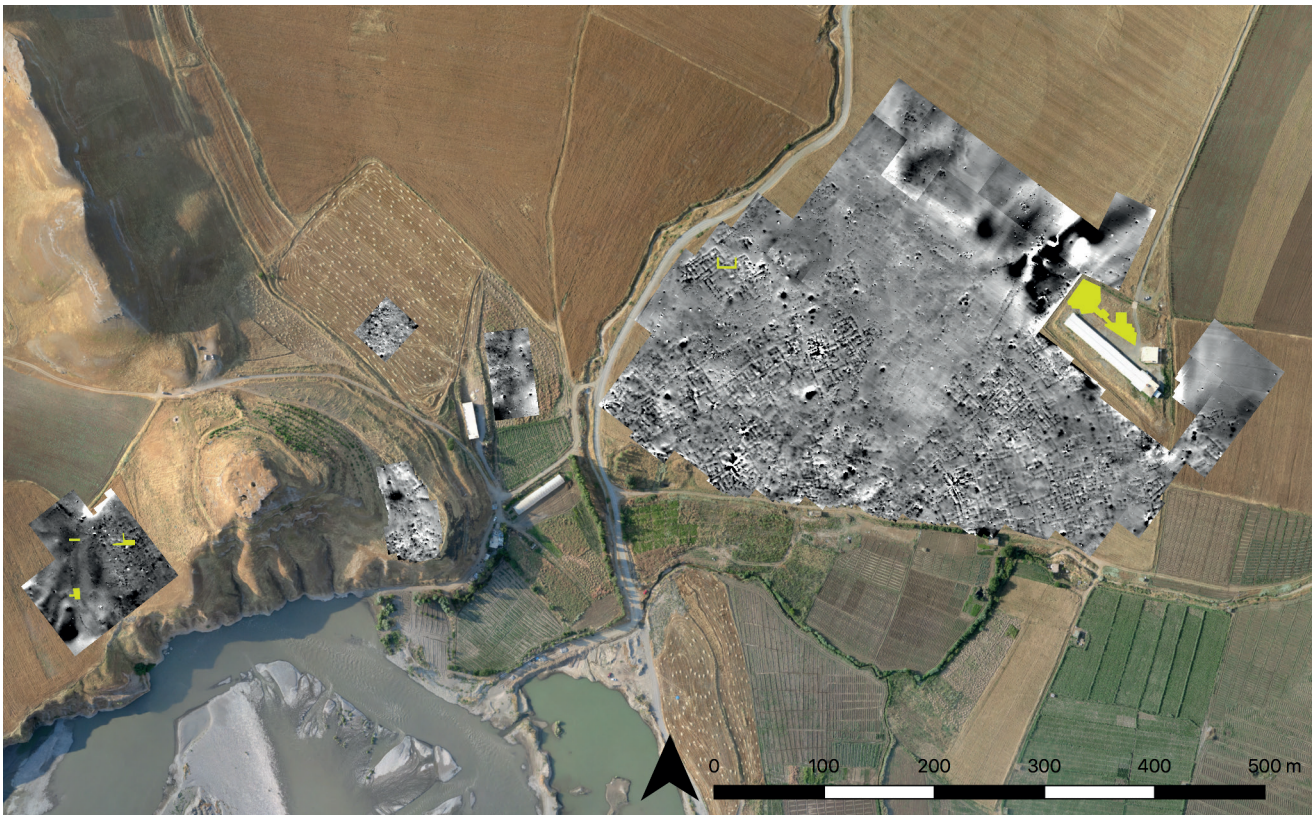


Fig. A4: The results of the magnetometer surveys 2015-1017 and, in yellow, the position of the excavations conducted so far at the Dinka Settlement Complex, from west to east: the three trenches at Qalat-i Dinka (spring 2016 and 2018); the U-shaped sounding in "Dinka Lower Town 2" (DLT2, spring 2017); the area in the enclosure of the chicken farm at Gird-i Bazar (autumn 2015, 2016 and 2017; "Dinka Lower Town 1"). Drone image created by ICONEM (Paris; http://iconem.com), courtesy of Un Film à la Patte (Strasbourg; http://www.unfilmalapatte.fr) and Jessica Giraud. Prepared by Andrea Squitieri.

With three study and fieldwork campaigns, 2017 was a very productive year for the project. The following gives a brief overview over the work undertaken in the Kurdish Autonomous Region of Iraq and lists the team members. I am very pleased that the Peshdar Plain Project continues to attract experienced archaeologists and specialists, from Iraq and abroad, whose hard work, great expertise and tremendous professionalism are gratefully acknowledged here.

A1.1 Pottery study season in Sulaymaniyah in winter 2017

The study season of the pottery from Gird-i Bazar unearthed in autumn 2016 began on 14 January 2017. Once Karen Radner and Andrea Squitieri had helped establish the workflow, work continued in the Archaeological Museum of Sulaymaniah until the entire pottery backlog of the 2016 season had been processed by 15 February 2017; about 1500 sherds were drawn and photographed by the team. The fruits of this work informed the 2016 pottery report[9]. We thank Hashim Hama Abdullah, director of the Archaeological Museum of Sulaymaniyah, for his institution's hospitality and his support.

Team members:

- Karen Radner, LMU Munich, project director, 14.1. – 17.1. 2017.
- Abdullah Bakr Othman, ELTE Budapest & Salahaddin University Erbil, pottery database,
- Amanj Ameen, Sulaymaniyah Directorate of Antiquities, pottery drawing,
- Awad Jihad, Sulaymaniyah Directorate of Antiquities, pottery labelling and drawing,
- Hayman Noori, Sulaymaniyah Directorate of Antiquities, pottery photography,
- Hero Salih Ahmed, Sulaymaniyah Directorate of Antiquities, pottery processing and drawing,

9 Herr 2017.

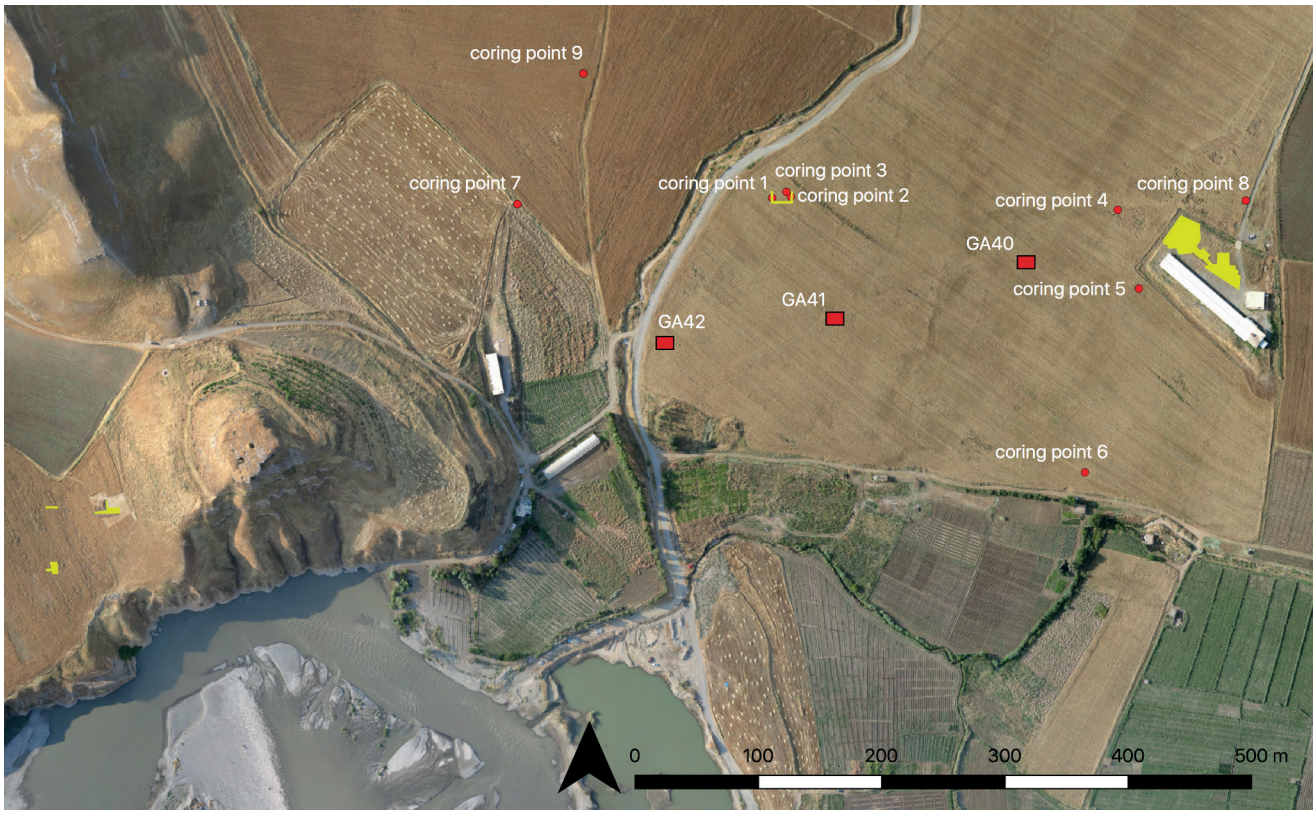


Fig. A5: The position of the geoarchaeological soundings of 2015 (GA40-42) and corings of 2017 (Coring Points 1-8) within the areal of the Dinka Settlement Complex; excavated areas marked in yellow. Coring Points 1 and 2 are situated inside the U-shaped sounding of DLT2, and Coring Point 3 outside, in the centre of the U-shape. Drone image created by ICONEM (Paris; http://iconem.com), courtesy of Un Film à la Patte (Strasbourg; http://www.unfilmalapatte.fr) and Jessica Giraud. Prepared by Andrea Squitieri.

Fig. A6: The position of the Iron Age ^{14}C samples from the Dinka Settlement Complex and the calibrated date ranges (BC) with the highest probability; excavated areas marked in yellow. Detail of drone image created by ICONEM (Paris; http://iconem.com), courtesy of Un Film à la Patte (Strasbourg; http://www.unfilmalapatte.fr) and Jessica Giraud. Prepared by Andrea Squitieri.

- Andrea Squitieri, LMU Munich, pottery processing and database, 14.1. – 24.1.2017.

A.1.2 First excavation campaign to the lower town of the Dinka Settlement Complex in spring 2017

The first excavation campaign in an operation called "Dinka Lower Town 2" (with the operation at Gird-i Bazar representing "Dinka Lower Town 1") took place from 23 April to 27 May 2017. During that time, Mark Altaweel and Eileen Eckmeier undertook sediment sampling in the excavated area and in the Dinka Settlement Complex. The results are presented in **Chapters C** and **E**.

Team members (Fig. A7):
Karen Radner, LMU Munich, project director, 22.5. – 27.5. 2017.

Representatives of the Suaymaniyah Directorate of Antiquities:
- Hayman Noori, also field team, small finds and pottery photography,
- Hero Salih Ahmed, also field team and pottery processing.

Logistics:
- Aziz Sharif, Sulaymaniyah Directorate of Antiquities, driver,
- Ibrahim Manla Issa, Erbil, cook,
- Baiaz Ibrahim, Erbil, assistant cook and pottery team support.

Field team:
- Janoscha Kreppner, LMU Munich & FU Berlin, field director,
- Andrea Squitieri, LMU Munich, deputy field director, digital documentation and small finds processing,
- Christoph Forster, Fa. Datalino, Berlin, digital documentation, 28.4. – 6.5.2017,
- Jens Rohde, LMU Munich, trench supervisor and field photography,
- Felix Wolter, FU Berlin, trench supervisor and field photography,
- 11 workmen mainly from Qaladze and Nureddin,

Pottery team:
- Jean-Jacques Herr, LMU Munich & ÉPHÉ Paris, lead ceramicist and pottery processing,
- Abdullah Bakr Othman, ELTE Budapest & Salahaddin University Erbil, pottery registration and photography, 9.5. – 27.5.2017,

Fig. A7: Most of the 2017 Dinka Lower Town team in front of Qalat-i Dinka (4 May 2017). Photo by Jean-Jacques Herr (by automatic shutter release).

- Zuhair Rajab Abdullah al-Samarraee, Baghdad, pottery drawing,
- Mohammad Aziz, Sulaymaniyah, pottery washing and labelling.

Specialists:
- Mark Altaweel, University College London, geoarchaeology, 27.4. –4.5.2017,
- Eileen Eckmeier, LMU Munich, geography and landscape ecology, 22.5. – 27.5.2017.

A.1.3 Third prospecting and excavation campaign to Gird-i Bazar in autumn 2017

The third and final excavation campaign in Gird-i Bazar was conducted from 1 September to 16 October 2017, with the third geophysical survey of the Dinka Settlement Complex taking place from 20 to 25 September 2017. The results are presented in **Chapters B**, **D** and **H**.

Team members (Fig. A8):
Karen Radner, LMU Munich, project director, 21.8. – 2.9. 2017 (pre-season).

Representative of the Sulaymaniyah Directorate of Antiquities:
- Hero Salih Ahmed, also field team and pottery processing.

Logistics:
- Aziz Sharif, Sulaymaniyah Directorate of Antiquities, driver,
- Ibrahim Manla Issa, Erbil, cook,
- Hamrin Ibrahim, Erbil, assistant cook and pottery team support, 8.9. – 5.10.2017.

Field team:
- Janoscha Kreppner, LMU Munich & FU Berlin, field director,
- Andrea Squitieri, LMU Munich, deputy field director, digital documentation and small finds processing,
- Silvia Amicone, University of Tübingen, pyrotechnology and kiln excavation, 11.9. – 29.9.2017,
- Peter Bartl, FU Berlin, trench supervisor,
- Francesca Chelazzi, University of Glasgow, trench supervisor, 17.9. – 29.9.2017,
- Kathleen Downey, Ohio State University, physical anthropology and excavation of human remains, 14.9. – 16.10.2018,
- Christoph Forster, Fa. Datalino, Berlin, digital documentation, 1.9. – 15.9.2017,
- Alessio Palmisano, University College London, trench supervisor, 13.9. – 10.10.2017,
- Jens Rohde, LMU Munich, trench supervisor,
- 20 workmen from Nureddin and Qaladze, 6.9. – 12.10. 2017.

Fig. A8: Most of the 2017 Gird-i Bazar field team at the end of the excavation season (11 October 2017). Photo by Andrea Squitieri, taken with a DJI Phantom 4 Pro drone.

Pottery team:
- Jean-Jacques Herr, LMU Munich & ÉPHÉ Paris, lead ceramicist and pottery processing,
- Abdullah Bakr Othman, ELTE Budapest & Salahaddin University Erbil, pottery registration and photography, 9.9. – 14.10.2017,
- Mohammad Aziz, Sulaymaniyah, pottery washing and labelling.

Geophysical survey team, 20.9. – 25.9.2017:
- Andrei Ašandulesei, Alexandru Ioan Cuza University of Iași, Romania,
- Jörg Fassbinder, Bayerisches Landesamt für Denkmalpflege, Munich,
- Marion Scheiblecker, LMU Munich.

A2. The scope of this volume

As the two earlier volumes of the series *Peshdar Plain Project Publications* (4P) have done for 2015[10] and 2016[11], the present work offers a comprehensive report of the Peshdar Plain Project's fieldwork in 2017 and its results.

Section B presents the results of the 2017 magnetometer survey undertaken at the Dinka Settlement Complex by Jörg Fassbinder and his collaborators Marion Scheiblecker and Andrei Ašandulesei and offers a detailed interpretation of the lower town's layout, its buildings and other features as revealed by the 2015-2017 prospections. Importantly, there is no evidence for an enclosing wall surrounding the lower town although the settlement's borders have been reached in several areas.

As a consequence of the identification of a group of three large buildings, positioned somewhat separate from the rest of the lower town occupation on a slight elevation in the eastern part of the magnetometer survey area of 2016, excavations were conducted in this part of the settlement, dubbed "Dinka Lower Town operation 2" (DLT2). In Section C, F. Janoscha Kreppner, Jens Rohde, Andrea Squitieri and Felix Wolter present first results of the excavation of Buildings K (280 m² according to the magnetogram), L (800 m²) and M (650 m²), which can be shown to all have been used during a common occupation phase; Karen Radner contextualises the first set of ^{14}C dates from two carbonised emmer seeds (*triticum dicoccum*), recovered from the bottom of one of the large storage vessels that were encountered *in situ* in Room 35 of Building L, the largest building of the three that seems to have served as a centralised grain storage facility. The excavations will continue in autumn 2018.

The excavations at Gird-i Bazar, on the other hand, came to a close with the third season in 2017, as planned. In Section D, Peter Bartl, F. Janoscha Kreppner, Alessio Palmisano, Jens Rohde and Andrea Squitieri present the results of this final fieldwork season that served to complete the excavation of all buildings previously identified; Silvia Amicone discusses her work on the two kilns in Room 31 of Building D and in Outdoor Area 8; and Kathleen Downey details her study of the human remains encountered in the filling of the well in Room 49 of Building I – the first Iron Age bodies unearthed at Gird-i Bazar. Also in this section, F. Janoscha Kreppner and Karen Radner discuss the ^{14}C dates derived from one of these individuals as well as from a donkey tooth and several carbonised seeds and legume fragments and offer a first evaluation of these results.

Section E, by geographer Eileen Eckmeier and her students Hakan Tolbas and Maximilian Weidenhiller, offers an assessment of the soils and sediments encountered in the Dinka Settlement Complex and the surrounding Bora Plain and considers their significance for landscape and site formation processes. The chapter discusses the soil characteristics of some rooms and alleys excavated at the Dinka Settlement Complex and offers a first description of sediment records recovered from the eight cores harvested in the 2017 coring programme overseen by Mark Altaweel.

The focus of the 2017 pottery studies, presented in Section F, was to produce a first assessment of the pottery recovered from the new excavation area of DLT2. Focusing on the morphological types and the *chaînes opératoires*, Chapter F1 of Jean-Jacques Herr, Abdullah Bakr Othman and Hero Salih Ahmed establishes a strong link with the pottery of Gird-i Bazar. They offer new evidence for the so-called "Groovy Pottery" from both Gird-i Bazar and DLT2 (known from sites in the Upper Tigris region, the Khabur Triangle and Hasanlu in Western Iran) whose local production can be demonstrated; and they present some pottery from the Middle Islamic Period, recovered without architectural context in the DLT2 topsoil. Silvia Amicone's Chapter F2 provides a discussion of the petrographic analyses conducted on selected pottery fragments from DLT2 while Elsa Perruchini's chapter F3 discusses the results of the second round of residue analyses performed on material from the Dinka Settlement Complex, this time eight samples of DLT2 pottery.

Andrea Squitieri, in Section G, presents the Iron Age small finds recovered in 2017 at DLT2 and at Gird-i Bazar. Compared to the strictly utilitarian character of the Gird-i Bazar object repertoire, the finds of DLT2 suggest a wider

10 Radner/Kreppner/Squitieri 2016.
11 Radner/Kreppner/Squitieri 2017a.

and more diverse range of activities for Buildings K, L and M. The star find of the 2017 Gird-i Bazar excavations is a pivoted stone that constitutes the upper-bearing for a potter's wheel, recovered in Room 46 of Building I. As the three pottery kilns, this piece highlights the importance of pottery making at Gird-i Bazar.

In Section H, Kathleen Downey discusses the extensive Sasanian cemetery overlying the buildings of the Iron Age occupation of Gird-i Bazar; 94 graves have been identified and 52 excavated, yielding the remains of 62 individuals. In addition to a general assessment of the cemetery, the section presents a detailed description of those eleven burials with any surviving manufactured grave goods.

The book closes with Section I and Karen Radner's, F. Janoscha Kreppner's and Andrea Squitieri's conclusions drawn from the work undertaken so far at the Dinka Settlement Complex.

As ever, we are enormously grateful to the colleagues from Sulaymaniyah, Erbil and Baghdad who have greatly contributed to the success of all fieldwork and who have taken on the main burden of processing and analysing the pottery: Zuhair Rajab Abdullah al-Samarraee, Abdullah Bakr Othman, Hero Ahmed Salih and Hayman Noori, supported in Sulaymaniyah by Amanj Ameen and Awad Jihad. Thank you!

B. The 2017 magnetometer survey of the Dinka Settlement Complex

Jörg W.E. Fassbinder, Andrei Ašandulesei & Marion Scheiblecker

B1. Objectives and methodology

The objective of the 2017 magnetometer survey was to complete the measurements of the Dinka Settlement Complex in the southern part of the lower town, to enlarge the surveyed area towards the north, to verify the possible extension of the site towards west, north, and east, and to look for a possible fortification wall enclosing the settlement in the Bora Plain (**Fig. A4**). We can already state here that the 2017 survey has not brought to light any evidence for a fortification wall or similar structure enclosing the lower town in the north and east. Since the geophysical investigations show a densely built-up, large settlement with various functional areas, we call this urbanised settlement the Dinka Settlement Complex, consciously avoiding its designation as a city.

The magnetometer prospection in September 2017 extended into the south, where the survey area is nowadays limited by a topographical ridge and a modern field road. South of this road, there is a steep slope, and the terrain of the next terrace is ca. 5 m below the settled area of the site. No further magnetometer prospecting could be undertaken here since this area is intensively irrigated and used for the cultivation of vegetables. As in previous years, our survey area was limited by a cornfield to the east, and by a road and a modern erosion channel to the west. Beyond the road, the adjacent deeply-ploughed fields prevented us from surveying any further. Not only are such deeply-ploughed areas simply not walkable, but the uneven topography is not amenable to a high quality, high-resolution magnetometer survey.

For the magnetometer measurements, we used the handheld caesium magnetometer Scintrex SM4G-Special (**Fig. B1a**), as in the previous years at the Dinka Settlement Complex. For the first time, we also employed a Geometrics G-858 magnetometer (**Fig. B1b**) in the so-called duo-sensor configuration. The instruments were carried ca. 30 cm above the ground, gridded by 40×40 m, in a sampling density of 10-12 cm in the profile and 50 cm traverse intervals, interpolated to 25×25 cm. Visualization and image processing was done by Envimap (Scintrex), using the "Resam2" program developed by Jörg Fassbinder, MagMap2000 and Magpick (Geometrics), Geoplot 4 (Geoscan Research), and "Surfer 13" (Golden Software). Additional details and an assessment of the advantages of this uncompensated magnetometer configuration have

Fig. B1a: Magnetometer prospection with the handheld total field caesium magnetometer Scintrex Smartmag SM4G-Special in duo-sensor configuration. Photo by Jörg Fassbinder.

Fig. B1b: Magnetometer prospection with the handheld total field magnetometer Geometrics G-858 in duo-sensor configuration. Photo by Jörg Fassbinder.

been previously discussed by Fassbinder[12], also in the previous two volumes of the series *Peshdar Plain Project Publications*[13]. Further details on magnetometer prospecting were described by Aitken[14] as well as by Aspinall, Gaffney and Schmidt[15], while Dunlop and Özdemir[16] and Jordanova[17] discussed details on the magnetic analysis of rock, soil and mineral.

The 2016 survey covered a large area, and therefore provided us with a first idea of the layout and the organization of the Dinka settlement complex[18]. The 2017 survey has further clarified and increased our comprehension of the settlement organisation.

B2. Geophysical and archaeological interpretation

For the interpretation, we superimposed the two magnetometer images derived from all field surveys (**Fig. B2**) and the high-pass filter of the data (**Fig. B3**). Occasionally we also applied the hill shading option of the Surfer program. This technique allows us to recognise the presence of old ash layers and, at the same time, to identify kilns and to detect archaeological structures behind a black spot of high magnetisation[19]. Here, it is necessary to remind archaeologists and non-specialists that ash layers consist not only of dark charcoals, which are easily recognisable in the excavation, but also of fine-grained, ferrimagnetic magnetite and maghemite, which are formed during the burning process and remain to enrich the topsoil, even when the charcoal itself has already eroded or washed away[20].

B2.1 Alleyways

To understand the spatial organisation of a settlement, it is best to start with the layout of the streets and alleyways (**Fig. B4**). Throughout the whole area surveyed we did not detect large and wider streets, but only small, narrow pathways and alleyways between densely settled areas.

The layout and organisation of these alleyways resembles the shape of a coarse irregular spider web, facing towards the Lower Zab river in the south. The alleyways are narrow pathways between the houses, about 2-4 m wide and sometimes even less. None of these alleys can be regarded as a main thoroughfare. These narrow alleys form a more or less irregular and semi-circular web, with house quarters of ca. 40×60 meter in size. The semi-circular shape has its centre in the south and is bordered by the edge of the terrace. Whether the settlement continued towards the Lower Zab river or whether this edge is a part of the old boundary of the settlement remains an open question and cannot be decided from the magnetometer data presently available.

B2.2 Courtyards

It seems that there are only in the eastern part of the city open spaces between houses and residential quarters (**Fig. B5**). These areas measure about 10×10-15 m. Frequently there is evidence for kilns or intensively used fireplaces in these spaces.

B2.3 Buildings

The settlement is divided into two different parts by a smooth gully or cutting (**Fig. B4**). On the western edge of this gully, we detected clear traces of mudslide destruction on some of the structures. Although the remaining area appeared to be without buildings at a first glance, more detailed analysis revealed a multitude of linear features, and even some building layouts.

B2.3.1 The isolated buildings in the west

Detailed analysis of the magnetometer data revealed isolated buildings in the southwestern part of the settlement (**Fig. B5**). Each single building is clearly separated from the neighbouring houses by a small alleyway. The buildings have sizes of up to 12×25 m and, despite the general layout of the alleyways in a semi-circular grid, all houses and buildings are oriented towards the northeast. The inner organisation and room layout differs from building to building, which may be the result of structural alterations during the life of the buildings.

12 Fassbinder 2016, 500.
13 Fassbinder/Ašandulesei 2016, 36; Fassbinder/Ašandulesei/Scheiblecker 2017, 18-22.
14 Aitken 1958.
15 Aspinall/Gaffney/Schmidt 2008.
16 Dunlop/Özdemir 1997.
17 Jordanova 2017.
18 Fassbinder/Ašandulesei/Scheiblecker 2017, 18-28.
19 Aspinall/Gaffney/Schmidt 2008, 127-129.
20 Scollar et al. 1990, 380-383.

B2.3.2 A group of three large buildings

In the northwestern part of the survey area (**Fig. B5**), we found a group of three large buildings in a situation separate from the rest of the settlement. Because of their considerable size, their inner organisation, and their topographical location on a slight elevation of ca. 1-2 m above the Bora Plain, we assume that they must have had a function that differs from all other building complexes. Although the three buildings stand very close to one another, they are clearly separated from each other by small alleyways, as confirmed by the 2017 excavations in this area (dubbed "Dinka Lower Town 2"; cf. **Chapter C**).

B2.3.3 Odeon, arena, theatre, meeting place – or a natural depression?

About 40 m to the northeast of the three large buildings, we discovered a slight circular depression in the landscape. Although this depression is in part visible on the ground and from the air, the form and organisation revealed by the magnotogram is surprising: a semi-circular arena-like feature of ca. 50-75 m, with an inner semicircle of 50 m. Inside this inner area there is a rectangular feature ca. 30×20 m in size (**Fig. B5**), perhaps a floor.

As its shape suggests a building like an odeon, arena, or theatre, typically observed in later periods in a Greek- or Roman-influenced cultural context, the structure should be excavated to further investigate whether it is indeed a built structure or whether this is simply a natural depression.

B2.3.4 The houses in the east

The houses on the eastern part of the settlement display a different construction style compared to those in the west (**Fig. B5**). They are organised as conglomerates of rooms, thus forming large, irregular-shaped complexes. Despite this difference in organisation, these complexes maintain the same northeastern orientation as all the other features and buildings within the site.

The housing complexes are interspersed with courtyards or open spaces. Some of these could have been used as gardens, but others show clear evidence for kilns, intensively-used fireplaces and ovens and may be interpreted as outside working spaces.

B2.3.5 The houses in the centre

The central section between the densely settled areas in the southwest and northeast is, at a first glance, dominated by the signs of a mudslide, as well as other traces of destruction (**Fig. B6**). However, detailed and sophisticated analysis of the magnetograms in different shades and dynamics enables us to detect traces of house foundations and building construction.

There are different possible reasons for this. Firstly, the foundations might have been constructed using rather weak magnetic limestone and dolomite gravels, as is demonstrably the case for some buildings in the eastern part of Gird-i Bazar[21]. Secondly, this area of the settlement might have served for different purposes, such as gardening, workshops or animal enclosures, and resultant features may have been less deeply founded in the ground. Thirdly, foundations may have existed but were frequently exposed to destruction by mudslides or erosion. Since this area forms a slight depression and as hydrology analysis of the Digital Elevation Model (DEM) revealed a possible water stream in this particular area[22], this seems to be the most likely explanation.

B2.3.6 The features in the north

The area in the north and northeastern part of the settlement complex is dominated by wide ash layers (**Fig. B6**), some extensive kiln complexes, and linear features such as single walls or boundaries. **Coring Point 4** is situated in this area and the cores extracted from there show clear evidence of recent anthropogenic activity (**§E3.1**). A large fire-affected feature could therefore date to modern times, perhaps war activity during the period of Saddam Hussein's regime. Alternatively, one could assume the kilns of the pottery workshops of Gird-i Bazar[23] to be the source of the ash layers and magnetic contamination.

No building complexes have been detected in the north (**Fig. B6**). The results from the 2015 survey in the eastern part of Gird-i Bazar call us to caution[24]. While the magnetometer data revealed a very clear layout of walls in the western part, no clear results were achieved in the eastern part, although excavation subsequently brought buildings to light. This was due to the weak magnet signature of the stones used for the walls in this area. It therefore remains

21 Fassbinder/Ašandulesei 2016, 38.
22 Radner/Kreppner/Squitieri 2017b, 177-178.
23 Amicone 2017a, 77-82.
24 Fassbinder/Ašandulesei 2016, 38-39.

possible that also in the north of the Dinka Settlement Complex walls were constructed with nearly non-magnetic limestone and dolomite stone gravels, whose weak signal is not detectable with magnetometry[25].

B2.4 Magnetic traces of lightning strikes

Traces of lightning strikes can be clearly identified magnetically by their high Koenigsberger Q-ratio (ratio of remanent versus induced magnetization) and by their star-shaped features in the magnetogram[26]. Several lightning strike-related anomalies were detected in buildings within the settlement[27].

B3. Discussion and preliminary conclusions

The magnetometer surveys from 2015-2017 cover an area of nearly 500×500 m. Therefore, they provide us with a first overview of the organisation of a large settlement complex (**Figs. B7-B8**), whose existence in the borderlands of the Assyrian Empire came as a surprise. Due to the special configuration and the adoption of the caesium magnetometer for archaeological purposes, but also due to the occurrence of serpentine rock gravels in the wall bases of the houses, the survey results offer a very detailed view beneath the ground. Outer conditions such as the flat surface and the fact that this is for the most part a single-phase archaeological site, which was abandoned and later remained largely undisturbed, have contributed to the outstanding results.

Due to the magnetometer measurements, we were not only able to draw a first map of the site (**Figs. B7-B8**), but also to ascribe specific functions to the buildings. It is possible to identify large, probably administrative buildings in the northwest as well as houses that presumably served primarily as accommodation in the west. Moreover, the presence of kilns, ovens and fireplaces indicate workshop areas or houses with workshops in an area of small sized house complexes.

In the middle part of the settlement, evidence for clear house constructions are absent in the magnetogram. This could be due to the fact that the wall bases were made of limestone or dolomite rock gravels and of rammed earth construction. Prior excavations at Gird-i Bazar have revealed wall bases of these types[28]. Unlike the serpentine rock gravels, with their high magnetic remanence and induced magnetization, features built with these materials cannot be traced easily by magnetometer measurements.

With a size of ca. 650 m in diameter and with a radial layout with an irregular, spider web-like street system, the Dinka Settlement Complex can profitably be compared in size and layout to the ancient Assyrian capital city of Assur[29], or the Syrian Bronze Age cities of Ugarit[30] and Tall Munbaqa (Ekalte)[31]. But there is a very important difference: as far as we can see from the magnetometer results, there was no fortification wall constructed around the boundary of the Dinka Settlement Complex in the Bora Plain.

25 Fassbinder/Ašandulesei 2016, 36-38.
26 Koenigsberger 1938; Maki 2005; Fassbinder/Gorka 2009.
27 Fassbinder/ Ašandulesei/Scheiblecker 2017, 22, 27-28.
28 See **Chapters C** and **D** in this volume.
29 Margueron 2013, 174 fig. 146.
30 Margueron 2013, 106 fig. 91.
31 Becker/Fassbinder/Chouker 1994, 68 fig. 3.

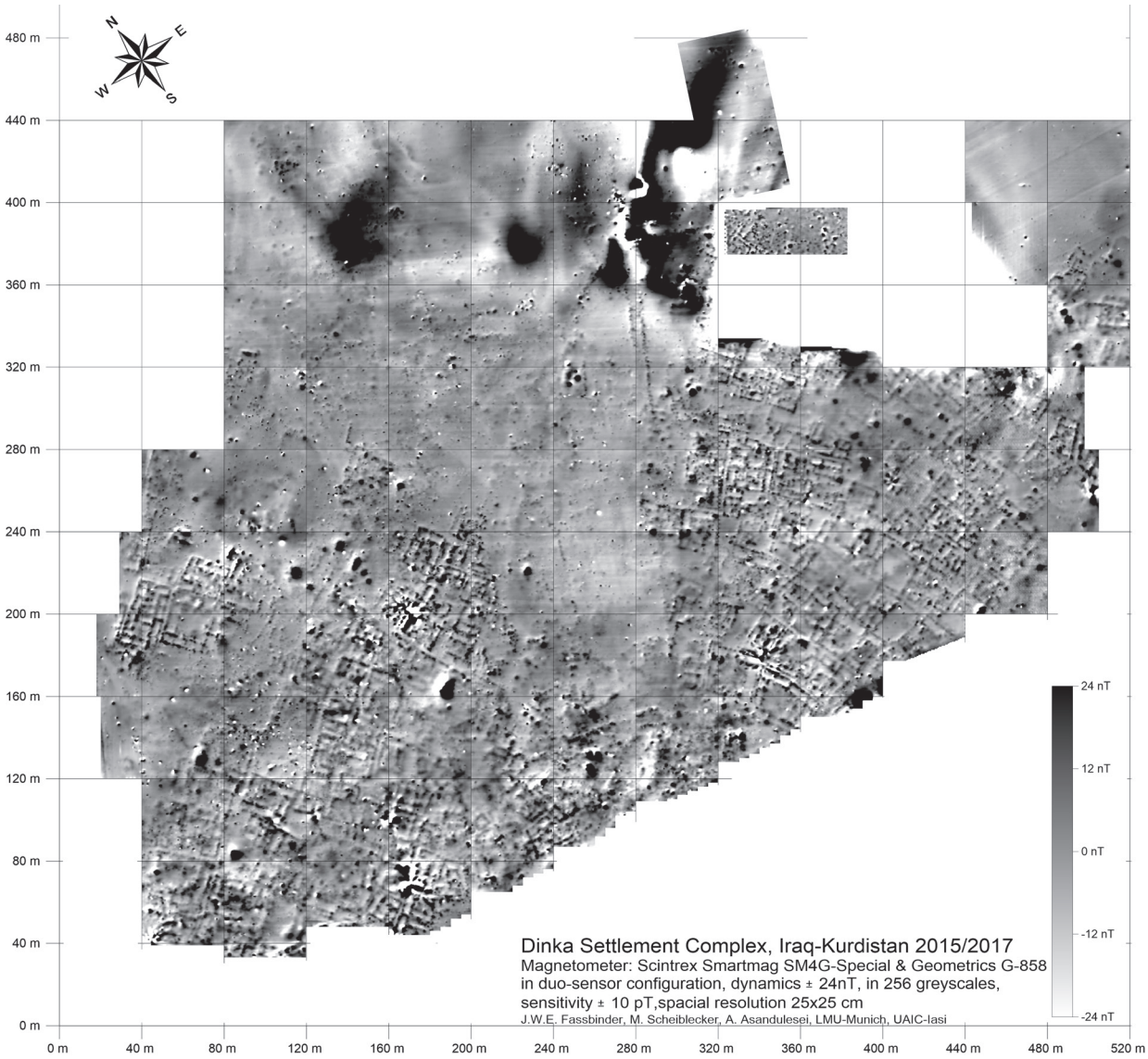


Fig. B2: Magnetogram with the 2015-2017 results of the survey area of ca. 500×500 m at the Dinka Settlement Complex, including the 2015 work at Gird-i Bazar but excluding the 2015 work at Qalat-i Dinka. Magnetometer survey conducted with a Scintrex Smartmag SM4G-Special and Geometrics G858 total field magnetometer in duo-sensor configuration. 40×40 m grid, sampling density 10×50 cm, interpolated to 25×25 cm, dynamics +/- 24 nT in 256 greyscales. Intensity of the Earth's magnetic field: 47.600 nT +/- 30 nT (September 2016). Prepared by Jörg Fassbinder.

Fig. B3: The magnetogram of the Dinka Settlement Complex, data as in Fig. B2 but processed with a 10×10 high-pass filter. Prepared by Jörg Fassbinder.

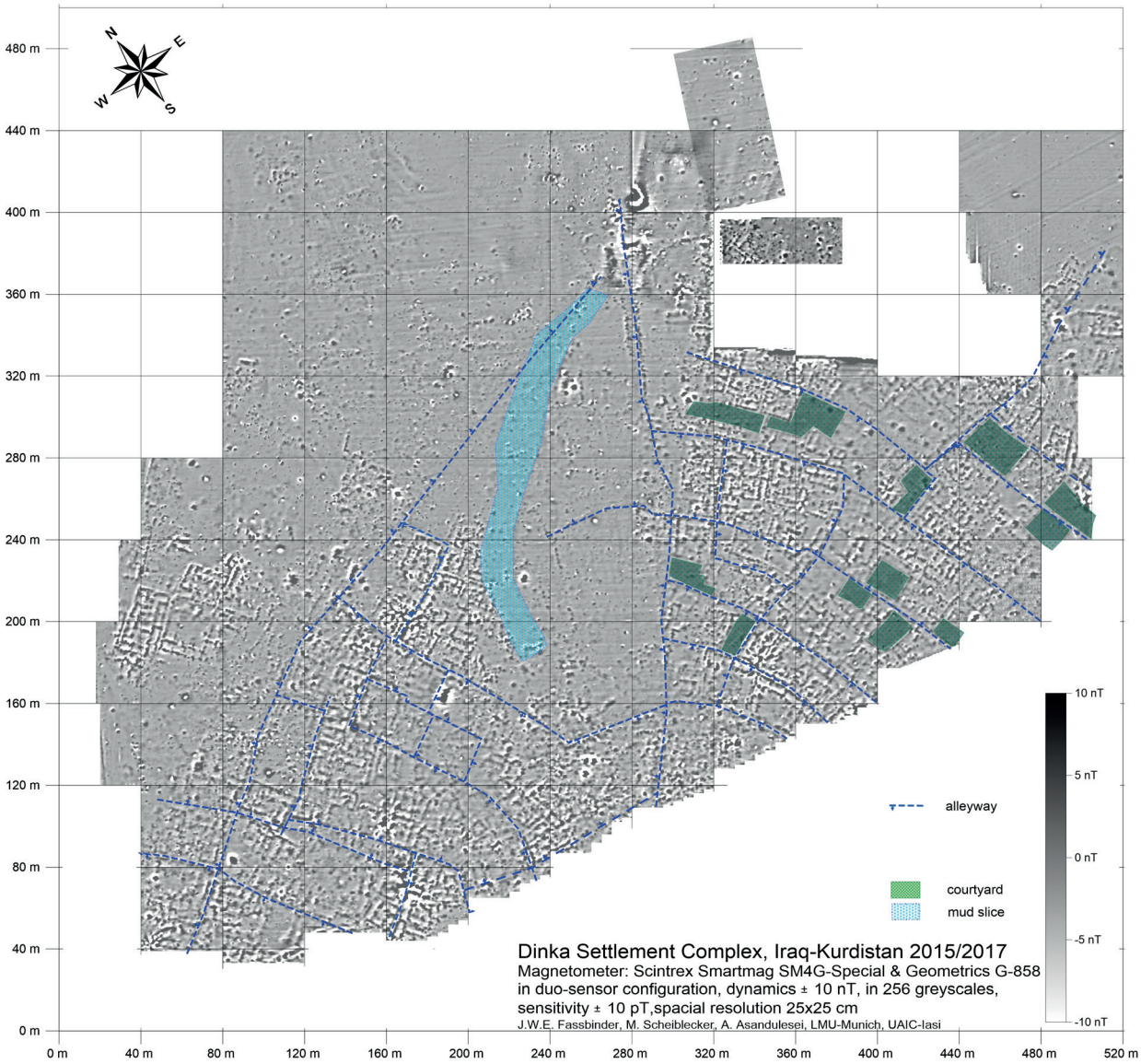


Fig. B4: The magnetogram of the Dinka Settlement Complex interpreted, part 1: alleyways (in dark blue), courtyards/open spaces (in green) and mud slice (in light blue). Prepared by Jörg Fassbinder.

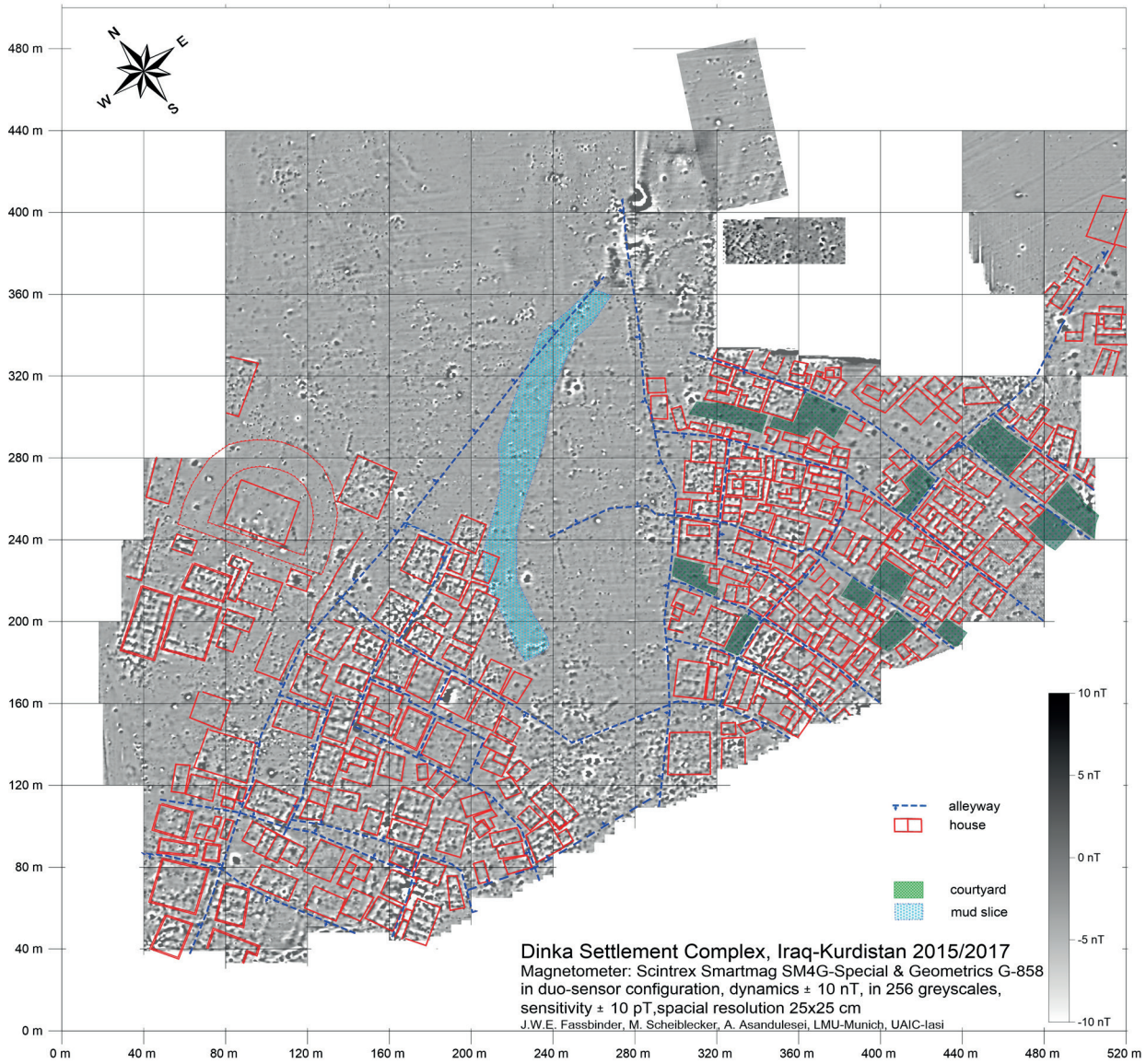


Fig. B5: The magnetogram of the Dinka Settlement Complex interpreted, part 2: alleyways (in dark blue), courtyards/open spaces (in green), mud slice (in light blue) and houses (in red). Prepared by Jörg Fassbinder.

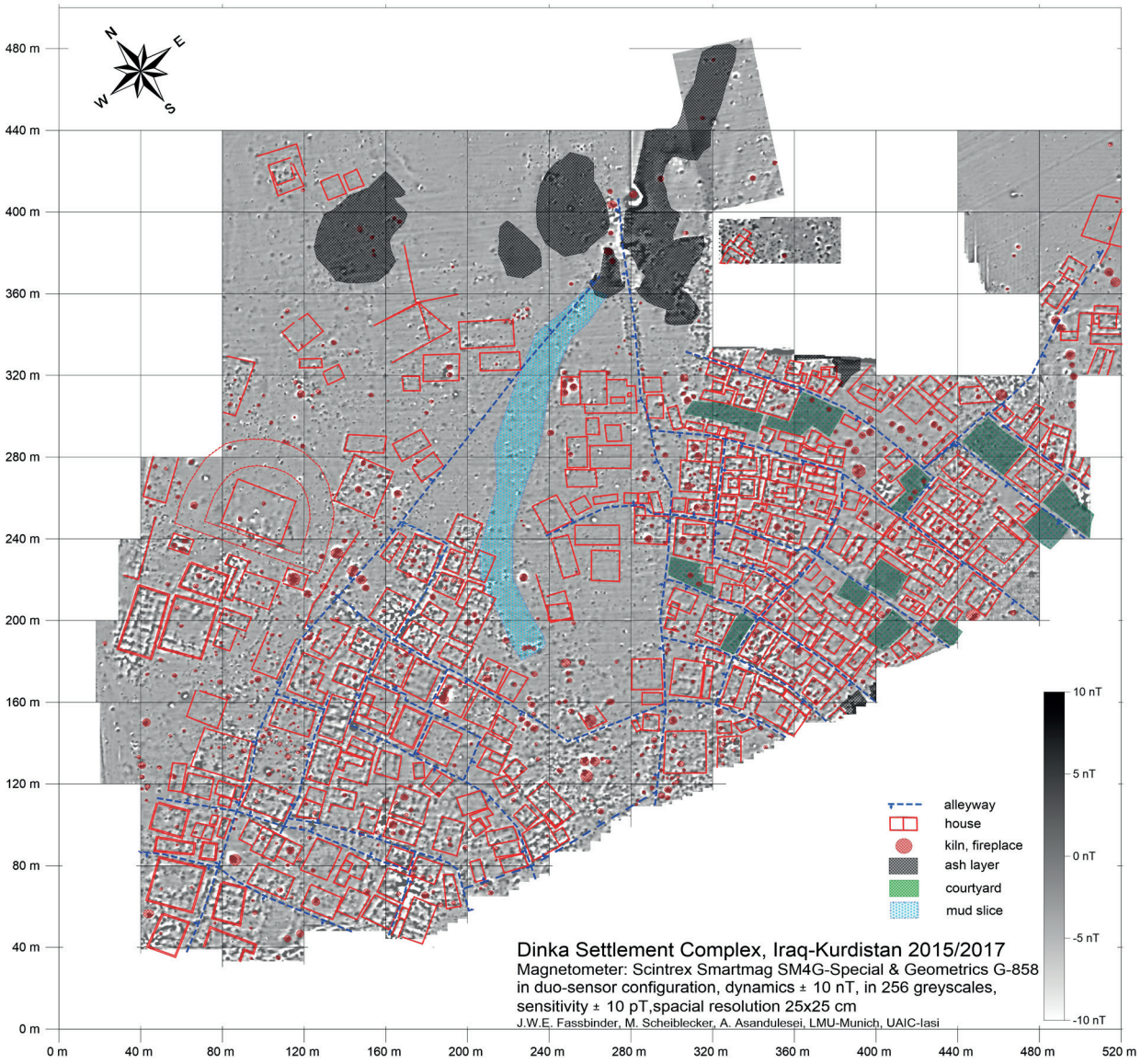


Fig. B6: The magnetogram of the Dinka Settlement Complex interpreted, part 3: alleyways (in dark blue), courtyards/open spaces (in green), mud slice (in light blue), houses (in red) and kilns/fireplaces (in solid red). Prepared by Jörg Fassbinder.

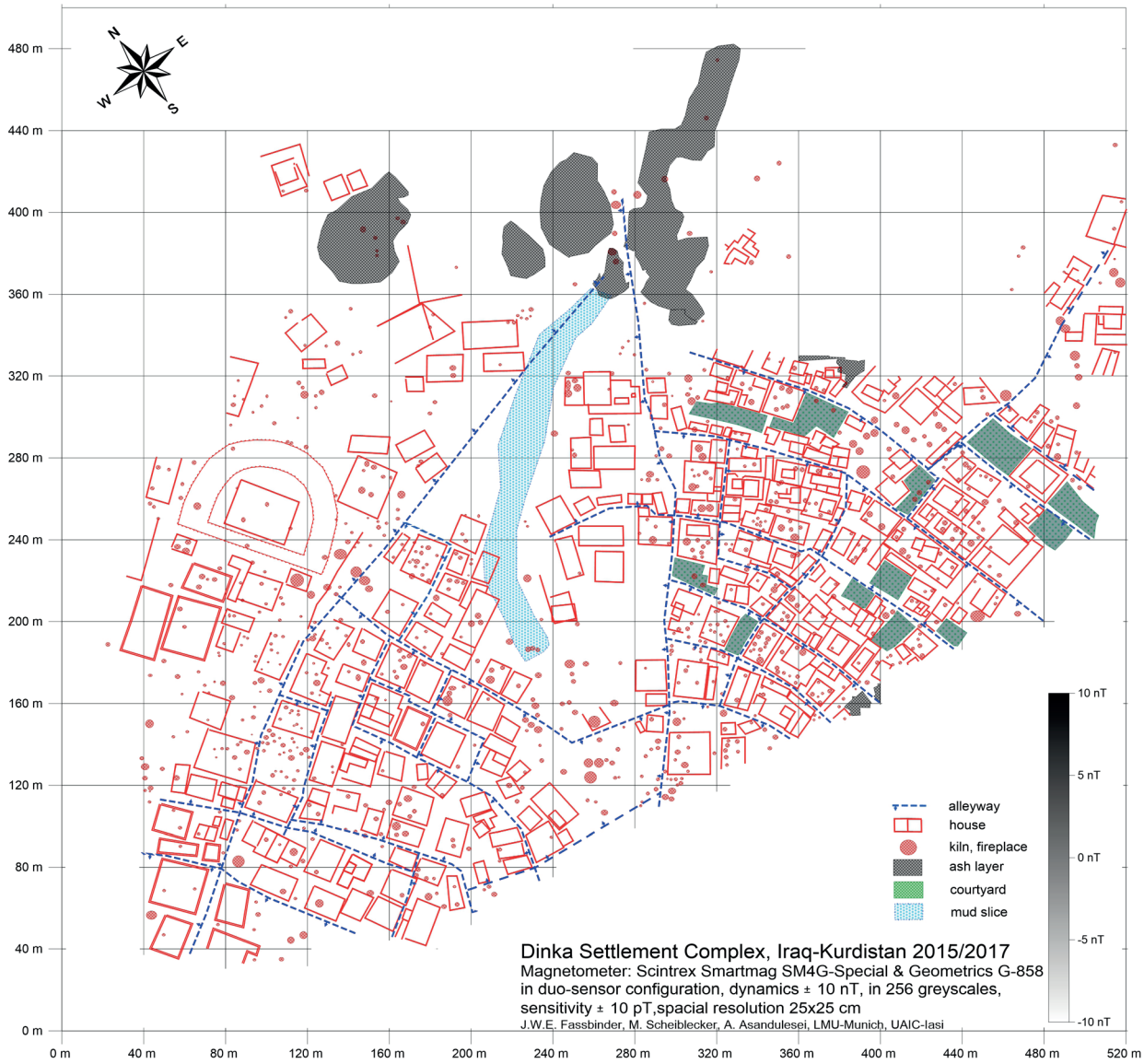


Fig. B7: The magnetogram of the Dinka Settlement Complex interpreted, part 4: alleyways (in dark blue), courtyards/open spaces (in green), mud slice (in light blue), houses (in red), kilns/fireplaces (in solid red) and ash layers (in grey). Prepared by Jörg Fassbinder.

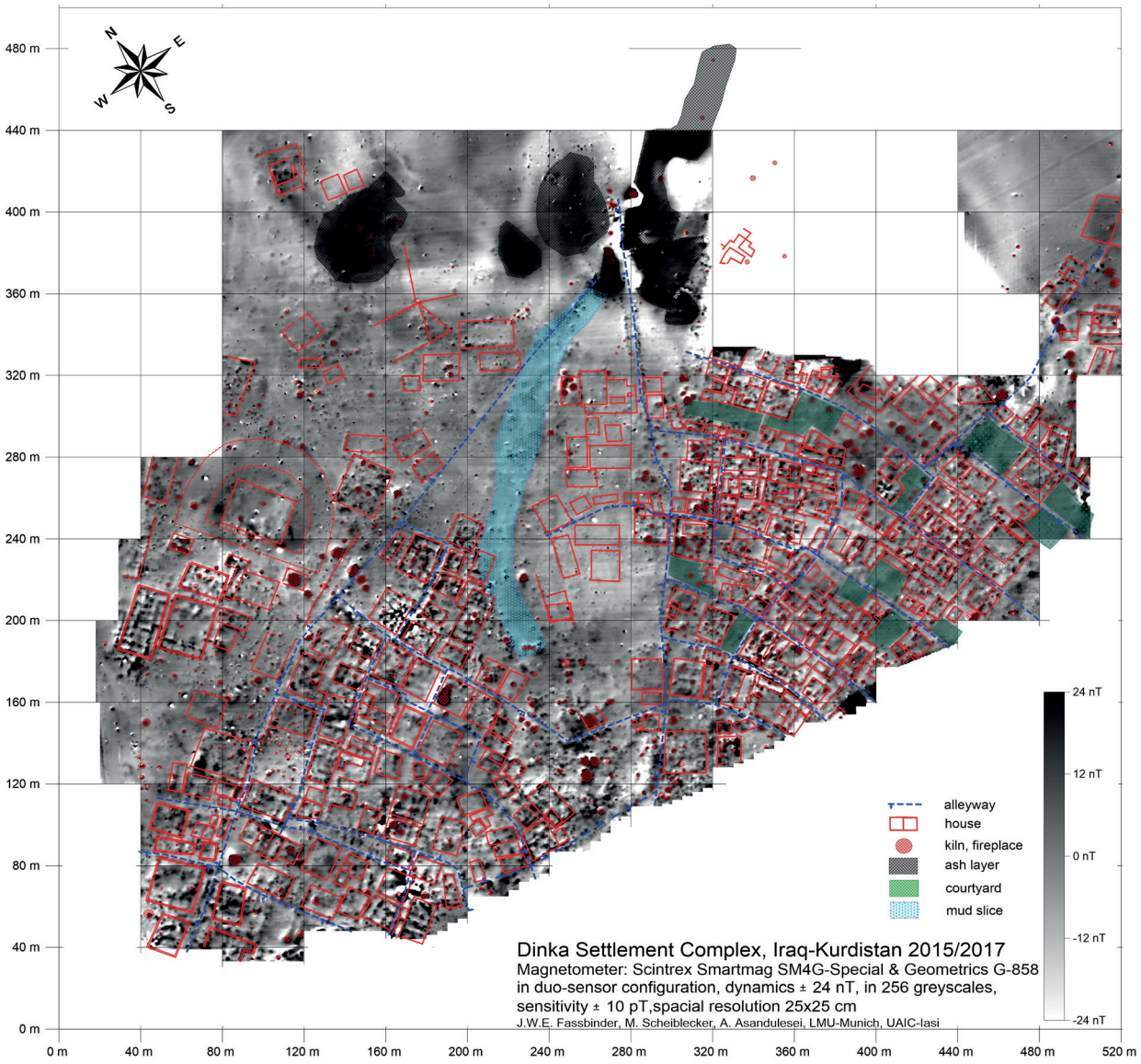


Fig. B8: Map of the Dinka Settlement Complex according to our interpretation of the magnetogram.

C. Excavating the Dinka Lower Town Operation 2 (DLT2)

This chapter presents the results of the archaeological excavations conducted in Spring 2017 in the Lower Town of the Dinka Settlement Complex, outside the chicken farm enclosure of Gird-i Bazar, in an area dubbed "Dinka Lower Town operation 2" (**Fig. A4**), abbreviated DLT2.[32]

C1. Excavation overview and method

F. Janoscha Kreppner & Andrea Squitieri

In Autumn 2016 the magnetometer prospection conducted in the area between Gird-i Bazar and Qalat-i Dinka revealed the presence of a large lower town made of well-arranged houses and roads, among which a complex of three large free-standing buildings stood out[33] (**Fig. B2**). These were identified on top of a very shallow elevation located around 300 m west of the chicken farm enclosure of Gird-i Bazar, very close to the modern road leading towards Qalat-i Dinka.

In order to obtain more information about these free-standing buildings, in spring 2017 we opened a U-shaped, 69 m² test trench, designed to intercept each of the three buildings. The east-west part of the trench was 18 m long, whereas the two north-south "arms" were 10 m long each. Based on the magnetometer image, we assumed that the three buildings had all been in use simultaneously, because in the image they did not seem to overlap with each other. This trench extended over the grid squares labelled 234934 (on the west), 235934 (in the south) and 236934 (on the east) (**Fig. C1**). The excavation started in the centre of the U-shaped trench (in square 235934) and continued to the east and north in square 235934, as well as to the west and north in square 234934. The excavation confirmed the general accuracy of the building plans obtained from the magnetogram. The portions of three buildings were successfully identified and labelled, from east to west, Buildings K, L, and M. They are separated by three alleys called Alley 41 in the northeast, 45 on the east and 38 on the west (**Figs. C2**, **C4**).

The excavation method adopted at DLT2 followed the same protocol established in Gird-i Bazar in 2015, with a digital documentation system, daily orthophotos and a locus/collection registration system[34]. This system is explained in more detail below (**§D1.2**).

C2. Absolute chronology and relative stratigraphy

C2.1 The first ^{14}C dates from DLT2 and their preliminary interpretation

Karen Radner

A first step towards establishing the absolute chronology of the buildings at DLT2 was taken with the ^{14}C analysis of two emmer wheat seeds (*triticum dicoccum*) from the bottom of a large storage vessel (Locus:235934:037) found in Room 35 of Building L. These seeds were isolated from soil sample PPP 235934:003:001, which was collected from the bottom of the vessel and then underwent flotation according to our standard protocol. The seeds were identified and selected for ^{14}C analysis by Dr. Melissa Rosenzweig. They were analysed as samples MAMS 34635 and 34636 at the Klaus Tschira Archaeometry Centre, Curt-Engelhorn-Zentrum Archäometrie in Mannheim. The calibration of the ^{14}C-dating was performed with the data set INTCAL13 and the software OxCal 4.3.2. The resulting dates are (**Fig. C3**):

- Sample MAMS 34635: 1012-894 calBC (94.4% probability);
- Sample MAMS 34636: 930-824 calBC (95.4% probability).

These dates indicate when these cereals were harvested. The last years of the possible date range of Sample MAMS 34636 fall into the period when the Assyrian presence in the region was established at some point during the reign of Shalmaneser III (r. 858-824 BC). On the basis

32 Our excavations at Gird-i Bazar are therefore "Dinka Lower Town operation 1" (DLT1).

33 Fassbinder/Ašandulesei/Scheiblecker 2017, 23.

34 Kreppner/Forster/Squitieri 2016; Kreppner/Squitieri 2017b.

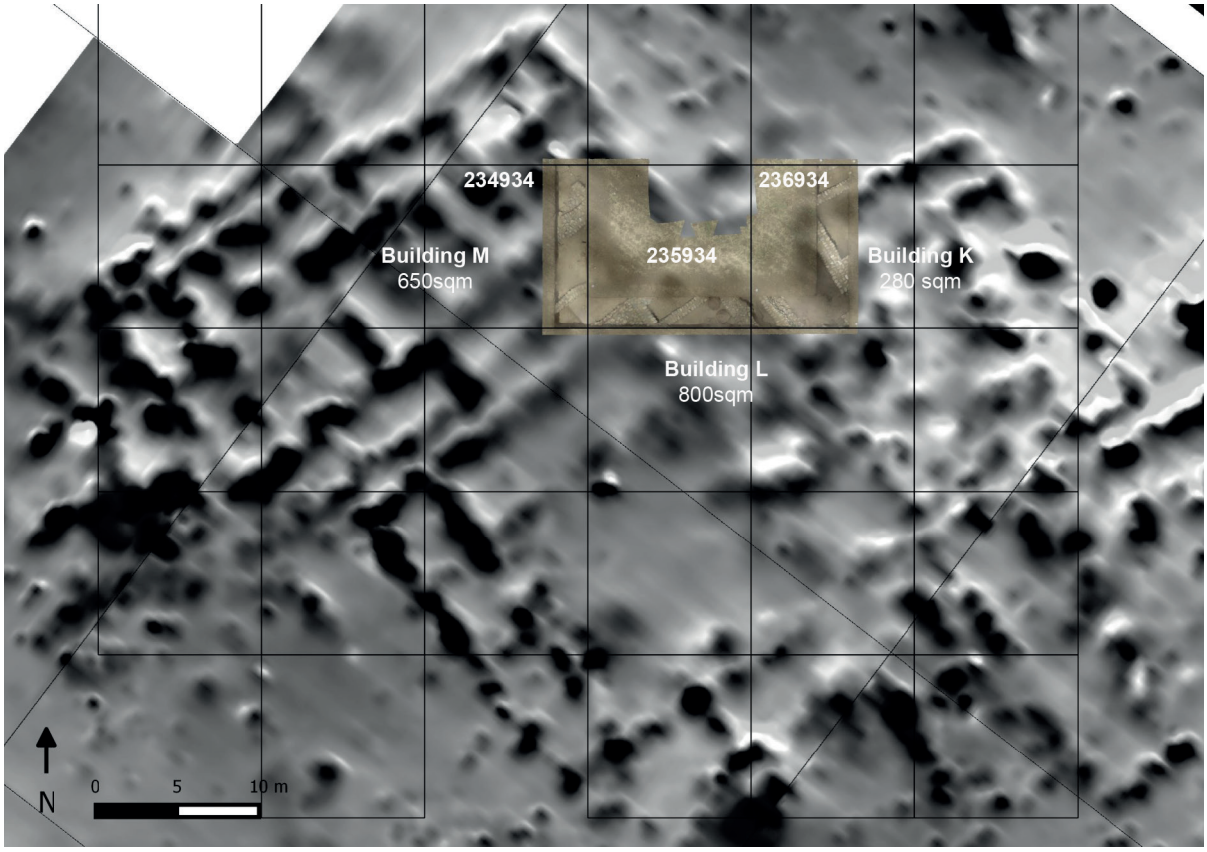


Fig. C1: The 10×10 m excavation grid of DLT2 superimposed on the orthophoto and the magnetogram of the area. Prepared by F. Janoscha Kreppner. Magnetogram by J. Fassbinder, A. Ašandulesei and M. Scheiblecker (Fassbinder/Ašandulesei/Scheiblecker 2017, 23).

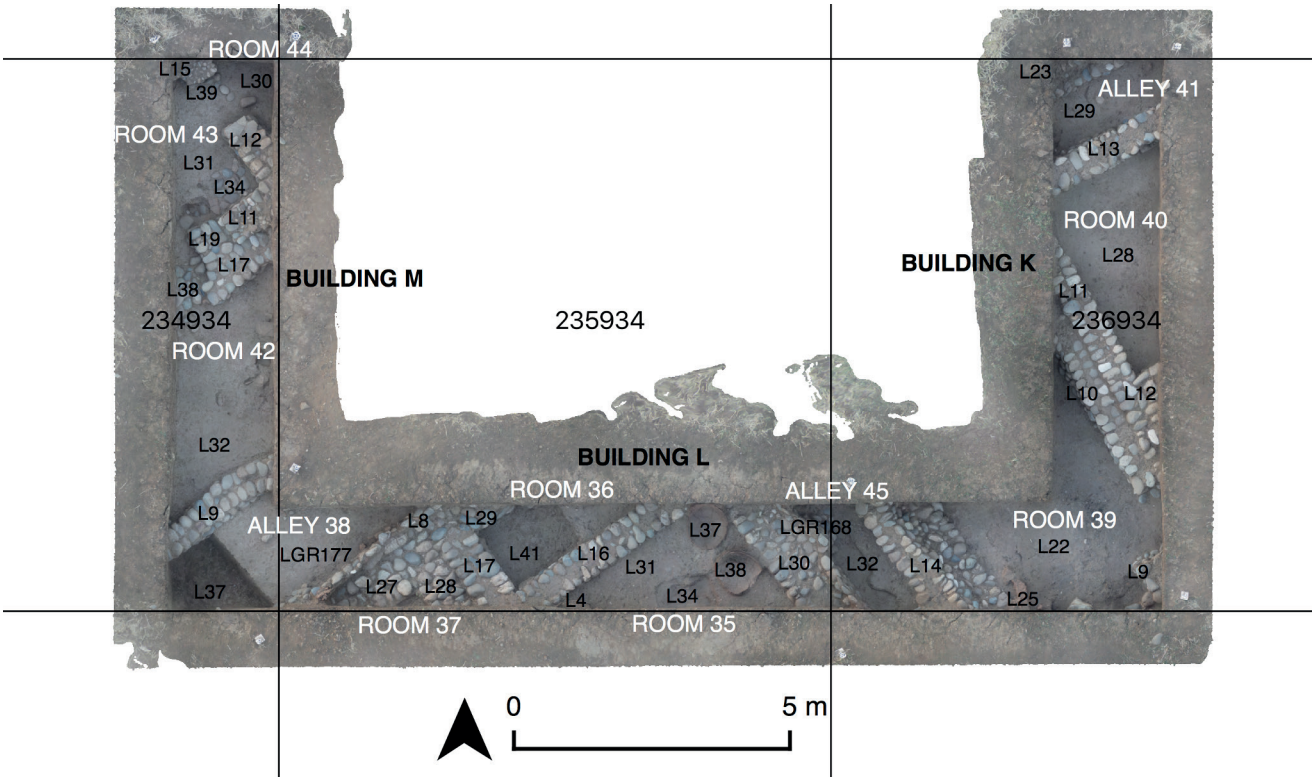


Fig. C2: Orthophoto of DLT2. Prepared by Andrea Squitieri.

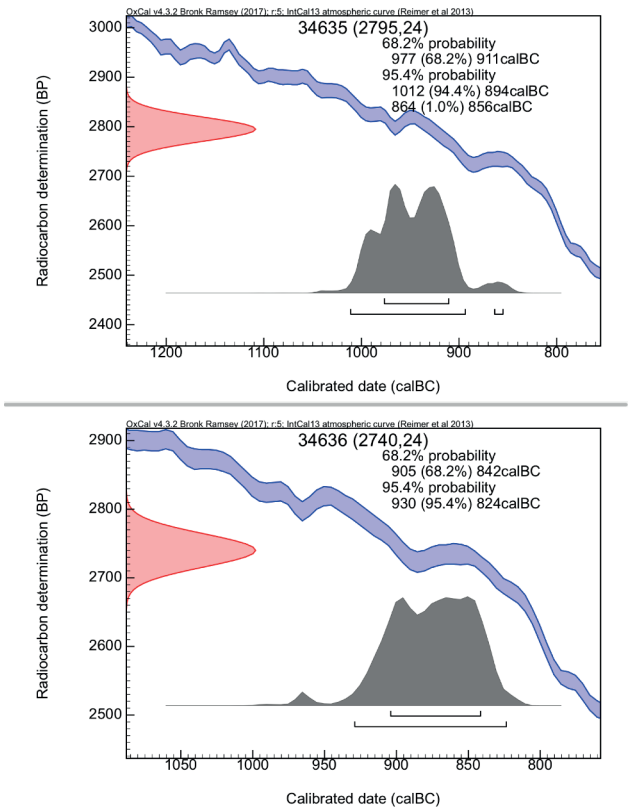


Fig. C3: Radiocarbon dating of two emmer seeds from the fill of a storage vessel (Locus:235934:037) from Room 35, Building L. Laboratory: Klaus Tschira Archaeometry Centre at the Curt-Engelhorn-Zentrum Archäometrie in Mannheim.

of only this sample, the stockpiling of the grain in Building L could thus date to the time when the Assyrians took control of the Peshdar Plain. The strategy of immediately creating an administrative infrastructure by building a palace and stockpiling grain therein as soon as control is secured over a territory is extremely well attested for the Assyrian Empire[35]. Good examples for the stockpiling of grain are found especially in the inscriptions of Assurnasirpal II (r. 883-859 BC):

- In the Orontes valley: "I entered the city Aribua, the fortified city of Lubarna of Patina, and took the city in hand for myself. I reaped the barley and straw of the land Luḫutu and stored it inside."[36]
- In the Upper Tigris valley: "I resettled in their abandoned cities and houses Assyrians who had held fortresses of Assyria in the Nairi lands and whom the Arameans had subdued. I placed them in a peaceful abode. ... I reaped the harvest of the Nairi lands and stored it for the sustenance of my land in the cities Tušḫan, Damdammusa, Sinabu, and Tidu."[37]
- In the Sharizor Plain: "At that time in the land Mazamua, the city Atlila which Sibir king of Karduniaš had captured, was dilapidated and had turned into ruin hills. Assurnasirpal, king of Assyria, took (this city) in hand for renovation. I put a wall around it, founded therein a palace for my royal residence, and decorated it more splendidly than ever before. I stored therein barley and straw from all the (surrounding) land. I named it Dur-Aššur."[38]

However, the other sample recovered from the very same archaeological context excludes the otherwise tempting interpretation that Building L and the neighbouring buildings were built soon after the Assyrian takeover of the region and the creation of the Province of the Palace Herald under Shalmaneser III. The date range for Sample MAMS 34635 (1012-894 calBC; 94.4 % probability) falls firmly into the period before the Assyrian conquest. Our current hypothesis is therefore that the buildings were constructed at an earlier time and that stockpiling took place before an Assyrian presence was established at the Dinka Settlement Complex. Additional evidence, especially from floor context, will flesh out this first assessment.

C2.2 The stratigraphic table

F. Janoscha Kreppner and Andrea Squitieri

The relative stratigraphy of DLT2 is shown in **Table C1**. This table is designed to show the stratigraphy of DLT 2 in the same manner as the stratigraphic tables already presented in our previous volumes, and it will be used again below in the discussion of the Gird-i Bazar 2017 stratigraphy (**§D2.2**). Below are the guidelines for how to read the table:

- The rows of the table follow the timeline, from the oldest (bottom) to the youngest (top) deposits.
- The columns contain the spaces, such as rooms within buildings or alleys, arranged from east to west. Roughly contemporary depositional processes and occupation periods that span multiple areas across the excavated space can be identified in the table by reading it horizontally.

35 Liverani 2012.
36 Grayson 1991 A.0.101.1 iii 81-82.
37 Grayson 1991 A.0.101.19: 95-97.
38 Grayson 1991 A.0.101.1 ii 84-86 // Grayson 1991 A.0.101.17 iii 136'-137'.

Dinka Lower Town 2	236934				
			Building K		
		Alley 41	Room 40	Room 39	Alley 45
PRESENT SQUARE SURFACE	Locus:236934:003 corer cut with fills Locus:236934:004, Locus:236934:005, Locus:236934:006				
TOPSOIL					
		LGR:0176 dark brown clayey soil with medium amount of small pebbles included, some small pieces of charcoal (Locus:236934:007)			
POST MAIN OCCUPATION PERIOD 1		Locus:236934:021 dark grayish brown clayey soil	LGR:0175 dark brown clayey soil with pottery, ashes, pebbles (Locus:236934:020, Locus:236934:026)	Locus:236934:016 dark brown clayey soil with reddish pieces: brick and brick fragments, and almost everywhere huge amounts of ashes and burnt debris	LGR:0170 brown compact clayey soil with some pebbles and very few sherds (Locus:235934:020, Locus:235934:040, Locus:236934:015, Locus:236934:030)
END MAIN OCCUPATION PERIOD 1		Locus:236934:024 dark brown clayey soil with sherds and ashes	Locus:236934:027 dark brown clayey soil, moderately sorted, moist firm, with some pebbles, common sherds	Locus:236934:019 dark brown clayey soil with huge amounts of ashes	Locus:236934:031 dark brown compact clayey soil
MAIN OCCUPATION PERIOD 1				Locus:236934:025 collapsed burnt clayey material of oven (?)	
CONSTRUCTION FOR MAIN OCCUPATION PERIOD 1		Locus:236934:029 beaten mud floor	Locus:236934:028 beaten mud floor	Locus:236934:022 beaten mud floor, Locus:236934:033 bench	Locus:236934:032 beaten mud floor, LGR:0168 stone revetment (Locus:235934:009, Locus:236934:017)
FIRST CONSTRUCTION PHASE FOR MAIN OCCUPATION PERIOD		Locus:236934:013, Locus:236934:023 walls	Locus:236934:011, Locus:236934:012, Locus:236934:013 walls	Locus:236934:009, Locus:236934:010, Locus:236934:014 walls	Locus:235934:030, Locus:236934:014 walls
VIRGIN					

Table C1: Stratigraphic table of DLT2. Prepared by F. Janoscha Kreppner.

235934			234934				Dinka Lower Town 2
Building L				BUILDING M			
Room 35	Room 36	Room 37	Alley 38	Room 42	Room 43	Room 44	
LGR:0167 (234934:001, 235934:001, 236934:001)				Locus:234934:003 corer cut with fills Locus:234934:004, Locus:234934:005, Locus:234934:006			PRESENT SQUARE SURFACE
LGR:0178 (Locus:236934:002, Locus:235934:002, Locus:234934:002)							TOPSOIL
LGR:0176: dark brown clayey soil (Locus:235934:006, Locus:235934:007 dark brown clayey soil), LGR:0173 reddish collapse material (Locus:235934:005, Locus:235934:013) LGLR:0171 brown clayey soil with some pebbles and sherds, locally with higher density of burnt material / fire traces (Locus:235934:010, Locus:235934:011,Locus:235934:015, Locus:235934:022, Locus:235934:023)			LGR:0176 dark brown silty clay (Locus:234934:007, Locus:234934:008, Locus:234934:016)				
	LGR:0173 reddish collapse material (Locus:235934:005, Locus:235934:013	Locus:235934:025 dark brown reddish clayey soil		Locus 234934:018 brownish moist clayey soil with charcoal and pottery	Locus:234934:013 silty, partly clayey dark to medium brown soil, Locus:234934:021 brown clayey soil with charcoal inclusions, Locus:234934:023 clayey silty soil with charcoal inclusions above threshold	Locus:234934:014 partly silty, partly clayey dark brown soil, Locus:234934:022 brown clayey soil with charcoal	POST MAIN OCCUPATION PERIOD 1
Locus:235934:018 moist friable yellow brown silty clay with some ashes, Locus:235934:014 fill of storage vessel (south), Locus:235934:003 fill of storage vessel (north) with 14C-samples, Locus:235934:036 fill of storage vessel (west)	Locus:235934:019 black ashey clayey soil		LGR:0174 light brown clayey soil with charcoal and ash inclusions, many sherds lying flat (Locus:235934:012, Locus:234934:010, Locus 234934:020)	LGR:0179 clayey moist soil with many pottery, and some charcoal inclusions (Locus:234934:024, Locus:234934:036)	LGR:0180 brown clayey soil with charcoal (Locus:234934:025, Locus:234934:033, Locus 234934:035)	Locus:234934:026 brownish clayey soil with medium amount of charcoal and some small pebbles included	END MAIN OCCUPATION PERIOD 1
	Locus:235934:033 dark brown clayey soil with pebbles (pit fill), Locus:235934:042 pit cut		LGR:0177 beaten mud floor (Locus:234934:027, Locus:235934:035), Locus:235934:008 stone revetment				MAIN OCCUPATION PERIOD 1
Locus:235934:031 beaten mud floor, Locus:235934:034 pit for storage jar (?), Locus:235934:004 storage vessel (west), Locus:235934:037 storage vessel (north), Locus:235934:038 storage vessel (south)	Locus:235934:032 beaten mud floor		Locus:234934:028 package of earth floors	Locus:234934:032 beaten mud floor	Locus:234934:031 beaten mud floor, Locus:234934:034 stone installation	Locus:234934:030 beaten mud floor	CONSTRUCTION FOR MAIN OCCUPATION PERIOD 1
LGR:0172 rammed earth superstructure (Locus:235934:021, Locus:236934:008, Locus:236934:018); Locus:235934:016, Locus:235934:030 stone bases of walls	Locus:235934:039 substructure of the floor, Locus:238934:016, Locus:235934:017, Locus:235934:029 walls, Locus:235934:041 prepared ground	LGR:169 rammed earth superstructure (Locus:235934:024, Locus:235934:026); Locus:235934:027, 235934:028 stone bases of walls	Locus:234934:009, Locus235934:027, Locus:235934:029 walls, Locus:234934:029 substruction of floor	Locus:234934:038 threshold, Locus:234934:009, Locus:234934:017 walls	Locus:234934:038 threshold, Locus:234934:011, Locus:234934:012, Locus:234934:015, Locus:234934:017, Locus:234934:019 walls	Locus:234934:039 threshold, Locus:234934:012, Locus:234934:015 walls	FIRST CONSTRUCTION PHASE FOR MAIN OCCUPATION PERIOD
			Locus:234934:037 (?)				VIRGIN

Table C1 (continued): Stratigraphic table of DLT2. Prepared by F. Janoscha Kreppner.

Locus Group	Square	Locus
167	234934	1
167	235934	1
167	236934	1
168	235934	9
168	236934	17
169	235934	24
169	235934	26
170	236934	15
170	235934	20
170	236934	30
170	235934	40
171	235934	10
171	235934	11
171	235934	15
171	235934	22
171	235934	23
172	236934	8
172	235934	21
172	236934	18
173	235934	5
173	235934	13
174	235934	12
174	234934	10
174	234934	20
175	236934	20
175	236934	26
176	235934	6
176	235934	7
176	234934	7
176	236934	7
176	234934	8
176	234934	16
177	234934	27
177	235934	35
178	235934	2
178	234934	2
178	236934	2
179	234934	24
179	234934	36
180	234934	25
180	234934	33
180	234934	35

Table C2: Correspondence list between locus groups and loci of DLT2. Prepared by Andrea Squitieri.

- The cells of the table contain either a locus number (e.g., Locus:271927:027) or a locus group number (e.g., LGR:0010), followed by a brief description of the locus / locus group, be it a deposit, a wall, an installation, or a grave number (e.g., G6). The definition of "locus" and "locus group" is given below in **§D1.3**. A concordance list between locus groups and loci (pl. for locus) is given in **Table C2**.
- The background colours of the cells provide information on the temporal extension and an interpretation of the stratigraphic units as belonging to periods of occupation or non-occupation. Different pink shades are used for topsoil and virgin soil; brown is used for post-occupation periods; yellow for occupation periods. The same colour coding is used in the section drawings so that the stratigraphic table and the section drawings can be read in parallel.

To read the table from bottom up, start with the virgin soil (coloured in pink). This is followed by the so-called Main Occupation Period, coloured in yellow on the table. This represents the period when the walls were erected on the virgin soil and the floors were laid down. The Main Occupation Period was followed a period of abandonment, when erosion and other post-depositional processes were responsible for the formations of the deposits; this period is coloured brown in the table. Above these deposits, the topsoil (pink on the table) formed in more recent times. The following sections will describe the architectural units uncovered in DLT2, from east to west, following the same order as that used in the table.

C3. Alley 41

Jens Rohde

Alley 41 (**Figs. C2**, **C4**, **C5**, **C6: sections G**, **H**) is situated in the northeastern corner of the U-shaped test trench. It is about 0.90 to 1 m wide, and its excavated length is about 2.30 m. The alley is bordered by two walls to the northwest and southeast within the trench; they are parallel and oriented in a SW–NE direction. Wall Locus:236934:023, located in the north western corner of the trench, extends within the trench by only 1.65 m and it was uncovered at ca. 0.55-0.60 m below the site surface. Connections to other walls were not identified within the excavated area. It is not certain whether this northern boundary wall had the same two rows of stone at about a width of 0.60 m as we see in the southern boundary wall (Locus:236934:013), since its northern face was not fully excavated. Two courses of the wall Locus:236934:023 are visible; it is likely that

the preserved height corresponds to the original height of the wall base. The wall's stones are mostly rounded (their origin is probably the river), with a longish or squarish shape and they are set in perpendicular to the orientation of the wall itself. Some of the cobbles are sharp-edged, perhaps because they have a different origin from the others. The cobbles' size range from 12-15 cm to 20-25 cm.

Wall Locus:236934:013 separates Alley 41 from Room 40 of Building K to the south and was exposed over a length of ca. 2.2 m. The upper edge of the wall was discovered about 25 cm below the site surface. The wall is four courses high above the floor level, as can be seen from inside the alley. Similarly to wall Locus:236934:023, wall Locus:236934:013 is made of two rows of longish or more quadrangular cobbles set mostly in a perpendicular orientation to the direction of the wall. The stones are about 30×15 cm in size. Their colours range from greyish blue to almost white. Between the cobblestones a clay mortar was used to fix the stones. There is no evidence for the use of plaster on the face of either wall.

Locus:236934:029 represents the only excavated floor of Alley 41. The existence of older floor(s) has not been tested. The floor consists of beaten earth with some sherds, pebbles and a few cobbles pressed into it, and it abuts walls Locus:236934:013 and Locus:236934:023. On the floor, a dark, brown, moist, friable and moderately sorted clayey soil with ashes, containing some sherds lying flat (Locus:236934:024), had accumulated. This deposit marks the end of use of the floor and is superimposed by a dark, greyish-brown, moist friable, and moderately sorted, clayey soil with some sherds (Locus:236934:021). Due to its colour, density, and consistency, as well as its position above the deposit Locus:236934:024, deposit Locus:236934:021 is interpreted to be the result of post-occupation erosion processes. Above Locus:236934:021, a dark, brown, moist, firm, clayey soil with some sherds and few pebbles (Locus:236934:007, part of LGR:0176), accumulated as the result of further erosion processes. This deposit runs over the remains of the walls of Alley 41 and it continues on to cover the walls of Building K as well, which means that the walls were no longer visible after this deposit had accumulated. Above it, the topsoil was excavated (Locus:236934:002, part of LGR:0178) covered by the site surface (Locus:236934:001, part of LGR:0167).

C4. Building K

Jens Rohde

Building K is delimited in the northwest by Alley 41, and in the southwest by Alley 45 (**Figs. C2**, **C4**). Only small portions of Rooms 39 and 40, which are located in the northwestern part of the building as shown in the geophysical prospection (**Fig. C1**), were uncovered in the test trench.

C4.1 Room 40

This room is located in the northwestern part of Building K, south of Alley 41, and it is bordered by walls Locus:236934:013 to the northwest, Locus:236934:011 to the southwest and Locus:236934:012 to the southeast (**Figs. C2**, **C4**, **C6: section H**). The northeastern bordering wall is not visible as it is situated outside the trench, on the east. The room measures about 3.5 m along wall Locus:236934:011 (assuming that walls Locus:236934:011 and Locus:236934:013 connect at some point outside the trench to the northwest). Along wall Locus:236934:013, the room likely extends more than 2.5 m. In the geophysical prospection (**§C1**), this area showed a very bright white shadow, which may have been created by the double wall formed by Locus:236934:010 (belonging to Room 39), Locus:236934:011 and wall Locus:236934:012. From inside Room 40, wall Locus:236934:013 is composed of two rows and four courses of cobblestones as is also visible from Alley 41. Wall Locus:236934:011, bordering Room 40 to the southwest, is about 0.60 m wide and binds to wall Locus:236934:012, which is SW–NE oriented. Wall Locus:236934:011 was revealed at a depth of about 0.20 m below the surface. It is made of two rows of longish, mostly rounded stones set perpendicular to the orientation of the wall. Its eastern face, the only one completely visible, consists of four courses above floor level, while only the uppermost part of the western face is visible, because wall Locus:236934:010 ends on a lower elevation (see below). Wall Locus:236934:012 borders Room 40 to the southeast. It runs perpendicular to wall Locus:236934:011 and connects to it. Only a small portion of wall Locus:236934:012 has been unearthed, just about 0.25 m below surface. It seems that this wall is about 0.6 m wide. The joint between the two walls is marked by a longish stone. From inside the room up to four courses of the northwestern face of wall Locus:236934:012 is visible.

No entrance to the room was intercepted from within the trench. Most likely, the entrance is situated in the eastern part of the room, possibly in a NW–SE oriented wall.

In Room 40, floor Locus:236934:028 was uncovered. This is a beaten mud floor with some pebbles. It abuts walls Locus:236934:013, Locus:236934:011, and Locus:236934:012. There was a high density of sherds laying flat on this floor, especially in the central part of the room. This "carpet" of sherds was excavated as Locus:236934:027,

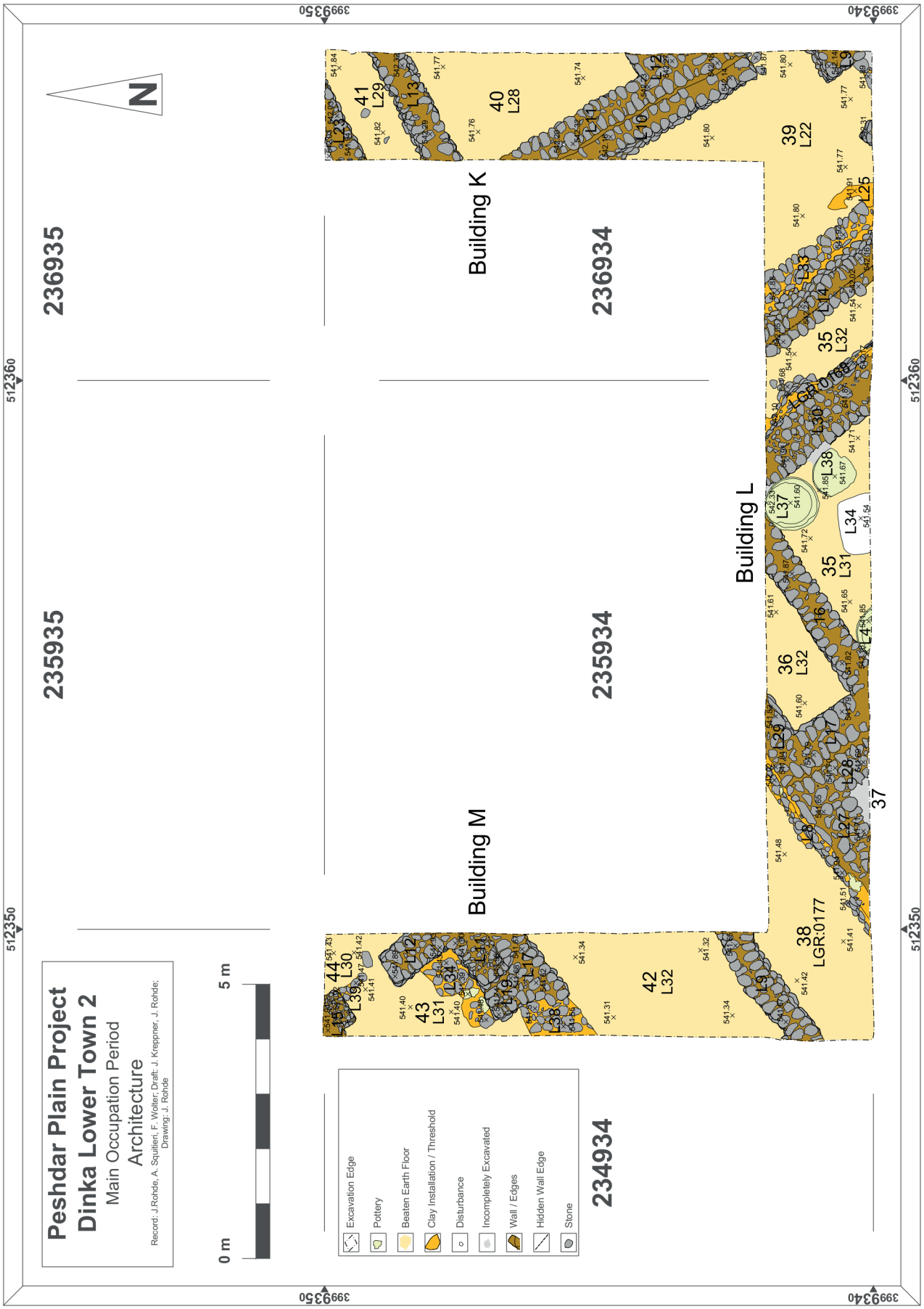


Fig. C4: Plan of DLT2. Drawing by Jens Rohde.

Fig. C5: Alley 41. Photo by Jens Rohde.

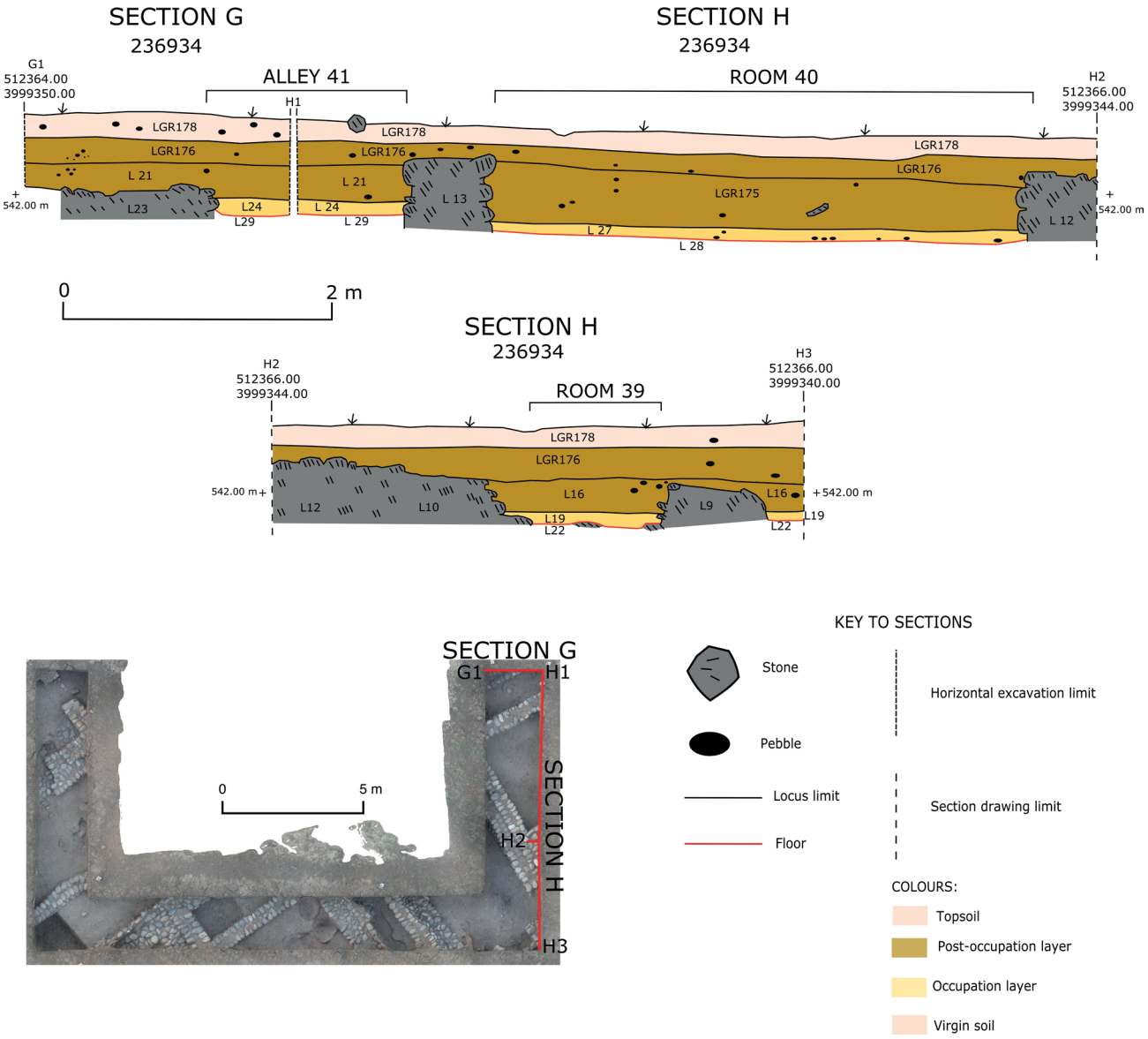


Fig. C6: Sections of Alley 41, Rooms 40 and 39 of Building K. Prepared by Andrea Squitieri, based on drawings by Jens Rohde.

along with the thin, dark brown, moderately sorted, moist, firm clayey soil that covered the sherds (**Fig. C7**). This soil also contained ashes. Locus:236934:027 represents the end of use of this room. In this layer, one earring (PPP 236934:027:020; §**G1.1, no. 3**), one possible stone weight (PPP 236934:027:017; §**G1.1, no. 2**) and an earring (PPP 236934:027:021; found only through flotation; §**G1.1, no. 4**) were found. Compared to the other rooms excavated in this area, Room 40 seems to contain a higher density of pottery. Above Locus:236934:027 is Locus:236934:026, made of almost the same material as in the fill Locus: 236934:020. Together they form LGR:0175, a dark brown, moderately sorted, clayey soil with some sherds, which accumulated as a result of erosion and abandonment processes. Above this layer (and also covering the walls) is Locus:236934:007 (part of LGR:0176), made of dark brown, moist, firm, clayey soil extending throughout the entire excavated part of Building K. It is located just below the topsoil (LGR:0178). Locus:236934:007 has yielded some pottery sherds and a few pebbles that had accumulated as a result of erosion processes, and also by the upheaval caused by recent ploughing.

Fig. C7: Room 40 floor covered by pottery sherds. Photo by Jens Rohde.

C4.2 Room 39

Room 39 is separated from Room 40 by the double wall Locus:236934:011 and Locus:236934:010, which borders Room 39 in the northeast. In the southeast, the room is delimited by wall Locus:236934:009, not yet completely excavated (**Figs. C2**, **C4**, **C6: section H**). On the southwest, the room is bounded by wall Locus:236934:014. The northwestern wall of the room has not been detected. Two doorways were identified: one in the northeast, in wall Locus:236934:010, and the second one in the southeast, in wall Locus:236934:009. Assuming the room has a regular shape, it should measure about 4 m SE–NW and 3 m SW–NE, at the very least. Room 39's wall bases were found ca. 0.30-0.40 m below the site surface, and their top level is about 0.10 m lower than Room 40's wall bases. Room 39's walls are made of four rows of cobbles, similar to the walls in Room 40, but because the cobbles of wall Locus:236934:010 (Room 39) are smaller than those of wall Locus:236934:011 (Room 40), the top levels of the walls of the two rooms differ. Close to the south-eastern corner of trench, in wall Locus:236934:010, there is a doorway about 1.05 m wide (measured from the junction of baulk and the wall Locus:236934:009 to wall Locus:236934:010), whose existence is indicated by two isolated cobbles south of wall Locus:236934:010.

Two parts of wall Locus:236934:009 are visible: the eastern part which is mostly under the eastern baulk, and the western part, which is mostly under the southern baulk. In between these two parts, there is a doorway of about 1.05 m width (similar to the doorway in wall Locus:236934:010). Here, two cobbles in a row indicate the existence of the threshold. The western part of wall Locus:236934:009 has five courses above floor level, one course higher than the eastern part. It is likely that wall Locus:236934:009 and, to the west, wall Locus:236934:014 bind to each other outside the trench.

Fig. C8: Installation Locus:236934:025, possibly part of an oven. Photo by Jens Rohde.

Fig. C9: Floor of Room 39, with burnt traces. Photo by Jens Rohde.

A relevant feature of Room 39 is a partially excavated installation resembling an oven (Locus:236934:025), located in the southwest, close to wall Locus:236934:014. This installation is partly situated on stones which should belong to a bench (Locus:236934:033). Except for an enclosed part with abundant ashes, the ground plan of this oven is barely visible. It was presumably closed from above, as indicated by secondary burnt material around this installation (**Fig. C8**). The installation was lying on the floor and therefore was used simultaneously with it.

The floor of Room 39 is Locus:236934:022 (**Fig. C9**), a greyish, beaten mud floor with very abundant ashes, traces of fire, many pottery sherds, and some pebbles especially close to the walls. The layer directly on the floor, that is Locus:236934:019, is a dark brown, clayey soil, rich in reddish particles (likely brick fragments) and a large quantity of ashes and burnt debris. This layer accumulated during the final use of the floor and also contains debris that were the result of destruction processes.

Above this layer is Locus:236934:016, a dark brown, clayey soil with brick fragments, ashes, and some burnt debris, most likely a by-product of erosion processes. The fill above (LGR:0176) is the result of continuing erosion processes that covered the walls of Building K.

C5. Alley 45

Jens Rohde

This alley separates Building K from Building L on the west (**Figs. C2**, **C4**). It is bounded in the southwest by wall Locus:235934:030, whose eastern face is equipped with a stone revetment (LGR:0168, composed by Locus:235934:009 and Locus:236934:017). On the northeast, the alley is bounded by the leaning wall Locus:236934:014. The width of Alley 45 is about 1.05 m on floor level and about 0.85 m at the western edge of the leaning wall, at a height of about 0.4 m above floor level. The alley's walls run in parallel in a NW–SE direction. The eastern wall (Locus:236934:014), leans to the west. It is made of two rows of longish cobbles set perpendicular to the orientation of wall. In the southern part, the westernmost row is separated due to the leaning position of the wall. The wall is about 0.55 m wide (western leaning part). From inside Alley 45, four courses of this wall are visible above floor level, despite the leaning position.

Fig. C10: Floor of Alley 45. Photo by Jens Rohde.

The protective installation LGR:0168, which is set against wall Locus:235934:030, has parallels with walls Locus:235934:027 and Locus:235934:029, the western outer walls of Building L (see below for a detailed description). This kind of protective installation can be evidence for an unroofed space, as one would expect in an alley.

The alley's floor (Locus:236934:032) consists of beaten earth embedded with pebbles (which are more densely distributed in the centre and run parallel to wall Locus:236934:014) and sherds lying flat on the floor (**Fig. C10**). During the excavation, the western part of the floor was cut; in this section so that it is possible to see that installation LGR:0168 is abutted by the floor in the west and abuts wall Locus:236934:014 on the east. On the floor, the deposit (Locus:236934:031), is a dark brown, moist, firm, moderately sorted, clayey soil with some pebbles. This is covered by debris of a comparable consistency (LGR:0170), which itself is the result of erosion processes that occurred after abandonment. Above that debris, Locus:236934:007 (part of LGR:0176) covered the walls of the alley completely.

C6. Building L

Jens Rohde

Building L is separated from the other excavated architectural units by Alley 38 to the northwest and Alley 45 to the northeast (**Figs. C2**, **C4**). Two rooms (Rooms 35 and 36) in the northern part of Building L were partly excavated, and a third (Room 37) is only known by its northern corner, the only part located within the trench limits. The building's outer walls, that is Locus:235934:027 and Locus:235934:029 to the west and Locus:235934:030 to the east, are protected by stone installations (Locus:235934:008, attached to the western walls, and Locus:235934:009 attached to the eastern wall). These are stone revetments similar to LGR:0168 which protect the western wall of Alley 45.

There are some noteworthy features, observed only in Building L, that point to the use of rammed earth (also called *pisé*) for the walls' superstructure. First, the top elevations of the stone protective installations are higher than the upper level of the walls. Second, on top of the walls some debris is visible which is clearly distinguishable from the fills of both Rooms 36 and 37. The elevation of this debris is higher than these fills also (see below). In my opinion, this debris is part of the original superstructure of the walls themselves. Because this debris looks quite homogeneous, with no discernible bricks or brick fragments, it can be assumed it originally formed a rammed earth superstructure. In addition, there is another supporting argument for the use of rammed earth coming from Room 35. Here, some large storage vessels were found (**§C6.1**) which have been preserved to a certain height, with their rims missing. Assuming that the vessels and the walls underwent similar destructive/erosive processes, one would expect to find that the walls were preserved to a height very close to that of the vessels. However, the preserved stone bases of the walls have been preserved to a level that is lower than the top of the vessels. It is clear that these preserved stone bases were not originally higher because their upper faces are very even. It is therefore reasonable to suggest that between the upper faces of the stone bases and the top of the vessels, the debris of the wall superstructures is still present. No bricks or brick fragments could be discerned within this debris, and therefore it may be what remains of rammed earth construction.

Unlike Building L, no significant differences can be observed within the other buildings of DLT2 between the debris on top of walls and the fills inside the rooms. This may be due to the fact that the room fills in these buildings were the result of collapsed wall superstructures and, as a consequence, they are indistinguishable.

C6.1 Room 35

Room 35 is bounded by wall Locus:235934:030 to the northeast, with the protective installation LGR:0168 (made of Locus:235934:009 and Locus:236934:017), and by wall Locus:235934:016 to the northwest (**Figs. C2**, **C4**, **C11: section I**). The southeastern and southwestern walls remain unexcavated as they fall outside the trench. The eastern wall (Locus:235934:030), is about 0.9 m wide and is made of four rows of cobbles of different shapes and sizes, not very carefully set into the inner core of the wall. On its western face the stones are more similar in shape and size, and are aligned in perpendicular to the orientation of the wall. The eastern wall face is hidden behind the protective installation LGR:0168. The wall was uncovered about 0.65 m below the surface, while installation LGR:0168 was unearthed about 0.3 m below the surface. Inside Room 35, one and a half to two courses are of wall Locus:235934:030 are visible. All in all, the cobbles of Building L are bulkier than those of Building K.

Limited by the protective installation LGR:0168 to the east, the debris on top of this wall can be described as a moderately sorted, moist, friable, yellowish-brown, silty-clayey soil. It has been named LGR:0172 (a group composed of Locus:235934:021, Locus:236934:018 and Locus:236934:008), and it is what remains of the wall's

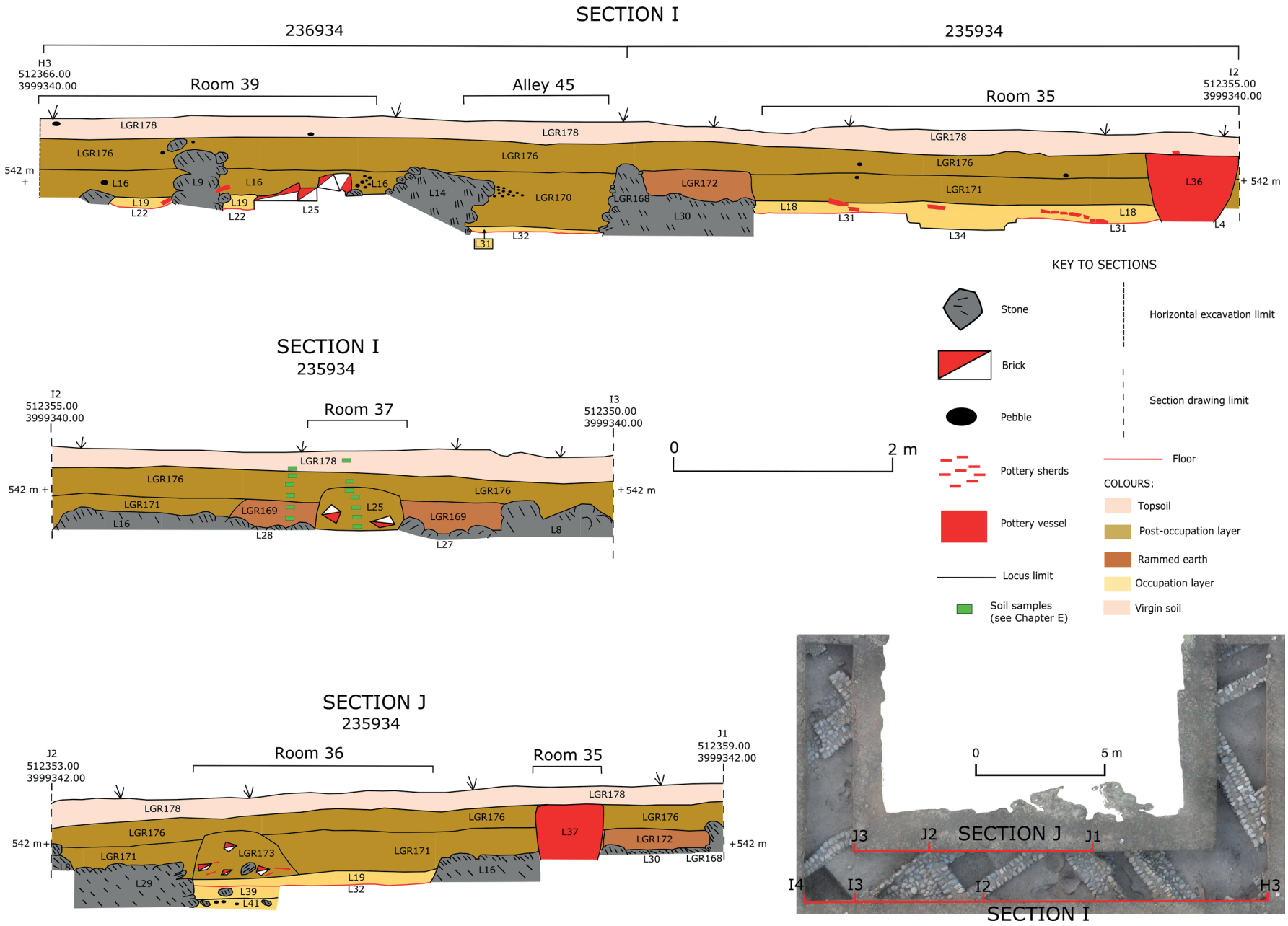


Fig. C11: Sections of Rooms 35, 37, 37, 39 and Alley 45. Prepared by Andrea Squitieri, based on drawings by Jens Rohde.

Fig. C12: LGR:0172 in Room 35 representing the rammed earth collapse of the wall superstructure. Photo by Jens Rohde.

Fig. C13: Room 35 with the three large storage vessels. Photo by Jens Rohde.

rammed earth superstructure (**Figs. C11: section J**, **C12**). Therefore this deposit dates back to the First Construction Phase of the building (see **Table C1**). The installation LGR:0168 is made of one row of longish cobbles of a diameter of 15-20 cm, set in the same orientation as the wall's stones but of a different size.

The northwestern wall of the room (Locus:235934:016), is about 3.5 m long and 0.6 m wide. It is made of two rows of stones, with one and a half courses visible from the inside of the room. It was uncovered about 0.6 m below the surface.

Two storage vessels were found beside wall Locus: 235934:016. Both are preserved about 0.4 m above the wall and about 0.2 m below the site surface. As vessel Locus:235934:037 marks the corner between walls Locus: 235934:016 and Locus:235934:030, so may the vessel Locus: 235934:004 mark the southwestern corner of the room, thus indicating that there should be a SE–NW oriented wall in alignment with wall Locus:235934:017 and parallel to wall Locus:235934:030. If so, then this room may have had a symmetrical layout.

Except for sherds, there were no finds inside the storage vessels. Vessel Locus:235934:037 contained dark brown-greyish, moist, firm, clayey soil (Locus:235934:003) with pebbles and ashes that increased in abundance towards the bottom. Two seeds coming from this fill, and isolated through flotation, provided radiocarbon dates (**§C2.1**). Sherd and soil samples for residue analyses were also taken, and their results are discussed in **Chapter F3**. Vessel Locus:235934:004, only partly excavated, had a fill (Locus:235934:036) made of dark brown, moderately-sorted, clayey soil with a few sherds and some pebbles.

Within vessel Locus:235934:038, located beside wall Locus:235934: 030, a dark (almost black) and compact, ashy, clayey soil (Locus: 235934:014), with abundant burnt debris (and devoid of finds) was excavated. The three large storage vessels of Room 35 (Locus:235934:004 in the west, Locus:235934:037 in the north, and Locus:235934:038 in the south) were sunk into the beaten mud floor (Locus:235934:031), which abuts the room's walls (**Fig. C13**). A pit cut (Locus:235934:034) to the southwest of vessel Locus: 235934:038 was found in the room's floor, and this is probably what remains of another storage container which has not been preserved. This pit cut was filled with the

same deposit that lay on the floor: a dark greyish-brown, moist, friable, moderately-sorted, clayey soil with ashes (Locus:235934:018). Above this deposit was LGR:0171 (composed of Locus:235934:010, Locus:235934:011, Locus: 235934:015, Locus:235934:023, and Locus:235934:022), made of a brown, clayey soil with some pebbles, charcoal and sherds. This soil had a higher density of burnt material, especially in between vessels Locus:235934:004 and Locus:235934:037. These accumulations are the result of erosion and abandonment processes. The layer LGR:0171 yielded two brick fragments (**§G1.2**, **no. 17**), possibly the remainders of an installation or a structure.

It is likely that parts of the superstructure of the walls still existed during these formation processes, which is indicated by the different levels of preservation of the vessels Locus:235934:004, Locus:235934:037 and Locus:235934:038 (of this room), the installations Locus:235934:008 and LGR:0168 on the outer walls, and the debris (of Rooms 36 and 37 below) as well as the rammed earth on top of stone base of wall Locus:235934:030. All these loci were preserved at a higher elevation than LGR:0171.

LGR:0171 is covered by LGR:0176 (composed of Locus: 235934:006 and Locus:235934:007): a dark brown, moist, firm, moderately-sorted, clayey soil with a few stones, pebbles, and sherds. This layer, which accumulated as the result of erosion processes, covered the architectural structures of Building L, but not the vessels themselves (**Fig. C11: section I**). Above LGR:0176, the topsoil LGR:0178 bears marks of modern disturbance due to ploughing.

Fig. C14: Floor of Room 36. Photo by Jens Rohde.

C6.2 Room 36

This is the northernmost room of Building L, bordered by walls Locus:235934:016 to the south-east, Locus:235934:017 to the southwest, and Locus:235934:029 to the northwest (**Figs. C2**, **C4**, **C11: section J**). Wall Locus:235934:017 connects to the other two walls of this room. In the northeast, Room 36 was likely bordered by wall Locus:235934:030, even if this has not been entirely excavated. The walls were uncovered about 0.6 m below surface. Wall Locus: 235934:016 (described above, **§C6.1**) has two courses of cobbles visible above the floor level inside Room 36 and four courses of stones in total. Wall Locus:235934:017 consists of two rows of cobbles visible above the floor and three or four courses in total. The cobbles are bigger than those used in wall Locus:235934:016 but set in the same way. The width of wall Locus:235934:017 is about 0.7 m. In contrast, wall Locus:235934:029 measures only about 0.6 m in width. This wall is made of stones of differing sizes. Installation LGR:0168 (composed of Locus:235934:009 and Locus:236934:017), described above as a protective installation set against the wall, is abutted by wall Locus: 235934:017 and wall Locus:235934:027 to the southwest. Of installation LGR:0168, five courses of stones set in one row are visible from Alley 38. These cobbles are oriented according to the alignment of the wall.

Inside Room 36, the floor Locus:235934:032 (**Fig. C14**) is the youngest and so far only floor identified, made of greyish-brown, compact, beaten mud, with pebbles and some sherds lying on it. In the western part of Room 36, a pit, Locus:235934:033 (with pit cut Locus:235934:042), was cut from this floor. This pit has yielded cobblestones and very small pebble stones from the bottom centre, which leads us to think that these stones were consolidated within the pit to hold a post, or something similar, in position in the ground. A broken pestle and a broken quern were found in this pit, possibly discarded here after they could not be used anymore (**§G1.2**, **nos. 11-12**).

Beneath this pit, a sounding was opened to investigate possible older floors. A firm, moderately-sorted, clayey soil with some pebbles and a few sherds was found and registered as Locus:235934:039. This has been interpreted to be either the lower part of the packed floor itself or a substructure of it. This deposit reaches down to a package of pebble stones, which marks the

level on which the floor was laid down. This layer, called Locus:235934:041, is a dark brown, clayey soil, with some pebbles and very few sherds, which reaches down to the bottom of walls Locus:235934:016, Locus:235934:017, and Locus:235934:029, thus proving that no older floor belongs to this room (**Fig. C11: section J**).

Above floor Locus:235934:032, the deposit (Locus:235934:019) consisted of a dark brown, moist, friable, clayey soil, with ashes and some sherds lying flat. This accumulation was the result of the final use of this room. Above this, the room's fill (LGR:0173), was found in the western part of the room. It consisted of dark brown, clayey, moist, friable soil, with some pebbles and pieces of brick representing collapsed material. These accumulations were likely caused by post-occupational erosion processes. LGR:0171 (made of Locus:235934:010, Locus:235934:011, Locus:235934:015, Locus:235934:022 and Locus:235934:023) covered Locus:235934:019 in the eastern half of Room 36, and it consists of a brown, clayey soil with some pebbles and sherds and a high density of burnt material. Above this deposit, the upper debris was assigned to layer LGR:0176, which was made of a dark brown, moist, firm, moderately-sorted, clayey soil with some stones and pebbles. Above all this is the topsoil: LGR:0178.

C6.3 Room 37

This room is adjacent to Room 36 to the southwest. It is bordered by walls Locus:235934:027 to the northwestern and Locus:235934:028 to the northeast (**Figs. C2**, **C4**, **C15**, **C11: section I**). Not much is known about this room, as the southwestern and south-eastern walls are situated outside the trench and no floor level could be reached.

Wall Locus:235934:027 most likely connects to wall Locus:235934:028, because there is no clear-cut separation between these two walls visible from above. Locus:235934:027 is made of four rows of cobbles of different sizes and shapes, set to create two opposite faces, of which the northwestern one is covered by the stone installation Locus:235934:008. One course of this wall is visible inside Room 37. Wall Locus:235934:028 is made of at least three rows. These two walls form a corner which is abutted by walls Locus:235934:029 and Locus:235934:017. It is noteworthy that wall Locus:235934:027 is about 0.9 m wide, while Locus:235934:029 is about 0.7 m wide. Wall Locus:235934:028 is about 0.75 m wide, a little wider than the neighbouring wall Locus:235934:017. Both walls of Room 37 are about 0.1 m below the top elevation of walls of Room 36, which means they were uncovered about 0.7 m below the site surface. It seems that Rooms 36 and 37 were each built up as two single units, separated by a double wall, with the wall Locus:235934:017 higher than Locus:235934:028.

On top of walls Locus:235934:027 and Locus:235934:028 a brown clayey soil with some pebbles and sherds, called LGR:0169 (composed by Locus:235934:024 and Locus:235934:026) was found, bordered to the northwest by the stone installation Locus:235934:008 and by Room 37's fill to the southeast (**Figs. C11: section I**, **C16**). This layer is interpreted to be the remains of the rammed earth that formed the superstructure of these walls, therefore dating back to the First Construction Phase.

The only fill of Room 37 excavated (Locus:235934:025), was likely the result of erosion and abandonment processes. It consists of collapsed baked bricks in fragments sticking out from the southern baulk in a dark, reddish-brown, clayey soil (**§E3.2**). Above both this layer and the architectural structures of this room, is layer LGR:0176, a dark, brown, moist, firm, and moderately-sorted, clayey soil with some stones and pebbles, which was created by the processes of erosion and abandonment. Above this, LGR:0178 represents the topsoil and shows traces of recent ploughing.

Fig. C15: The small excavated portion of Room 37, visible on the left. Photo by Jens Rohde.

Fig. C16: Locus:235934:028, interpreted as rammed earth of the wall superstructure. Photo by Jens Rohde.

C7. Alley 38

Felix Wolter

In the southwestern part of the trench, an alley with a width of ca. 2 m was excavated between Buildings L and M (**Figs. C2**, **C4**, **C17: sections I**, **J**, **K**). It is enclosed by the outer walls of Building K, wall Locus:234934:009; Building L, walls Locus:235934:027 and Locus:235934:029, whose stone bases are preserved to a height of 45 cm (southeastern wall) and 30 cm (northwestern wall), measuring from the youngest floor of the alley (LGR:0177). A sounding from the southeastern part of the alley indicates that this alley features an accumulation of 30 cm of deposit (**§E3.2**), which may be explained by the long duration of its use. No entrance connecting the alley to one of the surrounding buildings was located in the trench.

The oldest layer was reached in the lowest part of the sounding, at ca. 541.14 m a.s.l., where a dense gravel layer with a dark greyish colour, understood to be virgin soil, was found (Locus:234934:037, **Fig. C18**). A layer of nearly sterile, silty, brown soil (Locus:234934:029) covers it, which might be interpreted as the substructure of the original floor of the alley (**Fig. C17: sections I**, **K**). Above this, there was a package of floors that contained a large quantity of pebbles, as well as abundant bone and pottery fragments (Locus:234934:028). The youngest floor in the alley is represented by a very compact surface of clayey soil with a large amount of small pebbles (LGR:0177). Floor LGR:0177 abuts the stone installation Locus:235934:008, itself attached to walls Locus: 235934:027 and Locus:235934:029, indicating it was used in conjunction with the floor. It seems that installation Locus:235934:008 was built during the course of Alley

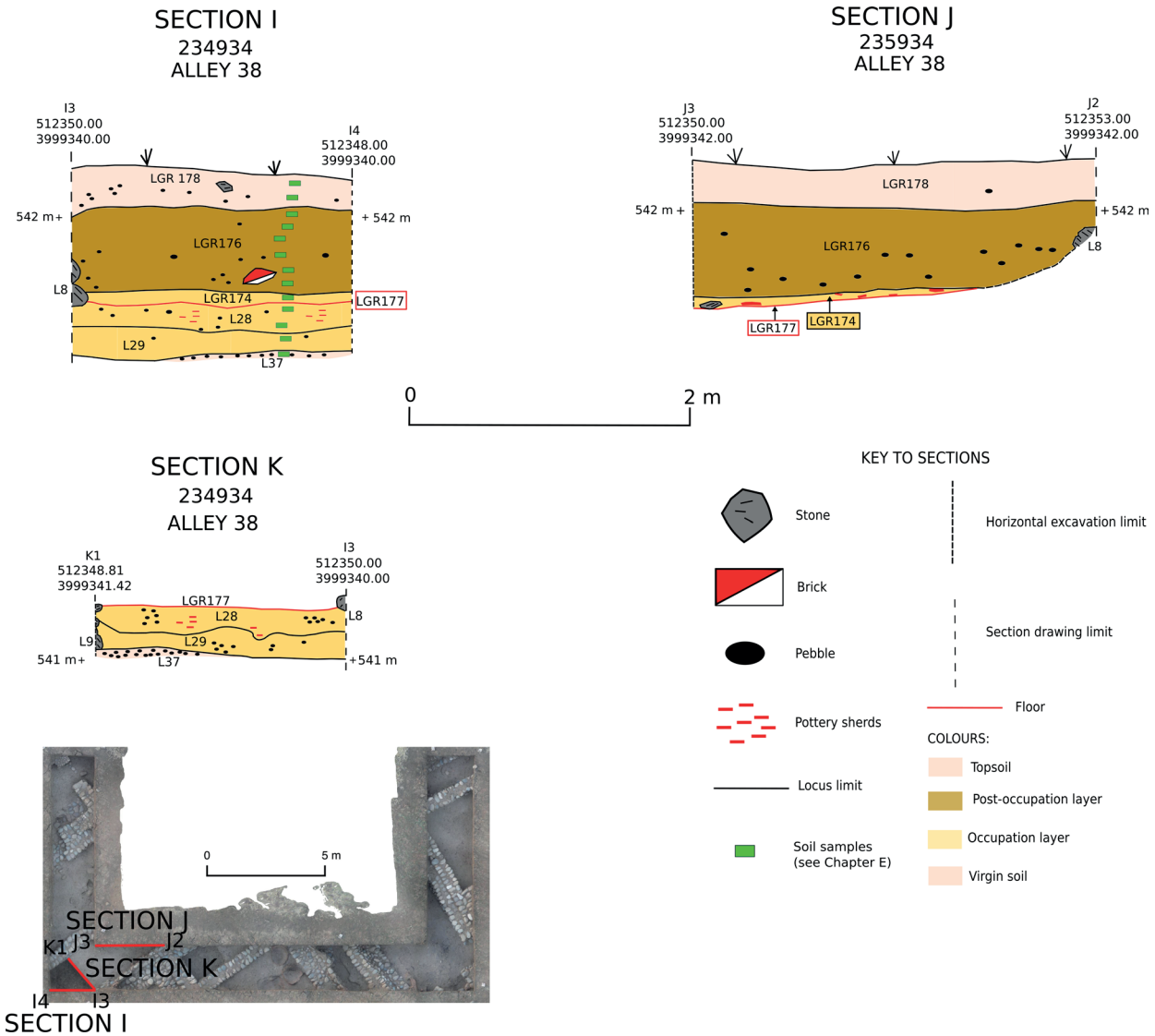


Fig. C17: Sections of Alley 38. Prepared by Andrea Squitieri, based on the drawings by Felix Wolter and Hero Salih Ahmed.

Fig. C18: Alley 38 and the sounding down to the virgin soil. Photo by Felix Wolter.

38's use, because the package of floors Locus:234934:028 abuts wall Locus:234934:009 and runs under the installation Locus:235934:008.

Deposit LGR:0174, resting on the youngest floor (LGR:0177) represents the endpoint for the use of Alley 38. It is characterised by a light brown, clayey soil that contains a noticeably high number of charcoal inclusions and ashes clustered around several fragmented sherds (that lay flat), as well as bone fragments and several phytoliths. A stone mortar (PPP 234934:020:016; **§G1.2**, **no. 18**) and three fragmented vessels (PPP 235934:012:009, PPP 235934:012:011, PPP 235934:012:012) mark the youngest and last use-layer in Alley 38 (**Fig. C19**). The post-occupation layer in this alley consists of a reddish-brown, clayey soil (LGR:0176) covered with dark-brown topsoil (LGR:0178) below the present site surface (**Fig. C17: sections I**, **K**).

Fig. C19: Pottery vessels lying on the floor of Alley 38. Photo by Felix Wolter.

C8. Building M

Felix Wolter

Building M is the westernmost of the three buildings in this area, composed of Rooms 42, 43 and 44, all partially excavated (**Figs. C1**, **C2**, **C4**)

C8.1 Room 42

Room 42 is roughly 2.5 m wide (**Figs. C2**, **C4**, **C20: sections M**, **N**). The magnetogram (**Fig. C1**) indicates that it is a rectangular architectural unit; however, the original length of the room is unknown due to the small area excavated. Room 42 is delimited to the south-east by a narrow wall (Locus:234934:009; **Fig. C21**). This wall is made of two parallel rows of river cobbles, ca. 50 cm wide and roughly oriented in a SW–NE direction. There is no door connecting Room 42 to Alley 38 in the area exposed. Apparently the eastern third of the wall shifted slightly towards south, giving the wall a bent shape when viewed from above. The wall's south-eastern face was exposed in the sounding in Alley 38 down to the lowest of the five stone courses, below the floor level. The total preserved height of the wall base is 50 cm (**Fig. C20: section M**). The floor that was used at the end of Room 42's occupation (Locus:234934:032) abuts at the third wall's course from above. We currently do not know if there was another older floor, because we did not yet dig deeper. The face of wall Locus:234934:017 and the threshold (Locus:234934:038) to the entrance to Room 43 define the northwestern limit of Room 42. Wall Locus:234934:011 and wall Locus:234934:017 to the south-east form a double wall. Due to the small area excavated, it is not possible to establish whether they were built at the same time or in two different periods; however, the differences in height and construction techniques of these two walls may indicate that they had two different architectural functions.

The room's beaten mud floor (Locus:234934:032) is characterised by many fragmented sherds found laying flat at roughly at the same level, clustering, in particular, in the in southeastern part of the room. Several other finds (e.g., PPP 234934:024:030, PPP 234934:024:031, PPP 234934:024:034, PPP 234934:024:036; see **§G1.3**, **nos. 20-27**) were found all over the room's floor. A few small finds deserve a special mention as they were found next

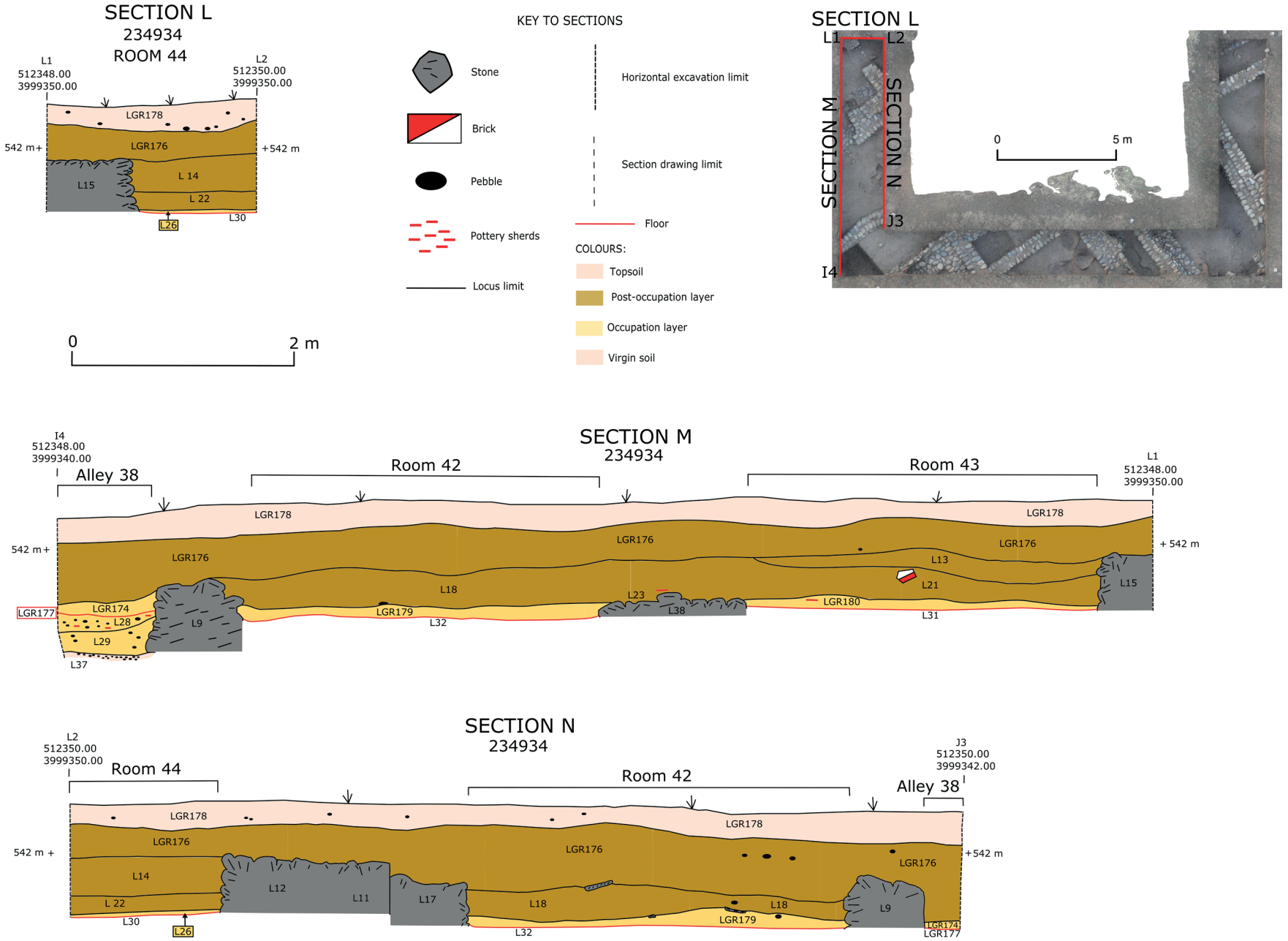


Fig. C20: Sections of Building M. Prepared by Andrea Squitieri, based on drawings by Felix Wolter.

Fig. C21: Room 42, with pottery and a pebble mortar lying on the floor (§G1.3, no. 20). Photo by Felix Wolter.

to the accumulation of sherds. These are an iron blade (PPP 234934:024:003), a needle made of bronze/copper alloy (PPP 234934:024:041), and a ceramic "Yo-yo"-shaped object (PPP 234934:024:037) that could be related to the spinning of wool (see **§G1.3, nos. 22, 25-26**).

Substantial quantities of burnt material were present on the room's floor (Locus:234934:024, part of LGR:0179), clustering around the sherds in the southern part of the room, as well as in front of the southern wall's face (Locus:234934:009). The high concentration of fragmented vessels found in the southern part of the room's excavated area marks the endpoint of the floor's use (LGR:179, which includes Locus:234934:024 and Locus:234934:036). Several well-preserved fragments of a carinated bowl (PPP 234934:018:001) were found in the room's fill, which was composed of a brownish, moist, clayey soil with some charcoal (Locus:234934:018). A dark brown, silty, clay, soil (LGR:0176, composed of Locus:234934:007, Locus:234934:008, and Locus:234934:016) covered that fill as well as the walls of the room. This was, in turn, overlaid by topsoil LGR:0178 (**Fig. C20: section M**).

Finally, it should be noted that the southeast wall Locus:234934:009 is thinner than the northwest wall. It is also strangely bent (see above). Because only a small area was excavated, it is not possible to conclusively clarify whether Room 42 was roofed.

C8.2 Room 43

Room 43 (**Figs. C2**, **C4**, **C20: section M**, **C22**) was accessible from Room 42 to the southwest, and from Room 44 to the northeast via passageways. Only a small part of the room was investigated. The eastern boundary consists of two pairs of walls (Locus:234934:017 with Locus:234934:019, and Locus:234934:011 with Locus:234934:012), each pair connected at a right angle. The two pairs are separated by a construction joint. Walls Locus:234934:017 and Locus:234934:019 consist of two rows of large stones with smaller stones in between. The walls are about 60 cm wide. Since the upper surface of the wall is flat, this might be the original upper course of the wall stone base, which is three to four courses high above the floor. To the west, some stones form a threshold (Locus:234934:038) connecting this room to Room 42 to the south.

The second pair of walls (Locus:234934:011 and Locus:234934:012) is five courses high for a total height of 50 cm above the floor. Wall Locus:234934:011 is three rows wide with a rubble fill composed of loosely placed, small, irregular stones of different shapes. These stones were fixed with a brownish, hard, clayey plaster. The northwest to southeast oriented wall Locus:234934:012 is built of two

Fig. C22: Room 43, with pottery lying on its floor. Photo by Felix Wolter.

rows of stones (ca. 20 × 30 cm). At the entrance of the passage to Room 44, the wall edge is strengthened by one big flat stone, ca. 50 × 20 cm. In the passage area, the beaten mud floor of Room 43 abuts a row of stones which form a threshold (Locus:234934:039). To the north of the passageway, wall Locus: 234934:015 is also five courses of cobbles high. However, the top of the wall base is constructed in a different way, with small stones of 5-10 cm in diameter. Nevertheless, despite the different building techniques, the two walls obviously belong to the same occupation phase.

The floor of the room is made of beaten mud (Locus:234934:031), which abuts the boundary walls. The floor also abuts a stone installation (Locus:234934:034) located in the eastern corner of the room. The installation consists of a pedestal to the east and a basin-like feature in the west. On the floor lay a brown, loamy, earth with charcoal and many ceramic fragments lying flat (LGR:0180, composed of Locus:234934:025, Locus:234934:033, and Locus 234934:035) representing the remains of the final use. This in turn was covered with a brown, clayey soil with charcoal inclusions (Locus:234934:021). Above the threshold was a clayey, silty soil with charcoal inclusions (Locus:234934:023). These two deposits, as well as the overlying Locus:234934:021 and the silty, partly-clayey, brown soil Locus:234934:013, represent the processes of decay within Room 43. A dark brown, silty, clay, LGR:0176, below the topsoil LGR:0178, also covered the fill in this room.

C8.3 Room 44

Room 44 is located north of Room 43 and was accessible from there (**Figs. C2**, **C4**, **C20: sections L**, **N**, and **Fig. C23**). Only a tiny part of the room was uncovered in the trench. The beaten mud floor Locus:234934:030 abuts the threshold Locus:234934:039, and was therefore used at the same time as the floor in Room 43. It was covered with brownish clayey soil with some charcoal and small pebbles (Locus:234934:026) which contained no other finds apart from some pottery fragments. Above this, brown clayey soil with charcoal (Locus:234934:022) and silty and clayey dark brown soil (Locus:234934:014) accu-

Fig. C23: Room 44. Photo by Felix Wolter.

mulated and are interpreted to be deposits which came into existence through erosion processes after the room was abandoned. Dark brown, silty clay LGR:0176 and the topsoil LGR:0178 superimposed the fill of the room.

C9. Preliminary conclusions

F. Janoscha Kreppner and Karen Radner

The aim of the field season in spring 2017 was to verify by means of archaeological excavation the presence of a group of large, free-standing buildings in the plain between Qalat-i Dinka and Gird-i Bazar, as indicated in the magnetogram produced by the 2016 geophysical prospection (**Fig. B2**). A key result of this campaign is the fact that the excavations verified walls and buildings in exactly the spots where the magnetogram displayed corresponding anomalies.

Using the same excavation strategy as previously employed in Gird-i Bazar, we dug a U-shaped test trench in order to gain information about all three buildings (called Buildings K, L and M) and their relationship to each other and to get a first assessment of the stratigraphy in this area of the settlement. The floors of each of the three buildings are located about 1.5 m below the site surface. As the floors of the alleys between the buildings connect to the buildings' walls, we can certainly assume that they were all inhabited during a common occupation phase.

Building L allowed us to gain new insights into the construction of the walls at the Dinka Settlement Complex; so far, it had remained unclear how the wall structures erected on top of the stone bases should be reconstructed. In Building L, the earth (Locus:235934:169, Locus:235934:172) above the wall bases of river stones displayed a noticeably different colour than the room fillings (**§C6**, **Fig. C11**). Had clay bricks been used, their joints would have been filled with clay mortar, and their traces should have been visible in the planum and/or in the section. As this was not the case, we can now assume with some confidence that the walls above the stone bases were raised using rammed clay.

In fabric, production technique and form, the ceramics found on the floors of Buildings K, L and M correspond closely to the ceramics already known from Gird-i Bazar (**§§F1-F2**). Therefore, there was likely only a short passage of time, if any, between the manufacture of the two assemblages. The similarities between the ceramic assemblages are striking also because of the quite different character of the architecture encountered at Gird-i Bazar and DLT2. The ceramics used in Buildings K, L and M may have been produced in the pottery workshops of Gird-i Bazar.

The area exposed in the test trenches is too small to be able to make accurate statements about the function of the buildings. But according to the magnetogram, Building L covers an area of about 800 m², Building M of about 650 m² and Building K of about 280 m², indicating that they may have been of central importance to the wider settlement. This assumption is further strengthened by the presence of great storage vessels in the largest Building L, which suggest stockpiling.

Two cereal grains from the bottom of one of these storage vessels underwent ^{14}C analysis and produced calibrated dates from 1012-894 BC and 930-824 BC, respectively (**§C2.1**). The Assyrian presence in the region was established at some point during the reign of Shalmaneser III (r. 859-824 BC), and the grain thus dates to the time before the Assyrians arrived in the Peshdar Plain.

But more evidence is needed to determine the date of construction, duration, and end of use of the buildings in DLT2 and their chronological and functional relationship to the occupation of Gird-i Bazar and Qalat-i Dinka. We will of course continue using a sampling protocol that will allow us to retrieve material for further ^{14}C analysis.

D. Excavating Gird-i Bazar: the 2017 season

D1. The final campaign inside the chicken farm enclosure

F. Janoscha Kreppner & Andrea Squitieri

The 2017 excavations continued directly from the results of the 2015 and 2016 seasons. Overall, the aims of the 2017 campaign were, firstly, to continue the excavation of the area enclosed by the metal fence surrounding the chicken farm in order to better understand the layout of those buildings, rooms and outdoor areas which had been only partially traced during the previous two campaigns (**Fig. D1**); secondly, to complete the excavation of two pyrotechnical installations that had been partially uncovered in 2016, and thirdly, to continue excavation of the Sasanian cemetery. This was the final excavation season within the chicken farm enclosure.

In the eastern part of Gird-i Bazar, the excavation of Courtyard 2, Buildings B and C, and Outdoor Areas 7 and 24 (squares 270928-272928 and 271929) was completed under the supervision of Alessio Palmisano and Jens Rohde. In the western part of Gird-i Bazar, Peter Bartl, Francesca Chelazzi, Janoscha Kreppner and Andrea Squitieri continued the excavation of Buildings D, H, I, O, N, and Alleys 12 and 13 (squares 266930-269930 and 266931-268931).

In 2017, we were fortunate to have a pyrotechnology expert and a physical anthropologist on the team. In the central part of Gird-i Bazar, where the so-called "connecting trench" had been opened in 2015 and enlarged in 2016, lies Outdoor Area 8. Very close to the pottery kiln unearthed in 2015-6, another pyrotechnical installation had been partially uncovered in 2016. Pyrotechnology specialist Silvia Amicone continued its excavation (squares 269930-270930). She also supervised the excavation of

Fig. D1: Orthophoto of the areas excavated at Gird-i Bazar in 2015-2017 superimposed on a drone photo (courtesy of Jessica Giraud), showing the chicken farm and the surrounding metal fence. Prepared by Andrea Squitieri.

another pottery kiln in Room 31 (Building D), which had been found in 2016. The excavation of the previously discovered Sasanian cemetery was continued under the supervision of Kathleen Downey; she discusses this work and the graves in **Chapter H**.

D1.1 The digital documentation system

The digital documentation system used during the 2017 excavation campaign continued and expanded on the system implemented in the previous campaigns[39]. This system entails:

- The use of a MySQL-based database created by Christoph Forster (www.datalino.de) and accessible via a local network both on the field and in the excavation house. The access to the database on the field allows the trench supervisors to enter as much data as possible in "real time" as the excavation proceeds.
- The creation of daily orthophotos, digital elevation models (DEMs) and 3D models of the excavated areas. This allows to produce day-by-day digital versions of the excavation and it lays the basis for a 3D stratigraphy.
- The use of a geo-database based on QGIS and connected to the database, in which daily geo-referenced drawings are made using both the daily orthophotos and the DGPS measurements taken on the field. These drawings are used as basis for the 2D plans.

D1.2 The excavation grid and the locus/collection system

The 2017 excavation grid is the same as that one used in 2015 and 2016: a 10×10 m grid system based on UTM coordinates, oriented towards the North, with the squares' vertexes placed on rounded coordinates (**Fig. D2**). Each square is identified by a number made of 6 digits, 3 for the East coordinates and 3 for the North coordinates of its SW vertex. So, for example, the square 272928 has a SW vertex with coordinates East 512720, North 3999280.

The square number constitutes the first part of the ID number identifying loci, collections, finds and samples. In our system, loci (pl. for locus) are discreet stratigraphic units that represent a single event or action leaving discernible traces in the archaeological record. A locus can be a soil deposit (e.g., topsoil, fills) or an installation (e.g., floor, wall). Each locus receives a number which is formed by the square number in which the locus lies followed by a progressive number. So, for example, Locus:271928:001 is locus 001 in square 271928. Of course, no two loci can have the same number within the same square.

If a stratigraphic unit (for example a wall) extends across two contiguous squares, it receives two locus numbers, one in each square. These two locus numbers are then unified in the so-called Locus Group (abbreviated LGR). Each Locus Group is identified by a progressive number followed by "LGR". So, for example, Locus Group 283, indicated as LGR:0283, represents a wall extending across squares 271928 and 272928, and it is composed by Locus:271928:188 and Locus:272928:058. A concordance list between loci and Locus Groups is given in **Table D3**.

Locus Groups are also used when, in post-excavation analysis, it is understood that two deposits or installations within the same square, formerly thought to be distinct loci, are in fact parts of the same stratigraphic unit; therefore, these loci are unified into the same Locus Group. The fragmentary material collected from each locus is registered as a collection, based on the type of material (e.g., pottery sherds, bone fragments, glass shards). Each collection is given a number, which is made of the locus number followed by a progressive number, with the label being preceded by PPP ("Peshdar Plain Project"). So, for example, the collection PPP 271928:171:001 is the pottery sherd collection number 001 from the locus 271928:171. Single finds and samples (the latter being in most cases charcoals, seeds, and soil samples for flotation) are labelled the same way as collections. Particular attention is paid to floors and the material lying directly on them. For this reason, floors are gridded (**Fig. D3**). Though belonging to the same locus, the material collected from each floor grid square receives a different collection, find or sample number, in order to have more precise spatial control of the zone within the floor area from which a particular material was collected.

Lastly, as in previous years, the Sasanian graves are labelled with a progressive number followed by "G" (e.g., G52). Graves are composed of at least four loci: the grave cut, the skeleton, the grave fill, and the grave architecture.

39 Kreppner/Squitieri 2017b, 57-60.

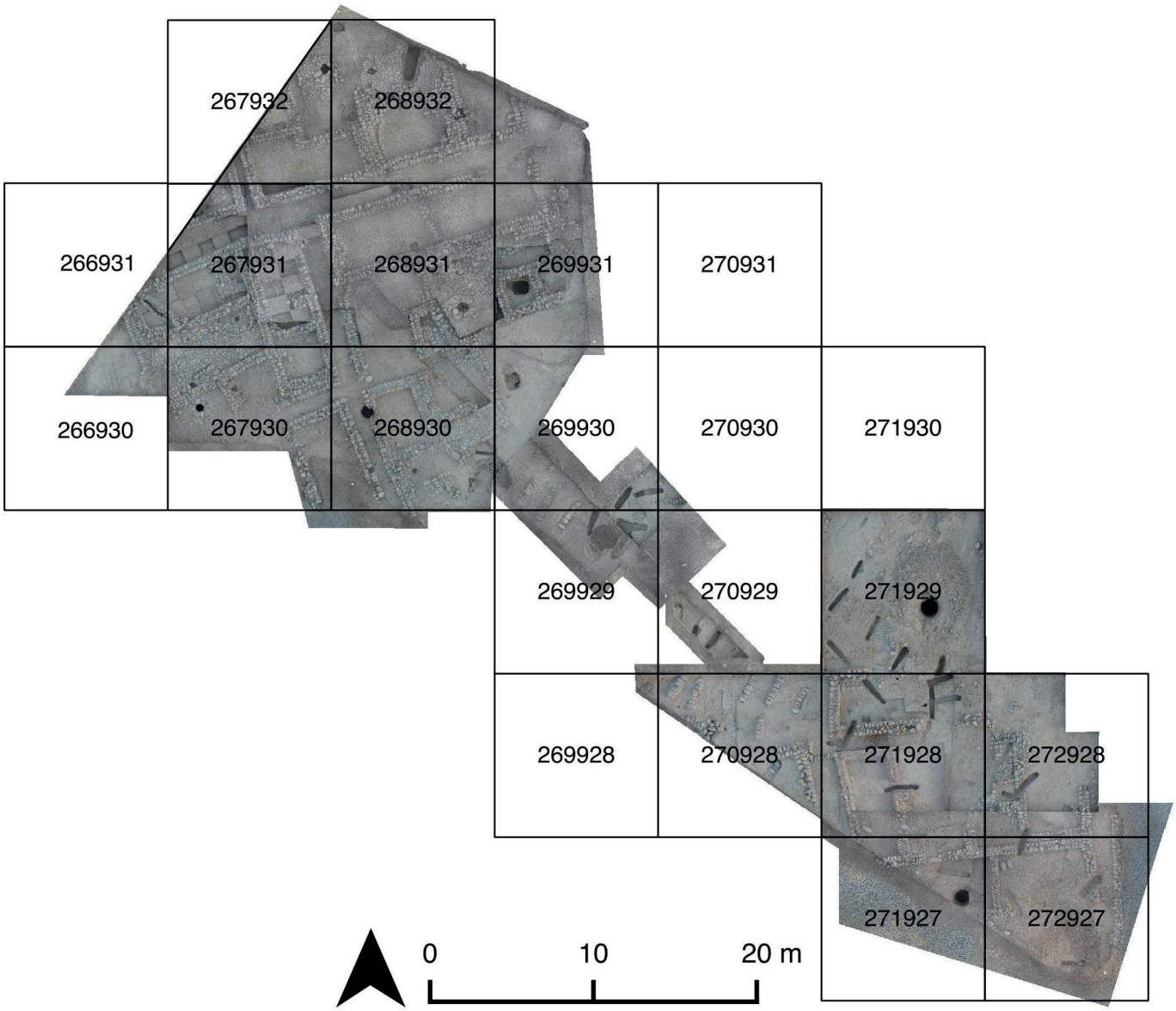


Fig. D2: The 10×10 m north oriented grid superimposed on the orthophoto of the areas excavated at Gird-i Bazar in 2015-2017. Prepared by Andrea Squitieri.

Fig. D3: Two workmen excavating a gridded floor. Photo by Zahra Hashemi.

D2. Gird-i Bazar's absolute chronology and relative stratigraphy

D2.1 The results of the ^{14}C analyses and their discussion

F. Janoscha Kreppner and Karen Radner

A first step towards establishing the absolute chronology of the occupation at Gird-i Bazar was made in 2016 by means of the radiocarbon analysis of a charcoal sample (PPP 271927:014:008) from the floor of Building A, Room 3, collected during the 2015 campaign (**Table D1**, sample no. 5). This produced a *post quem* date of 937-829 calBC (92.21 % probability) and thus confirmed the attribution of Gird-i Bazar's main occupation phase to the Iron Age[40].

Since then, additional ^{14}C analyses were undertaken on: five carbonised seeds and legume fragments found directly on floors (collected by flotation during the 2016 excavations and identified and selected for ^{14}C analysis by Dr Melissa Rosenzweig); a fermur from a human skeleton found in the well in Room 49 (**§D19.5**); and a tooth from a donkey's mandible found in the well in Outdoor Area 7 (**§D7**; **Figs. D4-D5**). The ^{14}C results from Gird-i Bazar are summarised in **Table D1**, arranged from the oldest to the most recent; their spatial distribution is shown in **Fig. D6**.

As **Table D1** illustrates, all available dates fall well within the Iron Age horizon. Samples 1-3 have yielded dates that definitely predate the Assyrian conquest of the region at some point during the reign of Shalmaneser III (r. 858-824 BC). The date ranges of Samples 4-7, on the other hand, cover the period just before and soon after the Assyrian conquest.

Floor samples were always taken from the last floors attested at each location. Samples 4-7 come from inside covered rooms: from inside a bread oven in the courtyard of Building F (Sample 4; 937-834 BC), the floors of the reception rooms of Buildings A (Sample 5; 937-829 BC) and E (Sample 6; 936-831 BC) as well as from the floor next to the toilet in Building A (Sample 7; 906-816 BC).

However, the two samples with early dates were recovered from unroofed spaces, namely from Alley 13 (Sample 1; 1215-1055 BC) and Courtyard 11 (Sample 2; 1216-1053 BC), and may have to be interpreted as relocated seeds. Sample 3, the donkey tooth, produced a dating range of 1006-901 BC, referring to the animal's time of death. The isolated bone from which the tooth was taken may have been old when it was thrown into the well in Outdoor Area 7.

Based on this material, we therefore assume that the settlement of Gird-i Bazar flourished during the first part of the first millennium BC and was destroyed when the region was brought under Assyrian control during the reign of Shalmaneser III.

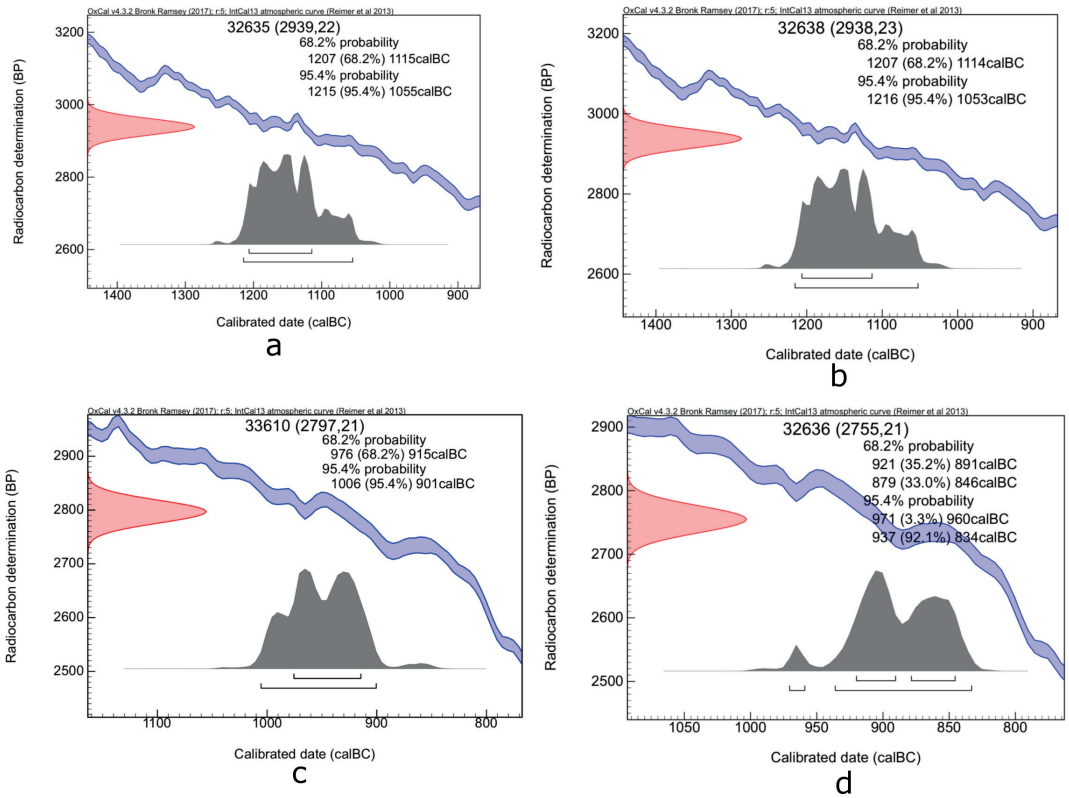
Finally, Sample 8 yielded a long range of possible dates from 748-409 BC. This is due to the notorious "Hallstatt Plateau", a flat area on the radiocarbon graph affecting the dating of samples from the period c. 800-400 BC[41]. While it cannot be said when precisely the dead body, from whose femur this date was derived, was put into the well, it is one of three individuals to have been deposited in its uppermost filling (**§D19.5**). This happened apparently some time after the well had been given up as its bottom had already been filled in. The depositing of these bodies, however, brought the use of this source of water decisively to an end and is clearly associated with the terminal abandonment of Building I. The dead can most likely be

Sample no.	Sample ID	Sample type	Calibrated date BC	Probability	Context
1	268932:042:001	Cereal grain	1215-1055	95.4 %	Alley 13, floor
2	268931:041:012	Cereal grain	1216-1053	95.4 %	Courtyard 11 (Building D), floor
3	271929:042:004	Donkey tooth	1006-901	95.4 %	Well in Outdoor Area 7
4	268932:052:002	Large legume	937-834	92.1 %	Bread oven in Courtyard 21 (Building D)
5	271927:014:008	Charcoal	937-829	92.21 %	Room 3 (Building A), floor
6	268931:032:017	Large legume	936-831	92.8 %	Room 19 (Building E), floor
7	272927:020:017	Large legume	906-816	95.4 %	Room 23 (Building A), floor
8	267930:037:004	Human bone	748-409	95.4 %	"Grave" 71 in the well of Room 49 (Building I)

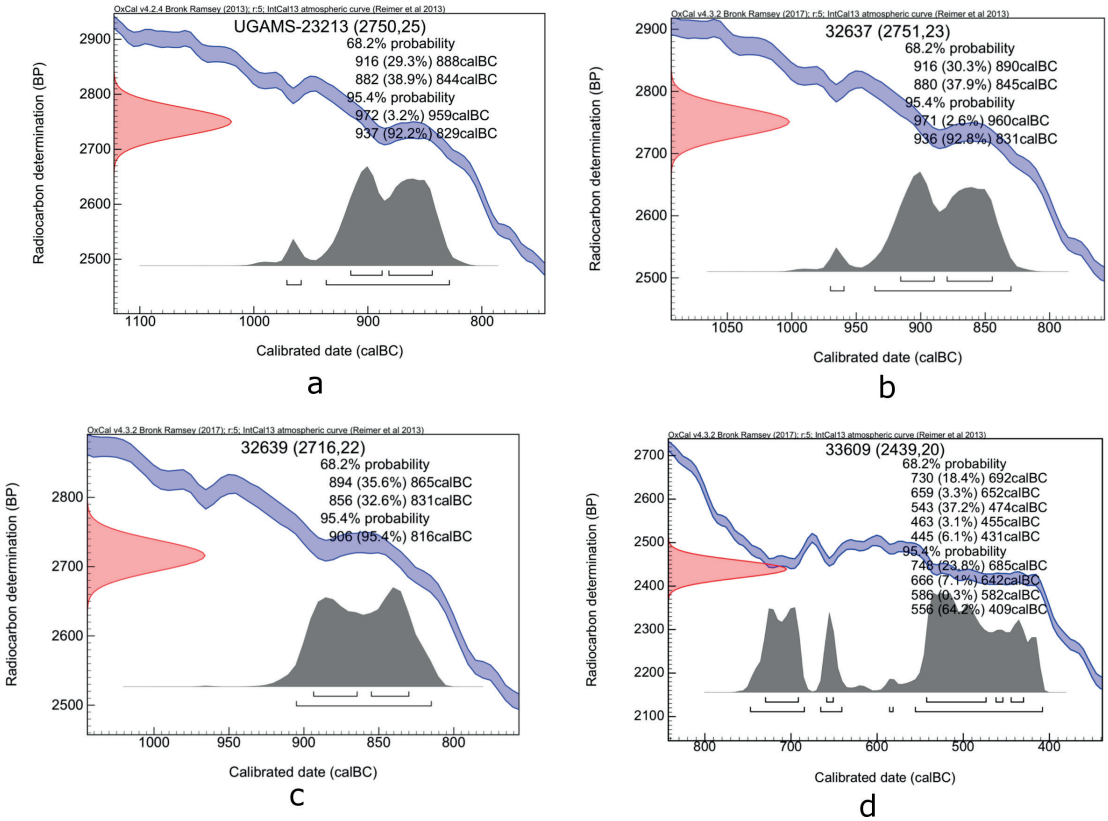
Table D1: Radiocarbon results from Gird-i Bazar (excluding data from Sasanian cemetery).

40 Radner 2016b.

41 Plicht 2004.



Figs. D4: Calibrated radiocarbon dates for samples: (a) PPP 268932:042:001; (b) PPP 268931:041:01; (c) 271929:042:004; (d) 268932:052:002. Refer to sample list in **Table D1**. Calibration software OxCal 4.3.2. Prepared by Andrea Squitieri.



Figs. D5: Calibrated radiocarbon dates for samples: (a) 271927:014:008; (b) 268931:032:017; (c) 272927:020:017; (d) 267930:037:004. Refer to sample list in **Table D1**. Calibration software OxCal 4.3.2. Prepared by Andrea Squitieri.

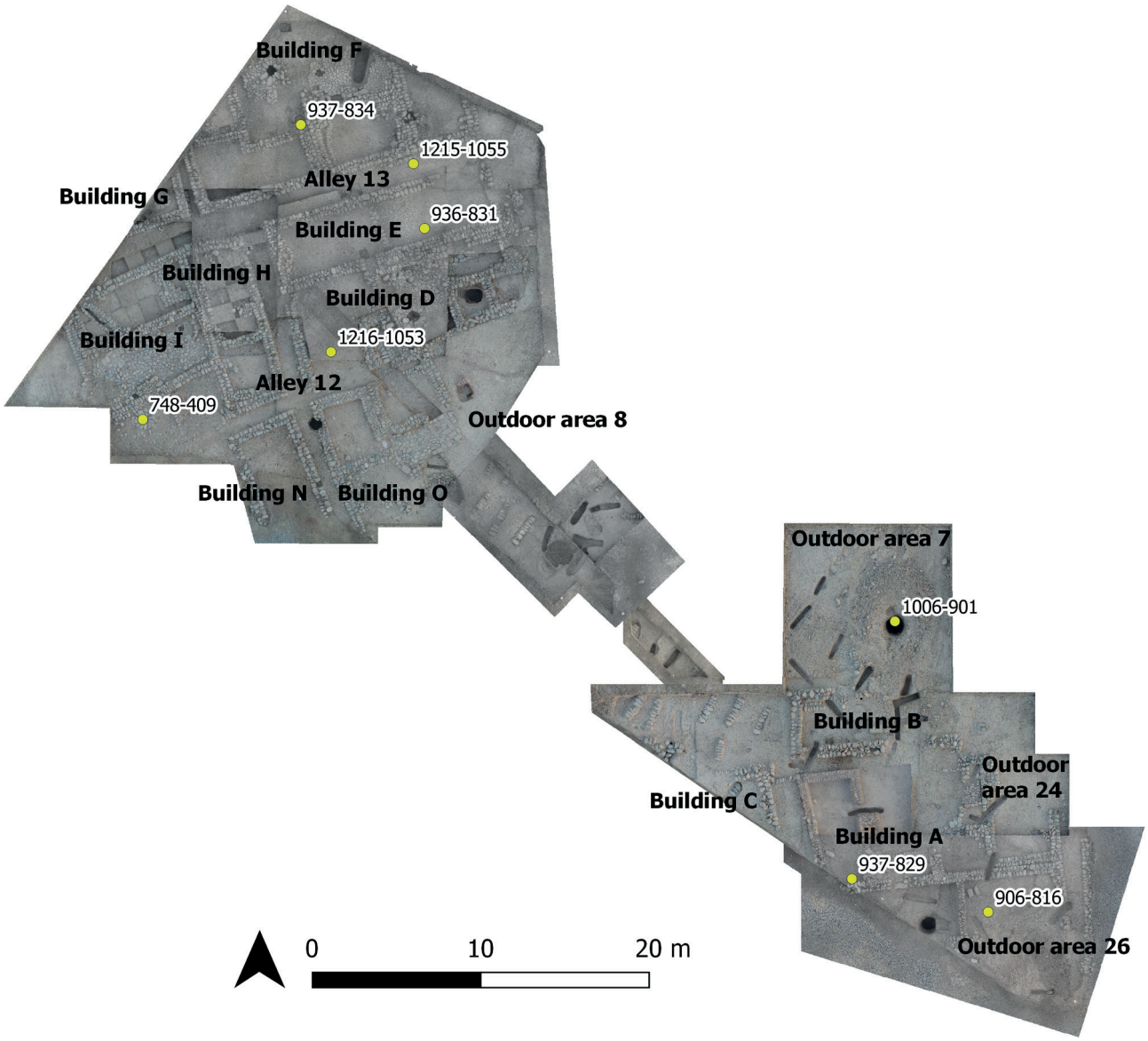


Fig. D6: Distribution of the radiocarbon dates (in CalBC years) at Gird-i Bazar. Prepared by Andrea Squitieri.

interpreted as victims of the destruction of the settlement of the Assyrian occupation, certain evidence for which is provided by the ^{14}C dating of a charcoal sample from the sounding GA 42[42] as well as by the Neo-Assyrian slave sale document dated to 725 BC[43]. It is presently unclear whether or how the buildings at Gird-i Bazar were still in use during the Assyrian occupation.

D2.2 The relative stratigraphy

F. Janoscha Kreppner & Andrea Squitieri

The relative stratigraphy of Gird-i Bazar is offered in **Table D2**. This table extends and updates the stratigraphic tables presented in the previous publications[44], following the same principles, with only few modifications. Below we list the information needed to read this table.

- The rows of the table follow the timeline spanning from the oldest (bottom) to the most recent (top) periods.

42 Altaweel/Marsh 2016.

43 Radner 2015; Radner 2016c, 17-18.

44 Kreppner/Squitieri 2017b, Table D2.

- The columns of the table reflect the spaces, such as rooms, courtyards and outdoor areas, arranged from east to west. Consequently, roughly contemporary depositional processes and occupation periods that span across various areas of the site can be read in the table horizontally.
- The cells of the table contain a locus number (e.g., Locus:271927:027), a Locus Group number (e.g., LGR:0283) followed by a brief description; or a grave number (e.g., G 6).
- The background colours of the cells indicate their interpretation and duration. Hence, different pink shades are used for topsoil, modern occupation, graves and virgin soil; brown indicates post-occupation periods, and yellow is used for occupation periods. The same colour coding is employed in the section drawings so that the stratigraphic table and the section drawings can be read in parallel.
- Each occupation period is defined by a floor. If a new floor is detected that overlies an earlier one, then a new occupation period is defined. It is noteworthy that the term "floor" refers to the purpose-built surface or the trodden surface created through use, which is assigned a specific locus number. On the other hand, deposits found directly on the floor are given their own locus numbers. This allows us to isolate material found on a floor and, at the same time, to gain a better understanding of the formation processes of the deposits associated with the use of the floor.

Reading the table from the bottom up, it is possible to identify the following phases:

- Virgin soil (cell colour: pink).
- The Construction Phase when the walls of the buildings were created (cell colour: yellow).
- The Main Occupation Period, indicating when the buildings were in use (cell colour: yellow). The Main Occupation Period 1 represents the period when the buildings were founded on the virgin soil and when the oldest floors were laid down. Over time, as the buildings of Gird-i Bazar were inhabited, new floors were constantly stacked in the alleys (e.g. Alley 13 or Alley 50), so that the floor level increased over time. This phenomenon is also found in buildings (e.g., Building I). In other buildings, structural changes have been made during the main use with new walls (e.g., Building D) or new floors (e.g., Building A). However, since in many outdoor areas and rooms only a single floor was used from the beginning till the end of the occupation, we deal with one Main Occupation Period, within which a Main Occupation Period 1 is differentiated from a Main Occupation Period 2 in those spaces featuring changes.

  In terms of absolute chronology, we have seen above **(§D2.1)** that the Main Occupation Period at Gird-i Bazar belongs to the Iron Age chronological horizon. Deposits marking the end of use are found in the rooms with only one floor and on the youngest floors in the rooms where new floors were created. Since these deposits are interconnected by doors, it is possible to deduce a common end of the Main Occupation Period, which is entered in the table in the line End of Main Occupation 2. Each of these two phases is divided into three sub-phases, from the oldest to the youngest:
  - Floor Construction, including the construction of the floor and any installations (e.g., door sockets) created shortly before the floor was used;
  - Floor Occupation, including deposits and installations from the time when the floor was in use.
- End of Occupation, including deposits that indicate the destruction or abandonment of the floor, thus covering the finds collected directly on the floor.
- The Post-Occupation Period (cell colour: brown) follows each occupation period, representing a period of non-occupation during which erosion phenomena are the main causes for the formation of the archaeological deposits. These processes may be repeated cyclically, which is why yellow and brown rows alternate in the table.

Continuing to read **Table D2**, the Post-Main Occupation Period 2 is followed by a so-called "Re-Use Occupation Period", a very ephemeral occupation identified only in Building A. As the use of these buildings drastically changed and could no longer be compared to their former use, we have defined this as a period of re-use. This Re-Use Period is then followed by the "Sporadic Occupation Period", represented by a pebble floor identified above Buildings D and O. This sporadic occupation had already been dated to the Sasanian period in 2015, based on the pottery sherds found on the pebble floor; the 2016 and 2017 investigations confirmed this attribution, having found additional pottery and other finds datable to the Sasanian era on this floor. Because radiocarbon results date a tooth from Grave 47 to the late Sasanian period (calAD 390-533, with 95.41 % probability)[45], we assume that the remains of the pebble floor and the graves also belong to the same occupation period.

Finally, in the upper part of the table, the Modern Occupation Period refers to the recent activities at Gird-i Bazar occurring during the 20th and 21st centuries AD, which include a stone surface, stone installations and pits dated

45 Greenfield 2017, fig. G5.

GIRD-I BAZAR STRATIGRAPHY	EASTERN TRENCH											
	Building J				BUILDING A						BUILDING A (cont.)	
		Outdoor Area 26	Alley 25	Outdoor Area 24	Room 23	Room 29	Room 1	Courtyard 2			Room 3	
PRESENT SQUARE SURFACE				Locus:272727:001		272928:001	Locus:271927:001	LGR:0192	Locus:271927:001		Locus:271928:001	Locus:271927:001
TOPSOIL					LGR:0011							
MODERN OCCUPATION					LGR:0197 Saddam era surface of pebbles with greyish granules and some muddy soil, along this a set of cobbles							
POST SPORADIC OCCUPATION PERIOD												
END SPORADIC OCCUPATION PERIOD												
SPORADIC OCCUPATION PERIOD		Grave 51, Grave 58		Grave 44, Grave 52, Grave 63	Grave 46, Grave 47 (14C sample: 389-535 calAD, 94.4% probability), Grave 50	Grave 12, Grave 13, Grave 53	Grave 13, Grave 25, Grave 26, Grave 5	Grave 2, Grave 4, Grave 8-13, Grave 64, Grave 66-70, Grave 80, Grave 84, Grave 88	Grave 23, Grave 24		Grave 1	
CONSTR. FOR SPORADIC OCCUPATION PERIOD								LGR:0038 tough grey clayey soil			LGR:0038 tough grey soil, LGR:0007 eroded mudbricks, LGR:0008 red clayey earth	
POST RE-USE OCCUPATION PERIOD											Locus:271928:36 hard light	
END RE-USE OCCUPATION PERIOD									Locus:271928:055 tannur Locus:271928:022 tough grey clayish material: trodden surface	LGR:0041 charcoal and red burnt clay		
RE-USE OCCUPATION PERIOD												
CONSTRUCTION FOR RE-USE OCCUPATION PERIOD												Locus:271928:037 floor (South only)
POST MAIN OCCUPATION PERIOD 2			LGR:0147 Light brown and clayey soil, Locus:272927:024 stone collapse	LGR:0206 tough light grey clayey soil with some charcoals	Locus:272927:006 tough light grey clayey soil	LGR:0086 very tough light grey clayey soil; quite a lot of pieces of soft red burnt clay; quite a lot of bits of charcoals	LGR:143 tough light grey clayey soil with quite significant amounts of charcoal and burnt red clay	LGR:0019 red clayey earth,			LGR:0151 tough red clayey material	
END MAIN OCCUPATION PERIOD 2			LGR:0146 Light brown and clayey soil with a quite a bit patches of charcoal	Locus:272928:017 tough light grey clayey soil with red burnt clay and a lot of charcoal	Locus:272927:020 tough grey clayey soil with charcoal and much pottery with 14C sample no. 7	LGR:0091 very tough dark grey clayey soil; quite a bit of pieces of soft red burnt clay; quite a lot of bits of charcoals	LGR:0142 very tough light grey clayey soil; quite a lot of pieces of soft red burnt clay; quite a lot of bits of charcoals	LGR:0273 brown dry hard muddy soil			LGR:0150 reddish-brown clayey soil with white inclusions, very crumbly, quite a lot of soft burnt red clay with 14C sample no. 5	
MAIN OCCUPATION PERIOD 2							LGR:0140 floor, LGR:0141 brown clay with ash, charcoal					
CONSTRUCTION FOR MAIN OCCUPATION PERIOD 2							Locus:271927:039 floor					
POST MAIN OCCUPATION PERIOD 1												
END MAIN OCCUPATION PERIOD 1							LGR:0014 fill of the pit					
MAIN OCCUPATION PERIOD 1											Locus:271928:087 stone feature	
CONSTRUCTION FOR MAIN OCCUPATION PERIOD 1			LGR:0145 floor	Locus:272928:032 stone inst., LGR:0205 floor	Locus:272927:038 toilet(?) Locus:272927:048 door socket Locus:272927:019 floor	Locus:272928:031 stone inst., Locus:27928:119 circular stone inst., LGR:0092 floor	LGR:0139 floor, Locus:271927:031 cut of the pit	Locus:271928:089 pedestalled installation, Locus:271927:027 podium-like installation, 271928:109 drain?, Locus:271928:197 platform, Locus:272928:062 stone installation, LGR:0018 mud floor			LGR:0010 floor, Locus:271927:033 stone feature,	
FIRST CONSTRUCTION PHASE FOR MAIN OCCUPATION PERIOD	LGR:0144 wall	LGR:0137 wall	LGR:0144, Locus:272927:009, LGR:0186 walls	LGR:0186, Locus:272928:004, Locus:272928:029 walls, Locus:272928:051 buttress	Locus:272927:008, LGR:0138, Locus:272927:009, LGR:0137 walls	LGR:0138, Locus:271927:009, Locus:272928:004, Locus:272928:005 walls	LGR:0137, LGR:0138, Locus:271927:010, 272927:008 walls, Locus:271927:029 threshold	LGR:0138, LGR:0283, LGR:0284, Locus:271928:008, Locus:271928:088, Locus:271927:009, Locus:271927:010, Locus:271927:011, Locus:272928:004, Locus:272928:057 walls, Locus:271927:029 threshold, Locus:272928:061 stone threshold			LGR:0149, Locus:271927:010, Locus:271927:011, Locus:271928:008, Locus:271928:031 walls, Locus:271928:080 threshold	
VIRGIN				Locus:272928:046 whitish soil			Locus:271927:035 whitish soil					

Table D2: Stratigraphic table of DLT2. Prepared by Janoscha Kreppner.

EASTERN TRENCH (cont.)				CONNECTING TRENCH				
		BUILDING B			BUILDING C			
Alley 4	Alley 5	Room 6	Outdoor Area 7	Outdoor Area 8	Room 55		Outdoor Area 8	
Locus:271928:001	Locus:271928:001	Locus:271928:001	Locus:271929:002	Locus:270928:001	Locus:270928:001	baulk	Locus:270929:001	baulk
			LGR:0189		LGR:0286		Locus:270929:002	
	LGR:0150 pit (Locus:271928:186 pit cut with Locus:271928:157 fill), LGR:0151 pit (Locus:271928:187 pit cut with Locus:271928:158 pit fill), Locus:271928:015 drain, Locus:271928:012 surface		Locus:271929:008 pit cut, Locus:271929:009 pit fill, Locus:271929:010 filling of depression, Locus:271929:013 pit cut, Locus:271929:020 fill of shaft, Locus:271929:022 bown moist loose soil, LGR:0269 platform , Locus:271929:054 pit fill, Locus:271929:055 pit cut, Locus:271929:058 stone heap around well					
Grave 7	Grave 14, Grave 15	Grave 3, Grave 16, Grave 18, Grave 19, Grave 20, Grave 21, Grave 22, Grave 65, Grave 72, Grave 96	Grave 42-45, Grave 62, Graves 73-74, 77-78, 91-95	Grave 38-41, Grave 75, Grave 76, Grave 79, Grave 81, Grave 83, Graves 85-90	Grave 82		Grave 33, Grave 34, Grave 35, Grave 36, Grave 37	
	LGR:0038 tough grey fill	LGR:0030 grey material						
				LGR:0243 grey brown hard silty clay				
LGR:0015 red clayey material	Locus:2751928:051 tough red clay with white inclusions	LGR:0016 red clayey material	Locus:271929:039 dark brown clayey soil, fill of the well					
		Locus:271928:071 conglomeration of stones	Locus:271929:042 dark more yellowish brown clayey soil moist firm, well sorted, with pebbles an some cobbles with abundant sherds, fill of the well with 14C sample no. 3	Locus:270928:036 clayey dark brown soil			Locus:270929:005 (east) = Locus:270929:006 (west) grey brown silty clay	
			Locus:271929:047 brown dry hard muddy soil					
LGR:0287 hard greyish brown silty clay	Locus:272928:063 brown dry hard, moderately sorted, muddy soil	LGR:0182 brown moist soft muddy soil with ashes		LGR:0057 compact brown silty clay			Locus:270929:009 dark brown sandy silt	
		Locus:271928:198 pit fill, Locus:271928:199 pit cut						
LGR:0234 mud floor with pebble stones	Locus:271928:064	LGR:0029 floor, Locus:271928:183 stone bench	Locus 271929:051, Locus 271929:052 mud floors, Locus 271929:053 stone installation	LGR:0285 mud floor			Locus:270929:028 floor	
LGR:0149, Locus:270928:028 walls	Locus:271928:031, LGR:0284 walls, 271928:202 threshold	Locus:271928:017 wall, LGR:0271, LGR:0284 walls	LGR:0271, LGR:0283, Locus:271929:050 walls, Locus:271929:056 well	Locus:270928:057 wall	Locus:270928:023, Locus:270928:027, Locus:270928:028 walls, Locus:270928:059 threshold			
			Locus:271929:061 whitish soil	Locus:270928:011 whitish soil, Locus:270928:038 whitish soil			Locus:270929:029 whitish soil	

Table D2 (continued): Stratigraphic table of DLT2. Prepared by Janoscha Kreppner.

CONNECTING TRENCH (cont.)								
			BUILDING O					
Outdoor Area 8	Outdoor Area 8	Outdoor Area 8	Room 56	Room 57	Room 34	Room 9	Room 10	Courtyard 11
Locus:269929:001	Locus:269930:008 site surface	Locus:268930:001						Locus:268931:001
LGR:0126								
LGR:0128 modern pit								
		LGR.0207 hard and compact grey brown sandy silt, Locus:268930:004 medium brown compact silty clay, Locus:268930:026 stone collapse, Locus:268930:039 dry hard brown silty clay installation fill						
Grave 30, Grave 31, Grave 32, Grave 49, Grave 48	Grave 27, Grave 28, Grave 29, Grave 54, Grave 55, Grave 56, Grave 57, Grave 59		LGR:0155 surface, Locus:268930:044 stone installation LGR:0153, LGR:0154 walls whose upper rows reused					
								Locus:268930:084 dry hard brown silty soil
LGR:0127, LGR:0136 compact grey silty clay	LGR:0183 hard grey brown sandy silt	Locus:268930:069 dry hard brown silty soil, LGR:0241 yellowisch brown hard dry silty soil	LGR:0080 hard yellowish brown sandy silt Locus:268930:093 hard greyish silty soil		Locus:268930:063 dry hard dark brown silty clayey soil with some white particles	LGR:0288 yellow brown sandy silt	LGR:0242 hard yellowish brown sandy silt, Locus:268930:011 wall collapse, Locus:268930:013 wall collapse	LGR:0080 hard yellowish brown sandy silt
LGR:0071 dry, hard and silty soil; yellowish brown colour with some pottery, Locus:269929:027 grey brown, compact silty clay with sherds lying flat, LGR:0009 mixed deposit with dark grey brown silty clay, rich in pottery: upper kiln fill	pyrotechnical installation: LGR:0134 light reddish brown silty clay with patches of burnt red clay with fragments of charcoal and white carbonatic materials, LGR:0195 light reddish brown burnt red clay marked by the abundant presence of burnt clay and white carbonatic materials, small kiln: Locus:269930:061 reddish-brown burnt clay and silty soil, Locus:269930:066 crushed pottery	LGR:0208 dry, hard brown silty soil	Locus:268930:094 dry hard greyish-brownish silty soil with small granules	Locus:268930:101 dry hard brown clayey soil with pottery	Locus:268930:092 dry light brown clayey silty soil with pottery	Locus:268930:076 and Locus 268930:088 dry hard brown silty soil with some sherds lying flat	Locus:268931:071 dry hard brown silty soil	LGR:0130 hard compact silty soil, light brown in colour with few white particles with 14C sample no. 2
LGR:0152 dark grey black ashy deposit rich in charcoal flecks and pottery: lower kiln fill	LGR:0202 ashy deposit in pyrotechnical installation						LGR:0136, Locus:268931:021, Locus:268930:017 walls,	LGR:0158, Locus:268931:021 walls
LGR:0133 floor, LGR:0135 floor, kiln fetures: Locus:269929:006, Locus:269929:015, Locus:269929:016, Locus:269929:036, Locus:269929:037, Locus:269929:038, Locus:269929:040, Locus:269929:043	LGR:0203 pyrotechnical installation, LGR:0223 small kiln	LGR:0157 paved floor, Locus:268930:008 glacis, Locus:269930:058 pyrotechnicological installation, 268930:077 round pyrotechnological installation	Locus:268930:095 pavement of small stones, Locus:268930:081 threshold, Locus:268930:103 circular stone installation	Locus:268930:102 beaten mud floor	Locus:268930:104 beaten mud floor	LGR:0156 beaten mud floor		LGR:0160 pebble floor, LGR:0131 floor, Locus:268930:089 door socket
		LGR:0153 wall	Locus:268930:078, Locus:268930:079, Locus:268930:087 walls	Locus:268930:080, LGR:0264 wall	Locus:268930:032, Locus:268930:033, Locus:268930:059, Locus:268930:078 walls, Locus:268930:106 threshold	LGR:0153, LGR:0154, LGR:0222, Locus:268930:029 walls		Locus268930:033, LGR:0154, LGR:0072 wall, LGR:0224LGR:0225 wall, LGR:0159 threshold
LGR:0044 whitish soil, Locus: 268930:018 bedrock								LGR:0045 whitish soil, 268931:007 bedrock

Table D2 (continued): Stratigraphic table of DLT2. Prepared by Janoscha Kreppner.

WESTERN TRENCH							
BUILDING D (cont.)				Building E		BUILDING H	
Courtyard 27	Room 30	Room 31	Room 33	Room 19	Alley 12	Room 17	Room 47
					Locus:267931:001 present sit surface		Locus:267930:001
				LGR:0126		LGR:0066	
				LGR:0084 modern pit	Locus:268930:082 cut, Locus:268930:083 fill of modern pit		
	Locus:269931:008 pebble surface	Locus:269931:009 mixed layer of smaller to medium size pebbles in hard dark brown soil					
LGR:0085 clayey to silty hard light brown soil, Locus:268931:051 grey-brownish soft moist soil in well	Locus:269931:012 hard dry soil			Locus:268931:017 reddish-brown clayey-silty soil, Locus:268931:028 hard brown clayey-silty soil, Locus:268931:031 reddish-brown clayey-silty soil	LGR:0161 hard greyish silty soil Locus:267931:039 stone collapse	Locus:267931:023 hard light grey soil, Locus:267931:018 stone collapse	LGR:0258 light brown gritty soil
Locus:268931:046 greyish smooth clayey soil with a huge quantity of pottery	Locus:268931:046 greyish smooth clayey soil with a huge quantity of pottery	Locus:269931:021 silty soil, brownish with white inclusions, little moist, many burnt mud brick fragments and pottery sherds, some charcoal, Locus:269931:030 light reddish brown silty clay with patches of burnt red clay, pieces of charcoal and white carbonatic material, Locus:269931:033 light reddish brown silty clay with patches of burnt red clay in narrowing, Locus:269931:032 reddish brown silty clay with patches of burnt red clay, few pieces of charcoal and white carbonatic materials and abudant presence of fragments of burnt clay lining and ceramic, Locus:269931:034 collapse of kiln floor, Locus:269931:036 reddish brown silty clay with patches of burnt red clay with few pieces of charcoal and white carbonatic materials and abudant presence of burnt fragments and ceramics		LGR:0166 reddish-brown dry hard silty-clayey soil with white particles, Locus:268931:032 light brown, hard soil with 14C sample no. 6	LGR:0028 dry hard brown silty soil with pottery and some small stones		
LGR:0108, LGR:0093, Locus268931:021 walls, Locus:268931:059 stone podium	LGR:0093 wall		269931:031 pebble filling Locus:269931:039 dry dark brown clay with dark red fragments of fired clay linings		LGR:0268 trodden mud floor	Locus:267931:047 wall, Locus:267931:021 wall, Locus:267931:049: floor Locus:267931:033 hard grey soil, Locus:267931:031 stone collapse	
Locus:269931:052 well, Locus:269931:048 floor	Locus:269931:023 floor, Locus:269931:011 door socket	Locus:269931:025 kiln, Locus:269931:022 floor	Locus:269931:041 beaten earth floor, Locus:269931:042 pebble floor, Locus:269931:040 remnants of an oven	Locus:268931:027 floor, 269931:028 floor, Locus:268931:033 pebble floor, Locus:268931:024 pebbles in wall LGR:0072, 268931:039 bench?	LGR:0132 floor	Locus:267931:044 pebble floor	LGR:0259:beaten mud floor, Locus:267930:007 stone installation: bench?, Locus:267930:008 stone installation
Locus:269931:019 wall	Locus: 269931:014, Locus:269931:015, Locus:269931:016 walls	Locus:269931:016, Locus:269931:017, Locus:269931:018, Locus:269931:019 walls	Locus:269931:016, Locus:269931:017, Locus:269931:018 walls	LGR:0067, LGR:0072, LGR:0089, Locus:269932:008, Locus:269931:026 walls, Locus:268931:030 drain	Locus:268930:059, LGR:0277, LGR:0067, LGR:0224, LGR:0225, LGR:0264 walls	LGR:0276, LGR:0188 wall, Locus:267931:026 wall, Locus:267931:019 wall	LGR:0276, LGR:0277, Locus:267930:004, Locus:267930:005 walls, LGR:0260 construction surface
		Locus:269931:037 bedrock		LGR:0165 whitish soil	Locus:268931:064 whitish soil, LGR:0209 bedrock		LGR:0261 bedrock

Table D2 (continued): Stratigraphic table of DLT2. Prepared by Janoscha Kreppner.

WESTERN TRENCH (cont.)									
BUILDING I							Building N	BUILDING G	
Courtyard 18	Room 46	Room 48	Room 49	Outdoor Area 54	Outdoor Area 53	Alley 50	Room 51	Room 16	Alley 14
Locus:266931:001				Locus:266930:001				Locus:267931:001	
LGR:0126				LGR:0126		LGR:0126			
Locus:267930:041 pit cut, Locus:267930:042 pit fill		Locus:267930:039 pit cut, Locus:267930:040 pit fill							
								LGR:0129 hard compact grey brown clay	
			Locus:267930:019 dry hard sitly soil, Locus:267930:022 dark brown moist firm soil in well						
	LGR:0210 greyish-brown hard-compacted soil, Locus:267931:073 whitish silty soil		Locus:267930:044 stones					Locus:267932:023 hard light brown-yellow soil	
			Locus:267931:046 hard-dry and loamy soil of dark brownish colour					Locus:267932:022 reddish clayey soil	
LGR:0266 hard compacted soil with a silty matrix and the colour is light brownish	Locus:267931:100 dark brown loamy soil in drain, Locus:267931:083 light grey-brown soil Locus:267931:084 light grey-brown soil	Locus 267930:010 light grey hard clayey soil	[illegible] sample no. 8, Locus:267930:043,	LGR:0281 dry hard grey brown soil	Locus:267930:024 hard and dry silty soil	LGR:0217 grey-brown dry hard silty clay			LGR:0124 dark-brown silty-clayey soil
LGR:0233 hard dry and contains silty material with common inclusions of tiny charcoal pieces, few pebbles and the common amount of white calcium carbonite grains, Locus:267931:097 dark brown soil in semicircle, Locus:267931:098 friable dry dark brown soil with charcoal of stone lined pit	LGR:0211 drak-brown dry and gritty soil with charcoal and pottery	Locus:267930:036 hard loamy soil	Locus:267930:026 hard and dry soil, it contains common inclusions of medium size (2-5mm) pebbles, tiny abraded sherds, several fragmented vessels, bowls and other larger fragments of pottery that were smashed on the floor	LGR:0280 light greyish brown clayey soil	Locus:267930:028 hard greyish-light brown quite compacted soil with little inclusions of tiny pebbles, extremely rare bone pieces and tiny charcoal pieces some sherds rest on the walking horizont	LGR:0229 dark-brown, dry-hard silty soil contains few inclusions of small abraded sherds and some larger vessel fragments	LGR:0216 dark brown compact clayey soil	Locus:267931:014 burnt debris on stone installation, LGR0123: light brown soil on floor	
	LGR:0238 sherds pressed in floor								
	LGR:0244 beaten mud floor, LGR:0246 drain					LGR:0267 youngest mud floor			
	Locus:266931:029 dark brown loamy soil, fill of older drain								
	LGR:0245 accumulation of walking surfaces	Locus:267930:034 Tannur, Locus:267930:035 Tannur, Locus:267930:015 wall	Locus:267930:015 wall			Locus:267930:032 package of mud floors, Locus:267930:030 row of stones			
267930:020 stone installation with ceramic vessel, LGR:0219 stone and baked brick pavement, Locus:267931:095 stone semi circle, Locus:267931:096 stone lined pit, Locus 267931:099 pebble pavement in semi circle, LGR:0218 pebble surface	LGR:0247 beaten mud floor, Locus:267931:074 stone installation, Locus:266931:025 drain, Locus:266931:026 projection of wall	Locus:267930:050 pebble floor	Locus:267930:027 pebble floor, Locus:267930:021 well, Locus:267930:045 cut for well	Locus:266930:004 door socket	Locus:267930:029 pebble pavement	Locus:267930:033 mud floor	LGR:0282 beaten mud floor with some stones	LGR:0125 floor, Locus:267931:016 stone slab installation, Locus:267932:035 cooking place?	Locus:267931:046 floor
Locus:266930:003, Locus:266931:028, Locus:267930:006, Locus:267931:053, Locus:267931:061, LGR:0275, LGR:0279 walls	Locus:266931:028, Locus:266931:003, Locus:267931:053, Locus:267931:054, LGR:0220 walls, LGR:0215 threshold, LGR:0248 construction surface	Locus:267930:004, Locus:267930:006 walls	Locus:267930:006 wall	LGR:0279 walls		Locus:267930:005, LGR:0225 walls	LGR:0225, Locus:267930:025, Locus:268930:060 walls	LGR:0162, LGR:0187 walls	LGR:0162, LGR:0163 walls,
	LGR:0249 whitish soil			LGR:0289 whitish soil					

Table D2 (continued): Stratigraphic table of DLT2. Prepared by Janoscha Kreppner.

WESTERN TRENCH (cont.)							GIRD-I BAZAR STRATIGRAPHY
	BUILDING F						
Alley 13	Room 15	Room 20	Courtyard 21	Room 22	Room 28	Outdoor Area 32	
		Locus:267932:001		Locus:267932:001			PRESENT SQUARE SURFACE
			LGR:0066				TOPSOIL
Locus:268932:031 modern pit			Locus:268932:022 modern pit	Locus:268932:047 modern disturbance?			MODERN OCCUPATION
	Locus:267931:008 fine mud layer with tiny pebbles						POST SPORADIC OCCUPATION PERIOD
							END SPORADIC OCCUPATION PERIOD
							SPORADIC OCCUPATION PERIOD
							CONSTR. FOR SPORADIC OCCUPATION PERIOD
							POST RE-USE OCCUPATION PERIOD
							END RE-USE OCCUPATION PERIOD
							RE-USE OCCUPATION PERIOD
							CONSTRUCTION FOR RE-USE OCCUPATION PERIOD
LGR:0119: hard packed light brown grey soil, Locus:267931:025 stone feature, Locus:267931:017 river cobbles in dark brown soil, Locus:267931:027 stone collapse, Locus:267931:035 dark-brown heterogenous material with abandunt small pebbles and several large cobbles, Locus:269932:010 collapsed stones, LGR:0087 stone collapse, Locus:267931:040 stone collapse, Locus:267931:065 (test sounding)	LGR:0110: silty clayey soil of light brown colour, Locus:267931:006 hard-packed light brown soil	Locus:267932:012 soft dry brown soil	LGR:0121 soft clayey soil of light brown colour, Locus:267932:015 brown clayey soil, Locus:268932:011 brown soil, soft and silty clay with charcoal, 268932:013 fill of drain, 267932:018 fill of well	LGR:0082 light brown silty clayey soil	LGR:0116 silty reddish brown clayey soil with charcoal and burnt clay	LGR:0120 accumulation of big cobble stones Locus:269932:013 silty clayey soil of white-pink colour	POST MAIN OCCUPATION PERIOD 2
LGR:0118 silty clayey soil with some white particles with 14C sample no. 1	LGR:0109 silty-clayey soil of light-brown colour	Locus:267932:024 hard dry silty soil, light brown colour	LGR:0078 brownish clayey soil with much pottery, LGR:0113 brown-grey silty clayey soil, Locus:267932:013 brown-grey silty soil, 268932:012 silty soil with pottery, charcoal and ash	LGR:0083 silty dark brown clayey soil with charcoal and pottery	LGR:0122 clayey soil with charcoal and burnt clay		END MAIN OCCUPATIOD PERIOD 2
							MAIN OCCUPATION PERIOD 2
LGR:0088 floor	LGR:0103 floor, 267932:030 door socket	Locus:267932:027 floor, Locus: 267932:028 stone installation					CONSTRUCTION FOR MAIN OCCUPATION PERIOD 2
		Locus:267932:029 dark-brown clayey soil					POST MAIN OCCUPATION PERIOD 1
	Locus:267931:030 hard grey-brown soil with reddish/dark fragments						END MAIN OCCUPATION PERIOD 1
LGR:0098 accumulation of mud floors, LGR:0090 localised medium pebble floor, Locus:268932:064 localised big pebble floor, Locus:268932:053 stones against northern wall			267932:019 row of stones				MAIN OCCUPATION PERIOD 1
LGR:0100 beaten mud floor, LGR:0032 localised small pebble floor	Locus:267931:050 floor		LGR:0111 well, LGR:0112 floor, LGR:0114 stone pavement, Locus:267932:016 pebble floor, Locus:267932:021 door socket, Locus:267932:077 socket for pole, Locus:268932:050 small oven, Locus:268932:027 step to room 22, Locus:268932:052 big oven with 14C sample no. 4	Locus:268932:057 floor, Locus:268932:027 drain, Locus:268932:044 stone boxes, Locus:268932:045 stone podium, Locus:268932:078 threshold	LGR:0115 floor, 268932:056 oven, 268932:069 stone podium?, 268932:071 clay podium?, Locus:269932:021 stone box		CONSTRUCTION FOR MAIN OCCUPATION PERIOD 1
LGR:0089, LGR:0099, LGR:0102, LGR:0187, LGR:0220, Locus:267931:026, Locus:268932:017, Locus:267931:057 walls, LGR:0215 threshold	LGR:0099, LGR:0068, LGR:0104, LGR:0163, Locus:268932:007, Locus:267932:005 walls, Locus:267931: 043 threshold	LGR:0068, Locus:267932:005 walls	LGR:0068, LGR:0104, LGR:0164, Locus:268932:019, Locus:268932:024, Locus:268932:037 walls, 268932:028 pilaster, 268932:048 substructure of stone pavement	LGR:0164, Locus:268932:017, Locus:268932:019, Locus:268932:036 walls, Locus:268932:028 pilaster	LGR:0102, Locus:268932:037, Locus:269932:005 walls		FIRST CONSTRUCTION PHASE FOR MAIN OCCUPATION PERIOD
LGR:0209 bedrock						LGR:0081 whitish soil	VIRGIN

Table D2 (continued): Stratigraphic table of DLT2. Prepared by Janoscha Kreppner.

by the presence of coins to the Saddam era, as well as some cuts and pits caused by the more recent construction of the chicken farm in 2014.

The following sections describe in detail the structures uncovered in 2017 from east to west, thus following the same order as in **Table D2**.

D3. Outdoor Area 24

Alessio Palmisano

Outdoor Area 24 is located in the easternmost part of the excavated area of Gird-i Bazar, between Building A on the west, and Alley 25 on the east (**Figs. D7-D8**). This area was partially excavated in 2016, when it was thought to be a room, hence the name "Room 24" used in the previous publication[46]. This year the excavation continued north to complete Square 272928 and it was discovered that the northernmost wall of this space is missing, hence the new name "Outdoor Area 24". This area is bounded to the south by wall Locus:272928:029, to the east by LGR:0186, and to the west by wall Locus:272928:004 (**Fig. D8**). As mentioned before, there is no wall enclosing Outdoor Area 24 to the north. Both walls Locus:272928:004 and LGR:0186 are ca. 62 cm wide and are preserved at the height of two courses of medium-sized stones, with an average diameter of 25 cm. Wall Locus:272928:004 is about 5 m long, while wall LGR:0186 is about 2 m long. Wall Locus:272928:004 is cut in the middle by the Grave 63 (**Fig. D8**), which has a NE–SW orientation. Another wall running in a N–S direction (Locus:272928:051), abuts wall Locus:272928:004 to the east, forming a sort of buttress. This wall is 1.55 m long, 48 cm wide and it is preserved to the height of only one course of medium-sized stones with an average diameter of 20-25 cm.

The floor of Outdoor Area 24 is labelled LGR:0205; it is an earthen surface with patches of charcoal and flecks of grayish clay. It covers the south-eastern quadrant of square 272928 from its southern edge to the north-eastern corner of wall Locus:272928:051. To the north, there is virgin soil (Locus:272928:046), which extends in an east-west direction over the northern half of the square. This virgin soil is a silty-clayey soil, rich in white particles and particularly hard, which constituted an outdoor walking surface in the open area during the main occupation period. The deposit LGR:0206, lying on both the earthen floor (LGR:0205) and the virgin soil (Locus:272928:046), was a tough, light grey, clayey soil containing pieces of soft red burnt clay and many charcoals.

46 Palmisano/Kreppner/Squitieri 2017, 71.

D4. Building A

Jens Rohde

Building A (**Fig. D7**) was known from the previous excavations to be composed of a central courtyard, Courtyard 2, surrounded by Rooms 1, 3, and 29[47]. This year's investigations targeted Room 29 and Courtyard 2 in order to delineate their northern boundaries, and to understand better the relationship between Building A and Building B located to the north.

D4.1 Room 29

This room is located southeast of Courtyard 2 (**Fig. D8**) and was partially uncovered in 2016. It is bounded by walls Locus:271927:009 in the west, Locus 272928:005 in the north, Locus:272928:004 in the east, and LGR:0138 in the south. Walls Locus:271927:009 and Locus:272928:005, in fact, only partially delineate the area of the room; it does not have a completely closed perimeter separating it from Courtyard 2. Rather, this room should be understood as an open space partially delimited from the courtyard.

The floor (LGR:0092) in Room 29, made of hard clay with whitish particles, corresponds to the floor of Courtyard 2 (LGR:0018). In the north, floor LGR:0092 abuts both the wall Locus:272928:005) and a rounded stone installation Locus:271928:119, uncovered in 2016[48]. In Courtyard 2, the floor LGR:0018 also abuts this installation. Unfortunately, this rounded installation, which might be a well, Locus:271928:119, could not be examined further.

D4.2 Courtyard 2

Courtyard 2 (**Figs. D7-D8**) had already been partially uncovered in 2015 and 2016[49]. The 2017 excavations clarified its boundaries as follows: to the west, the walls Locus:271928:008, Locus:271928:088 and Locus:271927:011, to the south, wall LGR:0138 and wall Locus:272928:005; to the east, walls Locus:272928:057, Locus:272928:004, and Locus:271927:009, and to the north walls LGR:0284 and

47 Palmisano/Kreppner/Squitieri 2017.

48 Palmisano/Kreppner/Squitieri 2017, 73.

49 Squitieri/Kreppner 2017, 75-76.

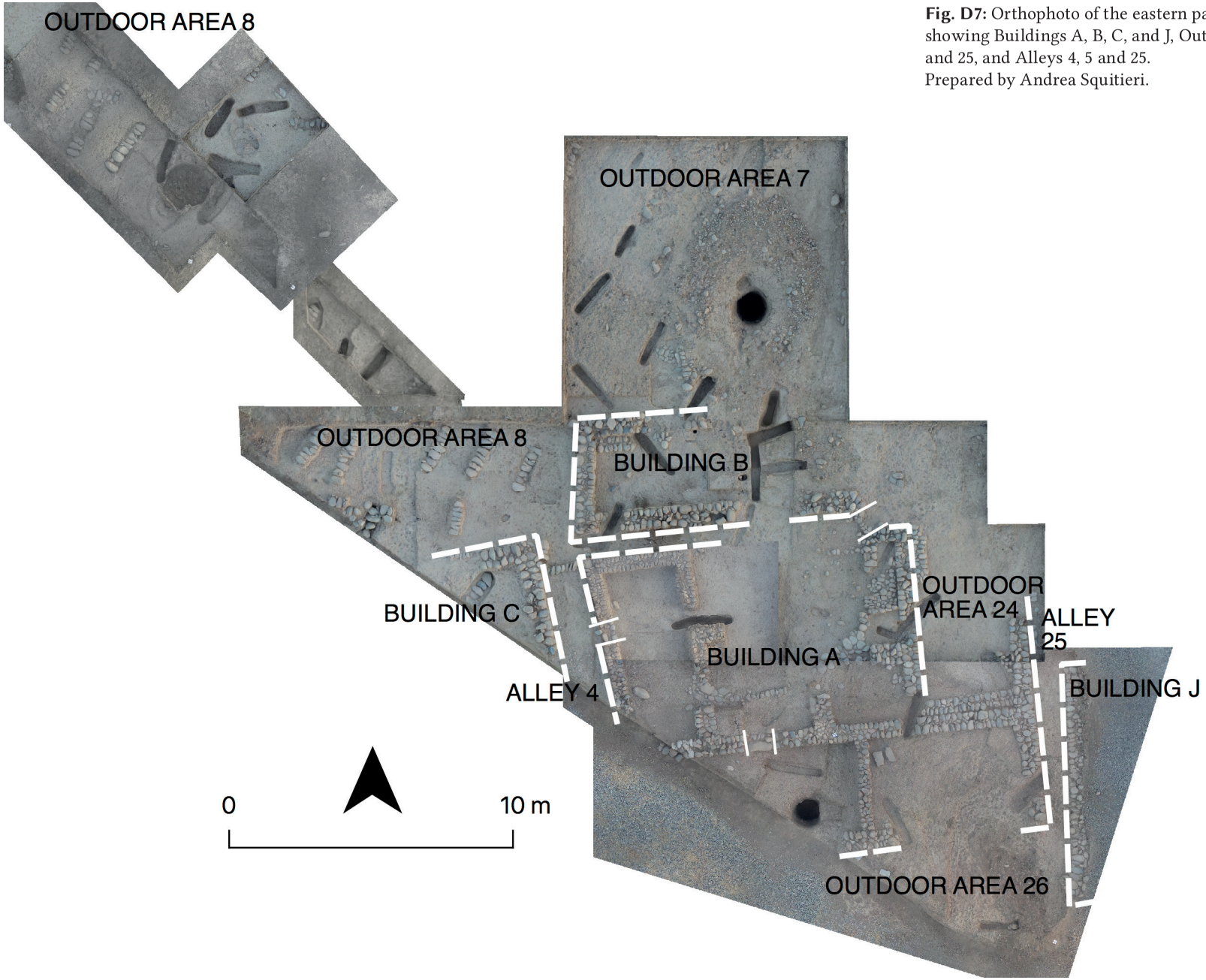


Fig. D7: Orthophoto of the eastern part of Gird-i Bazar, showing Buildings A, B, C, and J, Outdoor Areas 7, 8, 24 and 25, and Alleys 4, 5 and 25.
Prepared by Andrea Squitieri.

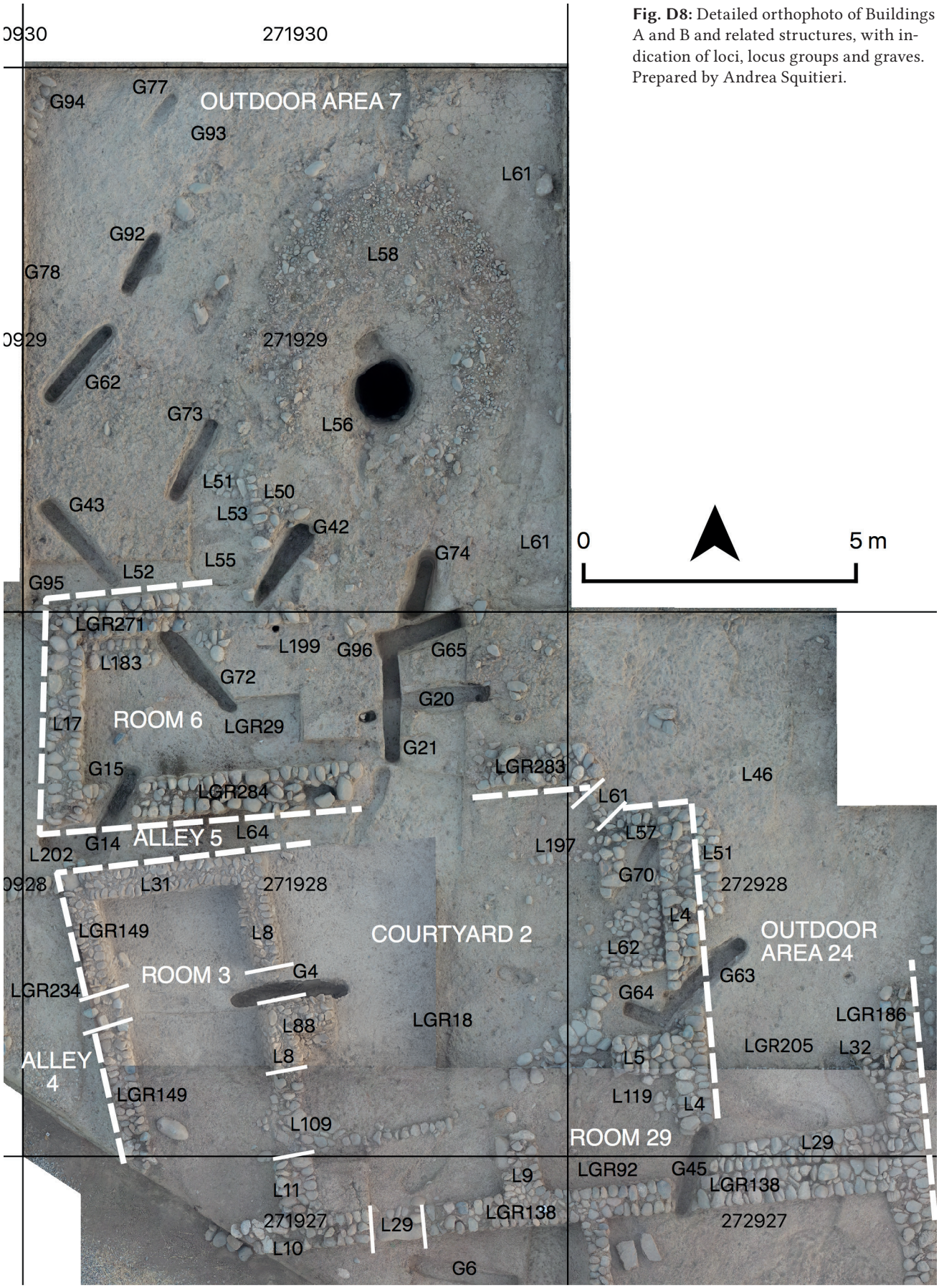


Fig. D8: Detailed orthophoto of Buildings A and B and related structures, with indication of loci, locus groups and graves. Prepared by Andrea Squitieri.

LGR:0283. If one includes Room 29, Courtyard 2 shows a quite regular quadrangular layout. The two walls (LGR: 0283-4) may have originally been parts of a single wall that constituted the northern boundary of the courtyard, which has not been preserved in its full length – most likely because of the damage caused in this area by the Sasanian graves.

Five entryways to the courtyard are known. The first is from Room 3, and it consists of a passageway, about 0.6 m wide, equipped with a mud threshold that has unfortunately been damaged by the cut of Grave 4. This entrance lies opposite the entrance connecting Room 3 to Alley 4 to the west; this second entrance is located more to the south and is 1 metre wide with a threshold (Locus:271928:109[50]) equipped with a step for negotiating the change in floor level. To the south of the courtyard, another passage is known, about 1 m wide with a flat stone threshold (Locus:271927:029), connecting the courtyard to Room 1. The fourth entrance is located in the northeastern corner. It is a passageway of about 0.65 m wide with a flat stone threshold: Locus:272928:061. One more entrance might have been located in the SE corner, connecting the courtyard to Room 29. This would constitute the only way to enter Room 29 from the courtyard. Otherwise this room remains inaccessible. However, no threshold or door socket has been found to mark this passage.

The floor of Courtyard 2, LGR:0018, abuts the boundary walls as well as installations Locus:271928:109 and Locus:271928:119 in the south. The floor has a mud-beaten surface characterised by small, whitish particles and some red patches, with a few flat sherds lying on it. In the eastern part of the courtyard, the floor LGR:0018 abuts threshold Locus:272928:061 and stone installation Locus:272928:062. This is a trapezoidal installation, measuring 1.8×1.15 m, abutting wall Locus:272928:004 to the west. It is built with medium-sized stones with an average diameter of 20 cm. The function of this installation is not clear.

To the north, the floor of Courtyard 2 abuts wall LGR:0283. Directly south of this wall and the threshold (Locus:272928:061), there is a roughly rectangular platform (Locus:271928:197) that is bordered by a row of stones parallel to wall LGR:0283. This row of stones may have served as a step to negotiate different floor levels, similar to installation Locus:271928:109 mentioned above.

The deposit lying on the floor was a brown, dry, hard soil, called LGR:0273, which contained some small pebbles, and whitish and reddish pieces which are possibly the remains of a brick collapse that occurred at the end of the main occupation period[51]. Above this, there was a dark brown, clayey soil, LGR:0019, with a moist, friable consistency. It contained pieces of soft, red, burnt clay and a lot of charcoals. Above the latter lies a soil material with pebbles and small sherds, called LGR:0038, which we have attributed to further decay processes, especially of the walls' superstructures during the post occupation phase.

During the excavation of Courtyard 2, eight Sasanian graves were uncovered, namely Graves 11, 66, 67, 68, 69, 80, 84 and 88. An installation (LGR:0197) was excavated above the graves. It belongs to the modern occupation phase and is connected to the modern structures found previously in 2016[52]. This installation consists of a set of stones that form a surface of pebbles, with greyish soil in between, and flanked by cobbles on each side. Along with three bullets, three coins found in this installation bear the date 1981 (PPP 272928:045:002-3, PPP 271928:135:001). Three more coins were found in the part of the installation uncovered in 2016 (PPP 271927:041:003-5), one of which one bears the date 1975. The coins constitute clear evidence for modern date of this installation. It is possible that the tannur (Locus:271928:055), discovered in 2015 and assigned to the "Re-use Period" (**Table D2**), is also chronologically related to this installation[53]. Finally, the stratigraphic sequence of this area ends with the topsoil LGR:0011, a compact, brown, clayey-silty soil, rich in modern materials and with much bioturbation.

D5. Alley 5

Jens Rohde

Alley 5 is located between Building A and Building B (**Figs. D7-D8**), bordered by wall LGR:0284 to the north, and wall Locus:271928:031 to the south. In 2015, the floor of this alley, Locus:271928:064, was reached. This year, the connection between this alley and Outdoor Area 8 on the west was clarified. After the excavation of the Graves 14 and 15 (**Fig. D8**), 3 stones, Locus:271928:202, were found that did not belong to the architecture of the graves. These are located between the walls Locus:271928:017 to the north and LGR:0149 to the south, and are understood to be a threshold, whose presence makes Alley 5 a connecting passage between Outdoor Area 8 and Courtyard 2.

50 Squitieri/Kreppner 2017, 76

51 See also Squitieri/Kreppner 2017, 76.

52 Kreppner/Squitieri 2017c, 76-77.

53 MacGinnis/Kreppner 2016, 58.

During the 2015 campaign, two main occupation phases were identified in Alley 5 based on modifications to the structure of wall LGR:0284 visible on its eastern edge. This year, the investigation of this alley, as well as of Courtyard 2 and Room 6 of Building B (see below), showed that this structural change in wall LGR:0284 (**Fig. D9**) had not in fact occurred. There was only one floor level abutting this wall, and therefore only one phase. It was discovered that this floor in Alley 5 (Locus:271928:064) gently slopes up eastwards, running along the lower edge of wall LGR:0284 up to wall LGR:0283 located in the northeastern corner of the Courtyard 2, and it is abutted from the south by the floor of Courtyard 2 which rises northwards. The irregular eastern edge of wall LGR:0284, which was interpreted as a second architectural phase in 2015, was probably due to damages that occurred after the end of the Main Occupation Period, perhaps during the modern era. To the east, wall LGR:0284 is not preserved anymore, likely because of the disturbances created by Grave 10 and the cut of two modern pits (LGR:250 and LGR:251). The possibility cannot be ruled out that a passage was located here, which would have connected Room 6 to Courtyard 2.

Fig. D9: Wall LGR:0284, separating Alley 5 on the left from Room 6 on the right. Photo by Jens Rohde.

D6. Building B = Room 6

Jens Rohde

Building B consists of one room, called Room 6, bordered by wall Locus:271928:017 in the east, wall LGR:0284 in the south, and wall LGR:0271 in the north. The unexcavated Grave 95 is located precisely in the corner between walls Locus:271928:017 and LGR:0271, interfering with any connection between them. The central section of Wall LGR:0271 has also been disturbed, showing a gap on the east through which another portion of wall is visible. The impressions preserved on the floor show that originally there was no gap, and that LGR:0271 was at least 5.90 m long (**Fig. D10**). Room 6's eastern boundary wall could not be found. Most likely, it has been damaged by the graves installed here (Graves 20, 21, 65, 74). In the south, the room is closed by wall LGR:0284, which is about the same length as its northern counterpart. Access to the room has not been identified and was possibly located in the severely damaged eastern part.

The southern part of Room 6's floor was excavated in 2015 as LGR:0029[54]. In the northern part of the room, the floor was uncovered this year, after Graves 16, 19 and 72 had been excavated. The floor is made of mud with charcoal and whitish remains pressed into it; these are especially concentrated in the northwestern part of the room. The floor abuts wall Locus:271928:017 in the west; in the north, it abuts a bench (Locus:271928:183) that is in the corner with wall LGR:0271. Unfortunately, this floor cannot be followed to the east any further, as it was disturbed by Grave 72. East of this grave, the floor continues. The floor also abuts some stones located east of Grave 72; these are understood to be a continuation of a bench (Locus:271928:183) in the northwest corner of room. Immediately south of wall LGR:0271, a small pit (pit fill: Locus:271928:198, pit cut: Locus:271928:199) cuts the floor. The purpose of this pit could not be determined, but it can be assumed that it is related to the floor. Above the floor, there was an accumulation of brown soil, called LGR:0182, with pebbles, some sherds, ashes and whitish remains. This deposit marks the end of the Main Occupation Period. Above this, there was a layer of brown moist muddy soil with pebbles and some sherds, called LGR:0016, belonging to the Post-Occupation Phase. An unexcavated grave (Grave 96) cuts the floor east of Grave 72.

D7. Outdoor Area 7

Jens Rohde

Outdoor Area 7 (**Figs. D7**, **D8**, **D11: section A**) extends north of Building B and Outdoor Area 24, and across the entire square 271929 and parts of 271928 and 272928. It is delimited towards the south by walls LGR:0283 and LGR:0271. Considerable damage from both the Sasanian graves and modern installations have made it difficult to reconstruct the layout of the Iron Age structures.

A small mud floor from the Main Occupation Period has been identified and called Locus:271929:052. It abuts wall LGR:0271 from the north and slopes to the west. In

54 MacGinnis/Kreppner 2016, 61.

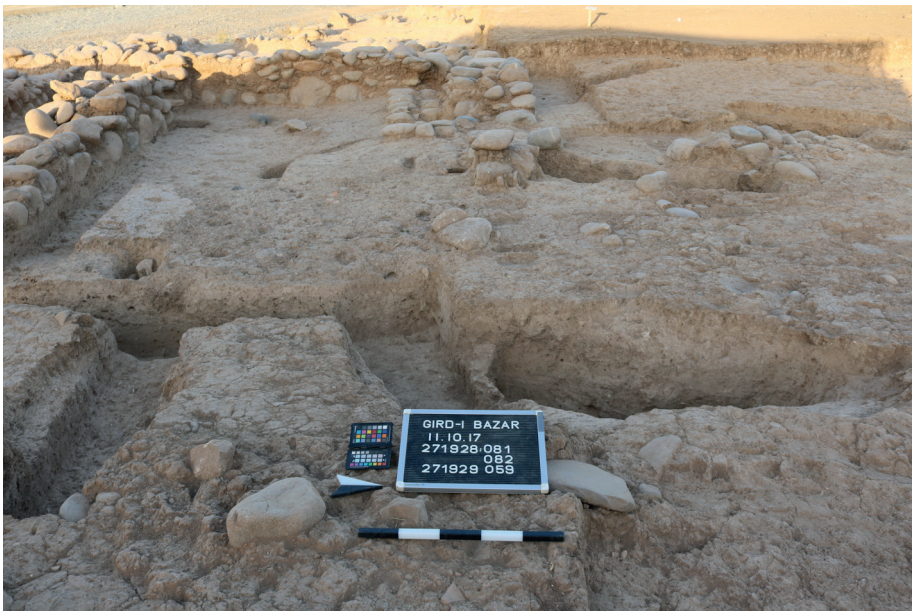


Fig. D10: Northern wall of Room 6 (LGR:0271) visible in the background, damaged by multiple cuts of Sasanian graves in the foreground. Photo by Jens Rohde.

the east, it has been disturbed by a modern pit (cut: Locus:271929:055, fill:Locus:271929:054). North of this pit, another mud floor (Locus:271929:051) has been detected, with stones sunk in it. This was probably originally connected to floor Locus:271929:052. Above both floors, there was a brown, dry, hard soil, with very few pebbles and sherds (Locus:271929:047), which accumulated during the Post-Occupation Period. The floor Locus:271929:051 (**Fig. D12**) abuts wall Locus:271929:050 and stone installation Locus:271929:053, which has been interpreted as a small storage facility. Only a small portion about 0.45 m wide and 1 m long of wall Locus:271929:050 has been preserved. This wall fragment approximately follows a north-south orientation, and could have been originally connected to wall LGR:0271; however, Grave 42 interrupts both walls exactly in the area where they might have met.

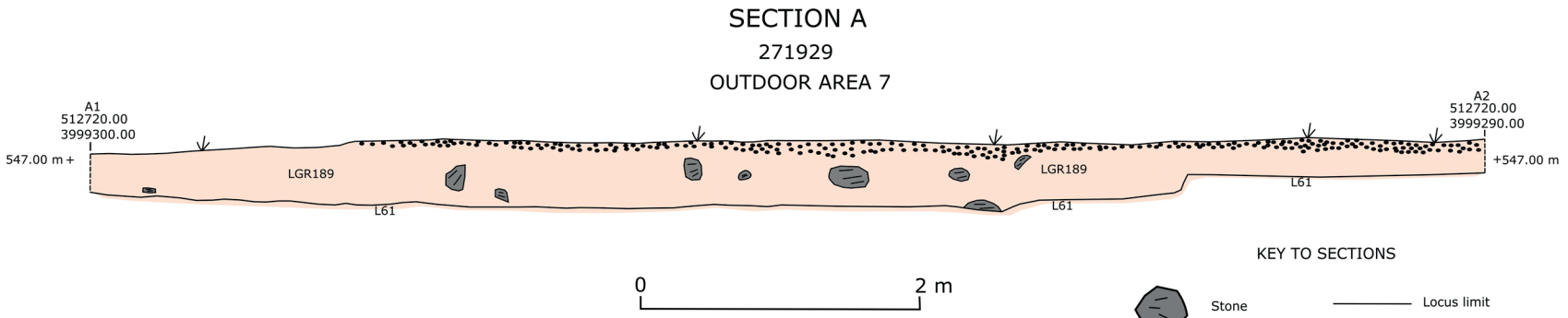
The wall is superimposed by the modern installation LGR:0269, a platform made of stones which may also have served as drainage or as a toilet, with an outlet connected to the large well to the north, Locus:271929:056. The lining of the outlet yielded remains of a plastic tarp, clearly proving the installation to be modern.

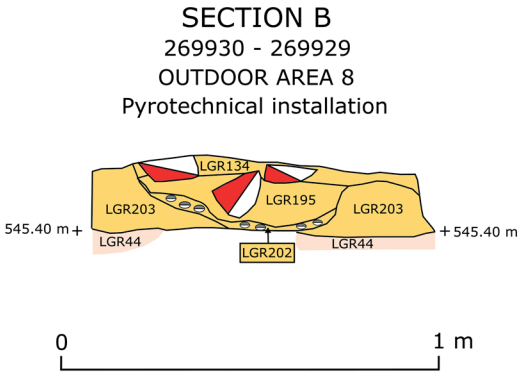
The large well Locus:271929:056 (**Figs. D8**, **D13**, **D14**) was excavated to a depth of 7.5 m, reaching an elevation of about 539.5 m above the sea level. The bottom of the well, however, was not yet been reached. The lowest deposit (Locus:271929:042) was very rich in pottery sherds, animal bones, and stones of various sizes. The pottery sherds were in a particularly good state of preservation. They represent an interesting assemblage comprising all the types and fabrics attested in Gird-i Bazar so far. They are discussed in detail in **Chapter F1**. This deposit can be attributed to the end of the Main Occupation Period, or immediately afterwards, because no younger material was found within it. Interestingly, a large donkey mandible with teeth was retrieved from this layer. A tooth taken from this mandible was radiocarbon dated to 1006-901 BC (see **Table D1**: Sample 3 and discussion in **§D2.1**).

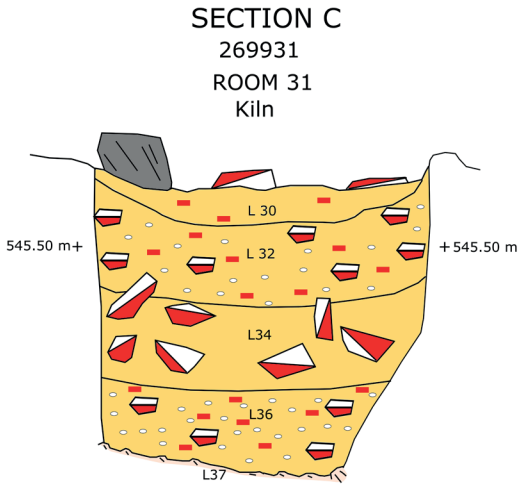
Locus:271929:039 lies above this layer. It contains less material, but is comparable to the lower deposit layer Locus:271929:042. Above Locus:271929:039, is a deposit called Locus:271929:020, characterised by the presence of large stones. It contains Gird-i Bazar type ceramics, but also modern material that possibly dates back to the same period as the deposits in platform LGR:0269 (outside the well) and the modern floor LGR:0197 (excavated in the area of Courtyard 2). This layer indicates that modern disturbances affected the upper part of the well fill, but not the earlier layers below.

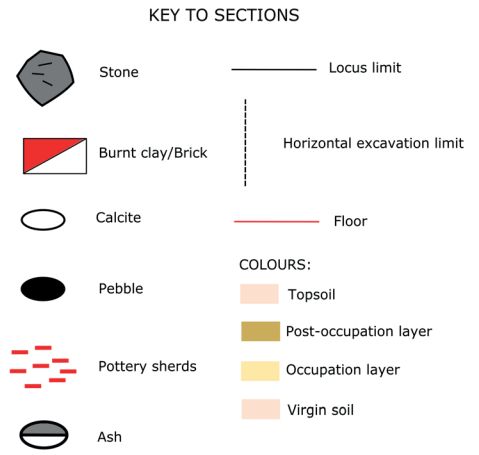
All around the well, there is a large accumulation of many pebbles and sherds, registered as Locus:271929:058 (**Fig. D14**). This extends for about 2 m east and west of the well, and about 3 m north, sloping down from the well entrance. Based on evidence from the upper layers of the well, which have yielded clearly modern material, it is possible that the well was recently reopened by people squatting on the site who, in the process of emptying the well, created the disturbed upper layer (Locus:271929:020) and the accumulation (Locus:271929:058) around it. Above Locus:271929:020, there was a brown deposit, Locus:271929:010, also yielding modern material. A further modern pit (cut: Locus:271929:008, fill: Locus:271929:009) containing beer cans which show the date 2010 (thus predating the construction of the chicken farm in 2014) was cut into the well's opening.

In Outdoor Area 7, several Sasanian graves were identified. Of these, Graves 42, 43, 62, 73, 77 and 93 have been excavated. Graves 78, 94 and 95 have been identified but not excavated. All these graves were covered with topsoil LGR:0189. In the eastern part of Outdoor Area 7, the virgin Locus:271929:061 was reached immediately below the topsoil (**Fig. D11: section A**).









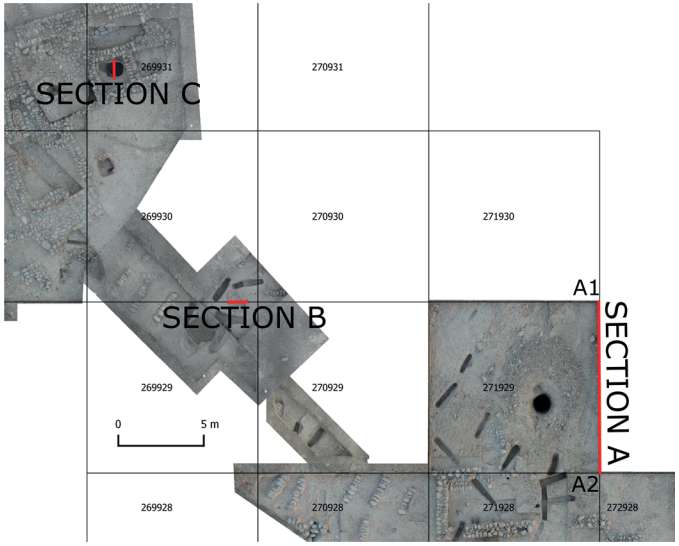


Fig. D11: Sections A of Outdoor Area 7; Prepared by Andrea Squitieri based on the drawing of Jens Rohde. Section B of the pyrotechnical installation in Outdoor Area 8; prepared by Andrea Squitieri based on the drawing of Silvia Amicone. Section C of the pottery kiln in Room 31; prepared by Andrea Squitieri based on the drawing of Silvia Amicone.

Fig. D12: The small floor Locus:271929:051 abutting the wall Locus:271929:050 on the left and the stone installation Locus:271929:053 in the foreground. On the left, the cut of the Grave 73 is visible. Photo by Jens Rohde.

Fig. D13: The entrance to the large well Locus:271929:056, excavated to a depth of about 7.5 m. Photo by Jens Rohde.

Fig. D14: The entrance to the large well Locus:271929:056, surrounded by an accumulation of pottery and stones (Locus:271929:058). Photo by Jens Rohde.

D8. Alley 4

Alessio Palmisano & Jens Rohde

Alley 4 is located between Building C and Building A (**Figs. D7**, **D15**), and it is delimited on the west by wall Locus:270928:028 and on the east by wall LGR:0149. Its floor (LGR:0234) is a compact, hard, grayish, clayey surface which contained a number of small pebbles (1-2 cm in diameter) and white particles, and had potsherds lying flat on its surface. On the floor lies a 40 cm deposit of a hard, grayish-brown, clayey soil LGR:0287, covered by a reddish, clayey material, LGR:0015, beneath the topsoil (LGR:0286). On the south, this alley was cut by the construction of the chicken farm, thus leaving its section exposed. Several soil samples were taken from this section, and analysed; their results are in shown in **Chapter E** (see **Fig. E2: profile 5**).

D9. Building C = Room 55

Alessio Palmisano

Building C is bounded by the walls Locus:270928:027 to the north, and Locus:270928:028 to the east, both built on virgin soil (**Figs. D7**, **D15**). It is composed of one preserved room, called Room 55. Both these walls are constructed from stones with a diameter of 30-35 cm, arranged in two rows, with a rubble fill of pebbles mixed with mud. In particular, the east-west wall Locus:270928:027 is 2.14 m long and 75 cm wide and connects to wall Locus:270928:028, which runs in a north-south direction and is 3.22 m long and 70 cm wide. The corner of these two walls was iden-

tified in 2015 and registered as Locus:270928:023[55]. Access to Building C was to the north; this was indicated by threshold Locus:270928:059, 81 cm wide, composed of medium-sized stones (10-15 cm diameter), and perfectly aligned in an east-west direction with wall Locus:270928:027.

Unfortunately, most of the southern side of Building C was bulldozed away during the construction of the chicken farm. This is why it is now only comprised of Room 55. In the north-eastern corner of this room, the virgin soil (Locus:270928:038) was used as walking surface. It is interesting to note that this room has wider walls and is made of larger stones than the walls of the adjacent Room 3 of Building A (**Fig. D8**), which may indicate that Room 55 of Building C had a more representative function than Room 3 of Building A.

D10. The eastern part of Outdoor Area 8

Alessio Palmisano

To the west and north of Building C and Alley 4, Outdoor Area 8 extends as far as Building D in the west (**Fig. D15**). To the west of Building C, the remnants of an east-west oriented wall (Locus:270928:057) were found; this wall is 1.7 m long and about 58 cm wide, and it was built with stones with a diameter of 30-35 cm arranged in two rows. This wall was cut through by Grave 90, and is badly preserved due to severe bulldozing during the construction of the chicken farm. The walking surface of this open area is represented by the virgin soil, a silty-clayey soil, rich in white particles and particularly hard, which was labelled as Locus:270928:038 and Locus:270928:011. Locus:270928:011 had already been reached in 2015 within the so-called "connecting trench"[56], whereas Locus:270928:038 was only identified after continuing excavation this year. It is located to the south of the connecting trench. On Locus:270928:038 and to the north of Wall Locus:270928:027, we found the sherds of a large jar and a pot lying flat (PPP 270928:058:001; **Fig. D16**). This represents clear evidence that the virgin soil was used as a walking surface in this open area during the Main Occupation Period.

The excavations were also continued north of the 2015 connecting trench, and reached virgin soil, here called LGR:0285, extending towards north-west and abutting the eastern wall of Building B, Locus:271928:017. In the light of evidence yielded by the virgin soil Locus:270928:038, we suggest that LGR:0285 was also originally used as a trodden surface. In the north, LGR:0285 is disturbed by Grave 95. In the south, it joins the floor of Alley 4, LGR:0234. Above LGR:0285, there was a pale brown, dry, hard soil, with pebbles and a few accumulated sherds (LGR:0057), which we interpreted as dating from the end of the Main Occupation Period. Above it, there lay a dark brown, clayey soil, LGR:0243, accumulated during the Post Occupation Period.

This area was re-used during the Sasanian period to install several graves. A total of 14 graves cutting the virgin soil were found this year. Nine graves are arranged in a north-south direction (Graves 83, 40, 82, 81, 79, 75, 90, 87, 86), while five graves show an east-west orientation (Graves 89, 39, 76, 85, 41) (**Figs. D15**, **D17**, **H1**). Only three graves have been excavated (Graves 75, 76, and 85). All the graves were covered by the topsoil, LGR:0286.

D11. The central part of Outdoor Area 8: the pyrotechnical installation

Silvia Amicone

In the area where a pottery kiln was excavated in 2015 and 2016[57] (Locus:269929:006), a fill containing a high concentration of red burnt clay was excavated this year, after its initial identification in 2016 (**Fig. D15**). This fill is located 1.5 m northwest of the pottery kiln, and its excavation revealed a pyrotechnical installation labelled LGR:0203. This installation was made of a poorly preserved burnt clay lining, roughly circular in plan, that was built on the virgin soil LGR:0044, with a diameter of about 1 m and 20-25 cm high (**Fig. D11: section B**, **Fig. D18**). At the bottom, the lining was filled with a soft layer rich in ash and charcoal (LGR:0202), out of which several samples were taken for analysis. This layer was covered by a dark brown and hard deposit, LGR:0195, marked by the presence of many burnt bricks and pieces of charcoal. Above LGR:0195, there was a softer, sandy-silty deposit, called LGR:0134, containing much burnt clay. This upper fill had already been exposed in 2016. This fill was covered by a sandy-silty brown deposit (LGR:0183), which extended into the rectangular 2×3 m trench that was opened during this campaign in order to investigate this installation.

Within this trench, four Sasanian graves were discovered, cutting the virgin soil. Graves 49 and 59 have been excavated, while Graves 60 and 61 have been left unexcavated. All the graves show the characteristic stone cap-

55 Stone 2016, 62.

56 Stone 2016, 65.

57 Stone 2016, 66; Amicone 2017a, 77-82.

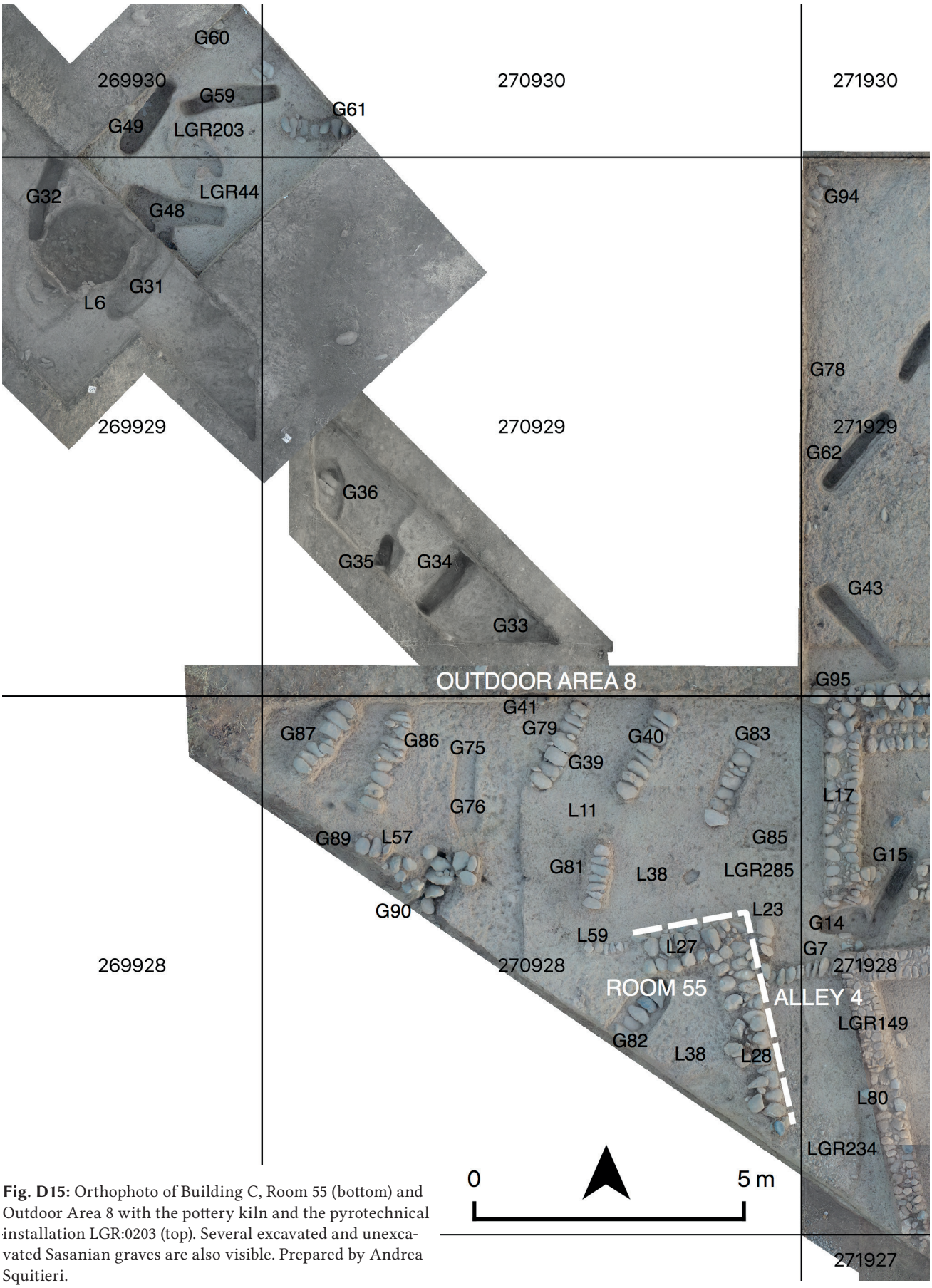


Fig. D15: Orthophoto of Building C, Room 55 (bottom) and Outdoor Area 8 with the pottery kiln and the pyrotechnical installation LGR:0203 (top). Several excavated and unexcavated Sasanian graves are also visible. Prepared by Andrea Squitieri.

Fig. D16: Several fragments of a pottery vessel (PPP 270928:058:001; on the right), found smashed on the virgin floor in the proximity of the corner of Building C. Photo by Alessio Palmisano.

Fig. D17: Unexcavated Sasanian graves in Outdoor Area 8, north of Building C, showing the characteristic stone capping. Photo by Alessio Palmisano.

Fig. D18: The pyrotechnical installation in Outdoor Area 8 during its excavation, in between two excavated Sasanian graves (G49 and G59). Note the two remaining chunks of the burnt clay lining on the sides of the reddish fill. Photo by Silvia Amicone.

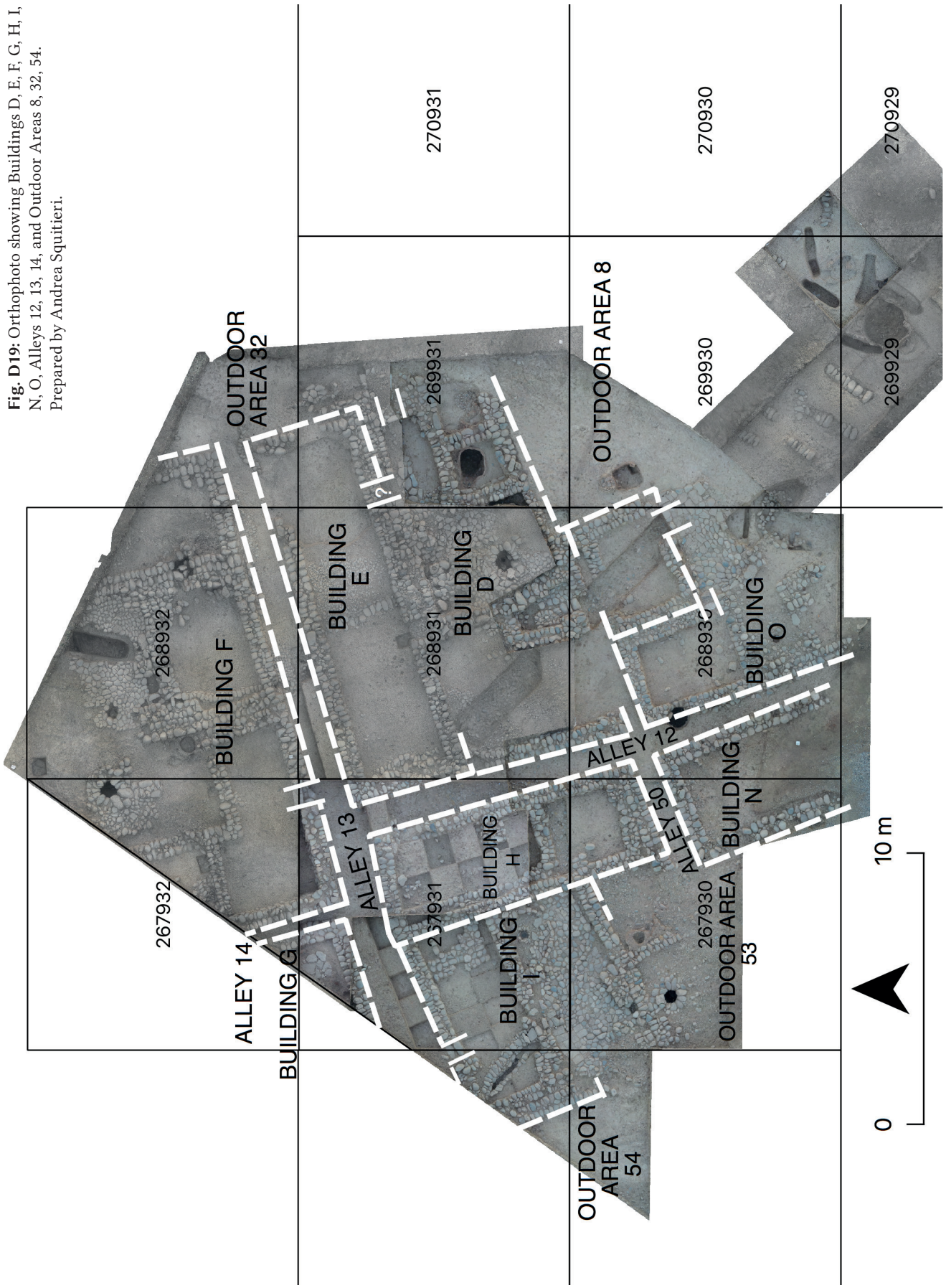


Fig. D19: Orthophoto showing Buildings D, E, F, G, H, I, N, O, Alleys 12, 13, 14, and Outdoor Areas 8, 32, 54. Prepared by Andrea Squitieri.

ping made of a row of medium sized stones. The deposit LGR:0183 extended above the pyrotechnical installation, was cut by the graves, and was then covered with topsoil LGR:0126.

Concerning the use of this installation, apart from ash, charcoal, burnt clay, and burnt brick fragments, no other material has been recovered that could help to interpret its function. Surely it was used for some activity involving fire; however, it is not possible to be more precise based on current evidence. It is hoped that results from the analysis of the samples will clarify its function.

D12. The western part of Outdoor Area 8 and Building D

F. Janoscha Kreppner & Andrea Squitieri

The western part of Outdoor Area 8 borders Buildings D and O (**Figs. D19**, **D20**). This area was partially excavated in 2016. The aim of the 2017 campaign was to determine the edges of Buildings D and O, and clarify the layout of the outdoor area[58].

The virgin soil LGR:0044 was reached, and, as was also the case in the eastern part of Outdoor Area 8 (**§D10**), it was used as a floor. A built stone and paved floor was also excavated south of Room 9 and east of Rooms 34 and 56, which had previously been detected in 2015 and 2016[59]. This paved floor, called LGR:0157 (**Figs. D20**, **D21**, **D29**), measures 6 m x 4 m and it is made of flat slabs alternating with rounded cobblestones. Towards north it is bordered by a stone structure named Locus:268930:008, which was installed between the floor and wall LGR:0153: the southern wall of Room 9. This room, belonging to Building D (**§D12.5**), was accessed from the paved floor through an entrance.

A characteristic feature of the western part of the Outdoor Area 8 is the presence of two pyro-technological installations, which join the pottery kiln and the pyrotechnical installation located in the central part of this outdoor area (**§D11**).

The first installation is located east of Room 57, immediately south of the paved floor LGR: 0157 described above. It is registered as Locus:268930:077 and it was found sunk into the virgin soil. It has a circular shape with a diameter of ca. 2.5 m, and about 40 cm deep, bounded by a lining of cobblestones. On its eastern wall, an oval black spot measuring 60 x 40 cm was found. This could be what remains of an oven. North and south of it, the remains of at least three other oval black spots, roughly of the same size, could be detected (**Fig. D22**). Unfortunately, this installation was heavily damaged by a large modern pit LGR:0128; its precise original shape and function are therefore not clear.

Further north and east of Room 9, a second pyrotechnical installation was found (**Fig. D23**). It measures 1.7×1.0 m with a roughly oval shape in plan view, and it has been registered as LGR:0223. It consists of two parts. The southern part is sunk into the ground about 30 cm deep, with a lining wall covered with clay plaster. In the SE corner, placed vertically, a brick was still in situ. Measuring about 20×10 cm and 30 cm high, it thus covered the entire depth of the structure. Possibly it had been placed here to reinforce the clay lining, or to support a superstructure for which no other evidence has been found. The fills (Locus:269930:061 and Locus:269930:066) were dark red in colour, with lumps of burnt clay, and several crushed pottery sherds. These sherds were of fine ware. These finds indicate heat exposure, hence the interpretation of this installation as an oven, a fire pit, or a kiln for pottery. If we assume it was a pottery kiln, surely this installation looks very different from the other two pottery kilns known at Gird-i Bazar (**§D12.2**).

The northern part of this installation consists of an earthen platform about 30 cm high, on which several smashed fragments of a large ceramic vessel were found. It is clear that this large pot was originally installed immediately next to the installation; however, the functional connection between the installation and this pot is not clear.

Building D is accessed from the east into Room 30 and from the west from Alley 12 into Courtyard 11. From the south Room 9 had its own entrance from Outdoor Area 8 (**Figs. D19**, **D20**). Some architectural modifications identified in the 2016 campaign[60], gave this building its current layout. This consists of two courtyards, 11 and 27, surrounded by Rooms 9, 10, 30, 31 and 33. Before these modifications, the two courtyards constituted one single open space, and Building D formed a single architectural unit with the rectangular single-room Building E - Room 19 located to the north[61]. The 2017 campaign targeted Rooms 9, 10, 33 and Courtyard 11, which had been left partially unexcavated during the previous campaign, and also focused

58 The 2017 excavations in this area were started by Francesca Chelazzi and continued after her departure by Janoscha Kreppner, Hero Salih Ahmed and Andrea Squitieri.

59 Stone 2016, 68; Chelazzi 2017d, 82.

60 Chelazzi/Egbers 2017, 84.

61 Egbers 2017, 89.

on the excavation of the kiln in Room 31, whose upper fill had been only partially exposed in 2016.

D12.1 Room 33

F. Janoscha Kreppner & Andrea Squitieri

Room 33 (**Fig. D19**) is located in the easternmost part of Building D, and it was partially excavated in 2016 when a concentration of pebbles was found inside the entire room[62]. This room is bounded by the walls Locus: 269931:018 to the south, Locus: 269931:016 to the north, and Locus: 269931:017 to the west. No wall was found to the east where the room opened to Outdoor Area 8. The floor of this room was made of a beaten earth surface, Locus: 269931:041, extending into the northern half of the room, while a pebble floor extended into the southern half, Locus:269931:042 (**Fig. D24**).

A very badly preserved oven (Locus: 269931:040) was found in the southwestern corner of the room. Unfortunately, only few remnants of the clay lining were still in situ. At a certain point in time, the oven went out of use and Room 33 was filled with a thick fill of pebbles (Locus: 269931:031), which were found mixed with numerous loose fragments of the oven itself (fill: Locus: 269931:039). The reason for filling this room with pebbles, destroying the oven in the process, are not clear. Nor is it clear when this may have occurred. It is possible that this event took place when the entire layout of Building D was modified and perhaps it was decided that, due to a change of function, this room would no longer be used.

D12.2 The pottery kiln in Room 31

Silvia Amicone

Room 31 is located east of Room 33, but is not connected to it (**Fig. D20**). It is bordered by walls Locus:269931:016 to the north, Locus:269931:017 to the east, Locus:269931:018 to the south, and Locus:269931:019 to the west. The architecture of this room was investigated in 2016, when a rounded clay structure with a reddish fill became visible during the excavation of the deposit lying on the room's floor Locus:269931:022[63]. In 2017, this structure, which was revealed to be a pottery kiln, was completely excavated (**Fig. D11: section C**, **Fig. D25**).

The kiln has a pear-shaped layout in plan view, with a narrowing part towards west. It was sunk into the bedrock (Locus:269931:037); the latter being made of conglomerate, a very coarse-grained sedimentary rock composed of pebbles held together with a cementing material. The kiln lining was made of burnt clay which appeared reddish-green in colour (Locus:269931:025). Within this lining, various fills were excavated. The lowest, Locus:299931:036, was a silty-clayey soil with patches of burnt red clay, characterised by the presence of burnt brick fragments, ash, charcoal, white carbonatic materials, and pottery sherds. This fill was covered by a harder deposit, Locus:269931:034, consisting of large fragments of burnt bricks embedded in a matrix of red, silty-clayey soil with very few pottery sherds and rich in white carbonatic particles. This fill most likely represents the collapse of the uppermost kiln's structure, as visible in **Fig. D26**. Locus: 269931:032 was excavated from above this fill; it was rich in lumps of burnt clay, charcoal, pottery, and brick fragments. This in turn was covered by the kiln's uppermost fill, Locus:269931:030, a soft, sandy-silty, dark brown deposit, characterised by fewer fragments of burnt bricks than the fills found below. In the narrowing part of the kiln, towards the west, a fill (Locus: 269931:033) rested directly on the bedrock. It was very similar to Locus:269931:030, but with almost no burnt brick fragments.

This pottery kiln was most likely a vertical kiln with an upper chamber covered by a structure (whose collapse may constitute Locus:269931:034) and a lower combustion chamber (whose fill may be Locus:299931:036). Room 31's kiln seems to be of the same type as the kiln excavated in 2015 and 2016 in the central part of Outdoor Area 8[64], although the two showed a very different state of preservation. Unlike the kiln in Outdoor Area 8, Room 31's kiln did not yield any fragments of the kiln floor with holes separating the lower from the upper chamber; moreover, it did not yield the last pottery load still in situ with almost entirely preserved vessels. Pottery sherds were indeed present in the Room 31's kiln fills but they were in a fragmentary state. Some morphological samples, whose analysis is ongoing, were taken in order to cast light on the formation processes of these fills.

62 Egbers 2017, 89.

63 Egbers 2017, 89.

64 Amicone 2017a, 77-82.

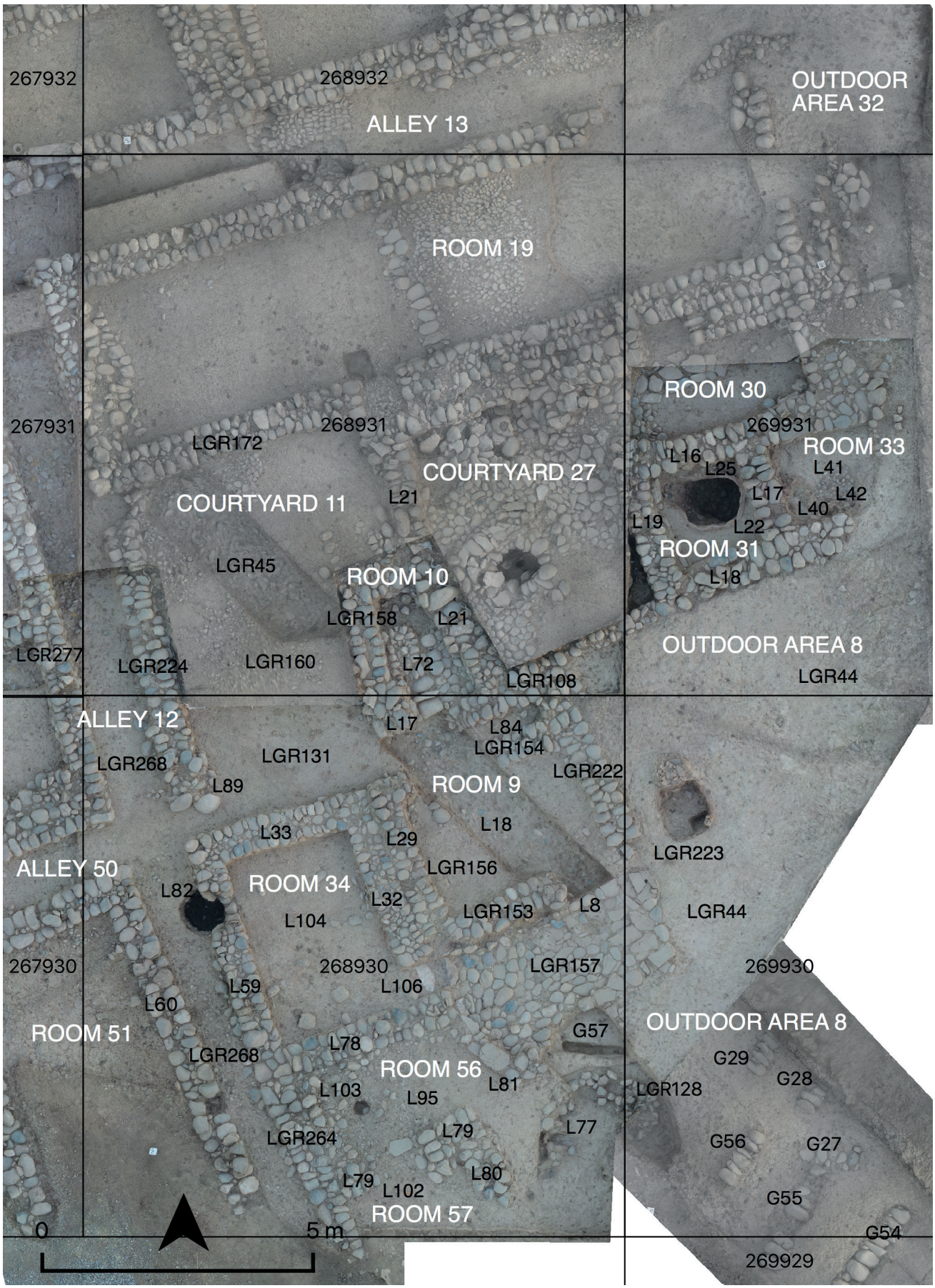


Fig. D20: Orthophoto of Buildings D and O and Outdoor Area 8. Prepared by Andrea Squitieri.

Fig. D21: The paved floor LGR:0157, viewed from northeast. Photo by F. Janoscha Kreppner.

Fig. D22: Pyrotechnical installation in Outdoor Area 8 (Locus:268930:077), heavily damaged by a modern pit (LGR:0128). Note the black spots and reddish lenses indicating activities involving fire took place here. Photo by F. Janoscha Kreppner.

Fig. D23: Pyrotechnical installation in Outdoor Area 8 (LGR:0223). Note the southern part cut into the virgin soil, lined with clay and a brick placed vertically; and the northern part with a clay platform on which a smashed vessel was found. Photo by Andrea Squitieri.

Fig. D24: Room 33 of Building D with a beaten earth floor in the north, and a pebble floor in the south. Note the oven placed in the southwestern corner, destroyed by the later fill of the room made of stones, created when the room went out of use. Photo by Andrea Squitieri.

Fig. D25: The pottery kiln in Room 33, Building D, half excavated. Note the oval shaped lining with an entrance towards northwest and the collapse of bricks visible in the eastern portion of the kiln fill. To the west of the kiln fill, the bedrock made of conglomerate is visible. Photo by Peter Bartl.

Fig. D26: The pottery kiln in Room 33: detail of Locus: 269931:034, showing the brick collapse. Photo by Peter Bartl.

D12.3 Room 10

F. Janoscha Kreppner & Andrea Squitieri

Room 10 (**Figs. D20**, **D27**, **D29**) is a small trapezoidal architectural unit. It is 2.3 m long and 0.8 m wide in the north, and 1.3 m wide in the south, covering an area of 2.5 m². The walls LGR:0158, Locus:268931:021, Locus:268930:017 bound Room 10, leaving the access from the south. The floor is paved with large cobblestones (Locus:268931:072), which may indicate that some activities in which water was involved took place in this small room. Apart from pottery sherds, no other finds were discovered on the floor.

On the floor, a dry, hard, brown, silty soil, Locus:268931:071, accumulated at the end of the floor's use. This deposit was overlaid by a hard, yellowish-brown, silty soil (LGR:0242 and Locus:268930:084), a result of erosion processes during the Post Occupation Period.

D12.4 Courtyard 11

Janoscha Kreppner & Andrea Squitieri

Courtyard 11 (**Fig. D20**) is located in the western portion of Building D. Its northern section had been partially excavated in 2016, and a mud floor and a pebble floor were found[65]. This year we located the access to Courtyard 11 from the southwest, through a passageway about 0.8 m wide, located where Alley 12 and Alley 50 meet (**Fig. D19**). Here, a door socket (Locus:268930:089) was found indicating that this passage was closed with a door (**Fig. D28**). Another passage leads to Rooms 9 and 10 to the east, although no door socket was found here. The remaining southern area of the courtyard was excavated down to the beaten mud floor LGR:0131. Overlaying this floor was a hard, compact, silty soil, light brown in colour, with few white particles (LGR:0130) marking the endpoint of the floor's use. This locus was in turn covered by LGR:0080, a hard, yellowish-brown, silty soil, and then by Locus: 268930:084, a dry, hard, brown, silty soil, which originated from erosion processes.

D12.5 Room 9

F. Janoscha Kreppner & Andrea Squitieri

Room 9 (**Fig. D20**), measuring 3.3 x 2 m (ca. 7 m²), is located in the southern part of Building D, and is accessed through the paved floor LGR:0157 dividing Building D from Outdoor Area 8. It is bounded by walls LGR: 0153 in the southeast, LGR:0154 in the northwest, Locus: 268930:029 in the southwest and LGR:0222 in the northeast (**Fig. D29**). This space had been partially uncovered (down to the bedrock made of conglomerate, Locus: 268930:018[66]) during the 2015 excavations of the connecting trench. In 2016, the upper layers of the western part of the room were investigated[67], whereas in 2017 the excavations targeted the northern and southern parts of the room down to the floor.

To the south, the wall LGR:0153 is oriented NE-SW, separating Room 9 from Outdoor Area 8. It is approximately 4 m long and 50 cm wide. It consists of one preserved course of cobblestones set on the virgin soil, and two rows of cobbles; in between there is a fill formed from smaller stones.

65 Chelazzi 2017b, 85-86.
66 Stone 2016, 68.
67 Chelazzi 2017a, 84.

Fig. D27: Building D, Room 10. Photo by F. Janoscha Kreppner.

Fig. D28: Building D, Courtyard 11: passage connecting Alley 50 to Courtyard 11. Photo by Andrea Squitieri.

To the west, it connects to wall Locus:268930:029. To the east, no proper corner existed because an entrance, ca. 70 cm wide, gave access from Outdoor Area 8 to Room 9.

To the north, the wall LGR:0154 is oriented NE–SW and has two rows of cobblestones (in total c. 55 cm wide). The stones measure ca. 28 x 19 cm with a rubble fill in between. It is preserved to a height of two courses of cobbles at the eastern corner, and three courses (38 cm high) at the western corner. In the west and the east, the wall binds to the western wall of Room 9 (Locus:268930:029) and to the eastern wall (Locus:268930:056). During the 2015 excavation of the connecting trench, the central part of this wall had been removed (Locus:268930:007). The sections of the connecting trench indicate that the wall was built on the virgin soil[68].

To the east, wall LGR:0222 divides Room 9 from Outdoor Area 8. The wall is 2.6 m long and 56 cm wide and consists of two rows of stones with small pebbles in between. The size of the stones is, on average, about 34 x 23 cm. One to two courses of stones with a maximum height of 22 cm are preserved. The lowest row was established on virgin soil.

To the east, wall Locus:26930:029 has a NW–SO direction. It is approximately 3.40 m long and is about 50 cm wide. It is formed from three courses of stones, and two rows of large cobblestones with a rubber fill in between. This wall connects to walls LGR:0153 and LGR:0154.

Room 9 has a beaten mud floor LGR:0156 abutting the four boundary walls. This floor was covered by a dry, hard, brown, silty soil with some sherds lying flat (Locus:268930:076 and Locus:268930:088), overlaid by yellow, brown, silty soil (LGR:0288). These remains were sealed by the Sasanian floor LGR:0155, which is discussed below in greater detail (**§D15**).

D13. Building O

F. Janoscha Kreppner & Andrea Squitieri

Building O (**Fig. D19**) is located west of Outdoor Area 8 and can be accessed from it via the paved floor LGR:0157. It is composed of three rooms, 34, 56 and 57, and it is bordered on the east by Alley 12. A corner of Room 34 had been exposed in 2016[69]; in 2017, the excavation of this and the other rooms was completed. To the south, Building O has not been preserved due to bulldozing activities that occurred during the construction of the chicken farm.

D13.1 Room 34

Room 34 (**Figs. D20**, **D33**) is located west of Room 9 and it is separated from the latter by a double wall. The room is 3.5 m x 2.5 m (8.75 m²) and was accessed from Outdoor Area 8 through an entrance with a threshold marked by a flat slab, Locus:268930:106. It is delimited by four walls: Locus: 268930:032 in the northeast, Locus: 268930:033 in the northeast, Locus: 268930:059 in the southwest, and Locus: 268930:078 in the southeast.

The walls consist of two rows, 0.6 m wide, with smaller stones in between. A disturbance can be seen in the middle of the western wall Locus:268930:059, where a modern pit (Locus:268930:082) damaged the wall.

Room 34 has a beaten mud floor, Locus:268930:104, abutting the walls (**Fig. D30**). Apart from pottery sherds, no other items were found on the floor of this room; how-

68 Stone 2016, fig. C4.1: section J.

69 Chelazzi 2017c, 85.

ever, an iron slag PPP 268930:070:004 was found just outside the room, in the passage leading to Outdoor Area 8 (see **Chapter G, no. 34**).

Above the floor, a dry, light brown, clayey-silty soil (Locus:268930:092) was present, marking the end point for use of this floor. This deposit was covered by a dry, hard, dark brown, silty soil (Locus: 268930:063) which was the result of erosion processes after the end of the Main Occupation Period.

D13.2 Room 56

Room 56 is located south of Room 34. It measures 3.3×1.7 m (= 5.6 m²) (**Figs. D20**, **D31**, **D33**). Wall Locus:268930:078 represents the northern boundary, abutting the corner of the western wall LGR:0264 and wall Locus:268930:059. These walls were founded on virgin soil; they are made of two rows of cobblestones (60 cm wide) and are preserved to a height of two courses. Wall Locus:268930:079, representing the southern boundary of Room 56, is divided into two, possibly 3 segments. The first segment begins in the west, abutting wall LGR:0264, towards the east it is interrupted by an entrance equipped with a stone threshold. This entrance connects Room 56 with Room 57 to the south. After the entrance, a second segment of the wall is visible forming a corner with wall Locus:268930:080, limiting the more southerly Room 57 in the northeast. Room 56 does not have an eastern wall. Therefore it is open to Outdoor Area 8. The passage between the room and paved floor LGR:0157 of Outdoor Area 8 was marked by two flat stone slabs forming a step (Locus:268930:081; **Fig. D32**), perhaps arranged in this manner to manage the different floor levels. Slightly to the south, the passage from Room 56 to the beaten earth floor of Outdoor Area 8 was not marked by any threshold and led directly to the pyrotechnical installations (perhaps ovens) labelled as Locus:268930:077 (heavily disturbed by a modern pit, see **§D12**). Because of the presence of these

Fig. D29: Building D, Room 9, shown in the middle of the photo, with the 2015 connecting trench still visible in its centre; in the background: Room 10; and in the foreground: the paved floor LGR:0157 giving access to Room 9 from the Outdoor Area 8. Photo by Andrea Squitieri.

Fig. D30: Building O, Room 34, with some pottery sherds lying on the beaten earth floor. Photo by Andrea Squitieri.

three entrances, two leading to Outdoor Area 8 and one to Room 57, Room 56 appears to have functioned as a distribution room.

Room 56's floor (Locus:268930:095) consists of beaten earth with a concentration of many small stones on the western side (Locus:268930:095). A rounded stone installation of unknown function, Locus:268930:103, is located in the eastern corner of the room. A dry, hard, greyish-brownish, silty soil with small granules, Locus: 268930:094, accumulated above the floor marking the end point for use of this room. This soil was then covered by hard, greyish, silty soil (Locus:268930:093). Above this, the Sasanian pebble floor (LGR:0155) was found, which is discussed below in greater detail (**§D15**).

D13.3 Room 57

Room 57 (**Fig. D20**) lies south of Room 56 and was accessible from there through an entrance (**Fig. D33**). The walls Locus:268930:080 and LGR:0264 limit this room to the east and the west respectively. To the south, the preserved room width is 2.3 m, however, to the south the room was destroyed by the construction of the chicken farm. The floor is made of beaten earth, Locus:268930:102, and it abuts the boundary walls. A dry, hard, brown, clayey soil containing much pottery (Locus: 268930:101) accumulated above the floor, marking the end of the room's use.

D14. Alley 12

F. Janoscha Kreppner & Andrea Squitieri

Alley 12 runs in a SE–NW direction, west of Buildings D, E and O, and separates the latter from Buildings N and H to the east (**Figs. D19**, **D20**). The bordering walls are LGR:0264, Locus:268930:059 and LGR:0224 to the east, and LGR:0277 and Locus:268930:060 to the west. Thirteen metres of the alley (down to the youngest floor) were uncovered during the 2017 campaign (**Fig. D34**). We know, thanks to the 2015 and 2016 campaigns, that Alley 12 continues further to the north for another 4.5 m, where it was excavated down to its oldest floor, LGR:0032. In total, this alley extends for about 17.5 m and meets Alley 13, which runs almost perpendicular to it in an east-west direction. Alleys 12 and 13 represent the main architectural units allowing circulation between buildings in the western area of Gird-i Bazar.

The youngest floor excavated in 2017 consists of beaten earth with some stones and pottery sherds pressed into it (LGR:0268). A dry, hard, brown, silty soil containing pottery and some small stones (LGR:0028) accumulated on the floor when Alley 12 ceased to be used. This layer is superimposed by a hard, greyish, silty soil, LGR:0161, which formed as a result of post-occupational erosion.

Fig. D31: Building O, Room 56: detail of the floor. Photo by F. Janoscha Kreppner.

Fig. D32: The stone step (in the foreground) connecting the paved floor (LGR:0153) of Outdoor Area 8 to Room 56. Photo by F. Janoscha Kreppner.

D15. The Sasanian and the modern occupation periods

F. Janoscha Kreppner & Andrea Squitieri

Above the southern structures of Building D and Building O, after a phase of non-use and decay, an open area equipped with a pebble floor, LGR:0155, was found (**Fig. D35**). This floor was associated with a semicircular stone installation, Locus:268930:044. Pottery fragments found on this floor featured a decorative motif of wavy lines that indicated a Sasanian date. A small decorated glass shard from this floor, PPP 268930:053:006 (**§G2.6**, **no. 64**), can also be connected to the Sasanian period. Interestingly, this surface lies east of the cemetery, also

Fig. D33: Room 57 in the bottom, cut by the modern building activities; Room 56 in the middle; and Room 34 in the top. On the left, part of Alley 12 is visible. Photo by Andrea Squitieri.

dated to the late Sasanian period thanks to ^{14}C analysis (**§H**). This surface ends roughly where the westernmost grave was found, Grave 57 near the paved floor LGR:0157. Possibly, the LGR:0155 surface served as a floor for ceremonies held during the burial rituals.

Two circular pits represent evidence for the modern occupation in this area. The first measures about 0.8 m in diameter (Locus:268930:082), and has been cut down to the bedrock damaging the western wall of Room 34, Locus:268930:059, already mentioned above (**§D13.1**, **Figs. D34**, **D36**). The fill in this pit (Locus:268930:083) contained plastic objects and biscuit packages from Saddam Hussein's era. The second pit (LGR:0128) cuts into the pyrotechnical installation east of Room 57 (**§D12**).

D16. The western part of Gird-i Bazar and its modern occupation

Peter Bartl

The aim of the 2017 excavation in the western part of Gird-i Bazar was to expand the excavation to the south and west up to the metal fence surrounding the chicken farm (**Figs. D1**, **D19**), so as to gather more information about Buildings I and H, already partially excavated in 2015[70], and find out whether they were related to further architectural units. Details of this work can be found below (**§D17-23**).

In this section, we will discuss the modern occupation of this area of the excavations. The topsoil LGR:0126, covering the western part of Gird-i Bazar, preserved the top of the ancient walls and had an average thickness of 20 cm. It contained a large amount of modern material. In several areas the archaeological features are directly beneath the modern surface resulting in a certain degree of distortion from ploughing or bulldozing. This is particularly the case in the southwestern part of the excavation area that is closest to the chicken farm. A few archaeological features could be identified that can be clearly be linked to modern activities in this part of the site. In particular, two post holes (cut: Locus:267930:039 / fill: Locus:267930:040 and cut: Locus:267930:041 / fill: Locus:267930:042) were excavated that cut into the Iron Age levels but could have been used for modern (possibly nomadic) tents. Their construction technique implied the use of plastic wrapped around the base of the wooden poles, to prevent them from rotting. This evidence for a modern occupation at Gird-i Bazar may be related to that found in the eastern part of the site, in particular in Outdoor Area 7 and Courtyard 2, where evidence for a modern occupation predating the construction of the chicken farm was found and clearly dated thanks to evidence provided by coins (**§D4.2**).

70 Bartl 2016, 74-75.

Fig. D34: View from south of the portion of Alley 12 excavated in 2017, with the modern rounded pit (Locus:268930:082) cutting its floor (in the middle). The alley divides Buildings D and O to the right from Buildings N and H to the left.
Photo by Andrea Squitieri.

D17. Building H

Peter Bartl

Building H extends west of Alley 12 and south of Alley 13 (**Figs. D19**, **D37**). After the results of the 2015 excavations, Building H was considered to be composed of a single room (called Room 17[71]) separated by a double wall from Building I, neighbouring it to the west, and connected to Alley 12 to the east by means of a passage located in the room's NE corner. This year's investigations have revealed another room south of Room 17: Room 47. These two rooms, however, do not seem to be connected by a passage.

D17.1 Room 47

Room 47 (**Figs. D37**, **D38**) is bounded by wall LGR:0276 to the north, LGR:0277 to the east, Locus:267930:005 to the south, and Locus:267930:004 to the west. The walls are made of two rows of rounded cobblestones and are preserved to a height of three courses in the east and one course in the west. The walls are resting on a construction fill rich in pebbles (LGR:0260) resting on the virgin soil (LGR:0261).

The floor of the room is made of beaten earth (LGR:0259) and it abuts a stone installation (possibly a bench), Locus:267930:007, running along the southern wall, as well as another small stone installation, Locus:267930:008, located in the NW corner of the room. No item, apart from pottery, was found on the floor. Above the floor, the fill (LGR:0258), a hard compacted, light-brownish, and extremely homogeneous silty soil, accumulated during the Post-Occupation Period. Room 47 is separated from Room 17 to the north by wall LGR:0276; no entrance has been found that would connect these two rooms, nor has an entrance to Room 47 been found at all. Room 47's function is, therefore, not clear.

71 Bartl 2016, 74.

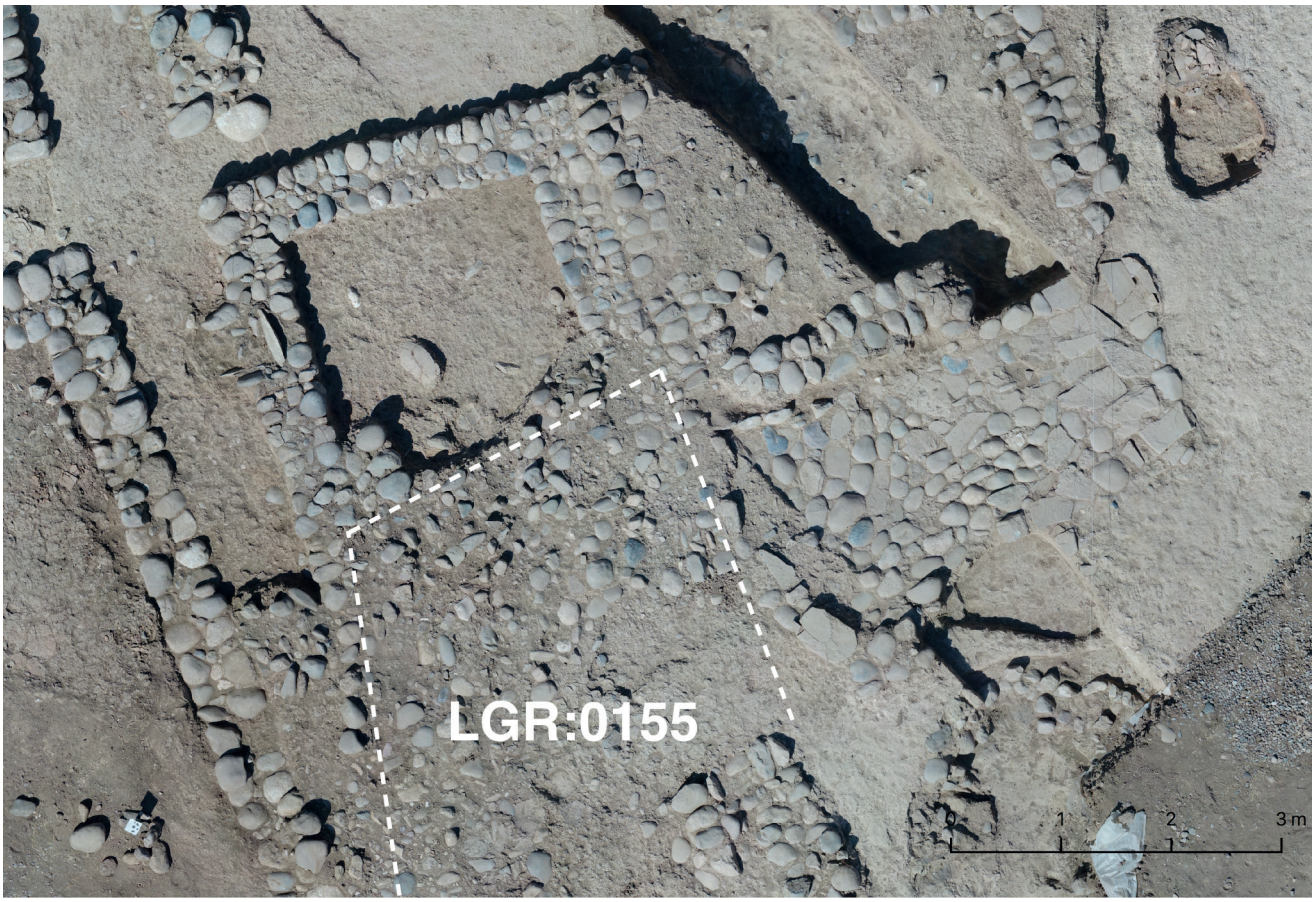


Fig. D35: Orthophoto showing the Sasanian pebble floor (LGR:0155). Prepared by Andrea Squitieri.

D18. Alley 13

Peter Bartl

Alley 13 runs roughly in an E-W direction, separating Buildings E, H, and I from Buildings F and G to the north (**Figs. D19**, **D37**, **D54: section F**). It is about 26 m long and was partially excavated in 2015 and 2016[72]. During the 2017 field season, the excavation of the alley was continued west by about 6.7 m, where it was noted that the alley slightly bends southward after the NW corner of Building I. The width of the alley also increases at this point, going from 1.5 m to 1.85 m.

The alley slopes slightly down towards the west, with the bottom elevation of the lowest floor (LGR:0100) of 545.02 m a. s. l. at the western edge and about 545.35 m a. s. l. in the central-east part of the alley. This slope of about 35 cm is enough to drain off water that was funnelled into the alley from the surrounding buildings, and in particular from the two drains, one coming from the north and from the south, found in 2016[73].

Fig. D36: The modern pit (Locus:268930:082), cutting through the floor of Alley 12 and damaging part of the western wall of Room 34. Note the bedrock made of conglomerate at the bottom of the pit. Photo by F. Janoscha Kreppner.

As in previous campaigns, an accumulation of walking surfaces was found during the excavation of the alley, between the younger and the older floors. In order to reach virgin ground more quickly, the alley was divided into a northern and southern half, the latter of which was exca-

72 Bartl 2016, 73-74; Hashemi/Egbers 2017, 95-96.

73 Hashemi/Egbers 2017, 95-96.

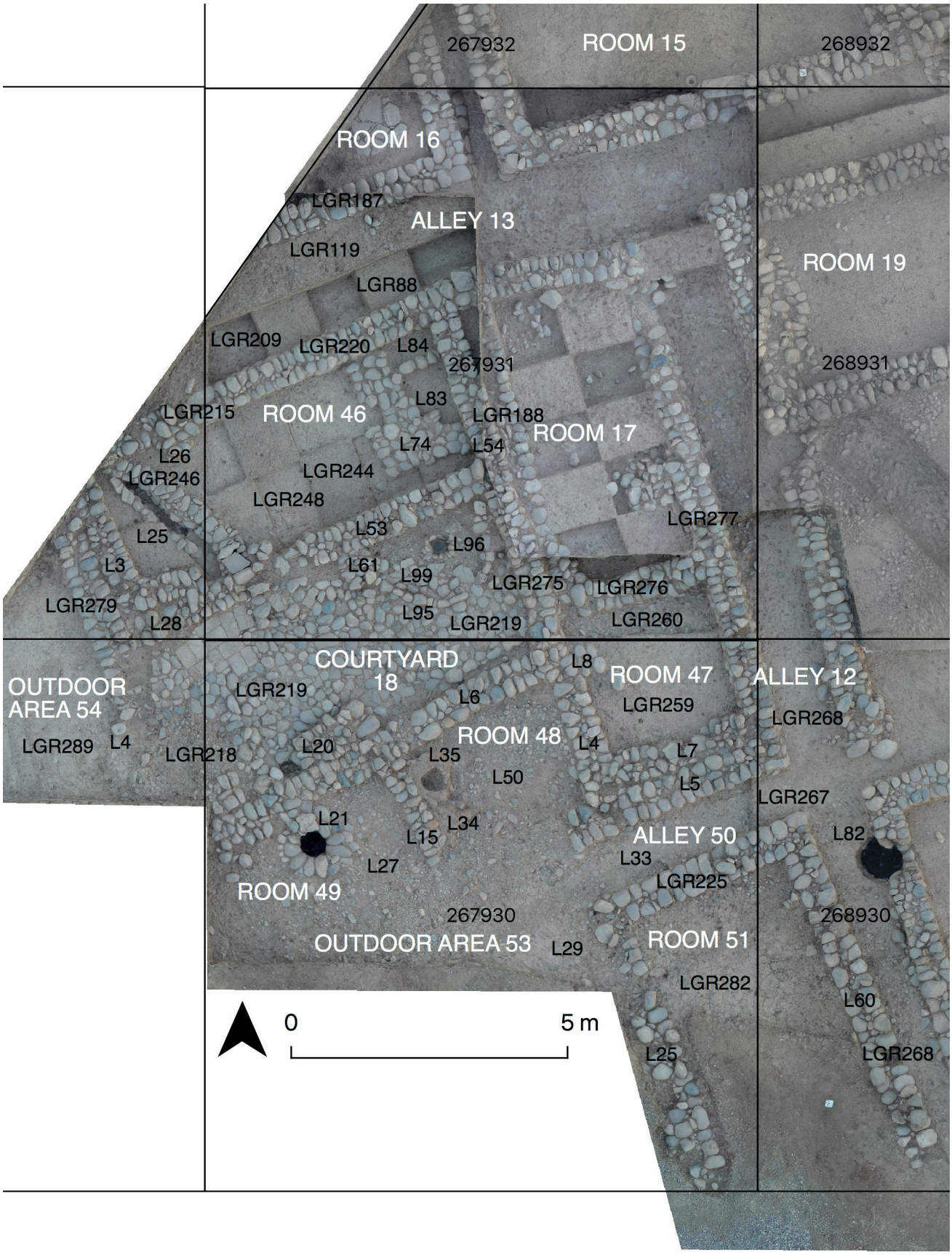


Fig. D37: Orthophoto of Buildings H and I. Prepared by Andrea Squitieri.

Fig. D38: Building H, Room 47. Note the beaten earth floor (LGR:0259) in the southern part of the room, and the construction fill in the northern part (LGR:0260). Photo by Peter Bartl.

Fig. D39: Alley 13 in the foreground, with its northern half not excavated and the southern half excavated by 1×1 m squares. South of the alley, Room 46. Photo by Peter Bartl.

vated in 1 x 1 m squares, three of which extended down to the virgin soil LGR:0209 (**Fig. D39**). The virgin soil is the same whitish soil with very small pebbles that has been encountered underneath the architecture in almost all areas of the site.

The oldest walking surface, LGR:0100, is made of beaten earth containing small pebbles, a few abraded sherds, and animal bones that have been trodden into the surface; it represents the first phase of occupation. This surface is followed by accumulations of walking horizons that are barely distinguishable from each other, labelled LGR:0098. The succession of deposits and walking horizons that have accumulated in the alley above the virgin soil display a U-shaped section, meaning that they slope upwards laterally, towards the bordering walls. This is a characteristic that has already been observed in previous campaigns elsewhere in this alley. The youngest walking surface LGR:0088 can be identified right on top of this accumulation and is marked by a few sherds lying flat upon it, with pebbles trodden into it. Above LGR:0088, a layer of debris was found (LGR:0119), a result of decaying processes from the buildings bordering the alley; this layer includes evenly scattered pieces of burnt mud and plaster.

D19. Building I

Peter Bartl

Building I extends west of Building H (**Figs. D19**, **D37**). A small portion of the southeastern corner of this building had already been excavated in 2015[74]. This year the excavation exposed Room 46, Courtyard 18[75], and Rooms 48 and 49 as far as Alley 50 which connects to this build-

74 Bartl 2016, 75.

75 In 2015 labelled "Room 18".

ing. Building I is bounded by Alley 13 in the north, Alley 12 in the east, Alley 50 and Outdoor Area 53 in the south. The question arises whether Building I constituted a single unit with Building H. No connection between the two structures could be observed; and a distinct change in orientation along the southern face of Alley 13, that is between Buildings I and H, suggests that the two should be considered to be separate units.

D19.1 Room 46

Room 46 (**Fig. D37**, **D40**, **D54: sections E**, **F**) is located in the northern part of Building I, and it is 6.6 m long and 2.65 m wide. It is surrounded by walls built with tightly-alligned, rounded cobblestones (average size of 15-25 cm), bonded with a dark brown soil matrix that can barely be distinguished from the surrounding soil. The walls are composed of two rows of stones that are placed with their short sides on the exterior; larger stones are placed on the edges, with occasional small stones filling any gaps in the middle, resulting in a total wall width of about 60 cm. The southern wall of the room, Locus:267931:053, binds to the wall to the east, Locus:267931:054, and forms an L shape. The same seems to apply to the southwestern and western walls Locus:266931:028 and Locus:266931:003, both in binding together and forming L-shapes; the implementation of this kind of construction technique has been observed in other buildings at the site as well. The northern wall of the room (LGR:0220), is divided by a doorway with a threshold (LGR:0215). Only the northeastern corner of this wall has been excavated, where it abuts eastern wall Locus:267931:054, therefore it cannot be ascertained whether this wall also employs the particular L-shape construction technique mentioned above. The northwestern corner of this wall has not been exposed because it lies beyond the metal fence surrounding the chicken farm. All the walls rest upon a construction layer (LGR:0248) that lies on the virgin soil (LGR:0249).

Room 46 can be accessed from the northern Alley 13 by the aforementioned doorway (LGR:0215), which gives access to the western half of the room. This entrance has a well-preserved, stepped threshold formed from two large rounded boulders, flanked by smaller stones, protecting the door frame sides (**Fig. D40**). On the inside of the doorway, on the west, a small projection (Locus:266931:026) extending out of the wall can also be associated with the door.

A second doorway can be located in the southern wall of the room, east of the point where the drain (see below) goes under the wall. This area is quite disturbed, but the presence of a door-socket and some large stone slabs suggests the existence of some sort of passageway.

Fig. D40: Building I, Room 46, with the younger of the two floors exposed in every second square (higher) and the virgin soil in every other (lower). In the foreground, the installation Locus:267931:074; in the background, the younger of two drains (LGR:0246) is visible; in the top right, the entrance (LGR:0215) is also visible. Photo by Peter Bartl.

Another interesting feature of Room 46, often observed elsewhere in Gird-i Bazar, is the presence of a corner reinforcement. In the southwestern corner of Room 46, the southern wall Locus:266931:028 had been reinforced on the interior by the addition of two rows of stones. All four rows were interconnected by the transversal placement of particularly long stones. This indicates that this reinforcement was not added later, but was part of the original plan. This structural feature may have been connected to the presence of a staircase or a bench.

Room 46's older floor (LGR:0247) is made of beaten earth and it abuts a drain which (Locus:266931:025) crossed the room on the western side (**Fig. D41**). This drain starts at an inlet located in the western half of the southern room's wall, reaching Alley 13 on the opposite side of the room, through its northwestern corner. This drain was partly dug into the virgin soil underneath. It is

Fig. D41: Western part of Room 46 where the two drains are visible. The excavated drain to the right is the older one (Locus:266931:025). To its left, the younger drain (LGR:0246) is visible with its capstones. Photo by Peter Bartl.

lined with two courses of rounded river cobbles on either side. The capping stones for the drain were not preserved as they had been reused at a later date for a new drain (see below).

During the initial phase of room-use, several rows of stones were laid out in the eastern part of the room along the wall, thus forming an installation (Locus:267931:074, **Fig. D40**) enclosing two compartments: a central one filled with light grey-brown soil (Locus:267931:083), and a smaller one to the north-east filled with light grey-brown soil (Locus:267931:084). The function of this installation is still unclear and the excavation of both compartments has yielded no clues to its original purpose. A hint may possibly be found on one of the stones used to build the installation, which has been smoothed and shows a large number of pick-marks on its surface, indicating that it might have been part of a work-bench of some sort. Moreover, an upside-down, pivoted stone belonging to a potter's wheel was found right next to this installation (**§G2.4**, **no. 53**; **Fig. G28**). This may suggest that this room was the location of the pottery workshop (or at least one of them) in this area. That this installation remained in use throughout the duration of the room's use can be deduced from the fact that the stones of the installation abutted against the walking surfaces that accumulated above the older floor for about 10-15 cm; this accumulation is called LGR:0245.

The highest level of these walking accumulations represents the youngest beaten earth floor of the room, LGR:0244. This floor abuts the younger phase of the drain in the western part of the room. The most recent drain, LGR:0246, re-used some of the stone-lining from the original drain. This new drain extended towards the east, in a new orientation that is slightly more curved than the older drain. It remains unclear why the old drain was abandoned and a new one was built. It can be proposed, however, that the rising accumulation of surfaces in Alley 13, into which the drain empties out, necessitated this renovation, and the adaptation of the new drain outlet to Alley 13's rising walking level.

The latest phase of use of Room 46 before abandonment is represented by a thin deposit (LGR:0238), containing charcoal pieces and traces of burnt and fragmented pottery that had been trodden into the underlying floor. This thin deposit is superimposed by another layer of debris (LGR:0211) that contained the largest pottery inventory discovered in this room, including several fragmented vessels and one stone bowl rim (**§G2.4**, **no. 52**). It should be noted that Room 46 has yielded, together with the adjacent Courtyard 18, a high number of pottery sherds and objects, especially stone tools (**§G2.4**).

During the non-use phase for this room, a whitish, silty soil, Locus:267931:073, accumulated around the installation (Locus:267931:074) and a greyish, hard compacted soil (LGR:0210), accumulated in the rest of the room. Both of these were covered by topsoil (LGR:0126).

D19.2 Courtyard 18

A space of roughly equal size (6.8×3.15 m), equipped with an elaborate stone and baked brick pavement, was excavated to the south of Room 46 (**Figs. D37**, **D54: sections E**, **F**). This type of pavement suggests that this was an open space because the other courtyards in Gird-i Bazar (i.e., Courtyards 11, 21 and 27) also show a similar arrangement in that they are completely or at least partially equipped with a stone floor. Hence, this space was named Courtyard 18. Courtyard 18's pavement more closely resembles those of Courtyards 27 and 21 (made with medium size cobbles), although, unlike in the other

two courtyards, Courtyard 18 is also partially paved with baked bricks (**Fig. D42**).

The stone walls bounding this courtyard are preserved to a height of one or two courses and feature the usual construction technique. The eastern wall (LGR:0275) is built against the corner of Room 46 to the north and abuts another L-shaped wall junction (consisting of wall Locus:267930:006 and wall Locus:267930:004) to the south. The former runs for 6.9 m from the eastern end of the courtyard to the edge of the excavation area on the west, thus separating Courtyard 18 from the open spaces to the south. Along this wall, in the western half of the courtyard, a stone bench with a height of ca. 70 cm was excavated (Locus:267930:020). Its upper surface is not preserved, with the exception of two large stones that seem to have been part of the original upper surface. Right next to this bench, to the east, the shoulder and rim of a large closed shape storage vessel was found resting upon a small hole that was filled with tiny river pebbles of less than 1 cm in diameter. The original purpose of this installation with its associated vessel is not clear; it can be speculated that it might have been used for storage.

The western part of the courtyard has been heavily disturbed by modern building activities, clouding our picture of the layout of the structural elements. Additionally, the western wall has mostly been destroyed. It can be said with some certainty that the wall coming from the north LGR:0279 (and built against the western wall of Room 46 on the outside, thus forming a double wall) would be a good candidate for the western boundary of Courtyard 18, if it did not end abruptly after about 4 m from north, where a door-socket was found still in place (Locus:266930:004).

As mentioned above, the interior of the courtyard is paved (LGR:0219). It consists of rounded river cobbles of different shapes and sizes. The cobbles have an average diameter of 20-30 cm, with a few larger exceptions that reach a length of up to 40 cm. Small pebbles were also found filling the gaps between the larger stones. The stones are do not have a particularly flat surface but are

Fig. D42: Courtyard 18 with its stone pavement and brick pavement visible in the foreground. The semicircular installation Locus:267931:095 is also visible to the right. Photo by Peter Bartl.

Fig. D43: Detail of the brick pavement of Courtyard 18 (LGR:0219). Photo by Peter Bartl.

often rounded or uneven, forming a quite bumpy surface. In the northwestern corner of the pavement, the floor has been paved with eleven baked bricks. These bricks oscillate between 38 cm and 48 cm, with an average length of 43 cm. The average width is 25 cm with some variability between 18 cm and 30 cm. It is interesting to note that the bricks seem to have been made without a mould as each brick has its own proportions. The sides are often slightly convex. Along their edges, the upper surface forms a slight protruding ridge a few millimetres height. This feature derives from the method of producing the bricks, that is, by compressing the edges for smoothing. Between the bricks, the narrow gaps were carefully filled with small flat stones (**Fig. D43**). The brick pavement slopes down towards a point in the western half of the northern wall (between Locus:267931:053 and Locus:266931:028), where the inlet of the drain (LGR:0246) that crosses Room 46 (see above) is found. This inlet is bounded by two stones that have been covered with a capstone. The fill, Locus:267931:100, was excavated from under the capstone. The area of the inlet inside the wall was covered by particularly thick stones that support the weight of the wall superstructure (**Fig. D44**). Just as the brick pavement was probably installed to improve its impermeability, attention was also given to the protection of the wall surrounding the inlet. Here, the brick pavement was slightly raised in order to prevent the water from causing damage to the base of the walls.

Finally, in the southwest portion of the courtyard, a small pebble floor is visible abutting wall Locus:267930:006.

Another feature exposed in Courtyard 18 is a circular pit located in the north-eastern corner (**Fig. D45**). It consists of a stone-lined pit about 60 cm in diameter and 35 cm deep, on the bottom of which a squared stone was found with a wide central cavity, 20 cm in diameter (Locus:267931:096) showing a very smooth surface (**Fig. D46**). The fill of this pit was a friable, dry, dark and brown soil

Fig. D44: Detail of the inlet of drain LGR:0246, with Room 46 in the background. Photo by Peter Bartl.

Fig. D45: The stone lined pit (Locus:267931:096) with a worked stone set in the bottom, enclosed by the semicircular installation (Locus:267931:095) in the northeastern corner of Courtyard 18. Photo by Peter Bartl.

containing charcoal (Locus:267931:098). Interestingly, this small pit is placed inside a semi-circular area delimited by large elongated stones placed on the pavement (Locus:267931:095) (**Figs. D42**, **D45**). This semicircular installation has a length of 2.3 m and extends from the northern wall of the courtyard by 1.5 m. Close to the wall the stones are larger. The floor inside this semicircular installation is Locus:267931:099. On its edge it is made of rounded, as well as flat, stones. Towards the walls and around the circular, stone-lined pit it is made of small pebbles alternated with beaten earth. On the western end of the semicircular installation, a stone projection (Locus:267931:061) was found, which was clearly part of the installation.

The initial interpretation of the stone lined pit Locus:267931:096 considered it part of a water pulling device, composed by a vertical beam placed inside the pit attached to a weighted horizontal beam pulling the water bucket from a well; a device very similar to a *shaduf*, the typical water pulling mechanism of the Middle East. This

Fig. D46: Detail of the worked stone inside the pit (Locus: 267931:096), lined with stones. The worked stone is set in the bottom of the pit and show a wide smooth cavity. Photo by Peter Bartl.

interpretation was based on the discovery in 2016 of a very similar pit with a squared stone placed in the bottom of it in Courtyard 21 of Building F, in very close proximity to the well of this courtyard[76]. However, in the case of Locus:267931:096, no well was found in its vicinity to support such an interpretation. It is important to notice that both the 2016 and 2017 stone lined pits yielded fragments a closed shape vessel with handle (PPP 268932:012:006 and PPP 267931:098:002) sitting upside down in the depression of the squared stone placed in the bottom of the pits. Further analysis continues, in an effort to clarify the function of these two installations.

In the western end of the room the pavement changes to incorporate baked bricks and it slopes upwards towards a concentration of several stones protruding from the surface. This may indicate that another installation was situated here, which could be associated with a badly preserved pebble floor extending west of the stones (LGR:0218). The room layout, however, is not entirely clear here, as modern bulldozing mostly destroyed this area.

The deposit LGR:0233 that accumulated directly on the pavement of this room during the Abandonment Phase includes sherds from a large storage jar that must have been resting on or near the stone installation (Locus:267931:061) located in the middle of the room's northern wall. Also, several other fragmentary vessels and small fragmentary bowls were found clustered in the southwestern corner. A large flat bowl was found in the middle of the room. Above the baked bricks, the number of charcoal pieces and animal bones suggests the presence of food processing activities here. Thus, the general function of the room possibly combined different activities, including food processing, possibly storage, and the use of liquids. This interpretation is supported by the inventory of objects from within the room, the elaborate pavement, and the numerous installations. Above LGR:0233, during the period of post-occupation, a hard compacted light brown silty soil LGR:0266 accumulated, which was covered by the topsoil LGR:0126.

76 Hashemi 2017, 99-100.

D19.3 Room 48

Room 48 is situated southeast of Courtyard 18. It is bounded by walls Locus:267930:004, Locus:267930:006, and Locus:267930:015. It opens towards Outdoor Area 53 in the south (**Fig. D37**). This room features a pebble floor (Locus:267930:050) and two ovens (Locus:267930:034 and Locus:267930:035) set against its western wall Locus:267930:015 (**Figs. D47**, **D48**). The oven to the north has a diameter of about 55-60 cm. It has been preserved to a height of about 5-10 cm and must have been left unused for a long period, as no remains of ashes or charcoals have been found inside or around it. Attached to it, the southern oven has only been partly preserved. About three quarters of it were destroyed and several fragments from the wall of the dome-shaped structure were lying on the pebble floor. Originally, it must have been at least 75 cm in diameter.

Numerous baked clay objects lying on the pebbles were found in ovens' proximity. These may have been lids that covered the ovens' openings. Interestingly, the southern, larger oven was placed directly upon the pebble pavement, as can be deduced from the fact that the pebbles could be found underneath the whole structure. Under the northern, smaller oven, however, the pebble surface does not continue, suggesting that this was the original oven, to which the second was added later.

Fig D47: The two ovens (Locus:267930:034 and Locus:267930:035) set against the western wall of Room 48. Photo by Peter Bartl.

Fig. D48: Detail photo of the two ovens (Locus:267930:034 and Locus:267930:035) in Room 48. Photo by Peter Bartl.

Fig. D49: The well of Room 49. Photo by Peter Bartl.

On the floor, a compact fill Locus:267930:036 accumulated which included many structural fragments from the ovens, as well as large lumps of burnt clay. Above this, the fill Locus:267930:010 was excavated, very close to the modern surface, which resulted in the presence of modern intrusive material.

D19.4 Room 49

To the west of Room 48, and separated from it by a small stone wall (Locus:267930:015), stands Room 49 (**Figs. D37**, **D54: section F**). Room 49 is another open room bounded on the north by wall Locus:267930:006, and possibly by another wall to the west which (due to modern bulldozing) was not preserved. To the south, however, the room seems to be open to Outdoor Area 53, as was Room 48.

It is important to notice that wall Locus:267930:015 separating Rooms 48 and 49 rests upon the pebble floor which extends across both rooms (the aforementioned Locus:267930:050 in Room 48 and Locus:267930:027 in Room 49). This means that Rooms 48 and 49 were originally intended as a part of Outdoor Area 53, and at some point during the Main Occupation Period, the separating wall Locus:267930:015 was added, perhaps to support the two ovens described above.

Room 49 features a well (Locus:267930:021), located about 50 cm from the northern wall, lined by a stone structure that protects the well's opening and the upper part of its shaft (**Fig. D49**). The structural elements of the well comprised a cut (Locus:267930:045) with a diameter of about 0.9-1.0 m, dug directly in the virgin soil, and the aforementioned stone lining that covers the top 50-60 cm of the well shaft (Locus:267930:021). The construction technique used several courses of stones slightly narrowing down so that the shaft diameter at about 40 cm of depth is about 0.5 m. The lining stones are of different sizes, between 15 cm and 35 cm wide, and they have been carefully laid out.

The excavation of the fill of the well led to some exciting discoveries. During the excavation of the first 40 cm of the fill, two layers of large stones with an average size of 20-25 cm were encountered (Locus:267930:044), covering and surrounding human remains (**Figs. D50**, **D51**). A minimum of three individuals could be distinguished, including a female adult aged 40-55 (Locus:267930:037), a stillborn child (Locus:267930:043), and a female adult aged 24-35 (Locus:267930:051). The bones were not articulated, and many of them seem to have moved during the process of decomposition. A detailed description of the human remains is offered below (**§D19.5**). The bones were embedded in a fill still containing numerous large stones (Locus:267930:046), covered by dark brown, moist, firm soil (Locus:267930:022). Excavation of the well fill had to be stopped at a depth of 1.1 m, as it became impossible to excavate further down from the top of the well.

The hard layer deposited on the floor of Room 49, Locus:267930:026, was overlaid by a hard, dry, silty soil, Locus:267930:019, containing some modern objects coming from the recent activities. Above this, there is topsoil LGR:0126.

D19.5 Humans remains in the well of Room 49

Kathleen Downey

During the excavation of Room 49's well, skeletal elements belonging to three separate individuals were identified in the fill of the well. At first, the workmen noticed small fragments of bone appearing under a layer of stones that they were removing. After a short time cleaning it

became clear that the acetabulum of a right os coxa was in the northwestern section of the well. More stones were carefully removed, and at the northwestern edge of the well a left adult femur was uncovered with its distal end sticking up out of the ground.

To the north, what can only be called shadows of ribs were found. The soil matrix here was hard and had deteriorated the strength of the cortical bone, especially in the thin parts of the skeleton. The majority of the bones were quite fragile. It became obvious that the bones would not be completely articulated and so the decision was made to excavate slowly, in layers of only a few centimetres at a time. All finds were documented with descriptions, pictures, and orthophotos whenever possible. The right os coxa was further investigated, revealing the right side of the pelvic inlet. The morphology was open, possibly indicating a female. Unfortunately, only a few small portions of the iliac blade survived excavation. The cranium was found to the southeast. It was partially fractured on the left parietal and temporal lobe while removing the stones that lay almost directly on top of it (**Fig. D51**). Further excavation revealed a more vertical forehead and a smaller mastoid process, supporting the observational assessment of the right os coxa. Some small ribs also became visible in the north. Originally these were assumed to have belonged to animals, but as more was uncovered their shape and size led to their identification as juvenile human. Lastly, for this layer, a long bone was found running north to south, slightly east of the centre of the well. This bone was heavily fractured and distorted, but was later identified as a right tibia. It is possible that some peri-mortem trauma occurred, which caused this deformation.

In the next layer, the shadow of vertebrae were found running in the southern section from east to west. The shadow of a left os coxa was also uncovered, too poorly preserved to remove from the soil. It is possible that this individual was laid in the well with the head in the east, facing north, and with legs flexed to the front (N) of the thorax. Some significant movement of certain elements must have occurred, possibly the result of stones being dropped on top of the body, or the movement of elements in watery soil after the onset of decay. In the next layer, more of the juvenile individual was uncovered, showing

Fig. D50: Humans remains in the well of Room 49. Photo by Peter Bartl.

Fig. D51: Cranium of Individual 3 (female aged 24-35) from the well in Room 49. Photo by Peter Bartl.

the right ilia to the west of the ribs and fragments of the cranium to the east to southeast. The juvenile individual appears to have been mostly articulated, laying on it left side oriented east to west. The head was in the east and was most likely facing south. A few small hand bones were found anterior (S) to the pelvis. The juvenile's two femora were stretched south and southwest at almost 90° from the axial skeleton, and a portion of the distal radius extended towards the distal portion of one of the femora. One juvenile lower leg was found beneath the westernmost juvenile femur. All of this was located north of the fractured adult tibia.

Those bones were removed and a new layer started. An adult left ulna was found running E-W when the juvenile tibia and fibula were removed. The other set of juvenile lower leg bones was found at the western end of the ulna. More vertebrae were found in the central area. One grouping appeared to have four lower thoracic vertebrae articulated together with their respective ribs. To the east of the femur were the remains of the left scapula and a few fragmented carpals, metacarpals, and finger phalanges. The juvenile's feet were found in the area north of its body, which is not near where the legs were found. It is possible that the juvenile was placed in the well with its feet tucked underneath its bottom. The legs may also have moved later, after deposition. After that layer was removed, fragments of the juvenile's arm bones were found just north of the ribs. The left arm was probably lying below the body. A left adult radius ran from the centre near the proximal ulna to the north, and an adult humerus was found just north of the head running southwest to northeast with the proximal end near where the chin would have been. The mandible was upside down, just in front of the face.

All skeletal elements were cleared away, and another layer of stones was found. Later, when workmen removed the next layer of stone another distal femur, scapula, and mandible were uncovered. The femur disappeared almost straight down into the well, angling slightly to the east. Because it was a right femur, it is possible that it actually belonged to the first individual. The scapula poses the same question as it is also from the right side of the body. However, the mandible indicates that the well contains a third individual and a second adult individual. In the attempt to excavate the right femur, more bones were found. Another articulated left humerus was found with the left radius and ulna slightly to the west and below the cranium belonging to Individual 1. It was decided that there was insufficient time to continue excavating properly through the layers, and, once the second femur was removed for sampling, the well was refilled.

Summing up, the minimum number of individuals (MNI) is three. Individual 1 is a female, aged 40-55+ years of age. Individual 2 is a 36-38 week-old fetus. Individual 3 is a female, aged 24-35. Excavation of the burials in the well was not completed due to the physical constraints on our ability to excavate as well as time constraints. This internment of multiple of individuals represents many possibilities, but needs to be completely excavated to reconstruct the event or events that led to the deposition of these people. It is important to determine if this was intended as a traditional grave that utilised a convenient feature, or if some type of ritual behaviour is present.

The ^{14}C analysis conducted on one bone (see **Table D1** and discussion in **§D2.1**) has yielded the calibrated date 748-409 BC, which indicates that these could be the first Neo-Assyrian period bodies found at this site. These individuals could give direct insight into the health, life, and mobility of the people from the Neo-Assyrian time period for this area.

D20. Outdoor Area 54

Peter Bartl

Outdoor Area 54 (**Figs. D34**, **D54: section E**) is located in the very west of the excavation area. Most likely it is another open space, which has been badly preserved due to the modern agricultural activities that have almost destroyed or disturbed all subjacent archaeological evidence. This area was probably an outdoor area because no traces of walls have been found. To the east, a door socket was found in situ (Locus:266930:004) indicating a door connecting this area to Courtyard 18. The virgin soil LGR:0289 was used as floor. This was covered by light greyish-brown, clayey soil, LGR:0280, below the dry, hard, grey-brown soil called LGR:0281.

D21. Outdoor Area 53

Peter Bartl

Outdoor Area 53 (**Fig. D37**) is located south of Rooms 48 and 49, and it is bordered to the south by the excavation limit, therefore it was not possible to investigate the full area. This outdoor area is covered with a pebble floor (Locus:267930:029) which continues north into the Rooms 48 and 49. Unfortunately, the layer right on the floor (Locus:267930:028) as well as the fill above it (Locus:267930:024) were both partly contaminated by intrusive modern material due to bulldozing which cut into this part of the site during the construction of the chicken farm.

D22. Alley 50

Peter Bartl

West of Outdoor Area 54 lies Alley 50 (**Figs. D37**, **D54: section D**), which is bounded by the walls Locus:267930:005 to the north and LGR:0225 to the south. This alley runs roughly east-west, parallel to the northern Alley 13, and meets perpendicularly with Alley 12 to the west (**Fig. D19**). The oldest of a series of walking surfaces (Locus:267930:033) was identified on the virgin soil. This was superimposed by an accumulation of surfaces (Locus:267930:032) in which a row of stones (Locus:267930:030), that might have had a water management function, was found (**Fig. D52**). The youngest floor, a beaten earth surface, was labelled LGR:0267, and it is superimposed by a dark brown, dry-hard silty soil (LGR:0229) that contained numerous sherds. Above this, a grey-brown, hard, silty, clayey soil (LGR:0217) covers the lowest two courses of stones preserved of the walls on either side of the alley.

Fig. D52: Alley 50 with the row of stones (Locus:267930:030) visible on the right. Photo by Peter Bartl.

D23. Building N

Peter Bartl, Janoscha Kreppner & Andrea Squitieri

Building N is separated from Buildings H and I by Alley 50 (**Figs. D19**, **D37**). It is located in the southernmost part of the excavated area, where the bulldozing activities for the construction of the chicken farm destroyed and damaged most of the archaeological features. Only Room 51 has been identified as belonging to this building.

D23.1 Room 51

Room 51 (**Figs. D37**, **D54: section D**) is 3 m wide, its southern part is not preserved beyond a length of 6 m from the northern wall of the room. The boundary walls are LGR:0225 to the north, Locus:267930:025 to the west and Locus:268930:060 to the east. They all connect to each other, indicating they were built at the same time. No access to the room has been identified so far. An entrance was likely located to the south, in the unpreserved area.

Room 51 has a beaten earth floor, LGR:0282, containing some scattered pebbles. This floor butts against the boundary walls. A dark brown, compact, clayey soil, LGR:0216, with smashed pottery and stones accumulated on the floor marks the end of the use of the room (**Fig. D53**). This deposit was then overlaid with topsoil LGR:0126.

Fig. D53: Pottery and stones lying on the floor of Room 51. Photo by Andrea Squitieri.

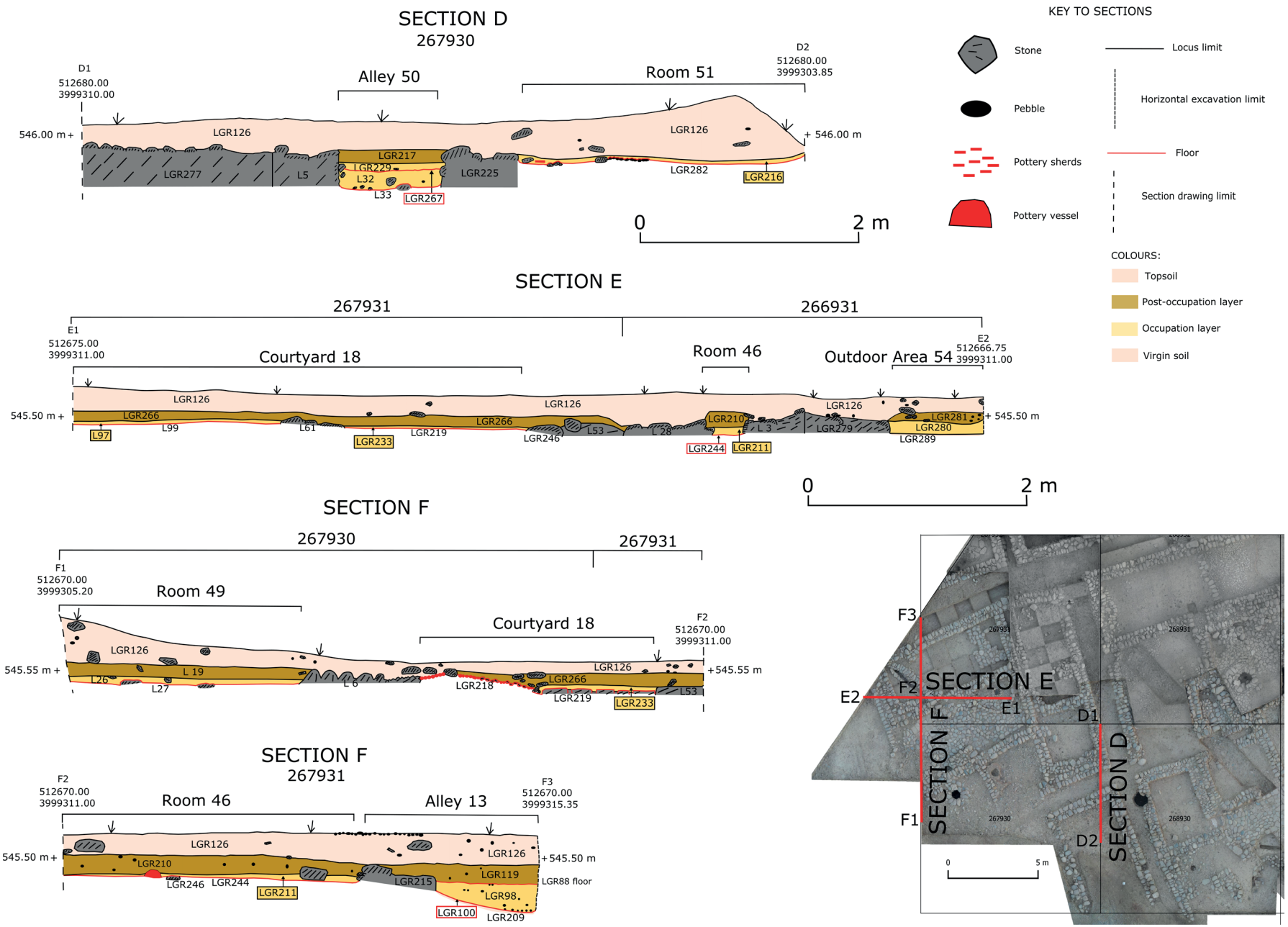


Fig. D54: Sections D, E and F. Prepared by Andrea Squitieri, based on drawings by Peter Bartl.

D24. Gird-i Bazar 2015-2017: some preliminary conclusions

F. Janoscha Kreppner

Our 2015-2017 salvage excavations in the Bora Plain focused on the area damaged by the construction of the modern chicken farm in Gird-i Bazar. Here, we uncovered an area of 1070 m². The application of a delicate stratigraphic excavation method and the use of the flotation machine resulted in a high amount of available data, which allows precise dating as well as a nuanced and comparative evaluation of the findings in relation to individual buildings and rooms. The excavation of the early first millennium BC architecture in the fenced off area of the chicken farm can be considered largely completed after the three excavation campaigns in 2015-2017. It was possible to obtain a clear picture of the organisation, structure and function of the small settlement built around a central place.

Only a few modifications in the stratigraphy of the previously excavated areas resulted from the 2017 investigations. We have now established that there are no re-use occupation periods in Building B, Room 6 (**§D6**) and Building A, Courtyard 2, (**§D4.2**). Because of the connections now exposed, the floors can be assigned to the main usage period. In the stratigraphic table (**Table D2**), small changes were made also for Buildings H and I within the main occupation period, the results of our improved understanding due to their continued excavation (**§D17**, **§D19**).

The archaeological record of Gird-i Bazar reveals a small Early Iron Age settlement in which buildings were arranged around a central open square. All buildings at Gird-i Bazar were erected on the virgin soil. All floors of the rooms, courtyards and alleyways were connected with each other through the doorways. It is therefore clear that the settlement was inhabited during one main occupation phase, during which only small changes to the buildings can be observed, and only in some places. For the time being, we assume that this part of the Dinka Settlement Complex was destroyed when the Assyrian control over the Peshdar Plain was established in the second half of the ninth century BC (for the preliminary chronological assessment see already **§D2.1**).

The buildings of Gird-i Bazar are organised according to a general pattern but differ in detail. The largest room usually has few or no installations and few finds including ceramics: Building A, Room 3 (**Fig. D8**); Building E, Room 19 (**Figs. D19**, **D20**); Building F, Room 15 (**Figs. D19**, **D37**); and Building H, Room 17 (**Fig. D37**). This may indicate that these rooms were used as living and reception rooms. The rooms were directly accessed from the alleyways that separate the buildings of Gird-i Bazar from each other. They are usually connected to the building's courtyard area where wells and bread baking ovens provided the comforts of everyday life.

Finds and installations indicate that the smaller rooms served as production areas and workshops. The presence of kilns in Outdoor Area 8 and Room 31 as well as the installations and finds in Building I, especially the discovery of the pivot of a slow rotating potter's wheel (**§G2.4**, **no. 53**), demonstrate that pottery was locally produced. Different types of ovens and kilns indicate the production of other products as well. The discovery of iron slags (**§G2**) suggests that also metal production and/or processing took place at Gird-i Bazar.

The well in Outdoor Area 7 (**Fig. D8**) is much bigger than the wells in the inner courtyards of the houses in the west. It is open to the public on the large square. It can therefore be assumed that this well was a collectively used source of water, which may also have served for particularly water-intensive production processes.

A peculiarity of the architecture of Gird-i Bazar is the presence of many double walls. Some are the result of changes to the buildings in the course of time (Buildings E/D). Others, however, cannot be explained in this way and point to a particular, local building style (Buildings H/I).

Now that the excavations at Gird-i Bazar have been completed, we look forward to analysing the architecture of the entire excavated area. We also intend to carry out activity area analyses, using the results gained from archaeobotany, archaeozoology and the analysis of small finds and ceramics.

Locus Group	Square	Locus	Locus Group	Square	Locus	Locus Group	Square	Locus
2	271928	24	11	271928	131	23	271928	127
2	271928	44	11	271928	132	23	271928	128
3	271928	40	11	271928	151	24	271928	75
3	271928	41	12	271927	4	24	271928	114
3	271928	42	12	271927	12	24	271928	115
3	271928	48	13	271927	20	24	271928	116
4	271928	33	13	271927	23	25	271928	76
4	271928	43	14	271927	30	25	271928	99
5	271928	62	14	271927	37	25	271928	100
5	271928	68	14	271927	38	25	271928	101
5	271928	69	14	271927	40	26	271928	61
5	271928	70	15	271928	14	26	271928	130
7	271928	16	15	271928	23	26	271928	136
7	271928	19	15	271928	27	26	271928	138
7	271928	20	15	271928	29	27	271928	72
8	271928	21	15	271928	46	27	271928	139
8	271928	25	15	271928	94	27	271928	145
8	271928	26	15	271928	159	28	267931	38
8	271928	52	15	270928	29	28	268931	60
9	269929	5	16	271928	32	28	268930	85
9	269929	26	16	271928	65	28	268931	70
9	269929	39	16	271928	90	29	271928	30
10	271927	15	16	271928	171	29	271928	39
10	271928	53	17	271928	49	29	271928	66
10	271928	54	17	271928	50	29	271928	78
10	271928	108	18	271927	25	29	271928	195
11	271928	3	18	271928	60	29	271928	200
11	271928	6	18	271928	111	30	271928	9
11	271927	3	18	271928	196	30	271928	13
11	271928	18	18	272928	64	31	271928	34
11	271928	38	19	271927	24	31	271928	83
11	271928	45	19	271928	59	31	271928	140
11	272927	2	19	271928	95	31	271928	152
11	271928	92	19	272928	50	32	268932	61
11	272928	2	20	271928	57	32	269932	17
11	271928	122	21	271928	58	34	271928	35
11	271928	123	21	271928	102	34	271928	173
11	272928	34	21	271928	103	34	271928	174
11	271928	126	21	271928	104	34	271928	175
			22	271928	67	35	271928	84
			23	271928	74	35	271928	133
35	271928	137	59	270928	12	80	268931	36
35	271928	144	59	270928	13	80	268931	44
36	271928	85	59	270928	14	80	268930	25
36	271928	129	60	270928	5	80	268930	37
37	271928	86	60	270928	15	80	268930	46
37	271929	5	60	270928	17	80	268930	58
38	271928	4	61	270928	16	80	268930	71
38	271928	5	61	270928	18	81	269932	11
38	271928	56	61	270928	19	81	269932	14
38	271928	178	62	271929	3	81	269932	20
38	271928	184	62	271929	21	82	268932	9
39	271927	18	62	271929	26	82	268932	32
39	271928	98	63	271929	4	82	268932	35
39	271928	105	63	271929	11	82	268932	43
39	271928	106	63	271929	12	83	268932	49
39	271928	107	63	271929	15	83	268932	51
40	271927	19	63	271929	19	84	269931	5

Table D3: Correspondence list between locus groups and loci of Gird-i Bazar. Prepared by Andrea Squitieri.

Locus Group	Square	Locus	Locus Group	Square	Locus	Locus Group	Square	Locus
41	271927	7	64	272928	14	84	269931	7
41	271927	17	64	272928	21	84	268932	41
42	271927	5	64	272928	24	84	268931	38
43	271927	6	64	272928	25	84	269932	3
44	269929	10	64	272928	47	84	269932	15
44	268930	15	65	272928	19	85	268931	43
44	268930	16	65	272928	26	85	268931	45
44	269930	13	65	272928	27	86	272928	9
44	269929	49	65	272928	28	86	271928	112
44	269930	35	66	267931	2	86	272927	43
44	269930	59	66	267931	11	86	272928	30
44	269929	64	66	267931	34	87	268932	65
44	269930	67	66	267932	2	87	268931	55
44	269931	43	67	267931	10	88	268931	53
45	268931	6	67	268931	15	88	268932	62
45	268931	8	68	267932	10	88	268932	63
46	269930	4	68	267932	14	88	268931	56
46	269930	5	68	267932	31	88	267931	70
46	269930	6	69	272927	3	89	268931	16
47	269930	7	69	272927	4	89	268932	34
47	269930	8	69	272927	5	90	268932	40
47	269930	9	69	272927	17	90	269932	16
48	269930	10	70	272927	13	91	272928	10
48	269930	11	70	272927	14	91	272927	44
48	269930	12	70	272927	15	91	271928	117
49	269929	8	70	272927	18	92	272928	11
49	269929	9	70	272927	21	92	272927	45
49	269929	19	71	269929	47	92	271928	118
50	269929	7	71	269930	33	93	268931	20
50	269929	17	72	268931	10	93	269931	13
50	269929	18	72	268931	14	94	269929	50
50	269929	41	72	269931	3	94	269929	51
51	269929	11	73	269929	31	94	269930	36
51	269929	12	73	269929	32	94	269930	37
51	269929	13	73	269929	33	95	269930	32
51	269929	21	73	269929	35	95	269929	52
51	269929	22	74	269930	17	96	269930	27
52	270929	23	74	269930	18	98	267931	41
52	270929	24	74	269930	19	98	268932	67
52	270929	25	74	269930	23	98	268931	58
53	270929	16	74	269930	44	98	267931	68
53	270929	17	74	269930	45	98	267931	69
53	270929	18	74	269930	46	99	267931	3
53	270929	19	75	272927	23	99	267931	9
53	270929	20	75	272927	31	99	268932	14
54	270929	3	75	272927	32	99	268931	65
54	270929	4	75	272927	36	100	267931	46
54	270929	13	76	272927	16	100	268931	63
54	270929	14	76	272927	34	100	268932	74
54	270929	15	76	272927	35	100	267931	71
55	270929	21	76	272927	37	102	268932	38
55	270929	22	77	272928	12	102	269932	4
55	270929	26	77	272928	13	103	267932	25
56	270929	8	77	272928	22	103	268932	33
56	270929	10	77	272928	23	104	267932	11
56	270929	11	78	268932	4	104	268932	15
56	270929	12	78	268932	21	105	268930	35
56	270929	27	78	268932	25	105	268930	98
57	270928	6	79	272927	39	105	268930	99
57	270928	9	79	272927	40	105	268930	100
57	271928	177	79	272927	41	106	272927	46

Table D3 (continued): Correspondence list between locus groups and loci of Gird-i Bazar. Prepared by Andrea Squitieri.

Locus Group	Square	Locus	Locus Group	Square	Locus	Locus Group	Square	Locus
57	270928	58	79	272927	42	106	272927	47
58	270928	20	80	268930	12	108	268931	49
58	270928	21	80	268931	3	108	269931	24
58	270928	22	80	268931	18	109	267932	17
109	268932	30	128	268930	24	160	268931	5
110	267932	9	128	269930	31	160	268931	42
110	268932	16	128	268930	45	161	267931	24
111	267932	6	128	268930	64	161	268931	57
111	268932	23	129	267931	7	161	268930	68
112	267932	26	129	267932	7	162	267931	13
112	268932	75	129	267931	60	162	267932	32
113	267932	20	130	268931	22	163	267931	4
113	268932	20	130	268931	41	163	267932	3
114	268932	3	130	268930	38	164	268932	6
114	268932	26	130	268930	47	164	268932	8
115	268932	68	130	268930	74	164	268932	10
115	269932	19	131	268931	23	165	269931	6
116	268932	29	131	268930	43	165	268932	73
116	268932	46	131	268930	48	166	268931	26
116	268932	54	131	268930	96	166	268931	29
116	268932	59	132	267931	45	181	269930	40
116	269932	6	132	268931	61	181	269930	41
118	268932	42	133	269929	29	181	269930	42
118	268931	50	133	269929	48	181	270930	3
118	269932	12	134	269929	34	181	270930	4
119	267931	5	134	269930	20	181	270930	5
119	267931	36	134	269930	48	182	271928	77
119	267931	37	134	269929	56	182	271928	192
119	268931	25	135	269929	30	182	271928	194
119	268932	39	135	269930	21	183	269929	55
119	269932	7	136	269929	28	183	269930	43
119	267931	58	136	269930	16	183	270930	6
119	266931	14	137	271927	32	183	270929	31
120	269932	9	137	272927	10	184	269930	47
120	269931	27	138	271927	8	185	270930	7
121	267932	8	138	272927	7	185	270930	8
121	268932	5	139	272927	28	186	272928	3
121	268932	18	139	271927	42	186	272928	35
122	268932	58	140	271927	22	187	267931	12
122	268932	66	140	272927	29	187	267931	59
122	269932	18	141	271927	28	188	267931	32
123	267931	28	141	271927	36	188	267931	63
123	267932	34	142	271927	21	189	271929	1
124	267931	15	142	272927	26	189	271929	7
124	267932	33	143	271927	16	190	271929	14
125	267931	29	143	272927	22	190	271929	16
125	267932	36	144	272928	6	190	271929	17
126	269930	2	144	272927	27	190	271929	18
126	268930	2	145	272928	16	191	272928	36
126	268931	2	145	272927	30	191	272928	38
126	268931	13	146	272928	15	192	271928	1
126	269929	24	146	272927	33	192	271928	121
126	269930	15	147	272927	25	192	271928	125
126	268931	35	147	272928	7	193	272928	37
126	268930	21	148	272927	11	193	272928	39
126	269929	45	148	272927	12	195	269930	49
126	269930	26	149	271928	7	195	269929	57
126	268930	42	149	271927	26	195	269930	56
126	267930	2	150	271927	14	195	269929	60
126	267931	52	150	271928	96	196	271928	131

Table D3 (continued): Correspondence list between locus groups and loci of Gird-i Bazar. Prepared by Andrea Squitieri.

Locus Group	Square	Locus	Locus Group	Square	Locus	Locus Group	Square	Locus
126	269930	39	151	271927	13	196	271928	134
126	270929	30	151	271928	93	196	271928	142
126	270930	2	152	269929	20	196	271928	143
126	269929	54	152	269929	42	197	271927	41
126	268930	51	153	268930	6	197	271928	97
126	269930	51	153	268930	28	197	271928	135
126	266931	2	154	268930	7	197	272928	45
126	266930	2	154	268930	49	198	272928	49
126	268930	54	154	268930	55	198	271928	141
126	266930	6	155	268930	5	199	271928	146
126	266931	9	155	268930	22	199	271928	148
126	267931	75	155	268930	27	199	272928	55
126	267931	81	155	268930	31	199	272928	56
126	266931	16	155	268930	53	199	271928	160
126	268931	68	155	268930	75	199	272928	59
127	269929	3	156	268930	14	199	271928	168
127	269930	3	156	268930	90	200	271928	147
127	269929	4	156	268930	91	200	271928	149
127	269929	14	157	268930	10	200	271928	156
127	269929	25	157	268930	34	201	271928	153
127	269929	46	157	269930	55	201	271928	154
127	269930	28	158	268930	9	201	271928	155
128	269930	29	158	268931	9	201	271928	167
128	269930	30	159	268931	11	201	271928	169
128	268930	23	159	268931	62	202	269929	58
						202	269930	52
202	269929	62	233	267930	38	274	271928	201
202	269930	62	233	267931	85	275	267931	20
202	269930	63	234	271928	28	275	267931	78
203	269929	59	234	271928	47	276	267931	21
203	269930	60	234	271928	165	276	267931	77
203	269930	64	234	270928	31	277	267931	19
203	269929	63	236	270928	46	277	267930	3
204	272928	52	237	270928	47	277	267931	76
204	272928	53	238	267931	67	278	271929	40
204	272928	54	238	266931	15	278	271929	46
205	272928	18	239	270928	48	279	266931	4
205	272928	48	240	271928	185	279	266930	3
206	272928	8	240	271928	190	279	266931	20
206	272928	44	240	271928	191	280	266930	11
207	268930	3	241	269930	53	280	266931	27
207	268930	52	241	268930	57	281	266931	6
208	268930	36	242	268931	47	281	266930	5
208	269930	54	242	268931	67	281	266931	18
208	268930	70	243	270928	4	282	267930	14
209	267931	42	243	270928	26	282	268930	105
209	267931	72	243	270928	33	283	272928	58
210	267931	56	243	271928	176	283	271928	188
210	266931	5	244	266931	19	284	271928	10
210	266931	10	244	267931	86	284	271928	73
211	267931	66	245	267931	64	285	270928	10
211	266931	8	245	266931	17	285	270928	35
211	266931	11	246	267931	87	285	271928	179
212	267930	37	246	266931	21	286	270928	3
212	267930	43	247	267931	88	286	270928	25
212	267930	51	247	266931	22	286	270928	32
213	271928	161	248	266931	23	286	271928	172
213	271928	162	248	267931	89	287	271928	164
213	271928	163	249	267931	90	287	270928	30
213	271928	166	249	266931	24	288	268930	30

Table D3 (continued): Correspondence list between locus groups and loci of Gird-i Bazar. Prepared by Andrea Squitieri.

Locus Group	Square	Locus	Locus Group	Square	Locus	Locus Group	Square	Locus
213	271928	170	250	271928	157	288	268930	72
214	271929	23	250	271928	186	288	268930	73
214	271929	24	251	271928	158	289	266931	30
214	271929	25	251	271928	187	289	266930	12
214	271929	27	252	270928	49			
215	266931	13	252	270928	52			
215	267931	80	252	270928	53			
216	267930	13	252	270928	54			
216	268930	65	253	270928	50			
217	267930	12	254	270928	51			
217	268930	66	255	271928	180			
218	267930	17	255	271928	189			
218	266930	10	256	270928	55			
219	267931	48	257	270928	56			
219	267930	16	258	267930	9			
219	266930	8	258	267931	79			
219	267931	91	259	267930	47			
220	267931	57	259	267931	92			
220	266931	7	260	267930	48			
220	266931	12	260	267931	93			
221	271929	28	261	267930	49			
222	268930	56	261	267931	94			
222	269930	65	262	272928	60			
223	269930	57	263	271929	41			
223	269930	58	264	268930	87			
224	268931	40	264	268929	2			
224	268930	62	265	271929	43			
225	267930	11	265	271929	44			
225	268930	61	265	271929	45			
226	270928	34	266	267931	55			
226	270928	39	266	267931	62			
226	270928	41	266	267930	18			
226	270928	42	266	266930	7			
227	270928	37	266	267931	82			
227	270928	40	267	267930	31			
227	270928	43	267	268930	86			
227	270928	44	268	268930	97			
228	271929	29	268	268931	73			
228	271929	30	269	271929	40			
228	271929	31	269	271929	46			
229	267930	23	270	271929	57			
229	268930	67	271	271928	81			
230	271929	32	271	271928	82			
231	270928	45	271	271929	59			
232	271928	181	272	271929	60			
232	271928	182	273	271928	110			
233	267931	22	273	271928	193			
233	266930	9	273	272928	63			

Table D3 (continued): Correspondence list between locus groups and loci of Gird-i Bazar. Prepared by Andrea Squitieri.

E. Soils and sediments in the Dinka Settlement Complex and the surrounding Bora Plain as indicators for landscape and site formation processes

Eileen Eckmeier, Hakan Tolbas & Maximilian Weidenhiller

E1. Introduction

Settlements are usually related to their surrounding landscape, and the characteristics of the landscape have an impact on the position and foundation of a settlement, but also its fate after abandonment. The soils surrounding a settlement are often used for agricultural purposes, while recent soils are affected by the former activities and remains of the past. This is especially true for regions that have been settled for millennia, and the question emerges often how "natural" the soils in these regions really are. As Buringh postulated, "Almost no virgin soils occur in Iraq, because human influence over a period of some thousands of years has directly or indirectly changed soil conditions.[77]"

The Dinka Settlement Complex is situated on the Bora Plain, which was formed by the Lower Zab and its tributaries. As Altaweel/Marsh 2016 have discussed the main geographical and environmental characteristics of the area, we shall focus in this chapter on the soils and sediments encountered inside and outside of the excavated areas, and their characteristics.

The following is based on Eileen Eckmeier's visit to the Dinka Settlement Complex in May 2017, during the excavation of DLT2, and the analysis of samples collected by Eckmeier from DLT2 during that time as well as some core samples taken by Mark Altaweel (Institute of Archaeology, University College London) in April 2017. The analysis of the samples was undertaken at LMU Munich's Department of Geography by BSc students Hakan Tolbas and Maximilian Weidenhiller under Eckmeier's supervision[78].

E2. Methods

E2.1 Fieldwork

The excavation area of DLT2 and its surroundings were surveyed by Eileen Eckmeier, F. Janoscha Kreppner and Hero Salih Ahmed on 23-24 May 2017. The aim was to identify possible approaches for investigating the soils and sediments of the Bora Plain, inside and outside of the excavated sites, in order to collect information about on site-formation processes, potential former use of different parts of the sites, and the development of the plain.

Sediment samples were gathered, firstly, from two excavation areas in the Dinka Settlement Complex (**Figs. E1** and **E2**). 34 samples were collected from four profiles (Profile 1-4) in the trenches of Dinka Lower Town 2 (DLT2), while excavations were ongoing in 2017, while eight samples were collected from a profile in Gird-i Bazar at the edge of the previously excavated area (Profile 5). The samples were taken in 10 cm increments and logged in the database together with their positions, measured by dGPS. Additionally, the colours of the sediments were measured in the field using a photospectrometer (Konica Minolta CM-700d).

Profile 1 is located in Alley 38, which separates Buildings M and L in DLT2 (**§C7**). It reaches down to a depth of 130 cm below the surface and cuts through the youngest floor. Numerous bone fragments were found in the alley. **Profile 2** is located in Room 37 of Building L (**§C6.3**). It

77 Buringh 1960, 23.

78 Hakan Tolbas, *Sedimentologisch-geochemische Analysen zu Nutzung und Schicksal von Gebäuden eines neuassyrischen Siedlungskomplexes in der Peshdar-Ebene (Autonome Kurdische Region des Irak)*, BSc thesis, LMU Munich 2018; Maximilian Weidenhiller, *Geomorphologie und Böden der Peshdar-Ebene (Autonome Kurdische Region des Irak) – Entwicklung einer Landschaft im Kontext eines neuassyrischen Siedlungskomplexes*, BSc thesis, LMU Munich 2018.

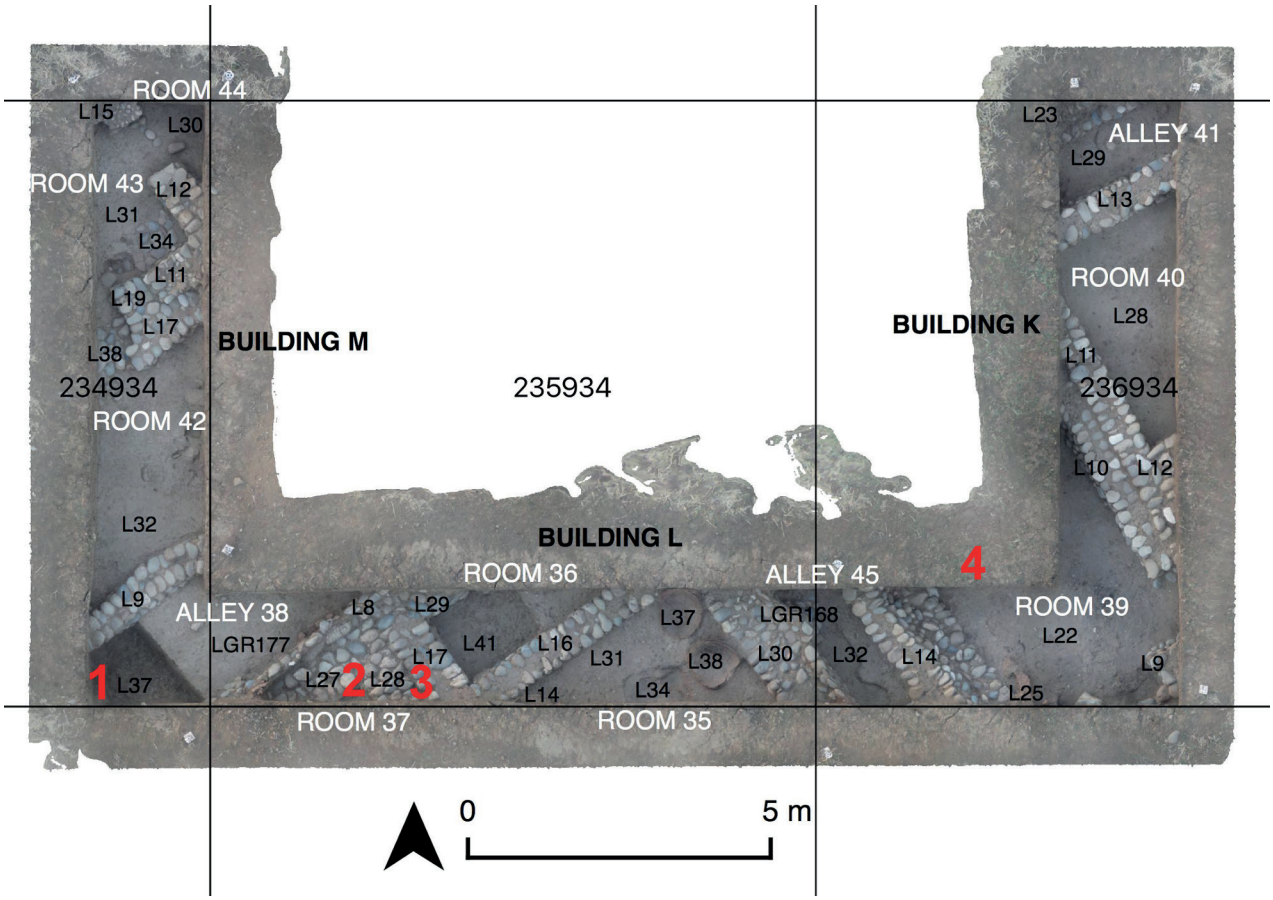


Fig. E1: Location of the investigated profiles in the excavated area of Dinka Lower Town 2 (DLT2). Prepared by Andrea Squitieri.

is 70 cm deep and covers the area between a presumably earlier floor and recent surface. The room was filled with sediment characterised by the presence of burnt materials that might be debris of a burnt and collapsed roof and mud bricks (**§C6.3**). The filling of the room is clearly separated by its red colour from **Profile 3**, which covers 60 cm of sediments on top of the walls between Rooms 37, 36 and 35, and therefore might be the sediment that accumulated after the settlement was abandoned. **Profile 4** is located in Room 39. It has a depth of 80 cm and reaches to an earlier floor which is covered with burnt material and ash related to an oven-like installation on the opposite part of the trench (**§C4.2**). **Profile 5** is the profile at Gird-i Bazar. It is located in Alley 4, at the edge of the excavated area. The alley's floor can be described as very compact and containing white particles (**§D8**).

Secondly, sediment samples derive from some of the nine coring operations undertaken in April 2017 in different parts of the Bora Plain under the supervision of Mark Altaweel with a gasoline powered percussion drilling set and soil sampler (Cobra TT Percussion Hammer). For the location of these coring operations see **Fig. E3**; for the description of the sediments see the Appendix at the end of this chapter. The authors wish to thank Daniel T. Potts and Karen Radner for transporting these core samples to Munich.

Samples for further investigation were selected from two of the nine coring operations: **Coring Point 4** was of interest because it was taken in an area which showed a strong magnetic anomaly, identified as a possible workshop area in the magnetic survey conducted in 2016[79]. **Coring Point 8** did not contain any archaeological artefacts and therefore might represent sediments from outside of the settlement area.

E2.2 Laboratory analyses

All analyses were performed under the supervision of Eileen Eckmeier in the soil laboratories of the Department of Geography (LMU Munich). The sediment cores were

79 Fassbinder/Ašandulesei/Scheiblecker 2017.

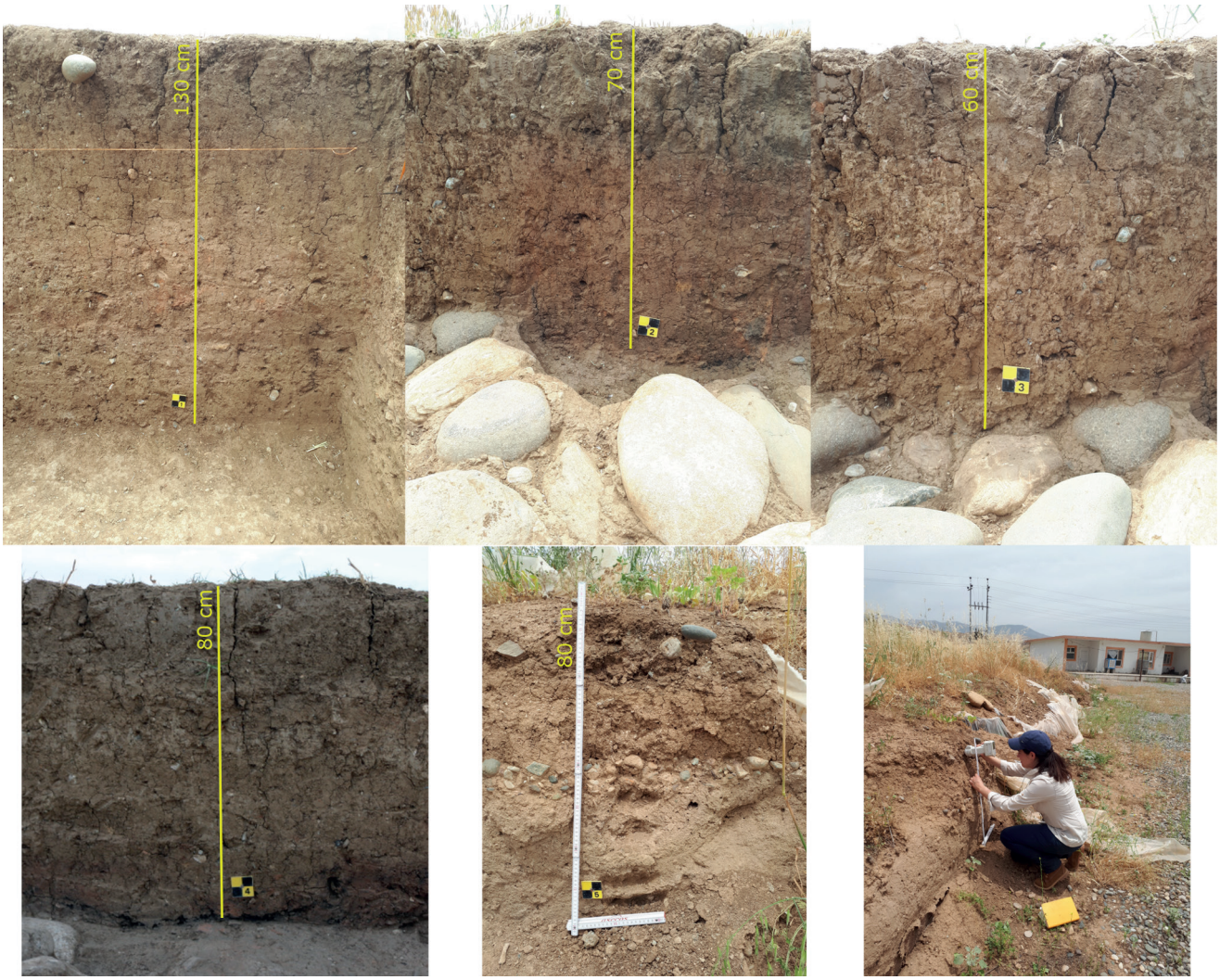


Fig. E2: The investigated profiles. From top left corner: nos. 1-4 (Dinka Lower Town 2) and no. 5 (Gird-i Bazar). The profile numbers are indicated on the markers. Bottom right corner: Eileen Eckmeier collecting the samples. Photos by Andrea Squitieri and Eileen Eckmeier.

opened using a saw. The dried sediments were very compact and dense. They were described, photographed, and sampled for further analyses. Archaeological materials and material for ^{14}C dating (in particular macro-charcoal particles) were collected separately.

Coarse particles (> 2 mm) were removed after drying the samples at 40° C. The particle size was determined by sieving the sand fractions (2000-630 µm, 630-200 µm, 200-63 µm) and pipetting silt (63-20 µm, 20-6.3 µm, 6.3-2 µm) and clay (< 2 µm) fractions after sedimentation. The calcium carbonate ($CaCO_3$) content was determined with a calcimeter (Scheibler method) after adding a 10% hydrochloric (HCl) acid solution to the sample material[80]. Total carbon (C) and nitrogen (N) were determined by dry combustion with an elemental analyser (Elementar Vario EL cube). Organic carbon (C_{org}) values were calculated by subtracting the carbon concentration in $CaCO_3$ from the total C content. Soil colours were determined by spectrophotometric measurements on homogenized samples (Konica Minolta CM-5) or directly on the core material (Konica Minolta CM-700d). After detection of diffused reflected light under standard conditions (2° standard observer, illuminant C), the colour spectra were converted into L*a*b* (CIE 1931) and Munsell values[81]. Total, inorganic and organic phosphate concentrations of soil samples were determined photometrically after extraction

80 Blume/Stahr/Leinweber 2011.

81 Eckmeier/Gerlach 2012.

Fig. E3: Locations of the sediment coring operation: "Coring Points" nos. 1-9. Prepared by Andrea Squitieri.

with sulphuric acid (H_2SO_4). Total phosphates (PO_{4tot}) were determined on soils ignited in a muffle furnace. Concentrations of inorganic phosphates (PO_{4inorg}) were obtained from unignited soil. Amounts of organic phosphates (PO_{4org}) were calculated by subtraction of values for PO_4inorg from values for PO_{4tot}[82].

E2.3 GIS analysis

Maps of the area were produced using ArcMap or ArcScene for 3D views, using the spatial reference system WGS 1984/UTM zone 38N. Four satellite images (Sentinel 2, ESA, 19.10.2017) with a resolution of 10 m were merged into one image, and four digital elevation models (DEM; NASA SRTM) were merged and resized to the satellite image resolution. Additionally, a satellite image overlay in true colours (transparency 30%) was used to clarify the terrain. A map of the excavated area was also constructed using an orthophoto (QuickBird Image, 24.10.2014) and a calculated DEM (data: Andrea Squitieri).

82 Klute 1986.

E3. Preliminary results

E3.1 Soil characteristics of the Peshdar and Bora Plains

The Peshdar Plain has an extent of about 1400 km². Its lowest point is where the Lower Zab today enters the dammed Dokan Lake, 160 m deeper from the point where it enters the plain. The Dinka Settlement Complex is located on a sub-unit of the Peshdar Plain. The Bora Plain is the lowest-lying part of the Peshdar plain. It encompasses a territory of about 7 km² and the difference in altitude between its lowest and highest parts is about 70 m.

The higher areas of the Peshdar Plain have an altitude of >700 m a.s.l. and increase steeply towards the *chaîne majeure* of the Zagros mountains. The lower parts, on which the Bora Plain and the Dinka Settlement Complex are located, are characterised by a rather plane relief with narrow foothills. The whole area is dominated by the presence of Quaternary sediments that accumulated either due to the activities of the Lower Zab or its tributaries, which accumulated large amounts of gravel, stones, and boulders, especially during the glacial phases of the Pleistocene. The geological formations of the Zagros moun-

tains are the source area for the sediments: Cretaceous limestones, Tertiary Red Bed Series, sandstone, schist, and conglomerates[83].

A succession of fluvial terraces, which were subsequently eroded by the river, are the base for the different levels of the present terrain. The Lower Zab passes through the plain and crosses different geological formation zones, mainly the Tertiary shelf units, finally entering the Dokan Lake through a gap in the tectonic fault which borders the plain. The constructed DEMs indicate the former presence of fluvial forms as tributaries, which are either no longer active, or only occasionally active (**Fig. E4**). The presence of fluvial sediments consisting of alternating layers of sorted gravel and fine-earth material near the Dinka Settlement Complex indicate different flood events and may also attest to relocations of the Lower Zab (and/or its tributaries), cutting deeply into the plain. The catchment area of the Lower Zab is often affected by drought, but with higher precipitation during winter months it is not unlikely that flood events occur[84], leading to the accumulation of sediments on the river terrace from the trespassing smaller wadis. The stratigraphy could easily be documented up to a depth of 2 m (**Fig. E5**). Even the formation of gullies in a "deep chestnut soil" due to severe soil erosion after intensive precipitation was documented for the area[85]. The influence of aeolian sediments accumulated during the dust events has not yet been investigated.

The soils are characterised by high levels of clay, which is an indicator of alluvial material that accumulated on top of the terrace gravel. The available soil map of the area (**Fig. E6**) describes the common soils of the Peshdar Plain as "chestnut soils"[86]. The chestnut soils could be related to Kastanozems, according to the WRB system. The soil map illustrates the special position of the plain, which is surrounded by "rough land" (meaning, by soils which are difficult to cultivate due to shallow or even missing topsoil material). It should be noted that the chestnut soils that developed on terrace gravel near Sungassar were completely calcareous, as were also the cultivated topsoils. They were described by Buringh 1960 as having dark brown topsoils with granular aggregates, containing < 9% $CaCO_3$ and 1-4% organic matter, with the subsoil being more dense and lighter in colour with depth. The amount of sand was < 12% and silt and clay reached values of 44-48%. Clay minerals shrink and swell intensively, leading to self-mulching (mixing of soil material) and to the formation of the granular structure, which has positive effects for plant-growth and therefore for agriculture. A different variety of chestnut soils that developed on clay loam or limestone was described as having higher proportions of sand, but the sand-sized grains seemed to consist mainly of carbonate particles. Here, the proportions of sand, silt and clay were nearly equal and the amount of $CaCO_3$ below the topsoil reached 33%. The soils were praised as fertile and very suitable for agricultural use. Says Buringh, "one even wonders why the land has not been ruined, and one of the conclusions should be that the farmers of northern Iraq have preserved their land well during quite many centuries.[87]"

The topsoil investigated in our study reaches a depth of ca. 20-30 cm. It has been regularly ploughed and lacks archaeological material, presumably due to soil management. It has comparable characteristics to the soils described above, but the topsoils are denser and less granular. Pedogenetic processes and leaching led to a decalcification of the topsoil material. It is rather unlikely that alluvial material covered the archaeological remains after the settlement had been abandoned. Nearly all of the inspected sediment cores, with the exception of that from Coring Point 8, contained anthropogenic material at different depths. These materials consisted mostly of sherds, remains of burnt mineral material, or charcoal. The rocky material could be either natural or parts of a wall or foundation.

The core sample of **Coring Point 8**, extracted from about 20 m north of the metal fence surrounding the chicken farm at Gird-i Bazar, was presumed to represent the situation outside of the settlement, because the magnetometer surveys conducted here in 2015 and 2017 have not highlighted any features that could be connected to archaeological structures[88]. The upper 30 cm of the core sample is ploughed topsoil material. The amount of $CaCO_3$ reaches 8%, which is rather high in comparison to the other investigated areas. Between 43 and 80 cm the gravel disappears, but sand is still present. The sediment is lighter than the upper material, but the colour is patchy with darker parts. Below 80 cm, the amount of clay decreases, and gravel reappears. The visual inspection revealed no artefacts and no anthropogenic influence, but its position next to the new road leading to the chicken farm, built in 2014, could indicate that the upper parts of the soil were disturbed (e.g., by removing and/or refilling material), which would also explain the mottled appearance.

83 Sissakian *et al.* 2016.
84 Saeedrashed/Guven, 2013.
85 Buringh 1960.
86 Ministry of Agriculture 1957.
87 Buringh 1960, 241.
88 Fassbinder/Ašandulesei 2016, 38; and see Chapter B in this book.

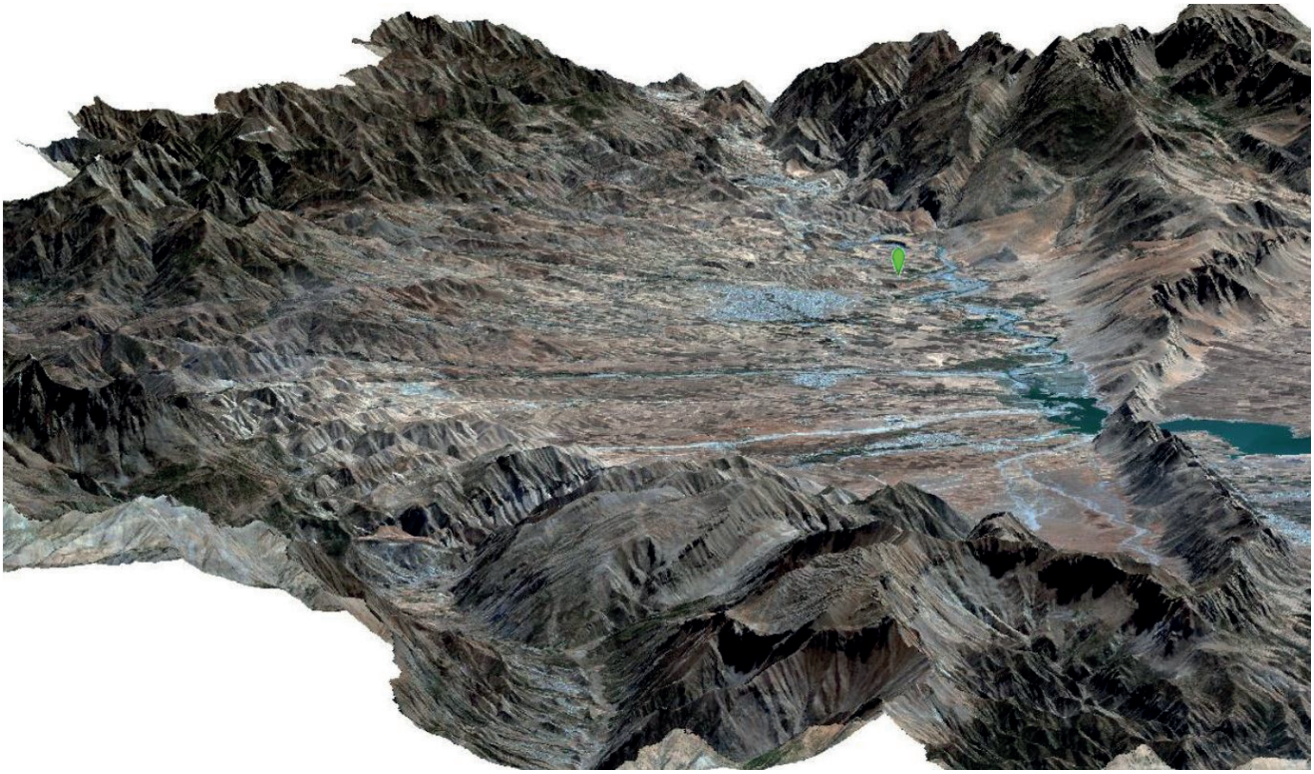


Fig. E4: Reconstruction of the Peshdar Plain using satellite images and DEMs. Prepared by Maximilian Weidenhiller.

The sediments in the core sample from **Coring Point 4**, taken from about 20 m west of the fence surrounding Gird-i Bazar, have a low density and a dark brown colour. Some kind of fibre was found at a depth of 58 cm, and the lower parts down to 100 cm contain many stones, gravel, slightly higher amounts of $CaCO_3$ (5%), and PO_4. A sherd of burnt clay from a depth of 70 cm is an additional indicator of anthropogenic influence. Most likely, the material represents a modern infilling of some kind of pit used to dump materials. The area around Coring Point 4 showed up in the magnetometer survey conducted in 2016 as an area with extreme contamination by heavy metals and ferrous iron, in which also a rectangular feature was visible[89]. It is possible, hence, that this coring operation hit a modern pit that had destroyed an older feature.

89 Fassbinder/Ašandulesei/Scheiblecker 2017, Figs. B1.9-10; also **§B2.3.6** in this volume.

E3.2 Soil characteristics of the rooms and alleys excavated at the Dinka Settlement Complex

The analysis of sediments in specific areas of a settlement focuses on site formation processes and possible uses of the areas. We wanted to know if the sediments filling the structures are different from each other, depending on their position. Is the sediment under the walls the "natural" or virgin soil? Are the sediments found in the rooms the remains of degraded mud bricks that supposedly formed the upper parts of the walls? Can we measure traces of burning in the sediments? Can we identify former floors? The analytical data for all profiles can be found in **Table E1** and **Figs. E7-E9**.

Profiles 1-4 in DLT2 are characterised by stable quantities of clay (average 27%), silt (average 50%) and sand (average 23%) throughout the profiles, with clay and coarse silt being the dominant particle size fractions (**Fig. E8**). The lowest quantities of clay were found in Profile 2, but the differences are negligible. The highest amounts of clay were measured in Profile 5 (in Gird-i Bazar), with up to 36%, and a clear increase in sand towards the lower parts, with stronger decreases in silt than in clay particles.

Due to traditional local building practices, one expects that also the ancient buildings were partly constructed from mud bricks. But those bricks, especially when not

Fig. E5: Fluvial sediments in the wadi located to the west of the DLT2 excavation area, showing alternating layers of coarser and finer particle sizes, from clay to boulders. The palaeo-channel (2) was filled with fluvial gravel and stones. The pictures were taken near the position of Coring Point 9 (see **Fig. E3**). Photos by Eileen Eckmeier.

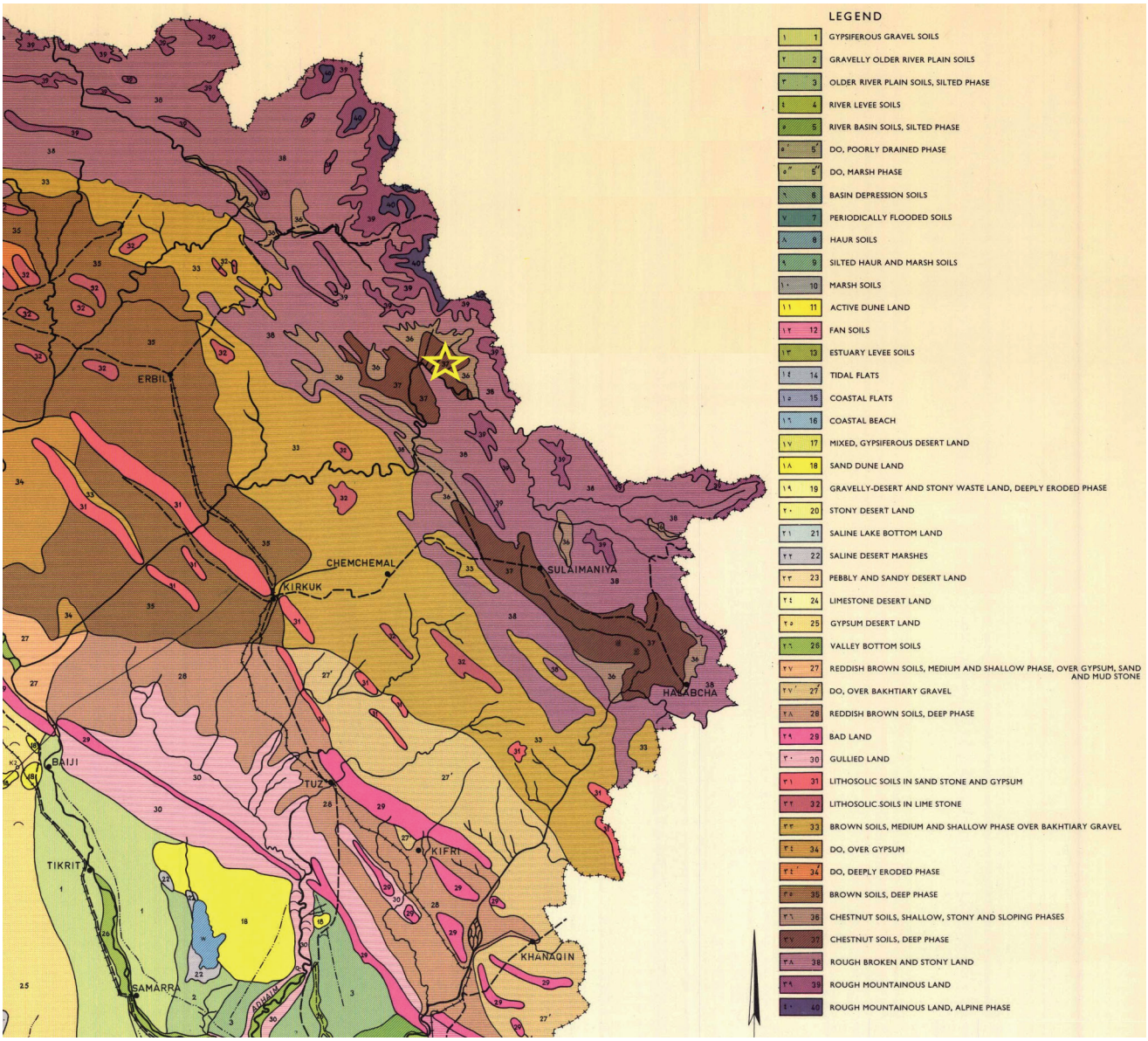


Fig. E6: Northeastern section of the Exploratory Soil Map of Iraq (1:1 000 000; Ministry of Agriculture, Baghdad 1957): the Peshdar Plain is marked with a yellow star. The mapped soil type is no. 37, chestnut soil. Modified by Eileen Eckmeier.

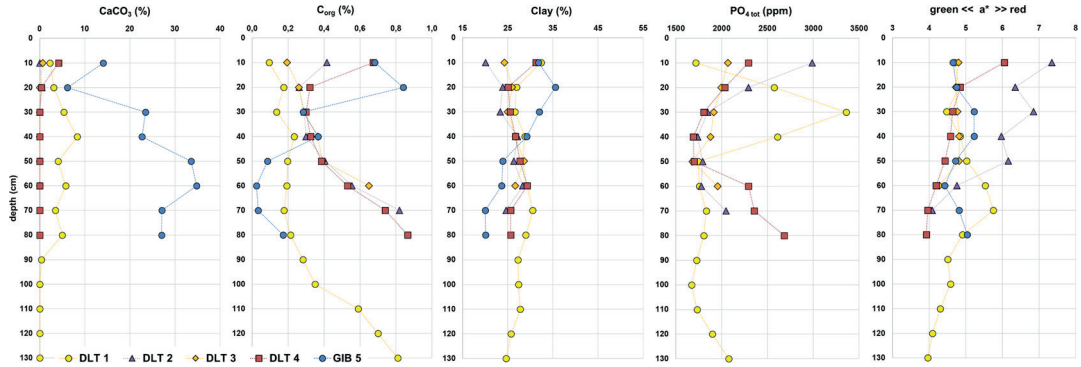


Fig. E7: Analytical data for the five profiles investigated: proportions of $CaCO_3$, C_{org}, clay, $PO_{4\ tot}$ and redness a*.

burnt, erode and disintegrate easily in humid climate conditions[90]. The rather high average yearly precipitation in the area (755 mm, climate station Sangassar) facilitates this process, and the overall high percentage of clay might indicate the presence of shrink-and-swell processes, which would speed up the decay of the bricks. If the clay particles in the settlement areas mainly derived from the naturally ocurring sediments or from the disintegrated mud bricks could not be clarified. A comparison of sediments in Room 37 (Profile 2) and sediments on top of the adjacent wall (Profile 3) revealed few differences, with the exception of colour. The redness of the sediments in the room (average a* 5.9) is more pronounced than in all other profiles, which could be a result of burnt or heated clay-rich material.

More substantial differences were found for $CaCO_3$ concentrations. While Profiles 2 and 3 of DLT2 contain hardly any $CaCO_3$, there is an increase of up to 8% in Profile 1. Below 80 cm, and therefore under the floor area in the presumably "virgin soil", the sediments are free of carbonates. In Profile 4 of DLT2 the carbonates are limited to the topsoil material. Profile 5 of Gird-i Bazar is, in contrast, very rich in carbonates, with concentrations of up to 35% in the fine and very light material below the gravel layer. The conspicuously high amounts of carbonates in the area can be related either to differences in the parent material, or to differences in the usage of the areas. Possible sources could be calcareous building materials or evaporation of calcium-rich water from the sediments. It should also be considered that HCl (Hydrochloric acid) dissolves not only calcium carbonates like calcite or aragonite but also other compounds like dolomite (calcium magnesium carbonate), but also reacts with sulphate compounds, which leads to an overestimation of the amounts of carbonates in sediments. Low amounts of $CaCO_3$ in the DLT2 samples might indicate that some kind of material containing carbonates was introduced during the time in which the settlement was constructed, or afterwards, and that this material was later not completely removed by leaching, at least in Profile 1. The lack of carbonates in the sediments under the floor level strengthens this hypothesis.

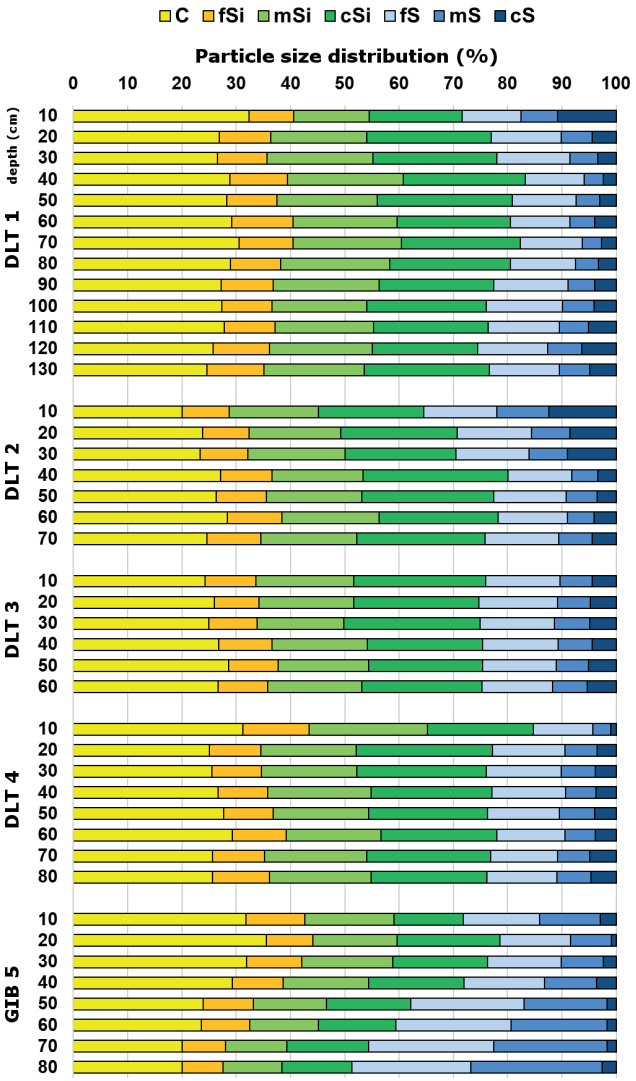


Fig. E8: Particle size distribution for the five profiles investigated: clay < 2 µm; silt 2-630 µm; sand 630-2000 µm.

90 Friesem et al. 2014.

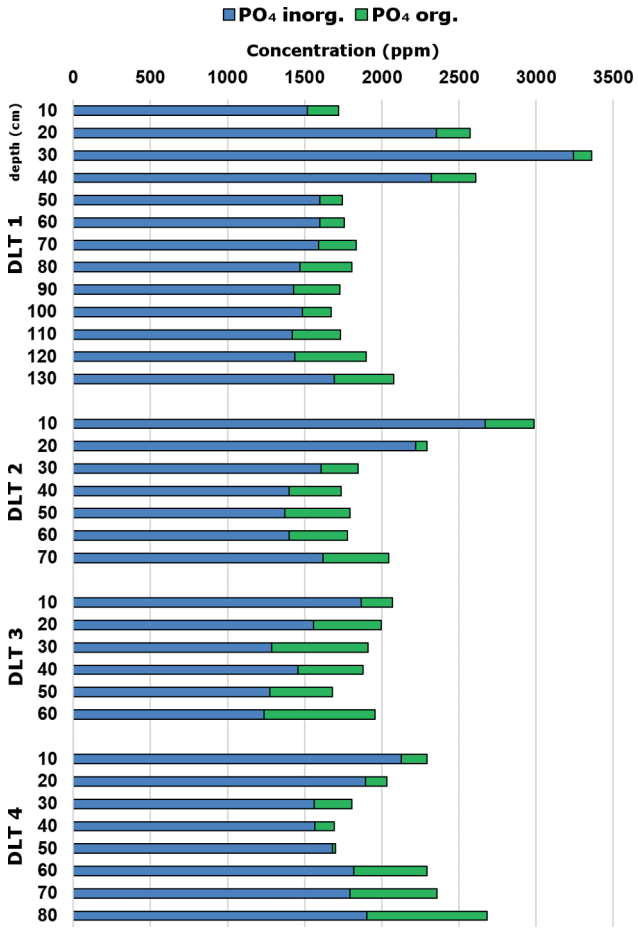


Fig. E9: Concentrations of $PO_{4\ anorg}$ and $PO_{4\ org}$ in Profiles 1-4 from DLT2.

Organic matter (C_{org}) is scarce in all profiles (< 1%). In Profiles 2 and 4, which were situated in rooms, the amount of organic matter is highest in the floor levels. Also, in Profile 3 the C_{org} concentrations increase with depth. The quantity of organic matter increases in Profile 1, even below the floors in the presumably "natural" soil or sediment. This might indicate either the presence of former topsoil material, or translocated alluvial sediment rich in organic matter. In Profile 5, C_{org} levels decrease towards the lower parts, with higher concentrations rather close to the surface, which would be a more natural distribution pattern.

Phosphates are relatively immobile, especially in clay-rich soils, and usually they mirror the presence of organic matter in the sediments. Inorganic phosphates are often present after mineralisation of organic matter, as apatite in bone or teeth, or as part of ash, while organically bound phosphates occur in fresh organic matter, e.g., biomass or manure. Together with the amount of C_{org}, the presence of phosphates therefore indicates additions of organic matter to the soil or sediment. Higher concentrations in the topsoils are related to fresh biomass or fertilizer, but higher concentrations are also present in the floor areas. In particular, the organic phosphate compounds increase towards the lower levels. The peak in Profile 1, at a depth of 30 cm, might indicate the presence of bone material. The vertical distribution of phosphates in Room 39 (Profile 4) clearly shows an accumulation of organic matter in the floor areas. This is in accord with the archaeological features found in this room, which belong to an installation related to burning and/or cooking (**§C4.2**). It is remarkable that the amount of C_{org} in the samples from Gird-i Bazar is small, because here, too, the sample comes from an alley, namely Alley 4 between Buildings A and C (see **Chapter D**). This may be due to different activities in the surrounding area.

Unfortunately, we could not yet compare the sediments in the settlements with undisturbed, naturally formed soils. Therefore, the measured data is valid only for on-site areas. The high amounts of clay, and also the high amounts of sand which were usually used in bricks for greater stability, cannot be related to the prior presence of mud bricks. Our results, however, clearly differ from the characteristics of the chestnut soils described by Buringh 1960; they contain fewer carbonates, less organic matter, and more sand. This could be related to differences in the parent material and land use, and to the characteristics of the building material used for the settlement structures.

E4. Further research

On a regional scale, the formation of the plain was related to a succession of fluvial processes. Further research should investigate the development of the plain and the general environmental history of the area in greater detail. Questions to investigate include: When did the plain stabilise? When did any colluvial or alluvial sediments accumulate? It also remains to be clarified, using more geophysical data, which areas were settled and which areas are outside of the site, in order to gain an insight from potentially undisturbed soils. Further inquiry is also needed on the nature of the construction material and the source of the gravel, stones, or rock used, and into the Quaternary sedimentation processes and stratigraphy. This could also resolve the questions related to the differences in carbonate contents in the two excavated areas DLT2 and Gird-i Bazar. Lastly, it would be interesting to know if natural risks like earthquakes, which are common in the area, affected the settlement.

Concerning the on-site processes, we wish to identify differences in sediment characteristics related to heating, presumed construction materials, and characteristics of the floor levels. It will be necessary to include more data

from rooms that yielded information on activities occurring in these areas. We also need to apply further analytical methods, e.g., Fourier transform infrared (FTIR) spectroscopy, in order to work out whether fired mud bricks were used as building material[91], and in order to determine the nature of the calcium carbonates in Gird-i Bazar. It will also be necessary to identify how the sediments in the settlement structures differ from the soils in the surrounding areas.

E5. Appendix: Description of the 2017 sediment cores

This section provides detailed description of the materials encountered in the eight coring operations conducted by Mark Altaweel in April 2017. We call them "Coring Points", identified by ascending numbers, which denote the locations from where the coring was undertaken.

Coring samples were collected in clear plastic pipes of a length of 1 m. At Point 2 and Point 3, only one sample was taken (Core 2/1 and Core 3/1, respectively). At the other points, it was possible to drill deeper and therefore take several coring samples were filled. Subsequent pipes are labelled with subsequent numbers. E.g, at Point 1, three coring samples of 1 m depth each were taken in total, with the first, top-most sample called Core 1/1, the second one Core 1/ 2, and the third Core 1/ 3.

Coring Point 1
Coordinates 512349.1488E, 3999344.63N; altitude 542.32 m a.s.l.

Core 1/1
- 1/1, 0-30 cm: medium brown, brighter with depth; very dense and fine texture; roots; gravel.
- 1/1, 30-51 cm: medium brown; roots; white concretions (carbonates); gravel; dark brown to blackish layer, with some reddish parts in the upper area at 50 cm.
- 1/1, 51-101 cm: light medium brown, brighter with depth; roots; stone at 80 cm; darker areas at 83-86 cm; reddish areas at 57 cm and 72 cm; white concretions.

Core 1/2
- 1/2, 0-16 cm: light medium brown; gravel.
- 1/2, 16-21 cm: dark medium brown; quartz; more gravel; coarser structure.
- 1/2, 21-47 cm: light medium brown; white concretions; finer material.
- 1/2, 47-76 cm: dark medium brown; white concretions; finer material; platy structure at 47 cm to 55 cm, below 63 cm blocky aggregates.
- 1/2, 76-86 cm: light medium brown; gravel; white concretions; blocky structure.
- 1/2, 86-94 cm: light medium brown; mainly gravel.
- 1/2, 94-101 cm: light medium brown; less gravel; dense structure; white concretions.

Core 1/3
- 1/3, 0-8 cm: dark to medium brown; gravel; white concretions.
- 1/3, 8-25 cm: medium brown; few gravel; coarse and homogeneous structure.
- 1/3, 25-36 cm: medium brown; no gravel; platy structure and small drying cracks.
- 1/3, 36-58 cm: medium brown; few gravel; platy structure and small drying cracks.
- 1/3, 58-72 cm: dark brown; no gravel; homogeneous and very dense structure; white streaks (secondary carbonates).
- 1/3, 72-95 cm: dark brown; no gravel, only few at 77 cm; homogeneous and extremely dense structure; white streaks.
- 1/3, 95-100 cm: medium brown; no gravel; white concretions; homogeneous and extremely dense structure.

Coring Point 2
Coordinates 512364.2521E, 3999345.658N; altitude 542.5 m a.s.l.

Core 2/1 has a length of only 57 cm. The drill had to be stopped because it reached a wall.

Core 2/1
- 2/1, 0-20 cm: lighter dark brown; densely rooted; very cohesive; sherd at 10 cm.
- 2/1, 20-31 cm: dark medium brown; rooted; homogeneous structure; few gravel; dense.
- 2/1, 31-46 cm: no fine-earth; angular stones (up to 3 cm diameter); gravel; some sand.
- 2/1, 46-57 cm: dark brown; very dense; homogeneous structure; sand, gravel and stones (up to 3 cm diameter); some roots.

Coring Point 3
Coordinates 512360.7141E, 3999349.462N; altitude 542.4 m a.s.l.

Core 3/1
- 3/1, 0-95 cm: gradient from dark medium brown to a light dark brown; fine, homogeneous structure; low

91 E.g., Forget *et al.* 2015.

root density; few gravel; sherd at 7 cm, macro-charcoal at 63 cm, quartz particle at 75 cm depth.
- 3/1, 95-100 cm: light dark brown; stony; very loose sediments.

Coring Point 4
Coordinates 512629.3594E, 3999334.885N; altitude 544.25 m a.s.l.

Core 4/1
- 4/1, 0-10 cm: light dark brown; very loose structure; granular aggregates; stone (3.5 cm diameter) at 8 cm.
- 4/1, 10-59 cm: light dark brown; few gravel; stone at 50 cm; unspecified fibres at 58 cm.
- 4/1, 59-100 cm: clear boundary; medium brown; very loose structure; mainly gravel and stones; reddish degraded burnt clay at 70 cm; presumably remains of a wall or foundation.

Core 4/2
- 4/2, 0-15 cm: medium brown; small pieces of quartz; homogeneous structure; no roots.
- 4/2, 15-39 cm: medium brown; darker brown channels; gravel.
- 4/2, 39-49 cm: light medium brown; homogeneous and very dense structure; few gravel; stone (diameter 4 cm) at 42.5 cm.
- 4/2, 49-66 cm: gravel, stones; very loose structure; quartz; presumably remains of a wall or foundation.
- 4/2, 66-82 cm: dark brown; few gravel; homogeneous structure; channel-like feature; stone (diameter 2.5 cm) at 77 cm.
- 4/2, 82-100 cm: medium brown; layer of gravel, quartz and degraded burnt clay runs at 89 cm to 94 cm horizontally through the core; dense matrix; stone at 99 cm.

Coring Point 5
Coordinates 512646.5316E, 3999271.174N; altitude 544.07 m a.s.l.

Core 5/1
- 5/1, 0-5 cm: light dark brown; very loose structure; plant remains; gravel; stones.
- 5/1, 5-10 cm: light dark brown; denser, homogeneous structure; few roots; gravel; quartz; sherd (diameter 2.5 cm) at 8 cm.
- 5/1, 10-30 cm: dark medium brown; few finer gravel; homogeneous structure; stone (diameter 2 cm) at 30 cm.
- 5/1, 30-41 cm: light dark brown, with red spots; few finer gravel; plant remains (roots?).
- 5/1, 41-44 cm: black and reddish layer; two sherds at 43 cm.
- 5/1, 44-62 cm: dark medium brown; yellowish stony area at 51 cm; black layer, one charcoal and white particles at 55 cm.
- 5/1, 62-75 cm: dark brown; mainly stones covered with powdery lime.
- 5/1, 75-91 cm: mainly gravel and stones, some covered with powdery lime.
- 5/1, 91-100 cm: greenish layer, crumbly structure; gravel; stones; plaster?

Core 5/2
- 5/2, 0-5 cm: medium brown; small stones and gravel.
- 5/2, 5-34 cm: medium brown; homogeneous and very dense structure; gravel.
- 5/2, 34-100 cm: no fine-earth; gravel and small stones; quartz; remains of a wall at 63-69 and 71-80 cm; plaster (?) at 81-88 and 90-97 cm.

Coring Point 6
Coordinates 512602.8132E, 3999122.349N; altitude 540.13 m a.s.l.

Core 6/1
- 6/1, 0-71 cm: medium brown; few gravel; homogeneous and dense structure; roots; small white platelets.
- 6/1, 71-76 cm: medium brown; no gravel but granite rocks; homogeneous and dense structure.
- 6/1, 76-83 cm: lighter medium brown; red spot at 79 cm.
- 6/1, 83-85 cm: layer of sherds.
- 6/1, 85-92 cm: lighter medium brown; homogeneous structure; white concretions; gravel; dark layer at 89 cm; black streaks at 90 cm.
- 6/1, 92-94.5 cm: gravel bound in matrix (natural conglomerate or piece of wall?).
- 6/1, 94.5-100 cm: lighter medium brown; homogeneous structure; white concretions; gravel.

Core 6/2
- 6/2, 0-7 cm: medium brown; gravel; homogeneous, crumbly structure; few roots.
- 6/2, 7-16 cm: grey angular stones (diameter up to 6 cm).
- 6/2, 16-44 cm: lighter, yellowish medium brown; gravel; homogeneous, loose structure; stones (diameter 3 cm) at 27 cm.
- 6/2, 44-61 cm: light dark brown; gravel; angular stones; reddish area at 54 cm; root at 48 cm.
- 6/2, 61-71 cm: few dark brown fine-earth; mainly gravel, quartz, stones covered with powdery lime.
- 6/2, 71-87.5 cm: medium brown; gravel; stones (about 2 cm in diameter) of various rock types (sandstone, granite and others).

Coring Point 7
Coordinates 512142.5329E, 3999339.502N; altitude 538.4413 m a.s.l.

Core 7/1
- 7/1, 0-6 cm: dark medium brown; gravel; loose structure; plant remains.
- 7/1, 6-38 cm: dark medium brown; gravel; stones; homogeneous and very dense structure; white concretions; sherd at 8 cm?
- 7/1, 38-51 cm: dark medium brown with reddish spots; very dense structure; white concretions; granite.
- 7/1, 51-60 cm: medium brown; very dense structure; gravel; stones; charcoal particles.
- 7/1, 60-71 cm: no fine-earth; gravel; stones; carbonacious material.
- 7/1, 71-86 cm: medium brown; very dense structure; layered sediment up to 74 cm; macro-charcoal particles at 76 and 82 cm.
- 7/1, 86-90 cm: black layer (charcoal or soot).
- 7/1, 90-100 cm: medium brown; very dense structure; layered sediment up to 74 cm; macro-charcoal particle at 100 cm.

Core 7/2
- 7/2, 0-22 cm: light medium brown; gravel; dense structure; roots; white concretions; layered sediment up to 3 cm; darker layer 3-6 cm.
- 7/2, 22-29 cm: stones/rocks (granite).
- 7/2, 29-61 cm: light medium brown; few gravel; dense structure; burnt clay at 54 cm.
- 7/2, 61-79 cm: light medium brown; gravel; stones; dense structure.
- 7/2, 79-90 cm: stones covered with lime, bound in a matrix (plaster?); quartz.
- 7/2, 90-99 cm: yellowish medium brown; gravel; stones; carbonate-covered channels; very dense structure.

Coring Point 8
Coordinates 512733.2102E, 3999342.439N; altitude 546.8337 m a.s.l.

Core 8/1
- 8/1, 0-31 cm: dark brown; gravel; dense structure; roots; white concretions.
- 8/1, 31-43 cm: dark medium brown; gravel; dense structure; roots; white concretions (more compact than above).
- 8/1, 43-80 cm: mottled colour between dark middle brown and light brown; few gravel.
- 8/1, 80-100 cm: less mottling, progressing to light brown; scattered gravel, more sand; no carbonates; dense.

Core 8/2
- 8/2, 0-2 cm: dark brown; fine-earth; loose; plant residues and roots (translocated topsoil material due to coring?).
- 8/2, 2-37 cm: light medium brown; gravel; crumbly structure; glimmer.
- 8/2, 37-63 cm: stones, few fine-earth; very dense; dark grey to black rocks with sharp edges (flint?), granite?
- 8/2, 63-70 cm: stones, yellowish to orange fine-earth; very loose; white concretions.
- 8/2, 70-79 cm: stones and slate-like rock material (schist, conglomerates); fine-earth matrix light medium brown, slightly reddish.
- 8/2, 79-88 cm: stone covered with lime.
- 8/2, 88-94 cm: yellowish-orange fine-earth matrix; stones; gravel; plaster (?); matrices could be of natural or anthropogenic origin.

Coring Point 9
Coordinates 512196.0204E, 3999445.262N; altitude 540.7016 m a.s.l.

Core 9/1
- 9/1, 0-36 cm: light dark brown; homogeneous and dense structure; plant residues and roots; white concretions.
- 9/1, 36-46 cm: mottled dark brown to almost black; white concretions; gravel; black spot. at 45 cm; stone (diameter 3 cm) at 37 cm (granite?); red burnt clay at 40 cm.
- 9/1, 46-73 cm: dark medium brown; white concretions; gravel; lighter areas at 53-64 cm.
- 9/1, 73-92 cm: dark medium brown; white concretions; mainly gravel and stones.
- 9/1, 92-100 cm: stones, gravel and red burnt clay embedded in dense white matrix.

Core 9/2
- 9/2, 0-10 cm: light dark brown; crumbly structure; plant residues but no roots; white concretions; clay particles; gravel.
- 9/2, 10-18 cm: stones.
- 9/2, 18-49 cm: burnt clay, mixed with fine-earth and stones until 30 cm; quartz and lime; large stone (diameter 6.5 cm) at 49 cm.
- 9/2, 49-67 cm: stones; gravel; powdery lime; little fine-earth.

Profile	Depth	L*	a*	b*	Hue	Val.	Chr.	$CaCO_3$	C_{org}	N	C	fSi	mSi	cSi	fS	mS	cS	$PO_{4\ tot}$	$PO_{4\ inorg}$	$PO_{4\ org}$	$PO_{4\ inorg}$	$PO_{4\ org}$
	cm							%	%	%	%	%	%	%	%	%	%	*ppm*	*ppm*	*ppm*	%	%
DLT 1	10	46.2	4.7	18.8	9,9 YR	4.5	2.9	2.3	0.09	0.04	32.4	8.2	13.9	17.1	10.9	6.8	10.7	1719	1517	202	88	12
DLT 1	20	49.0	4.8	20.6	10,0 YR	4.8	3.2	3.1	0.18	0.04	26.9	9.4	17.7	22.9	12.9	5.7	4.5	2573	2355	219	92	8
DLT 1	30	50.5	4.5	20.3	0,1 Y	4.9	3.2	5.4	0.14	0.05	26.6	9.1	19.4	22.8	13.5	5.1	3.4	3359	3241	118	96	4
DLT 1	40	48.4	4.9	19.6	9,8 YR	4.7	3.1	8.3	0.23	0.05	28.8	10.7	21.2	22.6	10.8	3.5	2.4	2608	2321	288	89	11
DLT 1	50	49.9	5.0	21.0	9,9 YR	4.8	3.3	4.1	0.20	0.05	28.3	9.2	18.5	24.8	11.8	4.3	3.1	1747	1598	149	91	9
DLT 1	60	49.4	5.5	20.8	9,5 YR	4.8	3.3	5.8	0.19	0.04	29.2	11.2	19.3	20.8	11.0	4.5	4.0	1756	1598	158	91	9
DLT 1	70	49.0	5.8	20.9	9,4 YR	4.8	3.3	3.5	0.18	0.06	30.5	10.0	19.9	22.0	11.4	3.6	2.7	1832	1590	242	87	13
DLT 1	80	50.6	4.9	20.8	9,9 YR	4.9	3.3	5.0	0.21	0.04	29.0	9.2	20.0	22.3	12.0	4.2	3.3	1805	1470	335	81	19
DLT 1	90	48.9	4.5	20.5	0,2 Y	4.7	3.2	0.4	0.28	0.07	27.3	9.5	19.6	21.1	13.7	4.9	4.0	1728	1429	299	83	17
DLT 1	100	47.5	4.6	20.1	0,2 Y	4.6	3.1	0.0	0.35	0.07	27.3	9.2	17.5	22.0	14.0	5.8	4.1	1671	1484	187	89	11
DLT 1	110	45.4	4.3	18.4	0,2 Y	4.4	2.8	0.0	0.59	0.09	27.8	9.4	18.2	21.0	13.1	5.4	5.1	1732	1419	313	82	18
DLT 1	120	45.8	4.1	18.3	0,3 Y	4.4	2.8	0.0	0.70	0.09	25.7	10.4	19.0	19.4	12.9	6.2	6.4	1898	1434	464	76	24
DLT 1	130	46.0	4.0	18.3	0,4 Y	4.5	2.8	0.0	0.81	0.11	24.6	10.4	18.5	23.1	12.8	5.6	4.9	2079	1692	386	81	19
DLT 2	10	41.8	7.4	19.5	8,3 YR	4.1	3.2	0.0	0.42	0.05	20.1	8.6	16.5	19.4	13.5	9.5	12.4	2988	2672	316	89	11
DLT 2	20	44.1	6.4	19.6	8,9 YR	4.3	3.2	0.5	0.26	0.05	23.8	8.5	17.0	21.5	13.6	7.1	8.5	2291	2218	74	97	3
DLT 2	30	45.6	6.9	20.7	8,7 YR	4.4	3.4	0.0	0.29	0.06	23.3	8.8	17.9	20.4	13.5	7.1	9.0	1847	1606	242	87	13
DLT 2	40	46.9	6.0	20.2	9,2 YR	4.5	3.3	0.0	0.30	0.06	27.1	9.5	16.7	26.7	11.8	4.9	3.3	1738	1399	340	80	20
DLT 2	50	44.2	6.2	19.1	9,0 YR	4.3	3.1	0.0	0.41	0.08	26.4	9.2	17.6	24.3	13.3	5.8	3.5	1793	1370	423	76	24
DLT 2	60	44.8	4.8	18.7	9,9 YR	4.4	2.9	0.0	0.56	0.09	28.3	10.0	18.0	21.9	12.7	4.9	4.1	1777	1401	377	79	21
DLT 2	70	45.6	4.1	18.3	0,3 Y	4.4	2.8	0.0	0.82	0.11	24.6	9.9	17.7	23.6	13.6	6.1	4.5	2046	1618	428	79	21
DLT 3	20	49.4	4.8	20.8	10,0 YR	4.8	3.3	0.7	0.19	0.05	24.2	9.4	18.0	24.3	13.7	5.9	4.4	2068	1867	200	90	10
DLT 3	30	48.9	4.7	20.6	0,1 Y	4.7	3.2	0.0	0.26	0.06	26.0	8.2	17.5	23.0	14.6	6.0	4.7	1996	1558	438	78	22
DLT 3	40	49.0	4.8	20.5	10,0 YR	4.8	3.2	0.0	0.29	0.05	25.0	8.8	16.1	25.0	13.7	6.5	4.8	1913	1284	629	67	33
DLT 3	50	47.7	4.8	20.0	10,0 YR	4.6	3.1	0.0	0.37	0.06	26.8	9.8	17.7	21.2	14.0	6.3	4.4	1879	1458	421	78	22
DLT 3	60	46.1	4.8	19.5	10,0 YR	4.5	3.0	0.0	0.39	0.06	28.6	9.2	16.7	21.0	13.6	6.0	5.0	1680	1273	407	76	24
DLT 3	70	44.6	4.3	18.3	0,2 Y	4.3	2.8	0.0	0.65	0.09	26.6	9.2	17.4	22.1	13.0	6.4	5.4	1956	1238	718	63	37
DLT 4	10	42.5	6.1	17.6	8,7 YR	4.1	2.8	4.2	0.67	0.09	31.3	12.2	21.8	19.6	10.9	3.4	1.0	2294	2127	167	93	7
DLT 4	20	48.0	4.9	19.8	9,9 YR	4.7	3.1	0.4	0.32	0.07	25.0	9.4	17.6	25.1	13.4	5.9	3.5	2034	1895	139	93	7
DLT 4	30	49.1	4.6	20.3	0,1 Y	4.8	3.2	0.0	0.30	0.06	25.5	9.1	17.7	23.7	13.8	6.3	3.9	1806	1563	244	87	13
DLT 4	40	48.5	4.6	20.1	0,1 Y	4.7	3.1	0.0	0.33	0.06	26.7	9.1	19.0	22.3	13.6	5.6	3.7	1692	1565	126	93	7
DLT 4	50	47.1	4.4	19.2	0,2 Y	4.6	3.0	0.0	0.39	0.06	27.7	9.1	17.6	21.9	13.3	6.5	3.9	1699	1678	21	99	1
DLT 4	60	45.0	4.2	17.9	0,2 Y	4.4	2.8	0.0	0.53	0.09	29.3	10.0	17.4	21.3	12.5	5.6	3.8	2293	1819	474	79	21
DLT 4	70	44.2	4.0	17.4	0,3 Y	4.3	2.7	0.0	0.74	0.10	25.6	9.6	18.8	22.8	12.4	5.9	4.9	2356	1792	565	76	24
DLT 4	80	45.2	3.9	17.8	0,4 Y	4.4	2.7	0.0	0.87	0.11	25.6	10.6	18.7	21.4	12.9	6.3	4.6	2682	1904	778	71	29
GIB 5	10	47.0	4.7	16.8	9,4 YR	4.6	2.7	14.1	0.68	0.12	31.8	10.9	16.5	12.7	14.0	11.3	2.9	n.d.	n.d.	n.d.	n.d.	n.d.
GIB 5	20	47.7	4.8	17.3	9,5 YR	4.6	2.8	6.2	0.84	0.11	35.5	8.6	15.5	18.9	13.0	7.6	0.9	n.d.	n.d.	n.d.	n.d.	n.d.
GIB 5	30	53.2	5.2	19.0	9,2 YR	5.2	3.1	23.5	0.28	0.05	32.0	10.2	16.7	17.5	13.6	7.8	2.3	n.d.	n.d.	n.d.	n.d.	n.d.
GIB 5	40	52.1	5.2	18.8	9,2 YR	5.1	3.1	22.7	0.37	0.05	29.2	9.5	15.7	17.5	14.9	9.5	3.6	n.d.	n.d.	n.d.	n.d.	n.d.
GIB 5	50	56.3	4.7	19.4	9,5 YR	5.5	3.1	33.6	0.09	0.04	23.9	9.3	13.4	15.5	20.9	15.2	1.7	n.d.	n.d.	n.d.	n.d.	n.d.
GIB 5	60	57.7	4.4	19.0	9,6 YR	5.6	3.0	34.8	0.02	0.03	23.6	8.9	12.7	14.2	21.3	17.7	1.6	n.d.	n.d.	n.d.	n.d.	n.d.
GIB 5	70	54.2	4.8	19.6	9,6 YR	5.3	3.1	27.1	0.03	0.03	20.0	8.1	11.2	15.1	23.0	20.9	1.7	n.d.	n.d.	n.d.	n.d.	n.d.
GIB 5	80	50.8	5.0	19.7	9,6 YR	4.9	3.1	27.0	0.17	0.04	20.1	7.5	10.8	12.9	21.9	24.1	2.6	n.d.	n.d.	n.d.	n.d.	n.d.

Table E1: Results of the soil analysis conducted on the five samples taken from Gird-i Bazar and DLT2. Abbreviations: L* = lightness, a* = redness; b* = yellowness; Hue, Value, Chroma = Munsell colours; $CaCO_3$ = calcium carbonate; C_{org} = carbon in organic matter; N = nitrogen; C = clay (< 2 µm); Si = silt (2-63 µm); S = sand (63-2000 µm); f = fine; m = medium; c = coarse; $PO_{4\ tot}$ = total phosphate; $PO_{4\ inorg}$ = phosphate in mineral compounds; $PO_{4\ org}$ = phosphate in organic matter. Prepared by Eileen Eckmeier.

F. 2017 Pottery studies

F1. A first assessment of the 2017 pottery from DLT 2

Jean-Jacques Herr,
Abdullah Bakr Othman & Hero Salih[92]

F1.1 Introduction

A key focus of the research of the Peshdar Plain Project is the study of local pottery production in the first part of the first millennium BC, a topic that has often been neglected in the archaeological literature due to a dearth of evidence. Beyond the potter's workshop excavated in Khirbet Qasrij[93], very little is known about pottery production organisation in the Neo-Assyrian Empire and its eastern border area. Therefore, the discovery of several pottery kilns (**§D12.2**) and a potter's workshop at Gird-i Bazar (**§D19.1**), where tools (**§G2.4**) and installations for the manufacture of pottery have been recovered, provides precious insights into local pottery production.

This chapter is a preliminary study of the pottery recovered in 2017 at DLT2, with a particular focus on identifying comparisons in the pottery found at Gird-i Bazar between 2015 and 2017. Our primary objective is to clarify whether the material from both locations shared the same characteristics (including morpho-stylistic and techno-petrographic features). Some new morphological types, hitherto unattested at the Dinka Settlement Complex, have been identified at DLT2 and are presented here.

F1.2 Methodology

The Dinka Settlement Complex is a reference site for the pottery of the wider region. In the long perspective, our main goal is to clarify the levels of specialisation of pottery production and reconstruct the shared network of apprenticeship and technological knowledge linking the Dinka Settlement Complex to the broader area of the Zagros. In order to achieve this goal we employ the *chaîne opératoire* methodology, which goes beyond the traditional typological approach.

The pottery recovered in DLT2 was therefore approached through technical and petrographic analyses, following the methodology already applied to the study of the Gird-i Bazar pottery[94]. This helps to compare the *chaînes opératoires* of DLT2 with those of Gird-i Bazar.

Based on both ethno-archaeological and experimental studies[95], our pottery classification follows three fashioning stages: forming, shaping and finishing, whose diagnostic traces are observable on the outside face of the sherds, as well as on the insides and in the sections[96]. Initially based on macroscopic observation, the results are then correlated with the microscopic analysis carried out by Silvia Amicone (**§F2**). The overall results show the presence of the same techno-petrographic groups in the DLT2 materials as those attested in Gird-i Bazar during its Main Occupation Period[97], namely TechP 1 to TechP 10 (**Table F1.1**).

F1.3 Typologically significant pottery

In this section, we describe the material recovered from the architectural units explored at DLT2 (**§C**), from west to east. The excavations of layers directly on floors and of installations dated to the Main Occupation Period in Buildings K, L and M and Alleys 38, 41 and 45 yielded 528 diagnostic sherds (10.7 kg) and 2445 non-diagnostic sherds (39.8 kg). Here we present the most significant materials with special reference to comparisons at Gird-i Bazar.

92 The pottery was processed by Jean-Jacques Herr, Abdullah Bakr Othman, and Hero Salih Ahmed. They were supported by Zuhair Rajab al-Samarrae, Hayman Noori, Muhammad Aziz and Bayaz Mala Issa. The author is grateful to the Competence Center Archaeometry Baden-Wuerttemberg (CCA-BW) at Tübingen, in particular its director Christoph Berthold and Silvia Amicone, for the use of their equipment in June 2018.

93 Curtis 1989.

94 Herr 2016; Herr 2017.

95 See Rye 1981; Rice 2005; Gelbert 2005; Martineau 2010; Roux 2016.

96 Presented in full in Herr 2017, 110-124.

97 For the description of the fashioning techniques and the macroscopic characteristics of the Gird-i Bazar fabrics, see Herr 2017, 108-127.

TechP	Characteristics
1 a	Fabric C1 + Coiling
b	Fabric C2 + Coiling
2	Fabric A + Coiling
3	Fabric E + Coiling + Wet brushing
4	Fabric B + Coiling + Slow wheel (?) + Leather hard brushing
5	Fabric B + Coiling + Slow wheel + Burnishing
6 a	Fabric C1 + Coiling + Slow wheel + Burnishing
b	Fabric D + Coiling + Slow wheel + Burnishing
7	Fabric D + Coiling + Slow wheel + Burnishing + dark slip
8	Fabric D + Coiling + Slow wheel + Burnishing outside
9	Fabric C1 + Coiling + Slow wheel + Planing inside + Burnishing outside
10	Fabric C1 + Coiling + Slow wheel + Planing inside + Barbotine

Table: F1.1: Overview of the techno-petrographic groups so far identified among the pottery of Gird-i Bazar's Main Occupation Period.

F1.3.1 Pottery from Building M, Rooms 43 and 42

On the floor of Room 42 (LGR:179), pottery similar to Gird-i Bazar material was found, including carinated bowls (**Fig. F1.1: no. 6**, **no. 10**) made with TechP 6a. Sherds of cooking pots that are very similar to those from Gird-i Bazar[98] (**Fig. F1.3: no. 1**) and necked jars made with TechP 9 (**Fig. F1.2: no. 4**) have also been recovered.

In Room 43, a few pottery sherds were recovered lying on the floor (LGR:180). A typical flat base made with TechP 6a (**Fig. F1.1: no. 14**), a sherd of a jar made with TechP 9 (**Fig. F1.2: no. 5**) and a cooking pot sherd made with TechP 4 have again parallels in the collection from Gird-i Bazar.

F1.3.2 Pottery from Alley 38, including some "Groovy Pottery"

A larger amount of pottery was found during the excavation of the layer directly on the floor of Alley 38 (LGR:174) **(§C7)**. We recovered rim sherds of carinated bowls, incurved rim bowls and disc bases from the floor surface. Many sherds correspond closely to the TechPs and shapes attested at Gird-i Bazar. The common TechP 6 is for example attested in a hemispherical incurved rim bowl (**Fig. F1.1: no. 3**), with close comparisons at Gird-i Bazar[99], and a carinated bowl (**Fig. F1.2: no. 11**). Also a flat base with a coil added on the outside wall (**Fig. F1.1: no. 15**) has close similarities to types and techniques found at Gird-i Bazar[100]. A rim sherd survives of a substantial jar with an opening diameter of 42 cm, made with Fabric A (**Fig. F1.4: no. 1**; visible *in situ* in **Fig. C19**). Other typical closed shape ceramics include fragments of cooking pots with a triangular rim made with TechP 4 (**Fig. F1.3: no. 5**; **Fig. F1.3: no. 4**) and of a round rimmed jar thickened on the outside made with TechP 9 (**Fig. F1.2: no. 1**).

Perhaps the most interesting pottery found in this context and also on the floor of Room 39 of Building K (Locus:236934:019) are the examples of sherds with grooves. In the present context, we recovered an incurved rim potsherd with two to three horizontal grooves on the outside, upper part of the body. The colour is reddish-yellow (Munsell chart 5YR7/6). Parallels were found in the Main Occupation Period 2 at Gird-i Bazar during the 2017 campaign where large preserved fragments were recovered on the floor of Courtyard 27 in Building D (**Fig. F1.9: no. 1**). They belonged to pots, sometimes equipped with lugs. This evidence helps to link also the DLT2 sherds to this particular shape, rather than to jars with a narrow opening.

These sherds with grooves can be compared morphologically to the so-called "Groovy Pottery"[101], also called "grooved ware" or "corrugated pots"[102]. This distinctive pottery type[103] has been identified north of the Tur Abdin mountain range in the Upper Tigris region at Giricano (ancient Dunnu-ša-Uzibi)[104] and Ziyaret Tepe (ancient Tušhan)[105] and south of the Tur Abdin at Tell Barri (ancient Kahat)[106] and Tell Halaf (ancient Guzana)[107] in the Khabur Triangle. The closest comparisons to material from the Dinka Settlement Complex come from Ziyaret

98 Herr 2017, 122, fig. E1.13.

99 Cf. Herr 2016, 92, fig. D2.2: no. 10.

100 Cf. Herr 2017, 114, fig. E1.7: no. 3.

101 Roaf/Schachner 2005, 116.

102 Parker 2001, 176, fig. 5.6: H and J.

103 See the distribution map by Roaf/Schachner 2005, 120, fig. 4, updated by Szuchman 2009, 65, fig. 4b.

104 Roaf/Schachner 2005, 116.

105 Matney/Rainville 2005, 58-59.

106 D'Agostino 2014, 189, fig. 4.

107 Sievertsen 2014, 307, fig. 11.

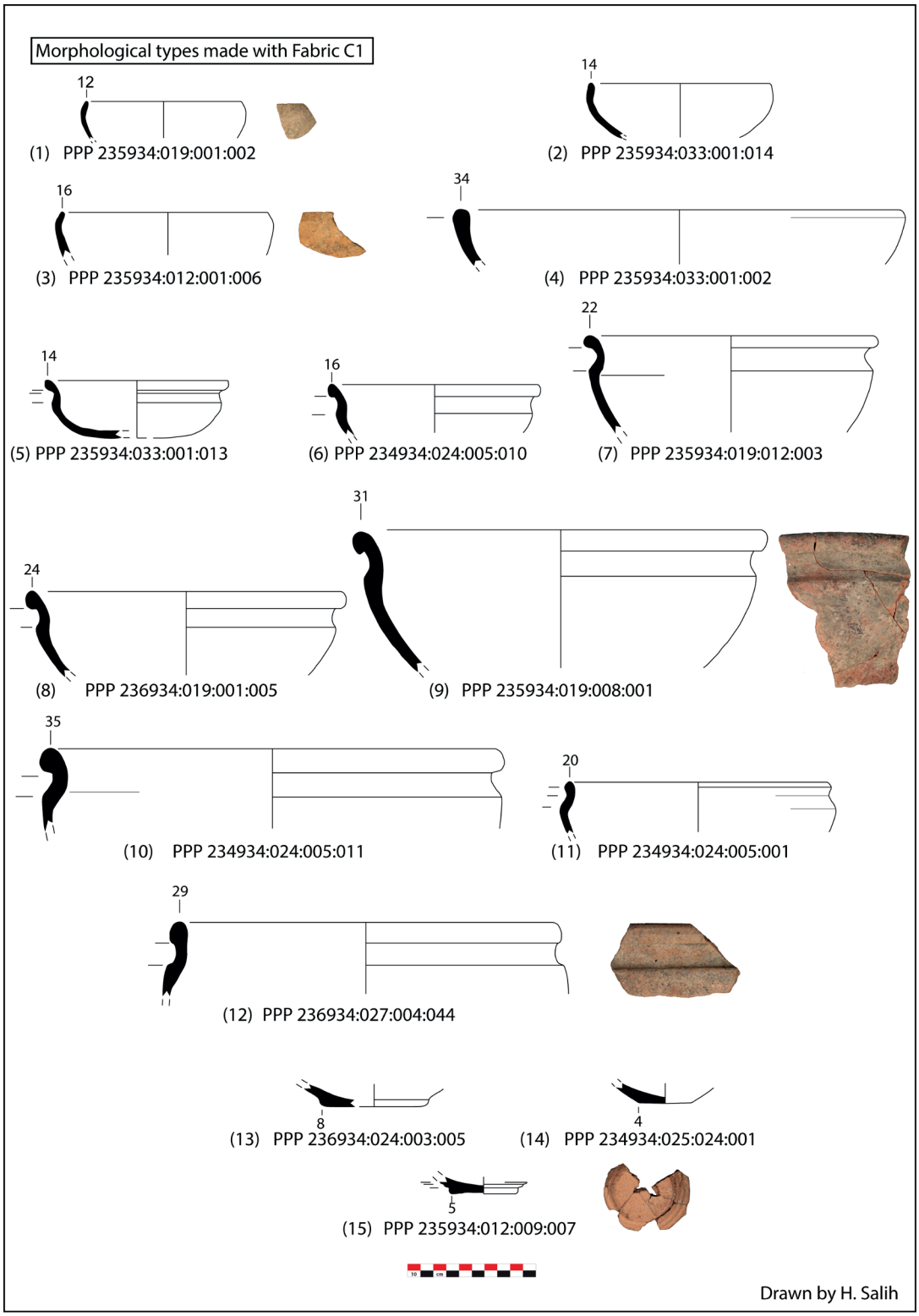


Fig. F1.1: DLT2 pottery 2017: Hemispherical bowls (1-4), carinated bowls (5-12) and bases, made with Fabric C1. Prepared by Jean-Jacques Herr, Abdullah Bakr Othman (photos) and Hero Salih Ahmed (vectorised drawings).

Tepe[108]. Parallels to the DLT2 and Gird-i Bazar grooved sherds can also be found in Western Iran at Hasanlu, in the Type 9 "jars" from the Iron Age I and early Iron Age II levels IVc-IVb[109]. This type of pottery is usually considered to be "indigenous" in south-eastern Anatolia in the Early Iron Age, assumed to predate the Neo-Assyrian conquest of the area from the reign of Shalmaneser III onwards[110], and therefore seen as a hallmark for dating a site to the beginning of the first half of the first millennium BC[111].

Bradley Parker proposed that this "Groovy Pottery" has a hand-made "irregular shape" because it was made on a "tournette" (that is, the slow wheel method used for shaping the vessels at DLT2 and Gird-i Bazar); as in the examples from the Dinka Settlement Complex, the sherds' surface is "always burnished"[112]. Other scholars have referred to the technique for this pottery as "hand-made" in a very broad sense in order to differentiate it from the "wheel-made" pottery thought typical of the assumed Assyrian technological progress of the Middle Assyrian and Neo-Assyrian periods[113]. But as Anacleto D'Agostino correctly stressed, the "hand-made" manufacture of "Groovy Pottery" has hitherto only been "presupposed rather than demonstrated"[114].

The new evidence from the Dinka Settlement Complex now demonstrates that the pottery was slow-wheel made. A sherd of "Groovy Pottery" from DLT2 was sampled for petrographic analysis by Silvia Amicone (**§F2**, **no. 83**): the fashioning technique for this pottery type uses coils, slow wheel and burnishing on both outside and inside, made with Fabric C1. This corresponds to the typical local TechP 6a (**Fig. F1.2: no. 7**, **no. 8**), a key staple of Gird-i Bazar's pottery of the Main Occupation Period, and suggests that "Groovy Pottery" was locally produced, and not imported. Our new material is therefore an important addition to the available information about the manufacture, distribution and local production of "Groovy Pottery".

108 Matney/Rainville 2005, 58, fig. 4: no. 1 and no. 5; 59, fig. 5, no. 19.
109 Danti/Cifarelli 2015, 260, fig. 4.55: P.
110 For the stages of the integration of these areas into the Assyrian Empire see Radner 2006.
111 Matney 1998, 12; 24, fig. 7; Parker 2001, 174; Roaf/Schachner 2005, 119-121; Szuchman 2009, 55-65; D'Agostino 2016, 119-121.
112 Parker 2001.
113 E.g., Guarducci 2014, 63; D'Agostino 2016; Roaf/Schachner 2005, 116.
114 D'Agostino 2016, 115.

F1.3.3 Pottery from Building L, Rooms 36 and 35, with remarks on the storage pots

The pottery finds discovered in Building L are so far the most impressive collection from DLT2. They significantly further our understanding of the different types of large storage jars (of which only small fragments have been found in Gird-i Bazar) and the techniques used for making them. According to the finds recovered in Room 35, we can now associate TechP 2 with ovens, trays, and the heaviest ceramic materials fashioned at the Dinka Settlement Complex.

From the surface of the floor in Room 36 (Locus:235934:019), pottery sherds made with TechP 4, 6, and 10 were recovered (**§C6.2**). The morphological types include: a large sherd of a triangular rim of a cooking pot TechP 4 (**Fig. F1.3: no. 3**); an incurved-rim bowl made with TechP 7, probably coated with a dark slip that was heavily weathered (**Fig. F1.2: no. 9**); a hemispherical incurved-rim bowl made with TechP 6a (**Fig. F1.1: no. 1**); a carinated bowl with a round, everted rim thickened on the outside (**Fig. F1.1: no. 7**); a triangular everted rim thickened on the outside (**Fig. F1.1: no. 9**); and a fine base with ribs above made with coils (similar to **Fig. F1.1: no. 15**). This combination of morphological types and TechP was also found in pit Locus:235934:033 (**Fig. F1.1: nos. 2, 4-5**). Additionally, sherds from a neckless jar with a round rim, thickened on the outside, coated with red barbotine and made with TechP 10 (**Fig. F1.2: no. 2**), were recovered, with close similarities to the type found in the kiln's fill at Gird-i Bazar[115].

Room 35 produced a major discovery (**§C6.1**), the *in situ* remains of three large jars (Locus:235934:004, Locus:235934:037 and Locus:235934:038). The evidence strongly suggests that this was a large storage area. The jars seem to have been arranged in two rows, one of which was set against the eastern wall. The vessels have either a square rim or a simple round rim and are made with TechP 2 **(Fig. F1.4: no. 1-3)**. Large coils, 2.5-3 cm in diameter, are joined one above the other, in a technique comparable to the one seen in the two jar sherds found within the fill (Locus:236934:016) above the layer on the floor (Locus:236934:019) of Building K (**Fig. F1.6: nos. 1-2**). This technique for producing large storage jars is well-known and has also been documented at Nush-i Jan in Western Iran[116].

The jars from Nush-i Jan have a stamped decoration marking their shoulder. This is also the case for one of

115 Herr 2017, 118, fig. E1.11: no. 1.
116 Stronach 1978, pl. VIIf.

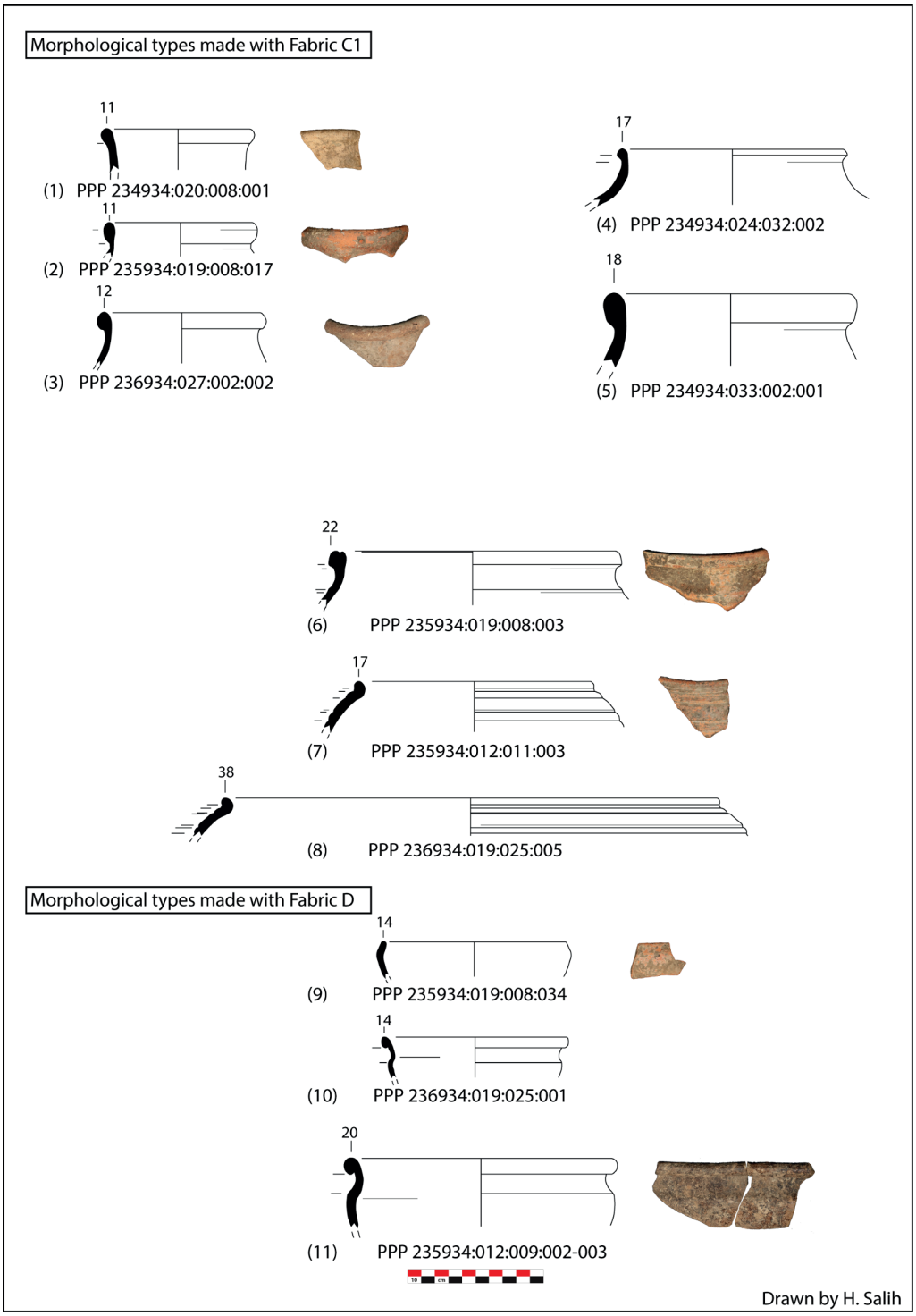


Fig. F1.2: DLT2 pottery 2017: Necked jars (1-5) and pots (6-8), made with Fabric C1. Hemispherical bowl (9) and carinated bowls (10-11), made with Fabric D. Prepared by Jean-Jacques Herr, Abdullah Bakr Othman (photos) and Hero Salih Ahmed (vectorised drawings).

our vessels, the southern jar (Locus:235934:038) whose shoulder is marked by a protruding rib, square in section, with a triangular pattern alternating around the diameter; stamped circular rings cover the surface of this protruding element (PPP 235934:014:001:002: **Fig. F1.4: no. 3**; **Fig. F1.5: no. 1**). Such decorations are also on the ribbed shoulders of a few other sherds recovered at Gird-i Bazar[117]. The tubular tool used to produce the stamped ring pattern for all these examples has a diameter of around 1 cm.

On the floor of Room 35 (Locus:235934:018), we found parts of a broken lid made with TechP 1b, using the organic tempering Fabric C2 (**Fig. F1.5: no. 2**). With a handle that is round in section, it is similar to morphological types recovered at Gird-i Bazar[118]. The lid may be connected to the large jars sunk into the floor and served to cover on of them. A rim fragment with a 40 cm diameter **(Fig. F1.4: no. 2**) may have belonged to jar Locus:235934:037, as also the fill inside the southern jar (Locus:235934:038) contained an additional rim sherd of that vessel (**Fig. F1.4: no. 3**). Fragments of another lid were recovered within the fill (Locus:235934:003) of jar Locus:235934:037. A fragment of the third jar (Locus:235934:004) can be assigned due to its location in the southern section (**Fig. C12**). Because by macroscopic analysis, the tempering of this jar seemed to be finer than that of the two others jars, it was sampled for petrographic analysis by Silvia Amicone (**§F2.2**). However, the results of the analysis proved that it is the exact same Fabric A, as also attested in the Gird-i Bazar material.

The floor of Room 35 produced also other morphological types associated with other TechPs, including the thickened round rim of a necked jar made with the organically tempered TechP 3 (**Fig. F1.5: no. 4**); a thickened square rim from a cooking pot made with the TechP 4 (**Fig. F1.3: no. 6**); and a fragment of flat lid with depressions, made with TechP 1b (**Fig. F1.5: no. 2**).

F1.3.4 Pottery from Building K, Rooms 39 and 40

A large quantity of pottery material was recovered from Rooms 39 and 40 of Building K. In contrast to the storage jars encountered in Building L, these vessels mainly relate to food preparation and consumption.

In Room 39, the excavation of the layer on the floor composed of burned debris and ashes revealed items that were still *in situ*. This included an almost complete cooking pot made with TechP 4, as confirmed through petrographic analysis (PPP 236934:019 016:001; **§F2: Sample 9**). The pot is in pieces and requires restoration. It has a triangular rim, thickened on the outside (**Fig. F1.3: no. 2**), with a convex bottom, and its body shape may have been spherical or ovoid. The fragments were lying next to an installation (Locus:236934:025), east of wall Locus:236934:014 (**§C**), which may have been related to food preparation activities.

Also other morphological types and TechPs familiar from Gird-i Bazar were found. These include a carinated bowl, with a close comparison from Gird-i Bazar (**Fig. F1.1: no. 8**); a disc base decorated with coils made with TechP 6a (similar to **Fig. F1.1: no. 15**); and another incurved rim pot with grooves on the outside (**Fig. F1.2: no. 8**). Moreover, we found a sherd of a carinated bowl made with TechP 6b, showing a thin dark layer on its surface that was most likely the result of a post-depositional process related to fire (**Fig. F1.2: no. 10**).

On the floor of Room 40, we found sherds of jars with a hollow band made with TechP 9 and a carinated bowl made with TechP 6a (**Fig. F1.1: no. 12**). A fragment of a flat lid with depressions, made with TechP 1b (**Fig. F1.5: no. 3**), was analysed by thin section (PPP 236934:027:004:005; **§F2: Sample 88**).

F1.4 Topsoil pottery from the Middle Islamic Period[119]

While removing the topsoil of DLT2 (LGR:0178), we found sherds that did not correspond to the material from the excavation and may date later than to the first millennium BC. The MAFGS survey had noted later occupation for this area, namely the Middle to Late Islamic periods[120].

One body sherd with a thickness is 0.9 cm consists of a highly levigated fabric whose colour (in section) is reddish-yellow (Munsell chart 5YR6/6). It was coated on both the outside and inside walls. This coating is complex and made first with a thin layer of whitish slip that is then coated with a polychrome green, purple and dark glaze. The purple (**Fig. F1.9: no. 2b**) and dark (**Fig. F1.9: no. 2a**) colours are concentrated on some areas of the sherd that are heavily weathered. Such a surface treatment is called "Splash Ware" and typical of the Middle Islamic Period (11^{th}-14^{th} centuries AD). It is commonly found in the Kurdistan region of Iraq, e.g. in the excavations on the citadel

117 E.g., Herr 2016, 97, fig. D2.7: no. 3.

118 Herr 2017, 106, fig. E1.2: nos. 1-2.

119 I would like to thank K. Nováček, M. Ahmad and A. Vernet for helping me to identify the Middle Islamic pottery.

120 Giraud 2016, 33.

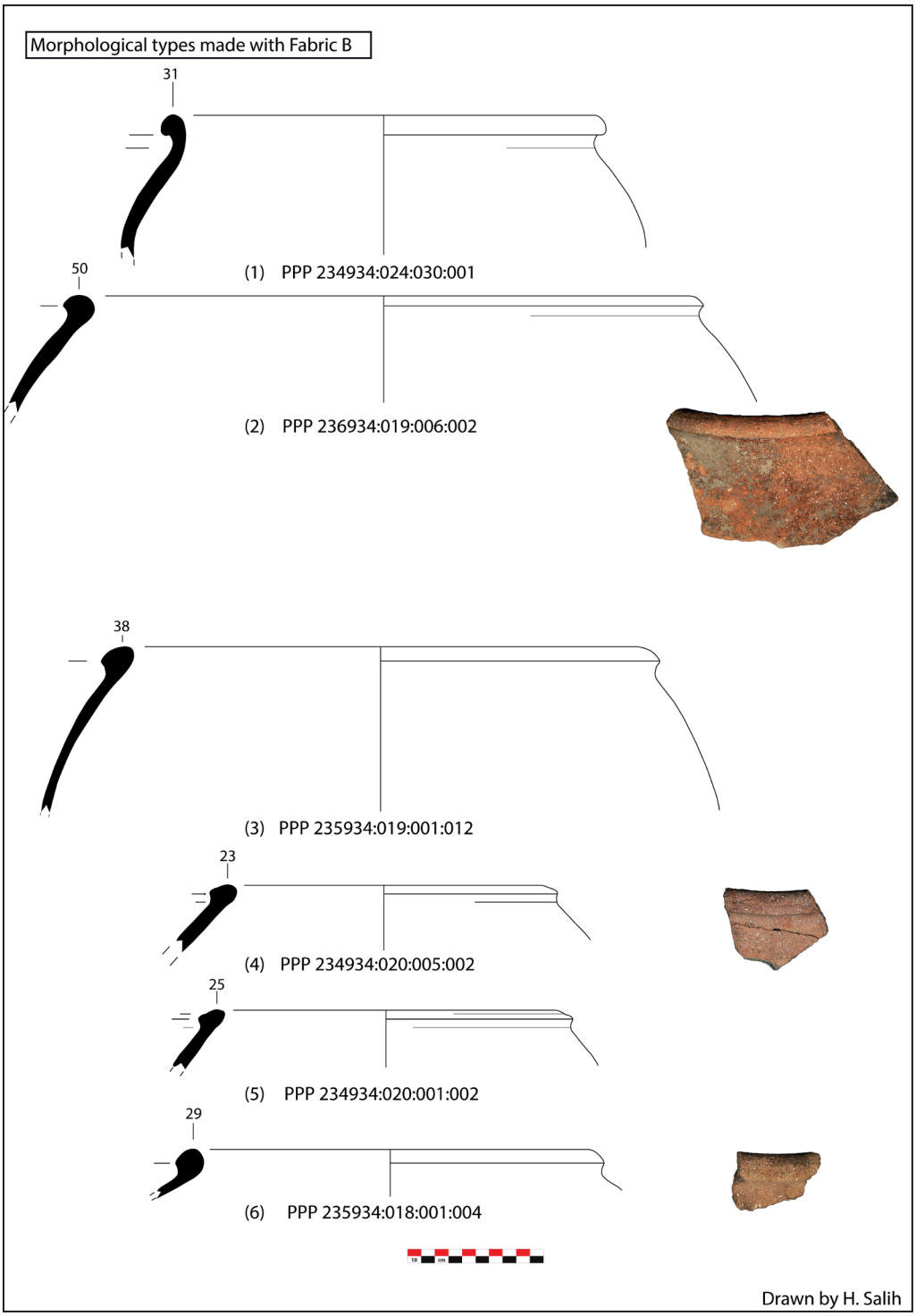


Fig. F1.3: DLT2 pottery 2017: Cooking pots made with Fabric B. Prepared by Jean-Jacques Herr, Abdullah Bakr Othman (photos) and Hero Salih (vectorised drawings).

of Erbil[121]. Good examples were published for the site of 'Ana[122] on the homonymous island in the Middle Euphrates.

F1.5 Preliminary conclusions

The preliminary assessment of the 2017 pottery from DLT2 has allowed us to establish a strong link between the material from this part of the Dinka Settlement Complex and the Main Occupation Period in Gird-i Bazar. The morphological types and the *chaînes opératoires* of the DLT2 pottery correspond closely to those known from Gird-i Bazar (**Fig. F1.7-8**), although no diagnostic sherds have been recovered so far that would match Gird-i Bazar's TechP 5 and TechP 8.

The distribution of the same shapes and *chaînes opératoires* points to a specialised pottery production whose products were distributed throughout the settlement. Is Gird-i Bazar with its pottery workshop a manufacturing centre that supplied the rest of the Dinka Settlement Complex with ceramics? As long as the chronological relationship between the different parts of the settlement is not yet clear, we must be cautious with far-reaching interpretations, and future research will need to focus on the distribution of pottery within the settlement, its function and its consumption (which includes the use, maintenance, repair, reuse, and ultimate discard of the pottery[123]).

The 2017 DLT2 material has allowed us to better understand the function of the large jars. Three examples were recovered *in situ* in Building L, Room 35, and clearly served as grain storage vessels. They were made with TechP 2, corresponding to a large jar found at Gird-i Bazar in Building A, Room 23, along with some fragments of the same type.

Although only part of Room 35 in Building L has been excavated so far, it seems likely that the facility served as grain storage for the wider community rather than only for a single household (cf. **§C2.1**). If Building L was used for the centralised storing of grain, its location at the fringe of the settlement in an isolated quarter is noteworthy. Despite the difference in size, the urban layout of the Neo-Assyrian capital cities may provide a parallel: large buildings with storage facilities are usually located on the edge of the city, close to the city wall, and their storage rooms are usually arranged around a courtyard that serves as a logistical hub to distribute products received directly into storage. At Kalhu (Nimrud), the storage areas of the so-called Arsenal (*ekal mašarti*) of Fort Shalmaneser and of the Ninurta Temple on the citadel provide good examples[124].

Comparisons for storage rooms can also be found in the east and in the north. In the east, centralised storage facilities were found on top of the tepe of Hasanlu for level IVb (1050-800 BC)[125]. Several buildings have rooms filled with large storage jars embedded in benches or set directly onto the floor, whose layout may be comparable to that of the storage room in in Building L. To the north, Urartian fortresses typically feature large storerooms with a high concentration of large storage jars; good examples are Ayanis[126] or Karmir Blur[127].

Finally, the so-called "Groovy Pottery", hitherto known from sites in the Upper Tigris region, the Khabur Triangle and Hasanlu in Westerrn Iran, was identified both at Gird-i Bazar and DLT2 and can be demonstrated to have been made with the locally well attested TechP 6a. This evidence links the Dinka Settlement Complex material to a broader pottery tradition which encompasses regions in the foothills of both flanks of the Taurus and Zagros mountain ranges in the early first millennium BC, generally thought to predate Assyrian control. Future research will serve to further elucidate these connections.

121 Nováček 2008, 275, EC412; 283, fig. 24: nos. 47-54.
122 Northedge 1988, 94-98.
123 For the use of the term "consumption" in this context, see e.g., Tite 1999, 182.
124 Mallowan 1966.
125 Danti/Cifarelli 2013, 21, fig. 1.6.
126 Çilingiroğlu 2001, 67-83; 344.
127 Pietrovskij 1962, 21 fig. 5.

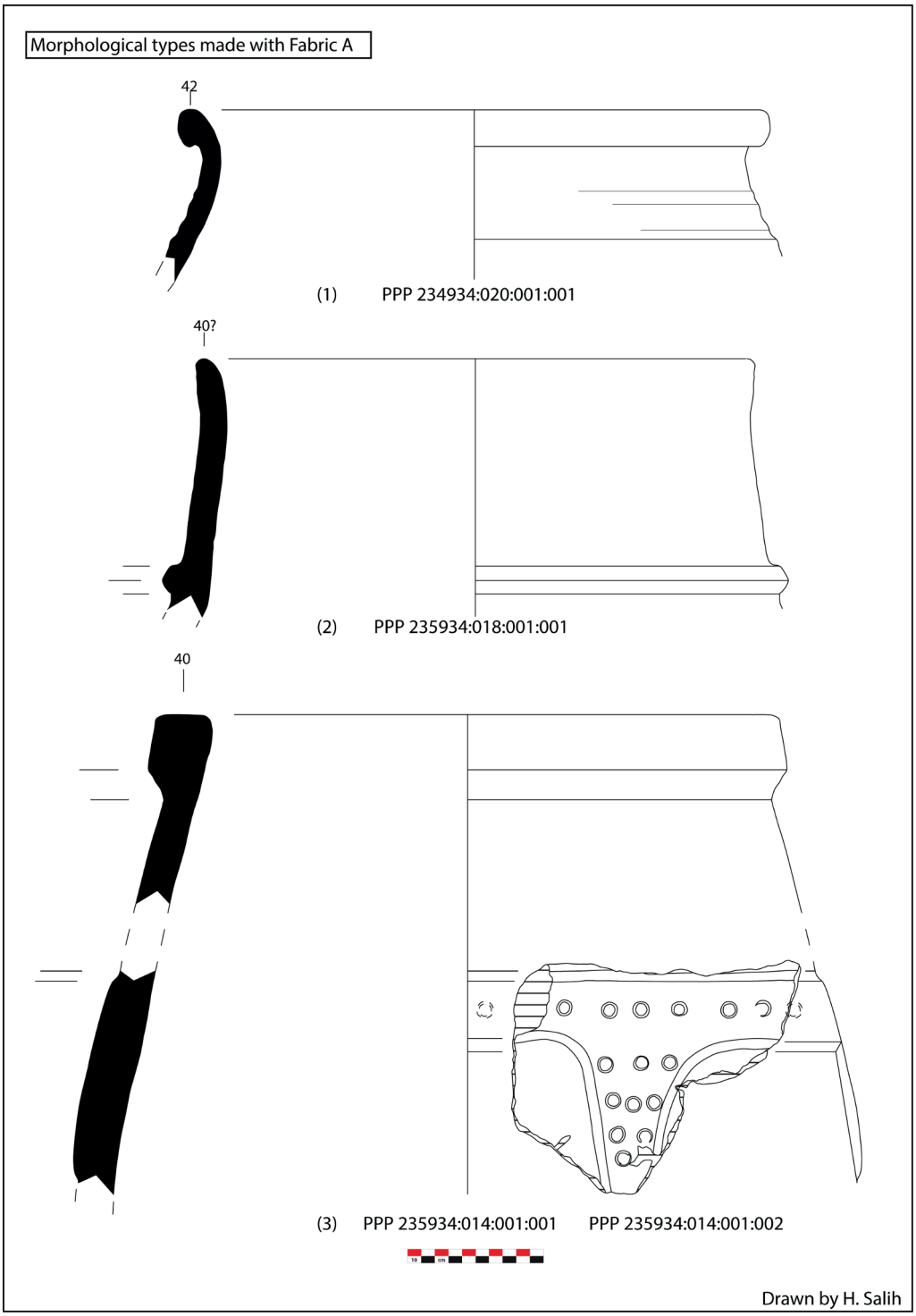


Fig. F1.4: DLT2 pottery 2017: Large storage jars made with Fabric A. Prepared by Jean-Jacques Herr, Hero Salih and Hayman Noori (vectorised drawings).

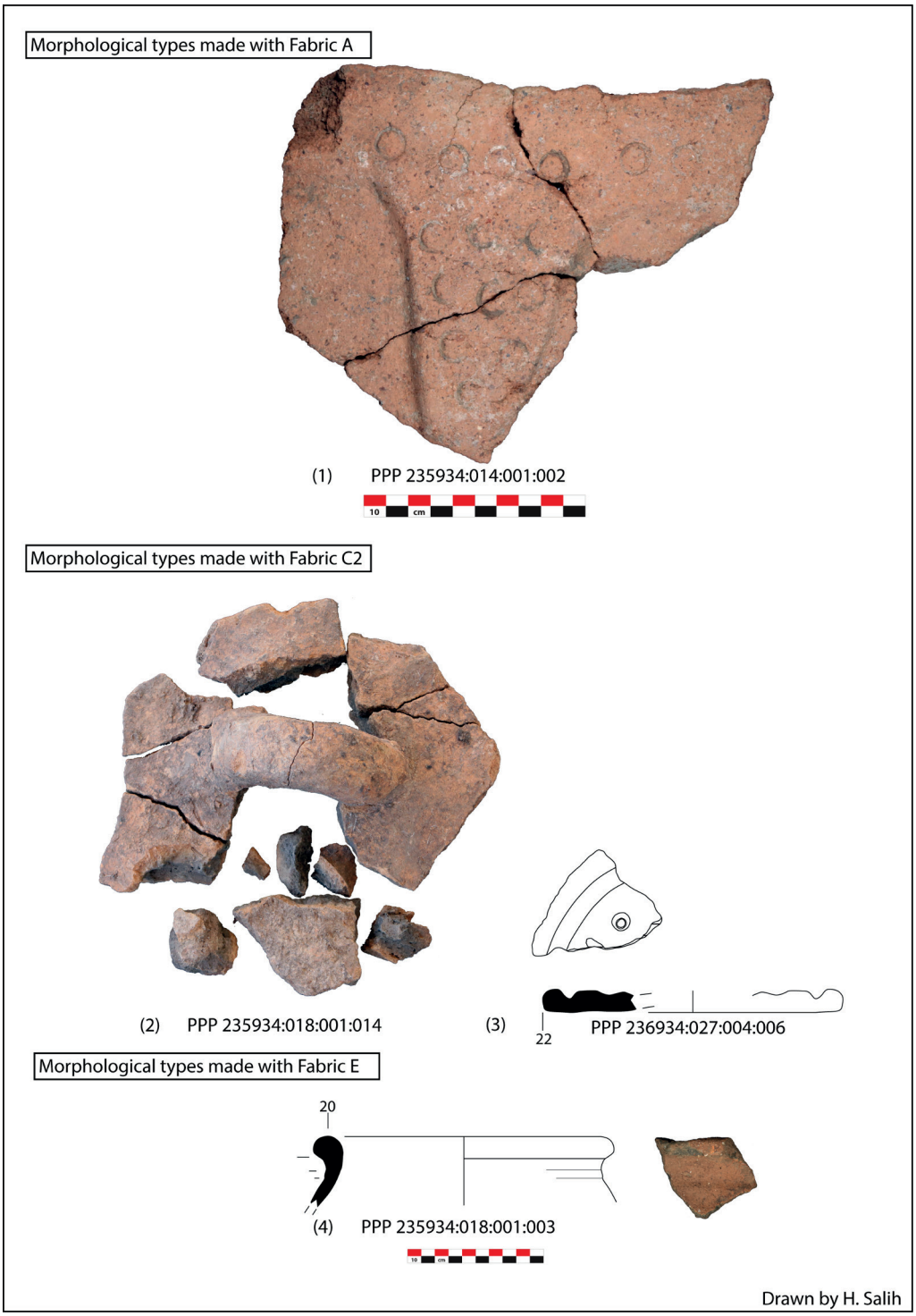


Fig. F1.5: DLT2 pottery 2017: Decorated ribbed shoulder made with Fabric A (1); lids made with Fabric C2 (2-3); jar made with Fabric E (4). Prepared by Jean-Jacques Herr, Abdullah Bakr Othman (photos) and Hero Salih Ahmed (vectorised drawings).

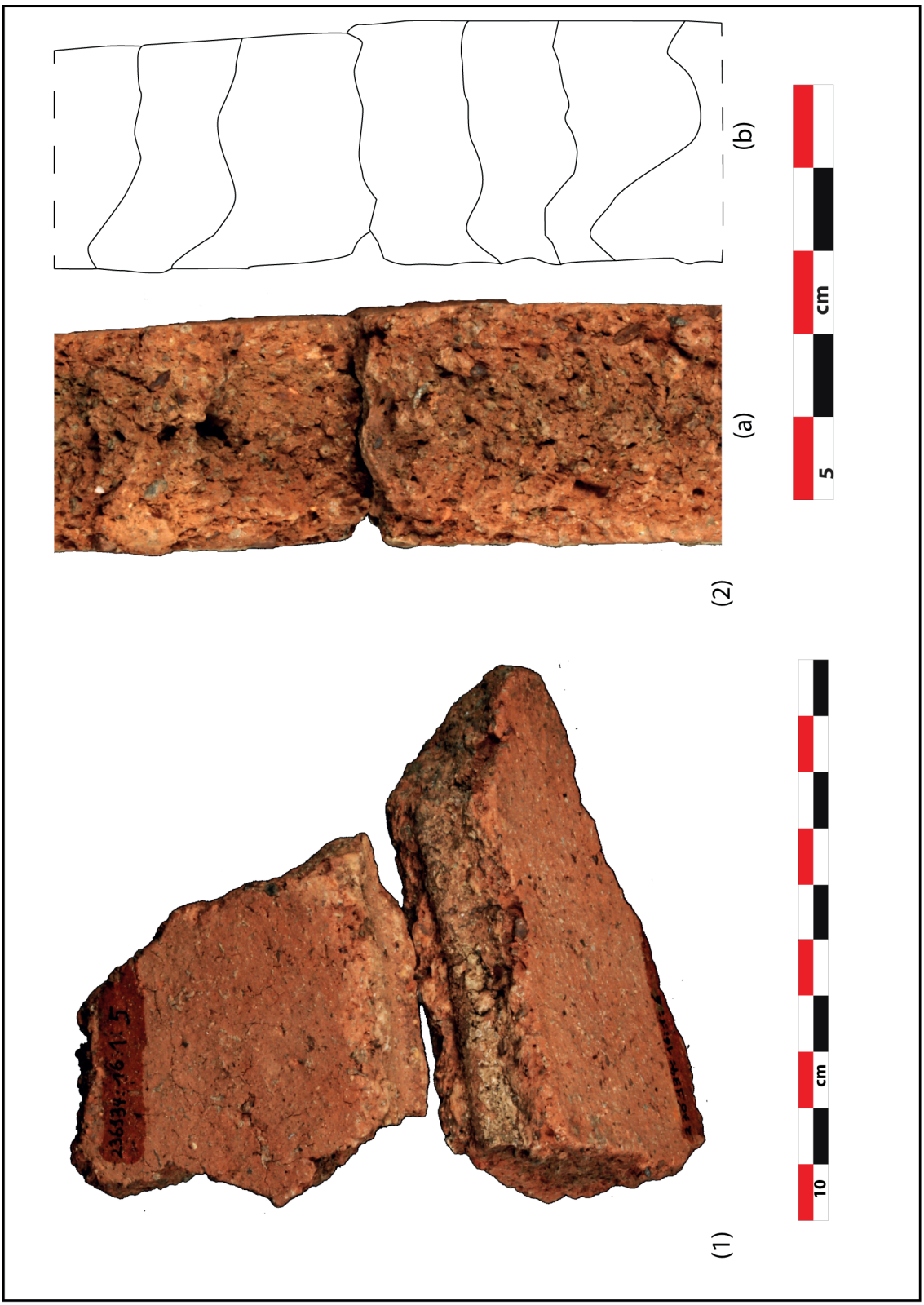


Fig. F1.6: DLT2 pottery 2017: Bodysherds (PPP 236934:016:001:005 and PPP 236934:016:001:006) of large storage jar made with Fabric A. (1) Inside wall and horizontal section of a preferential fracture showing the horizontal join between two coils. (2) Section of the two joined sherds showing the forming technique: each coil is set on above the other and has been prepared to fit together by a shallow depression on the bottom or on the top; photo (a) and interpretation (b).

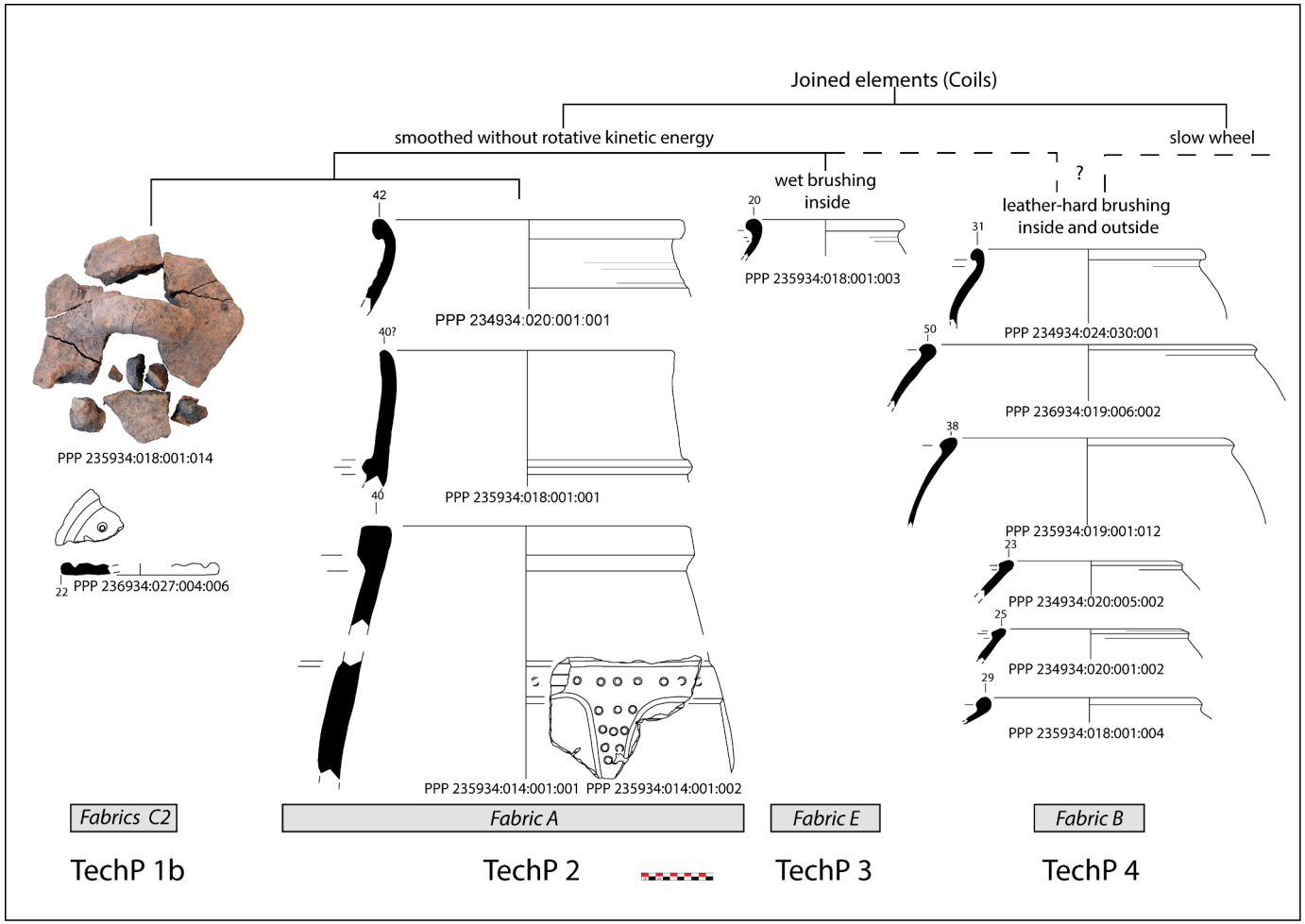


Fig. F1.7: DLT2 pottery 2017: Part 1 of the Techno-Stylistic Tree, showing (from top to bottom) the fashioning technique arranged by stages, the morphological types, the fabric groups and the Techno-Petrographic Groups, based on our current understanding. The groups correspond to our current understanding of Gird-i Bazar pottery.
Prepared by Jean-Jacques Herr, Abdullah Bakr Othman and Hero Salih Ahmed.

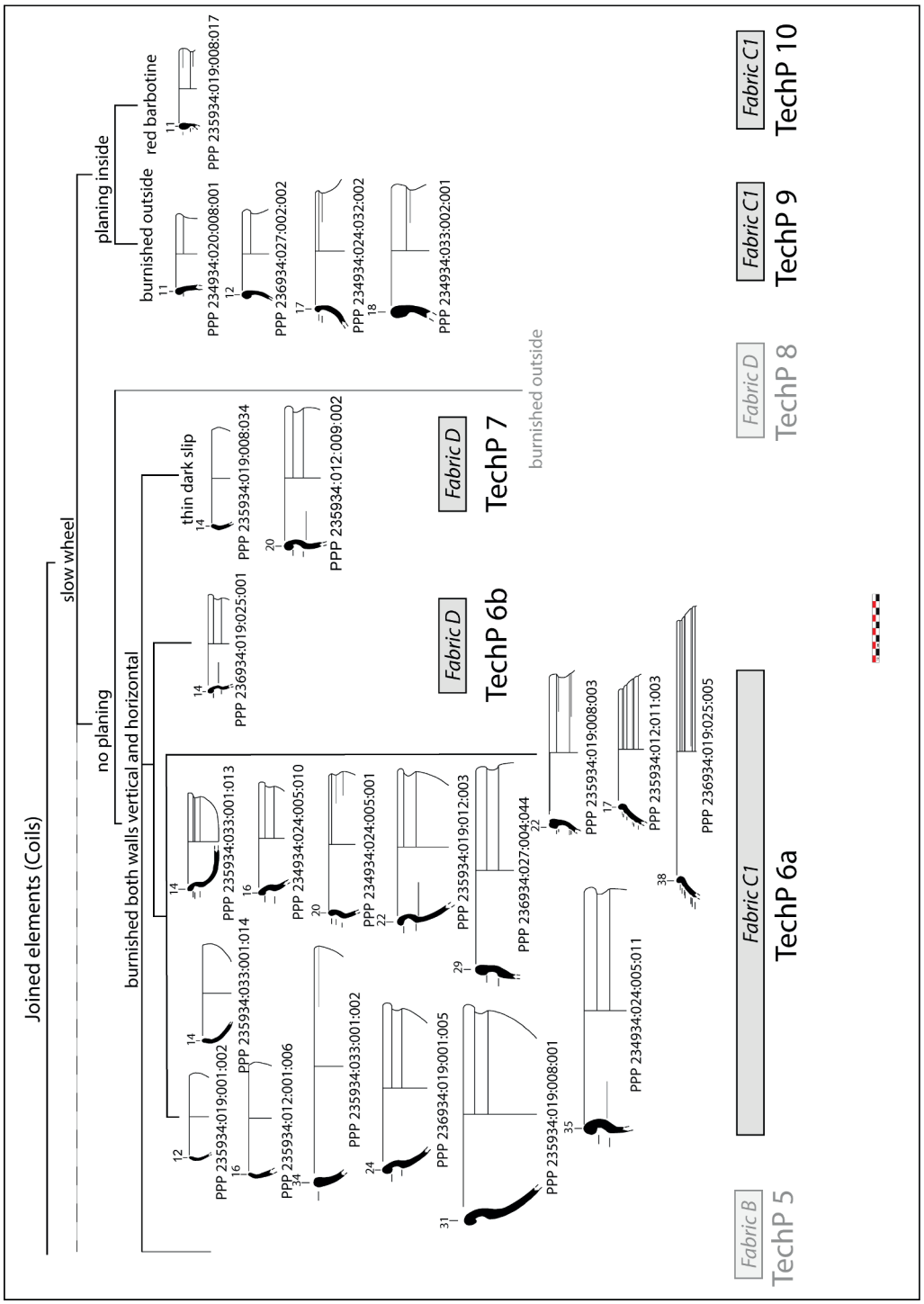


Fig. F1.8: DLT2 pottery 2017: Part 2 of Fig. F1.7. Prepared by Jean-Jacques Herr, Abdullah Bakr Othman and Hero Salih Ahmed.

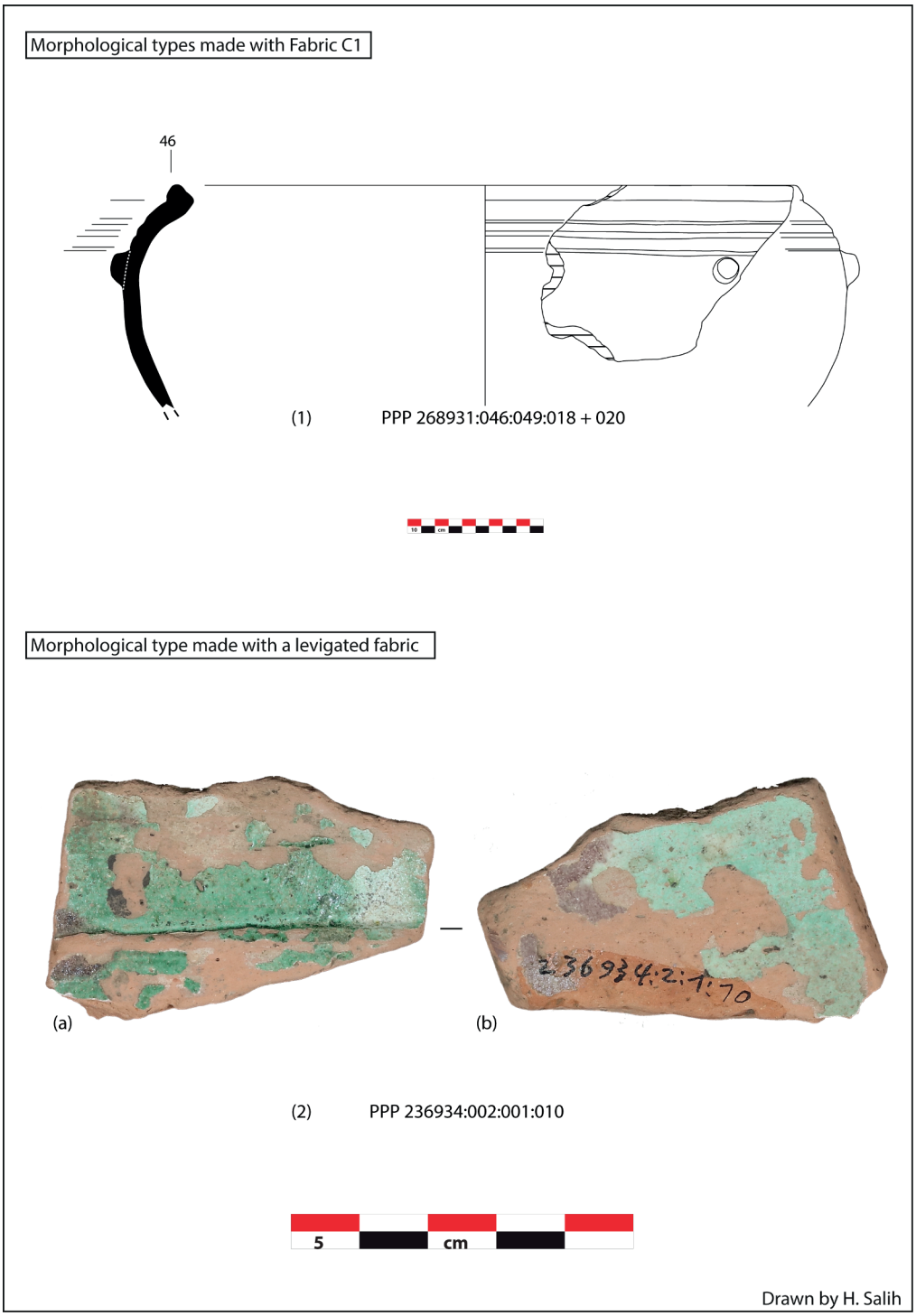


Fig. F1.9: (1) "Groovy Pottery" made with Fabric C1 from Building D at Gird-i Bazar. (2) "Splash Ware" bodysherd dated to the Middle Islamic Period found in the topsoil of DLT2. Prepared by Jean-Jacques Herr, Abdullah Bakr Othman (photos) and Hero Salih Ahmed.

F2. Petrographic analysis on the DLT2 pottery

Silvia Amicone

F2.1 Introduction

Fifteen ceramic samples (**Table F2.1**) from DLT2 were analysed through ceramic petrography using the same methodology applied to the analysis of the ceramic samples from Gird-i Bazar[128]. The DLT2 samples were selected to represent the technological variability observed during the macroscopic analysis of the ceramic assemblages conducted by Jean-Jacques Herr (**§F1**). On the basis of the characteristics of the inclusions, matrix, and voids observed in thin sections under the microscope, the DLT2 samples can be assigned to the same petrofabrics previously recognised after the analysis of the ceramic assemblages from Gird-i Bazar carried out in 2017[129]. In the following sections, the results of the DLT2 sample analyses are presented.

Abbreviations and terminology used in the following discussion:
eq. = equant
el. = elongate
vr = very angular
a = angular
sa = sub-angular
sb = sub-rounded
r = rounded
wr = well rounded

Frequency of inclusions	%
Predominant	>70%
Dominant	50-70%
Frequent	30-50%
Common	15-30%
Few	5-15%
Very Few	2-5%
Rare	0.5-2%
Very rare	<0.5%

128 Amicone 2017b; see also Whitbread 1995; Quinn 2013.
129 Amicone 2017b.

F2.2 Results of the petrographic analysis

Fabric A: coarse metamorphic fabric
Sample nos. 81, 82, 86.

Samples of this fabric form a heterogeneous group (**Fig. F2.1**, **a**, **b**) marked by well-rounded fragments of metamorphic rocks. Dominant mineral inclusions comprise fragments of foliated metamorphic rocks (wr.-el., max=2 mm, mode=1 mm) while quartz is frequent (sa.-eq., max=0.35 mm, mode=0.30 mm). Few inclusions of amphibole (sa.-el.,max=0.35 mm, mode=0.30 mm), plagioclase (sa.-eq., max=0.50 mm, mode=0.20 mm), biotite (sa.-el., max=0.35 mm, mode=0.20 mm), muscovite (sa.-el., max=0.30 mm, mode=0.20 mm) and clay pellets (wr-eq., max=0.65 mm, mode=0.50 mm) were observed. Fragments of mudstone (sr.-el., max=1.25 mm, mode=0.60 mm), serpentinite (sa.-eq., max=0.35 mm, mode=0.30 mm) and chert (sr.-el., max=0.35 mm, mode=0.20 mm) occur rarely. In Sample 86, mudstone fragments are common. The grain size distribution is bimodal. Voids are vesicles and vughs, and they do not show any preferred orientation.

The matrix is light brown in plain polarised light (PPL) and orange to dark brown in cross-polarised light (XP). It often shows the typical layers attributed to irregular firing conditions. The matrix is non-calcareous and exhibits low to moderate optical activity.

The inclusions and the textural characteristics of this group suggest that the raw materials employed to produce these vessels could have originated in a secondary clay, to which fragments of metamorphic rocks could have been added as tempers.

Fabric B: sparry calcite fabric
Sample nos. 79, 92.

Samples of this fabric compose a homogeneous medium-coarse group (**Fig. F2.1, c**) marked by the presence of sparry calcite inclusions whose angular, crushed character suggests that they may have been added as temper. Predominant mineral inclusions comprise sparry-calcite (va.-el., max=1.25 mm, mode=1.00 mm) while quartz is frequent (sa.-el., max=0.30 mm, mode=0.20 mm). Few inclusions of amphibole (sa.-el., max=0.35 mm, mode=0.20 mm) and clay pellets (wr.-eq., max=1 mm, mode=0.65) were observed. Rare occurrences of fragments of foliated metamorphic rocks (sr.-el., max=0.35 mm, mode 0.30 mm) together with fragments of mudstone (sr.-el., max=1.25 mm, mode=1.00 mm) were found. Very rarely plagioclase inclusions were observed (sa-el., max=0.30 mm, mode=0.20 mm). The grain size distribution is strongly bi-

Sample no.	Registration number	Locus/Locus group	Building	Space	Occupation period	Petrographic Group	Firing	TechP	Morphological Type	Shape	Optical Activity
78	235934:012:009:004	LGR:174	/	alley 38	End of Main Occupation Period 1	C1	oxidising	10	shoulder	jar	low
79	234934:025:025	LGR:180	M	room 43	Main Occupation Period 1	B	semi-oxidising	4	bodysherd	cooking pot	low
80	236934:027:001:009	236934:027	K	room 40	End of Main Occupation Period 1	C1	oxidising	6a	flat base	?	low
81	236934:016:001:005	236934:016	K	room 39	Post Occupation of Main occupation Period 1	A	oxidising	2	bodysherd	large storage jar	moderate
82	235934:004:002	235934:004	L	room 35	Post Occupation of Main occupation Period 1	A	semi-oxidising	2	bodysherd	large jar	low
83	235934:012:011:003	LGR:174	/	alley 38	End of Main Occupation Period 1	C1	semi-oxidising	6a	straight round rim	grooved pot	low
84	235934:033:007	235934:033	L	room 36	Construction Main Occupation Period 1	C1	semi-oxidising	6a	bodysherd	bowl	moderate
85	235934:033:008	235934:033	L	room 36	Construction Main Occupation Period 1	E	semi-oxidising	3	bodysherd	jar?	moderate
86	235934:018:009	235934:018	L	room 35	End of Main Occupation Period 1	A	oxidising	2	bodysherd	Large jar	low
87	234934:024:043	LGR:179	M	room 42	End of Main Occupation Period 1	C1	oxidising	9	bodysherd	jar	moderate
88	236934:027:004:005	236934:027	K	room 40	End of Main Occupation Period 1	A/C2?	semi-oxidising	1	bodysherd	lid	moderate
89	234934:024:042	LGR:179	M	room 42	End of Main Occupation Period 1	C1	oxidising	9	hollow band decorated	jar	high
90	236934:027:011	236934:027	K	room 40	End of Main Occupation Period 1	F	oxidising	unknown but coiled	bodysherd	potstand?	low
91	234934:018:003:003	234934:018	M	room 42	Post occupation of Main Occupation Period 1	D	semi-oxidising	7	carination	carinated bowl	moderate
92	236934:019:016:001	236934:019	K	room 39	End of Main Occupation Period 1	B	semi-oxidising	4	incurved triangular rim	cooking pot	high

Table F2.1: List of thin-sections of DLT2 pottery samples. The progressive numbers follow the numbers used in the Table E2.1 with the list of Gird-i Bazar samples analysed in 2017 published in Amicone 2017a.

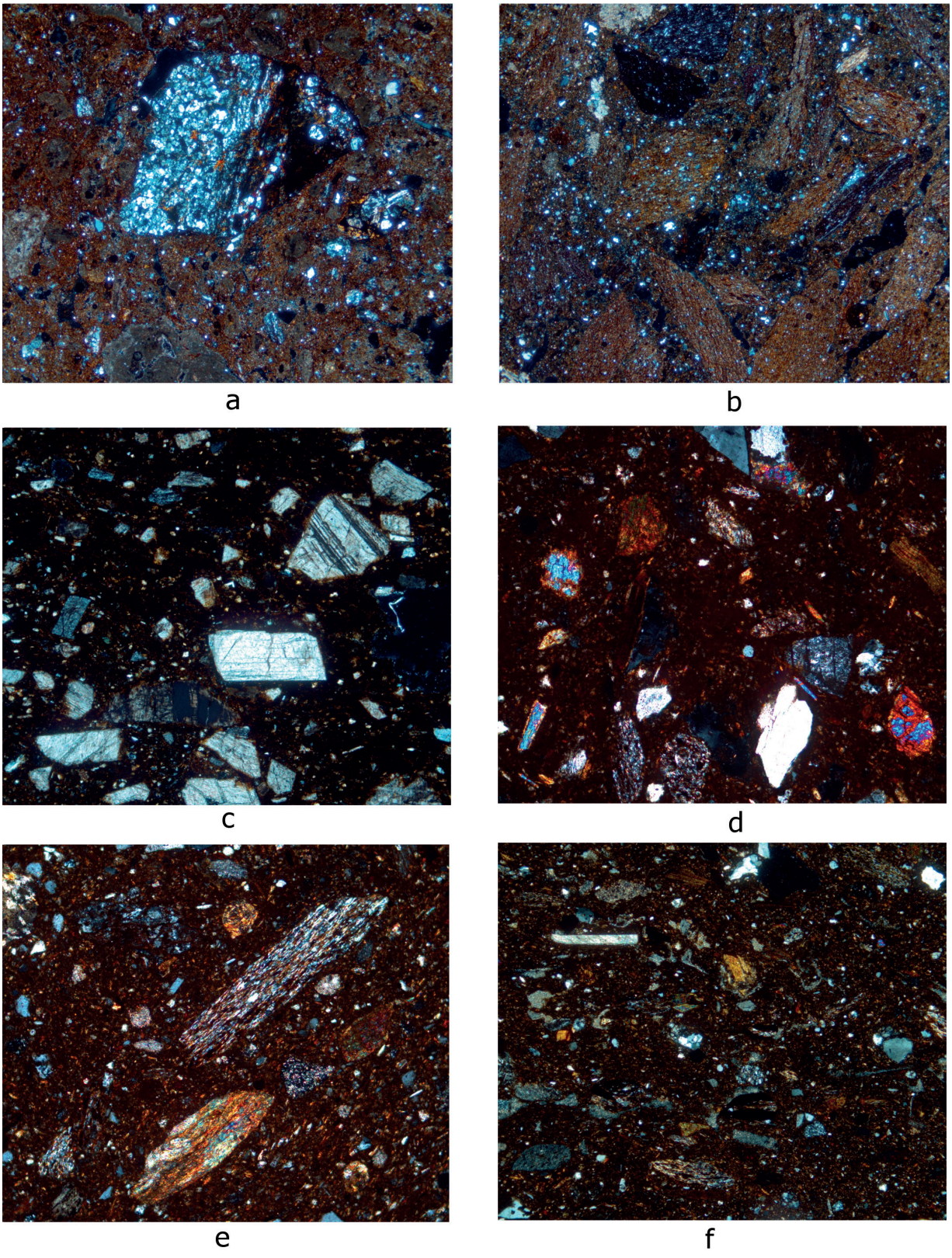


Fig. F2.1: Thin section photomicrographs of selected ceramics from DLT2 analysed in this chapter: (a) Fabric A (PH 81), with a fragment of metamorphic rock, XP; (b) Fabric A (PH 86), with fragments of mudstone, XP; (c) Fabric B (PH 79), sparry calcite, XP; (d) Fabric C1 (PH 87), with quartz, amphiboles and fragments of metamorphic rocks XP; (e) Fabric C1 (PH 87), fragments of metamorphic rocks, XP; (f) Fabric C1 (PH 87), with quartz, biotite, amphiboles, calcite and fragments of metamorphic rocks XP. Image width= 8 mm (a, b), 4 mm (c, f) and 2 mm (d, e).

modal. Voids are vesicles and vughs and they do not show any preferential orientation.

The matrix is light brown in PPL and orange to brown in XP. It often shows the layers typical of irregular firing conditions. The matrix is non-calcareous, and the samples exhibit moderate to low optical activities (especially Samples 33 and 44).

The inclusions and the textural characteristics of this group suggest that the raw materials employed to produce these vessels could have originated from a secondary clay, to which calcite inclusions deriving from limestone were intentionally added as tempers. The presence of relic coils was observed, suggesting the employment of coil forming technique.

Fabric C: micrite fabric
Sub-group C1: Sample nos. 78, 80, 83, 84, 87, 89.
Sub-group C2: Sample nos. 88.

Samples of this fabric form a heterogeneous medium-coarse to medium-fine group (**Fig. F2.1**, **d-f**) marked by rounded inclusions of micrite and fragments of metamorphic rocks. The dominant mineral inclusion is micrite (wr.-eq., max=2.5 mm, mode=0.85 mm). Quartz is frequent (sa.-eq., max=0.30 mm, mode=0.20 mm), and fragments of foliated metamorphic rocks (sr.-el., max=1 mm, mode=0.30 mm) composed of quartz and muscovite are common. Few inclusions of amphibole (sr.-el., max=0.35 mm, mode=0.30 mm), plagioclase (sr.-eq., max=0.50 mm, mode=0.20 mm), biotite (sr.-el., max=0.35 mm, mode=0.20 mm), muscovite (sa.-el., max=0.30 mm, mode=0.20 mm) and clay pellets (wr-eq., max=0.65 mm, mode=0.50 mm) were observed. Rarely, fragments of mudstone (sr.-el., max=1.25 mm, mode=0.60 mm) and sparry calcite (sa.-el., max=0.35 mm, mode=0.30 mm) occur. Very rarely serpentinite (sa.-eq., max=0.35 mm, mode=0.30 mm), epidote (sa.-eq., max=0.35 mm, mode=0.30 mm) and fragments of igneous rocks (sr.-el., max=0.35 mm, mode=0.20 mm) composed from quartz were found. The grain size distribution is strongly polymodal. Voids are vesicles and vughs, and they do not show any preferential orientation.

The matrix is light brown in PPL and orange to brown in XP. It often shows the typical layers attributed to irregular firing conditions. The matrix is non-calcareous and the samples exhibit both high and low optical activities.

The inclusion and the textural characteristics of this group suggest that the raw materials employed to produce these vessels could have originated from a secondary clay. Samples belonging to subgroup C2 (**Fig. F2.2**, **a**) also show possible evidence of plant tempering.

Fabric D: fine fabric
Sample no. 91.

Samples of this fabric compose a homogeneous fine group (**Fig. F2.2**, **b**). The dominant mineral inclusion is quartz (sa.-eq., max=0.1 mm, mode=0.8). Few inclusions of biotite (sa.-el., max=0.1 mm, mode=0.8 mm) were seen. Rarely, tiny fragments of metamorphic rocks were observed (sr.-el., max=0.1 mm, mode=0.8 mm). The grain size distribution is unimodal. Voids are vesicles and vughs, and they do not show any preferred orientation.

The matrix is light brown in PPL and orange to brown in XP. It often shows the typical layers attributed to irregular firing conditions. The matrix is non-calcareous and the samples exhibit poor optical activities.

The inclusion and the textural characteristics of this group suggest that the raw materials employed to produce these vessels could have originated from a secondary clay that may have been cleaned through levigation.

Fabric E: chaff tempered fabric
Sample no. 85.

This fabric is represented for the moment only by one medium-fine sample (**Fig. F2.2**, **c**) that is marked by the presence of chaff tempering. The dominant mineral inclusion is quartz (va.-eq., max=0.3 mm, mode=0.08 mm). Micrite (wr.-eq., max= 2.5 mm, mode=0.85 mm) is also common. There are a few inclusions of muscovite (va.-el., max=0.1 mm, mode=0.08 mm). Rare occurrences of tiny fragments of metamorphic rock (va.-el., max=0.3 mm, mode=0.1 mm) and chert (va.-el., max=0.1 mm, mode=0.08 mm) were seen. The grain size distribution is bimodal. The voids are planar and run parallel to each other. The matrix is dark brown in PPL and black to red in XP. It shows the typical layers attributed to irregular firing conditions.

The matrix is non-calcareous and the sample exhibits moderate optical activity.

The inclusions and the textural characteristics of this sample suggest that the raw materials employed to produce it could have originated from a secondary clay into which chaff material was added as temper.

Fabric F: grog fabric
Sample no. 90.

This fabric (**Fig. F2.2**, **d**) is marked by the presence of grog (max=2.4 mm, mode=2 mm). The dominant mineral inclusion is quartz (sa.-eq., max=0.40 mm, mode=0.20 mm) and fragments of foliated metamorphic rocks (sr.-el., max=0.50 mm, mode=0.30 mm) composed of quartz and biotite are common. Few inclusions of biotite (sr.-

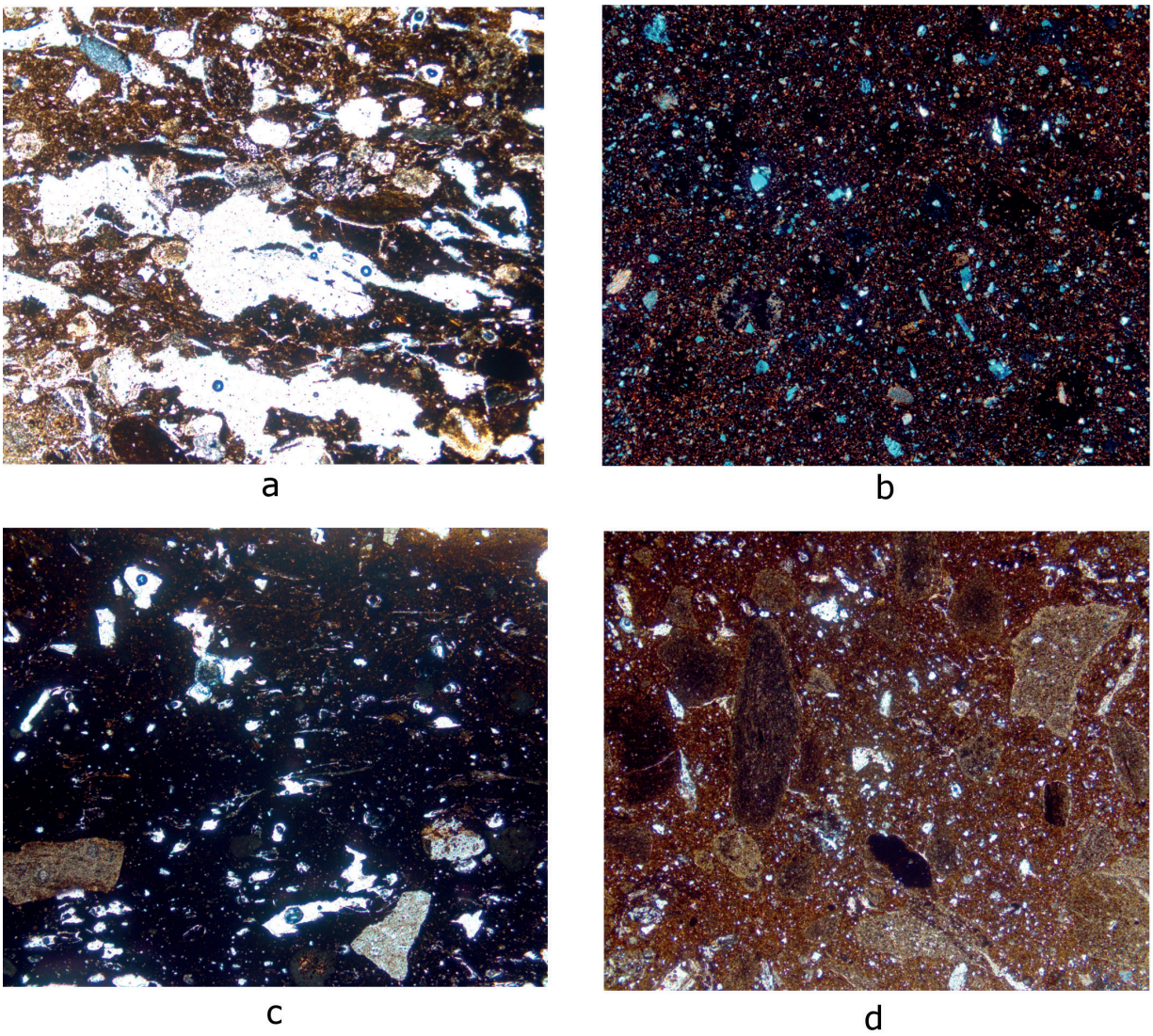


Fig. F2.2: Thin section photomicrographs of selected ceramics from DLT2 analysed in this chapter: (a) Fabric C2 (PH 88), with possible plant tempering, PPL; (b) Fabric D (PH 91), fine fabric, XP; (c) Fabric E (PH 85), abundant chaff tempering tempering, XP; (d) Fabric G (PH 90), grog tempering, XP. Image width= 8 mm (a, d), 4 mm (b, c).

el., max=0.35 mm, mode=0.20 mm), muscovite (sa.-el., max=0.30 mm, mode=0.20 mm) and clay pellets (wr-eq., max=0.65 mm, mode=0.50 mm) were observed. Rarely, fragments of amphibole (sr.-el., max=0.25 mm, mode=0.20 mm), plagioclase (sr.-eq., max=0.25 mm, mode=0.20 mm), mudstone (sr.-el., max=0.8 mm, mode 0.6 mm) and sparry calcite occur. The grain size distribution is bimodal. Voids are vesicles and vughs, and they do not show any preferential orientation.

The matrix is light brown in PPL and brown in XP. The matrix is non-calcareous and exhibits moderate optical activity.

The inclusions and the textural characteristics of this group suggest that the raw materials employed to produce these vessels could have originated from a secondary clay tempered with grog.

F2.3 Preliminary conclusions

The results of the petrographic analysis carried out on the samples from DLT2 show that the DLT2 petrofabrics are the same as those recognised in Gird-i Bazar.

These results have also permitted us to better define Fabric F. The investigation carried out last year on only one sample had allowed us to recognise that this petrofabric is marked by the intentional addition of aplastic material. The new analysis now more specifically pro-

vides evidence suggesting that the tempering agent is grog (chamotte i.e. fragments of broken ceramics)[130]. This type of fabric seems to be typical of jars, bowls and pot stands (**§F1**).

As has already been observed in the previous study on the results of the petrographic analysis of the samples from Gird-i Bazar,[131] the compositional characteristics of the petrofabrics described above are compatible with the geology of the area surrounding the Dinka Complex Settlement[132]. Therefore, it is possible to conclude that both groups of samples from Gird-i Bazar and DLT2 are the outputs of the same production centre. Pyro-technological installations, pottery kilns, and a pottery workplace discovered in Gird-i Bazar[133] suggest that the Dinka Settlement Complex was a relatively large ceramic production centre, probably organised into several workshops.

F3. Residue analysis on the 2017 DLT2 pottery

Elsa Perruchini

F3.1 Introduction

The analysis of organic residues from archaeological materials, in particular in ceramic vessels, has become increasingly important to our understanding of ancient diet, society, trade and technology. Its principle is based on the fact that during processing in ceramic vessels, remains from foodstuffs (like waxes, oils, fats) or natural products (like pitches, tars or resins) become trapped and preserved in the pores of the clay walls. The residues that are left behind degrade through time but still contain certain compounds that are characteristic of the substance once there. Through the use of gas chromatography, we aim to identify lipids, molecules that are specific to certain plants or animals, and ultimately determine what the vessel originally held.

Identifying the contents of vessels in this way, as well as determining the molecular structure of the substances, can provide direct evidence of the ways in which food and drink were transported, produced, consumed and valued in ancient times. With this information it is possible to reconstruct food and drink consumption and related practices in antiquity, a subject that, over the last two decades, has become a potent field of research and inquiry in the study of social complexity and identities in ancient societies.

F3.2 The 2017 material

The material presented here was unearthed during the 2017 season of excavations in the Dinka Lower Town operation 2 (DLT2).

Sample nos. 1-3: Ceramic sherd PPP 235934:014:006, ceramic sherd PPP 235934:014:008 and soil sample PPP 235934:014:006-S

The two sherds belong to one small vessel (or possibly two different small vessels) recovered within a larger vessel (Locus:235934:014) in Building L, Room 35. An associated soil sample PPP 234934:014:006-S was also analysed.

Sample nos. 4-5: Ceramic sherd PPP 234934:018:018 and soil sample PPP 234934:018:017

This sherd comes from the almost complete vessel PPP 234934:018:001 (**Fig. F3.1**), discovered in the room fill (Locus:234934:018) in Room 42 of Building M and interpreted as a carinated bowl. An associated soil sample PPP 34934:018:017 was also collected for analysis.

Sample nos. 6-8: Ceramic sherd PPP 235934:003:011, ceramic sherd PPP 235934:003:012 and soil sample PPP 235934:003:010

The first sherd was found in the fill (Locus:235934:003:011) and the other is part of the wall (235934:003:012) of the large storage jar (Locus:235934:003) located in Room 35 of Building L (**Fig. F3.2**). An associated soil sample PPP 235934:003:010 was also collected for analysis.

F3.3 Methodology

Organic residue analysis was carried out at the BECS (Biomarkers for Environmental and Climate Science) laboratory led by Dr. Jaime Toney and located at the University of Glasgow. For this analysis, we used the standard methodology that includes several key steps:

1. Recording the sherds (photos, entry in the database, etc.).
2. Both inner and outer surfaces of the sherd were drilled using a cordless Dremel 8200 with an abrasive point as grinding tool (cleaned with acetone before use) to remove any exogenous contamination. The resulting powders were kept for organic residue analysis and used as control samples.

130 Whitbread 1986.
131 Amicone 2017b.
132 Amicone 2017b, 128-132.
133 Amicone 2017a, and see **§D11** and **§D12.2**.

Fig. F3.1: Carinated bowl PPP 234934:018:001: *in situ* (on the left) and detail (on the right). Photos by Felix Wolter (left) and Abdullah Bakr Othman (right).

3. The "cleaned" sherd was then crushed into powder using an agate mortar and a pestle (previously cleaned with acetone) and put into 40 ml glass vials (previously combusted in an oven with a 450℃ temperature program that runs for 8 hours).
4. Samples of soil around the vessel, collected on site, were used as control samples to evaluate the effects of burial time on our results. This can provide a picture of potential contamination from the burial environment (e.g. leaching from decaying plant matter). The soil samples are processed using the same methodology as that employed for the samples extracted from the sherds.
5. ASE and lipid extraction: Lipids were extracted using a Dionex Accelerated Solvent Extractor (ASE) 350 in a mixture of dichloromethane and methanol (9:1 v/v DCM:MeOH). The ASE 350 can run 24 samples in 10 ml cells. On average, a 10 ml cell can hold 3 g of sample. This instrument enables better extractions in less time and effort than manual techniques, such as ultrasonication.
6. Derivatisation: The samples were derivatised by heating at 80℃ for two hours with the addition of 30 µl of the reagent N,O-bis(trimethylsilyl)trifluoroacetamide (BSTFA) and 40 µl of pyridine added as a basic catalyst.
7. An internal standard n-alkane C22 (100 µL of a 9,12 µg/mL solution) was added to the sample for quantification and samples were finally diluted in 100 µL of DCM.

Fig. F3.2: Storage jar Locus:235934:003 (on the left) located in Room 35 of Building L. Photo by Jens Rohde.

8. Gas chromatography: Samples were run on the Agilent 7890 GC-FID (GC-FID: Gas Chromatograph – Flame Ionization Detector) for biomarker quantification and then on the Agilent 5977 GC MS (GC-MS: Gas Chromatograph – Mass Spectrometer) for biomarker identification. The analysis time was 63 min (starting at 7 min) per sample and a specific column oven temperature program was created for this analysis. The GC oven temperature was held at 60℃ for 2 min, then increased 30℃/min up to 120℃, then increased 5℃/min up to 300℃, then increased 5℃/min up to 340℃ held isothermally for 15 min. Add carrier gas (He) and column specs.

F3.4 Results and discussion

The sherds, as well as samples used as a control to evaluate potential exogenous contamination (i.e., drilled inner and outer surfaces, soil samples and blanks), were prepared to be run on the GC-MS.

We were able to observe that organic residues have been well preserved. However, results also indicate the presence of phthalates and phenols, meaning that sherds and soil samples have been in contact with plasticizers. After comparison with soil residues and outer and inner surfaces, the results indicate that the samples yielded possible compounds of archaeological significance.

Sample nos. 1-3: PPP 235934:014:006 (ceramic sherd), PPP 235934:014:008 (ceramic sherd) and PPP 235934:014:006-S (soil)

Fig. F3.3 and **Fig. F3.6** show the partial total ion chromatograms produced by the residues extracted from the two fragments PPP 235934:014:006 and PPP 235934:014:008. The two samples yielded residues showing a similar chromatographic profile, which may suggest that they were part of the same vessel or at least held similar contents.

The lipid extracts are dominated by saturated fatty acids: series of odd ($C_{9:0}$, $C_{15:0}$, $C_{17:0}$), and even chain fatty acids ($C_{8:0}$, $C_{10:0}$, $C_{16:0}$, $C_{18:0}$, $C_{20:0}$) not present in the inner (**Figs. F3.4** and **F3.7**) and outer surfaces (**Figs. F3.5** and **F3.8**) of the sample and in higher quantities than in the soil sample (**Fig. F3.9**). Notably, we can detect the high concentration of $C_{16:0}$ and $C_{18:0}$ which are the most abundant and common fatty acids typically encountered in plant and animal tissues[134]. Interestingly, while the soil sample shows a higher abundance of $C_{17:0}$ in comparison to $C_{18:0}$ (**Fig. F3.9**), the sherd samples present the opposite trend.

The lipid extracts also contain lower concentrations of methyl isostearate or methyl 16-methylheptadecanoate.

A cholesterol derivative, Cholesta-3,5-dien-7-one, was also identified in the two samples and is a common oxidation product of cholesterol[135].

The identified compounds could be seen as the chemical evidence tentatively supporting the presence of animal fats mixed with plant waxes. Evidence of animal fats includes the detection of compounds such saturated fatty acids, especially short-chain fatty acids ($C_{9:0}$, $C_{10:0}$, $C_{12:0}$ and $C_{14:0}$), which could prove the presence of adipose fat[136]. However, in view of their relatively low concentration, their significance is rather limited, as they could derive from both animal or plant commodities. The presence of an iso-branched chain fatty acid (iso-C_{18}) could be evidence of animal fats. As well, the presence of cholesterol (cholesta-3,5-dien-7-one) is also consistent with the presence of animal fats[137]. The odd-chain alkanes (C_{14} and C_{15}) detected are also considered good indicators of an animal origin[138].

Components also include the presence of higher odd-numbered n-alkanes (C_{21} to C_{33}) dominated by C_{27}, C_{29}, C_{31} which may indicate the presence of plant material[139]. Furthermore, long-chain ketones, such as nonacosane-10one (C_{29}) and 16-Hentriacontanone (C_{31}), discovered only in our two sherd samples, are present in vegetal waxes[140].

Sample nos. 4-5: PPP 234934:018:018 (ceramic sherd) and PPP 234934:018:017 (soil)

Fig. F3.10 shows the partial total ion chromatogram produced by the residues extracted from one fragment of the vessel PPP 252934:018:018. We focus here on compounds not present in the inner (**Fig. F3.11**) and outer surfaces (**Fig. F3.12**) of the sample and that appear in higher quantities than in the soil sample (**Fig. F3.13**).

The lipid extract is dominated by odd numbered alkanes (C_{21}, C_{23}, C_{25}, C_{27}, C_{29}, C_{31} and C_{33}) that indicate the presence of plant waxes[141]. Furthermore, long-chain ketones, such as nonacosane-10one (C_{29}) and 16-Hentriacontanone (C_{31}) discovered in our two samples, are present in vegetal waxes[142].

Almost no trace of fatty acids could be detected, which is rather uncommon and thus could prove either the absence of oil and fat in this vessel, or indicate that they did not survive processing, burial time, or laboratory preparation.

Sample nos. 6-8: PPP 235934:003:011 (ceramic sherd), PPP 235934:003:012 (ceramic sherd) and PPP 235934:003:010 (soil)

Fig. F3.14 shows partial total ion chromatograms produced by the residues extracted from the sherd fragment PPP 235934:003:011 discovered in the large storage jar Locus:234934:003.

134 Evershed *et al.* 1997; Heron/Evershed 1993; Evershed 2008.
135 Dutta 2005.
136 Evershed *et al.* 2002; Manzano et al. 2016.
137 Regert 2011; Eerkens 2005.
138 Malainey *et al.* 1999.
139 Marshall *et al.* 2008, 250; Baeten *et al.* 2013, 1161.
140 Raven *et al.* 1997.
141 Marshall *et al.* 2008, 250; Baeten *et al.* 2013, 1161.
142 Raven *et al.* 1997.

By comparing the results of the lipid extract coming from the sherd sample and those from the inner (**Fig. F3.15**) and outer surfaces (**Fig. F3.16**) as well as the soil sample (**Fig. F3.20**), we can observe that no archaeologically significant compounds have survived.

On the other hand, **Fig. F3.17** shows that the partial total ion chromatograms produced from the residues extracted from another sherd fragment PPP 235934:003:012, discovered inside the storage jar (Locus:235934:003), presents possibly archaeologically significant compounds. However, the sherd does contain evidence of contamination by plasticizers, as there is a significant peak of Bis(2-ethylhexyl) adipate or DEHA, a plasticizer[143] also discovered in the inner surface sample (**Fig. F3.18**), making it difficult to interpret the results.

F3.5 Conclusions

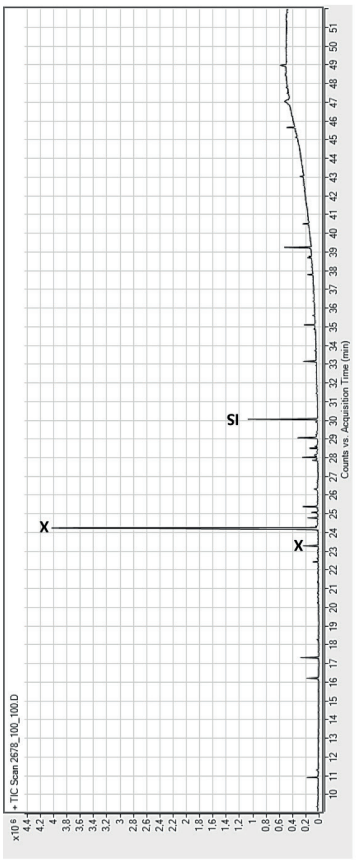
Table F3.1 summarises the residue analysis results obtained from the analyses of the ceramic samples collected in DLT2 in 2017. The organic residue analysis has yielded compounds of potential archaeological significance in the samples. Although it is not possible, based on these results, to draw clear conclusions about what the different vessels originally held, most of the samples analysed produced evidence for plant remains and plant waxes.

Interestingly, the results show that sample nos. 1 and 2 (PPP 235934:014:006 and PPP 235934:014:008) could be part of the same vessel, which may have contained a mixture of animal fats and plant remains. Compound-specific carbon isotope analysis using GC-IRMS (Gas Chromatography-Isotope Ratio Mass Spectrometry) will be applied in the near future to determine the δ13C of the most abundant fatty acids and thus distinguish ruminant from non-ruminant adipose fats, as well as dairy fats and plant oils.

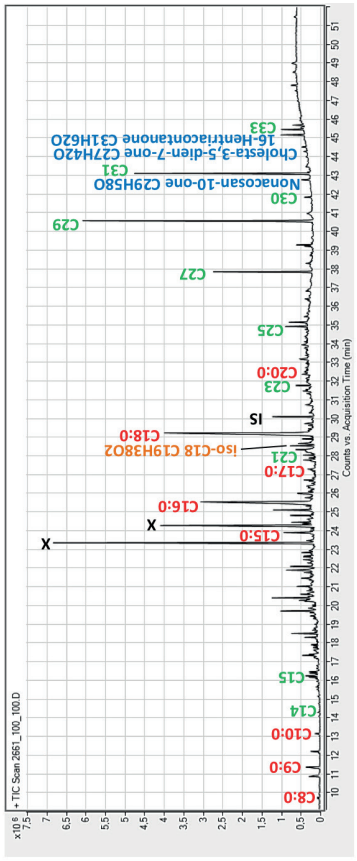
Sample no.	Description	Notable compounds identified by GC-MS	Results summary
259934:014:006	Sherd belonging to a small vessel recovered within a bigger vessel (Locus 235934:014) in Building L Room 35.	Saturated fatty acids, Iso-C_{18}, Odd numbered alkanes (C_{14}-C_{15}, C_{21}-C_{33}), Long chain ketones: nonacosane-10-one (C_{29}) and 16-Hentriacontanone (C_{31}), Cholesta-3,5-dien-7-one.	Possible animal fats mixed with plant remains and vegetal waxes.
235934:014:008	Sherd belonging to a small vessel recovered within a bigger vessel (Locus 235934:014) in Building L Room 35.	Saturated fatty acids, Iso-C_{18}, Odd numbered alkanes (C_{14}-C_{15}, C_{21}-C_{33}), Long chain ketones: nonacosane-10-one (C_{29}) and 16-Hentriacontanone (C_{31}), Cholesta-3,5-dien-7-one.	Possible animal fats mixed with plant remains and vegetal waxes.
234934:018:018	Sherd from carinated bowl (234934:018: 01) discovered in the filling of Room 42 of Building M (Locus 234934:018).	Odd numbered alkanes (C_{23}, C_{25}, C_{27}, C_{29}, C_{31}), only trace amounts of fatty acids.	Possible plant remains and vegetal waxes.
235934:003:011	Sherd discovered in the fill of a storage jar (Locus 234934:003) in Room 35	N/A	N/A
235934:003:012	Sherd of the wall of a storage jar (Locus 234934:003) in Room 35	Odd numbered alkanes (C_{21}, C_{23}, C_{25}, C_{27}, C_{29}, C_{31}), Long chain ketones: nonacosane-10-one (C_{29})	Possible plant remains and vegetal waxes. High contamination.

Table F3.1: Overview of the residue analysis results from the 2017 DLT2 samples.

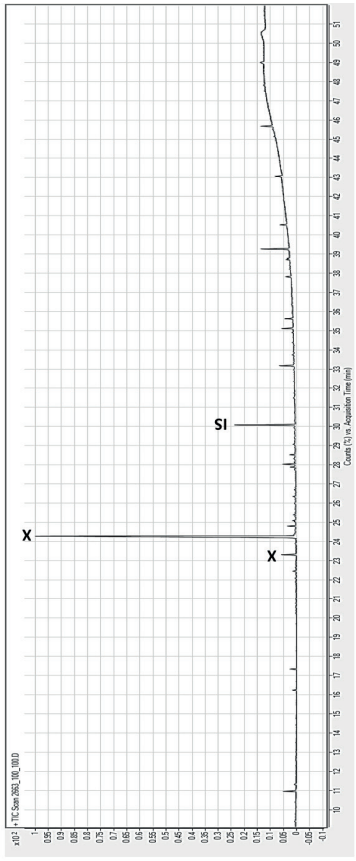
143 Page/LaCroix 1995.



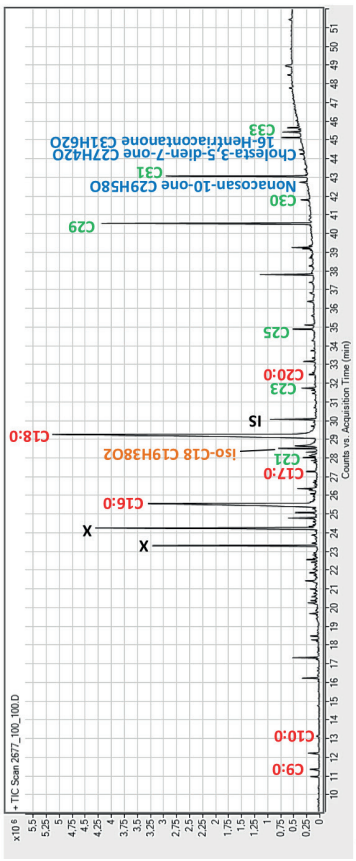
F3.4 : Partial total ion chromatogram of the inner surface of Sample 235934:014:006 – Black cross : plasticizers , IS denotes the internal standard.



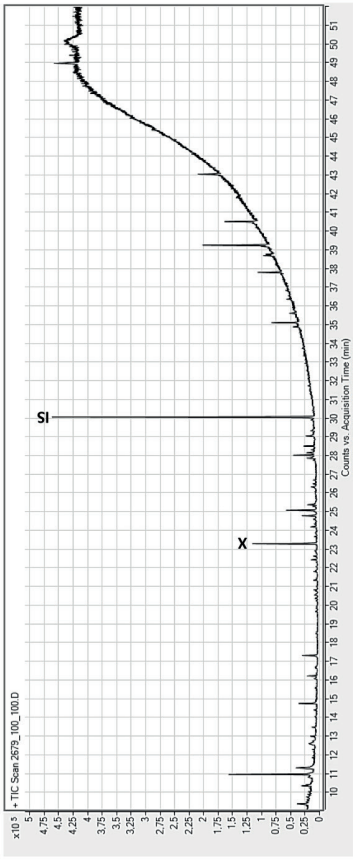
F3.6 : Partial total ion chromatogram of Sample 235934:014:008 – Red : Cx:y fatty acids, Green : Cx alkanes, Blue : ketones, Black cross : plasticizers , IS denotes the internal standard.



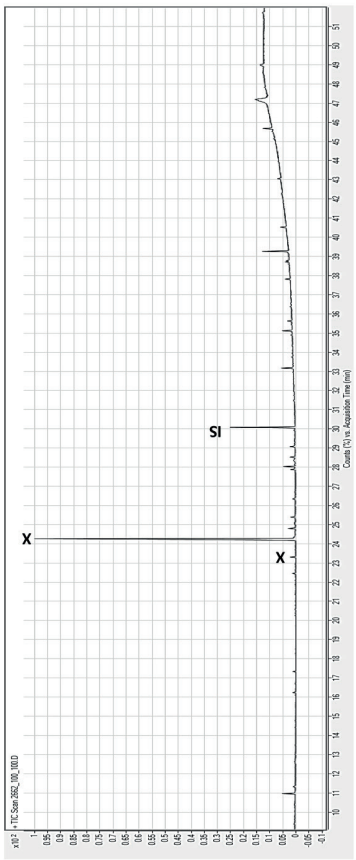
F3.8 : Partial total ion chromatogram of the inner surface of Sample 235934:014:008 – Black cross : plasticizers , IS denotes the internal standard.



F3.3 : Partial total ion chromatogram of Sample 235934:014:006 – Red : Cx:y fatty acids, Green : Cx alkanes, Blue : ketones, Black cross : plasticizers , IS denotes the internal standard.

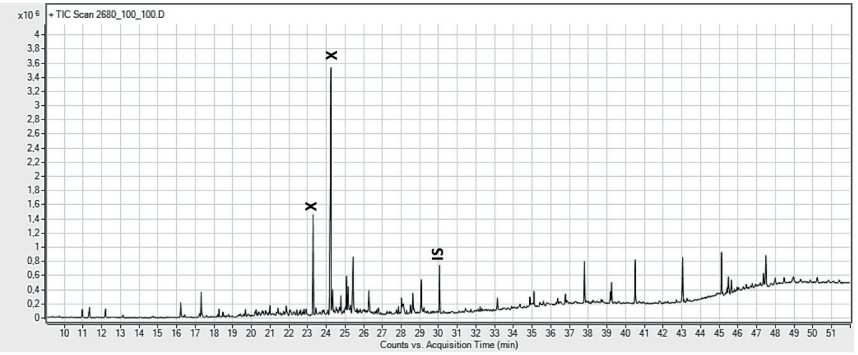


F3.5 : Partial total ion chromatogram of the inner surface of Sample 235934:014:006 – Black cross : plasticizers , IS denotes the internal standard.

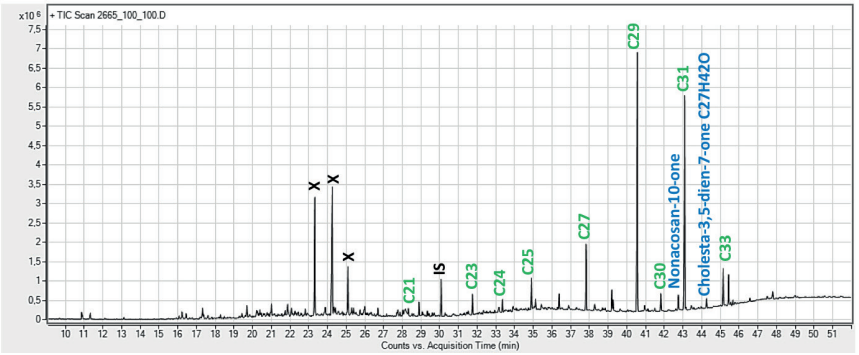


F3.7 : Partial total ion chromatogram of the inner surface of Sample 235934:014:008 – Black cross : plasticizers , IS denotes the internal standard.

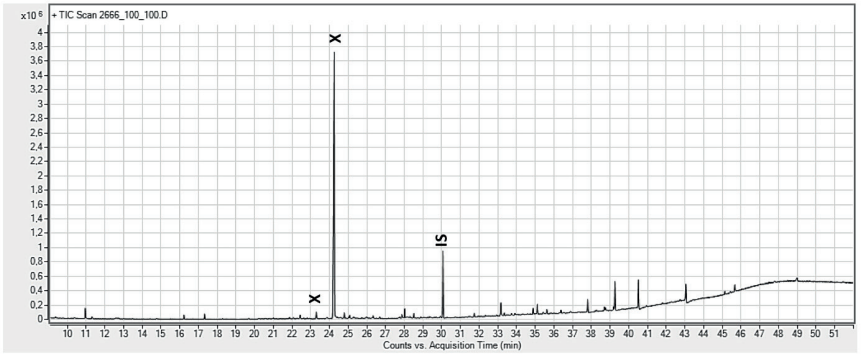
Figs. F3.3-F3.8: Chromatograms of samples 235934:014:006 and 235934:014:008.



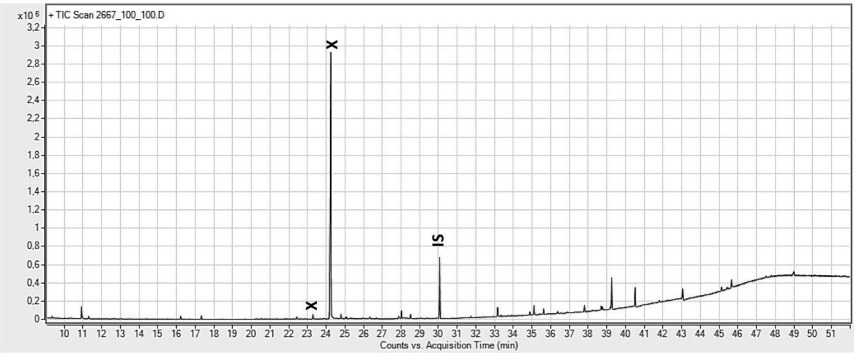
F3.9: Partial total ion chromatogram of Soil Sample 235934:014:006-S associated with sherd samples 235934:014:006 and 235934:014:008 - Black cross : plasticizers , IS denotes the internal standard.



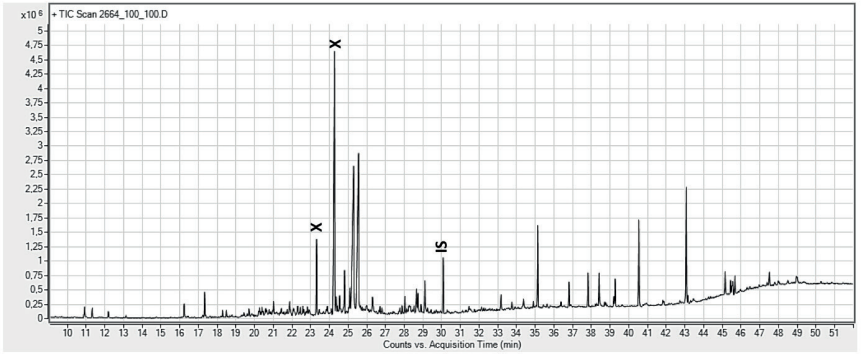
F3.10 : Partial total ion chromatogram of Sample 234934:018:018 – Green : Cx alkanes, Blue : ketones, Black cross : plasticizers , IS denotes the internal standard.



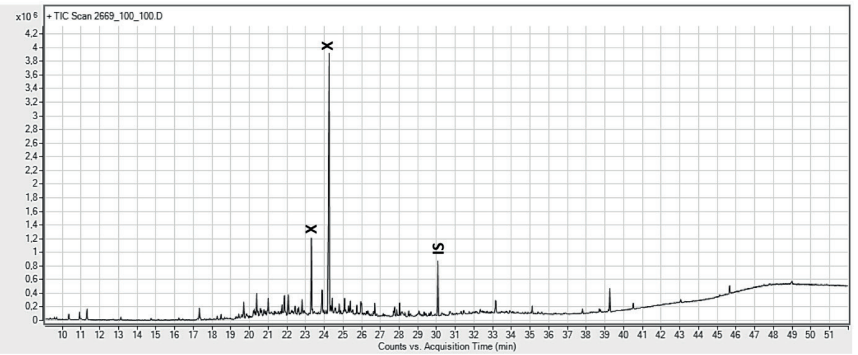
F3.11: Partial total ion chromatogram of inner surface of Sample 234934:018:018 –Black cross : plasticizers , IS denotes the internal standard.



F3.12: Partial total ion chromatogram of outer surface of Sample 234934:018:018 – Black cross : plasticizers , IS denotes the internal standard.

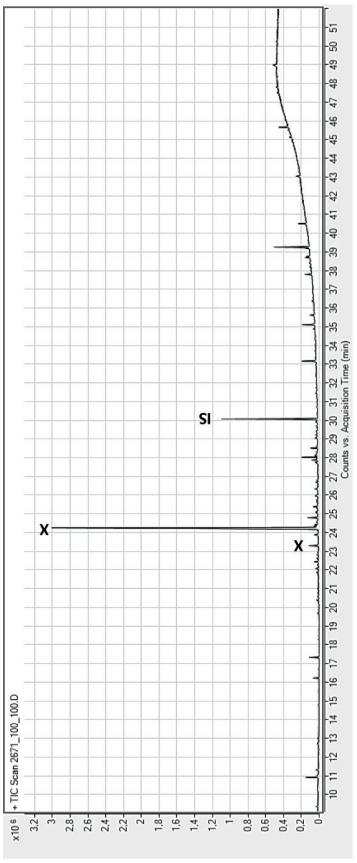


F3.13 : Partial total ion chromatogram of Soil Sample 234934:018:017 associated with sherd sample 234934:018:018 - Black cross : plasticizers , IS denotes the internal standard.

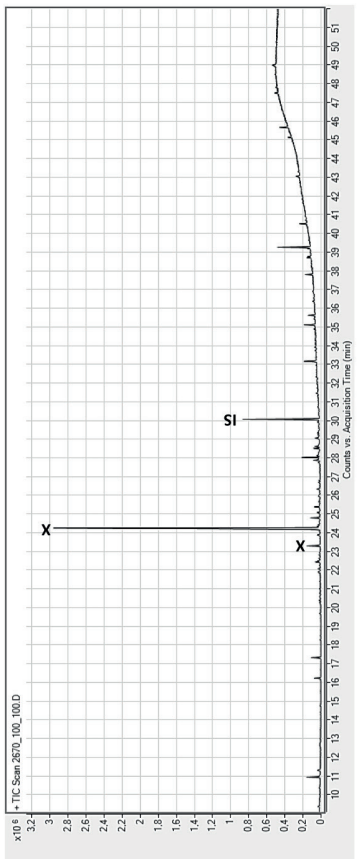


F3.14: Partial total ion chromatogram of Sample 235934:003:011 –Black cross : plasticizers , IS denotes the internal standard.

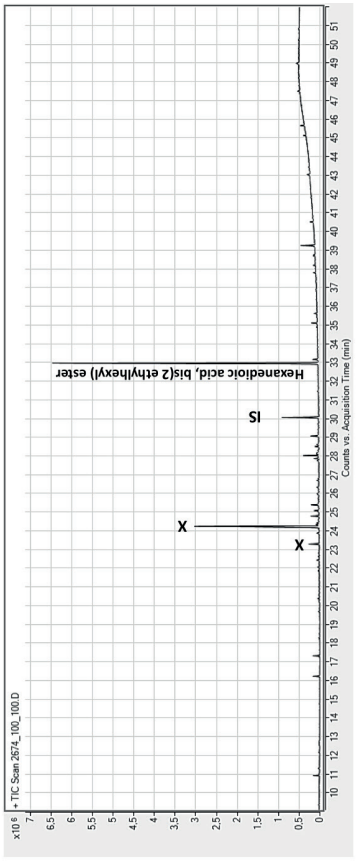
Figs. F3.9-F3.14: Chromatograms of samples 235934:014:006, 234934:018:018, 234934:018:017 and 235934:003:011.



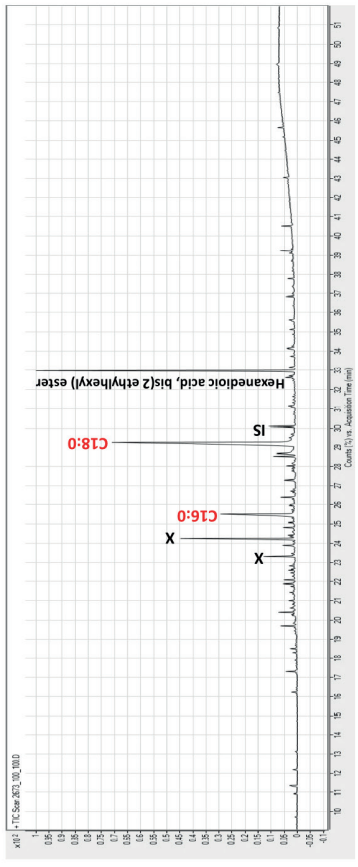
F3.16 : Partial total ion chromatogram of outer surface of Sample 235934:003:011 –Black cross : plasticizers , IS denotes the internal standard.



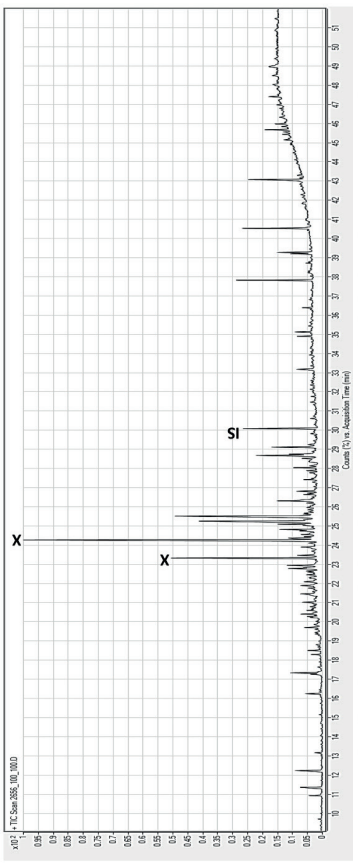
F3.15: Partial total ion chromatogram of inner surface of Sample 235934:003:011 –Black cross : plasticizers , IS denotes the internal standard.



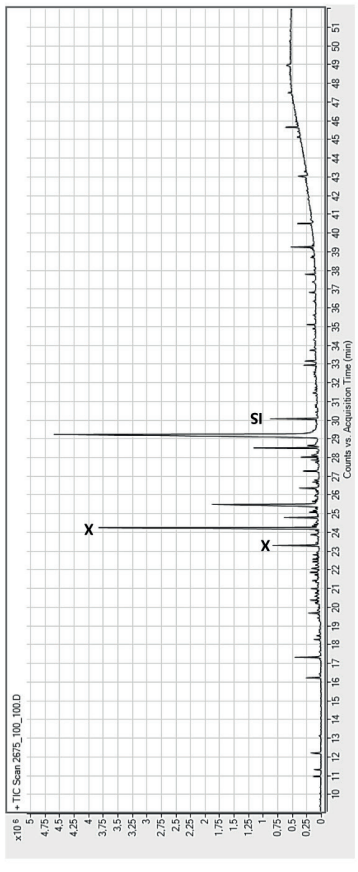
F3.18 : Partial total ion chromatogram of inner surface of Sample 235934:003:012 –Black cross : plasticizers , IS denotes the internal standard.



F3.17: Partial total ion chromatogram of Sample 235934:003:012 – Red : Cxy fatty acids, Black cross : plasticizers , IS denotes the internal standard.



F3.20 : Partial total ion chromatogram of Soil Sample 235934:003:010 associated with sherd samples 235934:003:011 and 235934:003:012 - Black cross : plasticizers , IS denotes the internal standard.



F3.19 : Partial total ion chromatogram of outer surface of Sample 235934:003:012 –Black cross : plasticizers , IS denotes the internal standard.

Figs. F3.15-F3-20: Chromatograms of samples 235934:003:010, 235934:003:011 and 235934:003:012.

G. The Iron Age small finds of the 2017 campaigns at DLT2 and Gird-i Bazar

Andrea Squitieri

G1. The Iron Age small finds from the Dinka Lower Town operation 2 (DLT2)

During the 2017 spring campaign in the Dinka Lower Town operation 2 (DLT2; **§C**), a total of 35 objects were found, of which 31 came from the levels of the main occupation period dating to the Iron Age. Among these, 17 were found on floors and 14 in room or pit fills. Additionally, three items came from the topsoil and one from the site surface. Concerning types and materials, the objects from the main occupation period comprise nine stone tools, nine metal items, three flint flakes and two glass shards. As has already been observed in Gird-i Bazar in the previous years, stone tools constitute the majority of the finds[144], followed by metal items. It is worth mentioning that several brick fragments were collected from the upper fills across DLT2, just below the topsoil (registered as PPP 235934:013:003, not listed in the catalogue accompanying this chapter): along with the two brick fragments discussed below (= no. 17), these fragments represent the remnants of the largely lost superstructures of the walls.

This chapter presents the descriptions of the 31 objects coming from the main occupation period, plus one object from the topsoil which likely originated in the Iron Age period. They are organised by architectural units from east to west, and, within each unit, by context type (with floors first, followed by fills).

G1.1 The small finds from Building K and Alley 45 (nos. 1-7)

Building K is located on the easternmost part of DLT2 and comprises two rooms, neither of which has been fully excavated. In Room 40, the floor was found covered by a high concentration of pottery sherds, whereas Room 39's floor has yielded a huge quantity of ash and burnt material. This is perhaps due to the presence of a possible oven or pyrotechnical installation in the southern part of this room, which has not yet been fully excavated because of its location, partially under the southern baulk. Only one small find came from Room 39, possibly a ceramic slag (= no. 1). Room 40 yielded three possible stone weights and two metal items (= nos. 2-6). Alley 45, bordering Building K on the west, yielded one pebble mortar (= no. 7).

Registration no.	Object	Context	Provenance	Cat. no.
236934:019:030	Ceramic slag	On the floor	Building K, Room 39	1
236934:027:017	Stone weight	On the floor	Building K, Room 40	2
236934:027:020	Copper-alloy or bronze earring	On the floor	Building K, Room 40	3
236934:027:021	Bronze or copper alloy earring	On the floor	Building K, Room 40	4
236934:020:003	Stone weight	Fill	Building K, Room 40	5
236934:020:004	Stone weight	Fill	Building K, Room 40	6
236934:015:006	Pebble mortar	Fill	Alley 45	7

(1) Registration number: PPP 236934:019:030
Material: ceramics
Dimensions: length: 7.2 cm; width: 5.1 cm; height: 2.5 cm
Weight: 80 g
Formless object, brownish in colour with reddish patches. Some breaks show a very dark grey fabric with small white inclusions. A break on one extremity shows a large void inside the object. It does not react to a magnet, so it may be a pottery slag. It was found on the floor of Room 39. The presence of a possible pyrotechnical installation in this room, not fully excavated because of its location under the southern baulk, may provide a context for the

144 For the stone tool typology and terminology used in this chapter, see Squitieri 2017a. Rock identifications are made by macroscopical observations only, as petrographic analysis has yet to be carried out.

existence of this slag. It is possibly connected to the large amount of burnt material (i.e., ash, large chunks of charcoal) found on the room's floor.

(2) Registration number: PPP 236934:027:017 (**Fig. G1**)
Material: limestone
Dimensions: length: 4.7 cm; width: 5.5 cm; height: 3.8 cm
Weight: 129 g
Ovoid object, with one flattish and smooth side. It is too small to be a polisher or pounder, as it would not comfortably fit into one's hand, so it may be a weight. The stone is whitish and fine-grained, possibly limestone. It was found on the floor of Room 40.

Fig. G1: Stone weight: PPP 236934:027:017. Photo by Andrea Squitieri.

(3) Registration number: PPP 236934:027:020
Material: bronze or copper alloy
Dimensions: 1.4 cm in diameter, width: 0.5 cm; thickness: 0.1 cm
Weight: 1 g
Small bronze or copper-alloy earring, with a flat and thin surface. Its surface showed much corrosion before the restoration[145]. It was found right on the floor of Room 40, amongst the many pottery sherds covering the floor.

(4) Registration number: PPP 236934:027:021 (**Fig. G2**)
Material: bronze or copper alloy
Dimensions: 1.50 cm in diameter; thickness: 0.5 cm
Weight: 3 g
Small earring with one thickened extremity. Found on the floor of Room 40.

Fig. G2: Earring: PPP 236934:027:021. Photo by Andrea Squitieri.

(5) Registration number: PPP 236934:020:003
Material: chalk (?)
Dimensions: length: 6.4 cm; width: 7 cm; height: 5.5 cm
Weight: 340 g
Ovoid pebble, with two slightly flattened opposite sides. No evident signs of pecking or other wear or manufacturing marks. The stone is whitish and powdery and can be scratched by a fingernail: it may be chalk. The item was possibly used as a weight. It was found in the fill of Room 40.

(6) Registration number: PPP 236934:020:004 (**Fig. G3**)
Material: limestone
Dimensions: length: 5 cm; width: 6 cm; height: 4.2 cm.
Weight: 182 g

Fig. G3: Stone weight: PPP 236934:020:004. Photo by Andrea Squitieri.

145 This and the other metal objects found during the 2017 DLT2 campaign were kindly restored by Carmen Gütschow in the Sulaymaniyah Archaeological Museum.

Small ovoid pebble with two slightly flattened opposite sides. Tiny pits on the surface are possibly due to pecking. The stone is light grey and fine-grained, likely limestone. Possibly it was used as a weight, as it would be too small to be comfortably used as a pounder. It was found in the fill of Room 40.

(7) Registration number: PPP 236934:015:006 (**Fig. G4**)
Material: limestone
Dimensions: length: 6.4 cm; width: 9 cm; height: 2.5 cm
Weight: 235 g
Disc-shaped worked stone, with pecking marks visible on the sides. The top surface features a very shallow cavity, 1.5 cm in diameter and 0.8 cm deep. Inside this cavity, several pecking marks are visible. The object was likely used as a pebble mortar, cut to shape by means of pecking. The stone is whitish and medium-grained, likely limestone. It was found in the fill of Alley 45.

Fig. G4: Pebble mortar: PPP 236934:015:006. Photo by Andrea Squitieri.

G1.2 The small finds from Building L and Alley 38 (nos. 8-19)

Building L extends into the southern portion of the DLT2 trench, and it is composed of Rooms 35, 36 and 37, all partially excavated. A characteristic of Room 35 is the presence of four large storage vessels sunk into the floor, of which one was found in a fairly good state of preservation (Locus:235934:037). The presence of such vessels seems to indicate that this room was used as a storage facility. A metal bead (= no. 8) comes from this room.

From Room 36, a metal ring and a small Egyptian blue bead were found on the floor (= nos. 9-10); a broken pestle and a broken quern were collected from the shallow pit excavated under the room's floor (= nos. 11-12); and a flint flake, a stone blade and a metal bead came from the room fill (= nos.13-15). From the upper fill of Building L, just below the topsoil, a flint (= no. 16) and fragments of two baked bricks were found (= no. 17).

Alley 38, west of Building L, yielded much pottery lying on its youngest floor. On this floor, a stone tool was also found (= no. 18). Below this floor, an accumulation of older floors was excavated down to the virgin soil. From this package of floors, a small perforated ceramic disc was found (= no. 19).

Registration no.	Object	Context	Provenance	Cat. no.
235934:018:008	Bronze or copper-alloy bead	On the floor	Building L, Room 35	8
235934:019:010	Bronze or copper-alloy ring	On the floor	Building L, Room 36	9
235934:019:015	Egyptian blue bead	On the floor	Building L, Room 36	10
235934:033:005	Pestle	Pit fill	Building L, Room 36	11
235934:033:006	Broken quern	Pit Fill	Building L, Room 36	12
235934:039:003	Flint	Fill	Building L, Room 36	13
235934:039:004	Broken blade in limestone?	Fill	Building L, Room 36	14
235934:041:004	Bronze or copper-alloy bead	Fill	Building L, Room 36	15
235934:015:006	Flint	Fill	Building L	16
235934:015:007	Two backed brick fragments	Fill	Building L	17
234934:020:016	Pebble mortar	On the floor	Alley 38	18
234934:028:008	Perforated ceramic disc	Accumulation of floors	Alley 38	19

(8) Registration number: PPP 235934:018:008
Material: bronze or copper-alloy
Dimensions: length: 0.6 cm; 0.6 cm in diameter
Weight: 1 g
Small barrel-shaped bead in bronze or copper-alloy. The perforation is visible although it is obstructed by dirt. Found on the floor of Room 35.

(9) Registration number: PPP 235934:019:010 (**Fig. G5**)
Material: bronze or copper-alloy
Dimensions: 2.5 cm in diameter; thickness: 0.5 cm
Weight: 2 g
Small open ring or earring in copper-alloy. Its surface was very corroded before restoration. It is 0.5 cm thick, with an opening 0.3 cm wide. It was found on the floor of Room 36.

Fig. G5: Ring or earring: PPP 235934:019:010. Photo by Andrea Squitieri.

(10) Registration number: PPP 235934:019:015 (**Fig. G6**)
Material: Egyptian blue
Dimensions: length: 0.6 cm; width: 0.6 cm; height: 0.3 cm
Weight: 1 g
Tiny cylindrical object, half broken, light blue in colour. It may be a bead, or a decorative element such an inlay. It was found on the floor of Room 36. The µ-XRD2 analysis carried out by Christoph Berthold (CCA-BW Tübingen) revealed that the material is Egyptian blue[146].

Fig. G6: Faience (?) bead or decorative element: PPP 235934:019:015. Photo by Andrea Squitieri.

(11) Registration number: PPP 235934:033:005 (**Fig. G7**)
Material: striated limestone
Dimensions: length: 8.5 cm; width: 4.9 cm
Weight: 321 g
Cylindrical object, broken at one extremity, with a rounded opposite extremity. The surface shows pecking marks likely due to the manufacturing process. The rounded extremity shows tiny pits that are perhaps the result of pounding or crushing other materials, hence the interpretation of this object as a pestle. The stone is sedimentary, showing striations of different dark and light colours. It is likely a variety of striated limestone which differs from the whitish limestone often used for stone tools in Gird-i Bazar (see below). It comes from the pit fill located under the floor of Room 36. It was likely discarded into the pit either after prolonged use or after it had broken.

Fig. G7: Pestle: PPP 235934:033:005. Photo by Andrea Squitieri.

(12) Registration number: PPP 235934:033:006 (**Fig. G8**)
Material: breccia or limestone-breccia
Dimensions: length: 12.5 cm; width: 15 cm; thickness: 8 cm
Weight: 2688 g
Half broken loaf-shaped quern, showing a very flat and smooth working surface with no clear striations or wear-marks. It has a slightly triangular section, with the bottom side slightly pointed. Overall, the object's shape is quite

Fig. G8: Broken quern: PPP 235934:033:006. Photo by Andrea Squitieri.

146 Detailed results will be published separately.

regular. The stone is a brownish sedimentary rock showing very large inclusions, likely breccia or limestone-breccia. It was found along with a pestle (no. 11) in the pit fill under the floor of Room 36. It was perhaps discarded into the pit after it had broken. Interestingly, the choice of the raw material sets this object apart from all the other stone tools so far found in both DLT2 and Gird-i Bazar. Perhaps the need for a harder rock than the common whitish limestone (hardness = 3-4 on Mohs scale) to create a long-lasting quern can explain the use of breccia (hardness = 7 on Mohs scale). It is also worth noting that no quern has been found in Gird-i Bazar so far, and despite this example coming from a pit, it may indicate that in the DLT2 area some food grinding activities took place, unlike in Gird-i Bazar[147].

(13) Registration number: PPP 235934:039:003
Material: flint
Dimensions: N/A
Weight: N/A
Small flint flake from the fill of Room 36.

(14) Registration number: PPP 235934:039:004
Material: limestone
Dimensions: length: 2.5 cm; width: 1.5 cm
Weight: 3 g
Flat fragment of a possible blade, with a sharp and dented edge. The material could be a whitish compact limestone. The object was found in the fill of Room 36.

(15) Registration number: PPP 235934:041:004
Material: bronze or copper-alloy
Dimensions: 0.5 cm in diameter
Weight: 1 g
Tiny spherical object in bronze or copper-alloy, much corroded. The perforation is not visible as it may be obstructed by the corrosion (not restored). The object was found in the fill of Room 36.

(16) Registration number: PPP 235934:015:006
Material: flint
Dimensions: length: 3.40 cm; width: 3.10 cm; thickness: 1 cm
Weight: 10 g
Flint flake coming from the upper fill of Building L, under the topsoil.

(17) Registration number: PPP 235934:015:007 (**Fig. G9**)
Material: baked clay
Dimensions: see description below
Weight: see description below
Two pieces of broken baked bricks. Neither shows the complete length and width, but their thickness is complete and measures 8 cm. One piece shows three regular striations on one side which may derive from finger impressions intended to help the mortar grip to the brick. One piece weighs 2.9 kg, and is 18.5 × 16 cm; the other weights 3 kg, and its dimensions are 22 × 14 cm. They both come from the upper fill of Building L, under the topsoil. These bricks are the only evidence so far available from DLT2 for the original superstructure of the walls.

Fig. G9: Baked bricks: PPP 235934:015:007. Photo by Andrea Squitieri.

(18) Registration number: PPP 234934:020:016 (**Fig. G10**)
Material: limestone
Dimensions: 9.6 cm in diameter
Weight: 259 g
Disc-shaped pebble mortar, half broken, with two opposite depressions of 4 cm in diameter each and 0.8 cm deep. Tiny pecking marks are visible inside the depres-

Fig. G10: Pebble mortar: PPP 234934:020:016. Photo by Andrea Squitieri.

147 Squitieri 2017a, 165.

sions. Small pecking marks are also visible on the body. The stone is white and medium-grained, likely limestone.

(19) Registration number: PPP 234934:028:008
Material: ceramics
Dimensions: 1.6 cm in diameter; thickness: 0.4 cm
Weight: 15 g
Small ceramic disc featuring a slightly off-centre perforated hole with a diameter of 0.4 cm. The hole has a biconic section indicating that it was perforated from both sides, and not drilled through. The colour is reddish. The object was possibly used as a simple pendant. It was found in the accumulation of floors in Alley 38 (Locus:234934:028), under the youngest floor.

G1.3 The small finds from Building M (nos. 20-31)

Building M is situated on the westernmost part of the DLT2 trench. It consists of Rooms 42 and 43, both partially excavated. This building has yielded the highest number of objects in DLT2.

Room 42 was characterised by abundant pottery on the floor. Two stone tools were found on the floor (= nos. 20-21), as well as four metal items, two of iron (= nos. 22-23) and two of bronze or copper-alloy (= nos. 24-25), and finally, a ceramic object (= no. 26). A stone vessel rim (= no. 27) was collected from the fill of this room.

Room 43 is characterised by a fair amount of pottery on its floor and a stone installation located in the south-east corner, on which pottery was found (Locus:234934:034). This room has yielded an iron fragment (= no. 28) on its floor and a glass shard from its fill (= no. 29).

Fig. G11: Stone weight: PPP 234934:024:014. Photo by Andrea Squitieri.

In Addition, a glass vessel rim and a flint flake (= nos. 30-31) were collected from the upper fill of Building M, just below the topsoil.

Registration no.	Object	Context	Provenance	Cat. no.
234934:024:036	Pebble mortar	On the floor	Building M, Room 42	20
234934:024:014	Stone weight	On the floor	Building M, Room 42	21
234934:024:003	Iron blade	On the floor	Building M, Room 42	22
234934:024:019	Iron fragment	On the floor	Building M, Room 42	23
234934:024:009	Bronze or copper-alloy fragment	On the floor	Building M, Room 42	24
234934:024:041	Bronze or copper-alloy pin or needle	On the floor	Building M, Room 42	25
234934:024:037	Yo-yo shaped ceramic object	On the floor	Building M, Room 42	26
234934:018:009	Stone vessel rim	Fill	Building M, Room 42	27
234934:033:003	Iron fragment	On the floor	Building M, Room 43	28
234934:013:010	Glass shard	Fill	Building M, Room 43	29
234934:008:008	Flint	Fill	Building M	30
234934:008:004	Glass vessel rim	Fill	Building M	31

(20) Registration number: PPP 234934:024:036
Material: limestone
Dimensions: 12.5 cm in diameter
Weight: 865 g
Circular pebble mortar, showing two opposite small circular depressions in an otherwise unmodified pebble. The depressions' diameters are 4.5 cm, and they are 2.5 cm deep. They both show tiny pecking marks inside. One depression also shows a circular striation in the bottom part, perhaps due to rotary motion. The stone is light grey in colour and fine to medium-grained, likely limestone. Found on the floor of Room 42.

(21) Registration number: PPP 234934:024:014 (**Fig. G11**)
Material: granite (?)
Dimensions: 3.9 cm in diameter
Weight: 95 g
Sub-spherical object, showing two small flattish surfaces and one rounded side. No clear pecking marks are visible on its surface. It is too small to be a polisher or a pounder, hence it is most likely a weight. The stone is me-

dium-grained with a whitish matrix and dark inclusions, possibly granite. Found on the floor of Room 42.

(22) Registration number: PPP 234934:024:003 (**Fig. G12**)
Material: iron
Dimensions: Length: 7.9 cm; width: 2.6 cm; thickness: 0.2 cm
Weight: 13 g
Flat and thin object with a crescent-like shape, showing two opposite sharp edges, one thinner than the other. Broken in two fragments, not complete. Made of iron, highly corroded. Based on shape and material, this is likely a knife blade. Found on the floor of Room 42.

Fig. G12: Iron blade: PPP 234934:024:003. Photo by Andrea Squitieri.

(23) Registration number: PPP 234934:024:019
Material: iron
Dimensions: length: 2 cm; thickness: 0.5 cm
Weight: N/A
Iron fragment with an elongated and irregular shape, heavily corroded. Original shape and function cannot be determined; possibly a pin. Found on the floor of Room 42.

(24) Registration number: PPP 234934:024:009
Material: bronze or copper-alloy
Dimensions: 0.4 cm in diameter
Weight: 1 g
Tiny fragment of bronze or copper-alloy, with an irregular spherical shape. Original shape and function cannot be determined. Found on the floor of Room 42.

(25) Registration number: PPP 234934:024:041
Material: bronze or copper-alloy
Dimensions: length: 3.1 cm; 0.4 cm in diameter
Weight: 1 g
Bronze or copper-alloy needle with a pointed extremity. The opposite extremity seems to be broken off. Found on the floor of Room 42.

(26) Registration number: PPP 234934:024:037 (**Fig. G13**)
Material: ceramics
Dimensions: 4.5 cm in diameter; Thickness 1.8 cm
Weight: 25 g
Pair of joined discs with a deep groove in between them, giving the object a "Yo-yo" shape. The groove has a "V" section. The discs have wavy edges, perhaps due to the manufacturing process. The object may have been a toy used as a spinner, or a tool used to wrap a yarn. Found on the floor of Room 42.

Fig. G13: Ceramic "Yo-yo" shaped object: PPP 234934:024:037. Photo by Andrea Squitieri.

(27) Registration number: PPP 234934:018:009 (**Fig. G14**)
Material: basalt
Dimensions: length: 10 cm; width: 4.5 cm
Weight: 264 g
Stone object with a slightly cylindrical shape and two broken extremities. It is worked on opposite sides. It could be the rim of a stone vessel. The stone is dark fine-grained and igneous, possibly basalt. It comes from the fill of Room 42.

(28) Registration number: PPP 234934:033:003
Material: iron
Dimensions: length: 2 cm; width: 1 cm
Weight: 3 g
Iron fragment whose original shape and function cannot be determined. Found on the floor of Room 43 in a very corroded state of preservation.

Fig. G14: Stone vessel rim: PPP 234934:018:009. Photo by Andrea Squitieri.

(29) Registration number: PPP 234934:013:010
Material: glass
Dimensions: length: 0.4 cm; width: 0.2 cm; thickness: 0.1 cm
Weight: 1 g
Tiny glass shard, light-blue and translucent. The fragment is too small to determine if it was originally part of a vessel or another type of object. Found in the fill of Room 43.

(30) Registration number: PPP 234934:008:008
Material: flint
Dimensions: length: 3 cm; width: 2.5 cm; thickness: 0.6 cm
Weight: 8 g
Flint flake from the upper fill of Building M.

Fig. G15: Perforated stone: PPP 234934:002:002. Photo by Andrea Squitieri.

(31) Registration number: PPP 234934:008:004
Material: glass
Dimensions: 5.0 cm in diameter
Weight: 5 g
Small glass rim, light blue and translucent, showing some tiny bubbles inside. Found in the upper fill of Building M.

G1.4 The small finds from the topsoil (no. 32)

As mentioned above, among the objects from the topsoil and the site surface, only one is very likely of an Iron Age date. This is a stone tool whose comparisons can be found in the Iron Age levels of Gird-i Bazar. The other objects found in the topsoil (two tiny glass shards and one metal pin) are not included in this catalogue as their dating to antiquity is highly doubtful.

Registration no.	Object	Context	Provenance	Cat. no.
234934:002:002	Perforated stone	Topsoil	Topsoil	32

(32) Registration number: PPP 234934:002:002 (**Fig. G15**)
Material: sandstone
Dimensions: 11 cm in diameter
Weight: 350 g
Half preserved perforated stone, circular in plan view showing pointed sides. The diameter of the hole measures 6 cm, and shows no signs of drilling. The stone is medium-fine grained and grey-brown in colour, likely sandstone. Similar perforated stones have not been found in DLT2, but are common in the Gird-i Bazar Iron Age levels[148]. However, these objects are usually made of compact limestone and this is the first time that we have encountered one made of sandstone. The function of these perforated stones is not clear[149], although it is likely that they were used as weights. On this tool, no wear marks are visible that could help determine its function.

148 Squitieri 2017a.
149 Squitieri 2017a, 157.

G1.5 Preliminary conclusions on the small finds from DLT2

Overall, the excavations at DLT2 yielded mostly utilitarian items suitable for everyday production activities, as in the case of stone tools (pebble mortars, pestle, quern, weights) and some metal tools (needle, iron blade). Interestingly, at least two stone tools (= nos. 12 and 32) are made of stones which are not attested in Gird-i Bazar; and one of these one is a quern (half broken), a tool type that does not have parallels in Gird-i Bazar. Despite the presence of two metal beads, two metal earrings and an Egyptian blue bead, which were likely used for personal decoration, the utilitarian aspect of most of the DLT2 objects and the raw materials used for most its stone tools surely parallel the inventory encountered at Gird-i Bazar. However, the differences in the object repertoires hint at a broader range of activities occurring at DLT2 than those attested at Gird-i Bazar, although it is still difficult, based on the current evidence, to identify such activities with certainty.

The intensity of the everyday activities in DLT2 also appears to be higher than in Gird-i Bazar (assuming that the latter was not more thoroughly emptied of objects upon abandonment, which is possible). For comparative reasons, we calculate the object density found on the floors of DLT2 and in the western area of Gird-i Bazar; this is the area richest in objects, with Buildings D, E, F, G, H, I, N, O and P. In the area of 69 m² excavated so far, DLT2 yielded 17 items on its floors. The western area of Gird-i Bazar is a much larger with 602 m², and a total 48 objects were collected from its floors. Simply dividing the number of items by the amount of square metres exposed results in an object density of 0.24 for DLT2 and only 0.07 for Gird-i Bazar. Despite a far larger area having being excavated at Gird-i Bazar, it has yielded about three times fewer items than the much smaller area of DLT2.

As long as none of the rooms of DLT2 have been completely excavated, this type of comparison can only give a rough impression. But coupled with our observations on the object types, it seems plausible that we can provisionally assume a higher intensity as well as a broader range of activities to have been performed in the DLT2 buildings than in the Gird-i Bazar buildings.

Registration no.	Object	Context	Provenance	Cat. no.
236934:019:030	Ceramic slag	On the floor	Building K, Room 39	1
236934:027:017	Stone weight	On the floor	Building K, Room 40	2
236934:027:020	Copper-alloy or bronze earring	On the floor	Building K, Room 40	3
236934:027:021	Bronze or copper alloy earring	On the floor	Building K, Room 40	4
236934:020:003	Stone weight	Fill	Building K, Room 40	5
236934:020:004	Stone weight	Fill	Building K, Room 40	6
236934:015:006	Pebble mortar	Fill	Alley 45	7
235934:018:008	Bronze or copper-alloy bead	On the floor	Building L, Room 35	8
235934:019:010	Bronze or copper-alloy ring	On the floor	Building L, Room 36	9
235934:019:015	Egyptian blue bead	On the floor	Building L, Room 36	10
235934:033:005	Pestle	Pit fill	Building L, Room 36	11
235934:033:006	Broken quern	Pit Fill	Building L, Room 36	12
235934:039:003	Flint	Fill	Building L, Room 36	13
235934:039:004	Broken blade in limestone?	Fill	Building L, Room 36	14
235934:041:004	Bronze or copper-alloy bead	Fill	Building L, Room 36	15
235934:015:006	Flint	Fill	Building L	16
235934:015:007	Two backed bricks	Fill	Building L	17
234934:020:016	Pebble mortar	On the floor	Alley 38	18
234934:028:008	Perforated ceramic disc	Accumulation of floors	Alley 38	19
234934:024:036	Pebble mortar	On the floor	Building M, Room 42	20
234934:024:014	Stone weight	On the floor	Building M, Room 42	21
234934:024:003	Iron blade	On the floor	Building M, Room 42	22
234934:024:019	Iron fragment	On the floor	Building M, Room 42	23
234934:024:009	Bronze or copper-alloy fragment	On the floor	Building M, Room 42	24
234934:024:041	Bronze or copper-alloy pin or needle	On the floor	Building M, Room 42	25

Registration no.	Object	Context	Provenance	Cat. no.
234934:024:037	Yo-yo shaped ceramic object	On the floor	Building M, Room 42	26
234934:018:009	Stone vessel rim	Fill	Building M, Room 42	27
234934:033:003	Iron fragment	On the floor	Building M, Room 43	28
234934:013:010	Glass shard	Fill	Building M, Room 43	29
234934:008:008	Flint	Fill	Building M	30
234934:008:004	Glass vessel rim	Fill	Building M	31
234934:002:002	Perforated stone/ weight	Topsoil	Topsoil	32

Table G1: Summary table of the Iron Age small finds from DLT2.

G2. The Iron Age small finds from Gird-i Bazar, 2017

During the 2017 campaign at Gird-i Bazar, 55 small finds were collected. This number does not include the objects coming from the Sasanian-period graves, which are discussed in **Chapter H**. Thirty out of the 55 objects came from the main occupation period levels dating to the Iron Age, of which 21 were found lying on floors, whereas nine were from fills (i.e., room, pit and installation fills). Three items were found on the Sasanian-period floor; five finds came from the modern occupation levels (of which two probably date to the Iron Age); and finally, 17 objects came from the topsoil: of these, 14 possibly date to the Iron Age.

Overall, the majority of objects are stone items (40 out of 55), following the same trend already observed in previous years at Gird-i Bazar. Metal items number twelve in total, of which five are surely modern (and therefore not presented here), and five are metal slags. In addition, one cowrie shell, perhaps used as a pendant, was found on an Iron Age floor, and one glass shard came from the Sasanian floor.

This report will focus on the thirty objects coming from the Iron Age levels and on the three objects from the Sasanian floor, as well as on the 16 items coming from the modern occupation level and the topsoil which have a possible Iron Age origin. The items will be presented in sequence according to architectural unit (from east to west) and context type (from floors to the upper fills and topsoil).

G2.1 The small finds from Outdoor Areas 7 and 8 (nos. 33-35)

The excavated part of Outdoor Area 7 extends for about 100 m² north of Building B and Courtyard 2. It is characterised by the presence of a large and deep well, excavated for about 7 m in depth. This well was partially reused in modern times, as evidenced by the mix of modern and ancient material coming from its upper fill. Apart from this well, few other remains in this area can be assigned to the Iron Age, as the Sasanian graves and the modern installations heavily disturbed this area and likely obliterated most of its Iron Age structures. Only one stone tool (= no. 33) was found in the fill below the topsoil covering Outdoor Area 7.

More to the west, Outdoor Area 8 was excavated between Building C and Building D. This area has yielded two pottery kilns and two pyrotechnical installations (see **Chapter D**). A possible iron slag (= no. 34) and a stone polisher (= no. 35) are the only items collected from this area, although without a clear relation to any of these installations.

Registration no.	Object type	Context type	Provenance	Cat. no.
271929:039:003	Perforated stone	Fill	Outdoor area 7	33
268930:070:004	Iron slag	On the floor	Outdoor Area 8	34
269930:053:002	Stone polisher/ pounder	Fill	Outdoor Area 8	35

(33) Registration number: PPP 271929:039:003 (**Fig. G16**)
Material: limestone
Dimensions: 12.3 cm in diameter
Weight: 450 g

Fig. G16: Perforated stone: PPP 271929:039:003. Photo by Andrea Squitieri.

Circular perforated stone, half broken. The hole has a biconic section with some marks visible that may come from the manufacturing process. No drilling marks are visible. On the outside, pecking marks are visible on the edges possibly due to the manufacture. The stone is greyish and fine grained, with some white veins, likely limestone. It was found in one of the upper fills of the deep well located in Outdoor Area 7.

(34) Registration number: PPP 268930:070:004 (**Fig. G17**)
Material: metal slag
Dimensions: max. length: 5.5 cm; max width: 4 cm; max. thickness: 2.5 cm
Weight: N/A
Metal slag, possibly iron. It was found on the pavement floor located just outside Building D, Room 9. Not far from this find, we excavated a pyrotechnical installation (Locus:268930:077), heavily damaged by a Sasanian grave (G57) and a modern pit.

Fig. G17: Metal slag: PPP 268930:070:004. Photo by Andrea Squitieri.

(35) Registration number: PPP 269930:053:002
Material: granite or diorite
Dimensions: length: 7 cm; width: 8.5 cm
Weight: 654 g
Polisher with three flat faces and one broken side which may originally have been flat. The flat faces are very smooth through use. On the non-flat edges of the objects, some tiny pecking and battering marks are visible, perhaps due to the use of this tool as a pounder at some point during its life cycle. Multi-use stone tools are very common in the archaeological record and have also been previously attested in Gird-i Bazar[150].

The stone is a greenish stone, white speckled and medium-grained, perhaps granite or diorite. It comes from the fill below the topsoil located in the western part of Outdoor Area 8, between Rooms 9 and 10 of Building D.

G2.2 The small finds from Building D (nos. 36-37)

Building D extends on the west of Outdoor Area 8 and consists of several rooms around a courtyard. Excavation started in 2016 and was completed in 2017. In 2016, this building yielded nine stone tools[151], to which two more excavated in 2017 can be added.

Registration no.	Object	Context	Provenance	Cat. no.
269931:031:004	Pebble mortar	Fill	Building D, Room 33	36
269931:031:006	Pebble mortar	Fill	Building D, Room 33	37

(36) Registration number: PPP 269931:031:004
Material: serpentinite
Dimensions: 14 cm in diameter
Weight: 663 g
Half broken pebble mortar consisting of a shallow depression (ca. 2 cm deep) carved into a unworked pebble. Some pecking marks are visible in the depression. Usually these tools have two opposite depressions[152], but this one has only one. The stone is grey and fine-grained, with some whitish irregular veins, possible a form of serpentinite. It was found in the post-occupation upper fill of Room 33.

(37) Registration number: PPP 269931:031:006 (**Fig. G18**)
Material: limestone
Dimensions: 11 cm in diameter; thickness: 6 cm
Weight: 1285 g
Disc-shaped pebble mortar showing two opposite shallow depressions (ca. 2 cm deep each) in a slightly worked pebble. Some pecking marks are visible on the sides and may derive from the manufacture. Inside the depressions pecking marks are also visible perhaps due to crushing of a small material (e.g., minerals). A thick brown patina covers the stone. Only in some spots, the original surface is visible: it is white limestone with white large crystals

150 Squitieri 2017a.
151 Squitieri 2017a.
152 Squitieri 2017a.

of calcite. The object was found in the post-occupation upper fill of Room 33.

Fig. G18: Pebble mortar: PPP 269931:031:006. Photo by Andrea Squitieri.

G2.3 The small finds from Alleys 12 and 13 (nos. 38-39)

Alleys 12 and 13 are two long alleys, each with a length of about 20 m, crossing the western sector of Gird-i Bazar and meeting perpendicularly, thus dividing Buildings G and F (north), E and D (east), G and I (west), O and N (south) from each other. Both alleys had already been partially excavated in 2016, when only very few objects were collected from there. The same trend continued in 2017, with only one item found in each alley.

Registration no.	Object	Context	Provenance	Cat. no.
268930:085:038	Stone polisher/ pounder	On the floor	Alley 12	38
267931:058:004	Metal slag	Fill	Alley 13	39

(38) Registration number: PPP 268930:085:038
Material: serpentinite
Dimensions: length: 7 cm; width: 6 cm; height: 5.5 cm
Weight: 405 g
Cuboid polisher with five flat faces and one corrugated one. The flat faces are very smooth and shiny, indicating that this tool was used as a polisher, whereas the pecking marks on the corrugated face may indicate that it also served as a pounder. The stone is greyish and fine-grained with some irregular white veins, possibly serpentinite. It was found on the floor of the southern portion of Alley 12.

(39) Registration number: PPP 267931:058:004 (**Fig. G19**)
Material: metal slag
Dimensions: length: 5 cm; width: 4 cm; thickness: 2 cm
Weight: N/A
Possible metal slag from the upper fill of Alley 13, in its western portion. No nearby installation has been identified from which this slag may have originated.

Fig. G19: Metal slag: PPP 267931:058:004. Photo by Andrea Squitieri.

G2.4 The small finds from Building I (nos. 40-60)

Building I is located in the westernmost part of Gird-i Bazar, between Alley 13 in the north and Outdoor Area 53 in the south, and is composed of Room 46, Courtyard 18, the open Room 49, where a well was excavated, and Room 48, where two ovens were found. With 21 objects collected, Building I features the highest concentration of items found during the 2017 campaign, amounting to about 40% of that campaign's total small finds. Even when considering all of the finds collected during the 2015 and 2016 campaigns in all of Gird-i Bazar, Building I still maintains its primacy. Within the building, half of the objects were found in Courtyard 18 (eleven out of 21). Stone tools, in particular polishers and pounders, figure as the most common objects from this building. The most prominent object found here is the pivoted stoned of a potter's wheel from Room 46 (= no. 53). The presence of this pivoted stone and the high number of stone tools and pottery on the floor indicate the existence of a pottery workshop in this building (see **Chapter D**).

Registration no.	Object	Context	Provenance	Cat. no.
266930:010:001	Stone pounder	On the floor	Building I, Room 18	40
267930:038:001	Stone polisher/ pounder	On the floor	Building I, Room 18	41
267930:038:040	Stone pounder	On the floor	Building I, Room 18	42
267930:038:041	Stone polisher/ pounder	On the floor	Building I, Room 18	43
267930:038:042	Stone polisher/ pounder	On the floor	Building I, Room 18	44
267931:022:002	Stone weight	On the floor	Building I, Room 18	45
267931:085:014	Whetstone	On the floor	Building I, Room 18	46
267931:085:040	Stone polisher	On the floor	Building I, Room 18	47
267931:097:004	Stone weight	On the floor within the installation limits	Building I, Room 18	48
267930:020:001	Stone polisher	Installation fill	Building I, Room 18	49
267930:020:003	Stone pounder	Installation fill	Building I, Room 18	50
266931:011:007	Large stone square bowl	On the floor	Building I, Room 46	51
266931:011:008	Stone bowl rim	On the floor	Building I, Room 46	52
267931:064:031	Upper potter's wheel-bearing	On the floor	Building I, Room 46	53
267931:064:037	Cowrie shell	On the floor	Building I, Room 46	54
267931:066:009	Metal earring	On the floor	Building I, Room 46	55
267931:064:040	Metal slag	On the floor	Building I, Room 46	56
266931:010:002	Stone pounder	Fill	Building I, Room 46	57
267931:056:004	Iron pin	Fill	Building I, Room 46	58
267930:036:022	Stone polisher	On the floor	Building I, Room 48	59
267930:026:047	Stone polisher/ pounder	On the floor	Building I, Room 49	60

(40) Registration number: PPP 266930:010:001
Material: limestone
Dimensions: length: 8.5 cm; width: 7 cm
Weight: 534 g
Worked pebble of spheroid shape with two slightly flattened opposite sides. Signs of pecking are visible all around, although a thick patina covers most of the object. The stone is fine-grained, greyish, perhaps limestone. Its pecking marks suggest that it was likely used as a pounder. It was found on the pebble floor of Courtyard 18.

(41) Registration number: PPP 267930:038:001 (**Fig. G20**)
Material: serpentinite (?)
Dimensions: length: 8 cm; width: 6 cm
Weight: 608 g
Spheroid tool, slightly flattened on two opposite sides. Most of its surface is very smooth and polished, which may indicate that it was used as a polisher. However, pecking marks are visible on one side, right next to a part that was chopped off or is heavily worn off. This may indicate that the tool was also used (or re-used) as a pounder. The stone is light bluish in colour, fine-grained with some larger white and dark inclusions. Possibly serpentinite. It was found on the pebble floor of Courtyard 18.

(42) Registration number: PPP 267930:038:040
Material: limestone (?)
Dimensions: length: 6.50 cm; width: 7.50
Weight: 470 g
Spheroid tool showing signs of both light and heavy pecking. One face even has some small parts chopped off as if the tool had been used against a very hard surface for long time. All the other faces also look corrugated. It could be a pounder, although no pounder so far found at Gird-i Bazar has such a corrugated surface. The stone is dark grey and fine-grained, perhaps limestone. It was found on the pebble floor of Courtyard 18.

(43) Registration number: PPP 267930:038:041
Material: serpentinite
Dimensions: length: 8 cm; width: 6.5 cm
Weight: 490 g
Slightly ovoid tool showing a flat and smooth face, which may have been used to polish other surfaces and objects. The other faces are not flat and on one of them some pecking marks are visible. This can indicate that the tool was also used as a pounder. The stone is light bluish, fine-grained, possibly serpentinite. It was found on the pebble floor of Courtyard 18.

(44) Registration number: PPP 267930:038:042 (**Fig. G21**)
Material: granite
Dimensions: length: 8.50 cm; width: 9.50 cm; height: 9.0 cm
Weight: 703 g
Slightly domed-shaped tool with a flattish and smooth bottom face likely used to polish other surfaces. The upper, "domed" part shows some pecking marks, possibly because the tool was also used as a pounder. The shape of the tool seems to have been modified by use. However,

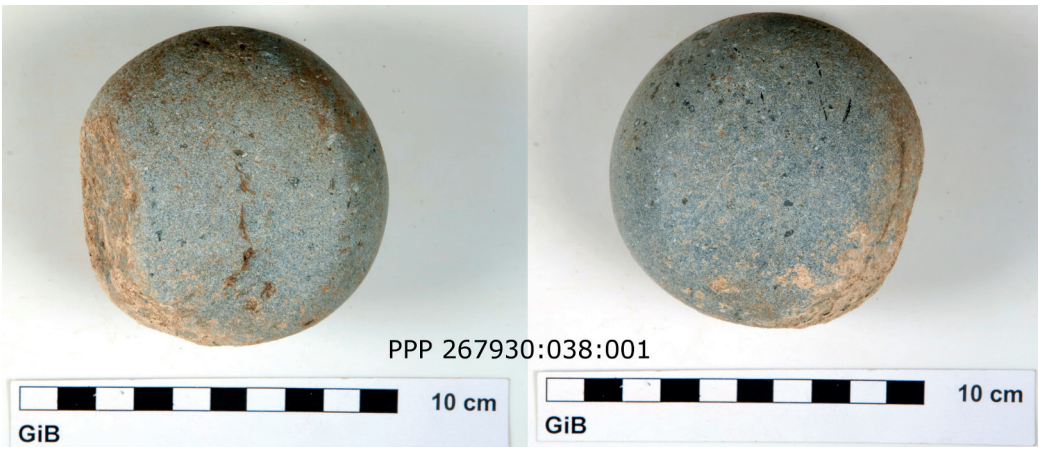


Fig. G20: Pounder: PPP 267930:038:001. Photo by Andrea Squitieri.

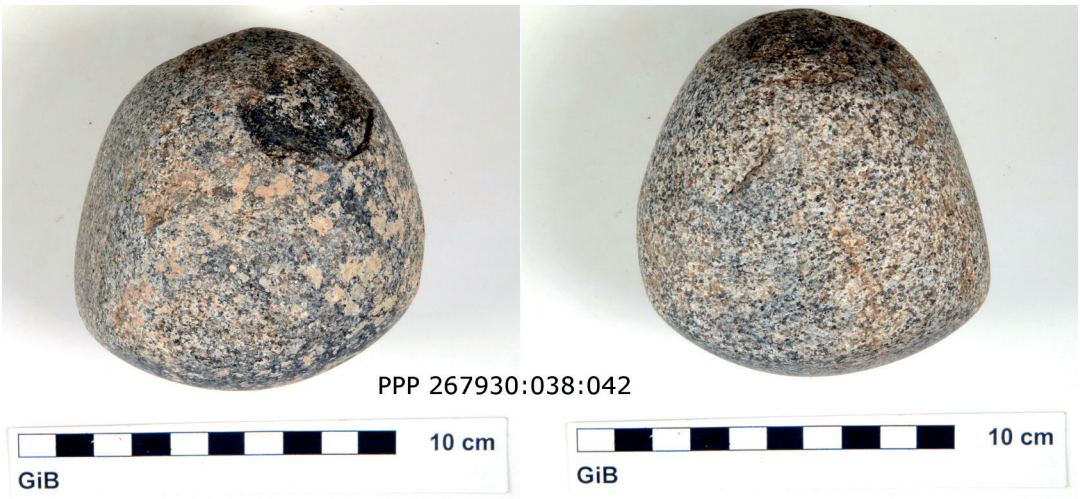


Fig. G21: Polisher: PPP 267930:038:042. Photo by Andrea Squitieri.

the other faces do not seem to have been used and perhaps are simply unworked. The stone is speckled, medium-grained, with a white matrix and dark minerals visible, possibly granite. It comes from above the floor of Courtyard 18.

(45) Registration number: PPP 267931:022:002 (**Fig. G22**)
Material: limestone
Dimensions: length: 6.5 cm; width: 5.5 cm
Weight: 270 g
Spheroid tool, with no signs of pecking marks on its surface. It is too small to fit comfortably into the palm of a hand in order to be used as a pounder, so it is more likely a weight. The stone is whitish and fine-grained, possibly limestone. It comes from above the floor of Courtyard 18.

Fig. G22: Stone weight: PPP 267931:022:002. Photo by Andrea Squitieri.

(46) Registration number: PPP 267931:085:014 (**Fig. G23**)
Material: hard limestone (?)
Dimensions: length: 8.50 cm; width: 2.80 cm; thickness: 1.30 cm
Weight: 64 g
Flattish and elongated tool with two opposite flat sides tapering towards a rounded extremity. The opposite extremity is broken off. The long edges are sharp, which leads us to think that this tool was used as a whetstone to sharpen other tools. It comes from above the floor of Courtyard 18.

Fig. G23: Whetstone: PPP 267931:085:014. Photo by Andrea Squitieri.

(47) Registration number: PPP 267931:085:040 (**Fig. G24**)
Material: limestone
Dimensions: length: 6.5 cm; width: 6.5 cm
Weight: 400 g
Cuboid polisher with three flat faces: two slightly curved, and one covered with a patina. The three flat faces show very smooth and shiny surfaces in a darker colour than the rest of the tool. The slightly curved faces show some pecking marks, so this tool was on one side used as both a polisher and as a pounder at some point during its life cycle. The stone is red-pinkish and fine-grained, perhaps a type of limestone not attested in Gird-i Bazar so far. It comes from directly above the floor of Courtyard 18.

(48) Registration number: PPP 267931:097:004 (**Fig. G25**)
Material: basalt (?)
Dimensions: length: 6 cm; width: 5 cm
Weight: 218 g
Ovoid pebble with one flattened face. Its surface is very smooth. It is possibly a weight because it is too small to serve as a pounder or a polisher. No tool or wear marks are visible. The stone is greenish in colour and fine-medium grained, perhaps basalt. It was found in Courtyard 18, on the floor inside the semi-circle installation located in the northeastern corner of the courtyard (Locus:267931:095).

(49) Registration number: PPP 267930:020:001 (**Fig. G26**)
Material: serpentinite
Dimensions: length: 7.5 cm; width: 6.5 cm
Weight: 275 g
Cuboid polisher showing four flat and shiny faces. The other sides show tiny pits, possibly due to manufacture or a secondary use as pounder. The stone is dark greenish in colour and fine-grained with some larger white minerals visible, perhaps serpentinite. It was found in the stone installation located in the south-western part of Courtyard 18 (Locus:267930:020), next to a large and fragmentary storage vessel in ceramics.

(50) Registration number: PPP 267930:020:003
Material: granite
Dimensions: length: 5.5 cm; width: 8 cm
Weight: 390 g
Ovoid pebble with a smooth surface and possible pecking marks on the smaller faces, although these are not clear. Perhaps it was used only for a short time, or it was used to grind soft substances. It fits well into the palm of one's hand. The stone has a whitish matrix, is medium-grained and shows many dark inclusions. It is possibly granite. The object was found in the stone installation located in the south-western part of Courtyard 18 (Locus:267930:020).

(51) Registration number: PPP 266931:011:007 (**Fig. G27**)
Material: limestone
Dimensions: length: 20 cm; width: 20 cm; height: 6 cm
Weight: 3458 g
Large and heavy bowl with a square body and a circular depression in the centre, measuring 14 cm in diameter and 4 cm in depth. On the external edges some parts are chopped off because of erosion. The stone is brownish in colour and fine-grained, likely limestone. It was found lying on the floor of Room 46. As this did not seem to be its *in situ* position, it is possible that its original location was different. This square bowl is so far unparalleled in Gird-i Bazar. Its use may be related to the pottery production activities taking place in Room 46 (see below).

(52) Registration number: PPP 266931:011:008
Material: serpentinite
Dimensions: length: 3 cm; width: 1.8 cm
Weight: 25 g
Flattish rim of a stone bowl, made of a speckled stone, likely serpentinite. It is the first time a stone bowl rim has been found in Gird-i Bazar (but see also no. 27 in DLT2, above). This fragment is too small to allow us to reconstruct the shape of the complete bowl. Nevertheless it is worth mentioning that stone bowls with a flattish rim are common across the Near East in the Iron Age stone vessel repertoire[153].

153 Squitieri 2017b, 70.

Fig. G24: Polisher or pounder: PPP 267931:085:040. Photo by Andrea Squitieri.

Fig. G25: Stone weight: PPP 267931:097:004. Photo by Andrea Squitieri.

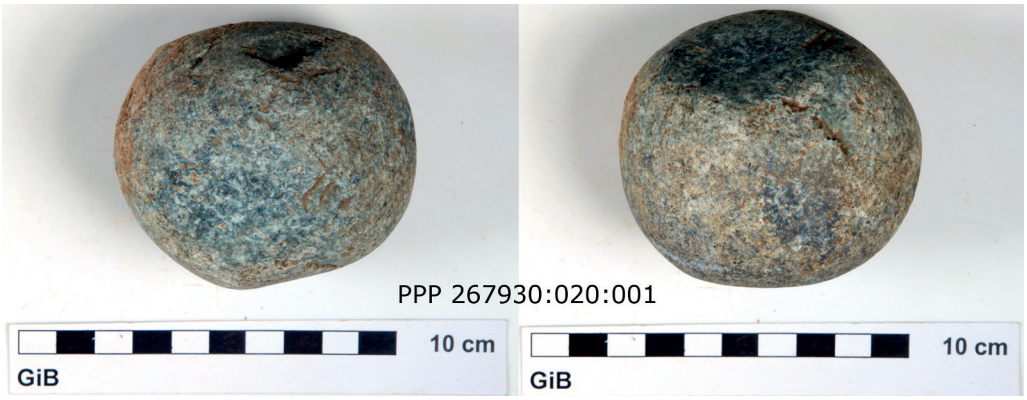


Fig. G26: Polisher: PPP 267930:020:001. Photo by Andrea Squitieri.

Fig. G27: Square stone bowl: PPP 266931:011:007. Photo by Peter Bartl.

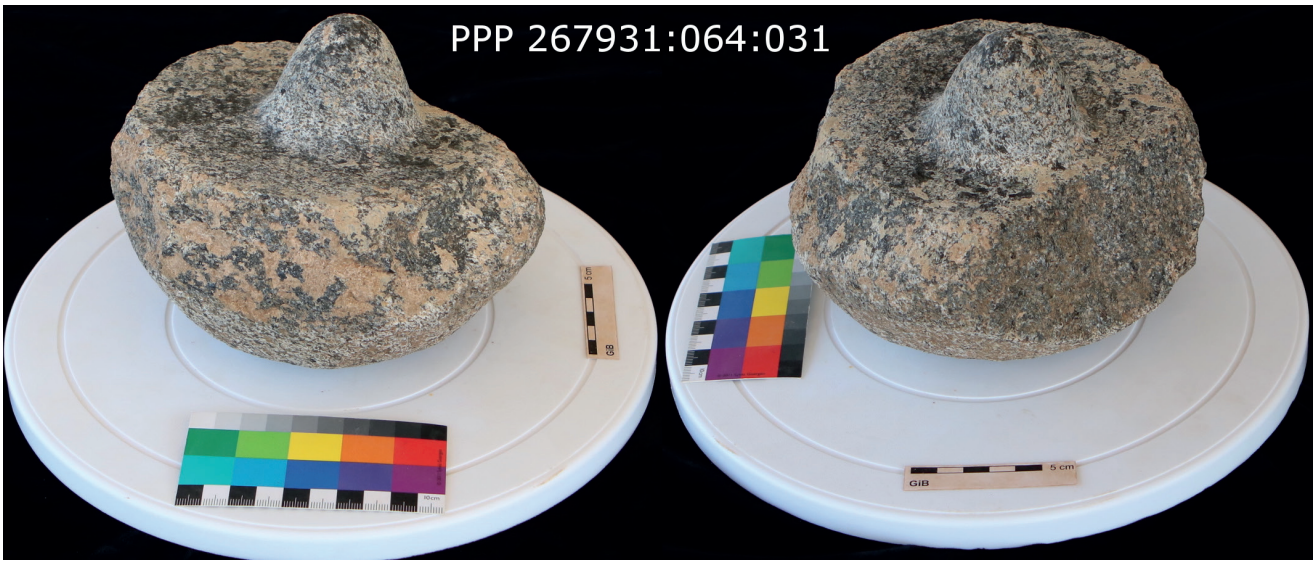


Fig. G28: Pivoted stone for potter's wheel: PPP 267931:064:031. Photo by Jean-Jacques Herr.

(53) Registration number: PPP 267931:064:031 (**Fig. G28**)
Material: compact basalt
Dimensions: 18 cm in diameter; height: 15 cm
Weight: 3568 g
This is a rounded object. It has a slightly curved and smooth side and, opposite to that, a very flat and smooth surface in the middle of which there is a conic protrusion: a pivot, around 4.5 cm high, with a rounded tip. The protrusion has a smooth surface. The maximum diameter of the object is 18 cm. The sides are slightly chopped off but the complete profile can still be seen. The item was found upside down on the floor, very close to the stone installation located in the western part of Room 46 (Locus:267930:020). The raw material is compact basalt.

Based on its shape, we interpret this pivoted stone to be the upper half of a potter's wheel-bearing. Originally, it was used in conjunction with a lower wheel-bearing provided with a central conical socket (a "socketed stone") in which the pivoted wheel-bearing could be inserted upside down. Such a lower wheel-bearing has not been found anywhere at Gird-i Bazar, possibly because an object of that shape could have easily been reused as a door socket.

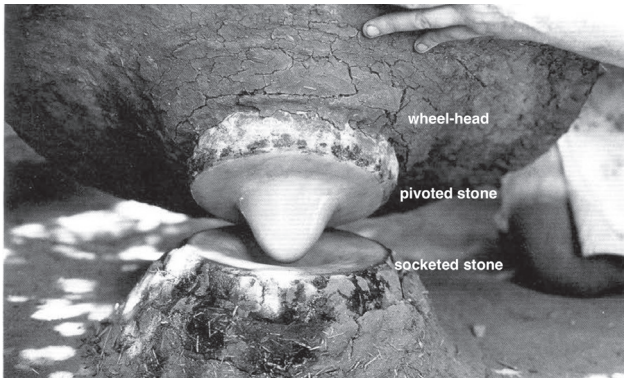


Fig. G29: Reconstruction of a potter's slow-wheel, after Powell 1995, fig. 10.7. Annotations by Andrea Squitieri. Courtesy of the Egypt Exploration Society, London.

This lower stone would have been kept still by fixing it into the ground or possibly by placing it inside the square bowl discussed above (= no. 51). A pivoted wheel-bearing, such as the one described here, was then inserted into the socketed stone in order to rotate. The friction between the two stones resulted in the polished surface that is still visible on and around the pivot.

The upper and the lower halves of several potter's wheel-bearings have been found in many Bronze and Iron Age sites across the Near East and Egypt[154]. Although scholars agree on their use as a part of a potter's wheel, some divergences exist about the reconstruction of the entire device[155]. Experiments have shown that in order to reach enough momentum to shape a lump of clay, the two wheel-bearings must be used in conjunction with a flat and larger wheel (known as the "wheel-head") fixed on the top of the upper wheel-bearing[156] (that is, on the side opposite the pivot). On this wheel-head, likely made of wood or unfired clay, the clay lump was fashioned into a pot (**Fig. G29**). In order to fix the wheel-head to the upper wheel-bearing, bitumen or clay could be used[157]. On the Gird-i Bazar pivoted stone, no bitumen has been noticed so it is more likely that clay was used to fix the wheel-head in place.

154 Trokay 1989; Bombardieri 2004; Duistermaat 2008, 147; Powell 1995.
155 See Powell 1995 and Duistermaat 2008, fig. V.11.
156 Powell 1995; Duistermaat 2008, 148; Amiran/Shenhav 1984, fig. 3.
157 Duistermaat 2008, 146; Powell 1995, fig. 10.7.

In the literature, it has been suggested that the upper and lower wheel-bearings could have been used for a more complex device known as the fast-wheel or double-wheel[158], in which the rotary movement is powered by the potter's foot on a lower wooden wheel, rotating on the two stone wheel-bearings placed underneath. A vertical shaft connects the lower wheel to an upper wheel, on top of which the potter could shape the lump of clay with two free hands. However, no direct archaeological or ethnographic evidence supports the idea of using two stone wheel-bearings placed below the lower wooden wheel[159]. It seems more likely, therefore, that the item found at Gird-i Bazar was used along with a lower socketed stone to give momentum to a slow-wheel, perhaps made of unfired clay or wood, fixed on top of the upper wheel-bearing, and that is was rotated by one hand or by means of a stick[160] (**Fig. G30**). This interpretation also matches the results of both the macro- and the microscopic analyses conducted on the Gird-i Bazar pottery, which have yielded evidence for the use of the slow-wheel[161].

Fig. G30: A man using a stick wheel in an Indian village. Photo by Nasir Akhtar, Delhi (7 March 2017): https://pixabay.com/en/pottery-old-man-working-in-village-333071/, under CC0 Creative Commons license.

(54) Registration number: PPP 267931:064:037
Material: shell
Dimensions: length: 2 cm; width: 1.5 cm; thickness: 0.5 cm
Weight: 3 g
Cowrie shell whose back is incompletely preserved. It could have been used as a bead although no perforation is visible. Found on the floor of Room 46.

158 Duistermaat 2008, fig. V.11, middle and bottom images; Magrill/Middleton 1997.
159 Duistermaat 2008, 148-149.
160 Rice 1987.
161 Herr 2017; Amicone 2017.

(55) Registration number: PPP 267931:066:009 (**Fig. G31**)
Material: bronze or copper-alloy
Dimensions: 1.80 cm in diameter
Weight: 3 g
Small bronze or copper-alloy object, almost circular with a straight side, possibly an earring. Covered by patina due to corrosion. Found on the floor of Room 46.

Fig. G31: Earring: PPP 267931:066:009. Photo by Andrea Squitieri.

(56) Registration number: PPP 267931:064:040 **(Fig. G32)**
Material: metal slag
Dimensions: N/A
Weight: N/A
Small metal slag from the floor of Room 46.

Fig. G32: Metal slag: PPP 267931:064:040. Photo by Andrea Squitieri.

(57) Registration number: PPP 266931:010:002 (**Fig. G33**)
Material: limestone
Dimensions: length: 12 cm; width: 10 cm
Weight: 230 g
This object shows two opposite rounded faces separated by a wide groove, ca. 1,5 cm wide. Its shape does not look natural although no clear manufacturing marks are

visible. While one of the sides shows a relatively regular surface, the other has been partially broken off. This object has no parallels so far, so it is difficult to establish its function. It could have been used as a pounder or grinder, although no clear wear marks are visible. Alternatively, it may have been used as a weight, hung by passing a cord along the groove. The stone is white limestone. The object was found in the fill of Room 46.

Fig. G33: Pounder (?): PPP 266931:010:002. Photo by Andrea Squitieri.

(58) Registration number: PPP 267931:056:004
Material: iron
Dimensions: length: 5 cm; thickness: 0.5 cm
Weight: N/A
Iron pin or needle, broken into two fragments, with a highly corroded surface. It comes from the upper fill of Room 46, just below the topsoil, so the possibility that it may be modern cannot be excluded.

(59) Registration number: PPP 267930:036:022 (**Fig. G34**)
Material: serpentinite
Dimensions: length: 7 cm; width: 8 cm
Weight: 492 g
Polisher with a spheroid shape, showing two very flat, smooth and shiny faces. A third face is damaged but was likely similar to the others originally. On the better preserved sides, tiny pecking marks are visible. The stone is a dark greenish and veined, fine-grained, likely serpentinite. The object was found on the floor of Room 48.

(60) Registration number: PPP 267930:026:047
Material: serpentinite (?)
Dimensions: length: 6 cm; width: 7 cm
Weight: 290 g
Sub-spherical, flattened object. It is possibly a weight because it does not comfortably fit into the palm of a hand for use as a pounder. Some pecking marks are visible on one side, but the other sides are smooth. Found on the floor of Room 49.

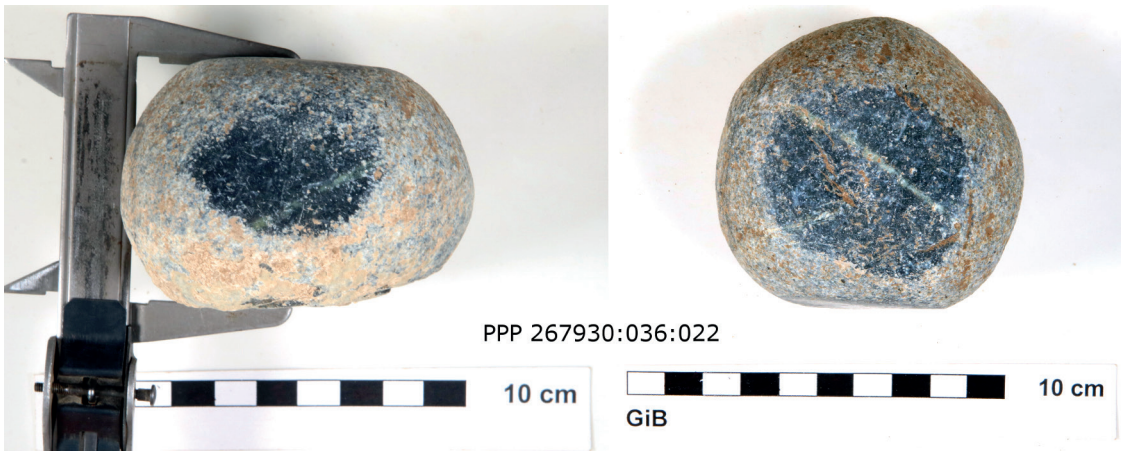


Fig. G34: Polisher: PPP 267930:036:022. Photo by Andrea Squitieri.

G2.5 The small finds from Building N and Outdoor Area 54 (nos. 61-62)

Building N is located in the south-western part of the excavated area of Gird-i Bazar. The excavated portion of Building N includes Room 51. No particular features or installations were found in this room. West of this building, on the westernmost part of Gird-i Bazar, lies Outdoor Area 54, which has not been fully excavated due to its proximity to the metal fence that surrounds the modern chicken farm.

Registration no.	Object	Context	Provenance	Cat. no.
268930:065:004	Quartz pendant	On the floor	Building N, Room 51	61
266930:011:029	Stone conic object	On the floor	Outdoor Area 54	62

(61) Registration number: PPP 268930:065:004 (**Fig. G35**)
Material: quartz
Dimensions: length: 1.5 cm; width: 0.8 cm
Weight: 1 g
Small object in the shape of a prism, made of quartz. No perforations are visible so it cannot be a bead. Perhaps it was part of a pendant or another piece of jewellery. The object is partially covered by a patina. It was found on the floor of Room 51. An almost identical object, although slightly larger, was found in Qalat-i Dinka during the 2016 campaign, registered as PPP 100000:021:020[162].

Fig. G35: Quartz pendant: PPP 268930:065:004. Photo by Andrea Squitieri.

(62) Registration number: PPP 266930:011:029 (**Fig. G36**)
Material: limestone
Dimensions: width: 7 cm; height: 5 cm
Weight: 282 g
Conic stone object with a flattish base and a conical body with a rounded tip. The shape is not very regular. The function of this object is not clear as its shape is unparalleled. Perhaps it is a type of weight or, less likely, a pounder (although it seems too small for this purpose, and pounders from Gird-i Bazar are sub-spherical, rather than conical). The stone is greyish and fine-grained, likely limestone. The object was found on the floor of Outdoor Area 54.

Fig. G36: Conic stone object: PPP 266930:011:029. Photo by Andrea Squitieri.

G2.6 The Iron Age small finds from the Sasanian-period levels (nos. 63-65)

The Sasanian period is represented in Gird-i Bazar by a cemetery (see **Chapter H**) and a pebble floor extending west of this cemetery (§D15), above parts of Buildings D and O. On this floor, where some Sasanian-period pottery sherds were found, three items were found that can be linked to the Sasanian period. Two are stone tools (= nos. 63, 65), which may have been reused from the older Iron Age levels, and one is a glass fragment (= no. 64).

Registration no.	Object	Context	Provenance	Cat. no.
268930:053:005	Stone pestle	Sasanian floor	/	63
268930:053:006	Glass bowl fragment	Sasanian floor	/	64
268930:075:002	Perforated stone	Sasanian floor	/	65

162 Kreppner/Squitieri 2017a, fig. C27

(63) Registration number: PPP 268930:053:005
Material: basalt (?)
Dimensions: length: 12 cm; width: 5.5 cm
Weight: 512 g
Elongated tool with a triangular section, broken on one extremity. The other extremity is rounded and may have been used as a pestle to crush. No marks are visible on its surface, which is heavily covered in patina. The stone is dark grey and fine-grained, possibly basalt. It was found on the Sasanian floor. It may originally be of Iron Age date, although no close parallel for this item is so far available from the Iron Age levels of Gird-i Bazar.

(64) Registration number: PPP 268930:053:006
Material: glass
Dimensions: length: 1.5 cm; width: 0.4 cm
Weight: 1 g
Tiny shard of transparent glass, showing some tiny bubbles inside and covered by a translucent patina. In the middle of its surface, there is a raised ridge separating two small shallow depressions. This decoration may indicate that this shard likely belongs to a glass bowl decorated with a honeycomb pattern all over its body. This type of decorated bowl was very common in the Sasanian period[163]. The object was found on the pebble floor belonging to the Sasanian period.

(65) Registration number: PPP 268930:075:002
Material: limestone
Dimensions: 13 cm in diameter
Weight: 858 g
The stone is whitish limestone, mostly covered by a thick patina. The object is half broken. It displays two opposite depressions carved into an unworked pebble with an almost regular disc shape. Both depressions are 3.5 cm deep with a conic section. Unlike the usual pebble mortars from Gird-i Bazar[164], whose depressions are shallow and wider, the depressions in this tool look too deep to be able to accommodate pounding or grinding actions. It is possible that this object is an unfinished perforated stone, which in most cases show a bi-conic perforation, with the same section as both depressions on this tool. It was found among the pebbles of the Sasanian pebble floor. It is possible that it came from the Iron Age occupation and was reused in the Sasanian period to create the pebble floor.

163 E.g., see Whitehouse 2007.
164 Squitieri 2017a.

G2.7 The Iron Age small finds from the modern occupation levels and the topsoil (nos. 66-81)

Traces of the more recent occupation of Gird-i Bazar have been identified all over the excavation area, with pits full of modern material, pebbled surfaces, and stone installations. Two modern coins (PPP 272928:045:002 and PPP 272928:045:003, not presented in this catalogue) were found at the modern installation in the eastern part of the site, (Locus:272928:045). They bear the date 1981, thus providing a *terminus post quem* for the modern occupation at the site.

However, from both the modern occupation level and the topsoil, some objects were collected that may date to antiquity, based on comparisons with the Iron Age material. These objects are 14 stone tools, namely five perforated stones, six pebble mortars, one pestle/handstone, one pounder and one fragment of a basin; and two metal slags.

Registration no.	Object	Context	Provenance	Cat. no.
271929:010:004	Perforated stone	Modern fill	/	66
271929:046:003	Pebble mortar	Modern installation	/	67
267930:002:004	Perforated stone with iron traces	Topsoil	/	68
267931:052:002	Perforated stone	Topsoil	/	69
271929:007:009	Perforated stone	Topsoil	/	70
271929:007:010	Perforated stone	Topsoil	/	71
267931:052:004	Pebble mortar	Topsoil	/	72
266931:009:002	Stone pebble mortar	Topsoil	/	73
271929:007:012	Pebble mortar	Topsoil	/	74
271929:007:016	Pebble mortar	Topsoil	/	75
271929:007:019	Pebble mortar	Topsoil	/	76
267931:052:008	Pestle/ hand-stone	Topsoil	/	77
268930:054:003	Stone pounder	Topsoil	/	78
271929:007:020	Fragment of stone basin	Topsoil	/	79
267930:002:005	Iron slag	Topsoil	/	80
271929:007:008	Metal slag	Topsoil	/	81

(66) Registration number: PPP 271929:010:004
Material: limestone
Dimensions: 7.5 cm in diameter; thickness: 3.5 cm
Weight: 164 g

Perforated stone, half broken, possibly used as a perforated weight. The perforation has a biconic section and a diameter of 2 cm. The object was found in the upper fill of the deep well located in the eastern area of the site (Locus:271929:010), mixed in with plastic materials.

(67) Registration number: PPP 271929:046:003
Material: limestone
Dimensions: 9 cm in diameter
Weight: 164 g
Half broken pebble mortar with one preserved shallow depressions (2 cm deep) carved into a disc-shaped pebble. Some pecking marks that may derive from the manufacturing process are visible on the edges. Pecking marks are also visible inside the depression, likely the result of pounding action. The stone is a whitish limestone. The object was found in a modern stone installation made of cobbles located in the eastern part of the site (Locus: 271929:046).

(68) Registration number: PPP 271929:007:012
Material: igneous rock
Dimensions: 11 cm in diameter; thickness: 4 cm
Weight: 185 g
Disc-shaped pebble mortar with two very shallow depressions (each less than 2 cm deep) on opposite sides. It is half broken. The stone is mottled light greyish, medium-grained and igneous. The object comes from the topsoil of the eastern part of the Gird-i Bazar.

(69) Registration number: PPP 271929:007:016
Material: igneous rock
Dimensions: 11.5 cm in diameter; height: 4.5 cm
Weight: 835 g
Disc-shaped pebble mortar, showing only one shallow depression on one side of a slightly worked pebble. The pebble looks smoothed by water, and no tool marks are evident. The depression is 2 cm deep and has a 2.5 cm diameter. Some pits are visible in the depression. The stone is light grey and medium-grained. The object was found in the topsoil of the eastern part of the mound.

(70) Registration number: PPP 271929:007:019
Material: limestone
Dimensions: 5.5 cm in diameter; height: 2 cm
Weight: N/A
Small pebble mortar with two opposing shallow depressions (0.5 cm deep), half broken. The stone is whitish limestone. The object was found in the topsoil of the eastern part of Gird-i Bazar.

(71) Registration number: PPP 271929:007:009
Material: limestone
Dimensions: 8 cm in diameter
Weight: 117 g
Half broken perforated stone with a disc shape, whose perforation shows a biconic section and has a diameter of 3.2 cm. The stone is whitish limestone. The object was found in the topsoil in the eastern part of the mound.

(72) Registration number: PPP 266930:011:029 (**Fig. G37**)
Material: limestone
Dimensions: length: 10.1 cm; width: 10 cm; height: 2.5 cm
Weight: 437 g
Perforated stone of a roughly square shape. The perforation has a 2.8 cm diameter and a biconic section. One side is chopped off. The stone is whitish limestone. The object comes from the topsoil in the eastern part of Gird-i Bazar.

Fig. G37: Perforated stone: PPP 266930:011:029. Photo by Andrea Squitieri.

(73) Registration number: PPP 271929:007:020
Material: limestone (?)
Dimensions: length: 15 cm; width; 10 cm; thickness: 4 cm
Weight: 386 g
Fragment of a possible stone basin, showing a curved surface at the bottom and a shallow cavity on the top. The sides are broken and it is therefore difficult to reconstruct the original shape. The stone is grey in colour and medium-grained, possibly limestone. The object comes from the topsoil in the eastern part of Gird-i Bazar.

(74) Registration number: PPP 271929:007:008
Material: igneous rock
Dimensions: 11 cm in diameter; thickness: 4 cm
Weight: 187 g

Half broken pebble mortar, with two opposite shallow depressions, each less than 2 cm deep. The raw material is a medium-grained, mottled light grey igneous rock.

(75) Registration number: PPP 267931:052:004
Material: limestone
Dimensions: length: 3.5 cm; width: 6.5 cm; thickness: 2 cm
Weight: N/A
Small pebble mortar with an irregular disc shape and in the centre, two shallow depressions on either side. Half broken. The stone is whitish limestone. Found in the topsoil of the western part of Gird-i Bazar.

(76) Registration number: PPP 267931:052:008 (**Fig. G38**)
Material: granite
Dimensions: width: 5 cm; height: 9 cm
Weight: N/A
Cylindrical tool, with two rounded extremities, both showing pecking marks. These marks may indicate that this tool was used, at some point, as a pestle. One of the long sides is flattish, which could mean that the tool was also used as a handstone. The stone is mottled white/greenish, hard and coarse-grained, likely granite – a stone that is so far attested very rarely in Gird-i Bazar. This item comes from the topsoil of the western part of the site.

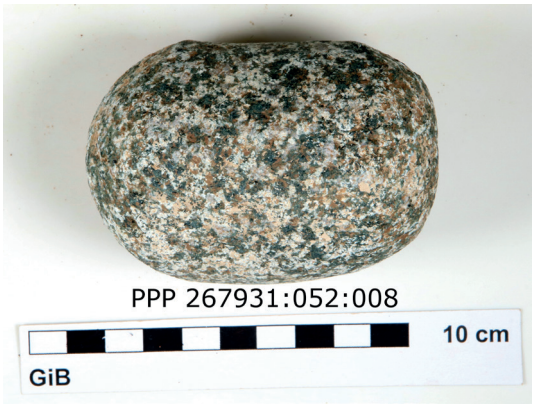


Fig. G38: Pestle or handstone: PPP 267931:052:008. Photo by Andrea Squitieri.

(77) Registration number: PPP 267931:052:002 (**Fig. G39**)
Material: limestone
Dimensions: 12.5 cm in diameter; thickness: 5 cm
Weight: 150 g
Half broken perforated stone, whose perforation has a 2.5 cm diameter and a biconic section. The stone is whitish limestone. The item was found in the topsoil in the western part of Gird-i Bazar.

Fig. G39: Perforated stone: PPP 267931:052:002. Photo by Andrea Squitieri.

(78) Registration number: PPP 266931:009:002
Material: limestone
Dimensions: 10 cm in diameter
Weight: 150 g
Small pebble mortar showing two opposite depressions. The stone is white limestone. It was found in the topsoil in the western part of Gird-i Bazar.

(79) Registration number: PPP 268930:054:003
Material: granite (?)
Dimensions: length: 7 cm; width: 5 cm
Weight: 245 g
Oval pebble, likely naturally smoothed by water, showing some pecking marks on one side. This may indicate its use as a pounder. The stone is grey-brownish and medium-grained, perhaps granite. The object was found in the topsoil in the western part of Gird-i Bazar.

(80) Registration number: PPP 267930:002:005
Material: iron slag
Dimensions: N/A
Weight: N/A
Two small fragments of iron slags. Found in the topsoil of the western part of Gird-i Bazar.

(81) Registration number: PPP 271929:007:008
Material: metal slag
Dimensions: length: 5 cm; width: 3.5 cm
Weight: 67 g
Small fragment of metal slag. Found in the topsoil of the eastern part of Gird-i Bazar.

G2.8 Preliminary spatial distribution analysis

The objects found during the 2017 campaign at Gird-i Bazar confirm some of the trends already observed in the previous two campaigns. The Gird-i Bazar item repertoire is composed mainly of utilitarian objects, with stone tools constituting the majority finds. As in previous years, no large stone tools for food processing, such as querns and mortars, have been found, indicating either that these tools were completely removed upon abandonment, or that foodstuff was processed elsewhere. The latter interpretation better fits the general interpretation of Gird-i Bazar as a workshop area for pottery production, where people were mostly involved in working activities other than food processing. However, food was certainly cooked and consumed at Gird-i Bazar, as indicated by the presence of bread ovens (tannurs) in Buildings F and I[165], as well as the sherds of cooking pots.

The most interesting item found during the 2017 campaign is arguably the pivoted stone from Room 46, used as the upper-bearing for a potter's wheel (= no. 53). Not only does this tool provide further evidence for the production of pottery on the site, which is clearly demonstrated by the presence of three pottery kilns uncovered so far. It also points to the location of a pottery workplace in Room 46 itself. Due to the pronounced focus on pottery production at Gird-i Bazar, it is likely that the many small stone tools uncovered at the site, such as pebble mortars, pounders and polishers, were used at different stages of the production process. For example, pounders and pebble mortars could have been used to crush minerals and plants used as temper[166], whereas the polishers may have been used to polish the finished vessels.

Of the seven metal objects from the Iron Age levels found during the 2017 campaign, five are metal slags. It is not clear whether these slags hint at the presence of metallurgical activities at Gird-i Bazar, as their occurrence is low and moreover scattered throughout the site. Perhaps such activities occurred in a nearby area outside the excavation limits.

A metal earring (PPP 267931:066:009), a quartz pendant (PPP 268930:065:004) and a cowrie shell (PPP 267931:064:037) so far represent the only evidence for personal ornaments from the Iron Age levels of Gird-i Bazar.

Given its probable nature as a workshop area, the analysis of the object distribution on floors can give us some insights about the intensity and distribution of the production activities. Distribution analysis can profitably only be applied to the western part of Gird-i Bazar because its floors – in contrast to those in the eastern part of Gird-i Bazar – have been largely spared from damage caused by either the construction of Sasanian graves or modern activities. This area has therefore yielded by far the highest number of objects during the three excavation campaigns.

Moreover, only completely excavated architectural units have been taken into account for the distribution analysis, because the partially excavated units might drastically change the distribution results if completely excavated.

Fig. G40 shows that the distribution of objects in the western part of Gird-i Bazar is rather uneven, with some architectural units particularly rich in items, whereas others appear to be almost empty. Most of the items were concentrated in open areas. Courtyards (units 21, 27, 18) are generally richer in objects than rooms (20 items versus 15 items), whereas only two items come from Alley 13.

The graph in **Fig. G41** confirms this uneven distribution. It shows the architectural units of Gird-i Bazar on the horizontal axis (i.e., rooms, alleys, courtyards), compared with the cumulative percentage of the item frequencies on the vertical axis (for the raw object quantities see **Table G2** below), in which the unit with most items, i.e., Courtyard 18, represents 100 % of the item frequency.

Architectural unit	Size in m²	Item quantity
Room 48	7.3	1
Room 49	8.1	1
Room 51	15.8	1
Room 15	17	1
Room 33	2.7	2
Room 22	11	2
Alley 13	34.5	2
Room 19	36.8	2
Courtyard 21	39	3
Room 46	16.1	5
Courtyard 27	14.3	6
Courtyard 18	20	11
		TOTAL: 37

Table G2: Item quantities from the floors of the completely excavated units of Gird-i Bazar. Prepared by A. Squitieri.

From this graph, it is clear that only three units (Courtyards 18 and 27, Room 46) yielded 50 % of all objects, whereas the other nine units produced the remaining 50 % of the objects. The red line on the graph indicates perfect equality, so that if the objects were equally distributed across the units, one would expect to see the vertical bars much closer to this line. This is not the case in this object distribution.

165 Hashemi 2017, 101, and see **Chapter D** in this volume.

166 Amicone 2017, Table E2.2, and see **Chapter F2** in this volume.

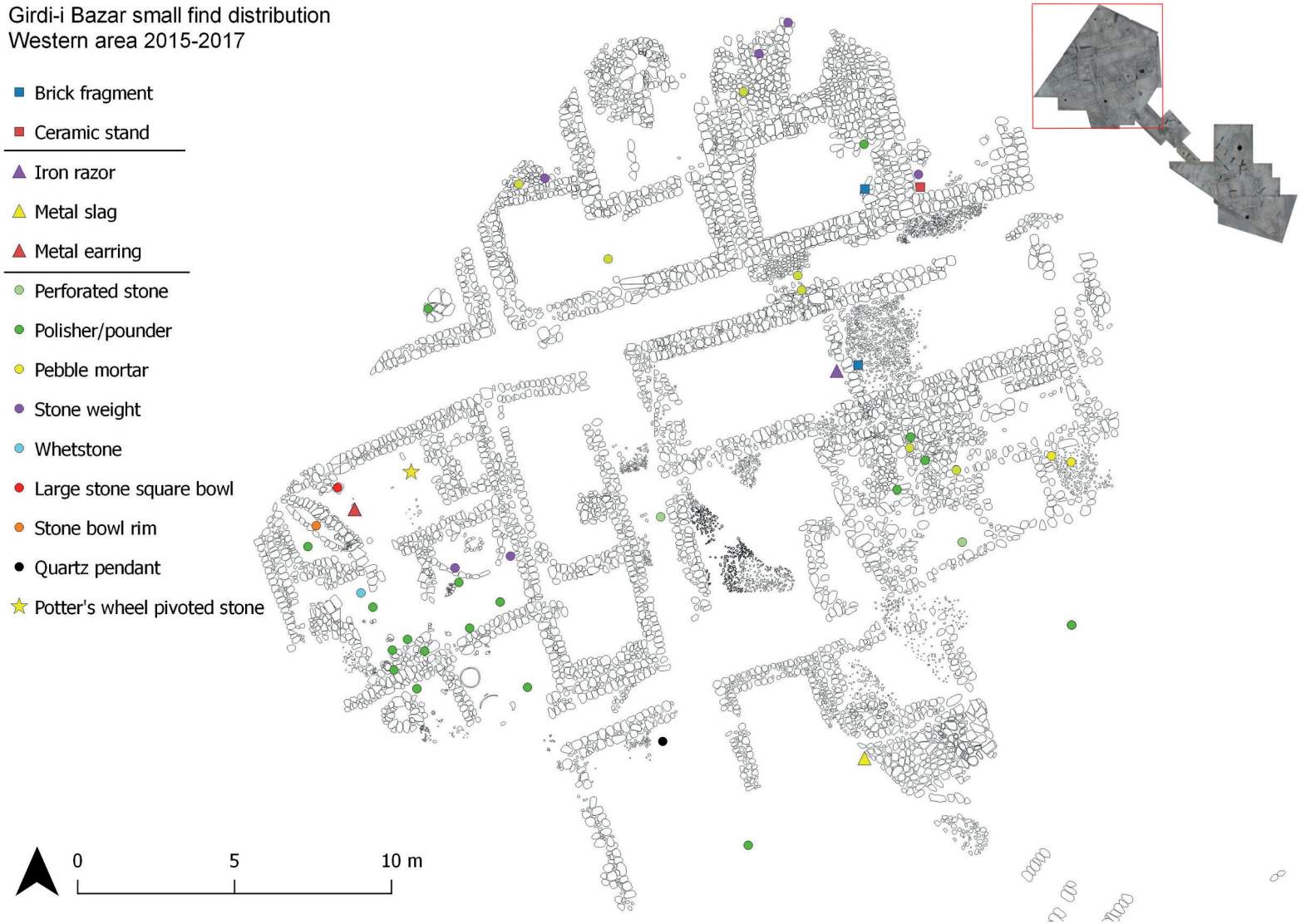


Fig. G40: Distribution map of the small finds from the western area of Gird-i Bazar, 2015-2017. Prepared by A. Squitieri.

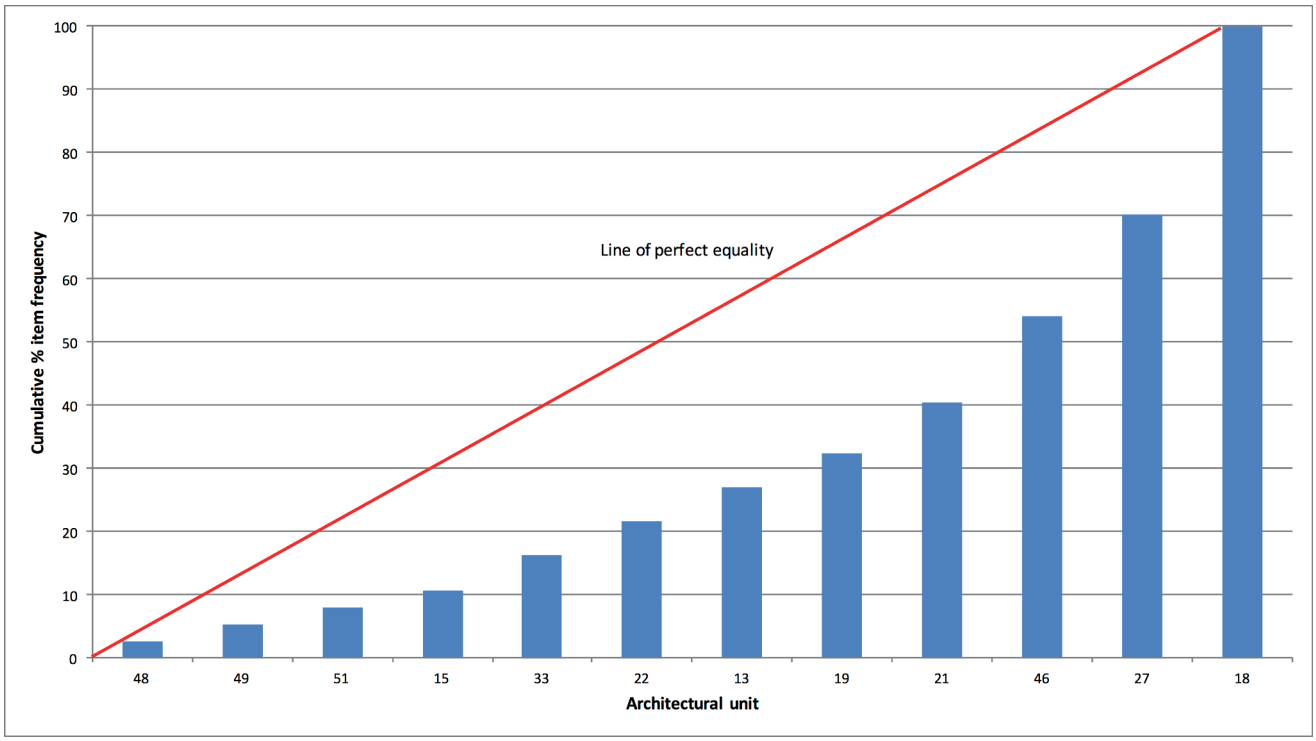


Fig. G41: Cumulative frequency in percentage of the items collected from the completed excavated architectural units of Gird-i Bazar. Prepared by A. Squitieri.

The uneven object distribution as shown in **Figs. G40-G41** can be explained by taking into account the different functions of the architectural units in Gird-i Bazar. Some units were evidently used for intensive production activities, mainly linked to pottery making, creating a concentration of most of the objects (mainly stone tools) in specific areas. Other units seem to have been used for activities that did not leave a visible mark in the object distribution. A possible explanation would be that the activities undertaken there used perishable objects. While this seems plausible, it should be borne in mind that, beyond function differentiation, also a possibly uneven abandonment strategy may account for the object distribution of Gird-i Bazar.

Registration no.	Object type	Context type	Provenance	Cat. no.
271929:039:003	Perforated stone	Fill	Outdoor area 7	33
268930:070:004	Iron slag	On the floor	Outdoor Area 8	34
269930:053:002	Stone polisher/ pounder	Fill	Outdoor Area 8	35
269931:031:004	Pebble mortar	Fill	Building D, Room 33	36
269931:031:006	Pebble mortar	Fill	Building D, Room 33	37
268930:085:038	Stone polisher/ pounder	On the floor	Alley 12	38
267931:058:004	Metal slag	Fill	Alley 13	39
266930:010:001	Stone pounder	On the floor	Building I, Room 18	40
267930:038:001	Stone polisher/ pounder	On the floor	Building I, Room 18	41
267930:038:040	Stone pounder	On the floor	Building I, Room 18	42
267930:038:041	Stone polisher/ pounder	On the floor	Building I, Room 18	43
267930:038:042	Stone polisher/ pounder	On the floor	Building I, Room 18	44
267931:022:002	Stone weight	On the floor	Building I, Room 18	45
267931:085:014	Whetstone	On the floor	Building I, Room 18	46
267931:085:040	Stone polisher	On the floor	Building I, Room 18	47
267931:097:004	Stone weight	On the floor within the installation limits	Building I, Room 18	48

Table G3: Summary table of all Iron Age small finds from Gird-i Bazar, 2017.

Registration no.	Object type	Context type	Provenance	Cat. no.
267930:020:001	Stone polisher	Installation fill	Building I, Room 18	49
267930:020:003	Stone pounder	Installation fill	Building I, Room 18	50
266931:011:007	Large stone square bowl	On the floor	Building I, Room 46	51
266931:011:008	Stone bowl rim	On the floor	Building I, Room 46	52
267931:064:031	Upper potter's wheel-bearing	On the floor	Building I, Room 46	53
267931:064:037	Cowrie shell	On the floor	Building I, Room 46	54
267931:066:009	Metal earring	On the floor	Building I, Room 46	55
267931:064:040	Metal slag	On the floor	Building I, Room 46	56
266931:010:002	Stone pounder	Fill	Building I, Room 46	57
267931:056:004	Iron pin	Fill	Building I, Room 46	58
267930:036:022	Stone polisher	On the floor	Building I, Room 48	59
267930:026:047	Stone polisher/ pounder	On the floor	Building I, Room 49	60
268930:065:004	Quartz pendant	On the floor	Building N, Room 51	61
266930:011:029	Stone conic object	On the floor	Outdoor Area 54	62
268930:053:005	Stone pestle	Sasanian floor	/	63
268930:053:006	Sasanian glass bowl fragment	Sasanian floor	/	64
268930:075:002	Perforated stone	Sasanian floor	/	65
271929:010:004	Perforated stone	Modern fill	/	66
271929:046:003	Pebble mortar	Modern installation	/	67
267930:002:004	Perforated stone with iron traces	Topsoil	/	68
267931:052:002	Perforated stone	Topsoil	/	69
271929:007:009	Perforated stone	Topsoil	/	70
271929:007:010	Perforated stone	Topsoil	/	71
267931:052:004	Pebble mortar	Topsoil	/	72
266931:009:002	Stone pebble mortar	Topsoil	/	73
271929:007:012	Pebble mortar	Topsoil	/	74
271929:007:016	Pebble mortar	Topsoil	/	75
271929:007:019	Pebble mortar	Topsoil	/	76
267931:052:008	Pestle/ handstone	Topsoil	/	77
268930:054:003	Stone pounder	Topsoil	/	78
271929:007:020	Fragment of stone basin	Topsoil	/	79
267930:002:005	Iron slag	Topsoil	/	80
271929:007:008	Metal slag	Topsoil	/	81

Table G3 (continued): Summary table of all Iron Age small finds from Gird-i Bazar, 2017.

G3. General conclusions

Overall, the items collected at Gird-i Bazar during the 2017 campaign confirm the observations made in the previous years. The extensive use of utilitarian items, mainly stone tools, is likely connected to production activities, in particular pottery making. The objects from DLT2 are also in the main utilitarian tools, closely comparable to those from Gird-i Bazar, with only a few exceptions. While there are some personal ornamental items (beads, earrings) attested from both DLT2 and Gird-i Bazar there is hitherto no clear evidence for either luxury or imported objects available from either of these excavation areas.

H. The Sasanian Cemetery of Gird-i Bazar

Kathleen Downey[167]

The Sasanian cemetery of Gird-i Bazar extends into the eastern and central parts of the site and it is composed of approximately 94 identified graves. After three excavation campaigns in 2015, 2016 and 2017, a total of 62 individuals have been recovered (**Fig. H1**).

Architecturally, the graves appear to be all quite similar. They typically have a stone capping made of a row of middle-size cobblestones (most likely made by reusing stones from the earlier Iron Age walls), covering the grave pit in which usually one individual is interred. Only two graves (Grave 2 and Grave 53) distinguish themselves in having a stone lining, making them similar to cist graves.

The few burials that included manufactured grave goods typically contained pieces of jewellery such as beads, earrings and metal pins. No contemporary pottery has been found in association with the skeletons. The pottery that has been recovered from the grave fills belonged to the Iron Age period and therefore came from the surrounding soil used to fill the grave pits after burial.

To establish the chronology of the cemetery, a tooth from Grave 47 was radiocarbon dated in 2017[168]. The analysis returned a date of 389-535 calAD (with 95.4 % probability), which falls within the Sasanian era. Because of the shared similarities in architecture, funerary rituals, and grave goods, it is assumed that all the graves belong to the Sasanian era. Moreover, some of the jewellery retrieved from graves (especially from Grave 93; see below) show parallels with items from other Sasanian sites.

H1. Work conducted during the 2017 campaign

During the 2017 campaign at Gird-i Bazar, 34 graves were excavated, and 62 individuals, including those excavated in 2015 and 2016, were analysed in order to generate biological profiles. It is estimated from our opened trenches that there are still roughly 30 more graves to be excavated and analysed. We acknowledge that there are probably more graves in areas that have yet to be ground-truthed.

Analysis of the skeletal remains from Gird-i Bazar was limited to creating biological profiles for as many individuals as possible. This was due to the time constraints based on the sheer number of graves to excavate and analyse, in addition to the task of analysing the backlog of individuals from previous seasons. A biological profile includes age, biological sex, stature, and ancestry. These are the basic elements of developing a demographic analysis of any population. Ancestry can be quite time consuming when using more modern methods, especially with such fragmentary remains, and has been, therefore, delayed until a later season. Stature estimates are based on the measurement of full long bones, a calculation that is, again, difficult with heavily fragmented remains. In situ measurements were taken wherever possible. The variables of age and biological sex are useful for understanding the demographic makeup of a specific population. They are also variables that often affect the funerary process. Types of burials, positions, or grave goods can often be linked to patterns of age or biological sex. Concentrating on these two biological variables will allow for comparative analysis within the cemetery at Gird-i Bazar, and it will allow us to compare this population with other contemporary cemeteries in the region.

In total, from all field seasons, there are 62 individuals excavated from 52 graves. This number includes 16 juveniles, 31 adults of varying age categories, twelve individuals whose remains are so poorly preserved that they cannot be analysed, and three graves so disturbed that it is difficult to gather any information (**Fig. H2**). Within the adult group, the majority are Old Adults (OA) with 14 individuals, aged 40+ years. Eight are Young Adult (YA) who are aged between 20-30 years old at the time of death. Four are aged 30-40 years and are categorized as Middle Adults (MA). Five are simply categorized as adults (A) because too few diagnostic portions of the skeleton were preserved to age them more specifically (**Fig. H3**). Biological sex was also assessed for the adults, and there are 18 females, ten males, and three of indeterminate sex (**Fig. H4**). More in depth statistical analyses will be performed after excavation of the cemetery is completed.

167 Department of Anthropology, The Ohio State University, Columbus, Ohio.

168 Greenfield 2017, 173.

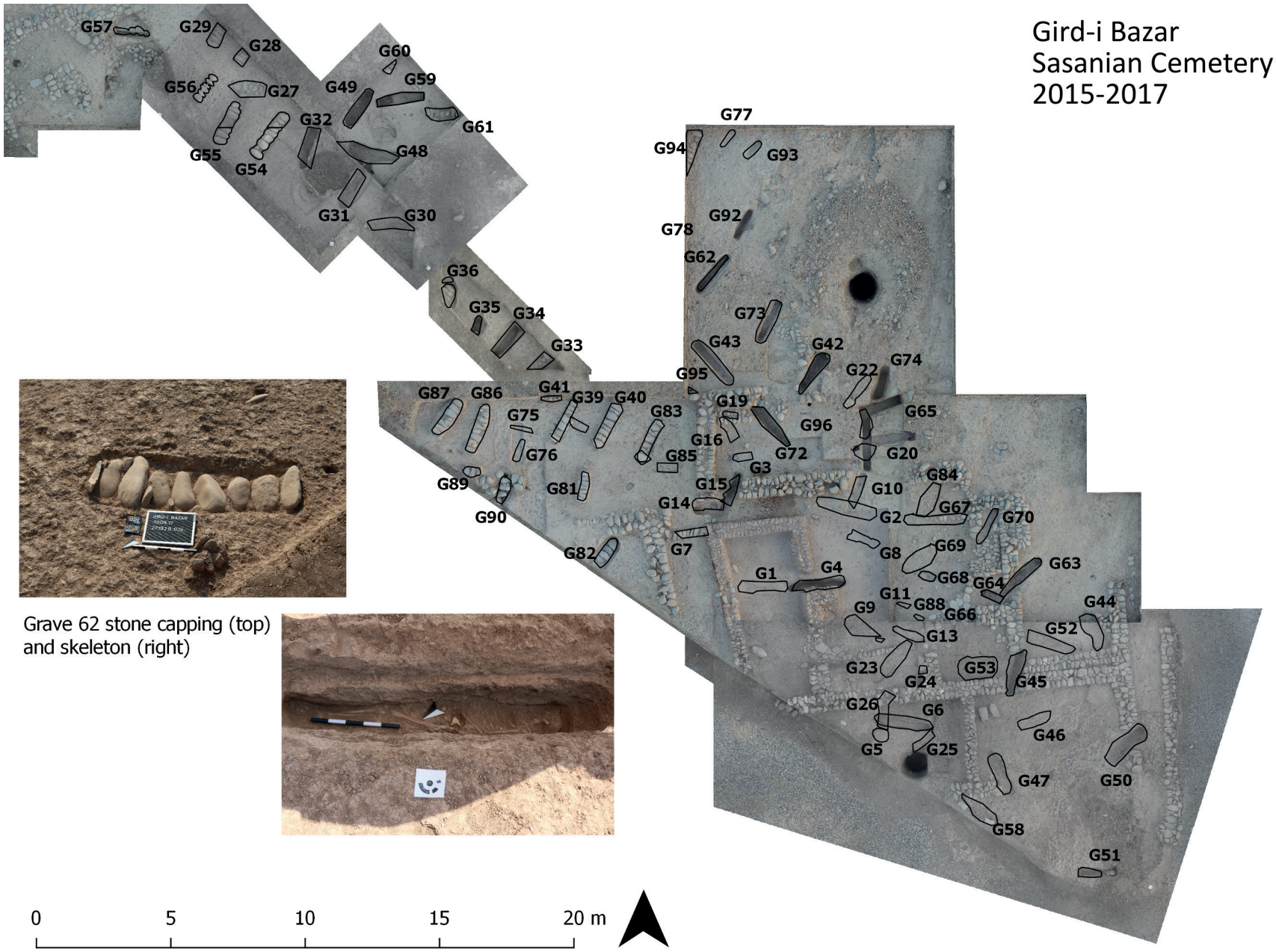


Fig. H1: Overview of the Sasanian cemetery of Gird-i Bazar, with a detail photograph of Grave 62 as an example. Prepared by Andrea Squitieri.

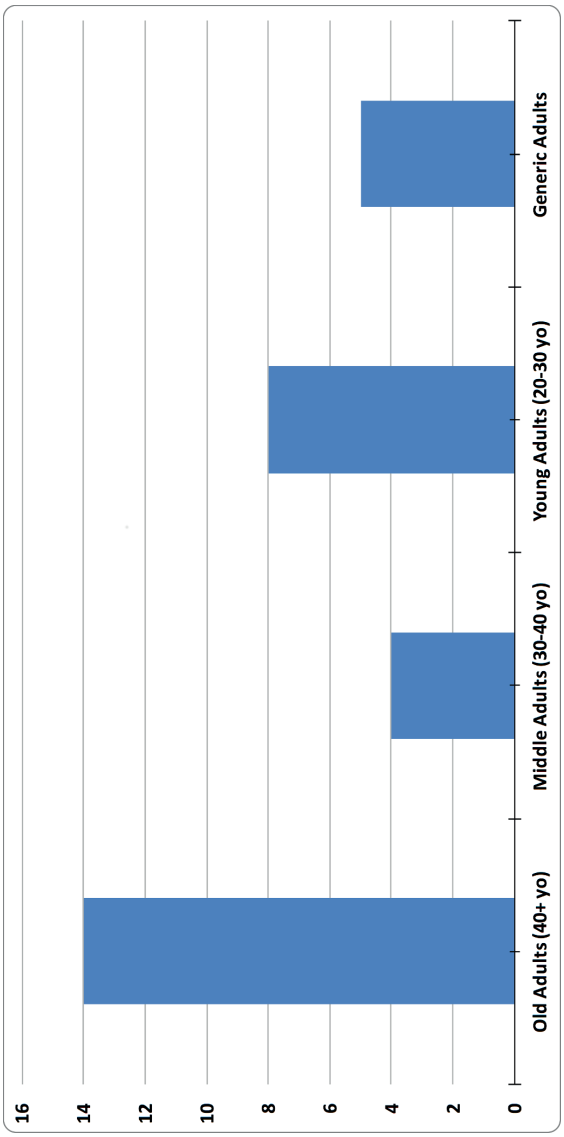


Fig. H3: Age categories of the 31 adult individuals from Gird-i Bazar cemetery. Prepared by K. Downey.

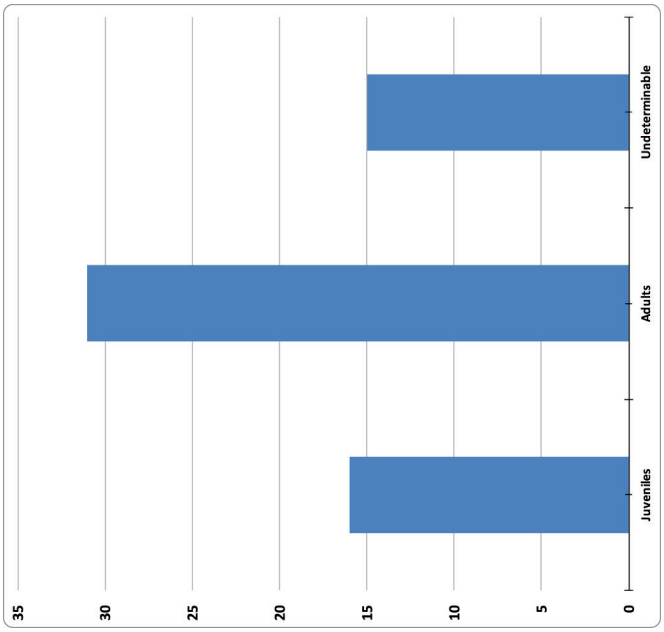


Fig. H2: Age categories of the 62 individuals from Gird-i Bazar cemetery. Prepared by K. Downey.

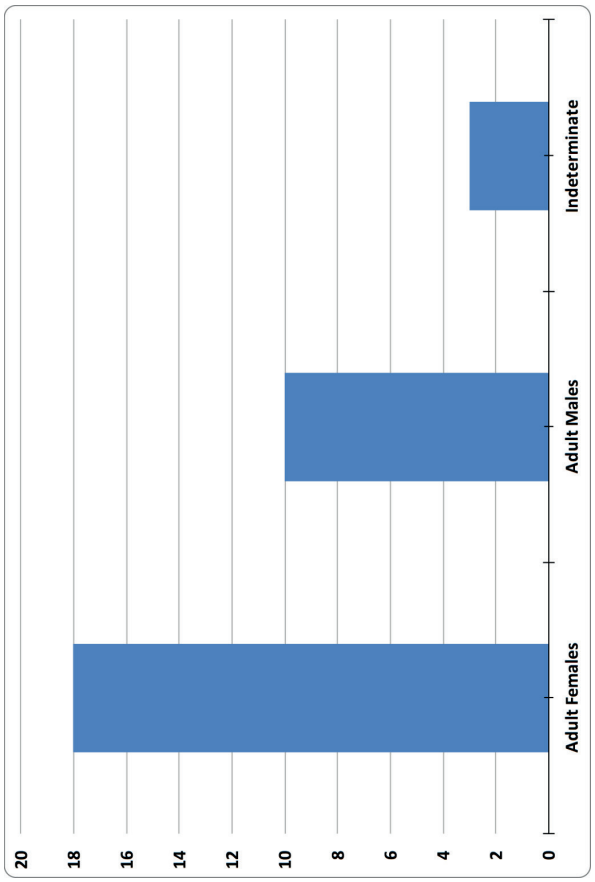


Fig. H4: Biological sex of the adults from Gird-i Bazar cemetery. Prepared by K. Downey.

H2. Bone preservation

Preservation of skeletal material at Gird-i Bazar is generally poor. The grave soil matrix tends to be hard packed and similar to the surrounding soil, which has made identifying grave cuts difficult in many cases. There are certainly areas with a softer grave soil matrix, but there are very few graves with soft, loose fill. Bone surface preservation is quite poor due to the wearing away of the periosteum. This has probably allowed increased leaching away of the organic matrix of the bone, which, ultimately, weakens the structure. This could lead to some issues for isotopic testing. Only areas with thick cortical bone, such as the femoral midshaft, or teeth will be likely to yield good results. This is an assumption, but it could be tested by thinly sectioning the bones and examining them under a cross-polarizing light microscope. This fragility created difficulties in excavating the skeletal remains while keeping more delicate diagnostic regions intact for curation and examination. Many measurements and observational analyses had to be made in the field while excavating because it was unlikely that the pertinent morphology would remain whole. This was especially true for the long bones, important for reconstructing stature, because the thinner cortical bone at the proximal and distal ends had often disappeared. *In situ* measurements were taken whenever possible, but these are generally less accurate.

There may have also been some anthropogenic forces that led to the heavy bone fragmentation, especially in the eastern squares. The bones have been heavily fragmented by time and possibly by the acidic soil, however, some breaks appear to be more recent in nature. Some of these fractures may be due to the heavy ground machinery that was driven over the site during the construction of the chicken farm. The already biomechanically weak bones that were close to the surface could have suffered additional fractures during this time.

H3. Grave goods

In 2015 and 2016, only a few grave goods had been found in the Sasanian cemetery of Gird-i Bazar, but this year's excavation has yielded several more. Grave goods can be divided into two categories: unworked pebbles and manufactured items.

The first group comprises small unworked pebbles that were placed on specific points of the body. These tend to be blue or green in colour with a white patina on at least one side and are generally ovoid in shape. There was an exception to the shape and colour of the unworked stone in two cases, Graves 14 and 16, which were both juvenile individuals who had smaller red angular, stones placed on their chests. Female individuals tended to have stones on or near the pelvis, Graves 62 and 72 are examples of this. Most individuals had stones placed at the superior anterior portion of the forehead. This trend was seen in individuals of all ages and biological sex classifications. Of the 18 graves excavated this year that were not disturbed, eleven had at least one unworked stone placed on the body. Three of the seven burials that did not have stones had other types of grave goods that are described below. There appears to be no pattern by gender. Both juveniles and adults are represented, but all the adults with stones are categorised as old adult (40-55+ years). This could, however, be due to older adults being better represented in this sample. Hopefully, the excavation of the remaining graves during the next field season will better illustrate any patterns.

The manufactured grave goods collected during this campaign are 80 in total, from eleven graves. 67 are small beads, divided into spherical carnelian beads[169] and yellow ring or ovoid beads made of glass. The carnelian beads, in particular, are the same as those found in many graves excavated during 2015 and 2016 campaigns[170], whereas the glass beads have not been found previously. Other pieces of jewellery coming from the 2017 graves include metal earrings, bracelets and pins. The grave goods of the 2017 campaign are summarised in the table below.

Grave no.	Number of objects (% of the total)	Object types
16	33 (41.2 %)	33 yellow glass beads
62	2 (2.5 %)	1 glass shard (modern contamination?) 1 black bead (stone?)
66	7 (8.75 %)	7 spherical carnelian beads
69	14 (17.5 %)	8 spherical carnelian beads 5 yellow glass ring beads 1 iron fragment (pin?)
72	1 (1.25 %)	1 shell
73	1 (1.25 %)	1 iron fragment (pin?)
77	10 (12.5%)	8 spherical carnelian spherical beads 1 bronze bracelet with decoration 1 iron bracelet (fragmented)
80	2 (2.5 %)	2 earrings with glass beads
84	1 (1.25 %)	1 iron fragment (pin?)
88	5 (6.25 %)	5 spherical carnelian beads

169 See Greenfield 2017, 175 for the geological determination of the red beads from Gird-i Bazar.

170 Greenfield 2017, 174.

Grave no.	Number of objects (% of the total)	Object types
93	4 (5 %)	1 glass pendant 1 perforated cowrie shell 1 miniature bronze bell 1 metal pin with a ring-shaped tip
	Total: 80	

Table H1: The manufactured grave goods from Gird-i Bazar graves excavated during the 2017 campaign. Prepared by K. Downey.

H4. The funerary and anthropological descriptions of the graves with grave goods

In this section, the eleven graves to have yielded manufactured grave goods are described in greater details. There is one clarification on how the adult age variables will be employed. Adult skeletons are more difficult to age with precision because they are no longer growing, and there is no steady process of change. For these analyses three large ranges have been assigned to have more accurate results. Individuals between the ages of 20-35 will be considered young adults. Ages of 35-45 will be middle adults, and any older adults will be categorized as old adults. The biological data below represents preliminary assessment. A more thorough and exhaustive catalog will be published at a later date. When in doubt, methods utilized are described in White (2005) and Schaefer *et al.* (2009).

Grave 16

Age:

- Tooth formation and eruption: 3 years ± 12 months
- R Radius 85 mm: (male 10% 1-1.5 yrs, male 90% 1 yr, female 10% 1.5-2 yrs, female 90% 1 yr)
- L Femur 108 mm: (male 10% 6 mns-1 yr, male 90% 3-6 mns, female 10% 6 mns-1 yr, female 90% 3-6 mns)

Grave 16 is a small burial that runs NW to SE with the head at the SE end. The face was pointed east. The individual had been placed on their right side with both arms coming together above and a little bit to the east (right side of the body) of the pelvis. Both legs had been brought together on the right hip and the feet placed together on a large stone in the north of the grave. At first the stone was believed to have been purposely placed in the grave, but after removing and cleaning the skeleton it was possible to see that this stone was in line with a second stone only partially in the NW corner of the grave. There was also a high density of the local white chalky substance. An oval-shaped stone had been placed in front of the forehead, and a more angular stone, very similar to those found in Grave 14, had been placed in the centre of the chest. One glass bead, coated in a yellow powder, was resting on the anterior and superior portion of the forehead. Upon removing the mandible, 31 small glass beads were found stacked across the neck in groups.

Preservation of the skeletal remains was extremely poor. Simply brushing across the surface to clean caused many of the bones to disintegrate into a powder. Two in situ measurements were taken of the diaphyses of the right radius and left femur. The individual is aged to between 1-3 years. It is important to remember that populations in the past might have had a shorter variation range than the modern American children who were used in the Maresh study used as reference to determine age[171]. Dentition does tend to be more accurate. Juvenile individuals cannot be assessed for biological sex.

Grave 16 was particularly rich in items, yielding 33 objects, all beads, comprising c. 41% of all items collected from the Sasanian graves. 31 small beads (PPP 271928:152:003-015; PPP 271928:152:018-022; PPP 271928:152:025-026; PPP 271928:152:028-040) were found clustered on top of and around the cervical vertebra, or neck; they are made of glass and have a ring or an ovoid shape. Their sizes are quite regular being under 1 cm in diameter, and the colour is yellowish.

Grave 62 (Figs. H1, H5)

Age:

- Mandibular tooth wear: H-I (40-55 ya)[172]
- Maxillary tooth wear: G-H (40-55 ya)[173]
- Cranial sutures were not analyzed due to the poor surface preservation
- Pubic symphysis: IX (44-50 ya)[174]
- Pubic symphysis Phase 5 (25-83 ya)
- Auricular surfaces were both present, but neither was scored using the Buckberry and Chamberlain method due to poor surface preservation and the inability to clean the surface without causing further damage. However, the portions of the surfaces that were clear had high proportions of microporosity indicating an older individual.

Sex:

- Gonial angle was obtuse: F
- Mandibular ramus was short and slight: F

171 Maresh 1970.
172 Lovejoy 1985.
173 Lovejoy 1985.
174 Todd 1920.

- Mental eminence: 1 F[175]
- Greater sciatic notch: 2 F[176]
- Ventral arch: F[177]
- Ischiopubicramus: F[178]
- Subpubic concavity: F[179]
- Stature:
- L Femur 145.49 ± 3.72 (using an *in situ* measurement of 37 cm)[180]

The Grave 62 architecture appears to have two different cuts; a larger one for the stones capping the grave, and a smaller one for the inhumation. This smaller cut was clearly indicated by a darker soil colour. The grave soil matrix was softer in this grave and there were more air pockets, which may indicate that the grave soil matrix was filled in slowly over time. The individual was laid on their right side with the head in the west end of the grave.

Fig. H5: Detail of Grave 62. Photo by Jens Rohde.

175 Walker 1994.
176 Buikstra/Ubelaker 1994.
177 Phenice 1969.
178 Phenice 1969.
179 Phenice 1969.
180 Trotter 1970.

The left hand was placed anteriorly to the body directly below the right hand, and both were under the left femur. Preservation of the cortical bone appears to be better, but the proximal and distal ends of the long bones are still poorly preserved. One in situ measurement was taken of the left femur, which is listed below.

Five separate coloured stones were found on the body. First, a smooth blue stone was found in the middle of the pelvic inlet, and a darker blue/purple stone was found resting inside the left iliac blade. A soft white stone was found on top of the left forearm. A fourth blue stone was directly underneath the right scapula. The frontal, or forehead was placed on a fifth stone that appears to be gray or white. It should also be mentioned that a small, amorphous piece of pure clay was found in the grave soil matrix a few centimetres above the mandible.

The skeleton is estimated to be a female, aged 40 years or older, with a stature of 145.49 ± 3.72 cm. The upper limit of the age bracket is left open due to the extreme nature of the tooth wear and the wide age ranges given in the methods using the pubic symphysis.

The teeth were especially degraded and the roots were often completely gone or fragmented. It was noticed that the dentine on the inferior side of the tooth had patches of purple on two of the molars. Grave 62 yielded two manufactured grave goods. The first item is a tiny glass shard (PPP 271929:014:001) that may, in fact, be a modern contamination because it came from between the stones of the grave capping. The other item, found next to the skeleton, is a tiny disc shaped black bead made of a soft powdery material, perhaps a soft stone (PPP 271929:018:006).

Grave 66

This is a very poorly preserved grave packed into a concrete-like matrix with no grave cut visible. It was probably compressed so tightly by the modern road that passes above it. The bones are quite distorted and show indications of early mineralization. This is possibly due to construction material (such as concrete) located above it. However, it is impossible to say with any certainty without a microscopic analysis. The bones near the beads appeared to be the remains of a fibula, but it is also possible that they belonged to the distorted distal end of an ulna. Another bone to the east was assessed to be a humerus due to round and relatively smaller (to femur) cortical shaft. The following day the remains of a cranium were found to the west of the beads (in another square), indicating that the burial was either secondary or disturbed. Within the vicinity of the cranial fragments excavators also found fragments of teeth, scapula, femur, and a proximal hand phalanx, further indicating the disturbed nature of the burial.

Grave 66 has yielded seven red carnelian spherical beads with a diameter of about 0.5 cm (PPP 272928:049:001-007; **Fig. H6**).

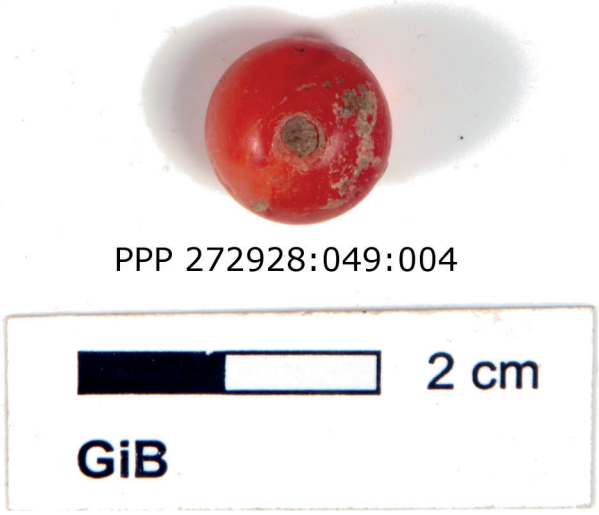


Fig. H6: Carnelian bead PPP 272928:049:004 from Grave 66. Photo by Andrea Squitieri.

Grave 69

Individual 1:

Age:

- Mandibular tooth wear: H-I (40-55 ya)[181]
- Maxillary tooth wear: G-H (40-55 ya)[182]

Sex:

- Greater sciatic notch (assessed in field): F

Individual 2:

Age:

- Maxillary tooth wear (molars): F 30-35 years
- Maxillary tooth wear (incisors, canines, premolars): D 20-24 years
- Mandibular tooth wear (molars): E 24-30 years
- Mandibular tooth wear (premolars): D 20-24 years

Sex:

- Gonial angle: F
- Mental eminence: F
- Greater sciatic notch: F

This was originally thought to be a small grave, given the small area covered by capping stones. However, when opened it only showed the bent knee region of one individual. This mismatch could be either a previously unseen burial practice or it could indicate modern disturbance. The actual grave cut was very unclear, and so the final shape of the grave through excavation most likely doesn't match its original shape. The excavators followed the bones and the soil with white inclusions that are associated with the location of human remains within a grave cut.

The grave runs SW to NE, and it contained two individuals laid directly on top of one another. There was, quite literally, no space between the two interred individuals, so it is more likely that one burial event occurred than a later addition to the grave of the upper individual.

For the first individual the head was in the SW end of the grave. It was laid more on its back with the pelvis tilted slightly to the right, but flat enough that the pelvic inlet could be seen during excavation. The upper arm was placed down along the body line while the lower arm was placed over the body just above where the stomach would have sat. The hands were put under the opposite elbow, with the left hand going down and the right hand going up. Its legs are bent, with the left leg above the right leg. It became clear that there was a second individual when the posterior of a second left femur was uncovered emerging from below (E) the pelvis. The pelvis of the first individual was crumbling quickly, and was quite difficult to excavate because it was placed so that the lower individual's pelvis fit inside.

The second individual was lying more on their right side, which is why the posterior of its left femur was visible. The mandible of the second individual was clearly visible underneath the right clavicle of the upper individual. While the left arm was placed over the body and in front of the pelvis, the right arm was brought up so that the hand rested next to the top anterior portion of the face. The legs of the second individual were placed tightly together and bent. For the second individual, the left side of the face is fairly well preserved, including the left and front maxillary and mandibular dentition. It may be a suitable candidate for isotope testing. Fragments of an iron pin were on the right anterior portion of the shoulder.

Several yellow and red beads were found with this burial. Each skeleton has been attributed some beads, but because of how close the two skeletons were positioned it is possible that there was some intermixing in our attribution of the beads between the two individuals. Single find points taken for each single find may be helpful in clarifying the ownership.

Grave 69 has yielded 14 items, eight associated with the first interred individual (PPP 271928:155:002-009), and the remaining six associated with the second individual (PPP 271928:167:005-010). The first group of objects is comprised of five red carnelian spherical beads (diameter c. 0.5 cm) and three yellow glass beads (**Fig. H7**). The second group includes three carnelian spherical beads (diameter c. 0.5 cm), two yellow glass beads with a ring shape, and

181 Lovejoy 1985.
182 Lovejoy 1985.

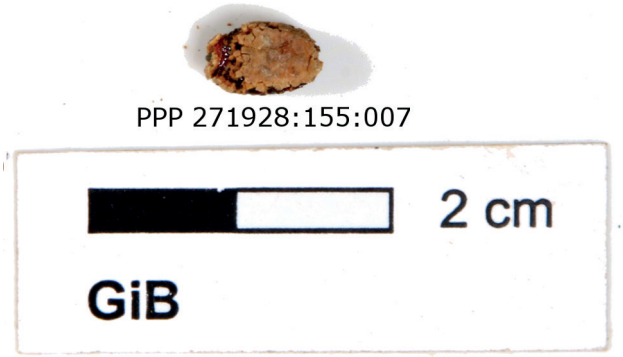


Fig. H7: Glass bead PPP 271928:155:007 from Grave 69. Photo by Andrea Squitieri.

one iron fragment, much corroded, whose original shape cannot be reconstructed. It must be stated that Individual 1 was deposited directly on top of Individual 2. The skeletons were articulated, and it was easy to distinguish which skeletal elements belonged to each individual. The cervical vertebra, or neck, of Individual 2 was only slightly inferior (within the plane of the body) to the neck of Individual 1. It is possible, therefore, that some of the beads were mixed during the post-depositional processes as well as during excavation of the hard-packed grave matrix.

The first individual is estimated to be female between the ages of 40-55 years. The second individual is estimated to be female between the ages of 20-35 years.

Grave 72

Sex:

- Glabella: M (females in the population as well as others from the region tend to have a stronger feature than the populations that were used to set up the standards)
- Gonial angle: F
- Greater sciatic notch: F
- Mental eminence: F

Stature:

- R Femur 43cm: 160.31 ± 3.72 cm
- L Femur 45cm (best angle): 165.25 ± 3.72 cm
- R Fibula 37cm: 168.02 ± 3.57 cm
- L Fibula 35cm: 162.16 ± 3.57 cm

This grave is oriented NW-SE with the head in the NW, facing east. The grave cut had an extremely soft fill. The body was lying on its left side with the right arm placed over the body. Both hands were in front of the anterior pelvis. The left arm was placed straight along the front of the body. It is assumed to be a woman.

Two unworked stones were found at the anterior of the face, and two were also found on the anterior portion of the pelvis. One unworked stone was placed on the individual's chest. In addition, a very large snail shell seems to have been deposited in association with the skeleton and was perhaps used as a pendant (PPP 271928:166:007). It was found behind the lumbar vertebrae, or lower back.

Grave 73 (Fig. H8)

Age:

- Mandibular tooth wear: H-I (40-55 ya)[183]
- Maxillary tooth wear: G-H (40-55 ya)[184]

Sex:

- Mental eminence: F
- Gonial angle: F
- Sub pubic angle: F
- Angle of AIIS: F
- Pelvic inlet: F (all features of the pelvis did not survive excavation)

Stature:

- All long bones were too poorly preserved to estimate stature.

Fig. H8: Grave 73 with its skeleton. Photo by Jens Rohde.

183 Lovejoy 1985.
184 Lovejoy 1985.

The grave was oriented S-N with the head in the south, facing east. The body was positioned on its right side with the left arm placed over the body and in front (E) of the pelvis. Both hands were placed in front of the pelvis, but it was not clear which side was on top. Its right lower leg was angled slightly to the back (W) of the left lower leg. There were two unworked stones placed along the anterior center of the pelvis. One iron fragment (see below) was positioned lengthwise S-N on the left shoulder approximately halfway along the clavicle. The surface preservation is quite poor and the bones were heavily fractured. The interred individual is estimated to be a woman of an age between 40-55+ years.

Grave 73 yielded one only iron fragment (PPP 271929: 027:007), much corroded, about 2 cm long and 0.5 cm thick. Perhaps it belonged to a pin, but it is not possible to reconstruct its original shape.

Grave 77

Age:

- Tibia 124 mm (in situ): (M) 1-2 yrs, (F) 1-2 yrs[185]
- Fibula 119 mm (in situ): (M) 1-1.5 yrs, (F) 1-1.5 yrs[186]

Stone capping was present that did not quite cover the skeleton as the cranium was exposed when excavating around the cobbles. This grave was oriented SW- NE with the head in the SW end, facing south. The body was laid on the right side, but the pelvis is slightly tilted back rather than being directly on its side. The left arm was placed over the body with both hands in front of the pelvis. Three stones were lying to the right of the cranium. Near the anterior superior portion of the forehead, the typical round unworked stone was found. Typically these seem to be resting directly against the forehead, but this one had fallen away. It is possible that it fell from its position during excavation. Near the face to the right side of the body was a T-shaped stone, and then a third long, thin stone lay inferior to that next to the upper chest. There was also a stone placed on the anterior pelvis. On the right wrist was an iron bracelet, and a bronze bracelet was around the left wrist. Eight beads were also found near the neck of the individual, all of which were round and red. This is a juvenile individual aged between 1-2 years old.

Fig. H9: Bronze bracelet with decoration PPP 271929: 031:003 from Grave 77. Photo by Andrea Squitieri.

Grave 77 yielded ten items, eight of which are red carnelian spherical beads of about 0.5 cm in diameter (PPP 271929:031:011-018). The remaining two items are two metal bracelets. One is a bronze or copper-alloy bracelet, complete, showing two decorations in the form of spirals (PPP 271929:031:003, **Fig. H9**). It has a diameter of 4 cm. The other bracelet was found broken in four fragments and is made of iron; its diameter was originally about 4 cm (PPP 271929:031:002).

Grave 80

Age:

- L Radius 78 mm: M (6 months-1 year) or F (6 months-1 year)[187]
- M (9 months-1 year) or F (9 months-1 year)[188]
- Dentition (maxillary M1 + M2 and mandibular I2): 2 years ± 8 months

No grave cut or architecture was seen for this burial, and it was discovered when the cranium was uncovered while looking for a floor. This grave was oriented W-E with the head in the west, facing south. It was laying on its right side with its legs bent together. The left arm was laying over the body with the hands lying in front of the pelvis. There was one earing laying on top of the left temporal and another earring underneath the right temporal. Both earrings appear to be bronze hoops with alternating blue and white beads. The earring on the left had five beads and the earring on the right had three beads. When the cranium was lifted out excavators discovered that there was a ring of four stones creating a pillow-like shape underneath the head. This is shown in the photo of the grave after the removal of bone and cleaning. The stones are all different shapes and colours. This individual is estimated to be between one and two years of age. Biological sex cannot be determined for juvenile individuals.

185 Maresh 1970.
186 Maresh 1970.
187 Maresh 1970.
188 Gindhart 1973.

Grave 80 yielded two earrings. The first (PPP 271928:181:002) is a thin bronze earring found above the skull and decorated with two white glass beads alternated with two dark beads also in glass. The dark beads are decorated with vertical ridges. The beads are about 0.4 cm in diameter with the exception of one white bead that has only a diameter of 0.2 cm. The second earring (PPP 271928:181:005) is a similar thin bronze item decorated with three glass beads of a diameter of 0.5 cm, two white ones (showing some fluorescence on the surface) and one darker one.

Grave 84

This grave was oriented NE-SW with the head in the NE end, facing west. The skeleton was laying on its right side with the left ankle crossed over the right one. There was one unworked stone on top of the left knee, and a long thin piece of iron was laid in the middle of the chest. The bones were heavily fragmented and weak. It was impossible to get out the pelvis, ribs, and vertebrae, so they were lifted in a block in the hope that they could be excavated more carefully later. Only three teeth survived: two deciduous canines and one deciduous molar. All three were heavily worn, so it is likely that the individual was close to losing these teeth. Extrapolated from Ubelaker[189], it is possible that juvenile was between 10 years ± 30 months and 11 years ± 30 months.

Grave 84 yielded an iron fragment (PPP 271928:191:005), much corroded, 2 cm long and 0.5 cm wide, perhaps belonging to a pin.

Grave 88

Age:

- Development of the adult maxillary central incisors and the first molars of both the maxilla and mandible: 3 years ± 12 months

The grave cut is oriented W-E with the head in the west end, facing south. The bones were in very poor condition, and were disintegrating as they were being brushed during excavation. This individual is laying on its right side with the left arm positioned over the body so that both hands could be placed anterior to the pelvis. Four beads were found in the grave. The individual is estimated to be between 2-4 years of age.

Grave 88 yielded five carnelian spherical beads (PPP 271928:180:002-004; PPP 271928:180:008 and PPP 271928:189:002), with diameters of 0.5 cm.

189 Ubelaker 1989.

Grave 93

The grave was oriented NE-SW with the head in the NE end, facing S-SW possibly, but the preservation was so poor that it was difficult to tell. The body was laid on the left side with its legs bent. The skeletal remains were fragmented and fragile. Given the development and eruption pattern of the deciduous teeth, particularly the lower left lateral incisor, canine, and first molar the individual was aged to 18 months ± 6 months[190]. Some developing adult teeth were also helpful in this assessment. Juvenile individuals cannot be assessed for biological sex.

Grave 93 yielded four items: a teardrop-shaped pendant with a perforation on the narrower extremity, made of greenish transparent glass with fluorescence (PPP 271929:045:008, **Fig. H10**); a cowrie shell with a perforation, likely used as a pendant (PPP 271929:045:006); a partially broken miniature bronze bell (**Fig. H11**); and a small elongated bronze pin with a ring-shaped head (PPP 271929:045:007, **Fig. H12**). The bell is 2 cm long and 1.8 cm wide. It has a flat rectangular handle on top with a tiny perforation. Inside the bell, there was a tiny white pebble (PPP 271929:045:005). The pin is 2.5 cm long and 0.5 cm thick (shaft). Close parallels to the items from Grave 73 can be found in many Sasanian sites in Iran[191].

Fig. H10: Teardrop-shaped glass pendant PPP 271929:045:008 from Grave 93. Photo by Andrea Squitieri.

190 Ubelaker 1989.

191 E.g. at Qasr-i Abu Nasr: Whitcomb 1985, figs. 65u and 65hh. See also Whitcomb 1985, 169 for comparisons in other Iranian sites of the Sasanian period.

This grouping of small finds were probably one piece of jewellery as they were found running down the lower right side of the neck of the individual, ending near and slightly beneath the lateral side of the left clavicle. The bell was found first on top. Underneath the bell was a bronze pin. Superior (in the plane of the body) to the bronze pin was the perforated cowrie shell. Below the pin was the teardrop-shaped pendant. This grouping is unlikely to be a necklace because it would have fallen the left where the medial anterior portion of the skeleton was placed.

Fig. H11: Miniature bell with its tiny stone PPP 271929:045:005 from Grave 93. Photo by Andrea Squitieri.

Fig. H12: Bronze pin with rounded tip PPP 271929:045:007 from Grave 93. Photo by Andrea Squitieri.

H5. Object distribution and preliminary assessment

Overall, 80 finds were collected from the Sasanian graves. Of these, 67 are small beads in glass or stone; nine small metal items, mainly for jewellery; and finally, one glass pendant, one glass shard, and two shells. As in 2015 and 2016, beads represent the majority of finds from the graves, although a larger variety of objects was found in 2017 than in the previous campaigns.

Excluding the unworked stone pebbles from this counting, the manufactured grave goods' distribution seems rather uneven: 24 out of the 35 graves excavated in 2017 (i.e., 66.5 %) have yielded no items at all, whereas only eleven graves (comprising twelve individuals) contained manufactured grave goods. Among the graves with manufactured goods, the distribution is also very uneven. A single burial (Grave 16) has yielded 33 objects out of 80 objects from all graves, which accounts for 41 % of the total.

Of the eleven graves that preserved manufactured funerary objects, only adult females and juvenile individuals are represented (**Table H2**). The individual from Grave 66 is so poorly preserved that no demographic data could be assessed. Grave 69 contained two individuals, both adult females, an old adult and a young adult. If simply split between adult and juvenile the group is roughly split in half, with the juvenile group containing one more individual. However, if more specific age ranges are used then more differences can be observed. At 41.7%, juveniles under the age of 10 years (in fact, all roughly 3 years or younger, based on dentition and long bone length) represent the majority of burials with grave goods. At 25%, older adult women (40+ years) represent the next largest group. The three other groups – young adult female; unsexed adult; and unknown – all contain only one individual and represent 8.33%. Two of the other three groups could possibly overlap, but at this time it is impossible to categorize them more specifically.

When grave orientation of burials with grave goods is compared to age no pattern is found. The only orientation not present is N-S. There is no reason to test orientation against biological sex because so far, only female adult individuals have been identified as having grave goods.

Grave	Number of grave goods	Generic Age	Specific Age	Age Range	Gender	Orientation
62	2	Adult	40-55 y	Old Adult	F	W-E
66	7	?	?	?	?	W-E
69	14	Adult	40-55 y	Old Adult	F	SW-NE
69		Adult	20-35 y	Young Adult	F	SW-NE
72	1	Adult	?	Adult	F	NW-SE
73	1	Adult	40-55 y	Old Adult	F	SE-NW
16	33	Juvenile	3 y ± 12 m	< 10 y	NA	NW-SE
77	10	Juvenile	1-2 y	< 10 y	NA	SW-NE
80	2	Juvenile	6 m - 2 y	< 10 y	NA	W-E
84	1	Juvenile	10 y - 11 y	< 10 y	NA	NE-SW
88	5	Juvenile	3 y	< 10 y	NA	W-E
93	4	Juvenile	18 m ± 6 m	< 10 y	NA	NE-SW

Table H2: Anthropological characteristics of the graves with manufactured grave goods. Prepared by K. Downey.

H6. Plans for future research

With its extensive cemetery, Gird-i Bazar gives researchers an excellent window into the life and death in this area during the Sasanian period. The 2017 field season has allowed for the excavation and preliminary analysis of life, death, and funerary practices, but this was a triage situation. Skeletons needed to be removed to be preserved and observational analyses done.

More thorough cleaning and observational analyses need to be carried out in order to gain the most accurate understanding of the wealth of material available. Each individual needs to be thoroughly cleaned, inventoried, and analysed for any possible pathologies. First, this should be done to properly curate the collection for the antiquities department and to illustrate to other archaeologists and anthropologists whether the material is appropriate for their intended research. Second, more in depth analyses can give more accurate data on the ancestry, diet, health, life, and death of this population. It can also highlight which more in depth and destructive testing would be most appropriate and helpful in providing information for the project's research questions.

In the future, statistical analyses will be utilised to compare a number of variables. Differences in grave orientation, body position, location of burial, and grave goods can be examined between adult males and females. The same questions can be explored between adults and juveniles. Variation here could help us to have a better understanding of what age an individual became an adult in this particular society; in most cultures, the community does not recognise skeletal fusion as the transition to adulthood. Age of the individual could have other effects on the choices of the mourners. For Gird-i Bazar, we can already observe that very young juvenile individuals have elaborate grave goods more often than adults: 55 manufactured items come from six juvenile graves, against 18 items from the five adult graves.

It is also planned to utilise multivariate statistics in order to evaluate the differences between age, sex, health, grave goods, grave architecture, and location to elucidate whether there are particular areas of the graveyard that are reserved for a specific group or that are more likely to house burials of a higher socioeconomic status.

In any case, it has become abundantly clear at this point that the cemetery at Gird-i Bazar contains a significantly sized Sasanian-period population that will give insight into the demographics of this region during the Sasanian period and could yield many useful comparisons for other cemeteries of this time period throughout the Near and Middle East. Large cemetery populations can help researchers to comprehend the overall makeup of the people who lived in this region, providing information about their health, quality of life, stress, socioeconomic status, and more. Hopefully, the boundaries of the cemetery at Gird-i Bazar can be identified and the remaining individuals excavated in order to create a more complete picture of this past population.

I. Conclusions and perspectives

Karen Radner, F. Janoscha Kreppner & Andrea Squitieri

In 2017, the Peshdar Plain Project continued the investigations of the Lower Town of the Dinka Settlement Complex, and the results are presented in this volume. In particular, the area of the magnetometer prospection (**§B**), started in 2015, was enlarged, thus revealing more of the densely built-up settlement of about 60 ha that extends between Gird-i Bazar and Qalat-i Dinka. The magnetometer prospection did not produce evidence for any fortification wall surrounding the Lower Town, thus raising the question whether the Dinka Settlement Complex should be called a "city" at all. The lack of a fortification wall distinguishes our site from the excavated Neo-Assyrian cities in the heartland (Aššur[192], Dur-Šarruken = Khorsabad[193], Imgur-Enlil = Balawat[194], Kalhu = Nimrud[195], Nineveh[196]) and in the western and northern provinces (including Dur-Katlimmu / Magdalu = Tell Sheikh Hamad[197], Kunallia = Tell Tayinat[198], Til Barsip / Kar-Shalmanassar = Tell Ahmar[199], Tušhan = Ziyaret Tepe[200]). Yet it is much larger and more complex than the small rural settlements uncovered during the Saddam Dam excavations in the Eski Mosul area in the 1980s[201]. We have therefore opted to use the deliberately vague designation as an urbanised settlement.

The residential areas of the Dinka Settlement Complex in particular appear to have been carefully planned rather than have developed gradually. Our new ^{14}C results (**Fig. I1**) seem to indicate that not all parts of this site, despite appearing single-phase, were in use at the same time. In particular, there are dates from seeds and legume fragments from Gird-i Bazar (now also referred to as "Dinka Lower Town operation 1" or DLT1) and the new Dinka Lower Town operation 2 (DLT2) that predate the Assyrian annexation of the area in the second half of the 9th century BC (**§C2.1**; **§D2.1**).

Revising our previous understanding[202], our current working hypothesis is therefore that the buildings excavated in Gird-i Bazar represent an Early Iron Age village, founded on a shallow mound that raises out of the Bora Plain even when the Lower Zab is in flood. This village consists of a range of roughly identically sized buildings with highly individual layouts of rooms and inner courtyards, usually with a private well, that are separated by narrow alleys and arranged around open spaces serving communal activities. The final season of excavations at Gird-i Bazar in 2017 (**§D**) permitted us to deepen our understanding of this village. We can now firmly place various activities linked to pottery production in the open areas, and thanks to the discovery of a component of a potter's slow-wheel in Courtyard 18, we are now able to identify one of the pottery workplaces in this courtyard of Building I (**§G**).

According to our current understanding, this village was replaced by, or possibly integrated into, the newly created Dinka Settlement Complex in the course of the incorporation of the Peshdar Plain into the newly founded Assyrian Province of the Palace Herald. The magnetogram provides insight into the layout of this much larger settlement, shaped like segments of a spider web that radiate away from the rocky outcrop of Qalat-i Dinka on the Lower Zab river in the south, with Gird-i Bazar lying at the extremity of one of these segments. The magnetogram indicates various residential quarters separated by alleys and roads (**§B**, **Fig. B8**).

In an isolated position on another shallow elevation on the northwestern edge of the settlement area, the magnetogram indicated a group of three large buildings. This is where a first test trench was excavated here in 2017

192 Andrae 1977.
193 Albenda 2003.
194 Curtis 1982.
195 Oates/Oates 2001.
196 Petit/Morandi Bonacossi 2017.
197 Kühne 2013.
198 Osborne 2017.
199 Bunnens 2016.
200 Matney *et al.* 2017.
201 Curtis 1989; 2016.

202 Radner/Kreppner/Squitieri 2017b, 180: "For the time being, we assume, because of historical data and the results of ^{14}C analysis on two pieces of charcoal excavated in two distinct areas of the "Dinka Settlement Complex" in 2015, that the site was founded in the second half of the 9th century BC when Shalmaneser III of Assyria (r. 858-824 BC) had the Border March of the Palace Herald established."

Fig. I1: Distribution of the ^{14}C dates currently available (in calBC; date ranges with highest probabilities) from the Dinka Settlement Complex marked by red dots; with the green triangle marking the approximate findspot of the Neo-Assyrian tablet of 725 BC. Drone image created by ICONEM (Paris; http://iconem.com), courtesy of Un Film à la Patte (Strasbourg; http://www.unfilmalapatte.fr) and Jessica Giraud. Prepared by Andrea Squitieri.

(DLT2; **§C**), and it confirmed the results of the magnetometer prospection. We brought to light the partial plans of Buildings K (ca. 280 m²), L (ca. 800 m²) and M (ca. 650 m²), whose sizes are considerably larger than any of the other architectural units recognisable in the magnetogram in the rest of the settlement (**Fig. B8**). Size and layout suggest that these buildings did not have a domestic purpose, but a functional specialisation that served the wider community: the discovery at Building L of a room full of large storage vessels with remainders of grain indicates grain stockpiling. The pottery and the objects retrieved from DLT2 (**§F1**, **§F2**, **§G**) establish a strong link with the material culture attested at Gird-i Bazar. ^{14}C analysis of two emmer corns from one of the storage vessels in Building L produced possible date ranges of 1012-894 calBC (94.4% probability) and 930-824 calBC (95.4% probability) (**§C2.1**).

Summing up, the material culture and the first ^{14}C dates from DLT2 suggest that its occupation was contemporary with that of Gird-i Bazar, and the continued excavation of DLT2 and further ^{14}C sampling from both operations will substantiate this first assessment. For the moment, our working hypothesis is that the (original) occupation of both these areas in elevated positions, largely protected from the spring flooding of the Lower Zab, predates the Assyrian conquest.

But how long where these areas in use? Here, we want to highlight the ^{14}C date gained from one of the human bodies that was thrown into one of the private wells of Gird-i Bazar (Building I; **§D19.5**), which firmly falls into the period after the Assyrian annexation. The long date range of 748-409 calBC (95.4 % probability), courtesy of the highly inconvenient Hallstadt Plateau that hampers more precise radiocarbon dating between ca. 800 and 400 BC[203], excludes, however, any connection with the Assyrian conquest in the 9th century BC. Were the bodies killed and deposited when Assyrian control over the region was lost sometimes in the 7th century BC? In any case, the fact that bodies were placed into a well inside one of the houses at Gird-i Bazar demonstrates that the buildings of

203 Hajdas 2008, 16.

the village were accessed, at least occasionally, also at the time after the Assyrian annexation.

For historical and agricultural regions[204], we currently assume a connection between the growth of the Dinka Settlement Complex and the creation of the *qanat* system that we have been investigating west of Gird-i Bazar in the surrounding Bora Plain since 2015 by means of surface surveys and geo-electric resistance tomography (ERT)[205]. This underground irrigation system led groundwater from higher elevations east of the Dinka Settlement Complex into the plain. We therefore suggested dating the extensive structures to the Iron Age, and more specifically the time of the Assyrian domination[206]. For the Early Iron Age, we assume that the spring floodwaters of the Lower Zab river were used for irrigation of the plains by controlled flooding. However, building up the Bora Plain with the low-lying residential quarters that constitute the Dinka Settlement Complex was only possibly if the Lower Zab was hindered from seasonally flooding the plain, as it does when not managed otherwise. A geo-archaeological sounding of 2015 (**Figs. A5**, **A6**: GA42[207]), south of DLT2, produced charcoal from an archaeological layer whose date range of 830-789 calBC (probability 95.4%) definitely falls into the period after the Assyrian conquest and provides clear evidence for that part of the Dinka Settlement Complex's occupation during the Assyrian domination[208]. Future research will need to focus on the investigation of the residential areas in the low-lying areas of the Bora Plain.

Without the irrigation provided by the river flooding, the Dinka Settlement Complex required alternative water for the agriculture needed to support the site. We therefore see the creation of the complex underground *qanat* system, parts of which are again in use today, as the solution to this problem. Also, maintaining sanitary conditions and agriculture on the scale necessary to support the greatly enlarged settlement will have required the reliable and continual supply of water that such an underground irrigation system, in contrast to seasonal flooding, was able to provide, justifying the time, labour and expense necessary for its creation.

An important but tantalising discovery at Gird-i Bazar in 2017 was the deep communal well encountered in Outdoor Area 7 (**§D7**), which could not be excavated in full[209]. Its fill produced a great deal of pottery, but also a donkey mandible, which ^{14}C analysis dated to the period well before the Assyrian annexation (1006-901 cal BC, 95.4 % probability). Intriguingly, the shape of the well recalls that of the *qanat* shafts. A physical connection between the qanat system and Gird-i Bazar's deep well is quite unlikely, but the similarities in the workmanship point to the role of local expertise in the construction of the underground irrigation system.

Massive interventions in the landscape have been documented elsewhere as part of imperial Assyrian land use[210], for example the hydraulic constructions to supply water for the capital cities of Kalhu and Nineveh or the canal along the Khabur river in northeastern Syria[211]. In the Bora Plain, however, a great deal of technical and financial effort was put into a project without any apparent prestige character. At the Dinka Settlement Complex, the transformative influence of the Assyrian Empire can thus be traced not only in an unexplored geographical context, but also in a hitherto unknown social and economic context.

Where do we stand with the Lower Town? The material culture so far unearthed in our two digging operations in the Lower Town (Gird-i Bazar = DLT1 and DLT2), both situated on elavated sites, does not reveal any obvious Assyrian influence (**§F1**, **§G**). Rather it seems deeply rooted in the local traditions linked to the Zagros area. Regarding pottery, there is presently no evidence for Neo-Assyrian fossil types like hammerhead bowl, indented rim bowl, nipple base, collar jar or fine ware ("Palace Ware"), whose attestation was integral to the attempted identification of the Assyrian imperial presence on the northern border of the Empire[212]. With regard to the production and consumption of ceramics, neither pottery symbolising Assyrian elite affiliation[213] nor pottery possibly associated with the Assyrian administration[214] has been recovered so

204 While the presence of the Sasanian cemetery with 92 hitherto identified graves, overlying the ruins of the earlier buildings at Gird-i Bazar (**§H**), points to the existence of a Sasanian settlement somewhere in the Bora Plain, this cannot have been very large, and we consider it unlikely that the qanat system was built only at that time.

205 Altaweel/Mash 2016; Altaweel 2017.

206 Radner/Kreppner/Squitieri 2017b, 176.

207 Altaweel/Marsh 2016, 27-28.

208 The Assyrian presence on Qalat-i Dinka is demonstrated by the Neo-Assyrian tablet dated to 725 BC: Radner 2015; Radner 2016c, 17-18.

209 We hope to return there, and also to the well in Building I, to conclude the excavation of the fill.

210 Wilkinson *et al.* 2005; Harmanşah 2012; 2013, 72-101.

211 Kühne 2018.

212 Parker 2001, 283-285.

213 Hunt 2015 on "Palace Ware".

214 For the Middle Assyrian period, Pfälzner 2007 and Postagte 2010 argued for a clear connection between specific types of ceramics, in particular carinated bowls, and the Assyrian administration. For the Neo-Assyrian period, such a link has been postulated by Parker 2001 but not demonstrated.

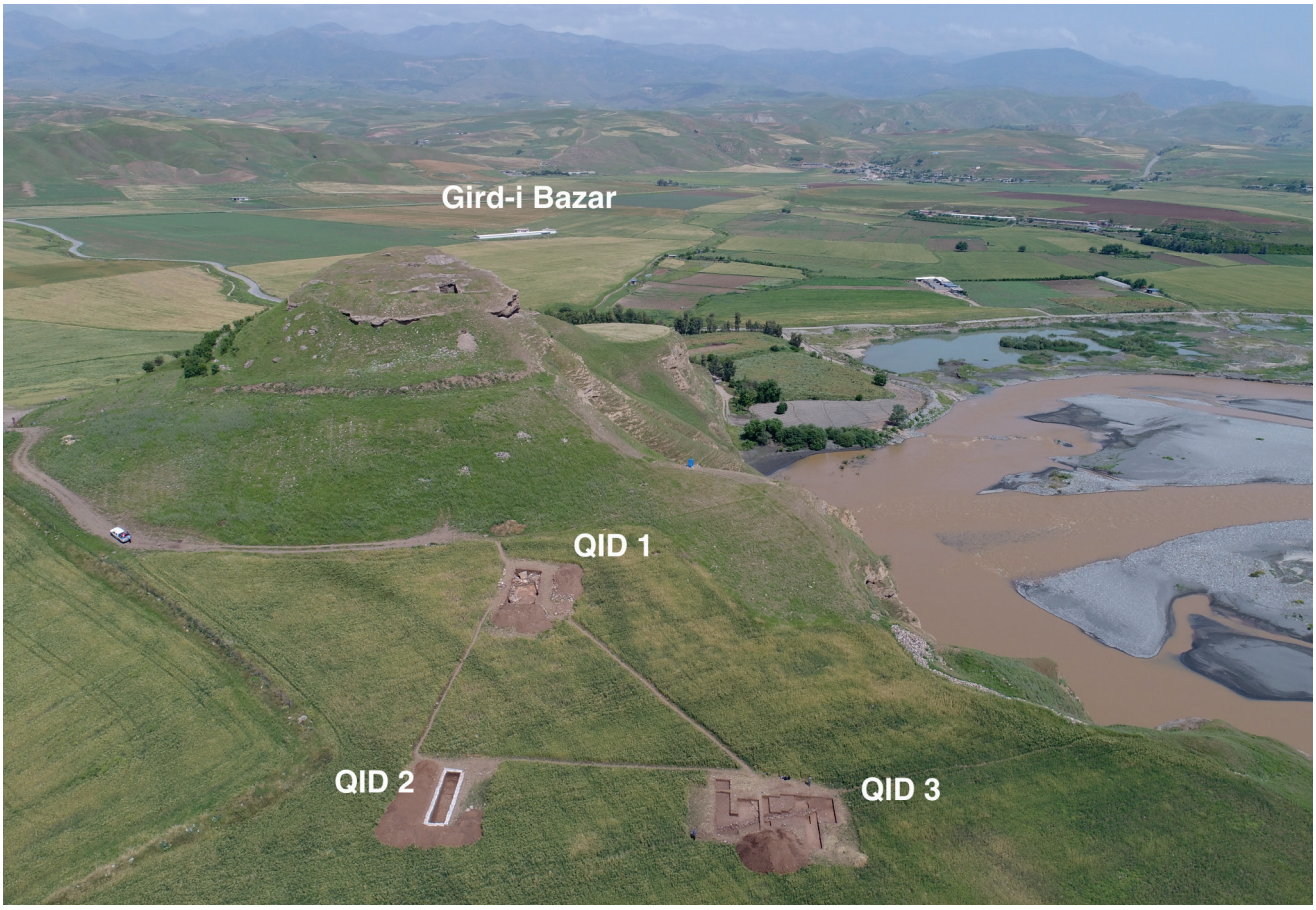


Fig. I2: View from south of the western slope of Qalat-i Dinka, showing the three trenches opened in 2018: QID1, QID2 and QID3. Gird-i Bazar is visible in the background. Drone image by Andrea Squitieri, taken with a DJI Phantom 4 Pro.

far. Regarding architecture, building techniques but also building design is shaped by local traditions. The typical type of ground plan for Assyrian palace and residential architecture termed "Hofhaus mit vorgelagertem Empfangsraum"[215] that is also well attested in the western and northern provinces of the Assyrian Empire, has not been identified, neither in our excavations nor in the geophysical prospection.

However, we interpret the urbanisation process in the Bora Plain, including the planning and creation of extended residential quarters and of the road system that connects them and the realisation of a large underground irrigation system, as the result of the Assyrian domination of the Peshdar Plain. Excavations in one of the low-lying residential quarters is the necessary next step in our research programme.

While we did not excavate on the rocky outcrop of Qalat-i Dinka in 2017, the spring campaign of 2018 has seen us return to its western slope, and we shall close this book with a brief first assessment of what we now term the Upper Town of the Dinka Settlement Complex[216]. We continued excavation of the first test trench dug in 2016[217] and opened two more trenches (**Fig. I2**). As revealed by the magnetogram, the area is divided into two parts by an anomaly of semi-circular shape and of a length of 200 m (**Fig. A4**). Trench QID1 (**Fig. I3**), in the intramural part, revealed remains of substantial stone architecture, of much larger dimensions than anywhere in the Lower Town, as well as precious objects, such as fragmentary worked ivory, and seven iron arrowheads. In trench QID2 (**Fig. I4**), we encountered a large, sloping stone structure that we interpret as a glacis and part of the defence system for the Upper Town. The stone structure exposed in QID3 (**Fig. I5**) may have served as an inner divider of the settlement

215 Miglus 1999, 175.

216 Full results will be published in the next volume of the series Peshdar Plain Project Publications.

217 Kreppner/Squitieri 2017a.

or as another part of the defence system, perhaps a rampart. The monumental architecture of QID1 as well as the ivory finds from there point at the presence of elites in the fortified Upper Town, feeling safe behind the defensive systems partially uncovered in QID2 and QID3. We continue to interpret Qalat-i Dinka as a fortress.

Importantly, the architectural construction methods as well as the pottery attested in this part of the excavation correspond closely to the findings from Gird-i Bazar and DLT2, again following the local traditions. When was Qalat-i Dinka built as a fortress, and by whom? The results of the ^{14}C samples, currently under analysis, may help to formulate some answers. Based on the current evidence, we assume that, using local craftsmanship, the fortress was either built or else taken over and possibly adapted in the time of the Assyrian domination, around the same time when the Lower Town was being enlarged. We have no real archaeological knowledge of how an Assyrian fortress (*birtu*) was built and organised: another reason why continuing the excavations at Qalat-i Dinka are an exciting prospect.

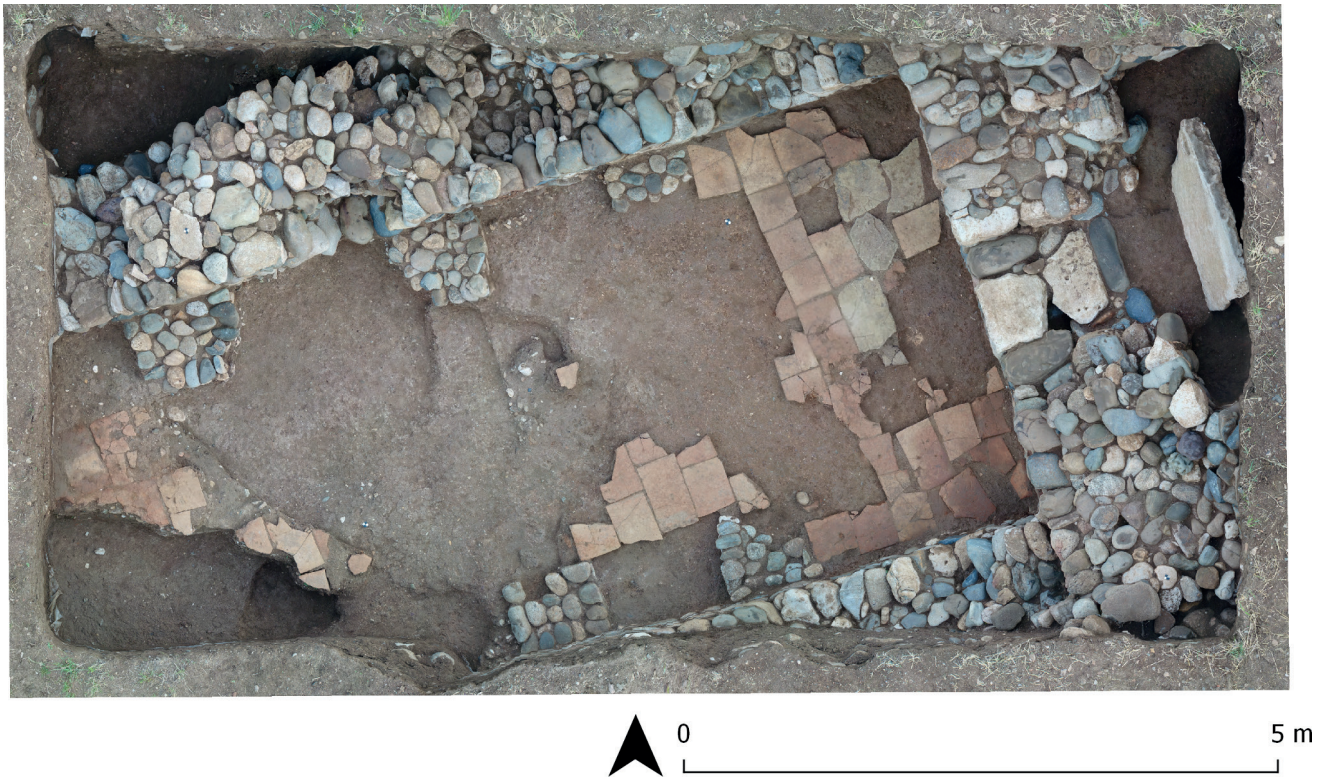


Fig. I3: Orthophoto of the trench QID1. Prepared by Andrea Squitieri.

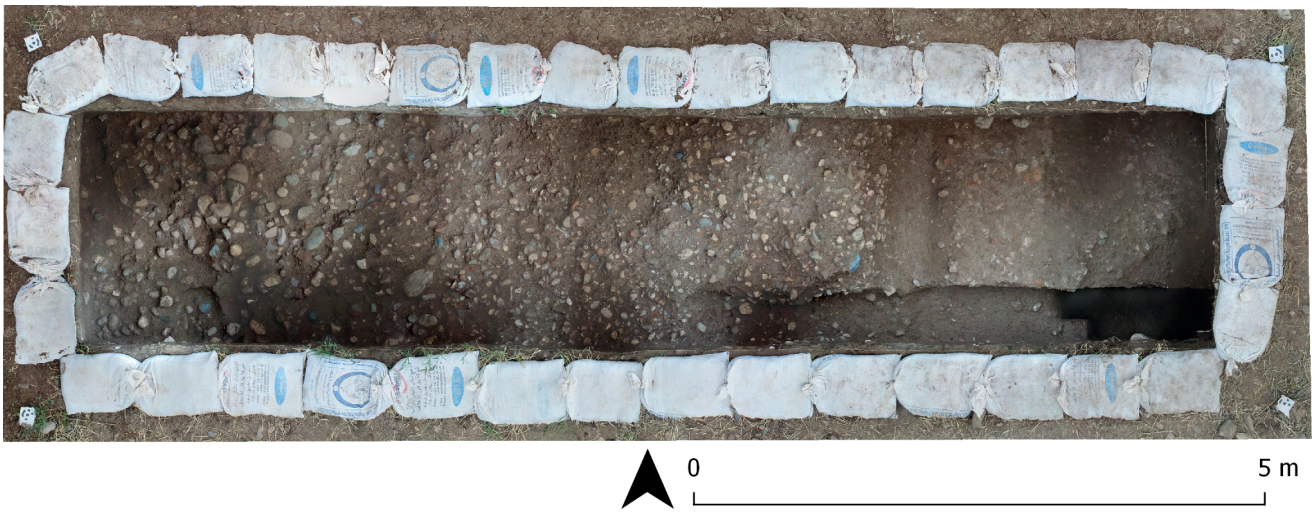


Fig. I4: Orthophoto of the trench QID2. Prepared by Andrea Squitieri.

Fig. I5: Orthophoto of the trench QID3. Prepared by Felix Wolter and Andrea Squitieri.

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