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This book presents a complex analysis of the Hrdlovka Neolithic settlement in Northwest Bohemia (Czech Republic). As the site was occupied without interruption from the Linear Pottery (Linearbandkeramik, LBK) to the Stroked Pottery (Stichbandkeramik, SBK) phase, development of many phenomena could be observed in the long-term perspective, especially the Neolithic longhouse architecture. With many well-preserved LBK and post-LBK longhouse ground plans and recorded constructional details, the Hrdlovka site can be regarded as one of the best examples of Neolithic architecture in Central Europe.

The volume comprises analyses of all essential categories of archaeological finds – pottery, lithic and stone artefacts, and animal bones. The chronology of the settlement area lays the cornerstone for further investigation of the dwellers' subsistence strategies and household activities. Text is accompanied by comprehensive catalogue of excavated artefacts, sunken features and longhouses.

Nakladatelství Jihočeské univerzity v Českých Budějovicích

Ústav archeologické památkové péče severozápadních Čech, v. v. i.

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CONTENT

PREFACE

It has been almost thirty years since the writer of this text attended the forefield of a huge open cast mine between Bílina and the Duchcov Castle in northwest Bohemia. At the beginning of May 1987 the regular control of areas, ve been found close to the northernmost point of the mine front, not far from the Duchcov Castle's historical garden. These artefacts were located in the subsoil level in long narrow areas between huge belts of plough soil heaps waiting to be transported away. The area itself was located on the administrative border between the Liptice and Hrdlovka village cadastres. The name of the second village, whose administrative area covered the majority of the Neolithic site, was chosen as the name for the entire site.

Field investigation took three years, a relatively short time, from spring of 1987 until the end of the summer of 1990. The entire area was mined away shortly after we finished our excavation. Comparing current approaches in field archaeology, some important methods, which are quite common today, were not used thirty years ago. In particular, this concerns the flotation of sediments, a basic tool used today for not only finding botanical macroremains, but also for recording small artefacts and animal bones. The investigation of the Hrdlovka site had, for the most part, the character of a rescue excavation. However, some methods, which have been used, could be regarded as innovative in the Neolithic research at that time. For example, the post-holes of Neolithic houses have been documented on profiles in prolonged trenches for the better visibility of constructional details. In addition, phosphate analysis was used for the first time in the case of longhouse 44. At the time, a young group of archaeologists and technicians from the Institute of Archaeology of the Czechoslovak Academy of Sciences took part in the in archaeological field research. Their work was enabled by a fruitful atmosphere ruling scientific life in the former branch of the Institute located in the town of Most.

Around 1993 I left the Institute of Archaeology for another job. Afterwards, opportunities for the systematic post excavation work of the site was not as readily available. Nevertheless, we processed and published younger prehistoric components from the Late Eneolithic and Early Bronze Age (Beneš – Dobeš 1992; Beneš 1998; 1999). In 2009 I asked my student, Václav Vondrovský, to elaborate his bachelor, and later master's thesis, about the Neolithic site of Hrdlovka concerning longhouses complexes and ceramic analysis. Soon after, he became the main analyst of the Neolithic Hrdlovka site. As a result, along with the archaeozoologist Lenka Kovačiková, we applied for a research grant entitled *Neolithic Houses from Hrdlovka, NW Bohemia: Changing Shape and Changing Meaning* at the Czech Scientific Foundation. The application was successful and we obtained financial support from 2012 to 2014. The team was completed by Petr Šída for the analysis of lithics and Michaela Ptáková, who contributed substantially on a theoretical level and during the preparation of texts. She is also responsible for all the hand drawings of ceramics in this book. The results of our research grant are published in this volume, as well as in a series of papers (Beneš et al. 2014, 2015, 2016, Vondrovský et al. 2015, 2016). I hope that, in the future, the work of our "Neolithic" team will continue to move forward.

Jaromír Beneš
České Budějovice, 29. 9. 2016

INTRODUCTION

Jaromír Beneš, Václav Vondrovský

This book presents the complex processing results of the Neolithic settlement area of Hrdlovka in northwest Bohemia (Czech Republic). The settlement was occupied during the period of Linear Pottery culture (Linearbandkeramik, LBK) and Stroked Pottery culture (Stichbandkeramik, SBK). In the context of Bohemian Neolithic archaeology the Bylany site undoubtedly represents the best-processed settlement with a long-term research tradition. Since the 1960´s, when the field excavation started, situations recorded at Bylany became the subject of many studies. This in turn had a significant impact on the knowledge of the Bohemian Neolithic and enriched research abroad, particularly in the methodological sphere (recently Pavlů 2000; 2010; Květina 2010b; Květina – Končelová 2011 and others). So far, a settlement of comparable extent processed in complexity is missing, particularly for the period of the Stroked Pottery culture (Pavlů – Zápotocká 2013, 19).

In this respect, the Hrdlovka site could, to a certain extent, compensate the recent situation. This is due to the fact that components excavated here reflect a major part of Neolithic development. Furthermore, the recorded assemblage of longhouse ground plans has the potential for the researching of Neolithic architecture. Before the Hrdlovka excavation the only larger Bohemian assemblage of post-LBK architecture was recorded at Mšeno (Lička 1990) and Plotiště nad Labem sites (Rybová – Vokolek 1972; Vokolek – Zápotocká 1997). However, along with the building development of recent years, new sites are being recorded during rescue excavations, for example Hostivice (Pleinerová – Zápotocká 2004), Jaroměř (Burgert 2013), Kolín (Končelová 2013; Burgert – Končelová – Květina 2014) or Turnov (Prostředník 2003). For a long time, the only publication of situations and material obtained at the Hrdlovka site was the preliminary report presenting the processing state just before the excavation was finished and shortly after that (Beneš 1991a; 1991b) along with some individual situations (burial in the sunken feature 1926: Beneš 1995). We hope that this situation is remedied by this book.

The basic goal of this book and the entire Hrdlovka research project is the processing of the complete material assemblage and situations recorded in the field. A basic inventory of material and a digitalised plan of the site had to be created. This attempt is primarily reflected in the catalogue incorporated at the end of this book, which should give a clear overview of the Hrdlovka site. The next logical step after the primary processing of material is the processing of the relative chronology of the settlement area, a complex analytical issue, which requires the implication of multidimensional statistics, based in particular on the chronologically sensitive attributes of ceramics.

The relative chronology establishes the frame for the analyses of other materials, lithics and animal bones. Their analysis tracks the subsistence strategies of settlement inhabitants in its time development, although the Hrdlovka lithics assemblage, concerning chipped, polished stone industry, querns and other coarse stone industry can be concerned as average in quantity as well as quality. The majority of attention is paid to distribution networks of raw material on a regional and inter-regional scale and their chronological changes. Unfortunately, the osteological material can be described as very poor both in quantity as well as in quality, which was most probably caused by pedological conditions at the site. The archaeozoological analysis has thus contended with some limits. Nevertheless, the strategies of animal husbandry at Hrdlovka in regional context can be traced.

The uniqueness of LBK and post-LBK longhouse assemblage from Hrdlovka has been mentioned. This is also a result of the good visibility of architectural and constructional details of houses as well as their variability. The analysis is thus concerned about the questions of house construction. During the excavation, the phosphate analysis of one longhouse ground plan, which enriches the (so far not large) assemblage of such analysed buildings, was also performed. Further, also the symbolic mean-

ing of the house should not be put aside. We suggest its artefactual expression in the rare accumulation of querns spatially connected to the longhouse, worthy in itself of detailed analysis.

We hope the Hrdlovka site will become a proper representative of the Neolithic period in the northwest Bohemia region. The specifics of this area, which is in several aspects different in comparison with central and eastern Bohemian lowland regions, are known (Rulf 1997). Due to this we have turned our attention in particular to the present-day regions of German Saxony, because recent borders should not limit our knowledge of prehistory. This approach brought some significant links in the development of both areas, which should be followed in future research.

1. THE NATURAL SETTING

Jaromír Beneš

1.1. The Geology, Geomorphology and Pedology of the Region

The Neolithic site of Hrdlovka was situated in Northwest Bohemia in the Czech Republic in the lowlands of the Podkrušnohoří Basin area (Fig. 1.1). The site was located close to the foothills of the Ore Mountains (Krušné Hory), damaged by brown coal mining since the 19th century. The landscape is part of the Bohemian Massif with a complicated geological history. The Ore Mountains form an important body of the northern part of the Bohemian Massif (*Saxothuringikum*) gradually limited lowland basins from the North in Germany.

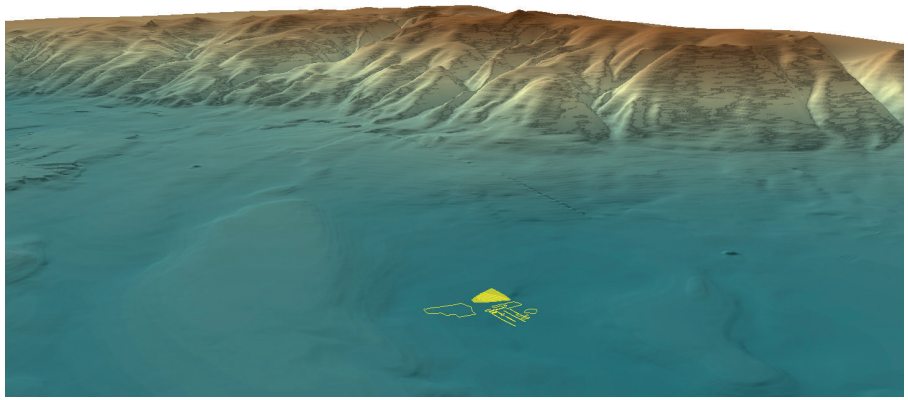


Figure 1.1. Position of the Hrdlovka site in the reconstructed elevation model of the Podkrušnohorská Basin, currently deeply modified by mining activity.

Border mountains were formed during the Varisian mountain-building period between the lower Devon and upper Perm in the Palaeozoic. The dominant rock bodies of the Ore Mountains are granites, rhyolite and gneiss. A crucial geological feature of the region is the Ore Mountain rift situated in the northwest from the Ohře (Eger) river, causing a steep uplift on the Bohemian side (Chlupáč et al. 2002, 204–206). The basin lowland was formed in the Tertiary period as part of the Elbe river drainage area with a low base-level of erosion. The landscape took on its current appearance at the end of the Tertiary Period as a result of rock and earth removal and basin sedimentation (Bártová et al. 1999, 12–19). Neovulcanic activity in the České Středohoří Mountain formed the southern limit of the Podkrušnohoří Basin by a number of volcanic outstanding rock cones frequently exceeding hundreds of meters above lowland basin level. The western section of the České Středohoří Mountain forms an impressive landscape and is composed mainly of Cretaceous marlstones and sandstones or a volcanic–sedimentary complex. Their slopes are rich in rocky outcrops and a huge open accumulation of screes without a fine-grained matrix (Juřičková et al. 2013).

After the main neo-volcanic period in the Mostecká Basin a lake system was developed in the area as a result of sedimentary activity. A lakes system with argilliferous deposits and brown coal layers arose in the basin. From the perspective of the Neolithic occupation, local quarcite deposits (Skršín

type and Tušimice type) originated by the silification in some upper Cretaceous and Tertiary layers. The geomorphological formation of the Podkrušnohoří Basin landscape and the Mostecká Basin is, in particular, connected with neotectonic movement, hydrological activity and the accumulation and erosion of the Quaternary period. Loess deposits are frequently distributed throughout the basin.

The main hydrological body in the basin is the river Bílina, a 80 km long left tributary of the Labe (Elbe) river with a complex of local creeks comprising drainage elements of shallow basin valleys. The hydrological network of the Bílina river drainage area was basically formed in the late Tertiary and in Quaternary period (Bártová et al. 1999, 31–34). Most of the Neolithic sites are situated in the basin's moderately articulated shallow valleys. Its hydrological regime is usually connected with straight floating creeks shaping long axes of the valley bottom.

The dominant water body of the Mostecká Basin at the end of the Late Glacial period was the Komořany Lake. The lake basin is situated within the Miocene sediments of the Mostecká Basin. The lake origin probably lies in the subsidence of part of the Most Basin and the damming of the Bílina River by a landslide of clastic material during the Late Pleistocene and Early Holocene transition (Řeháková 1986). At its maximum extent, the area of Lake Komořany was approximately 25 km^2 at an altitude of 230 m a.s.l. (Rudolph 1926). The lake's maximum depth probably did not exceed 10 m. It had several inlets and one outlet. The water basin, which persisted continuously from the Late Glacial Period, was completely drained in the 19th century (Bešta et al. 2015). The shore of the Komořany Lake was intensively settled since the Late Palaeolithic (Neustupný 1985). The Neolithic site of Hrdlovka is 8 km east of the North-eastern shore line of the former Komořany Lake (Fig.2.2). Some other Neolithic sites were situated much closer to this water basin. The water body of the Komořany Lake attracted a dense and specific prehistoric occupation, which might be connected with "lake" economy.

The climatic characteristic of the Northwest Bohemia region is created by its Atlantic/Continental position, which determines mild humid climatic zone conditions with prevailing western directions of wind streams. Its position on the edge between two climatic regimes makes weather variable. The difference between the lowest and highest point of the region is more than 1000 m. While the average temperature these days in the warm lowland of the Mostecká Basin in July is 18–19°C and -2–-3°C in January, the average July temperature in the Krušné Mountains is only 14–15°C and -4–-5°C in January (Bártová et al. 1999, 26–31). However, a mountain massive protects lowlands against north and northwest cold streams while shaping considerable precipitation shadows significantly affecting water balance. Annual precipitation in the basin lowland is therefore 350–400 mm during the vegetation period and 200–300 m in winter.

As mentioned above, the Mostecká Basin is built by Tertiary sediments. However, in some areas Quaternary loess deposits superimposed older geological features. This fact fundamentally formed the pedogenesis of the basin landscape. Main types of soils found here are different kinds of brown soils and chernozem, covering a substantial part of the lowland areas. The main period of pedogenesis here is the warm period of the Holocene with a mosaic of woodland, steppe or steppe-like vegetation. The large islands of loess are covered by modal chernozem. On the base of the heavy Tertiary loam *smonice* soil has been detected, as well as the vertic chernozem. These are some of the best fertile soils, however, their workability could be problematic (Bártová et al. 1999, 36–39).

The current knowledge of chernozem and similar types of heavy lowland soil pedogenesis indicates that the environmental condition of the evolution in Central Europe was a complicated variable process (Vysloužilová et al. 2015). The traditionally accepted assumption that Central European chernozems have developed under steppe has been declined (Vysloužilová et al. 2014). Chernozem has been found capable of persisting and perhaps developing under woodland as well. The spatial variability of soil types in the Mostecká Pánev Basin area also suggests a variable pedogenesis in the early and middle Holocene. Large-scale human impact, recorded here minimally since the Neolithic period, contributed to the persistence and dynamic development of chernozem and chernozem-like kinds of soil in the Mostecká Basin areas (Beneš 2004; 2008a). The anthropogenic formation of soil

profiles is, according to current research, obvious not only in the basin lowland, but also in the western part of the České Středohoří Mountains (Juřičková et al. 2013).

1.2. The Palaeoecology and Vegetation Ecology of the Region

The vegetation of the Northwest Bohemian landscape should be described under the concept of "potential vegetation," which reconstructs hypothetical past vegetation cover according to geomorphological and ecological factors (Neuhäuslová et al. 2001) without or with minimal human influence. Under this concept the vegetation of the top of the Ore Mountains is characterized as a waterlogged spruce woodland (*Mastigobryo-Piceetum*), woodrush-beech woodland (*Luzulo-Fagetum*) in lower montane positions and oak-hornbeam woodland (*Melampyro-nemorosi Carpinetum*) as the dominant vegetation in the basin lowland. However, these vegetation characteristics are only indicative of a hypothetical framework, not real vegetation cover in the Holocene.

Unlike the previous approach based on the concept of "potential vegetation," current studies are more associated with direct botanical and mollusc data acquired by various palaeoecological archaeobotanical methods such as palaeopedology, palynology and anthracology (Beneš 2004, 2008b; Novák et al. 2011; Kočár et al. 2014; Vysloužilová at al. 2014; 2015). It is argued that in warm areas with an annual precipitation of less than 500 mm, even during the more humid Atlantic period, a mosaic of steppe elements existed continuously since the beginning of the Holocene.

There is strong palynological evidence in Northern Bohemia for "the mid Holocene bottleneck" as a mechanism explaining how a landscape mosaic with patches of open pine-birch forest and steppe grassland survived until the Neolithic. Such vegetation could have covered the driest and warmest areas in the Mostecká Basin, where the Hrdlovka site is situated. The spread of mesophilous broadleaf trees with oak dominance could be synchronous with the onset of the Neolithic (Pokorný et al. 2015). Pollen analysis records in the Atlantic period show that *Quercus* sp., *Ulmus* sp., *Tilia* sp. and *Fraxinus excelsior* dominated in the vicinity of the Komořany Lake (Bešta et al. 2015). Anthracological data from archaeological sites in the Bílina drainage area reflect the oak dominated woodland (*Quercetum mixtum*) with the presence of *Quercus* sp., *Acer* sp., *Tilia* sp., *Ulmus* and *Fraxinus* excelsior (Novák et al. 2011). How open the landscape mosaic in the area of Hrdlovka and the near vicinity was, is the subject of current research.

An analysis of the Neolithic faunal assemblages indicates the occurrence of wild animals such as Artiodactyls (e.g. *Bos primigenius*, *Cervus elaphus*, *Capreolus capreolus*, *Alces alces, Sus scrofa)*, Carnivores (e.g. *Vulpes vulpes, Ursus arctos)*, Lagomorphs (*Lepus europaeus*) and some Rodents (e.g. *Castor fiber, Cricetus cricetus*) in proximity of the settlements (Kyselý 2005; Kovačiková 2012). It also suggests the hunting activities of prehistoric peoples.

The environmental requirements of the above mentioned taxons include various biotopes starting from non-wooded parts and cultivated landscapes (e.g. brown hare or common hamster) from lowlands up to submontane regions to discontinuous broadleaved and mixed woods (e.g. roe deer, red deer, wild boar), old-growth forests (e.g. brown bear) or in areas with wetlands, peat bogs and meadows (e.g. elk) (Anděra – Geisler 2012, 247–257). The bone remains of beavers indicate the localisation of settlements near freshwater habitats including rivers and streams (e.g. Kovačiková – Trojánková 2014). The malacozoological investigations of the remains of terrestrial gastropods found in settlement features dated back to the Neolithic period are usually associated with open habitats, alternatively groves and bushes (Ložek 2007, 68).

1.3. The Palaeoecological Characteristics of the Hrdlovka Site

The geographical and palaeoecological position of the Hrdlovka site seems to be optimal. The lowland setting on the slightly elevated plateaux on the confluence of the Loučenský Stream and an unnamed occasional right tributary made the hydrological setting of the site suitable. During archaeological excavations variable geological observations have been recorded. In the eastern part of the site (area V) 20-50 cm of Quaternary loess and loess-like sediments overlapped Tertiary loamy deposits in the central part of the site (area SJ) while a clear yellow deposit dominated and Quaternary deposits were absent. Area Z was almost flat and covered by a thin layer of loess (20 cm) and Late Neolithic (Eneolithic) sediments or cultural deposits (10-20 cm) beneath modern soil. Area B, situated southwest from the other was built of loess-like thin deposits and limited from the southwest by a moderate slope with thicker Quaternary sediments originating in the Early Medieval period.

2. HISTORY OF DISCOVERING AND ARCHAEOLOGICAL KNOWLEDGE

2.1. The Podkrušnohoří Region during the Neolithic Period

Václav Vondrovský

At the end of the 70s the network of identified and, in many cases, also excavated Neolithic sites was thick enough to define the individual settlement regions of Bohemia (Pavlů – Zápotocká 1979). Emphasis was also given to the environmental factors which had significantly influenced the settlement patterns.

In this chapter, we will focus on the Podkrušnohoří region (Pavlů – Zápotocká 1979, no. 16), which more or less corresponds with the geomorphological formation of the Chomutov-Teplice Basin and continues in the northeast up to Ústí nad Labem[1]. Apart from the Podkrušnohoří region in the area of northwest Bohemia, further regions that can be distinguished include the middle Ohře River (no. 14) and Litoměřicko (no. 15) (Pavlů – Zápotocká 1979, 282–289). In the frame of settlement regions smaller units can also be observed. These are called microregions. Their axes are in turn usually created by smaller water streams (cf. Břicháček – Rulf 1992; Pavlů 2002; Řídký 2011, 76–220). In some cases this has been proven to be the model of central and satellite settlements (Pavlů 2000, 169). These units can be traced to the Podkrušnohoří region thanks to the creeks and brooks going down from Krušné and Středohoří Mountain slopes which consequently flow into the Bílina River (Beneš 1995, 66). Along the Loučenský Creek, where the Hrdlovka settlement lies, many other Neolithic sites identified by surface collections, test pits and in several cases also by large-scale excavations can be observed. However, a complex analysis of these excavations is missing, complicating the cognition of settlement structure in this microregion and its chronological development. After all, unlike other Bohemian regions (cf. Pavlů – Rulf 1996; Končelová 2005; Stolz 2009; Zápotocká 2009a; 2011), the Podkrušnohoří region itself has not yet been comprehensively evaluated. Such a task goes beyond the scope of this publication, therefore only a brief overview will be propounded.[2]

2.1.1. Linear Pottery Culture

The occupation of Linear Pottery culture (Linearbandkeramik, LBK, 5500-5000/4950 BC) is in the following region of interest known at 106 cadastres (Fig. 2.1). Linear Pottery culture became emergent here with the wave of neolithisation following the most fertile areas of low altitude and loess soils, even if the earliest farmers settled also the Plzeňsko region with different pedological conditions (Pavlů – Metlička 2013, 19, 144). Considering the general trend of Neolithic dispersion, the arrival of agriculture into the Podkrušnohoří region can be expected to be spread from the south-eastward situated area of central Bohemia. It is probable the earliest farmers wave traced the flow of the Labe River and moved further to Saxony, where occupation during this period has also been documented (e.g. Hohle 2012; Kinne et al. 2014, Abb. 1). The indication for contacts between northwest Bohemia and Saxony in this initial period of Neolithic occupation might have already been documented by the distribution of the polished stone industry made from Jizerské Mountain metabasite (Šída 2014, 297).

[1] For the purposes of this brief overview the investigated area will be defined by the Chomutov, Most, Teplice and Ústí nad Labem districts. Bearing in the mind that the using present-day political districts for the description of prehistoric occupation, this was found to be the most appropriate choice.

[2] The data from the Archaeological database of Bohemia (ADČ 2010) was used mainly. For a detailed analysis of Neolithic occupation it would be appropriate to revise this data and, above all, complexly analyse the archaeological assemblages from region, particularly these coming from large-scale rescue excavations.

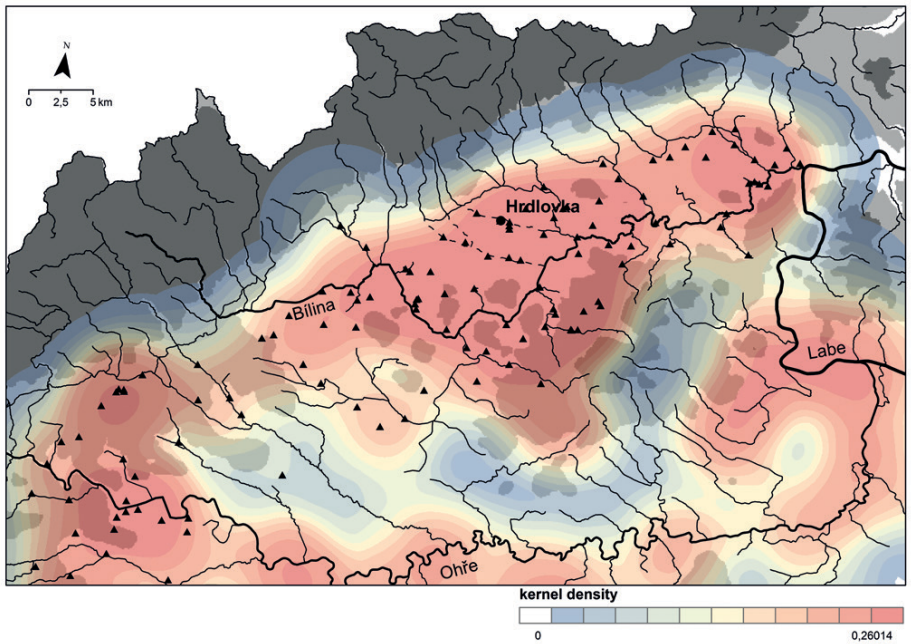


Figure 2.1. The occupation of Linear Pottery culture in the Podkrušnohoří region.

The settlement areas of the early LBK period were recorded in the Braňany (distr. Most), Bžany (distr. Teplice), Chabařovice (distr. Ústí n. Labem), Prosetice (distr. Teplice) Souš (distr. Most), Vyklice (distr. Ústí n. Labem) and Žalany (distr. Teplice) (Pavlů – Zápotocká 2013, Fig. 1) sites. Only a small part of them has been analysed and published in the appropriate way. At the Žalany site, the early LBK ceramics were present only in the form of an intrusion in the sunken feature 1/1958 where stroked pottery dominates. Bearing in mind the rugged bottom of this feature, a superposition of earlier and later phases of site occupation (Mašek et al. 1969) can be considered. Richer assemblages offered the settlement situated on the area of ca. 40 hectares among the Hrbovice, Chabařovice and Český Újezd (known in literature as Chabařovice or the Hrbovice-Chabařovice site) villages. The earliest settlement phase dated to the LBK I stage was localized in the northern part of the settlement area, whereas southward down the slope occupation did not penetrate (Kruta et al. 1966). An exceptional find is represented by an anthropomorphic figurine decorated by incised lines found in the no. 40 sunken feature (last time Lička – Hložek 2011). In the features excavated later in the field campaign of 1978, LBK I stage ceramics decorated particularly by wide grooves were represented only in a negligible amount (Zápotocká – Muška 2007, 61).

The settlement network became thicker following the middle stage of Linear Pottery culture. Typical assemblage of the LBK IIb phase in the Podkrušnohoří region can be demonstrated by finds from the sunken feature 11 of the Malé Březno site (distr. Most) (Šumberová 1995). Large-scale overburdens in the region were also undertaken, enabling significant insight in the spatial relationships in the frame of the settlement area. The Libkovice–U Cihelny site (distr. Most), about 3 kilometres from Hrdlovka, offered a Neolithic settlement at the area of ca. 7 hectares excavated under the leadership of M. Dobeš from 1988 to 1991. Considering the bad preservation statement of smaller sunken features (postholes), the number of recorded longhouse ground plans can unfortunately be only roughly estimated between 10 and 15. In the current phase of finds analysis it is not possible to determine which ground plan belongs to the LBK period and which to a later period (Káčerik 2007a). The extraordinary assemblage of 7 entirely preserved and 6 fragments of zoomorphic figurines dated on the basis of associated ceramics to the Late LBK stage (Káčerik 2008) was found in the feature 102/88.

Following the issue of Neolithic architecture, the significant assemblage of longhouse ground plans represents the settlement area of Krbice (distr. Chomutov) belonging to the Hutná Brook microregion. 15 longhouses in various states of preservation and 180 Neolithic sunken features were recorded here. The pottery decoration indicates that the site was occupied in the LBK III stage, but evidence of younger decoration styles is rather sporadic (Káčerik 2011). Taking into account the relatively thick settlement network (Březno u Chomutova, Kralupy u Chomutova, Krbice, Zásada), the microregion of the Hutná Brook allows the study of mutual relationships among individual sites, for example on the basis of raw materials distribution (Káčerik 2007b, 37).

The longhouse ground plans were also recorded during small-scale excavations. The older excavation of E. Simbriger in Tuchomyšl (dist. Ústí n. Labem) revealed a posthole structure dated generally to the LBK period. However, nowadays it is not possible to determine if it was the remains of one long building or three smaller ones (Koutecký 1965, 595). Part of the posthole building was also discovered at the Radovesice cadastre (distr. Teplice). Here, an unspecified amount of sunken features containing linear decorated pottery was found on "I" site during the excavation campaign taking place from 1973 till 1975. The next settlement, made up of 7 sunken features, was recorded in the location Pod Chlomkem (Velímský 1986, 167–168).

In the category of settlement structures, we should also mention the residues of the Neolithic well recorded in the year 1976 in the historical centre of Most.[3] Vessels, which were found in the infill, can be dated to the LBK IIIa phase (Rulf – Velímský 1993). The site in Most town currently represents the only example of a Neolithic well in Bohemia, contrasting with the Moravian region and particularly Saxony, where at least 7 Neolithic wells, sometimes with preserved wooden timbering, are known to be (Elburg 2011, Abb. 1).

The local sources of raw material in Podkrušnohoří had appreciable importance for the production of chipped stone industry during the whole Neolithic period, because it supplemented the production from imported silicites. During the LBK period the Skršín quartzite was the most used, as indicated by the chipped stone industry assemblage collected in the vicinity of Žichov (distr. Teplice). Local settlement or settlement cluster, dated most probably to the LBK II or III stage, evinces the manufacturing character given by its one-hour walk proximity to sources of Skršín quartzite and two-hours walk proximity to the source of Bečov quartzite (Vencl 1986, 495–496). However, the direct archaeological records of mining are related with the following period of Stroked Pottery culture (Tušimice: Neustupný 1963; Bečov-Písečný vrch: Fridrich – Rada 1986). Also some chipped stone industry assemblages from sites, which are more distant from the sources, might have manufacturing character. For example, the Hrobčice site (distr. Teplice), which is 5 kilometres away from the source, can be mentioned. Skršín quartzite is the most frequent here, including large flakes of this material. However, the LBK features did not offer rich assemblages of chipped stone industry (Vencl 1986, 496; Rauerová 2013, 47–51).

The end of Linear Pottery culture, the Šárka stage, has been significantly documented up to now on the Hrbovice-Chabařovice site only. At the area excavated in the 1978 season, sunken features no. 36 and 47 are typical representatives of this period. Here ceramic fragments decorated particularly by music-notes placed thickly along the line and thin filled-in bands were found (Zápotocká – Muška 2007, 61).

The number of burial grounds and isolated graves of Linear Pottery culture in the Podkrušnohoří region are in significant disproportion to the identified settlements. This is also true of the entire Bohemia region, which is partially mirroring the current statement of research, but we can rightfully assume that other burial practices apart from inhumation were also used (Pavlů – Zápotocká 2013,

[3] The town was moved about 3 kilometres south from the initial position because of an advancing brown coal quarry. On the other hand, this gave archeologists the unique opportunity of the complex excavation of a historical town centre.

89). In the light of new excavations in the Moravia region, where cremation in the LBK period was also recently documented (Šmíd 2012), we should consider these types of burials which may be irretrievably destroyed in contemporary times by, for example, deep ploughing.

In the traced region burials from the all periods of Linear Pottery culture, except from the Early stage, have been recorded. The LBK II stage is represented by graves from Chotověnka-Světce (distr. Teplice), Libkovice, Ohníč (distr. Teplice) and one burial from Trmice (distr. Ústí n. Labem), where three graves in total were excavated in total. Nevertheless, two were dated only generally to the LBK. According to preliminary dating, the burial situated in the sunken feature 1926 from Hrdlovka can also be dated to this chronological level (Beneš 1995, 65–66, Obr. 2). The grave of LBK III stage was already discovered in 1901 on the premises of König´s brickyard near Hrbovice. In 1935 two graves on the Třebušice cadastre (dist. Most) were recorded. The only known burial of the Late LBK Period is the individual placed in a ritual position in storage pit no. 44, discovered near the Plesses brickyard by Hrbovice. Remaining LBK burials in the region were not dated on the level of chronological stage: three graves were gradually documented on the wording face of the Karolina Quarry at the Bžany cadastre (distr. Teplice) and burials found in 1934 near Tuchomyšl (distr. Ústí n. Labem) (Zápotocká 1998, 169 and following; Zápotocká – Muška 2004).

2.1.2. Stroked Pottery Culture

Occupation of Stroked Pottery culture (Stichbandkeramik, SBK, 5000/4950–4400 BC) has been recorded at 86 cadastres (Fig. 2.2). Despite the slight decrease in the number of registrations, we can observe a continuity of settlement patterns established in the LBK culture. The clear relationship between settlement structures of both periods reveals "culture" as a rather artificial construct, useful to use in archaeological classification but often remote to the reality of prehistoric life (for a current discussion see, for example Květina 2010a; Šabatová 2013). Both cultures have been traditionally distinguished on the basis of pottery decoration particularly. Despite this, attributes like architecture, the already mentioned settlement structure or stone industry evince fluent continuity at least until the Early stage of Stroked Pottery culture. Nevertheless, the testimony of sites having the character of mass graves with traces of violence (Asparn a.d. Zaya/Schletz: Teschler-Nikola 2012; Herxheim: Häußer 1998; Talheim: Wahl – Trautmann 2012) and hiatus in settlement occupation, typical for the western areas of LBK ecumene, lead to concepts of socioeconomic crisis resulting in the transformation or degradation of the seeming uniformity of the Bandkeramik world in more local post-LBK cultures. In northwest Bohemia and, by extension, all of Bohemia as well as neighbouring Saxony, such situations are missing. Contrarily, the above-mentioned fluent transition can be observed. As a result, some scholars putting emphasis on higher regional variability have not accepted the concept of "great crisis" (Link 2014a).

The transitional period between both succeeding Neolithic cultures, called LBK IV–SBK I, was documented in detail in archaeological material right in the Podkrušnohoří region. The assemblage of feature 31/78 from Hrbovice-Chabařovice can be considered representative. Here techniques of late linear and early stroked pottery and, separately, parallel double-strokes (Zápotocká – Muška 2007, 62) were used in pottery decoration. The epicentre of stroked pottery genesis comprises, apart from the Podkrušnohoří, the Saxony region of Dresdner Elbtalweitung. This has been indicated by the analysis of the Dresdner-Prohlis site (Link 2012; 2014b).

Many of the previously mentioned LBK sites were also occupied during the Early stage of Stroked Pottery culture. At the Krbice site, stroked pottery is present only in the form of an intrusion in the chronologically older sunken features and no traces of SBK buildings have been recorded (Káčerik 2011, 685–686). At the Libkovice site the buildings themselves have not been chronologically analysed, however, there are 57 sunken features dated to the SBK period (Káčerik 2007a). One longhouse

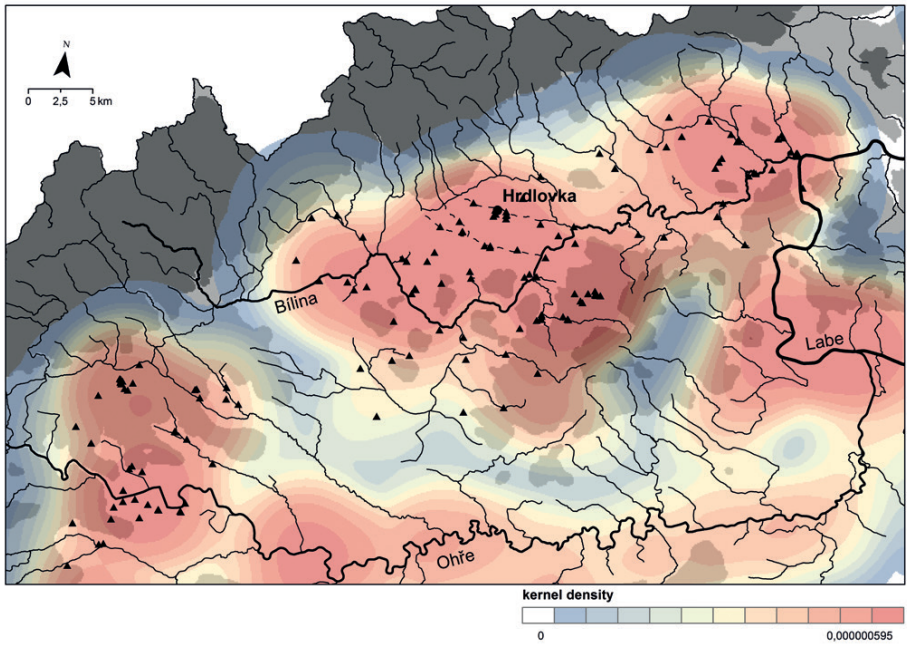


Figure 2.2. The occupation of Stroked Pottery culture in the Podkrušnohoří region.

dated back to the SBK period was recorded at the Hrbovice-Chabařovice site, but the preservation state is very poor (Zápotocká – Muška 2007, 84, Obr. 20). The assemblage of three settlement areas as documented at the Vikletice cadastre (distr. Chomutov) remains without detailed analysis. The excavations were part of a rescue campaign connected with the construction of the Nechranice water dam between 1961 and 1967. Up until now, only one longhouse ground plan with longitudinal trenches, dated back to the SBK period on the basis of ceramics from a postholes infill and the mentioned trenches, has been published (Koutecký 1965). On the same chronological level a fragment of longhouse ground plans was dated. It was recorded during 1985 at the excavation near Soběsuky (distr. Chomutov) at the U Fary site (Holodňák 1991, 429). Voluminous assemblages of the Early stage stroked pottery were obtained during the excavation in Žalany (SBK IIa phase, Mašek et al. 1969) and Hrobčice, where 5 features dated to the Early SBK stage were excavated at the overburden area in 2011 (Rauerová 2013).

The growing influence of the Lengyel culture sphere, whose epicentre laid in the Carpathian Basin, was decisive for the Early SBK stage in Bohemia. At the very beginning of this period contacts were probably rare as has been sporadically witnessed in the archaeological record by imported vessels, for example, from grave found in Praha-Dejvice (Zápotocká 1967). A new phenonmenon for all of central Europe is the rondel enclosures. On the general level their socio-ritual function is assumed, but going into detail the interpretations are variable (e.g. Pavlů et al. 1995, 98; Parkinson – Duffy 2007; Květina et al. 2009; Zotti – Neubauer 2011; Pásztor et al. 2015). Despite the relatively high occupation density of the Late SBK period in the Podkrušnohoří region only one rondel enclosure has been registered, namely in the present-day centre of Ústí nad Labem town (Lissek et al. 2007). On the other hand, in the neighbouring regions evidence of this monumental architecture are quite

frequent.[4] Considering the fact that in the Podkrušnohoří region many large-scale overburdens connected with salvage archaeological campaigns were undertaken as well as aerial prospections, the absence of Neolithic enclosures seems to be a reflection of prehistoric reality rather than a current research statement.

Some previous settlement areas (Hrbovice-Chabařovice, Krbice, Libkovice) continued in their development during the Late SBK stage, albeit with varying levels of intensity. Significant ceramic assemblage of this period was obtained from the 2/1956 feature at the Žalany site (Mašek et al. 1969) and three features (4/11, 20/11 and 21/11) in Hrobčice. In feature 18/11 a beaker decorated by small striated strokes was also found. The closest analogy is represented by the pottery of the Polish Samborzec-Opatów group or its successor, the Malice group. Taking into consideration the beaker profile, M. Rauerová, the author of ceramics analysis, is inclined to the second possibility (Rauerová 2013, 45–46). Nevertheless, wide double-strokes seem to dominate the spectrum of decoration techniques in the area of northwest Bohemia, but the overall evaluation needs the analysis of more ceramic assemblages. A sporadic presence of Rössen strokes was also recorded (Vondrovský et al. 2015).

The decline of Stroked Pottery culture (SBK V phase) and transition to the late Lengyel culture belongs, in the frame of Bohemian archaeology, to periods that are poor in the finding of assemblages and consequently less known. It can be characterised, probably under the influence of Lengyel culture, by a steep decrease of stroked decoration on the vessels of local provenience. Contemporaneously, also pottery of the Moravian Painted Pottery culture (phase IIa) have occured (Pavlů – Zápotocká 2013, 52; synchronisation table: Zápotocká 1986, Obr. 12).[5] Ceramic assemblage of the SBK V phase, even if low in number, was obtained in 1994 during the salvage campaign in the forefield of the Alexander Quarry on the Hrdlovka cadastre (Dobeš – Zápotocká 2002).

From the point of view of interregional synchronisation of local chronologies, the closed finds of three graves recorded during salvage excavation of the cadastre of Vikletice are important. The decoration of vessels found in the Early SBK cremation burials 1/64 and 2/64 has analogies in the Hinkestein group of Late Linear Pottery culture in Rhineland. Similar vessels come, for example, from the settlement areas of Worms-Rheingewann, Bischofsheim or Rübenach (Zápotocká 1986).

The large SBK burial grounds have not yet been recorded in the region under examination (Dobeš 1995, 21). Individual burials, often found in the settlement context are, however, frequent: e.g. the feature 450/88 containing one buried individual with a ceramic vessel and grinding tool, further feature 751/89 where a human skull had been deposited, the rib and two horses' skulls which were excavated at the Libkovice settlement area, at the U Cihelny site. Both contexts have been dated generally back to the SBK period for now (Káčerik 2007a). Earlier and insufficiently documented excavations of SBK burials were held in Kopisty (dist. Most, cremation, SBK), Most (distr. Most, cremation, SBK III) and Prosetice (distr. Teplice, cremation?, SBK IIa) (Zápotocká 1998, 169 and following). During a subsequent excavation in 1976 in the forefield of the Pokrok Quarry on the northeast edge of Liptice village a torso of an infant skeleton, damaged by a bulldozer during mechanical overburden, was recorded (Rada 1976; Velímský 1986, 169).

Only one grave, located at Světec (distr. Teplice), has been recorded as belonging to the period of the Late SBK V phase. The circumstances of excavation held in 1913 are considerably unclear. The only preserved items are a four-handled amphora and bowl on a narrow stem, where the latter might have been part of the set to cover the amphora orifice. Such an arrangement has been documented in some other burials of this period as well (Zápotocký 1996, 434).

[4] For a summary of Bohemian enclosures see Řídký 2011, for the Saxony region see Stäuble 2007. In neighbouring regions the rondel at Vchynice site in Litoměřice region is closest to the Podkrušnohoří region (Řídký et al. 2012). Further sites include Skupice and Lišany in the Lounsko region (Řídký 2011, 33–34; personal announcement of Z. Smrž). In Saxony, the closest rondel is the Dresden-Nickern site (Bartels et al. 2003).

[5] Considering the strong influence of Lengyel culture (Moravian Painted Pottery) it would be possible to assign this chronological phase already to the following chapter, but it has been respected the division of current synthesis of Bohemian prehistory (Pavlů – Zápotocká 2013).

2.1.3. The Influence of Lengyel Culture

As mentioned above, in Bohemia a wider source basis for the transitional phase between Neolithic and Eneolithic period is missing. The Podkrušnohoří region is not an exception in this respect. The occupation of Lengyel culture (LgC, 4400–4000 BC) has been recorded only on 6 cadastres (Fig. 2.3). This steep decrease can be partially ascribed to the fact that identification of undecorated late Neolithic pottery fragments in assemblages of surface collections is more difficult in comparison to the significantly decorated pottery of LBK and SBK cultures. In spite of that, the changes in settlement structure are clearly visible, nevertheless their nature is only quantitative. In Bohemia the same sites settled already in earlier Neolithic periods were occupied continuously (Zápotocká 2009a, 119). A comprehensive summary of sites dated to the end of the Neolithic and beginning of the Eneolithic period in the area of northwest Bohemia was submitted in M. Zápotocký's study (1996).

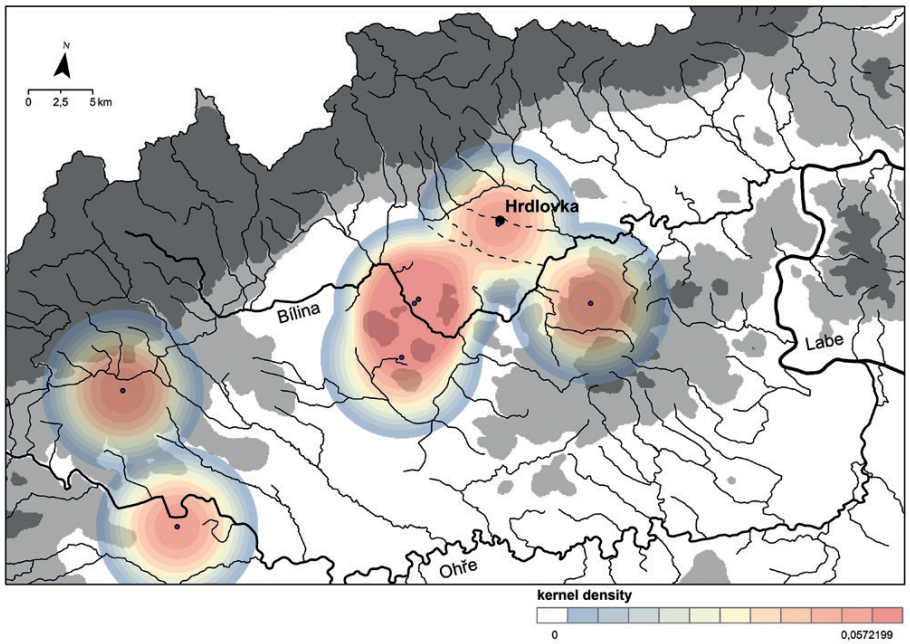


Figure 2.3. The occupation of Lengyel culture in the Podkrušnohoří region.

In the Podkrušnohoří region occupation during the late Neolithic, documented particularly in the frame of multi-phase Neolithic settlement areas with an overall longer chronological span, has been found. House ground plans were recorded exceptionally. The first example comes from Soběsuky. On the "IX" site, ground plans of houses with circumferential trenches were excavated, however their number and construction has not been specified in literature (Holodňák 1991, 429). At the Hrdlovka site one longhouse preliminarily dated to the late Neolithic period also exists (Beneš 1991b, 32). The spatially closest analogy to this architectonical type of house can be seen in the house from the Postoloprty site (distr. Louny; Soudský 1969).

The other assemblages from settlement contexts are rather small in number. During the prospection by Z. Váňa at the Libkovice cadastre a profile with cultural layer and sunken features was identified

in the brickyard working face. In the pit complex with linear and stroke decorated ceramics a vessel of Lengyel character was also found (Váňa 1952, Obr. 18). Together with other finds this vessel was later dated back to the Praha-Střešovice horizon (Zápotocký 1996, 428), directly followed by the Jordanów group. At Hrobčice in 2011 the feature 9/11, dated generally to the period of Neolithic/Eneolithic transition, was excavated (Rauerová 2013). The last, more significant assemblage of this period comes from the Bílina cadastre (distr. Teplice). It was excavated in the first half of the 20th century. Only one biconical bowl and handle-less amphora have been preserved untill today (Zápotocký 1996, 433–434).

The inhumation burial of Lengyel culture was also found at Bílina, excavated by G. Laube. Apart from one beaker, a bone bead and most probably also a garnish made of rolled copper sheet, which has not been preserved, were added in the grave. This find probably represents the oldest documented metal artefact in the Podkrušnohoří region (Zápotocký 1996, 434) and definitively foreshadows the forthcoming Eneolithic period with its deep social and material changes as reflected in archaeological record.

2.2. Hrdlovka Site in Context of Rescue Investigation and Landscape Archaeology Projects

Jaromír Beneš

The Hrdlovka site and its surroundings comprise a long history of archaeological evidences and investigation. The site was situated in a landscape with dense industrial activity, which was associated with many diverse building actions. The core of two prehistoric settlement areas is located around the former village of Liptice and at the site of Velký Fírek in the Hrdlovka village cadastre (Fig. 2.4). Both the sites are situated southwest from the Duchcov Castle Park and gardens. The original landscape before massive coal mining activity can be reconstructed with the help of historic maps (Fig. 2.5).

The oldest archaeological finds here can be traced back to 19th century (Budinský 1978), including the registration of the "Stone Age" archaeological components. In the first half of the 20th century isolated Neolithic/Eneolithic polished artefacts have been found around the Hrdlovka village (Preidel 1934). A vast amount of archaeological finds from the Neolithic period in the area around the Hrdlovka and Liptice villages is associated with the building activity of the industrial development after the World War II, namely with the later expansion of open cast mining.

"The Lomský potok project," which integrated systematic rescue activities with theoretical concepts of landscape archaeology between 1983–1992, offered a new quality in archaeological field records (Beneš 1991a; 1995; Beneš – Zvelebil 1999). In the project, data about the Neolithic period as newly regarded as an integral part of landscape occupation (Beneš – Koutecký 1987). Shortly after the project started, the studied area, originally embodying a shallow long valley of the Lomský Creek, was extended to the neighbouring valley of Loučenský Creek (Beneš 1991b), where the Hrdlovka site was discovered (Fig. 2.6). Systematic archaeological control of mining and related building activity in two valleys enabled the identification of maximum "well-visible" sites. The recorded Neolithic components in the project region were methodologically regarded as highly identifiable with the coefficient $d_x = 0.4$, indicating a ratio of areas with the Neolithic components to the sum of every area with archaeological records (Beneš 1991a, 42–43). From the methodological perspective of the Neolithic Period, Linear Pottery and Stroked Pottery Culture can be archaeologically recognized quite easily in comparison with younger period and its chorological evidence in a so-called "polygon of total excavation," which seems to be very representative.

The geographical space of the Lomský and Loučenský Stream area (LLP) project offers a dense network of prehistoric settlement areas with a chorological perspective of the Neolithic settlement areas. Currently we have knowledge of about ca 8–10 Neolithic areas, the majority of which are preserved only in fragments.

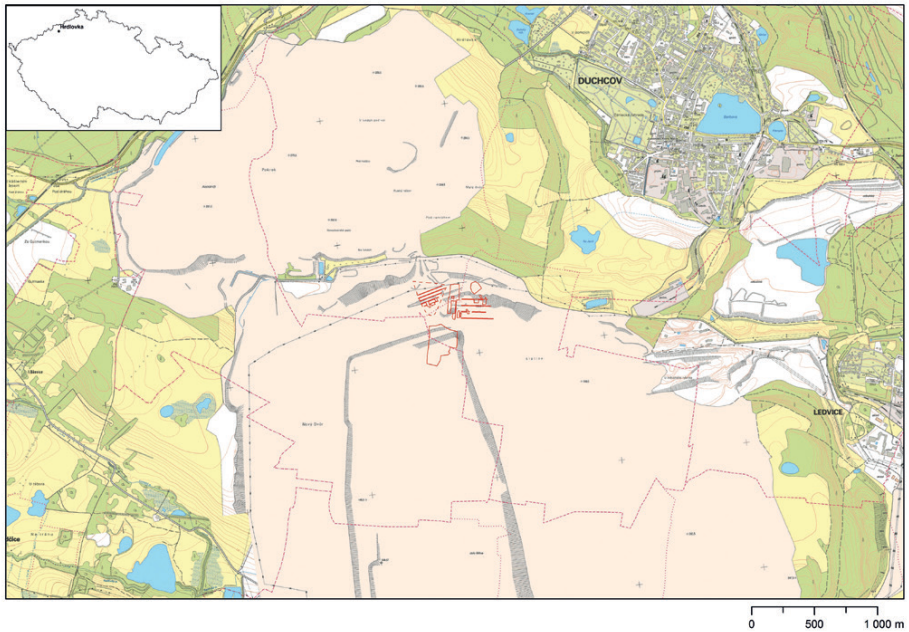


Figure 2.4. Position of the Hrdlovka site on the map with the current extent of mining.

Figure 2.5. The Hrdlovka site on the map of the Second Military Survey (1806–1869).

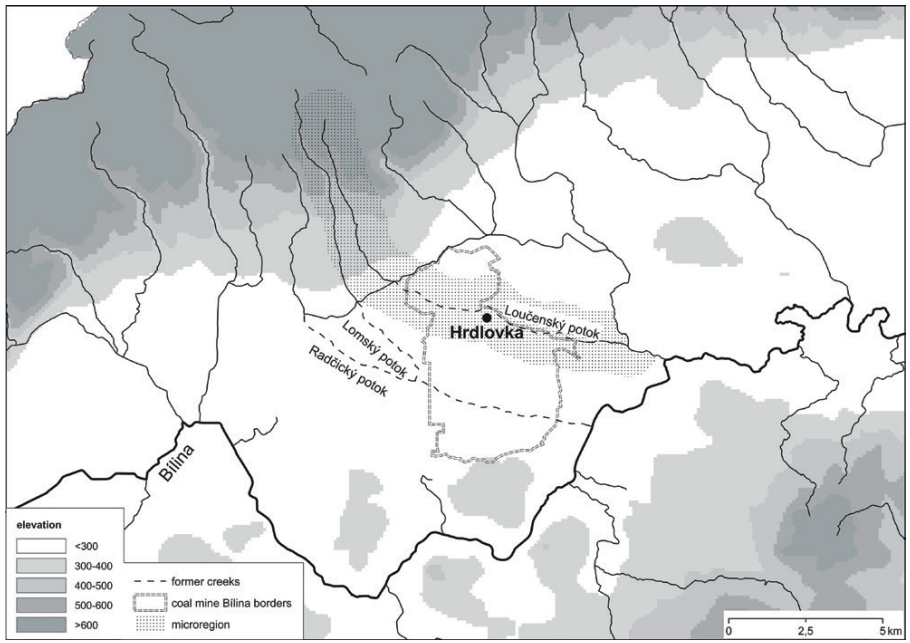


Figure 2.6. Geomorphological setting and landscape location of Hrdlovka site in the drainage area of the Loučenský Stream.

During LPP in the 1980s spatial analysis of Neolithic finds in the area of the Loučenský Stream valley alone indicated two large settlement areas from the Neolithic period. The core of the first settlement was located ca. one kilometre east from the Hrdlovka site around the former historical village of Liptice. The second Neolithic site is the Hrdlovka site itself (Beneš 1991b, Fig. 1, H). Extension of both Neolithic settlement areas have been estimated ca. 25 ha. The third Neolithic settlement area in the foothill of the Krušné Mountains, geographically associated with the Loučenský Creek, reaches an unknown extension. The site close to the Alexander Mine is located 2 km northwest, close to the historical Hrdlovka village (Dobeš – Zápotocká 2002).

An important source of data, which LLP contributed to, is the Czech Archaeological Database (Institute of Archaeology, Czech Academy of Sciences Prague, v.v.i.). This system, which originated as a system called PIAN, has recorded 14 archaeological field actions in the area of the Liptice and Hrdlovka cadastres. Most of them have been made in connection with the systematic control of mining areas and is related with the moving of ground in the gradually expanding forefield of the mine "Pokrok", later named "Maxim Gorkij" and nowadays "Bílina". These field actions reflect long-term industrial development occurring during the 1960s up until the present time.

Between 1990–1993, extensive archaeological prospection of the region was made under the framework of the Ancient Landscape Reconstruction of Northwest Bohemia (ALRNB) project. The theoretical, research-oriented objective of the project was to gain an understanding of the evolution of cultural landscape and of the social transformations associated with it. This prospection and landscape archaeology programme revealed a vast amount of the new Neolithic and other prehistoric components in northwest Bohemia (Beneš et al. 1992; Beneš – Zvelebil 1999). This knowledge enabled contextualisation of the Neolithic site of Hrdlovka in a broader landscape scale, because

the Neolithic sites had to be regarded as not an isolated phenomenon but as geographical networks (Beneš – Brůna 1994, Fig. 1). The main reason of settlement areas studies is the statement developed in several following studies that the network of the Neolithic areas founded cores of later prehistoric settlements, which were changed only a little in younger prehistorical periods (Beneš 1991c).

This phenomenon was reflected in a similar pattern of the Neolithic settlements, later prehistoric sites and burials networking in the end of the Eneolithic (Corded Ware) and the Early Bronze Age burials. During landscape archaeology studies in the Lomský and Loučenský Stream area, it became obvious that a barrow denoting a burial zone covered the Corded Ware burials. It is, however, becoming increasingly clear that the demarcation of the landscape as a burial zone survived the Corded Ware landscape. At the Lomský Stream and Loučenský Stream drainage area, where the Hrdlovka site was situated, the distribution of Early Bronze Age burials of the Únětice culture is linked in a clear, non-random relationship to the Corded Ware and Bell Beaker burials. The spatial contingency of the younger graves on the foundation of an older Neolithic pattern seems clear (Beneš – Zvelebil 1999, Fig. 6.4). The division of the area originated clearly in the Neolithic period, later Corded Ware groups acted as the landscape antecedent for later use by successors of the same area conservatively until the high medieval period. Simply said, landscape archaeology studies in the Lomský and Loučenský Stream micro-regions formed at the beginning of the nineties of the last century developed a theoretical approach stressing strong settlement continuity in a very similarly organised landscape during all agricultural prehistory.

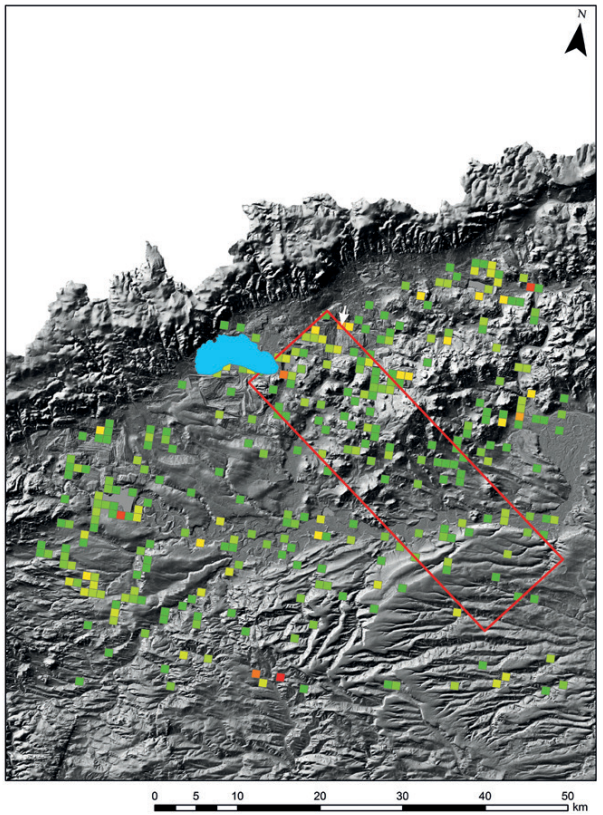


Figure 2.7. Geomorphology of Northwest Bohemia: reconstructed extent of the former Komořany Lake and the Neolithic occupation. Each square means the presence of the Neolithic component in area 500 x 500 m, green – low intensity to red as the highest intensity. The white arrow indicates the Hrdlovka site. Source: LIDAR data by ČÚZK, Czech Archaeological Database and ALRNB Project Database (surface survey area in red frame, data J. Beneš). Layout J. Bumerl.

As mentioned above, during rescue excavation in Hrdlovka, the Czech-British ALRNB project began. In order to homogenize large-scale archaeological field knowledge, extensive field walking surveys (Beneš et al. 1992) were made between 1991–1993. During this field campaign clusters of prehistoric components have been located in areas selected on the basis of earlier research interest and rescue considerations. The principal fieldwork of the project consisted of systematic surveys using surface and subsurface techniques as well as remote sensing (Zvelebil et al. 1993). As is obvious from the ALRNB database, knowledge about density and geographic patterning of the Neolithic period substantially expanded (Fig. 2.7, red frame) and shaped the basis of the current evidence about the Neolithic settlement network in Northwest Bohemia.

2.3. Hrdlovka as a Polycomponent Site

Jaromír Beneš

The above-mentioned theoretical concepts of landscape archaeology strongly influenced the investigation of the Hrdlovka site itself. Effort was mainly targeted towards knowledge of general settlement patterns. Nevertheless, the main reason of the field investigation of the Hrdlovka site was to rescue as much archaeological knowledge as possible in a limited time. The preferred methodology was to record large-scale onsite knowledge and was combined with sampling strategy, which shaped the methodology of the Hrdlovka site's discoveries.

The Hrdlovka site itself (in locations Velký Fírek and Malý Fírek) is a typical polycomponent site as are many in Northwest Bohemia. Neolithic occupation of the site represents the oldest chronological level of the site, however, some lithics indicate the presence of much older Palaeolithic components (see chapter 6.1). The younger components belong to the Early Eneolithic period (unpublished scarce fragments of ceramics from the area Z) and a rare settlement feature (storage pit no. 1521) from Globular Amphora Culture in area SJ and a small burial place dated to the Corded Ware period (Beneš – Dobeš 1992). This small cemetery was situated in the northern part of the SJ area. One grave has been located in a trench in the north-eastern limit of area V. One Corded Ware grave with the round ditch of an eroded burial mound was unearthed in area B.

The area of the Hrdlovka site has been used as a settlement and burial place in the Early Bronze Age as well. Finds from this period (Únětice Culture) are quite frequent. A concentration of 6 burials and 4 settlement features was situated in the B area (Malý Fírek), one burial has also been located in area Z. Two burial-like features with a rich artefactual composition, which could be regarded as the symbolical graves of craftsman, were quite extraordinary (Beneš 1998; 1999). Remaining features from the Early Bronze Age were conventional skeletal burials and simple pits containing pure fragments of ceramics. The houses 11, 19 and 74 could be associated to the period of Únětice Culture. However, there is a lack of direct dating materials. Houses have been preliminary dated only by ground plan ordering.

The Iron Age at the Hrdlovka site is represented by huge pits and sunken houses dating back to the between the Hallstatt and La Tène period (Beneš 1995). Hrdlovka is archaeologically rich regarding the Iron Age, with tens of sunken features. It is therefore in need of substantial processing in the future. This period is dated by long ditch in the northern part of the area SJ. A very important component of the Hrdlovka polycomponent site is the Early Medieval settlement of Hrdlovka, detected during the excavation of the B area, processed and already published in a particular monograph work (Meduna 2012). The Early Medieval village is of particular interest not only due to the field methodology used, but also because of the interesting results concerning vegetation reconstruction, made here from sediments of several Early Medieval wooden wells (Čulíková et al. 2008).

3. FIELD EXCAVATION: 1987–1990

Jaromír Beneš

3.1. The Hrdlovka Site in a Micro-Regional Scale Context

The Neolithic Hrdlovka site was identified during a regular control of an open cast mine forefield in May 1987. In the first weeks of fieldwork work was concentrated in area SJ (Fig. 3.1), which consisted from a huge, long accumulation of plough soil removed by bulldozers with ca 30 m belts with remains of dark earth subsoil containing spots with Neolithic artefacts. The eastern area V between the mine edge and heaps of stripped plough soil was covered by 10–15 cm of subsoil with a similar concentration of artefact spots. Because movement of mining edge was quite rapid, it was soon decided to reduce archaeological rescue activity in area V in order to intensify archaeological work in area SJ.

Figure 3.1. View of the excavated ground plan of house III in the year 1987. The area SJ.

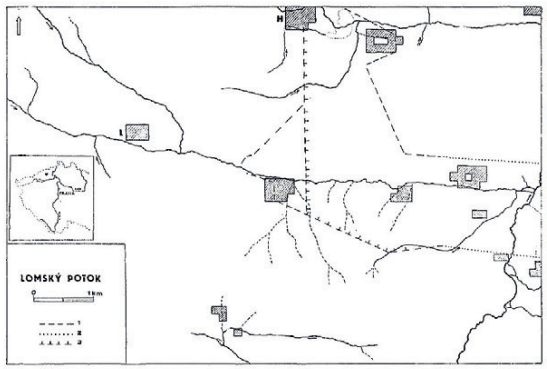


Figure 3.2. Schematic map of areas with positive Neolithic occupation (knowledge at 1991). The Hrdlovka site is signed as H. The picture illustrates research knowledge in the microregion with large scale soil movement. After Beneš 1991b.

Identification of three Neolithic settlement cores in the area of the Lomský and Loučenský streams resulted from the spatial analysis of finds in 1991 (Fig. 3.2). This was enabled by record empty interspaces between sites during large-scale earth movement as a key element of archaeological evidence in the area of the Lomský and Loučenský Valley streams. According to the soil protection

law of former Czechoslovakia and later the Czech Republic, plough soil was removed and transported away to another area before area mining destruction. The primary activity here was, and still is, open cast coal quarrying where a major part of the lowland landscape, including a vast portion of prehistoric and medieval sites, was destroyed, including the Hrdlovka site itself (Beneš et al. 1993). Broadening of the open cast quarries in the 1960s stimulated a number of archaeological rescue events, pre-dating the systematic field salvage activity by the Institute of Archaeology, Academy of Sciences in Prague, Branch Most. Field identification of the Neolithic site of Hrdlovka was connected with the systematic control of the approaching huge open quarry Maxim Gorkij in 1987 (Beneš 1991b). The entire site was mined away and currently no longer exists.

3.1.1 Area V

Area V was sampled in 1987 sampled by long trenches 200–250 m long and 250 cm wide with the mechanical excavator of the Czechoslovak UDS type, equipped with a long blade (Fig. 3.3) enabling soil removal and identification of postholes, features and longhouses as well as lateral sunken pits.

The distance between two trenches reached 50 meters. The subsoil has been removed under the control of the archaeologist, who guided the driver of the mechanical excavator indicating the deepness of the subsoil removal to him. This approach enabled identification of 17 longhouses in the V area. Unfortunately, lack of time excluded discovering longhouse units in full extension here. Soon after sampling the Hrdlovka eastern area V, this part of the Neolithic site was quickly mined away.

Figure 3.3. Mechanical excavator working in the V area in 1987.

3.1.2 Area SJ

In 1987–1988 the main field activity was concentrated in the SJ area (Fig. 3.1), where an accumulation of artefacts was quite obvious. As a result, expectation of the longhouses identification and uncovering was promising and high. The SJ area was uncovered again by the same type of mechanical excavator. In the first phase in 1987, uncovering only interspaces between three long soils depositions

in north-south direction was done. In 1988 three huge depositions of soil were transported away and the area under deposition heaps was again carefully scraped by the mechanical excavator. It is necessary to admit that keeping a suitable level of subsoil scraping was difficult and the altitudinal connection with the belts from 1987 was sporadically uneven. Despite this inconvenience both belts were successfully connected, resulting in the largest systematically excavated area of the Hrdlovka Neolithic site.

Area SJ shapes the key space of archaeological excavation. Shortly after excavation at Hrdlovka started, it was decided to investigate this area slowly and in detail. Yellow Tertiary clay has been raised on this spot while Quaternary clay has been preserved here only sporadically. Colour contrast between yellow subsoil and very dark, almost black infills of the Neolithic sunken features was the most obvious. Younger, post-Neolithic features were a little lighter in colour and in some cases it was possible to distinguish them from the Neolithic ones.

3.1.3 Area Z

The Z area located in the western limit of the Neolithic site was sampled and selectively excavated. Most of this took place in 1989. Analogically, with the above-mentioned V area, the Z area has been sampled with long parallel trenches (150–200 m long and 250 cm width; Fig. 3.4) enabling the detection of longhouse positions. In specific spots with a concentration of postholes, some extensions have been made.

Figure 3.4. Trench in the Z area in 1990.

3.1.4 Area B

Area B was situated in the southern limit of the Hrdlovka site and has been uncovered in the same way as the last area with time lacking. After removing plough soil, it was obvious that the Neolithic components were scarce and artefact concentration from younger prehistoric periods was present. The remaining subsoil was removed using a wheel scraper that unearthed only one longhouse and the fragments of two others. The B area comprises components from other archaeological periods.

In autumn of 1989 the northern limit of the B area was discovered to have Early Medieval layers and artefacts. Investigation of this component was forwarded to Petr Meduna, a specialist for medieval archaeology. He started his particular excavation here, which was already published (Meduna 2012). The Early Medieval village was already situated in a moderate elevated slope in the near vicinity of the

sparsely preserved Neolithic and Early Bronze Age sunken features. The Early Medieval settlement was determined later and investigated as an exceptional site, extended roughly across 10 hectares. The following excavation continued until 1994.

Figure 3.5. Area B in 1990.

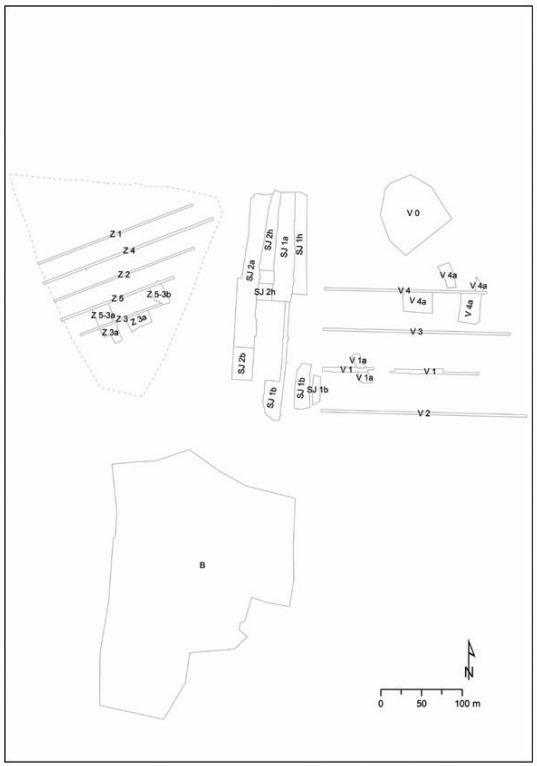


Figure 3.6. Hrdlovka site. Distribution of particular areas.

4. ARTEFACTS AND ECOFACTS

4.1. Ceramics

Václav Vondrovský

4.1.1. Description

As with other categories of artefacts, the ceramic vessel or its preserved fragments can be seen as a complex of individual attributes. They cannot be described entirely and without remnants – a selection influenced by the author of descriptive system is at work. Such a description is therefore always oriented, because it heads toward a specific goal, which does not need to be defined beforehand, because it is not *a priori* known if the chosen attributes correspond to the initial purpose (Pavlů 2011, 25).

For the ceramics analysis the descriptive system of Bohemian linear ornamented pottery was used, which was developed particularly during the excavation of the Bylany site (Soudský 1967; Pavlů 1977; Pavlů – Zápotocká 1978; Pavlů et al. 1986; Květina – Pavlů 2007) and the descriptive system of stroke ornamented pottery developed by M. Zápotocká (1978; 1998). It was already obvious according to the preliminary evaluation of the Hrdlovka site after the excavation phase (Beneš 1991a) that nearly the whole sequence of Neolithic development was recorded there, i. e. occupation of Linear Pottery as well as Stroked Pottery cultures. Furthermore, during the finds inventorying the joint presence of linear and stroked ceramics was observed. As Fig. 4.1 shows, 24 % (n=45) of analysed Neolithic features contain ceramic fragments with linear as well as stroke ornamentation. For now, let us put the question of whether it was caused by depositional and post-depositional processes or it is an image of LBK/SBK transitional phase aside.

Regarding ceramics analysis, it is important to note that it might be complicated and in the case of the second mentioned possibility, it may also be counter-productive to analyse both the Neolithic components by two separate descriptive systems producing two separate datasets. The need for a joint descriptive system comprising the whole of Neolithic pottery development is evident. Some partial possibilities for joint description are already present in current separate descriptive systems (e.g. coding of basic linear ornamentation techniques in the frame of stroked pottery description). Nevertheless, we assume it is possible to get further and some partial modifications can be made (see below).

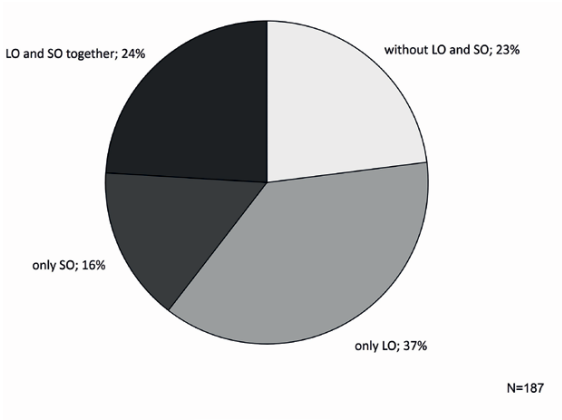


Figure 4.1. Presence of linear (LO) and stroke ornamented (SO) pottery within the analysed sunken features.

Ceramics description was recorded in the MS Access database in specialised form. Here, the essential entity represents a ceramic individual defined as an aggregate of all fragments from individual archaeological context originally belonging to one ceramic vessel. A unique number (ID) was assigned to each ceramic individual to figure under this number in the database. Furthermore, the ID was also physically written right on the ceramic individual, allowing for additional tracing of that concrete individual and, for the purposes of revision, the analysis or additional determination of other characteristics.

The first group of evaluated characteristics comprises formal attributes: size, thickness, weight and fragment curve. In this specific case the evaluated unit represents the ceramic fragment itself, because the formal attributes were recorded particularly to trace the transformation processes, therefore we must focus on ceramics in the statement in which it was found in the sunken feature infill. In cases when the ceramic individual comprised two or more fragments, the values of formal attributes were averaged. To reduce the time consumption of the analysing process, the size of fragments was measured in categories defined by concentric circles with a diameter increasing in 2 cm steps. For thickness measuring the average, not the extreme, parts of the fragment were used. Regarding the deposition processes, the abrasion of ceramic fragment is also significant. The degree of abrasion was determined on the basis of predefined categories (Fig. 4.2):

1	sharp edges and breakages
2	sharp breakage, slight abrasion of breakage structure
3	abraded breakage, in some places with original breakage structure
4	rounded breakage

Figure 4.2. Definition of abrasion categories.

To eliminate distortion caused by possible secondary fragmentation during field excavation and in post-excavation processing, only the most degraded parts of the fragment were evaluated. In the group of formal attributes the vessel rim diameter, recorded by rimchart, can also be comprised. The condition for precise determination was the preservation of at least 5 %, in case of smaller diameters rather 10 %, of the original rim circumference. The next recorded variable focuses on the preserved parts of initial vessel (wall, rim, bottom, handle, knob or lug). In several cases the complete vessels, defined as a ceramic individual preserved in the whole profile from the bottom to rim, were also observed.

The next group of attributes was described by nominal variables transformed to composite numeric code (Květina – Pavlů 2007): fine/coarse ware, fabric and surface treatment (Tab. 4.1). The description of vessel shape, where the bottom can be described as a separate variable (Tab. 4.2), expresses functional attributes together along with the description of knobs and handles (Tab. 4.3 and 4.4), although they might also have a secondary decorative meaning.

Naturally, the largest part of analysed attributes is connected with decoration, primarily distinguished in categories of technical (TO), relief (RO), linear (LO) and stroked ornamentation (SO). The first two categories applications (TO, RO: Tab. 4.5) could have, apart from decorative, also functional importance, for example as the reinforcement of a vessel by the relief. In case of linear ornamentation, several levels are distinguishable: technique of decoration (Tab. 4.6), main motif, secondary (supplementary) motif placed above or below the main motif (Tab. 4.7 and 4.8) and lines below the vessel rim (Tab. 4.9). The description of linear decoration is enclosed by the categorisation of the line itself with respect to incision implement (U-shape/V-shape and width categories) and general shape (rectilinear/curvilinear). A similar range of variables also describes the stroke ornamentation. The main attribute is the decoration technique (Tab. 4.10) defined particularly by the shape, size of implement and its

position during stroking. In the initial phases of SBK especially, incised lines can also persist. They are determined as a special category (INCISED) in the frame of the SO techniques description chart. It is followed by the determination of a decoration system describing its arrangement on the vessel, main motif, secondary (supplementary) motif, dividing motif separating the individual parts of main motif and finally by the determination of bands below the vessel rim (Tab. 4.11).

Although the analysis is focused on Neolithic sunken features, we cannot avoid, at least in part, analysing post-Neolithic ceramics too, which occurs in these features in the form of intrusion. There were recorded even several cases, when the Neolithic feature is part of pit complexes with various, a priory undistinguished, contexts. The determination of post-Neolithic ceramic individuals is rather brief, only the dating, some formal attributes and vessel part were determined, because the description of other attributes is designed especially for Neolithic pottery.

As mentioned at the beginning of this chapter, the description system of Bohemian Neolithic pottery has been adapted to better correspond with the purposes of the Hrdlovka site analysis. First of all, the LBK and SBK component is dealt with together, meaning the description of linear and stroked ornamented pottery is not performed as two separated datasets (cf. Zápotocká – Muška 2007). The reason is their common occurrence in many sunken features (see above). Most changes occurred in the case of vessel shape description. The original coding chart for LBK pottery (Soudský 1967; Květina – Pavlů 2007, Obr. 2) was supplemented by codes for everted rim and flat bottom, which in combination with wall shapes codes for beakers, kettles and pots or other specific shapes recorded in the post-LBK pottery (Zápotocká 1998, Abb. 29) enables to describe whole the development of Bohemian Neolithic vessel shapes since the beginning till the late phases, when the spectrum becomes more diverse thanks to influence from the Lengyel cultural complex.

The description of technical ornamentation (Soudský 1967; Květina – Pavlů 2007, Obr. 5) was also modified, namely for the possibility of adding a fourth descriptor to the originally three-digit code if needed in order to define the location of the technical ornament on the specific part of the vessel. It allows for an example describing the incisions on the rims of the Late SBK vessels. The coding of projections on the vessels (knobs, lugs, handles etc.) is somewhat problematic. Their high variability both in shapes as well as in the arrangement on the vessel did not allow joining the coding of linear and stroked pottery in one universal chart (Pavlů – Zápotocká 1978, Fig. 1, 17, 21 and 22). To distinguish these two systems the "L" (linear pottery) and "S" (stroked pottery) markers were added before the numeric codes. The original three-digit coding of linear pottery knobs was enlarged by the fourth elective digit, characterising their position on the vessel. However, there is a disadvantage with such a description, because the variants of knobs, lugs and handles, which are morphologically indifferent during the Neolithic and present in pottery of both chronological periods, can be *de facto* labelled by two different codes, although strictly speaking the "L" coding chart was used for contexts with a predominance of linear pottery and *vice versa* the "S" chart was used to describe the contexts with a predominance of stroked pottery.

The second reason for changing the established description system was the regional differences suspected in Neolithic pottery production. The description of linear pottery is especially based on the material of the Bylany site in eastern Bohemia. It therefore does not necessarily express the whole variability of pottery production in the area of northwest Bohemia. Some additions in coding particular decoration motifs were already mentioned (unfortunately without any closer characterisation) in the study about the Chotěbudice site, Louny distr., published by I. Rada (1986, 79). Changes in the original description can also be found in J. Rulf's study, where the description broadening was necessary because of aiming to the whole Elbe province of LBK (Rulf 1997, Abb. 37a, 37b and other).

The overview of individual elements added during the Hrdlovka assemblage analysis is displayed in Fig. 4.3. Photographic and drawing documentation is submitted in Tab. 4.14.

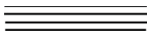
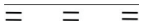
category	code	description	symbol
surface treatment	93	pitch impregnation	
surface treatment	81	combination of polishing and pitch impregnation (80+93)	
linear pottery knobs	L957	large oval with boat-shaped frontal facet	
LO techniques	247	middle wide band filled by 2 or 3 longer drawn punctures	
LO techniques	295	doubled ladder	
LO techniques	479	music-notes in form of double nail impressions placed sparsely along the line	
LO main motif	.76	simple curvilinear spiral running around the vessel	
LO secondary motifs	229	two vertical lines with punctures	
LO secondary motifs	245	simple line running around the vessel accompanied by vertical with transversal lines	
LO secondary motifs	339	"V" motif accompanied by three punctures on the edge	
SO techniques	08	incision by multi-pointed implement	
SO bands below the rim	14	four horizontal bands of strokes	
SO bands below the rim	54	horizontal band of strokes accompanied by pairs of short bands	
SO dividing motif	44	motif of raised hands	

Figure 4.3. New element in the ceramics description.

4.1.2. Basic Assemblage

The essential sorting of ceramic assemblage was done during the initial inventorying of finds, when the presence of Neolithic pottery in finding bags was recorded. Subsequently, in combination with information obtained in the field the list of sunken features, which assemblages should be analysed in detail, was created. In total, assemblages of 187 sunken features comprising 16 745 ceramic fragments, among them 13 866 ceramic individuals were identified, creating the Hrdlovka basic assemblage. Out of it remain the ceramics collected on the surface of overburden areas (385 ceramic individuals in total). Despite the fact that Neolithic pottery dominates in this collection, these finds are missing surely defined context (sunken feature) considering the way of acquiring, hence they have only poor testimonial value.

In the basic assemblage, there are also features with mixed Neolithic and post-Neolithic ceramics. In some cases the ratio was clearly in favour of the Neolithic component with only a small admixture of material from younger periods (e.g. feature 3: 2 post-Neolithic from the total number of 604 ceramic individuals), but in others the differences are smaller (e.g. feature 54: 206 post-Neolithic from total number of 969 ceramic individuals). If we remove the post-Neolithic admixture, the resulting basic assemblage will comprise 13 500 ceramic individuals.[1]

This way of defining basic assemblage is an essential starting point for the following analysis of general trends in pottery production at the Hrdlovka site. The statistical analysis was performed in the Statistica 12 interface.

4.1.3. Characteristics of the Basic Assemblage

Some pottery attributes can already be analysed on the level of the basic assemblage without the distinguishing of individual chronological horizons. This analytical step is important primarily for the reconnaissance of the Hrdlovka site overall image. If not stated otherwise, the individual analysis and graphs are coming from a set defined by the basic assemblage (N=13500).

One ceramic individual was, on average, made up of 1,2 fragments, the maximal number of fragments in one individual was 47 (ID 7455). Generally, the Hrdlovka site assemblage can be evaluated as highly fragmented, there were only 6 cases of ceramic individuals fulfilling the definition of a whole vessel (ID 3761, 3899, 5825, 6547, 8085, 11514). This statement is also reflected in the formal attributes of individual fragments (Fig. 4.4). Most of them did not exceed the size of 4 cm (size category 2), weight of 25 g and fragment curve with a mean of 1.29 mm in the whole assemblage. Only a minimum of fragments evinced a low degree of abrasion. The majority could be assigned into the category of advanced abrasion pointing to the longer time span when abrasive agents had an effect on the fragment.

Regarding the preservation statement of ceramics, one exceptional example of a vessel, most probably preserved *in situ*, even if in a fragmented state, was excavated. The whole situation took place in the southern part of the SJ 2 area near the sunken feature 1100. It was marked as feature 1102 A during the excavation, because the vessel surroundings showed up as darker soil concentration with unclear margins in yellow bedrock. Only the lower part of the vessel was preserved (ID 7455, Tab. 4.15). It can be supposed that the upper part was destroyed during the site overburden or even earlier, during deep ploughing. It could be described as a coarse ware vessel with a round bottom made of unwashed coarsely grained sandy fabric with a weak mica admixture. No traces of decoration were noticed. All the attributes pointed to it being the type of storage vessel, which might

[1] The number does not include 7 Neolithic ceramic individuals, excavated in the infill of features, which are, beyond a doubt, post-Neolithic (1317, 1633, 1729 and 2030). The Neolithic individuals were only admixture low in number in these features, therefore they were not comprised in the basic assemblage.

be partially sunken into the ground. The jar sunken in the frame of house 96 at the Bylany site can be considered an analogical situation (Končelová 2010, Obr. 7). Contrary to Bylany, in Hrdlovka no spatial linkage with longhouse ground plan was observed.

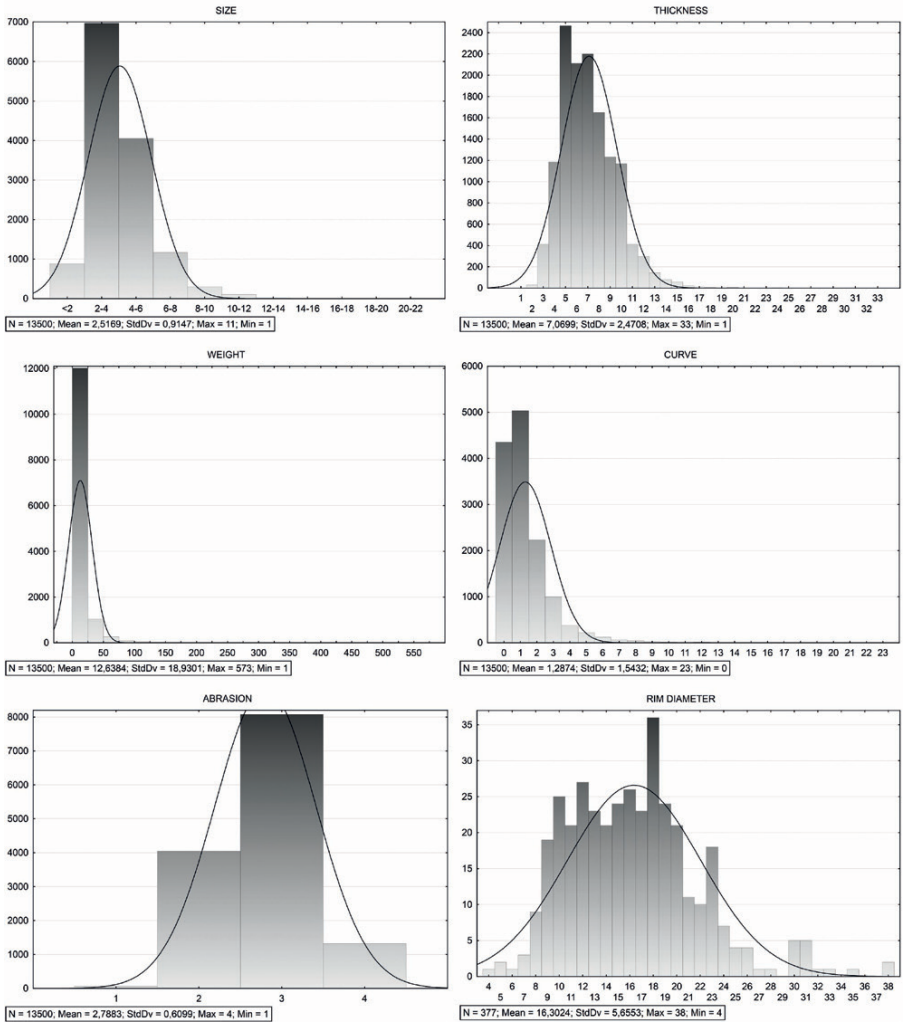


Figure 4.4. Histograms of fragment formal attributes in absolute numbers.

Focusing on the technological attributes of pottery (Fig. 4.6), the coarse ware was present in lower numbers (43.5 %; n=5871) compared to the fine ware (56.5 %; n=7629). This dichotomous categorization of ceramic individuals was considered complexly according to several criteria. A typical representative of fine ware was made of fine-grained fabric, the vessel surface was often supplied by additional treatment and decorated by a linear or stroked ornamentation. On the contrary, the typical representative of coarse ware was made by coarse-grained fabric with a high ratio of temper, the surface did not evince any traces of additional treatment and the decoration was comprised only of the variants of technical or relief ornamentation. Of course, apart from clearly classified individuals, cases, where determination was slightly disputable, were also noticed.

Another important criterion for classification was the thickness of the ceramic fragment. The border between the thin walled fine ware and thick walled coarse ware was usually put between 7 and 10 mm in the Bohemian Neolithic (Šumberová 1995, 83; Káčerik 2011, 678 and others). There has not been set any determinative limit in our analysis, because deviations can be observed in both directions. The thickness mean of fine ware walls is 5.49 mm in comparison to 9.11 mm of coarse ware (Fig. 4.5). Taking into consideration the higher thickness of coarse ware and consequently its lower predisposition to fragmentation, it is no surprise that the coarse ware was preserved in bigger fragments (size category mean 2.8) in comparison to fine ware (size category mean 2.2)

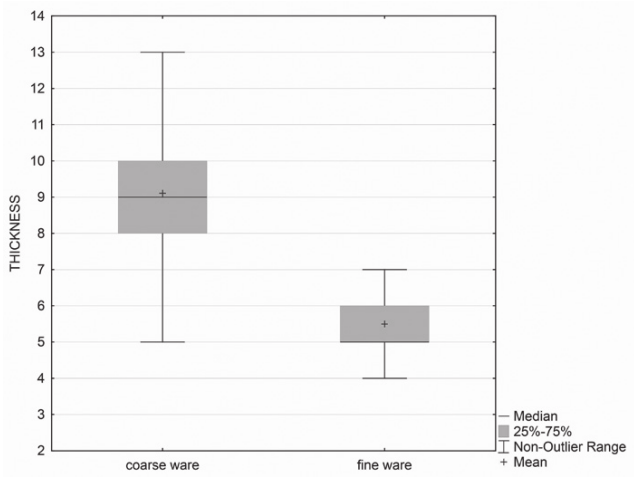


Figure 4.5. Difference between the maximal observed thickness of fine and coarse ware fragments.

The fine ware was most linked to the washed material with hard firing (58.8 %; n=4487) This type was also the most frequent in the whole basis assemblage (53.5 %; n=7222). On the contrary, the unwashed fabric was connected nearly exclusively to the coarse ware, 91.3 % (n=2242) of cases of using this material were connected to the coarse ware. In the whole basic assemblage it comprised 18.2 % (n=2453). Muddy fabrics represented the lowest ratio (4.5 %; n=611). Tracing the tempers added in pottery clay the finely grained admixture was characteristic for fine ware (69.5 %; n=5300), but coarsely grained admixture was frequent too (26.7 %; n=2037). In coarse ware fabrics the sandy (32.9 %; n=1929) and coarsely grained tempers (51.2 %; n=3007) were frequent. It also corresponded with the image of the whole basic assemblage, where finely and coarsely grained temper dominated, meanwhile the organic tempers were found to be rare (0.4 %; n=53).

More than half of all ceramic individuals in the basic assemblage were made without using any special additional temper in the pottery fabric (59.3 %; n=8010). In the rest of the assemblage mica temper is mainly observed. It was distinguished between the lower portion (32.4 %; n=4371) and high concentrations (3.2 %; n=434) or mica. Crushed ceramics have also been found (5.1 %; n=865). Graphite usage was not recorded. The determination of ceramic fabric as well as tempers and other admixtures was performed macroscopically, hence it provided only general results, but petrographic analysis could bring more accuracy.

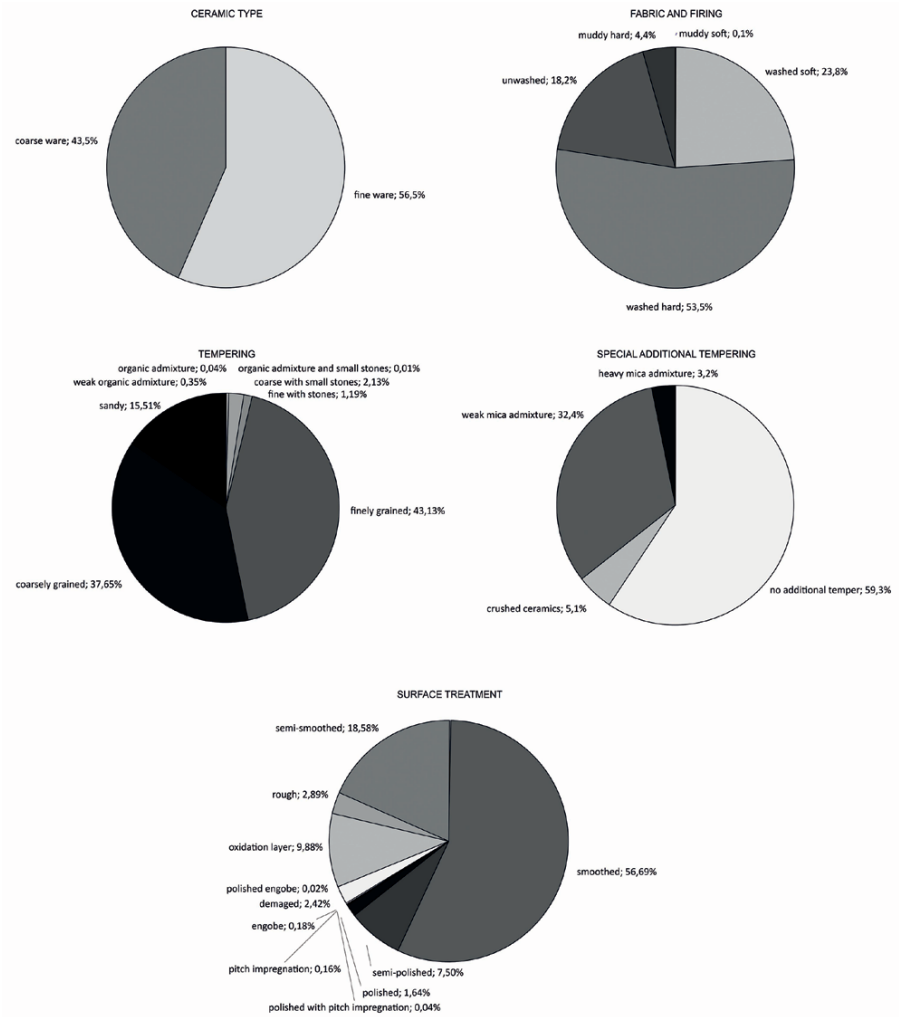


Figure 4.6. Percentage representation of ceramics' technological attributes.

Also the determination of vessel surface treatment can be burdened by an error, because the original surface layer might be eroded. Damage of the surface was recorded in 2.4 % (n=327) of ceramic individuals, but this number can be underestimated for example, in cases where the original engobe has eroded and only the surface treatment, classified as smoothing, has remained. Simple treatment via smoothing was indeed observed most frequently (56.7 %; n=7653), usually on fine ware (72.4 %; n=5520) and then on coarse ware (36.3 %; n=2133). For coarse ware the semi-smoothing treatment was found to be more typical (40.2 %; n=2359) or it was left without any special treatment, which resulted in rough surface (6.6 %; n=388). Relatively frequently the oxidation layer (11.5 %; n=675)

could be observed. Representation of other treatment types on coarse ware was marginal. Contrarily, on the fine ware, apart from dominant smoothing, it was also noticed to occur more frequently the semi-polishing (11.3 %; n=865) and polishing (2.9 %; n=218). Relatively frequent the oxidation layer was also found on the fine ware (8.6 %; n=659). The engobe was recorded in a minimal amount, either in simple or polished form (in total 0.2 %; n=27). The using of pigments and graphite painting was missing completely, which may be caused by the already mentioned problem of surface erosion.

Apart from the standard description categories, the occurrence of impregnation by black pitchy matter was also classified. It was noticed on the smoothed, as well as polished surface, in 0.2 % (n=27) of the basic assemblage. Usually, it was found on the fine ware (77.8 %; n=21), corresponding with the assumed use of the pitch as an adhesive for the reparation of more valuable vessels. On the ceramic individual ID 2518 the mutual presence of pitch impregnation and reparation hole was observed. The wetland archaeology of Neolithic wells, where the preservation of organic materials is good, gives several evidences for the use of pitch impregnation as an undercoat for birch bark applications (e.g. Altscherbitz: Elburg 2010). It should be noticed, that decoration by birch bark often completely overlaps the incised ornamentation without respecting it. In ordinary settlement contexts, such as Hrdlovka, the larger preservation of pitchy matter is rather exceptional (e.g. Vencl 1961, 123; Lička 2011, 63–64). More frequent is preservation in the form of small residuals, hence it is not possible to identify the original birch bark decoration, nor to try decoding its sense. Such examples of pitch impregnation on pottery come from the vessel found in the sunken feature 201/XC on Litice site, Plzeň region (Braun 2001, Obr. 4:15), in the Podkrušnohoří region sporadic traces of pitch recorded in the assemblage of the Krbice site were found (Káčerik 2011, obr. 6:D:35). Based on data obtained from the chemical analysis of the pitchy matter performed on the assemblage of Moravian Neolithic pottery and chipped stone industry, we can conclude that it was prepared using a process of birch bark dry distillation (Prokeš et al. 2011).

Let us focus on some unusual cases beyond the common assemblages of Neolithic pottery. At first it should be mentioned that miniature vessels are defined particularly according to rim diameter. The smallest recorded diameter is 4 cm (ID 11514). This vessel comes from the grave goods assemblage of a Neolithic burial in the feature 1926. Further, vessels with a rim diameter equal or smaller than 7 cm can also be considered miniature. Their observed frequency (n=7) lies deep under the limit of expected cumulative frequency (18.85), if the values of rim diameter are considered to be an assemblage with normal distribution (Kolmogorov-Smirnov test d=0.07433, p<0.05; Chi-Square=57.42173, df=21, p=0,00003). The percentage representation of vessels with a rim diameter between 4 and 7 cm is 1.86 % (ceramic individuals ID 151, 1271, 3884, 11250, 11461, 11514 and 12064; Tab. 4.16). The rim part was not preserved on the vessel ID 3892. However, the dimensions of body and partially bottom gives evidence that this individual belongs to the category of miniature vessels too, increasing their number in the basic assemblage to 8.

Analogical finds in Podkrušnohoří region were probably documented at the Malé Březno site, but due to the bad preservation statement, the interpretation of the fragment as a ceramic spoon (Šumberová 1995) could not be excluded. Interesting finds come from the German settlement area of Goseck, Saxony-Anhalt where the burial of a child, whose age was estimated from one to four years, was excavated and found to contain two miniature vessels. Whereas the first one was preserved only partially, the second bottle-shaped vessel[2] was excavated to the full extent. It is possible to date the grave back generally to the LBK period according to the decoration (Bertemes – Northe 2010, 12, Abb. 4). Although the interpretation linking miniature vessels with infants is tempting, it can be disproved by the Hrdlovka site burial (feature 1926), where one of the above-mentioned miniature vessels (ID 11514) was excavated. On the basis of anthropological classification, the buried individual was an adult – he was not older than 40 (Kuželka 1993).

[2] The picture of vessel in the cited paper is unfortunately missing the scale bar, hence it is not possible to determine accurate dimensions.

The issue of undetermined ceramic individual ID 1368 (Tab. 4.18) has been left for the end of this chapter. It can be described as a small ceramic stick 9 cm high and with a diameter from 1.5 to 2 cm made of unwashed fabric with coarsely grained temper and traces of pitch impregnation on the surface. It was excavated at the SJ 1 area in the feature 339, which contained only linear ornamented pottery with no traces of intrusion. The probable interpretations were narrowed down to the following:

a) vessel handle
b) specific fragment of daub
c) fragment of ceramic spoon
d) fragment of ceramic idol

In case of variants (b), (c) and (d) this artefact should be shifted to another category of finds (daub of other ceramic artefacts), but considering the unclear interpretation it remains registered in the basic assemblage of pottery as a ceramic individual. The first interpretational variant (a) is in contrast with asymmetric angles of both artefact edges, which would not allow fitting on the plane vessel body. It also has no logic that a pitch has been applied to the handle serving for manipulation with the vessel. On the other hand, it cannot be excluded, that the pitch clung onto the artefact during the process of archeologisation. The variant (b) might be supported by sporadic finds of plastic decorative elements of wattle-and-daub walls documented on the Eneolithic (Late Neolithic) houses in the Harz region (Wiermann – Wunderlich 2009). In the central European Neolithic milieu, the decoration of the longhouse wall has been documented only in forms of paintings (Steklá 1961, 86), even if other scholars point towards the natural crystallization of $CaCO_3$, which can cause the impression of a white layer (Lička – Mach 2011, 75–76). The character of flat wall decoration is not in agreement with the rod-shaped form of investigated artefact nor with pitchy impregnation. The variant of ceramic spoon (c) seems to be more probable, their fragments have been documented in Neolithic settlement assemblages (e.g. Bylany: Pavlů – Zápotocká 1983, Tab. 28; Pavlů 2000, Pl. 1-3; Malé Březno: Šumberová 1995, Tab. 8:3,4). However, at this variant we are once again faced with the problem of asymmetric angles of artefact edges, which does not correspond with the known shanks of Neolithic ceramic spoons. Thus only variant (d) remains. This would not be the only documented case of a Neolithic idol in the Podkrušnohoří region, anthropomorphic or zoomorphic idols are known from the Chabařovice and Libkovice sites (Lička – Hložek 2011; Káčerik 2008; 2011). In the neighbouring region of Saxony there exist the "Adonis of Zschernitz", "Venus of Zauschwitz" and many other examples of figurines (Coblenz 1965; Nebelsick et al. 2004; Kretschmer et al. 2014; Blaschta et al. 2016). The rod-shaped form of the artefact is then interpretable as an upper or lower limb fragment belonging to (most probably) an anthropomorphic figurine. Variant (d) is not in contrast even with traces of pitch impregnation, which partially covers the artefact surface. Traces of pitch were identified, for example on the figure of Brunn am Gebirge in Lower Austria, dated back to the Early LBK period (Sauter et al. 2002). Bearing in mind that artefact ID 1368 is only a small fragment of the original whole, it seems that its issue will never be definitively resolved.

4.2. Lithics

Petr Šída

The stone industry from Hrdlovka was evaluated using the method published in Šída (2007). The greatest attention was dedicated to the technotypological description and raw material determination. A complex description of the attributes of artefacts and other lithics ordered in a normalized database was used. The main attributes of the artefact are technotypes and a raw material description completed with three main artefact dimensions. Additional traits such as reburning, patination and other characteristics were recorded. Such a formalisation enables a comparison with other lithics assemblages. Raw material determination is based on Přichystal (2009) and Šída, Kachlík (2009).

4.3. Animal Remains

Lenka Kovačiková

All animal remains from the archaeological features dated back to the Linear Pottery culture (LBK, 5600/5500–5000/4950) and Stroked Pottery culture (SBK, 5000/4950–4400) were retrieved by hand and the area was not sieved. Animal bones and teeth were identified at the Laboratory of Archaeobotany and Palaeoecology in České Budějovice. The fundamental unit by which faunal remains were tallied was the Number of Identified Specimens (NISP) determined for each taxon. The Neolithic assemblage from Hrdlovka was divided into four smaller samples in concordance with the chronological levels defined by ceramic criteria (LBK III, LBK IV, LBK IV/SBK I, SBK II and SBK IV). Undetermined broken bone fragments were split among large, medium or small-sized mammals. Although the assemblage only had a modest number of bones of caprines, a few of them could be morphologically differentiated (Zeder – Pilaar 2010). Measurements were taken as described by von den Driesch (1976). For Bovinae, the acquired measurements have been compared to aurochs (*Bos primigenius*) discovered in pre-Neolithic contexts (Degerbøl – Fredskild 1970). The methodology of wild-domestic pig assignment was based on the size reduction of either dental or skeletal elements (Payne – Bull 1988; Evin et al. 2013). Several remains of Bovinae and Suinae could not be assigned and were therefore united to genus *Bos* sp. and *Sus* sp. The estimation of age at death of the animals was based on the stages of tooth eruption, replacement and wear. The age at death for cattle was estimated on the stages of tooth eruption and replacement given by Higham (1967) and the abrasion indexes proposed by Ducos (1968). The age of pigs was estimated from the replacement of teeth (Červený et al. 1999) and the abrasion stages of the lower jaw teeth (Grant 1982). The slaughtering age of the sheep and goats was specified following the methodology by Payne (1973) and Helmer and Vigne (2004). The degree of epiphyseal fusion of limb bones in domestic animals (Silver 1969) was registered as well. The stage of the weathering of the bones of mammals described by Behrensmeyer (1978) was recorded. Whereas the animal bone specimens categorized to weathering stages 1–2 were simply marked as "slightly weathered", the specimens in stages 3-4 were considered "heavily weathered". Permineralized bone remains, changes to bone subjected to heating, presence of gnawing by carnivores on bone surface and root etching indicating the bone depositing in a plant-supporting sedimentary environment were also noted (Lyman 1994, 375–376).

5. CHRONOLOGY

Václav Vondrovský

5.1. Current Approaches to the Chronology of Neolithic Settlement Areas

Defining the chronology of Neolithic settlement areas represents a crucial step in their processing, as well as quite a complicated task whose solution demands a complex approach. The large-scale excavations of Neolithic settlement areas usually reveal a multi-layer palimpsest of longhouse ground plans (more specifically postholes and trenches) and sunken features with often undistinguishable functions. In a way we are dealing with archaeological situations close to the Neolithic tell sites of the Balkan region, but here the vertical stratigraphy was replaced by a horizontal shift (Pavlů 1977, 14). Stratigraphic relations are thus significantly reduced, in the case of longhouse ground plans only the horizontal stratigraphy can be taken into consideration. Moreover, these spatial relationships are not frequent, because the ground plans overlapping is observed only in case of chronologically far distant buildings (Modderman 1970, 203). The solution for chronological issues is therefore searched in the artefactual infill of sunken features.

In the Czech milieu, the study of I. Pavlů (1977) sets the essential methodology for LBK settlements analysis. Chronology is, in his approach, based on the linkage between spatial data and the typology of ceramics decoration. Spatial relationships are taken together with other data sources out of ceramic analysis, which can contribute to solving chronological issues comprised in the term of external evidence (Pavlů 1977, 15). For example, the radiocarbon dating results and, to a certain extent, also the typology of house ground plans is ranked here. Essential chrono-spatial entity represents a *construction complex* forming more or less an independent settlement unit (Fig. 5.1). It comprises of a longhouse ground plan itself and associated sunken features, which are spatially delimited by the house's external area (or also house activity area) defined as the area in the house 5-meter vicinity (Pavlů 1977, 13–14). Adirect linkage between the house and sunken features situated within the house's external area is considered – ceramics collected in these features should mirror the agency of house inhabitants. Simultaneously, the external areas of two contemporaneous houses should not overlap. These principles were applied during Bylany site analysis, where 25 settlement phases were initially distinguished (Pavlů et al. 1986). Nevertheless, significant shifts in settlement structure were observed rather on the level of 6 chronological intervals (Pavlů 2000).

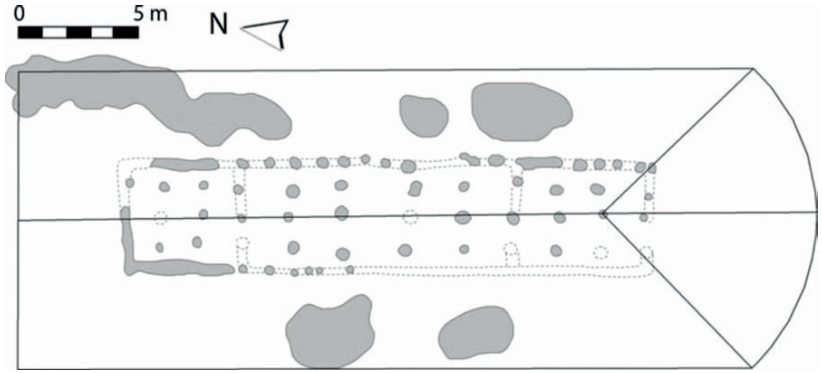


Figure 5.1. Construction complex of Bylany site house 88. The unit is formed by a longhouse ground plan and associated pits in the frame of the house external area (after Květina 2010b, Figure 3).

A new outline of the LBK settlement analysis was present in the paper of P. Květina and M. Končelová (2011). The previous Bylany site chronological sequence is confronted with the analysis, which does not deal with the concept of construction complex. Here, the basic analytical unit is the sunken features themselves. Despite the different approach, the resulting chronological sequence of linear decoration styles is comparable with previous models of Bylany site development.

Out of the Bohemian region the chronological analysis was performed in an innovative way for the LBK settlement area of Těšetice-Kyjovice "Sutny," in southern Moravia (Vostrovská – Prokeš 2012; 2013). The Moravian region apparently differs from Bohemia in terms of pottery ornamentation, the vessels decoration spectrum is in the period of developed LBK culture *de facto* restricted only to variants of music-note techniques. Therefore, a distinctive description system of Moravian LBK pottery had to be elaborated. The settlement area chronology was consequently established using the statistical analysis of evaluated music-note attributes. It confirmed the previous hypothesis about chronological development at this site. Chronological analyses of the LBK sites in German regions are usually based on the seriation of ceramics assemblage (Lüning 1988; Cladders 2001; Pechtl 2009a etc.). Attention is paid to the decoration technique itself and to the vessel shape spectrum; data of the external evidence mostly plays only a supplementary role. The foundations were laid by P. Stehli, during the pottery analysis of the Aldhovener Platte sites (Stehli 1973; 1977; 1988). This region was also crucial for the formulation of a ward complex, which could be considered as close to the I. Pavlů´s construction complex. The house's external area was, on the Aldhovener Platte region sites, widened to 20 – 25 meters vicinity around the house ground plan (Lüning 1988, 69–70, Abb. 37). The lifetime of individual house was estimated to one human generation, ca. 25 years, afterwards it was abandoned and a new one was built nearby. From a long-term perspective, this produces distinguishable house clusters in the space of Neolithic settlement areas (Lüning 2005).

Contrary to the LBK period, the Bohemian SBK settlement areas usually do not evince such complex archaeological situations comprising a series of spatial relationships, which would allow the distinguishing of settlement horizons on a more precise level. In case of non-stratified settlement areas,[1] whose image often only consists of isolated sunken features excavated in the frame of small scale overburden and more or less without observable spatial relations or units (longhouse ground plans), it is only possible to apply analysis based on the typology of ceramic finds. The results are afterwards compared with the general chronological sequences of pottery development. In an ideal case, it is possible to distinguish individual stages or phases of SBK culture (e.g. Dobřany: Novotná 2013; Libišany: Burgert 2012). An exception represents, for example, the Jaroměř site, where the spatial arrangement and construction of the houses together with the ceramics analysis allowed the distinguishing of three clearly defined developmental groups (Burgert 2013).

5.2. Methodology of the Hrdlovka Site's Chronological Analysis

The first outlines of the Hrdlovka settlement chronology were drawn in the preliminary excavation report on the image of decoration of ceramic fragments obtained from the sunken features (Beneš 1991a; 1991b). They were later confirmed in case of longhouse 3. Its ceramic assemblage was separately analysed and assigned to the transitional LBK/SBK period (Beneš et al. 2014).

On the Hrdlovka site we were faced with a disadvantage lying in the suppression of possible differences in the regional development of pottery decoration. Particularly, the development of linear ornamented pottery was established primarily on the analysis of the eastern Bohemian Bylany site assemblage. While its general applicability is widely agreed upon, in details it does not need to correspond to individual settlement regions within Bohemia. On the contrary, the chronological sequence of SBK pottery was defined on a more heterogeneous set of assemblages (Zápotocká 1970).

[1] Here the term is used in a different sense than in Pavlů 1977, 19.

However, the regional differences in the LBK and SBK pottery production in Podkrušnohoří area or rather in northwestern Bohemia are so far known only partially (Šumberová 1995, 84; Zápotocká – – Muška 2007, 61; Zápotocká 2009a, 81–94; Vondrovský et al. 2015 and others) and the regional pottery chronology has not yet been elaborated. Therefore, we are rather inclined to a inductive analytical approach for the determination of the Hrdlovka site's relative chronology and settlement phases, at least in the extent enabled by field excavation data. The general chronology of the Neolithic pottery should play the role of a control agent in the whole analytical process. Synchronization with LBK and SBK development stages or phases will be performed consequently.

The essential entity of chronological analysis represents the entire sunken feature as a comprehended contextual unit. Theoretically, this is not the most suitable attitude. In the frame of many features further partial contexts could be distinguished (layers, additional pits, projections, lobes, pit complexes etc.) and these should create a basic unit for analysing. Unfortunately, the capabilities of field excavation were hardly influenced by the salvage character of the whole campaign. The detail excavation of individual features suffered due to lack of time and, on that account, many of them (56 %; n=386) were excavated by a "surface to bottom" system (labelled as "0-bottom") and material from the feature infill was not separated according to any stratigraphic units. But even if the partial contexts were distinguished in the feature infill (usually in the form of mechanical layers), their mutual interconnection can be problematic and taking into consideration the time, which passed since the field campaign, it might be difficult to trace. This situation is demonstrated by the example of feature 261, which was rich for findings (Fig. 5.2):

layer	location	finds
0-20	W half	Ce, Dau, CHI, Bo, Gri, OI
20-bottom	W half	Ce, Dau, Bo, PI, CHI
0-bottom	W half	Ce, Dau
10-30	W half	Ce, Bo, OI, CHI, PI
-15	W half	PI
-20	W half	Dau
None	E half	PI, CHI, Bo, OI
0-30	NE part	Ce
0-bottom	NE part	Ce, Dau, CHI, Bo
None	NE part, marked area	Ce
None	NE part	Dau
0-bottom	NE part	Ce, CHI, PI, Bo
finishing	SE part	Ce
-17	None	Ce
None	gathering from feature and profile	Ce, CHI, PI

Figure 5.2. Contexts distinguished during feature 261 infill excavation (Ce – ceramics; Dau – daub; CHI – chipped stone industry; PI – polished stone industry; Gri – grinding stone; OI – other stone industry; Bo – bone).

A brief overview of different approaches to the chronology of complex situations, undoubtedly comprising large-scale excavated Neolithic settlement areas, is given above. Their common denominator was the separate analysing of either a LBK or SBK component. The structure of Neolithic settlement areas however, changed over time. Whereas the earlier Neolithic period was characterised by mutual linkage between the longhouse ground plan and the neighbouring pits – the construction complex, since the Late SBK stage onset this spatial arrangement started to disappear (Burgert et al. 2014, 31).

The general algorithm for the analysis of LBK settlement assemblages (Pavlů 1977; see Fig. 5.3) need to be adjusted in such a way, it would be convenient for requirements of the Late SBK stage component.

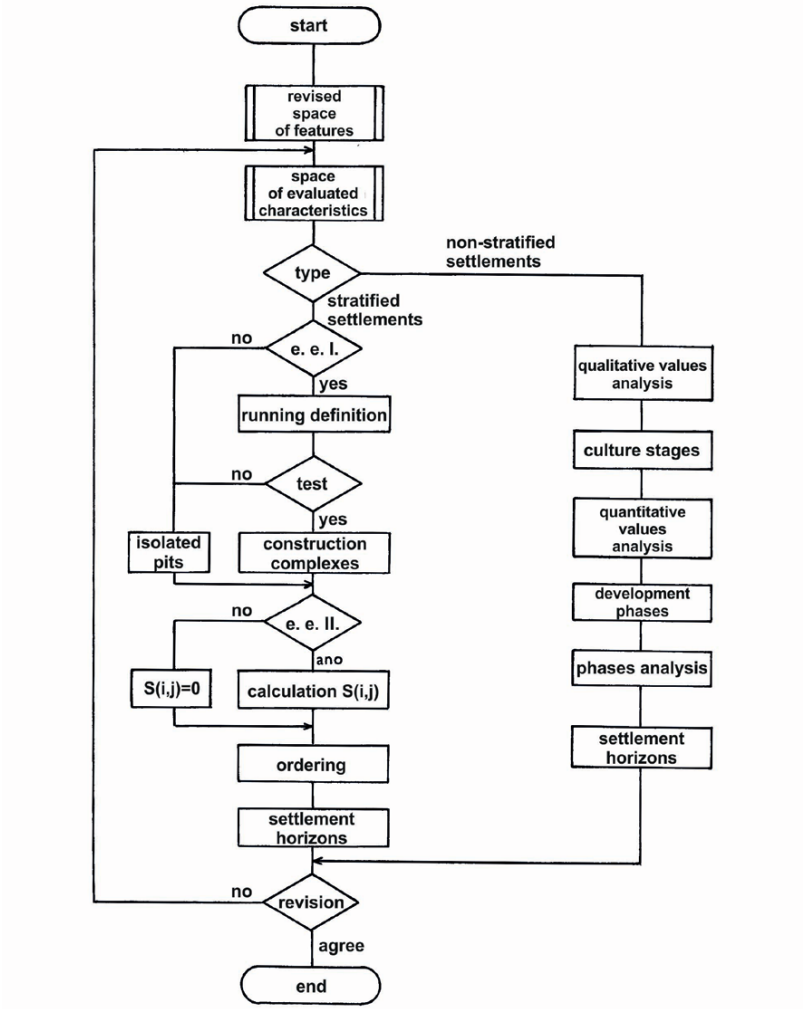


Figure 5.3. Flowchart for the chronological analysis of LBK settlement areas (according to Pavlů 1977, modified).

The fundaments for the chronological analysis of Hrdlovka are in accordance with the Bylany site methodology represented by spatial relationships and ceramics typology. Thus, in the algorithm of chronological analysis (Fig. 5.4), they constitute two parallel branches of the process. Contrary to standard procedure, here the inverse order was chosen. The *first chronological model* is based on the analysis of individual pits ceramic assemblages, yet with no regard to the concept of construction complex. The expected output is the decoding of the essential trends of Hrdlovka's chronological

development (Květina – Končelová 2011, 215). Just after the general overview about settlement area chronology arises, the spatial relations will also enter the analysis. A *second chronological model* determining individual settlement horizons should follow this process. In some cases also the sunken features, which did not for any reason (insufficient amount of decorated ceramics, no spatial relationships etc.) enter the first and second chronological model could also be dated, but on more general chronological levels. Summarizing all the information, the *final chronological model* will crown the chronological analysis of the Hrdlovka settlement area.

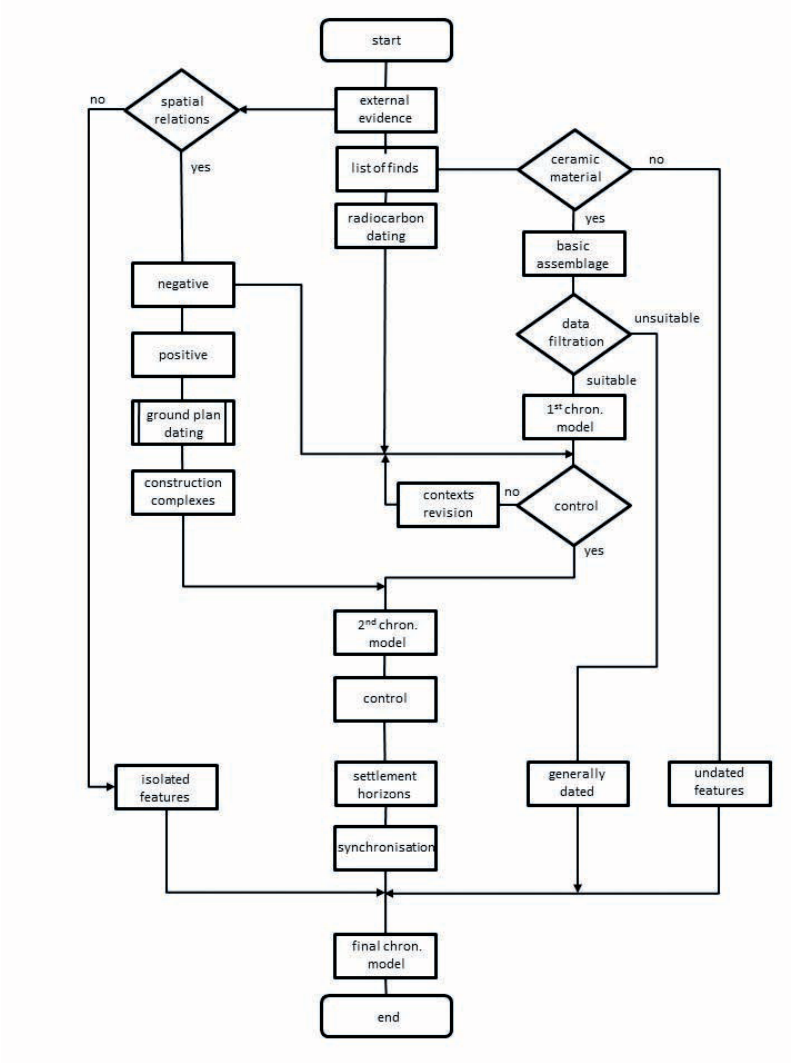


Figure 5.4. Flowchart for the chronological analysis of the Hrdlovka settlement area.

There is an axiomatic statement of an archaeological relative chronology claiming that un--contemporary or chronologically distant sunken features contain un-contemporary artefacts in their infill and vice versa. This difference might be statistically provable. Traditionally pottery decoration is considered to be a chronologically sensitive attribute, but the vessel shapes should also be traced, especially for the later Neolithic periods. Other attributes, such as the ceramic fabric composition, firing or projections (knobs, lugs, handles etc.) on pottery of course also change over time, but these are given to be much more likely the result of production technology and functional demands, so their analysis would product rather general chronology. But also the decoration by incised lines and strokes can be perceived on more levels. The first is the motif, which represents general organisation of decoration on the vessel surface. Except the main motif there are usually present even the secondary (complementary) motifs, dividing bands or lines and lines bellow the vessel rim too. The next distinguishable level in the Neolithic pottery decoration is the style, determined by the decoration techniques and their combinations (see Tabs. 4.6 and 4.10), which are the most detailed category to be determined in linear and stroked decoration. Individual techniques are just the building blocks of decoration styles (Květina – Končelová 2011, 200–203).

Forming the first chronological model, attention was aimed specifically to pottery decoration styles. This category evinces adequate chronological sensitivity, as well as a high rate of presence and determination possibility even on small fragments, which was proven at Hrdlovka site as well as in the overall context of Bohemian Neolithic (Pavlů 1977, 39; Květina – Končelová 2011, 203; Zápotocká – – Muška 2007, 169–203). Furthermore, general chronology has been elaborated for LBK and SBK pottery development, so each decoration style is more or less fixed at its chronological position (e. g. grooved lines, music-notes thickly placed along the line, multiple strokes, Rössen strokes). On the other hand, we must admit that by using this specific category of decoration exclusively, only 18.1% (n=2437) of ceramic individuals from the basic assemblage (N=13500) were able to participate in the chronological analysis.

To decode relations among individual sunken features, the correspondence analysis will be used. It is commonly used for this purpose in the Neolithic archaeology (cf. Michálek et al. 2000, Obr. 12; Pavlů 2000, Fig. 5.2.3.a.; Květina – Končelová 2011, Obr. 8; Vostrovská – Prokeš 2012, Fig. 14). The Detrended Correspondence Analysis (DCA) is the most suitable for this type of analysed data and its character. The DCA belongs to a group of unconstrained ordination methods, whose goal lies in searching axes of the highest variability (ordination axes). Similarities have been displayed between the observed cases (here sunken features and archaeological contexts) and responding variables (here decoration styles). The components correspondence rate is, in the resulting ordination space, in inverse proportion to their mutual distance. Essentially, the DCA is an algorithm of multiple simultaneous regressions based on a simplified model of unimodal response, which generally assumes a Gaussian distribution of variable values. It is thus suitable for longer gradients arising in our case due to a greater amount of heterogeneous archaeological contests entering the analysis. The optimum is calculated by the method of weighted arithmetic mean, which eliminates problems linked with an unbalanced amount of ceramic individuals in particular features (Šmilauer – Lepš 2014, 51–54). The analyses were performed in the Canoco 5 interface.

Despite the above-mentioned DCA positives, it is worth to test its suitability and ability to solve chronological issues of the Hrdlovka settlement area. In essence, an initial null hypothesis of the chronological models, i.e. the un-contemporary sunken features assemblages revealing statistically significant differences in the decoration styles composition, will be examined. For testing, the pair of features 617, 618 and the three features 330, 720 A, 720 B were chosen, because they accomplish the condition of un-contemporaneousness evidenced by mutual overlapping (spatial relationship of affinity type 4, see below). At the same time they offer an amount of ceramic material sufficient for

statistical evaluation. Moreover, the material from feature 1238[2] was divided in two separate assemblages (1238a, 1238b) by a random number generator and inserted into the analysis. Conversely, in this case only a minimal difference between pseudo-features 1238a and 1238b could be expected. As shown in Fig. 5.5, all the assumptions were more or less confirmed, but the pseudo-contexts 1238a and 1238b are quite distant to each other.

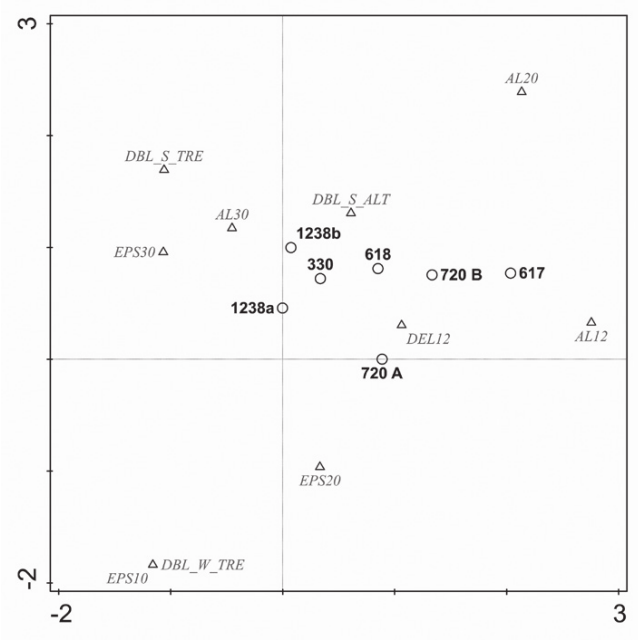


Figure 5.5. DCA diagram shows the suitability of this analytical tool for the agreement and differences investigation in linear and stroked decoration styles spectrum from spatially overlapping sunken features and artificial contexts. The first (horizontal) axis explains 47.9% of variability, the second (vertical) 9.1%. For abbreviations of decoration styles see Tabs. 4.6 and 4.10.

It is apparent that the resulting DCA diagrams are not fully reliable and can't be received uncritically. Therefore, there must be controls in the analysing process following the establishing of the first and second chronological model. Many sunken features at Hrdlovka contained linear as well as stroked pottery fragments (see below), which could be a glimpse of chronological heterogeneity in these pits undistinguished in the field.[3] The danger of the "garbage in – garbage out" effect could arise together with uncritical receiving. That is why the suggested chronological models must be taken into account as hypotheses needing to be proven. Only the negative spatial relations, i.e. mutual overlapping of spatial structures, might be considered as undeniable evidence. This is the only way how to prove two contexts un-contemptuousness, passing over possible mistakes during field excavation. Arguments on the level of indicia: radiocarbon data, positive spatial relationships (construction complex), chronological attributes of architecture and general development Neolithic pottery, are also available. In contrast to the negative spatial relationships, these evidence types are not fully reliable and only the co-action of multiple different indicia can be considered significant.

As it was mentioned, the spatial (stratigraphic) relations play a pivotal role in the chronological analysis. The four basic types of the mutual relationship of two spatial structures can be distinguished:

[2] This feature contained a small amount of stroked pottery, which leads to a different position in the resulting ordination space away from other features (except 720 B also containing stroke decorated individuals). Insertion of feature 1238 however, allows the comparison of the mutual position of two artificial contexts.

[3] The standard black compact infill of Neolithic sunken features usually does not allow for the distinguishing of initial layers.

- positive spatial relationships
  affinity type 1: definitely interrelated
  affinity type 2: possibly interrelated
- negative spatial relationships
  affinity type 3: possibly not interrelated
  affinity type 4: definitely not interrelated

The first two types of positive relations cannot be determined only according to the situation in the field, whereas the negative relations are distinguishable relatively easily in this way. Their definition is performed according to the law of superposition (Harris 1989, 30–31). It is however difficult to distinguish younger and older deposits in the vast majority of cases, because the infill of Neolithic pits usually consists of a typical dark compact layer, which does not allow to identify any contact line between two contexts. Despite that, in several cases the feature superpositions were already determined during field excavation according to the preliminary artefacts evaluation (Neolithic contra post-Neolithic pottery, feature only with LBK pottery contra feature only with SBK pottery).

For the truly inquisitive, zero relation of two features should accompany spatial relation types. Due to the fact that this category would be assigned between the majority of sunken features and it would encumber the evaluation, this type was not determined.

Based on the above-mentioned principles, a matrix of Neolithic sunken features and their mutual negative relationships (Fig. 5.6) can be established. The sunken features with no artefacts were not comprised, because these cannot be dated except for in very specific cases (e.g. longhouse northern wall trenches). In the matrix the higher amount of superposition evidences in the areas SJ and V in comparison to areas Z and B is obvious.

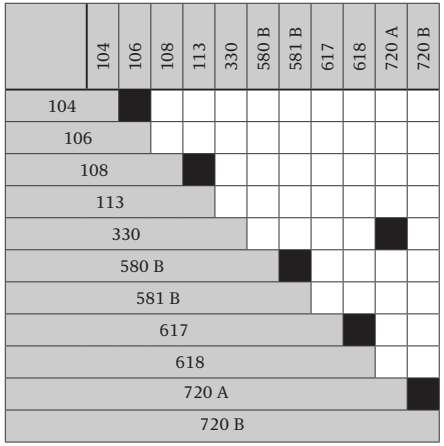


Figure 5.6. Matrix of sunken features related in affinity type 4.

On the level of the second chronological model the fundamental principles of the Harris matrix (Harris 1989) will be used to analyse the spatial relationships. Even if this method is used much more for chronological sequences of complex stratigraphy in medieval towns (e.g. Čapek 2010), we suppose it can be used in the case of the Neolithic settlement areas after providing particular adjustments. Above all, it will be used in diagram form, which displays the relative sequence of stratigraphic units in time, ergo plotting all the identified stratigraphic relationships (Harris 1989, Fig. 12: B). Strictly,

such a diagram is not Harris matrix in essence,[4] because this is trying to outline a simplified view on direct stratigraphic relations given by the law of stratigraphic succession. Neolithic settlement areas are characterised particularly by relationships of horizontal stratigraphy comprising information about the un-contemporaneousness of particular structures, but they do not reflect chronological sequence in the same way as vertical stratigraphy does. However, relation types "older than" and "younger than" derived from the vertical succession of stratigraphic units are crucial to establishing the Harris matrix type diagram. Therefore, it is necessary to find other supporting indications.

The first source of supporting data could be found in the analysis of Neolithic architecture. Despite the fact that it is not possible to outline a detailed sequence of individual houses only on the basis of construction attributes, we were able to distinguish at least general building chronology on the levels specified in Fig. 5.7 using this criterion. The presence of all listed characteristics is not a necessary condition for successful dating. On the other hand, it is also important to consider some exceptions that might go beyond supposed trends of the Neolithic architecture.

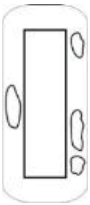
LBK	Early LBK (LBK I)	building pits, rectangular ground plan, slight inner posts, lateral trenches	 type I
	Classic LBK (LBK II-IV)	building pits, rectangular ground plan, simple and, exceptionally, doubled walls, thick inner rows with massive posts	
SBK	Early SBK (SBK I-III)	building pits, rectangular to slightly trapezoid ground plan, simple or doubled walls	
	Late and Final SBK (SBK IV-V)	no building pits, trapezoid ground plan, doubled walls or peripheral trenches around the entire structure, sparse inner rows	 type II

Figure 5.7. General dating of longhouse ground plans and determination attributes.

This classification was established on synthetizing studies (Coudart 1998; Schwerdtner 2009; Pavlů – Zápotocká 2013; Končelová 2013) as well as concrete examples from other sites with well-preserved Neolithic architecture (Bruchenbrücken: Stäuble 1997; Bylany: Modderman 1986; Březno u Loun: Pleinerová – Pavlů 1979; Pleinerová 1984; Dresden-Prohlis: Link 2014b; Mšeno: Lička 1989, 1990; Jaroměř: Burgert 2013; Libenice: Steklá 1961; Postoloprty: Soudský 1955; Zwenkau: Cladders et al. 2012). Of course, the ground plan preservation enabling its good legibility is an essential assumption for correct determination. For that reason all ground plans, which were excavated only partially (especially in the areas V and Z) or preserved only fragmentarily, were excluded in advance, so part of the ground plans was not suitable for closer classification. The process of longhouse ground plan general dating can be summarized by the following algorithm:

Further indication for the determination of relative chronological relationships represents the results of the first chronological model in combination with the concept of the construction complex. Knowing the position of individual sunken features in the first chronological model, which are simultaneously part of a given house external area, the whole construction complex can be dated this way.

[4] The euphemism "diagram on the principle of Harris matrix" will be used to describe the second chronological model of the Hrdlovka settlement.

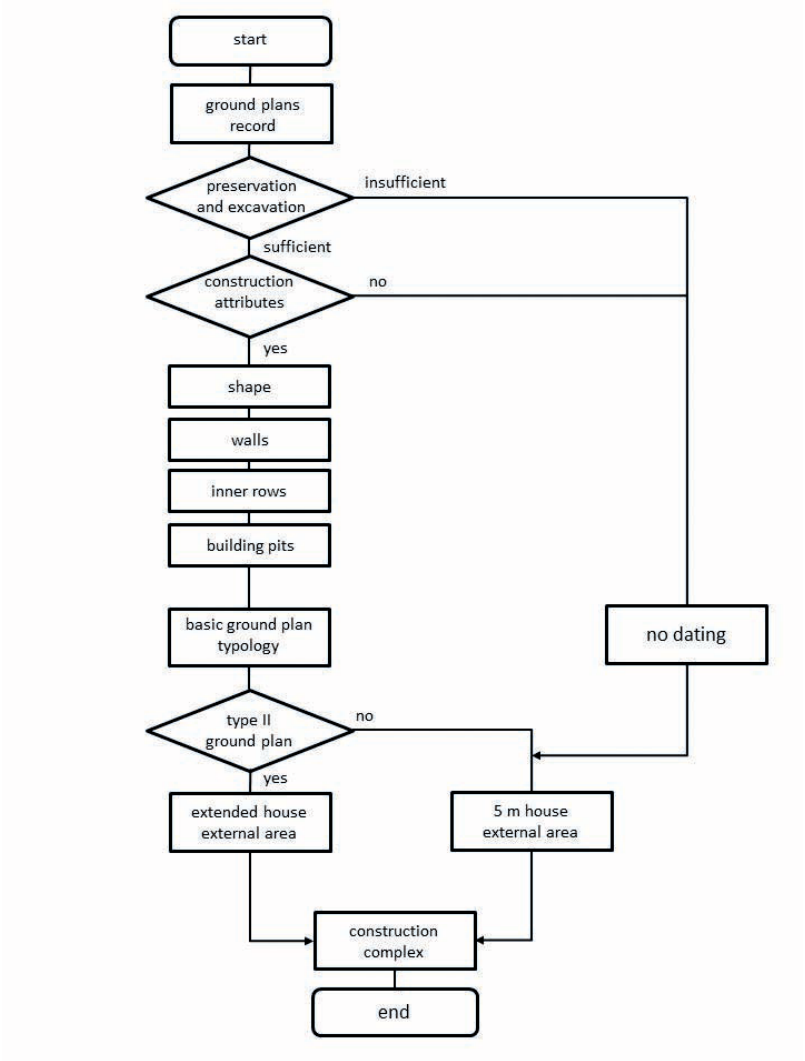


Figure 5.8. Flowchart of the procedure for longhouse ground plans general dating.

This procedure is, however, applicable only in the case of the LBK or Early SBK components. The Late SBK settlement patterns differ in the absence of building pits to be functionally linked with the house (Burgert et al. 2014). The solution seems to lie in multiple steps. At first, it must be determined which ground plans escape the classical scheme of the construction complex. In other words, which plans can be considered as dating back to the Late and Final SBK period must be determined. The procedure for this operation is outlined in Fig. 5.8. House chronology could not be drawn only according to the absence of building pits in the house's vicinity. The procedure is based rather on multiple criteria (ground plan shape, walls construction, density of inner rows), resulting in the detaching

of the type II ground plans. The original 5-meter distance determining the house external area should be extended in case of type II ground plans in order to hold more distant pits. The new widened perimeter is not defined explicitly. Here, the results of the first chronological model are a crucial indicator, because it can indicate the presence of sunken features dated to the latest settlement horizons in the vicinity of type II ground plans. Contrary to type I ground plans, where the mutual overlapping of the external areas is considered to be evidence of non-contemporaneity, the type II ground plans and their external areas are missing this premise.

5.3. Radiocarbon Dating

To obtain absolute chronological data, which could amend the relative chronology, the radiocarbon method was used. The carbon was isolated from the collagen of animal bones excavated from the sunken features infill. The advantage of using this specific material could be found in theoretically smaller time discrepancies in comparison to charcoals obtained, for example, from post holes, where the so-called "old wood problem" can be expected (e.g. Schiffer 1986; Geib 2008). Life cycle and consequently the resulting radiocarbon data dispersion of a full-grown tree is longer in comparison to domestic animals, which were usually slaughtered at a young age (even in spite of the probable use of animals secondary products by the LBK farmers; Kovačiková et al. 2012). On the other hand, the negatives of animal bones lie in poor preservation, which result in low collagen rate, meaning the sampling could not be designed purely according to analytical purposes, but *de facto* limited by the bone preservation statement in individual pits. Even so only 9 of 27 (33.3 %) submitted samples reached the required minimal 0.6 % N content and C/N ratio under value of 5, which are the limits for the radiocarbon method (Goslar 2015). In two cases pottery fragments, respectively organic temper (glumes) in ceramic fabric, were also sampled for radiocarbon dating. Ceramic individual ID 6587 from pit 1095 and ID 5408 from pit 559[5] were analysed this way. Radiocarbon data were successfully obtained from both these samples. The sunken features infill was not archaeobotanicaly sampled, therefore botanical macroremains could not be used for ^{14}C dating.

As one can see in Fig. 5.9, summarizing all 11 of the radiocarbon data from the Hrdlovka site, the long-term activity in the area, especially in the Bronze and Iron Age, has had a negative impact on the results. In the sunken feature 54, the Knovíz culture (1250–1025/950 BC) components was identified during the pottery analysis (763 Neolithic individuals, 206 Knovíz culture individuals), and thus it has become apparent that feature 54 is a pit complex containing multiple chronologically distant contexts. The part, which provided a radiocarbon sample, contained Neolithic as well as Knovíz pottery in the ratio 90:29, whereas 13 individuals bore linear and one stroked decoration. The risk of contamination was not expected in feature 1955, where the sampled bone data resulted in the La Téne period (480/450–30/20 BC). In the whole feature there were only 5 intrusive La Téne ceramic individuals, meaning 2.8 % of the total number. Conversely, 50 individuals were decorated by linear techniques and the sample context was free of intrusive La Téne ceramics.

We are facing problems also in contexts only with Neolithic pottery, where nothing indicates a younger disturbance. The first example is feature 345. The radiocarbon sample was in agreement with current chronology (Neustupný 2008, 14) dated back to the Eneolithic period. Low nitrogen content, which was at the very limit of suitability, is probably the root of the problem. Also the data from feature 559 and 1095 seems to be incorrect considering that the samples come from organic temper contained in pottery fabric, because the resulting data are set into the Mesolithic period (9650–5500 BC). The absolute data for contexts with the earliest LBK pottery in Lower Austria, where the advent of the Neolithic package coming from the east can be expected previous to the area of NW Bohemia, does not start before 5700 BC (Stadler 1995, Abb. 1). Although there is some evidence for ceramic

[5] The reasons for this choice will be discussed below.

vessels using just before the Neolithic package income in the area of subsequent LBK expansion (e.g. Amkreuz et al. 2010), this interpretation does not seem to be probable in the case of features 559 and 1095, thus the radiocarbon dates should be considered incorrect.

lab. no.	sample	feature	context	BP	BC_cal (95.4%)	notes
Poz-55406	animal bone	345	0-bottom	4960±70	3824-3641	0.5%N 2.2%C
Poz-51265	animal bone	261	0-20, W half	5560±40	4596-4439	1.0%N 4.8%C, 0.7mgC
Poz-57471	animal bone	838	50-70	5705±35	4620-4458	0.9%N 3.2%C
Poz-58342	animal bone	1955	30-60, 3+4	2165±30	263-147	0.7%N 3.6%C
Poz-61356	animal bone	111-depresion	50-bottom	5870±50	4849-4597	?
Poz-63456	animal bone	110	20-40, NW part	5950±40	4934-4727	1.7%N 5.9%C, 2.2%coll
Poz-63457	animal bone	102	0-dno, E half	6200±50	5301-5026	1.1%N 4.6%C, 0.8%coll
Poz-63458	animal bone	1656	0-10	6180±40	5229-5002	1.0%N 4.6%C, 2.6%coll
Poz-63459	animal bone	54	40-bottom, SE depression	2855±35	1122-919	1.7%N 6.5%C, 1%coll
Poz-68604	organic temper in pottery matrix	1095	ID 6587, -10, middle part	7540±40	6467-6353	HF
Poz-68606	organic temper in pottery matrix	559	ID 5408, 0-bottom, E half	7330±40	6256-6071	HF

Figure 5.9. Radiocarbon data obtained from Hrdlovka site.

5.4. Ceramics Decoration as a Chronological Indicator

This chapter should give an essential overview of chronologically sensitive attributes in the frame of the basic assemblage as an initial step for further analysis. The ratio of basic decoration types (linear ornamentation–LO, stroked ornamentation–SO, technical ornamentation–TO, relief ornamentation–RO) and undecorated ceramics (NO) is expressed in Fig. 5.10. In total the decorated individuals comprise 26.1% (n=3 521) of the Neolithic ceramics basic assemblage (N=13500; see Chapter 4). Preliminarily, according to this data, it is possible to assume the LBK component as dominant in comparison with subsequent settlement patterns of the Neolithic period. It is expressed by the prevalence of linear ornament (14.9% of the basic assemblage; 57.2% of decorated ceramic individuals; n=2013) against stroked decoration (7.4% of the basic assemblage; 28.4% of decorated ceramic individuals; n=999). Nevertheless, this approach supposes similar ratio in production of decorated and undecorated vessels during both periods. Differences can be actually observed just in the frame of a single cultural period, e.g. in the assemblages of Central Bohemia LBK sites the ratio fluctuates from 15 to 45% (Rulf 1986, Tab. 1). Furthermore, the fine ware of the Early SBK stage was decorated quite frequently, but since the SBK IVb phase a sharp decline of decoration was registered (Pavlů – Zápotocká 2013, 72–77).

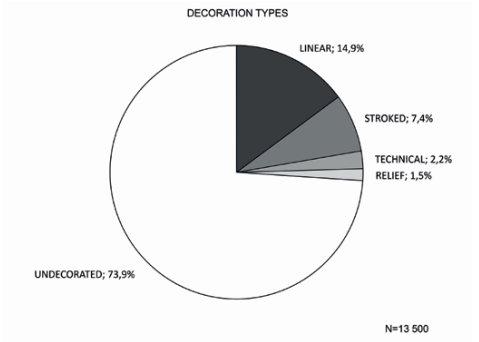


Figure 5.10. Presence of decoration types of Neolithic pottery in the basic assemblage.

In the frame of linear pottery decoration there is a further possibility of distinguishing partial subsystems (Pavlů 1977, 38). Unfortunately, their identification depends on the preservation degree of the initial vessel. The main motif of decoration was, at least partially, determined in 12.3% (n=247) of ceramic individuals bearing linear decoration. Most of the motifs belonged to the group of curvilinear spirals running around the vessel (67.6%; n=167). Nevertheless, it was possible to perform the mere distinguishing between curvilinear and rectilinear motifs in the case of nearly all the linear decorated individuals (95.6%; n=1925), including the individuals with a lower degree of preservation. The curvilinear motifs prevail (57%; n=1098) over the rectilinear (36.7%; n=707). The rest of the individuals evince the rectilinear as well as the curvilinear line course, which can be explained by the preservation of main and also secondary (complementary) motifs in the frame of a single ceramic fragment or individual, despite the fact that the secondary motifs evince a low rate of occurrence (9%; n=182). The lines below the rim were not detected frequently (5.6%; n=112). Here the percentage was rather influenced by determination difficulties connected with this decoration subsystem. Lines below the rim are most frequent in the form of simple incised lines with a triangle and various numbers of punctures (56.3%; n=63). Decoration of the vessels inner parts, which is not so common in the LBK pottery, was also recorded in 19 cases[6] (Tab. 4.17). Analogies from the Podkrušnohoří region can be found in the Krbice site ceramic assemblage, where this decoration type was recorded on the inner walls as well as on the bottom of vessels (Káčerik 2011, 683), or at the Malé Bžezno site, where the "W" motif occurs on the bottom of a vessel (Šumberová 1995, Tab. 8:7).

The technique of decoration itself was possible to identify in the highest rate compared to other decoration subsystems. On the ceramic individuals bearing linear decoration the technique was distinguishable in 60.5% (n=1218). Small fragments mainly represented the rest, where only general music-notes techniques, undifferentiated bands and mostly simple incised lines were recorded. To not bring error into the analysis, the small fragments with lines were not classified as a simple incised line decoration technique (DELTA 12). This is due to the fact that originally, the vessel could be decorated by music-note technique, but after the fragmentation processes only the section between notes was preserved.

The spectrum of observed LO styles is shown in Fig. 5.11. Unfortunately, the most frequent was the category of undistinguished lines and bands (33.2%; n=668), where the closer undistinguished music-note decoration described as EPSILON 0 (6.3%; n=127) should also be added. Based on the current knowledge about the occurrence of individual linear pottery decoration styles in time (Pavlů – Zápotocká 2013, 30–38), we can, according to the analysed ceramic assemblage, preliminarily assume the whole development of the LBK was captured at the Hrdlovka site, even if with various intensity. Attention should be paid to the increased occurrence of the thin band ALFA 30 (13%; n=262).

[6] ID 2345, 2401, 2983, 3893, 4049, 4803, 5145, 5177, 5216, 6641, 7146, 10046, 10625, 10787, 10792, 10882, 11280, 11610 and 11638.

These so-called ladders are peculiar to the Late (III) and especially Final (IV) LBK stage in the region of Northwest Bohemia and neighbouring Saxony (Pavlů – Zápotocká 2013, 34). To compare, at the Bylany site in eastern Bohemia, this decoration style was present in only an insignificant proportion of 0.2 %, 35 ceramic individuals of the absolute number (Květina – Pavlů 2007). Focusing on the techniques classified in more detail, the highest rate revealed the simple line or non-filled band[7] united in description as the style DELTA 12 (31.9 %; n=642), which unfortunately does not seem to be chronologically significant. No occurrence was detected in the case of style ETA.

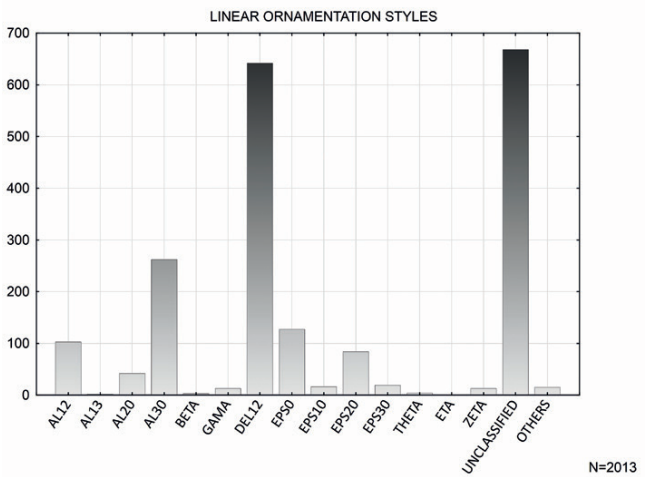


Figure 5.11. Bar chart for absolute numbers of linear ornamentation styles in the basic assemblage. For decoration styles abbreviations see Tab. 4.6.

The stroked ornament description also enables studying various levels of decoration (Zápotocká 1998, 99, Abb. 31). Decoration motifs were, however, determinable only in 10.8 % (n=108) of ceramic individuals, which approximately agrees with the ratio observed in linear pottery assemblage. The chevron motif, frequent in the Early SBK period, was the most common (77.8 %; n=84). Low presence, or rather determination ratio, was typical for secondary motifs (3.7 %; n=37) and dividing ornaments (6.9 %; n=69), in contrast with lines below the rim, which reached 20 % (n=200) occurrence in the stroked pottery assemblage. In the category of secondary motifs the short sections often organised in alternating or checkerboard patterns prevailed (48.6 %; n=18). Also the decoration of vessel inner parts could be classified as a specific type of secondary motifs. This was detected in 15 cases in total. Among the dividing ornaments, simple or doubled and tripled lines of strokes forming a band dominate (79.7 %; n=55). The same organisation further broadened by quadrupled lines predominates in the category of lines below the rim (87 %; n=174).

Compared to linear decoration the stroked ornament offers better possibilities for classifying the technique and style, because only a small fragment is sufficient for reliable determination (Fig. 5.12). Therefore, the ratio of determined stroked ornament styles reach a high value of 96 % (n=959). As well as in the case of linear pottery the detected stroked ornamentation techniques comprise the whole of SBK culture development, the Early (I-III) and also the Late (IV) SBK stage (Pavlů – Zápotocká 2013, 38–52). Most of the ceramic individuals were decorated with small alternating double-strokes (59.1 %; n=590) and small double-strokes made using a tremolo technique (19.3 %; n=193), which took their place particularly in the Early stage of SBK development, but intervene in a limited amount in the Late stage as well. Interesting (albeit relatively rare) is the presence of the Rössen strokes (0.6 %; n=6). The occurrence of Rössen strokes together with the tremolo technique (2 %; n=20) is dated to the Late SBK stage in Bohemia. Painted decoration on the SBK pottery remains completely undetected, but here the problem of original surface erosion should be kept in mind again (see Chapter 4).

[7] These two ways of linear ornament application are hardly distinguishable on smaller fragments, especially when spiral motifs were used, therefore they comprise one style DELTA 12.

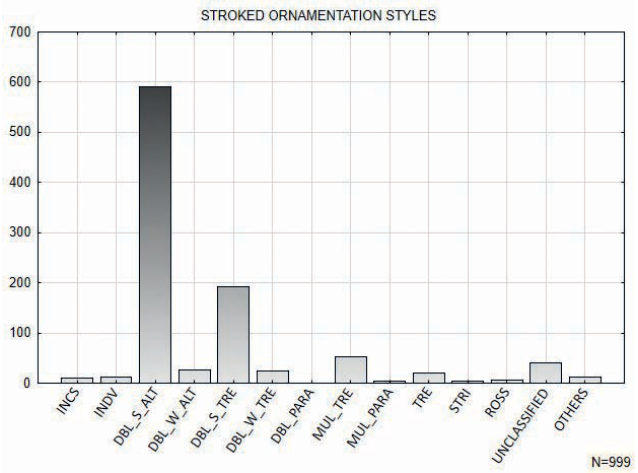


Figure 5.12. Bar chart for absolute numbers of stroked ornamentation styles in the basic assemblage. For style abbreviations see Tab. 4.10.

Except for the linear or stroked ornaments decorating the vessel surface, our attention should be paid to the vessel shape as well, namely for tracking the chronological sequences of the Late and Final SBK phases, when the variability in vessel forming highly increased.

The observed vessel shape spectrum is partially influenced by the obstacles for successful and complete classification. As was mentioned above (Chapter 4), the Hrdlovka site assemblage was highly fragmentary, thus only 6 ceramic individuals could be considered complete vessels. The original vessel shape was at least partially determined in the case of 12.8 % (n=1733) individuals, but the determinations of vessel rim shape and inclination are just the majority of them. Apart from this group, the rate of completely determined individuals would be reduced to 3.3 % (n=446). The most frequent category (55.4 %; n=247) is represented by the hemispherical vessels (Fig. 5.13), i.e. the shape, which was common during the whole linear and, at least partially, stroked pottery development. There were numerous universal shapes of classic deep bowls (25.6 %; n=114) as well, followed by pear-shaped vessels produced since the LBK Šárka stage and particularly later, in the frame of stroked ornamented pottery (16.6 %; n=74). Contrary to this, a low amount of occurrence can be found in bottles (0.9 %; n=4). To compare, at the LBK sites in central Bohemia they are present only in 2% (Rulf 1986, Tab. 1) of the overall finds. Rather than the initial spectrum of used vessels, the possibilities of determination seem to have an effect on the result in this case, because bottles are more difficult to identify in fragmentary assemblage in comparison to hemispherical shapes and bottles. More elaborated shapes of the developed stroked pottery, like profiled bowls, beakers, kettles or pot-like vessels occur altogether in a low rate (2.1 %; n=9). These ceramic individuals or others from the particular archaeological context still bear stroked decoration. Rare shapes, like flowerpots or profiled jars, were not identified at all.

The linear and stroked pottery decoration as well as identified vessel shapes allow for us to assume that, in the frame of the overburden area, all phases of the Neolithic period starting with commencement of LBK until the Late SBK stage have been captured. Nevertheless, the very late vessel shapes still bore extensive stroked decoration; hence settlement during the final SBK phase was not expected.

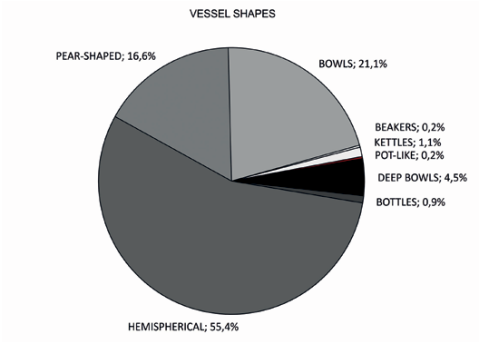


Figure 5.13. Presence of vessel shapes in the basic assemblage.

5.5. Longhouse Architecture as a Chronological Indicator

After the revision of the Hrdlovka overburden areas, there are 59 longhouse ground plans. Unfortunately, not all of them are well preserved and the majority of them were detected only by line overburden. Here, the overview and evaluation of house construction will be performed, where chronological sensitive attributes of the Neolithic architecture can provide indication for general settlement chronology formation.

Based on the procedure for the general dating of longhouse ground plans (Fig. 5.8), Fig. 5.14 was created to summarize information about the number of parts, ground plan shape, wall construction, building pits presence and number of inner posts rows. The main limit for the determination of these characteristics was the complete uncovering and preservation state of the individual ground plan.

no.	excavation	number of parts	shape	wall	building pits	inner rows total
1	incomplete	-	trapezoid	double regular	yes	-
2	complete	3	naviform	double alternate	yes	7
3	complete	3	rectangular*	double regular	yes	12
4	complete	1	rectangular	simple	yes	3
6	incomplete	3	rectangular	simple	yes	-
7	incomplete	1	rectangular	simple	yes	4
8	complete	3	trapezoid/ rectangular	simple	no	7
9	complete	3	rectangular	simple	yes	9
10	incomplete	2	naviform	simple	yes	-
12	complete	2	rectangular	simple	yes **	7
13	incomplete	-	rectangular	-	-	-
14	incomplete	-	-	simple	-	-
15	incomplete	2	trapezoid	-	yes	-
16	incomplete	3	-	simple	no	-
17	complete	1	trapezoid	furrow	no***	0
18	incomplete	-	-	simple	yes	-
20	incomplete	-	-	double regular	-	-
22	incomplete	-	-	-	-	-
23	incomplete	-	-	-	yes	-
24	incomplete	-	-	simple	-	-
25	incomplete	-	-	simple	yes	-
26	incomplete	-	-	-	yes	-

no.	excavation	number of parts	shape	wall	building pits	inner rows total
27	incomplete	-	-	double regular	-	-
29	incomplete	-	-	simple	yes	-
31	incomplete	-	-	-	yes	-
35	incomplete	-	-	simple	yes	-
36	incomplete	-	-	-	-	-
37	incomplete	-	-	-	-	-
38	incomplete	-	-	simple	-	-
39	incomplete	-	-	double alternate	yes	-
40	incomplete	-	-	-	-	-
41	incomplete	-	-	double alternate	yes	-
42	complete	3	rectangular	-	no	10
43	incomplete	-	-	simple	yes	-
44	complete	2	trapezoid	double alternate	yes	8
45	incomplete	-	-	-	-	-
46	incomplete	-	-	simple	yes	-
47	incomplete	-	-	double regular	-	-
48	incomplete	-	-	double regular	-	-
50	incomplete	-	-	-	yes	-
52	incomplete	-	-	simple	-	-
53	incomplete	-	-	double regular with big posts	-	-
54	incomplete	-	-	-	-	-
55	incomplete	-	-	-	-	-
57	incomplete	-	-	-	-	-
59	incomplete	-	-	double regular	yes	-
60	incomplete	-	-	simple	yes	-
61	incomplete	-	-	simple	-	-
62	incomplete	-	-	-	yes	-
63	incomplete	-	-	double alternate	yes	-
64	incomplete	-	-	simple	yes	-
65	incomplete	-	-	simple	yes	-
66	incomplete	-	-	simple	-	-
67	incomplete	-	-	-	yes	-
69	incomplete	-	-	-	yes	-
70	incomplete	-	-	simple	yes	-
72	complete	1	rectangular	-	yes	3
73	incomplete	1	rectangular	double alternate	yes	-
75	incomplete	-	-	simple	yes	-

* A slight difference between the northern and southern house part was noticed. Considering the enormous length of the house, it may be an inadvertent deviation.
** The northern projections of feature 945 can be most probably described as house 12 building pits. Unfortunately, feature 945 is a conglomerate of different contexts; its infill was excavated by probing trenches only in the central part, hence there are no finds from the suspected house 12 building pits.
*** There is a small feature, 1247, near the house 17, but only one fragment with strokes has come from the infill. Therefore, it is questionable, if it should be considered a building pit.

Figure 5.14. The main construction characteristics of the longhouse ground plans. The determination possibilities are dependent on ground plan legibility and the method of excavation.

According to the above-mentioned characteristics, the ground plans can be divided in the following way:

Early LBK	type I	-
Classic LBK		3, 4, 6, 7, 9, 12, 42,72, 73
Early SBK		1, 2, 8, 10, 15, 41, 44
Late and Final SBK	type II	17
generally Neolithic	undetermined	13, 14, 16, 18, 20, 22, 23, 24, 25, 26, 27, 29,31, 35, 36, 37, 38, 39, 40, 43, 45, 46, 47, 48, 50, 52, 53, 54, 55, 57, 59, 60, 61, 62, 63, 64, 65, 66, 67, 69, 70, 75

Figure 5.15. Hypothetical chronological and typological classification of longhouse ground plans according to the construction attributes.

This classification should, however, be considered only for next indicia in the complex analysis of Hrdlovka settlement area chronological sequence. The ratio of closely categorized ground plans is quite low (29 %), caused by the poor legibility of many excavated situations. Moreover, a multiple factors coincidence for reliable determination was needed.

5.6. Construction Complexes

Just as in the case of sunken features, it is possible to define mutual negative spatial relationships among house ground plans. These are expressed either by the overlapping of the house external areas (affinity type 3), or by the overlapping of the ground plans themselves (affinity type 4). All the houses, respectively their ground plans and external areas with mutual negative relations entered the matrix (Fig. 5.16).[8] It is apparent that the SJ area offered the most information thanks to the extensive way of overburdening. This is particularly true of a group of buildings in the centre of area, where principle of 5-meter perimeters overlapping excludes contemporary existence a series of houses. Theoretically, ground plans 3 and 7, also 4 and 6, can form one settlement horizon. On the other hand, at the areas of line overburden only relations of two neighbouring house complexes (e.g. 24/25 and 39/40) or triads (e.g. 52/53/54) can be usually seen. These are depicted in the axially symmetrical matrix as a cross formation, where the peripheral complexes are in a negative relationship to the middle ones. The direct overlapping of ground plans (affinity type 4) was observed only in case of couples 42/12 and 75/9. The ground plans 42 and 12 closely abut next to each other via their longitudinal walls.

Furthermore, a plot (Fig. 5.17) can be created using a combination of spatial information of sunken features and their relations to the house's external area perimeter and the construction features of longhouse ground plans (postholes, trenches). Only the sunken features containing Neolithic artefacts were inserted. Postholes and trenches are not displayed in the plot because they are implicitly present as a structure creating the house ground plan. This plot represents the primary model for construction complexes at the Hrdlovka settlement area, which should be further tested and specified. Further, the spatial relationships are not described not only dichotomously, but in multiple ways. Similarly, as discrete pits and houses it is also possible to categorize mutual spatial relations between features and longhouse ground plans. Affinity type 1 relation was assigned to sunken features and longhouse ground plans, whose association was, based on spatial disposition, out of the question. However, in many cases the determination was uncertain. The pits, whose distance from the house wall was smaller than one meter, have usually been exempted from the house complex (Pavlů 1977, 19)

[8] For better understanding the matrix is axially symmetrical in diagonal direction, thus each relation is displayed twice in the matrix.

and should be judged case-by-case. As an example, ground plan 6 and sunken feature 1238 can be mentioned. The pit interferes narrowly with the house wall and therefore it could be considered as possibly not associated with this building. Where some doubts concerning the pits association arise, the relations of affinity type 2 and 3 were assigned. The last affinity type (definitely not interrelated) is characteristic for features directly disturbing the longhouse ground plan.

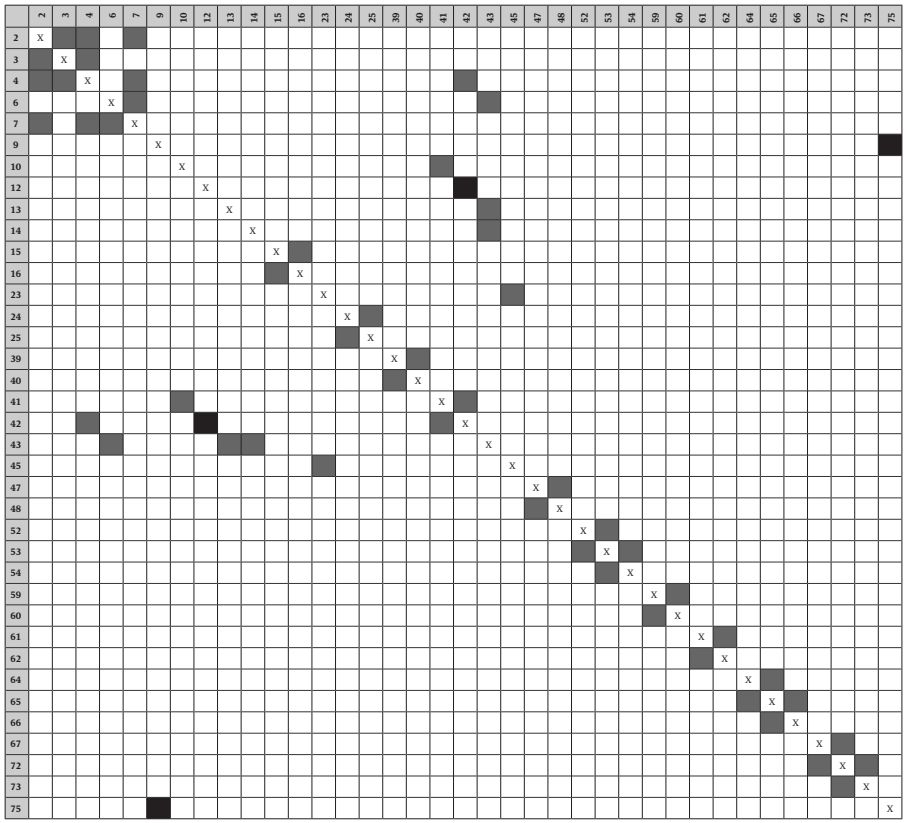


Figure 5.16. Axially symmetrical matrix of negative relations among the Neolithic house ground plans. Relations of affinity type 3 (possibly not interrelated, mutual overlapping of external areas) are in grey; relations of affinity type 4 (definitely not interrelated, direct overlapping of ground plans) are in black.

Thus, in this analytical step, the house construction complex represents a unit defined only according to the spatial disposition. The chronological and consequently functional relations are needed to be proven in the following steps. Determination of construction complexes in the case of type II houses will be possible only after the elaboration of the first chronological model.

ground plan no.	affinity type 1	affinity type 2	affinity type 3	affinity type 4
1	850			
2	202, 234, 236, 261	250	265	329, 330, 720 A
3	1090 A, 1090 B, 1090 C, 1092	305, 430, 1093	339, 261	345
4	329, 345, 765			392
6	189, 703, 1239	1238		
7	720 A*	704	720 B	
8	838			
9	103, 617, 654, 668	102		613, 616, 618
10	937	1358		
12				
13				
14				
15	1101	1094		1096
16			1095	1094, 1099
17	1247			
18	1274	1273		
20		1315		
22				
23	559, 566			565
24				571
25	574 B			
26	581 B, 586 B		580 B	
27				
29	108	104, 106**		105, 113
31			110	
35	489			
36				
37				
38				
39	543			
40				
41	1400			
42	1435			
43	950			1238
44	1800 A, 1800 B, 1808 B			
45				567
46	1659, 1666			
47				
48				
50	1836			
52				
53				
54				
55				
57				
59	1682, 1699			
60	1700, 1712***		1707	

ground plan no.	affinity type 1	affinity type 2	affinity type 3	affinity type 4
61				1718
62	1718, 1727			
63	1739			
64	1742		1752	
65	1761	1752		
66				
67	1924			
69	1929 B, 1934			
70	1954 B	1941	2023	1951
72	1964			
73	1773			
75	612			613, 616, 617,618

* the feature could be according to a spatial setting assigned to construction complex 4 as well as 7, but only the section closer to ground plan 7 was excavated, therefore the feature 720 A was classified as part of construction complex 7
** features 104 and 106 slightly overlap each other
*** there is a Neolithic building pit (context 1712-1) in the frame of the multi-component pit complex 1712

Figure 5.17. Association of sunken features and longhouse ground plans creating the construction complexes according to the spatial relationships (affinity type 1 and 2). The features with negative relationships to ground plans or construction complexes (affinity type 3 and 4) are also displayed.

5.7. The First Chronological Model

To establish the first chronological model the data coming from the basic ceramic assemblage will be used. However, the initial step comprises the revision of all archaeological contexts. Additionally, in the frame of pit complexes with more depressions several archaeological contexts were identified.[9] Distinguishing these contexts is crucial for a precise chronological sequence.

The data of basic ceramic assemblage also needs to be revised considering, in particular, the context of its origin. The following criteria of filtration are proposed:

1) To exclude the material obtained from post-holes and house northern wall trenches. Infilling process of these structures is rather problematic and it is not supposed the finds are contemporaneous to the house's lifetime (Vencl 2001, 607).[10] The grave 1926 inventory was also omitted. This assemblage was crated intentionally by inserting the grave goods into the feature, originally a storage pit. It means it was created in a different way than other "classical" settlement feature infills.
2) To exclude assemblages of features and contexts containing more than 5 % of post-Neolithic ceramic individuals, so-called intrusions. Their infill could obviously arise by multiphase process and chronological homogeneity is significantly questionable.
3) To include only the ceramic individuals with fully identified decoration styles. The individuals with only general determination (e.g. linear or stroked ornamentation generally, filled-in band, undistinguished music-note – EPSILON 0) should be excluded. The statistical program would consider them to be another type of decoration style, but they are rather supersets of

[9] Another context of depression around the pin "A" in the sunken feature 102 was identified. Here only one decorated ceramic individual was found, therefore this context does not participate on analysis. In feature 111 a depression in the western half of this pit was additionally identified. In the polycomponent pit complex 1712 the western part was separated, which is most possibly the remains of a Neolithic building pit (finds were during the terrain excavation labelled as "1712-1" and "1,2 m from west."

[10] The only exception represents feature 838 (sunken feature with post-hole in the centre and grinding stones deposit). Albeit it is directly linked to the house construction, the infill seems to be deposited during the house building (for more details see Beneš et al. 2015).

decoration styles. Similarly, it is appropriate to exclude individuals, whose decoration technique is not classified to any group of concrete decoration style. These cases were set in the "other linear/stroked ornamentation" category, but including this category into the analysis, the other pseudogroup would arise.

4) Finally, the features or contexts with a low number of closer identified decoration styles were excluded. The lower quartile (Fig. 5.18) was chosen as a minimum limit. It means, all features and contexts assemblages containing only one or two individuals with exact technique and consequently also style determination did not enter the analysis. The upper limit equals the maximum of input assemblage. Contrary to the Bylany site (Květina – Končelová 2011, 203–204; upper limit Q90) at Hrdlovka large loam pits were not excavated to the whole extent and thus their assemblages does not reach such a high number of ceramic individuals.

	Descriptive Statistics									
Variable	Valid N	Mean	Med	Min	Max	Lower Quartile	Upper Quartile	Per 10	Per 90	Std.Dev.
deter_indiv	129	15,15	5	1	198	2	14	1	33	28,62

Figure 5.18. Characteristics of input assemblage before the fourth step of filtration.

After the filtration the assemblage of 1871 ceramic individuals from 78 sunken features and contexts entered the analysis. The different extend features excavated and consequently various amount of finds were not taken into account, because the unimodal Detrended Correspondence Analysis deals with ratios of observed values, not absolute numbers. Ceramic assemblages coming from the features limitedly excavated by probing trenches (e.g. 945 or 1339) can be considered as random samples from the whole feature. If these cases were excluded, the possibility of large extend loam pits dating would be reduced.

The result of correspondence analysis for decoration styles according to their distribution in sunken features is displayed in Fig. 5.19. Bearing in mind the general development of Neolithic pottery in the Bohemia region (Pavlů – Zápotocká 2013, 29–55) a chronological trend highlighted by an arrow is apparent. The gradient is noticeable particularly contra the direction of the first ordination axis, which means that chronologically earlier styles appear simultaneously with increasing value. There is an opposite trend in a second ordination axis. The percentage of explained variability is not high, however. That is why it is necessary to confront the results with primary data additionally (see below).

In the diagram, the earliest style chronologically is represented by the GAMA, characterized by a technique of wide grooves and followed in the gradient by the groups of developed linear decoration. The central position is occupied by the linear pottery styles typical for the LBK Šárka stage and stroked pottery styles of the SBK Early stage. However the parallel double-strokes (DBL_PARA) do not much respect this setting. As an outlier and therefore non-classified value is represented by the style of incised lines in the frame of SBK pottery (INCS). The reason for its position can be found in the fact, that this group unites elements appearing in the SBK onset, as well as the technique of incising using a multi-pointed implement (Tab. 4.10: technique 08), which is derived from alternating double-strokes of the developed SBK period. The chronological gradient is enclosed by styles of the Late SBK stage: multiple, tremolo and Rössen strokes.

Displaying the sunken features as individual cases of style variability in the same ordination space, the first continuous model of the Hrdlovka site chronological sequence can be gained (Fig. 5.20). Here, we can already observe some space-time units defined by sunken feature concentrations, but the preliminary character of this model must be taken into account. It should be noticed, that the feature 838 spatially associated to house 8, which was according to the construction attributes dated

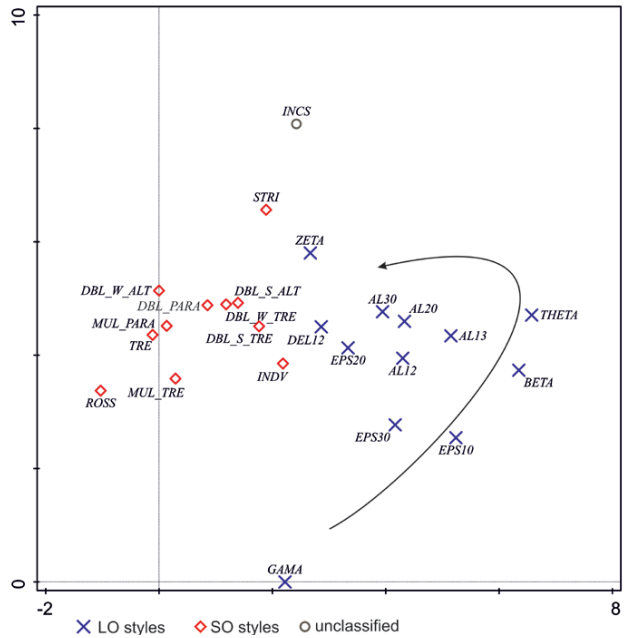


Figure. 5.19. The first chronological model. DCA ordination diagram displays relations among linear and stroked decoration styles according to their presence in analysed sunken features. The first axis explains 17.9 %, the second 10.7 % of the variability. The arrow indicates chronological development. The groups of linear and stroked decoration styles are marked. For style abbreviations see Tabs. 4.6 and 4.10.

to the Early SBK stage, is placed in the ordination space at the very end of the chronological gradient. The presence of decoration styles of the Late SBK (wide double strokes, tremolo and Rössen strokes) is the root of this effect.

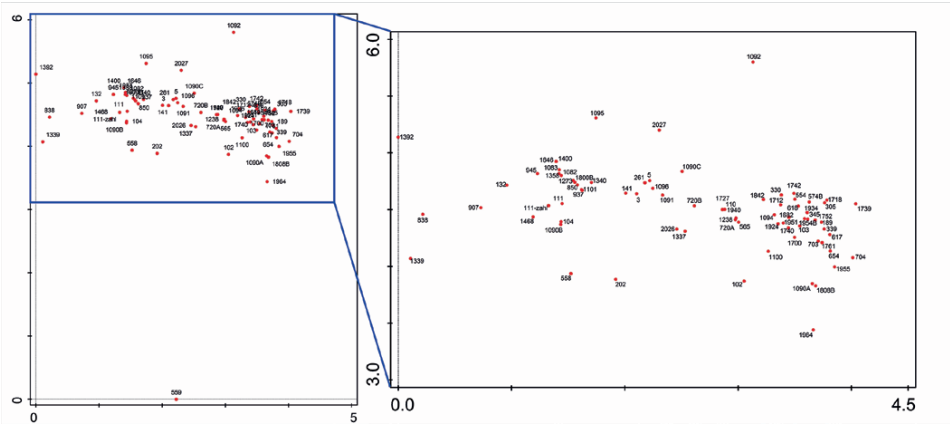


Figure 5.20. The first chronological model. DCA ordination diagram displays relations among the features according to the presence of linear and stroked decoration styles in the features infill. The first axis explains 17.9 %, the second 10.7 % of the variability. The cluster of features in the upper part of the diagram is zoomed in the cut-out for clarity.

5.8. Control of the First Chronological Model

Problematic nature of the first chronological model is apparent just after the displaying of some attributes of analysed assemblage (Fig. 5.21).

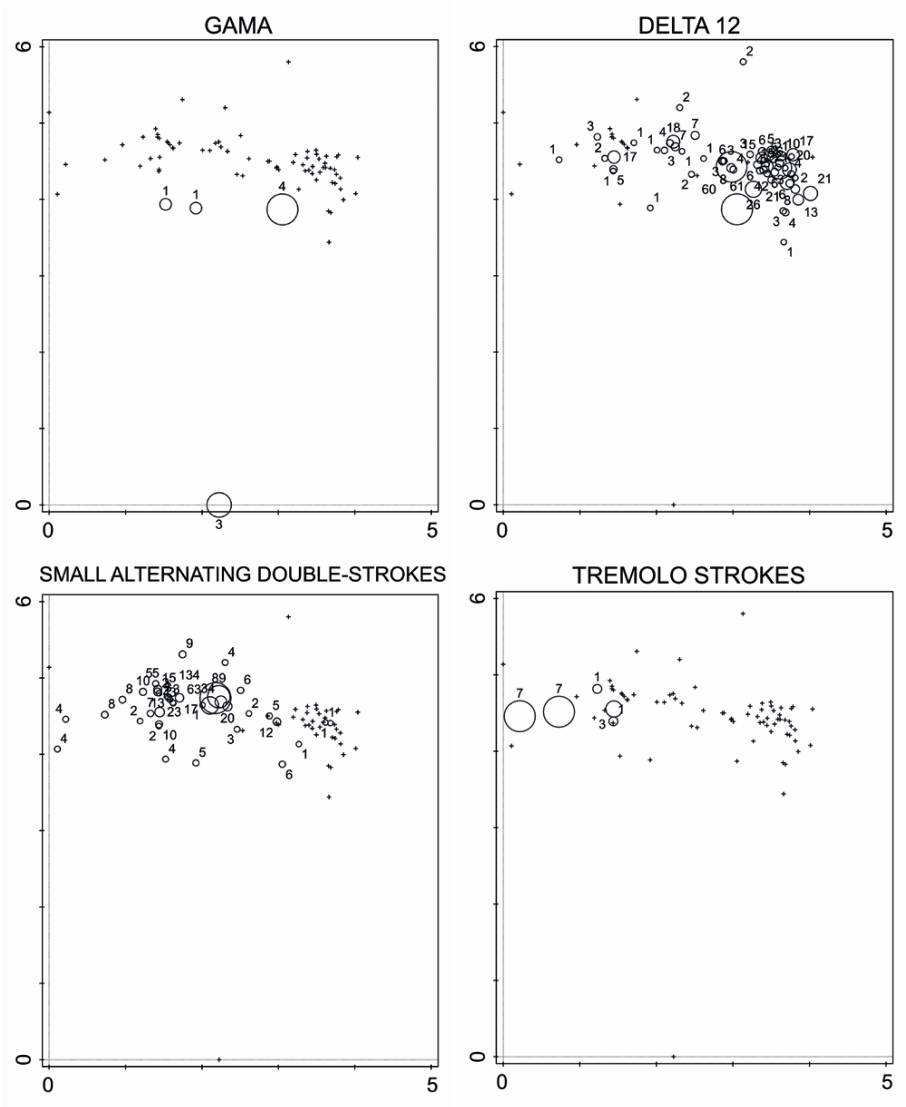


Figure 5.21. The symbol diagram based on the first chronological model DCA diagram (Figs. 5.19 and 5.20) displaying presence of individual decoration styles in the sunken features projected in the ordination space.

The simple incised line (DELTA 12) does not seem to be chronologically significant. Although it is the most frequent in the features containing other linear pottery styles, it does not disappear even with the decreasing value of the first ordination axos, i.e. in features with a predominance of stroked decoration. Partially, it can be explained by the description method. The technique of incised lines did not completely vanish even during the onset of stroked decoration (Pavlů – Zápotocká 2013, 40) and thus the ceramic individual can be classified either to the group of linear (Tab. 4.6: techniques 311, 318) or stroked techniques (Tab. 4.10: techniques 01, 02, 03). In many cases it is complicated to classify the incised line in the right group without previous knowledge of the whole context of pit assemblage. Hence, the classification into the linear ornamentation group, where this element is typical and eponymous, was *a priori* chosen. This is why the overlap of LBK techniques into SBK features area in the graph seems to be partially distorted.

The distribution of wide groove GAMA has to be considered in a different way, particularly if the ceramic individual has been created by a specific muddy fabric with an organic temper. This can be considered as a significant characteristic of the early LBK pottery (Neustupný 1956, 392–393; Pavlů – Vokolek 1996, 26–46). It is all the more startling that such a ceramic individual was found in the feature 202 fill, where stroked ornamentation dominates. Furthermore, according to its spatial position, this feature belongs to house 2, whose ground plan evinced attributes of the rather younger Neolithic period (see above). Pit 558, originally used as an underground storage feature, represents a very similar case.

The shift is observable in the direction of the first ordination axis as well, i.e. contrary the chronological development. Presence of small alternating double-strokes (DBL_S_ALT) was noticed also in features with a dominance of linear decoration (no. 345, 1752). Fusion of both the above-mentioned problems is represented by feature 102, where the linear GAMA style, double alternating strokes and other chronologically heterogeneous styles are present. During the excavation of this feature the depression in the western part was identified as an independent context, but the stratigraphy of whole feature seems to be more complicated.

On the other hand, many other attributes of the first chronological model are in agreement with the general chronology. As an example the tremolo stroke (TRE) can be mentioned. This Late SBK style is present in features at the very beginning of the first ordination axis, where the end of the Hrdlovka chronological sequence is supposed.

The following step of control will be performed on the basis of inter-feature spatial relationships. The affinity type 4, i.e. mutual overlapping, is considered to be a proof of the features non-contemporaneousness. Inserting these relations into the ordination space, no disagreement with the assumed chronological model (Fig. 5.22) was found. The mutually overlapped features are distant enough to each other in the ordination space. Preliminarily, it can be assumed that each feature belongs to a different chronological phase, which is presented in the diagram as a feature clusters, hence this diagram can be regarded as the first indication for settlement horizons[11].

Another data source can also be used to control the first chronological model: radiocarbon data was obtained from some features and contexts passing through the filtration before the first chronological model. Unfortunately, only part of the whole number of 11 samples can be considered as reliable (see above). Displaying this data in the first chronological model diagram ordination space, the expected chronological gradient became apparent (Fig. 5.23). The absolute data thus confirms (at least in rough shapes) the validity of the first chronological model, but closer evaluation should be performed.

[11] *A priori* it is assumed, that the disturbing of one feature by another was caused in longer chronological interval defined as at least one settlement phase. Naturally, the case of a short interval is also possible, because affinity type 4 gives evidence only about the non-contemporaneity itself without any other information.

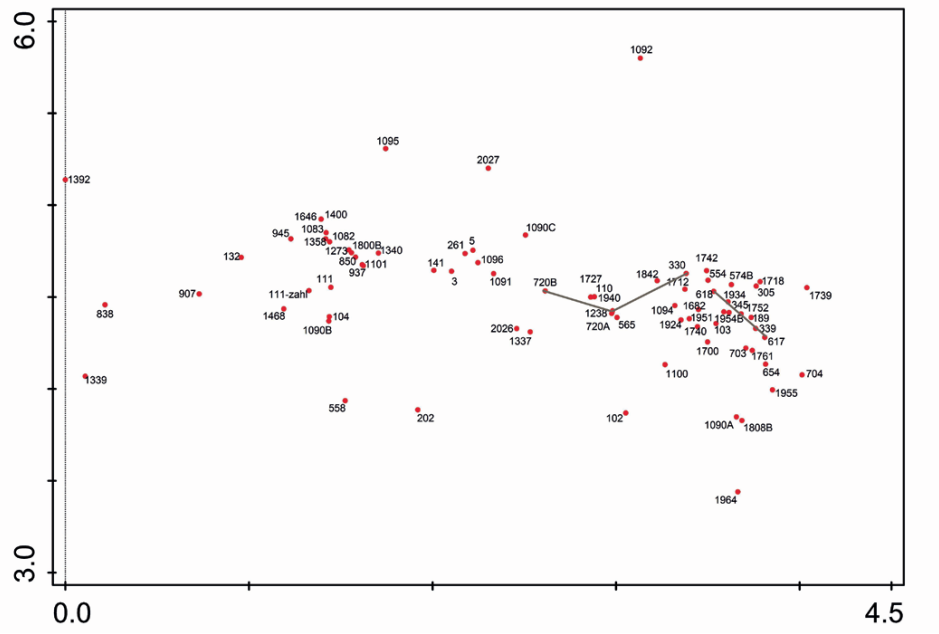


Figure 5.22. The cut-out of the first chronological model diagram displaying affinity type 4 relationships among the sunken features (grey line).

The absolute chronology of the LBK and following post-LBK cultures can be recently supported by many radiocarbon data and accompanied by dendrochronology (Neustupný 1968; 1969; Breunig 1987; Stäuble 1994; 1995; Lenneis – Stadler 2002; Stadler et al. 2006; Manning et al. 2014 etc.). These show possible differences of cultures onsets and descents in various regions of Central Europe. The LBK culture is generally defined by an interval of 5500–5000 BC (Whittle 1996, 146), nevertheless the latest study presenting absolute data for Neolithic cultures (Manning et al. 2014) suggests a little bit a younger range with a distribution curve peak at 5088 BC and a standard deviation of 310 years[12]. The beginning of stroked ornamentation is generally dated to 5000 BC, although higher regional variability can be expected here considering the gradual spreading of the new decoration style from the origin hotspot (Zápotocká – Muška 2007, 88). The next turning point was 4800 BC, the boundary between the Early and Late SBK stage, as a reaction to the increasing influence of the Lengyel complex from the east (Stadler et al. 2006; Manning et al. 2014).

Radiocarbon data obtained in sunken features 838 and 111 (western depression) are respecting the above outlined chronology by its position in the ordination diagram. In case of pit 838 the radiocarbon data is the next indication for dating this context and possibly also the whole house 8 to the Late SBK stage. Beforehand the sample from the feature 261 (4596–4439 BCcal) was rejected because of its unreliability. The date took place on the very lower limit of the stroked decoration use (Late SBK stage 4800–4500 BC, Pavlů – Zápotocká 2013, 46), but this does not correspond to feature 261's ceramic assemblage, where the small and middle double-strokes dominate accompanied, in a small rate, by subsiding techniques of linear ornamentation. The unreliability of this data is confirmed also

[12] Authors of the study propose to use a normal distribution curve, i.e. to state mean (fitted curve peak) and standard deviation, instead of classic time interval for expressing the time span. This way should better correspond to the concept of gradual onset and descent of "culture" (Manning et al. 2014, 1075).

by sample from feature 838, where pottery decoration typical for the Late SBK stage occurred, but the resulting data is even slightly older (4620–4458 BCcal) than in the case of 261.

Some doubts have also arisen about the feature 102 date. This feature appeared to be an inhomogeneous pit complex during the processing of the first step of control. It seems that the resulting data (5301–5026 BCcal) was obtained just from context originating in the developed LBK period (cf. Lüning 2005). A Feature 102 assemblage also inclines to this position in the ordination space, despite its mixed character. The last case is represented by feature 110 and its dating (4934–4727 BCcal) corresponding to the Early SBK stage. However, the feature 110 position in the first chronological model points toward another conclusion. After displaying the affinity type 4 relationships (Fig. 5.22) the feature 110 is ranked in the same group with features 565, 720 A, 1727 and 1940, where no stroke ornamented pottery was noticed at all. This leads us, as in previous cases, to take into consideration the possible existence of different (undistinguished) contexts in the frame of feature 110.

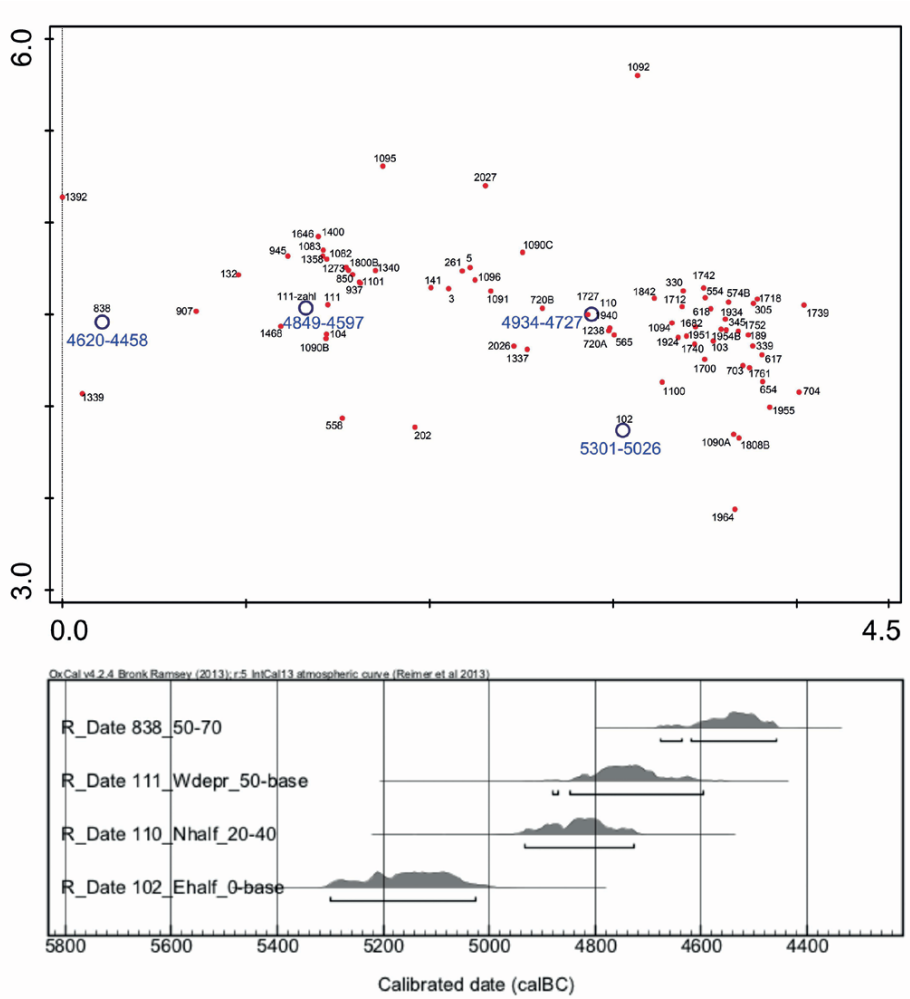


Figure 5.23. The absolute radiocarbon data displayed in the ordination space of the first chronological model.

To summarize, during the revision of the first chronological model non-homogeneity of some features infill (102, 110, 202, 558) according to various indications were identified. It is justified to consider that their position in the first chronological model is incorrect, but furthermore they bring error in the whole model. Following variants of problem solution can be proposed:

a) to separate the partial contexts according to their ceramic assemblages

b) to separate the partial contexts according to their spatial setting

c) to delete the problematic contexts from the model

The separation of features assemblages (e.g. stroked and linear decorated pottery) would by considerably artificial and this solution could bring more error into the model. Furthermore, the evidence of a possible LBK/SBK transitional phase can be erased. Particular risk is also carried by the second variant. The sunken features were not often excavated by unified methodology, the mechanical sectors and layers can moreover intersect several original contexts (see Deetz 1967, Fig. 2). Therefore, the last variant was chosen.

The feature 559 will also be expelled from the analysis. Its assemblage is a significant outlier in the chronological model, which causes a high increase of the ordination gradient and consequently difficult distinguishing of some nuances in other features ordering. In addition, after elimination of the above-mentioned features the feature 559 is the only case of GAMA style occurrence and its presence in the DCA ordination space would cause undesirable line effect in the features ordering. The feature 559 nevertheless keeps in agreement with the first chronological model and it is considered to be the earliest context of the Hrdlovka site chronological sequence.

Thus, the final step of the first chronological model revision will be performed by filtered assemblage comprising 73 sunken features or contexts with a total number of 1722 ceramic individuals. The important intervention in the correspondence analysis represents the reducing of style DELTA 12 (simply incised line) weight, which is for now only a supplementary variable. This decoration style occurs during nearly the whole LBK period, therefore it brings undesirable background noise in the model. The revised first chronological model is displayed in Figs. 5.24 and 5.25.

The reducing of simple line DELTA 12 weight helped to eliminate unwanted clustering of features containing LBK pottery. On the other hand, it is not possible to specify the position of feature 1727 and 1940, which contained only the individuals with a DELTA 12 style decoration. A chronological gradient is defined by the first ordination axis more firmly in comparison with the previous model:

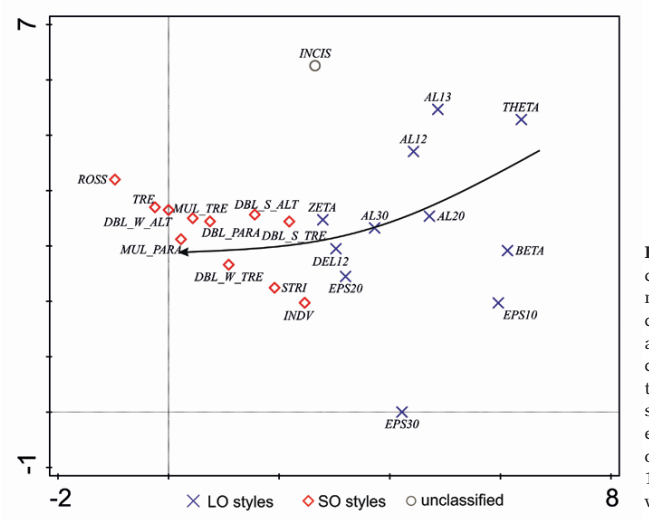


Figure 5.24. The first chronological model after revision. DCA ordination diagram displays relations among linear and stroked decoration styles according to their presence in analysed sunken features. The first axis explains 18.6 %, the second 7.9 % of the variability. The DELTA 12 style is a supplementary variable.

the latest decoration styles are ordered in the area of the axis beginning or even negative values. The only variable not respecting the presumptive scheme are music-notes placed close together on lines (EPSILON 30). It is considerably outlier in the direction of the second ordination axis and that causes deflection of chronological gradient.

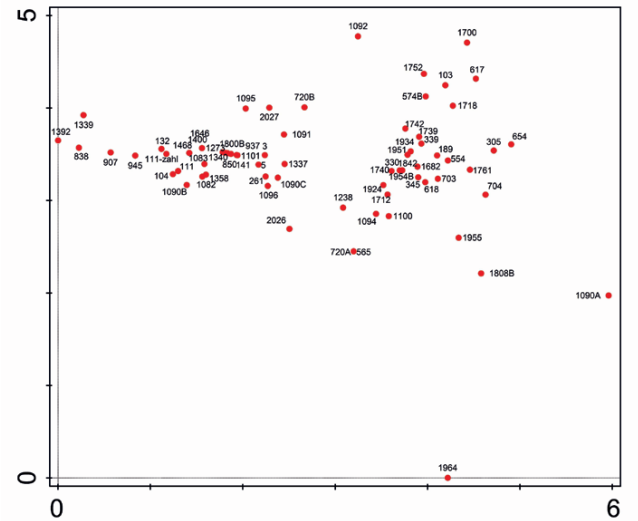


Figure 5.25. The first chronological model after revision. DCA ordination diagram displays relations among the features according to the presence of linear and stroked decoration styles in the features infill. The first axis explains 18.6 %, the second 7.9 % of the variability. The DELTA 12 style is a supplementary variable.

5.9. The Second Chronological Model

The spatial relationships have already been fully implemented in the second chronological model. The results of the previous revised first chronological model can be displayed in the real space of the settlement area. The ordination diagram is a type of planar Cartesian coordinate, where the point (sunken feature) position describes coordinate values [x, y], but for the purposes of displaying it will be better to characterise the point position by polar coordinate system [r, φ]. The φ represents the value of an oriented angle measured from the defined ray (positive half-axis x) and *r* is a distance from the outside (or initial) point of this ray (the beginning of the Cartesian coordinate system). Transformation from the Cartesian to polar system is defined by the following equations:

$$r = \sqrt{x^2 + y^2}$$

$$\varphi = arctg\left(\frac{y}{x}\right)$$

The φ value of polar coordinates is a two-dimensional vector (Hamhalter – Tišer 2005, 43–44). However, for successful displaying in the GIS interface the feature position should be characterized just by one variable, which will be consequently classified by colour ramp.

The features are distributed in the ordination space of the first chronological model in such a way that the oriented angle φ value would best describe the variability of sunken features connected with stroked ornamentation. On the other hand, this variable is not appropriate for features with linear pottery, because it would evince only negligible deviation, the value of all features would oscillate around 45° (0,785 rad). Hence, this part of the ordination space is expressed by *r* vector longitude. Furthermore, using this variable, the problem of the outlying style EPSILON 30 (present particularly

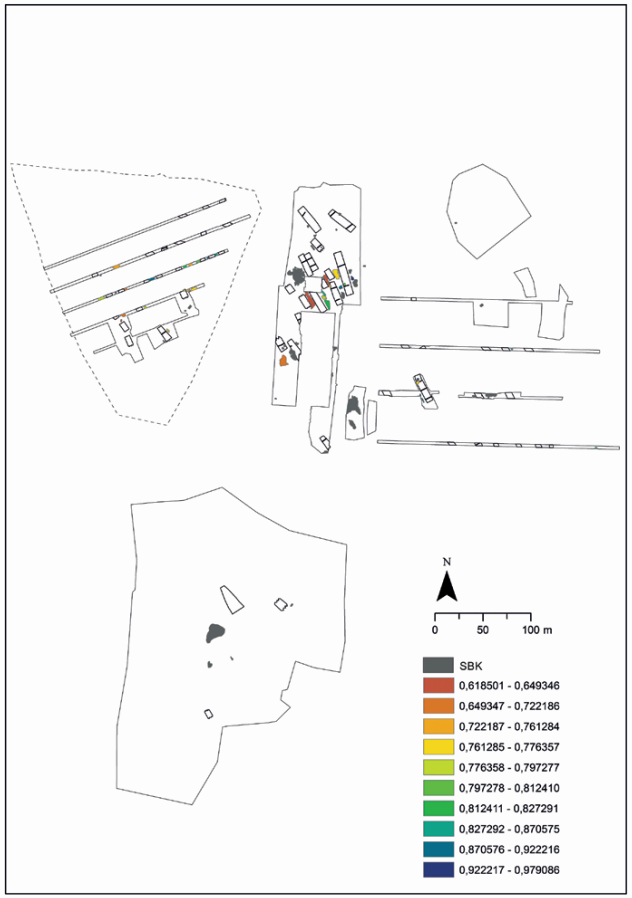


Figure 5.26. Plan of Hrdlovka settlement with classified values of *r* variable (features with linear decoration). Features with values of ϕ > 0,8 (SBK settlement period) are not classified. Classification method: Natural Breaks (Jenks).

in sunken feature 1964) is partially eliminated. Both the φ as well as *r* values are thus displayed in the real Hrdlovka settlement space (Figs. 5.26 and 5.27).

Visualization in the GIS interface already enables assigning sunken features to the type II ground plans, which bear the Late and Final SBK construction attributes. The feature 1339 should most certainly be considered a part of house 17′s widened external area. Also the above-mentioned necessity to revise the house 8 classification as type I building has occurred. Though its construction attributes are in agreement with this category, nonetheless material (stroke ornamented pottery and absolute ^{14}C data) from pit 838, which seems to be functionally connected with the ground plan, clearly shows the origin in Late SBK period. This variant is also supported by the absence of classical building pits in the vicinity of house 8. If the ground plan 8 is classified as type II, it will be possible to add feature 907 in its construction complex, which is placed close behind the 5-meter margin of the classical house external area. The ceramic assemblages of features 838 and 907 are close in decoration styles spectrum.

Surprisingly, the distribution of some features affiliated to type I ground plans in the ordination space and consequently also their colour classification in GIS interface appears to be problematic. It

contrasts with the assumption that sunken features in the frame of one construction complex should be chronologically homogeneous (at least at the archeologically definable level). However here, many construction complexes seem to be chronologically heterogeneous. This effect is the most striking in the case of houses 3 and 44. Essentially, there are four alternatives of explanation:

a) error in the chronological model
b) intrusion
c) some of sunken features do not belong to the construction complex
d) image of real chronology

We are touching the complex issue of longhouse ground plans dating, which is discussed broadly in another place (Vondrovský 2015, 137–147). Here, it will be only mentioned that the last eventuality seems to be the most probable, but it might be no obstacle for the creation of the chronological model based on sunken features affiliation to individual construction complexes.

Pre-analysis data filtration excluded all the ground plans with no sunken feature in the surrounding, which could form construction complex according to spatial relations (affinity type 1 was the only relation type considered as relevant in this process). In the next step, assemblages of construction

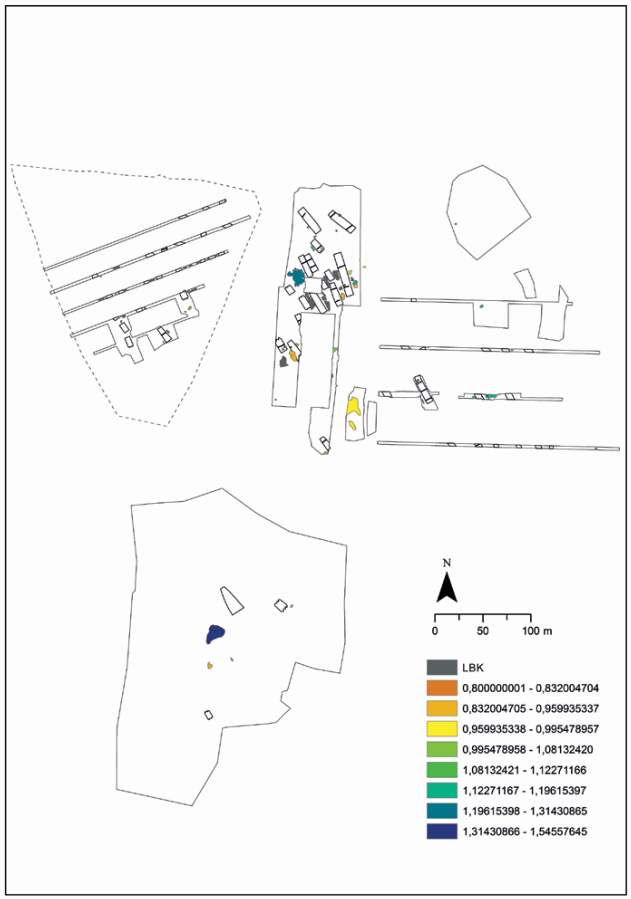


Figure 5.27. Plan of Hrdlovka settlement with classified values of ϕ variable (features with stroked decoration). Values of ϕ < 0,8 (LBK settlement period) are not classified. Classification method: Natural Breaks (Jenks).

complexes with low number of ceramic individuals with exactly determined decoration style were excluded[13], like the sunken features in the first chronological model. The 40 % quartile (6 ceramic individuals) was chosen as a threshold point (Fig. 5.28). After the filtration the input assemblage comprised 23 construction complexes and 798 ceramic individuals. The DELTA 12 style was set as a supplementary variable again.

	Descriptive Statistics									
Variable	Valid N	Mean	Med	Min	Max	Lower Quartile	Upper Quartile	Per 30	Per 40	Std.Dev.
individ	36	22,69	10	0	198	2	24	2	6	38,79

Figure 5.28. Basic characteristics of input data before filtration for the analysis of decoration styles distribution within construction complexes.

The DCA resulting diagram displaying distribution of decoration styles and houses in the ordination space (Fig. 5.29) is essentially in agreement with previous models and furthermore evinces a higher rate of explained variability (first ordination axis 27.6 %; second ordination axis 6.95 %), nonetheless the style EPSILON 10 appears to be an outlier not respecting the expected chronological scheme. Suppression of the style DELTA 12 effect on the level of the supplementary variable resulted in a position of the construction complex 44 closer to the area where SBK ground plans were anticipated. But if the simple line style effect remained unchanged, the construction complex 44 would be shifted in the direction of the second ordination axis closer to the construction complex 3. In addition, the gradient in of the first axis is more determinative.

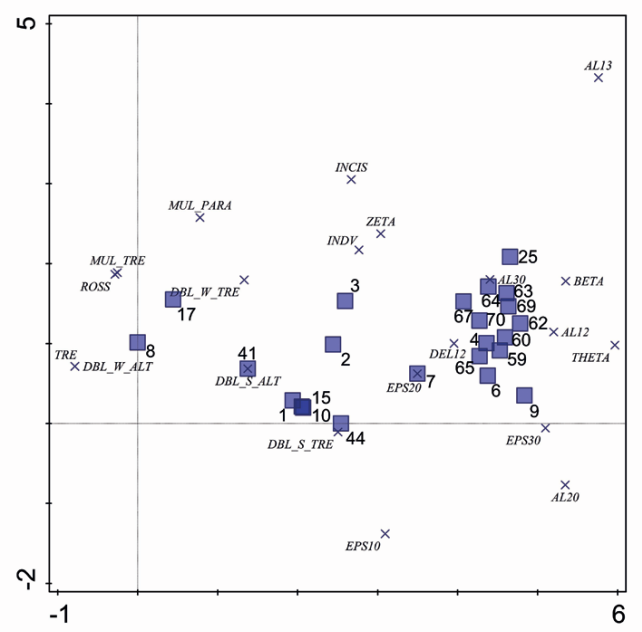


Figure 5.29. DCA ordination diagram displaying relations among the construction complexes assemblages and decoration styles. The first axis explains 27.6 %, the second 6.95 % of the variability. The DELTA 12 style is a supplementary variable.

[13] For a definition of exactly determined decoration style see point 3) of data filtration before the establishing of the first chronological model.

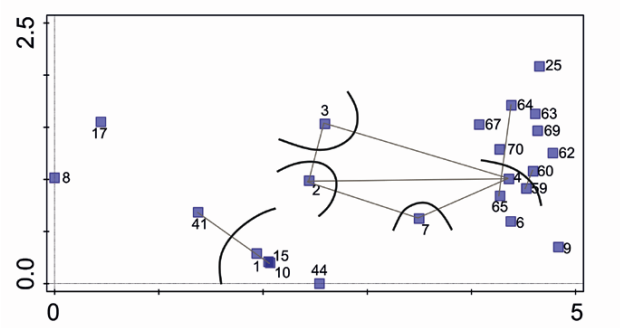


Figure 5.30. Ordination diagram displaying construction complexes (see previous Fig. 5.29), negative relationships among the ground plans (grey lines) and indication of settlement horizons (black lines).

Now, the mutual overlapping of construction complexes (see above) can be displayed in the established ordination space. These negative spatial relations might be considered as indications of un-contemporaneity, which in combination with correspondence analysis results states the important outline of the Hrdlovka site settlement horizons (Fig. 5.30).

As we can see, the cluster of LBK construction complexes was separated only partially thanks to the negative relationship of complexes 64 and 65. Individual horizons are probably represented by the ground plans 7, 2 and 3 with affiliated sunken features. The horizon of complexes 1, 10 and 15 separated from horizon of complex 41 were also distinguished.

Using the same principles as above, the relations of construction complexes can be inserted into the ordination space of the first chronological model. The un-contemporaneity of sunken features is defined by their affinity to mutually overlapping (un-contemporaneous) construction complexes. This method enabled distinguishing 8 settlement horizons (Fig. 5.31), so it is becoming apparent that sunken features analysing can produce more detailed chronology in comparison to construction complexes.

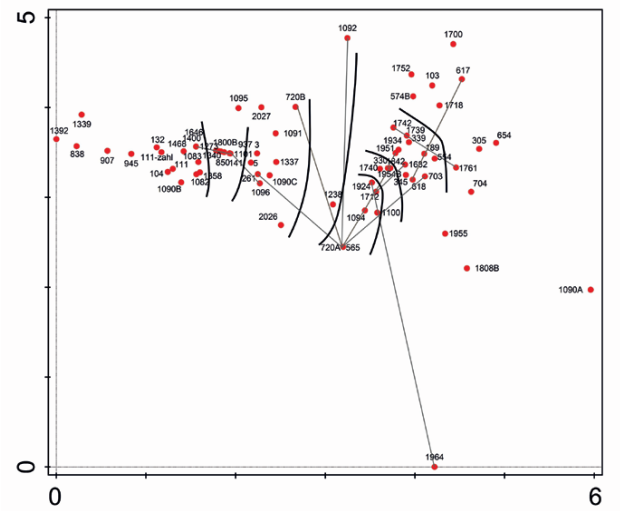


Figure 5.31. The first chronological model after revision (see Fig. 5.25) displaying the negative relationships among sunken features (grey line) based on their direct spatial relations or affinity to construction complexes. Separation of supposed settlement horizons is displayed by a black line.

On this level of chronological analysis sufficient data is available for establishing the diagram on the principle of the Harris matrix displaying the final image of the chronological sequence. The diagram was created manually, because available automatized software for the Harris matrix creation do not offer suitable interface to visualise all kinds of observed relationships (Fig. 5.32). Control of more complicated stratigraphic sequences (accumulation of features and ground plans in centre of SJ

area) was nevertheless performed in the Stratify 1.5 interface (Herzog 2002; www.stratify.org).

The diagram contains two essential items: sunken features and construction complexes. Sunken features can be displayed individually or as a part of a construction complex aggregate. Only the relationships between the sunken features and ground plans on a higher level of probability (affinity type 1 – definitely interrelated, affinity type 4 – definitely not interrelated) entered the process of diagram establishing. In the case of longhouse ground plans and construction complexes the affinities type 3 (possibly not interrelated) and type 4 mutual relationships were also used.

sunken feature	
construction complex	
mutual overlapping (affinity type 4)	
house external areas overlapping	
relationship based on chronological model	

Figure 5.32. Graphic codes for individual components and relations in the second chronological model matrix.

The longitudinal axes of matrix separate the sunken features and construction complexes according to their distribution on excavation areas. The extent of overburden actually defines opportunities for defining the spatial relations analysis and proceeding chronology. Only the SJ (particularly SJ 1) and Z areas (particularly Z 3, Z 5 and their enlargements) offer feature clusters, where it is more or less possible to define settlement horizons on the basis of spatial relationships, but interconnection among these sequences could be arranged only by data drawn by ceramic analysis. Except the excavation areas the longitudinal axis is also setting aside the units, whose position in the matrix is defined partially, but not in full degree. Chronological horizons and its shallow division according to LBK or SBK affiliation (prevailing linear of stroked decoration) are determined in horizontal levels. In total 55 sunken features and 29 construction complexes were displayed in the matrix (Fig. 5.33), which is only part of the Hrdlovka settlement assemblage. Remaining construction complexes and sunken features lack sufficient information for dating on the level of settlement horizons.

The lowest and so the earliest horizon in the matrix is created by the construction complex 23 defined by the ceramic assemblage of sunken feature 559. The initial horizon of the Hrdlovka settlement (A horizon) was thus distinguished only on the basis of the first chronological model results without employing the spatial relationships. Also ground plan 61 situated at the Z area can be somewhat loosely comprised in this horizon, although there is no association with the surrounding sunken feature. The reason for that is the overlapping[14] of ground plan 61 by the pit 1718, which belongs to subsequent B horizon, but, of course, the existence of the other undistinguished horizon wedged between A and B horizons cannot be ruled out, because there are no artefacts at least in the form of intrusions (cf. features 202 and 102) from the Z area evidencing the presence of occupation in the early LBK period. While the settlement horizons B and C were defined with no significant obstacles, questions arise in the case of the construction complex 72 situated in the D horizon. The sunken feature 1964, which defines this complex, is placed out of the main cluster in the first chronological model. Judging from its position, it could be included in the C or D horizon. However, the presence of thick music-notes style EPSILON 30 in this assemblage gives evidence in favour of a younger D horizon.

At first glance the construction complex 60 of the following E horizon can be seen as problematic

[14] In this case the chronological order of both units in their stratigraphic setting can be exceptionally observed.

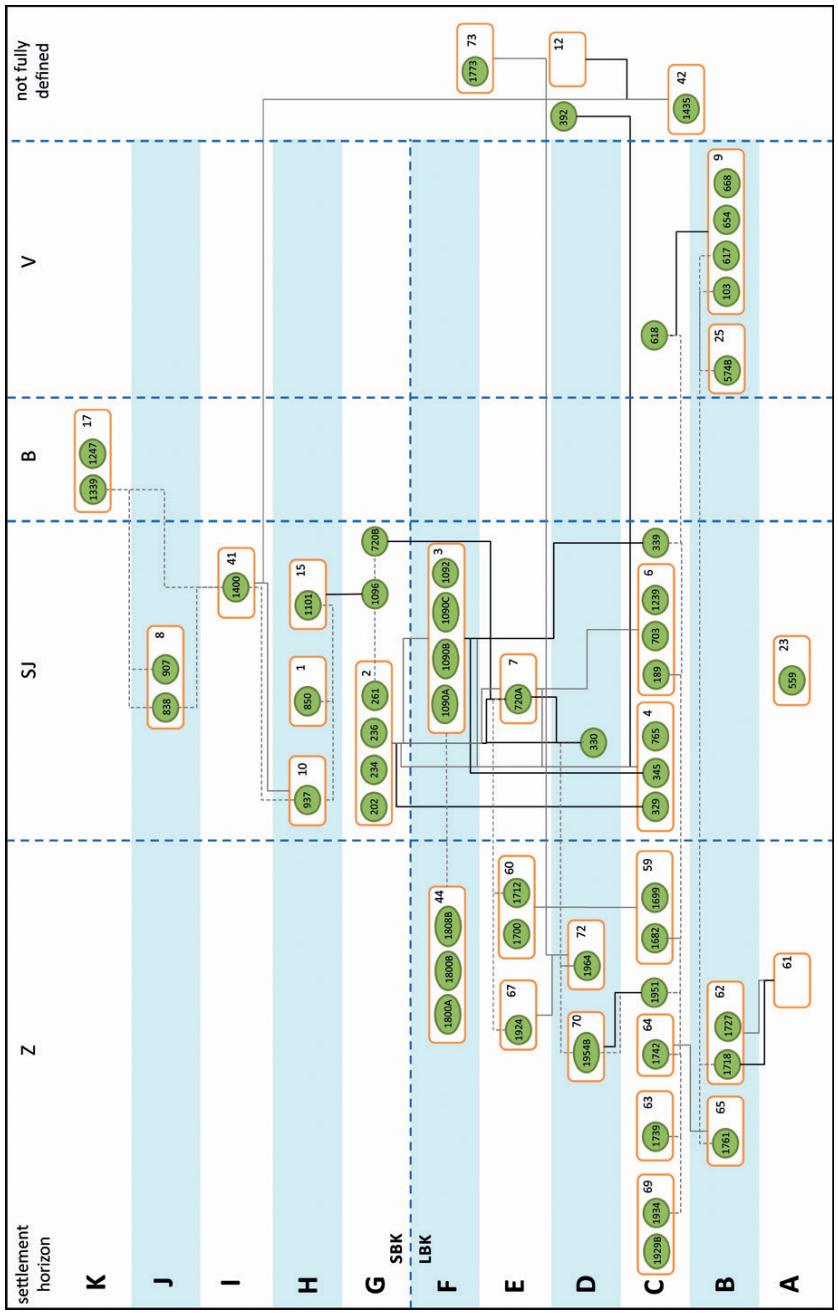


Figure 5.33. The second chronological model established on the principle of the Harris matrix.

as well. It is formed by pits 1712 and 1700, while both are holding a significantly different position in the first chronological model. The feature 1712 is considered to be more determinative, because feature 1700 assemblage comprises, except for the incised line style DELTA 12 whose weight has been eliminated to the level of supplementary variable, only two ceramic individuals decorated by filled-in band. Thus, feature 1700 is underestimated. Similar doubts are connected with the determination of construction complex 7, which is defined only by sunken feature 720 A. Except for the ceramic individuals with a simple incised line and undetermined music-notes decoration (EPSILON 0), the ceramic assemblage can be characterised only by one (!) ceramic individual bearing EPSILON 20 decoration style. Solely according to the stratigraphic relations construction complex 7 could be assigned to the same period as well as construction complex 3. The conclusive answer can be found in primary data. Here, it becomes clear that feature 720 A assemblage comprise only the LBK decoration techniques without stroked decoration or its indications, which contrasts to construction complex 3 assemblage, where a mixture of linear and stroked decoration occurs. Furthermore, feature 720 A is overlapped by pit 720 B containing ceramics with linear and stroked ornamentation (alternating double-strokes, simple incised line, filled-in band) as well. It should be taken into consideration that the joint presence of linear and stroked ornamentation might be proof of a transitional phase. This consideration led to the inclusion of construction complex 7 into the the Hrdlovka E horizon that is chronologically previous to F horizon with construction complex 3.

Contrary to LBK horizons the SBK occupation is not stratified to such a degree, which can be partially ascribed to the character of excavated situations. There is a slightly lower amount of ground plans with construction attributes of younger Neolithic (SBK) than with older Neolithic (LBK), but only part of them was successfully assigned to the individual settlement horizon.

The chronological setting of the very end of the Hrdlovka site sequence, i.e. the chronology of construction complex 8 and 17, should be described in more detail. As well as in the case of the earliest A horizon, the latest J and K horizons were also distinguished on the basis of ceramics analysis. The assemblages of features 838, 907 and 1339 identically evince developed decoration techniques and vessel shapes setting them with no doubt to the Late SBK stage. However, there are indications that these two construction complexes are not fully contemporaneous. At first, there is quite large distance of ca. 400 meters separating both ground plans, but what is more striking is the different longhouse construction. House 8 continues in the tradition of 5 rows of posts with a visible tripartite division of inner space, while house 17 is an example of the late Neolithic non-rectangular longhouse with absent inner posts, where the whole of the roof's weight is born by sidewalls preserved in the form of the building trench (Končelová – Květina 2015). Despite this step of chronological analysis, distinguishing J and K horizons should be considered as preliminary and needs to be confirmed or refused during synchronisation (see below).

The construction complexes 12, 42, 73 and the sunken feature 392 remain out of the closer defined settlement horizons, despite the fact that their position in the matrix is partially adjusted by negative spatial relationships. Conclusive data of ceramic analysis, which would help to establish the position, are nevertheless missing. Thus, even the well-preserved ground plan 12 is without closer dating.

5.10. Control of the Second Chronological Model

Just after the creation of the first chronological model it became apparent that the sunken features of some construction complexes evince significant chronological disperse contrary to the expectation based on their spatial setting. This problem especially concerns construction complexes 3 and 44 (Hrdlovka F horizon), whose assemblages are characterized by a mixture of linear and stroked decoration pointing to a possible origin in LBK/SBK transitional phase. But doesn't the Hrdlovka F horizon result beg the question of having its root in the variable chronological position of individual features

and their subsequent fusion in the frame of one construction complex?

For purpose of control the analysis design has been established comprised completely of all the sunken features located in the house 3 external area with no regard to spatial relations to the longhouse ground plan. Hence feature 345 will be also included despite the fact that it is without any doubt overlapped by postholes of house 3 sidewall and further features 339 and 261, which do not seem to be related with the house 3 either. These contexts play the role of control samples in the analysis. If construction complex 3 is, as defined by the second chronological model (i.e. comprising features 1090 A, 1090 B, 1090 C and 1092) really homogeneous, its sunken features will differ from the control samples in the analysis. Unfortunately, in the house 44 surroundings there are no sunken features, which could play a similar role of control samples, therefore the design described in the case of house 3 cannot be used also with the house 44 assemblage.

Variability in the present decoration styles will be described by the Principle Component Analysis (PCA) to bring accuracy to the previous chronological model. The PCA is focused on an absolute number of variables (decoration styles) on the account that it is usually able to explain a bigger part of total variability. Using this method by the house 3 assemblage is allowed by a lower diversity of input data in comparison with the analysis of the whole settlement assemblage, where the DCA is more suitable. The decoration styles are expressed by oriented vectors in the ordination diagram, where positively correlating styles vectors form acute angles. The sunken features distribution reflects the Euclidean distance (Šmilauer – Lepš 2014, 186–194).

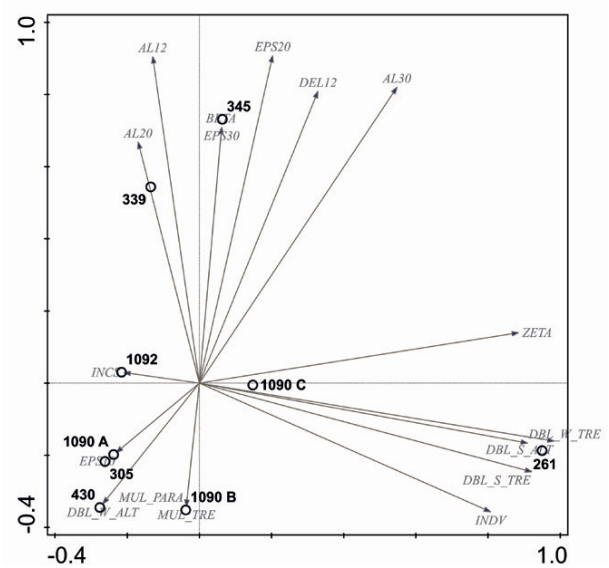


Figure 5.34. The first and second ordination axis of PCA comprising sunken features from longhouse 3 ground plan surroundings. The first ordination axis explains 50.1 %, the second axis 31.4 % of variability.

The PCA result (Fig. 5.34) allows us to conclude that sunken features forming construction complex 3 create a relatively homogeneous group in comparison with other features entering the analysis as control samples. Features 339 and 345, which are part of chronologically older horizons in the second chronological model, are significantly separated. Feature 261 is an outlier case. It respects direction of the house 2 wall by its western part, therefore it could be connected rather with this construction complex. Assemblages of features 430 and 305 are quite poor and so their position in the ordination space cannot be considered reliable.

5.11. Synchronisation to General Development of the Neolithic Period

This analysis step aims for the synchronisation of the local Hrdlovka settlement development to general Neolithic chronology. It has been partially done in the case of initial and final settlement horizons (Hrdlovka A, J and K), which is not in full agreement with proclaimed inductive way in chronology establishing.

The synchronisation should take into consideration not only chronological aspects, but also possible differences caused by unequal regions development. Here we are facing an essential problem: neither a comprehensive chronology for the Podkrušnohoří region nor for the wider area of northwest Bohemia has been established. It will be therefore necessary to choose partial assemblages best characterising individual chronological phases (assemblages of settlement horizons, construction complexes or rich sunken features) obtained on other sites of the Podkrušnohoří region.

However, we are forced by the low number of sufficiently rich and in detail elaborated sites of the Podkrušnohoří region to enlarge the analysed area to the whole of the northwest Bohemia region, where the source base is bigger. Only in the case of the LBK I stage there was no available and suitable data in this area,[15] therefore source assemblage of Nové Dvory 2 from eastern Bohemia was used. Summary of data and their sources used during the Hrdlovka settlement synchronisation is given in Fig. 5.35.

stage/phase	assemblage	reference
LBK Ib	Nové Dvory 2, construction complex 39 Nové Dvory 2, construction complex 11	Pavlů 2002
LBK IIa	Březno u Loun, horizon I	Pleinerová – Pavlů 1979
LBK IIb	Malé Březno, sunken feature 11 Březno u Loun, horizon II	Šumberová 1995 Pleinerová – Pavlů 1979
LBK IIIb	Chotěbudice, sunken feature 77	Šumberová 1994
LBK III	Krbice, construction complex D 94/2 Krbice, construction complex D 95/1 Krbice, construction complex D 95/8	Káčerik 2011
LBK IV	Hrbovice-Chabařovice, sunken feature 36/78 Hrbovice-Chabařovice, sunken feature 47/78	Zápotocká – Muška 2007
LBK IV/ SBK I	Hrbovice-Chabařovice, sunken feature 31/78	Zápotocká – Muška 2007
SBK II-III	Hrobčice, features of Early SBK Vchynice, sunken feature 37 Hrbovice-Chabařovice, features of Early SBK	Rauerová 2013 Řídký et al. 2013 Zápotocká – Muška 2007
SBK IV	Hrobčice, feature of Late SBK Vchynice, sunken feature 20	Rauerová 2013 Řídký et al. 2013

Figure 5.35. Summary of representative assemblages mostly from the northwest Bohemia region used for the synchronisation of the Hrdlovka settlement with general Neolithic development.

This data has established an ordination space, in which Hrdlovka settlement horizons have been displayed. The only exception is the Hrdlovka I horizon comprising only sunken feature 1400 assemblage with a low number of decorated ceramic individuals unsuitable for statistical evaluation. The resulting correspondence analysis (DCA), where the incised line style DELTA 12 had equal weight is displayed in Fig. 5.36; the change after reducing the incised line DELTA 12 weight bringing unwanted noise in the model is displayed in Fig. 5.37. In addition, the Generalised Additive Model (GAM),

[15] The detail data for the earliest horizon from Hrbovice and Chotěbudice is not available. In Žalany the LBK I stage pottery is present only as an intrusion in younger pits.

where smooth function describes the transformation from the predictor values to the (additive) effect of that predictor upon the expected values of the response variable (Šmilauer – Lepš 2014, 137), was created to display the main and most frequent decoration styles. Resulting trends are in agreement with general image of linear and stroked ornamented pottery development (Fig. 5.38).

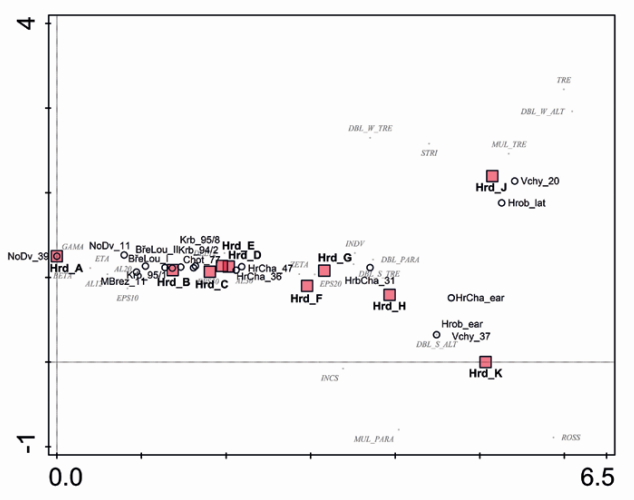


Figure 5.36. DCA ordination diagram displaying referential assemblages and Hrdlovka settlement horizons. First ordination axis explains 21.5 %, second 11.7 % of variability. The DELTA 12 style has full weight.

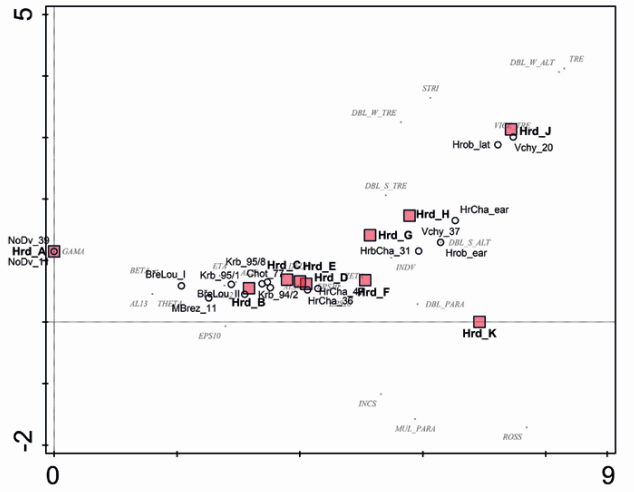


Figure 5.37. DCA ordination diagram displaying referential assemblages and Hrdlovka settlement horizons. The first ordination axis explains 19.6 %, the second 8.5 % of variability. The DELTA 12 style is a supplementary variable.

The Hrdlovka A horizon position in the ordination diagram is identical to the Early LBK assemblages of construction complexes 11 and 39 from the Nové Dvory 2 site. Nevertheless, it still invites questioning, because the Hrdlovka A horizon was distinguished right according to the similarities of feature 559 pottery to other Bohemian assemblages of LBK I stage, but similarities can be found also in pottery of the Early LBK sites in Saxony (Hohle 2012). Primarily, specific decoration style GAMA is the most significant. Except for this wide groove, the band filled-in by longer drawn punctures (code 247,

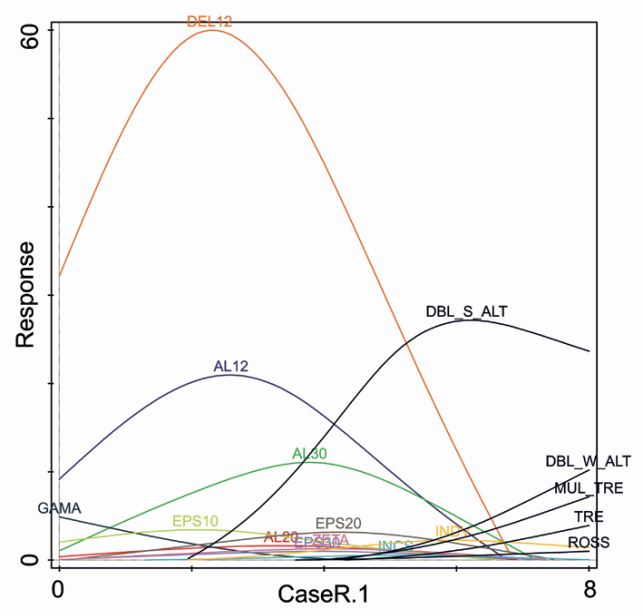


Figure 5.38. Generalised additive model (GAM) for response on decorative styles distribution in the direction of the first ordination axis (see previous Fig. 5.37) as a predictor best explaining the chronological gradient.

Tab. 4.59: ID 5489) also occurred. Analogical technique was noticed on the vessel from Most (Pavlů – Zápotocká 2013, Fig. 8:1), which is dated back to the LBK I/II transitional period. As a further significant characteristic of the Hrdlovka A horizon assemblage the prevailing muddy ceramic fabric with high amount of organic temper (76.4 %; n=197) can be considered. In the vessel shape spectrum no characteristic representative of the LBK I stage has been noticed, but this can be ascribed to limited possibilities for vessel shape determination. Based on all the above-mentioned criteria the Hrdlovka A horizon can thus be dated at the end of LBK I stage, with a question mark in the LBK I/II transitional period.

The Hrdlovka B horizon is close to the LBK III stage construction complex from the Krbice site in ordination space. It is caused particularly by the occurrence of the thin band ALFA 30 in both assemblages. This decoration style is curiously present, even in small numbers, also in the horizon II assemblage from the Březno u Loun site dated to LBK IIb phase, despite the fact that it should occur rather later (Pavlů – Zápotocká 2013, 34). On the contrary, the ALFA 30 style is missing in the contemporaneous LBK IIb sunken feature 11 from the Malé Březno site, hence this assemblage is not close to the Hrdlovka B horizon in ordination space. Bearing in mind the location of the Malé Březno site in the Podkrušnohoří region, same as the Hrdlovka site, this assemblage is considered to be more reliable than the Březno u Loun site belonging to the Žatec-Louny region. Thus, in Hrdlovka we should not expect the using of the thin band ALFA 30 already from the LBK II stage. The Hrdlovka B horizon is chronologically situated at least under the level of the LBK IIb phase. Unfortunately, we are facing an obvious lack of representative assemblages of the LBK IIc and LBK IId phases in the analysed region, which could be referenced to the Hrdlovka B assemblage. But there are other significant attributes for the Hrdlovka B chronology. One of them is the presence of vessel rims with a slightly S-shaped profile (Tab. 4.34: ID 4224; Tab. 4.99: 10708, 10781) and further ceramic individuals bearing ZETA decoration style, which appeared in the neighbouring Litoměřice region from the IIIb phase and can also be seen in the Chotěbudice site assemblage dated on the same chronological level. These attributes seem to be

decisive despite the lower number of the ALFA 30 band. The Hrdlovka B horizon is therefore classified into the LBK IIIb phase, even though the synchronisation to LBK IIIa phase is also possible.

The ALFA 30 band's increasing rate (27 %; n=81) is typical for the subsequent C horizon. Also thick music-notes EPSILON 30 and ZETA appear in lower ratio, although EPSILON 20 style is still more frequent. Rare double strokes seem to be rather intrusive. The Hrdlovka C horizon, as previous horizons, is taking a position similar to the Krbice construction complexes. Taking the simple incised line DELTA 12 into account, the Hrdlovka C horizon is rather closer to feature 77 from the Chotěbudice site. This assemblage of the LBK IIIb phase evinces a higher ratio of the DELTA 12 style, which is in contrast to generally expected trends (Pavlů – Zápotocká 1979, 119) and could be considered as one of the specifics of the northwest Bohemia region. The pear-shaped vessels (Tab. 4.54: ID 1397) begin to appear sporadically in the Hrdlovka C horizon. According to the above-mentioned criteria it is possible to synchronise the Hrdlovka C horizon with the LBK IIIb phase.

The D and E horizons take a very similar position in the ordination space. Therefore, we can assume that both horizons will be classified near to or in the same period of the Neolithic development, most probably the LBK IV stage. This is supported by similar or even identical characteristics in assemblages of these horizons and the LBK IV assemblage from the Hrbovice-Chabařovice site (features 36 and 47). A high ratio of the ALFA 30 band is determinative (however there is only one ceramic individual with this style in feature 47 from Hrbovice-Chabařovice). The absence of the ZETA style is slightly surprising, but a sporadic occurrence of individual strokes without line (code 13, Tab. 4.104: ID 11474) should be noticed. In the category of decoration motifs only the variants of spirals running around the vessel with various complementary ornaments in upper parts of vessel body were identified. In the vessel shape spectrum the pear-shaped vessels or rims with a slightly S-shaped profile are present. Considering the character of the following development at the Hrdlovka site, the D and E horizons can be synchronised to the LBK IV stage, and more precisely, to the IVa phase considering the following development on site.

The Hrdlovka F and G horizons evinced ceramic assemblages where linear as well as stroked decoration occured. This brings us to possible dating in the transitional period between using incised lines and strokes in pottery production. The rich sunken feature 31/78 from the Hrbovice-Chabařovice site was its representative in the analysis. Except the linear decoration mostly represented by the band ALFA 30 with music-note line EPSILON 20 and ZETA, stroked ornamentation also appeared in a high proportion (individual strokes, small double-strokes and occasionally and rather intrusive also multiple strokes). Unlike the Hrbovice-Chabařovice assemblage parallel double-strokes used as an independent decoration technique in the Hrdlovka assemblage were not observed. It may cause that Hrdlovka F horizon, defined by construction complexes 3 and 44, do not fully correspond to the assemblage of feature 31 from the Hrbovice-Chabařovice, despite other attributes being in agreement. Pear-shaped vessels take 46.2 % (n=6) from the total number of determined ceramic individuals. Linear decoration motifs can again be characterised as spirals running around the vessel with complementary decoration on the vessel upper part. Based on the mentioned characteristics the Hrdlovka F horizon is placed on the LBK/SBK transition itself, which can be described as the LBK IV/SBK I phase.

According to the second chronological model this period is chronologically and spatially (construction complex 2) followed by the Hrdlovka G horizon. A higher affinity of the Hrdlovka G horizon to the Early SBK assemblages, where alternating double strokes clearly dominated, can be observed in the ordination diagram. Contrarily, the Hrdlovka G horizon assemblage still contains linear techniques in a certain amount (3.9 %). Apart from the usual simple line DELTA 12, the ladder ALFA 30 or thick strokes ZETA are present together with a small amount of the subsiding band ALFA 12 and medium thick music-notes EPSILON 20. The GAMA style in the sunken feature 202 is considered to be intrusive. In the pottery shapes the fully developed pear-shaped vessels occur (e.g. Tab. 4.46: ID 20; Tab. 4.47: ID 544, 668). The strokes are organised in chevron motifs in an overwhelming majority. Obviously, it would not be possible to separate this horizon from the previous F horizon without the

evidence of negative spatial relationships between construction complexes 2 and 3. Both horizons are synchronised with the transitional LBK IV/SBK I phase, where the G horizon is defined as succeeding the F because of a higher amount of stroked decoration evincing more attributes of developed stroke ornamented pottery. The topic of LBK/SBK transition will be discussed in detail below (Chapter 9).

The Hrdlovka H horizon is close to the assemblages of the Early SBK stage. The larger distance dividing the Hrdlovka assemblage from the Early LBK reference assemblages could be caused by determining the double-strokes made by the tremolo technique at Hrdlovka, which was not especially classified in other sites. Generally, the small double-strokes dominate. Linear decoration persists only in the form of lines below the vessel rims. The only recognised motif represents the chevrons divided by single or multiple bands of strokes. A similar situation was observed in the case of bands below the vessel rim. Based particularly on multiple strokes absence, the H horizon is dated to the SBK II phase, where a more specific determination (sub-phase IIa or IIb) was not possible to perform.

The J, represented by construction complex 8, and K horizon, construction complex 17, encloses the Hrdlovka site chronological sequence. They were, as well as the A horizon, defined rather according to the results of the first chronological model, which was enabled by the specifics of the Late SBK pottery. Wide double strokes however, are not dominant in comparison to small double strokes, but tremolo strokes and various forms of multiple strokes are frequent. Linear decoration rare occurrence (one ceramic fragment) is considered to be intrusive. Thus construction complexes 8 and 17 assemblages can be identically dated to the Late SBK period, but even if the ceramic assemblages look similar at first glance, there are indications for mutual separation. The very different types of house construction and distance between these two ground plans were already mentioned above. Focusing on the ceramics attributes, the kettle-shaped vessel with lugs from the sunken feature 907 shifts the chronological determination of J horizon to SBK IVa1 sub-phase (Pavlů – Zápotocká 2013, 46). Several pear-shaped individuals with straight or everted rims and featuring lugs accompany it. Nevertheless, it would be precarious to establish such a detailed chronology *de facto* on the basis of one vessel. On the other hand, in the feature 1339 assemblage, defining the K horizon, the vessel shapes were classified loosely because of a high fragmentation rate. Our attention should be, however, paid to incisions on the vessel rims (e.g. Tab. 4.89: ID 12580, 12581, 12733), which were quite frequent (21.9 % of rims; n=7) and in coincidence with frequent strokes on the vessel surface it might point to SBK IVb (cf. Burgert et al. 2014, 46). Furthermore, Rössen strokes (50% of decorated individuals; n=6) were observed, as a unique case at the Hrdlovka site in the feature 1339 assemblage. The more distant position of the K horizon apart from the Late SBK Hrobčice and Vchynice sites assemblages, as well as the Hrdlovka J horizon, seems to be caused right by the presence of this specific technique, which has been so far noticed in the frame of the Podkrušnohoří region only in the Hrdlovka assemblage (Vondrovský et al. 2015, Table 2). To sum up, there are quite significant differences in the Hrdlovka J and K horizons allowing dating the first one to the SBK IVa phase, while the subsequent K horizon is rather dated to the SBK IVb phase.

The Hrdlovka I horizon, defined by house 41 and the associated pit 1400, seems to be the only unknown in the Hrdlovka settlement chronology. Feature 1400 assemblage contains only 5 ceramic individuals decorated by small double-strokes, which is insufficient for closer chronological determination. We can rather generally speculate about the Early SBK stage, but taking into consideration the negative relationship between construction complexes 10 and 41, the Hrdlovka I horizon can constitute the older phase of occupation in the frame of the SBK II period.

Now we are able to analyse the proportions of basic decoration types (linear, stroked, technical, relief) and undecorated pottery on the level of individual settlement horizons. As is apparent from the resulting diagram (Fig. 5.39), technical decoration has accompanied linear ornamentation since the earliest horizon, but it weakens slightly with the stroked ornamentation onset. Relief band decoration is mostly found in LBK settlement horizons, on the other hand it is missing in the horizons of fully developed SBK culture. In the very end of the Hrdlovka sequence the overall decline of decorated pottery in favour of undecorated ceramic individuals was observed.

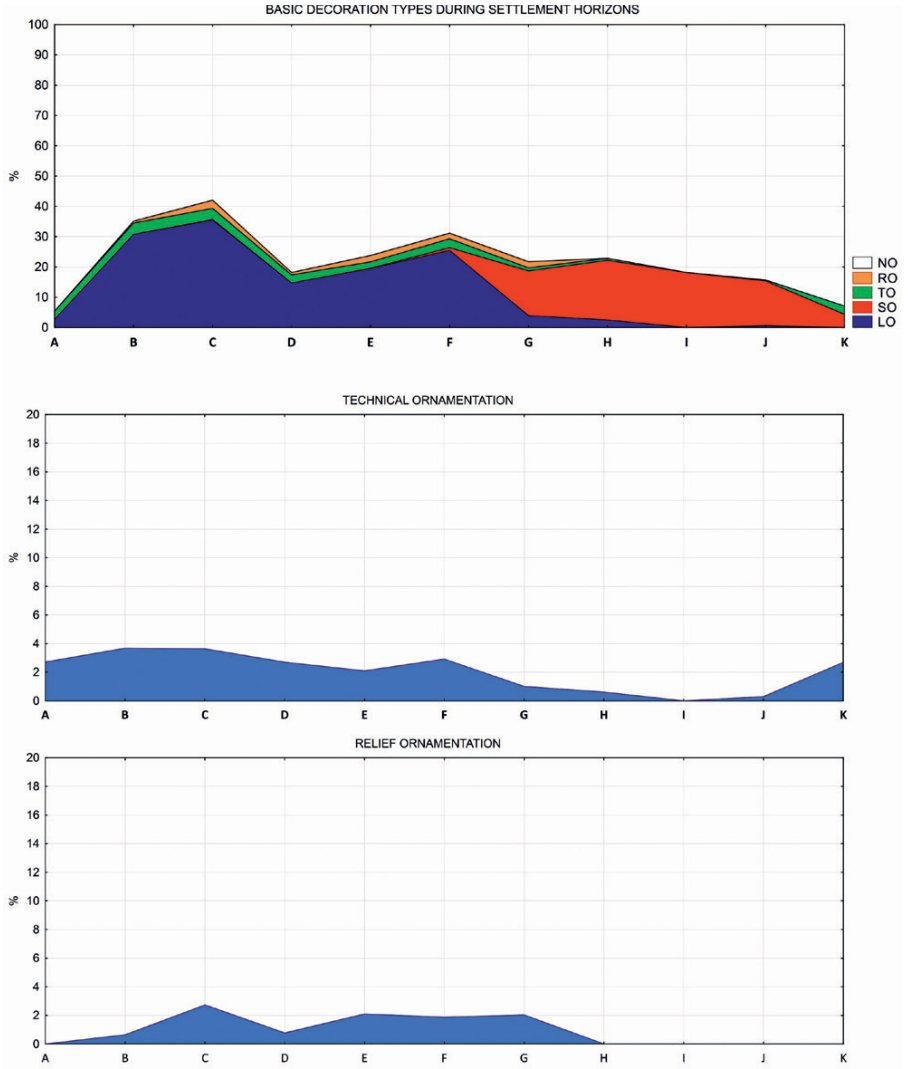


Figure 5.39. Percentage representation of main decoration types (LO – linear ornamentation, SO – stroked ornamentation, TO – technical ornamentation, RO – relief ornamentation, NO – no ornamentation) through the settlement horizons. Technical and relief ornamentation are displayed in detail (y axis maximum is lowed to 20 %).

Summary of the above-mentioned trends in linear and stroked ornamentation through the Hrdlovka settlement horizons is displayed in Figs 5.40 and 5.41.

style \ horizon	A	B	C	D	E	F	G	H	I	J	K
AL12	-	17.6	15.7	4.3	5.1	1.8	0.4	-	-	-	-
AL13	-	1.1	-	-	-	-	-	-	-	-	-
AL20	-	4.4	5.7	-	1.0	-	-	-	-	-	-
AL30	-	14.3	27.0	39.1	33.3	7.0	3.6	-	-	-	-
BETA	-	-	0.7	-	-	-	-	-	-	-	-
GAMA	100.0	-	-	-	-	-	0.4	-	-	-	-
DEL12	-	57.1	41.7	39.1	54.5	29.8	4.7	-	-	4.4	-
EPS10	-	2.2	0.7	-	-	5.3	-	-	-	-	-
EPS20	-	-	5.7	8.7	4.0	7.0	1.5	-	-	-	-
EPS30	-	-	1.0	8.7	1.0	-	-	-	-	-	-
THETA	-	1.1	-	-	-	-	-	-	-	-	-
ETA	-	-	-	-	-	-	-	-	-	-	-
ZETA	-	2.2	1.0	-	-	3.5	1.1	-	-	-	-
INCS	-	-	-	-	-	14.0	-	-	-	-	-
INDV	-	-	-	-	1.0	1.8	1.5	-	-	-	-
DBL_S_ALT	-	-	0.3	-	-	19.3	63.9	31.3	100.0	26.7	38.5
DBL_W_ALT	-	-	-	-	-	-	-	-	-	20.0	-
DBL_S_TRE	-	-	0.7	-	-	5.3	21.9	68.7	-	-	-
DBL_W_TRE	-	-	-	-	-	1.8	0.7	-	-	2.2	-
DBL_PARA	-	-	-	-	-	-	-	-	-	-	-
MUL_TRE	-	-	-	-	-	1.8	-	-	-	15.6	7.7
MUL_PARA	-	-	-	-	-	1.8	-	-	-	-	7.7
TRE	-	-	-	-	-	-	-	-	-	31.1	-
STRI	-	-	-	-	-	-	0.4	-	-	-	-
ROSS	-	-	-	-	-	-	-	-	-	0	46.2

Figure 5.40. Percentage representation of linear and stroked ornamentation styles through the settlement horizons. For decoration styles abbreviations see Tabs. 4.6 and 4.10.

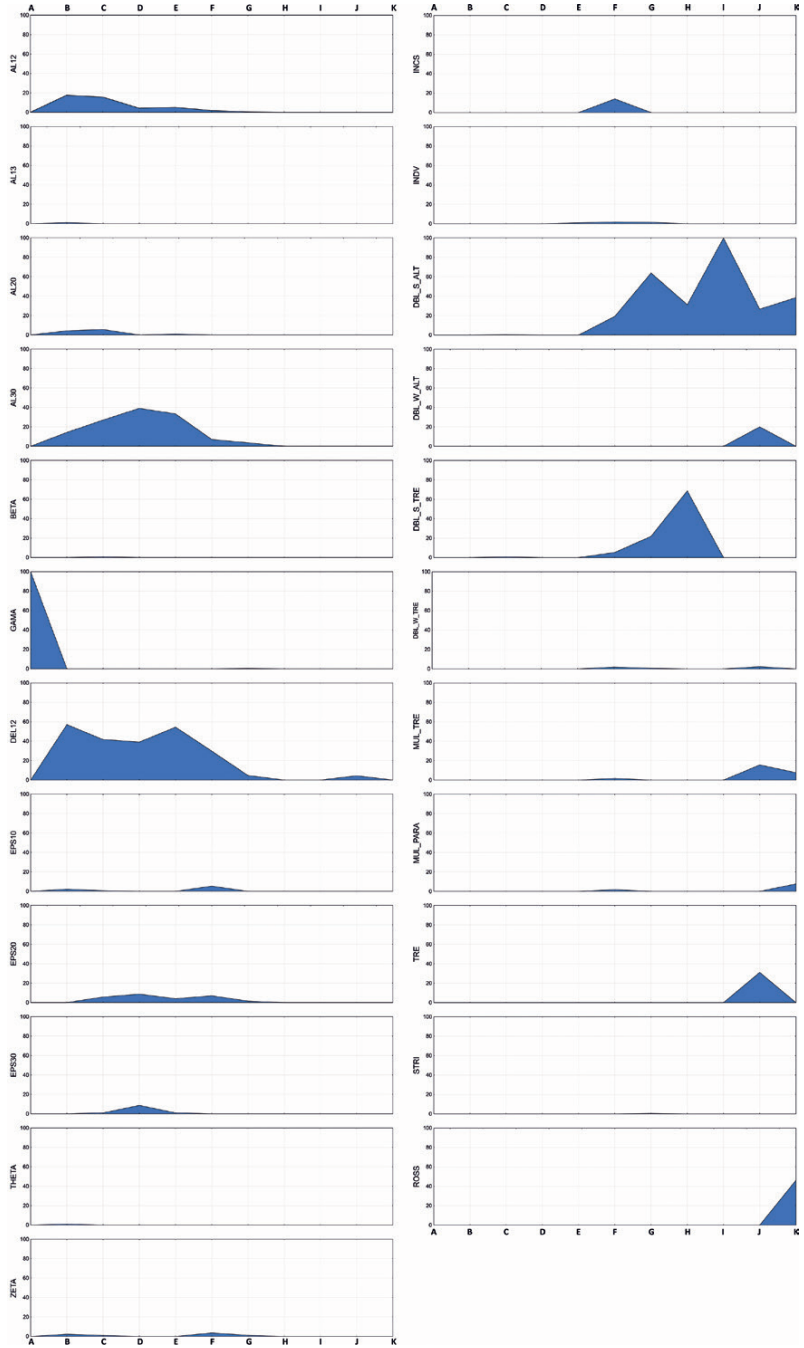


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Figure 5.41. Percentage representation of linear and stroked ornamentation styles through the settlement horizons. ETA style and parallel double-strokes, which are not present in settlement horizon assemblages, were excluded. The figure also does not display a closer undetermined category of the EPSILON 0 style. For decoration styles abbreviations see Tabs. 4.6 and 4.10.

5.12. Sunken Features out of Settlement Horizons

In the second chronological model there were 52 sunken features and 26 construction complexes successfully dated on the level of settlement horizons. The determination of remaining Neolithic features and ground plans is however still questionable. It would be misleading to classify these structures only on the basis of a pottery decoration spectrum. Even if these remaining sunken features contained enough of a suitable dating material enabling synchronisation on the same level as settlement horizons, the potential linage to previously established settlement horizons would not be accurate. The Hrdlovka chronological sequence was in some parts distinguished even in more detail than in the case of general Neolithic chronology. For example the B and C horizons are identically dated to the LBK IIIb phase (although B horizon could be possibly assigned to the LBK IIIa phase) and the subsequent D and E horizons are both synchronised to the LBK IVa phase. Also the transitional F and G horizons would not be separated only on the basis of ceramic analysis, because spatial relationships played an important role to exclude the coexistence of various structures.

For the dating of isolated structures, for which a precise position in the second chronological model was not found, the following method will be used:

1) Sunken features (pits), which passed through the filtration into the first chronological model, are determined by their position in the revised first chronological model and other attributes of ceramic assemblage (e.g. vessel shapes). Dating is performed on the chronological level of LBK culture stages (LBK I – IV) and SBK culture phases (SBK I – V) or their intervals.
2) Sunken features (pits), which did not pass through the process of filtration into the first chronological model, are dated on the chronological level of individual cultures (LBK, SBK). If there are mixed ceramic individuals with linear as well as stroked ornamentation in the assemblage, the feature will be classified as generally Neolithic (Neo).
3) Sunken features (pits) containing Neolithic pottery, but without traces of linear or stroked decoration, are also marked as generally Neolithic (Neo).
4) Other sunken features (postholes or building trenches) are dated according to their affinity to longhouse ground plans (previously dated on the basis of ceramic assemblages of affiliated pits or only generally). If the feature is not associated to any building, but its infill contains Neolithic pottery (LO or SO included), it will be dated as generally Neolithic (Neo).
5) Sunken features (pits, postholes and building trenches) without ceramic material are dated as generally Neolithic (Neo) only in the case they contain Neolithic polished stone industry, i.e. the category of non-ceramic artefact with minimal chronological sensibility.
6) All remaining cases were qualified as features with unknown dating (Unkn)

The resulting chronological determination of sunken features out of settlement horizons is summarized in Fig. 5.42. Nevertheless, it is appropriate to comment some cases in more detail. The first of these is represented by the burial which took place in sunken feature 1926, originally, in high probability, used as a storage pit (Tab. 3.55). The whole context was preliminarily published and dated back to the LBK II stage on the basis of two vessels from the grave goods assemblage (Beneš 1995, 66). It seems, according to the published drawing (Beneš 1995, Fig. 2:2), that in the case of the bigger vessel the decoration in the form of narrow music-notes placed in medium intervals on the incised line (EPSILON 20) was not recognised, which can change the resulting chronological determination of the whole context of feature 1926. The second ceramic individual is a considerably atypical miniature vessel with a slashed line below the rim. To classify this technique as ZETA style is quite questionable bearing in mind that it was not used within a main motif. The occupation of the LBK II period has not been proved in the frame of the excavated areas in Hrdlovka, therefore dating in the LBK III stage is more probable, but also the LBK IV stage cannot be excluded, despite the fact that ZETA style was not confirmed.

Chronological determinations of large loam pits 945 and 1518 are also problematic. Their ceramic assemblages were obtained only by small probing trenches,[16] which did not evenly cover the whole extent of the features. One might think that there could appear various chronological contexts in the frame of such large spatial structures. This opinion is valid particularly in the case of feature 945, where many (unfortunately unexcavated) projections can be observed. This is also the reason why these features were dated only generally into the Neolithic period. Loam pit 5 is a different case. Here the excavation was performed in several sectors and affected a major part of the recorded feature extend.[17] Also the features described during the process of chronological analysis as nonhomogeneous pit complexes (feature 102, 110 and 111) are classified in the general Neolithic category, because it is not possible to distinguish their partial chronological context.

generally Neolithic	Neo	2, 37, 38, 53, 60, 76, 101, 102, 105, 106, 108, 110, 111, 135, 265, 558, 567, 571, 580 B, 581 B, 588 B, 612, 940, 945, 1084, 1098, 1100, 1102 A, 1252 B, 1274, 1315, 1337, 1468, 1518, 1522, 1656, 1667, 1829
generally LBK	LBK	4, 109, 126, 134, 305, 392, 447, 489, 565, 566, 586 B, 589 B, 613, 616, 1097, 1099, 1435, 1469, 1659, 1707, 1819 B, 1836, 1935, 1940, 1941, 2009
generally SBK	SBK	28, 31, 113, 430, 543, 950, 1341, 1655, 1666
LBK stages	LBK I	-
	LBK II	-
	LBK III	554, 704, 1926, 1955
	LBK IV	1094, 1740, 1773, 1842
transition	LBK IV/SBK I	3, 5, 1091, 1238, 2026, 2027
SBK phases	SBK I-III	132, 141, 1358
	SBK III-IV	104, 1083
	SBK I	-
	SBK II	1082, 1095, 1273, 1340, 1646
	SBK III	-
	SBK IV	1392
	SBK V	-

Figure 5.42. Sunken features s. s. out of settlement horizons and their chronological classification.

5.13. Final Chronological Model

The Neolithic occupation in Hrdlovka is represented by 1212 sunken features. Of these 154 can be marked as settlement pits. A further 6, originally Neolithic pits, which were disturbed during the post-Neolithic occupation activities, can be added. The Neolithic features were dated on various chronological levels, but the major part of these was classified on the level of culture stages and phases (Fig. 5.43). 26 from a total number of 59 recorded longhouse ground plans were assigned to concrete settlement horizons (Fig. 5.44).

The ceramic assemblages of 11 settlement horizons were compared to the spatially close site of the northwest Bohemia region if it was possible. Consequently, we have been able to synchronise the Hrdlovka site with the general development of the Bohemian Neolithic (Fig. 5.45).

[16] The extend of feature 945 trenches is 24.6 m2, which is 12.9 % of feature total area. In feature 1518 the area of 7 m2 was excavated, which is 4.5 % of feature recorded (!) extent.
[17] The sector area is 83.6 m2, which is 48.7 % of feature total area.

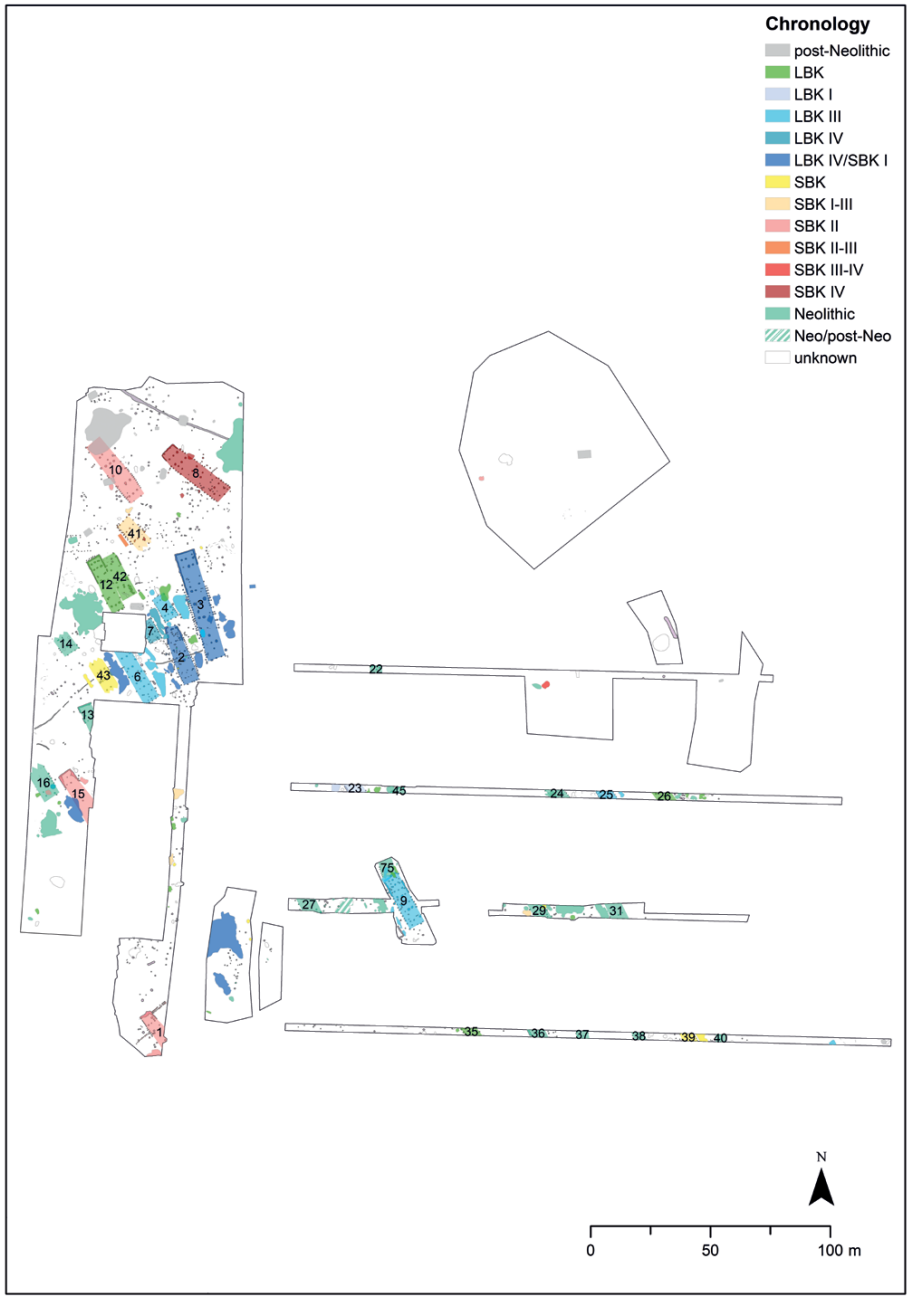

Figure 5.43a. Dating of Neolithic sunken features on the Hrdlovka settlement area on the chronological levels of the LBK culture stages (LBK I – IV) and SBK culture phases (SBK I – V) or their intervals.

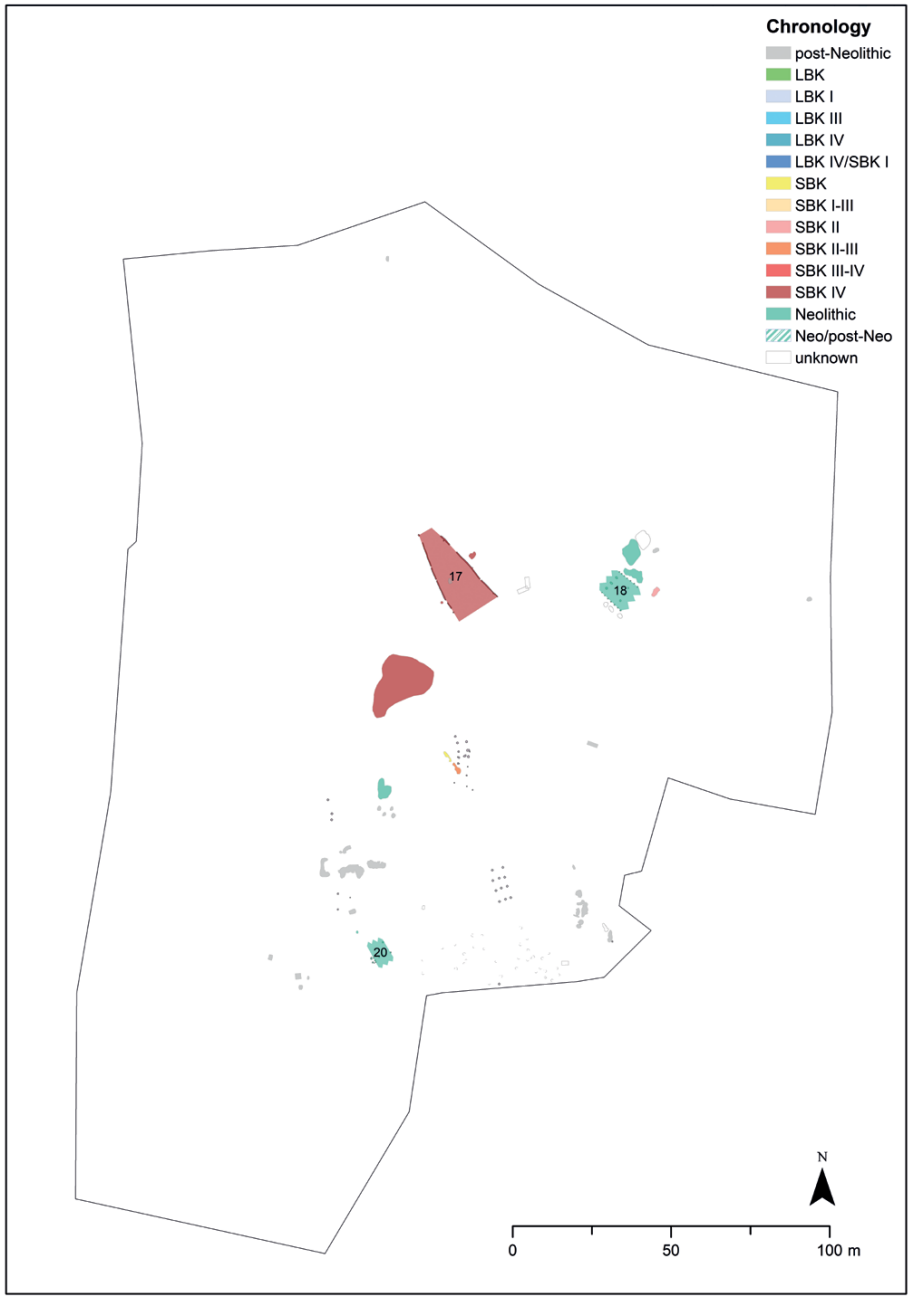

Figure 5.43b. Dating of Neolithic sunken features on the Hrdlovka settlement area on the chronological levels of the LBK culture stages (LBK I – IV) and SBK culture phases (SBK I – V) or their intervals.

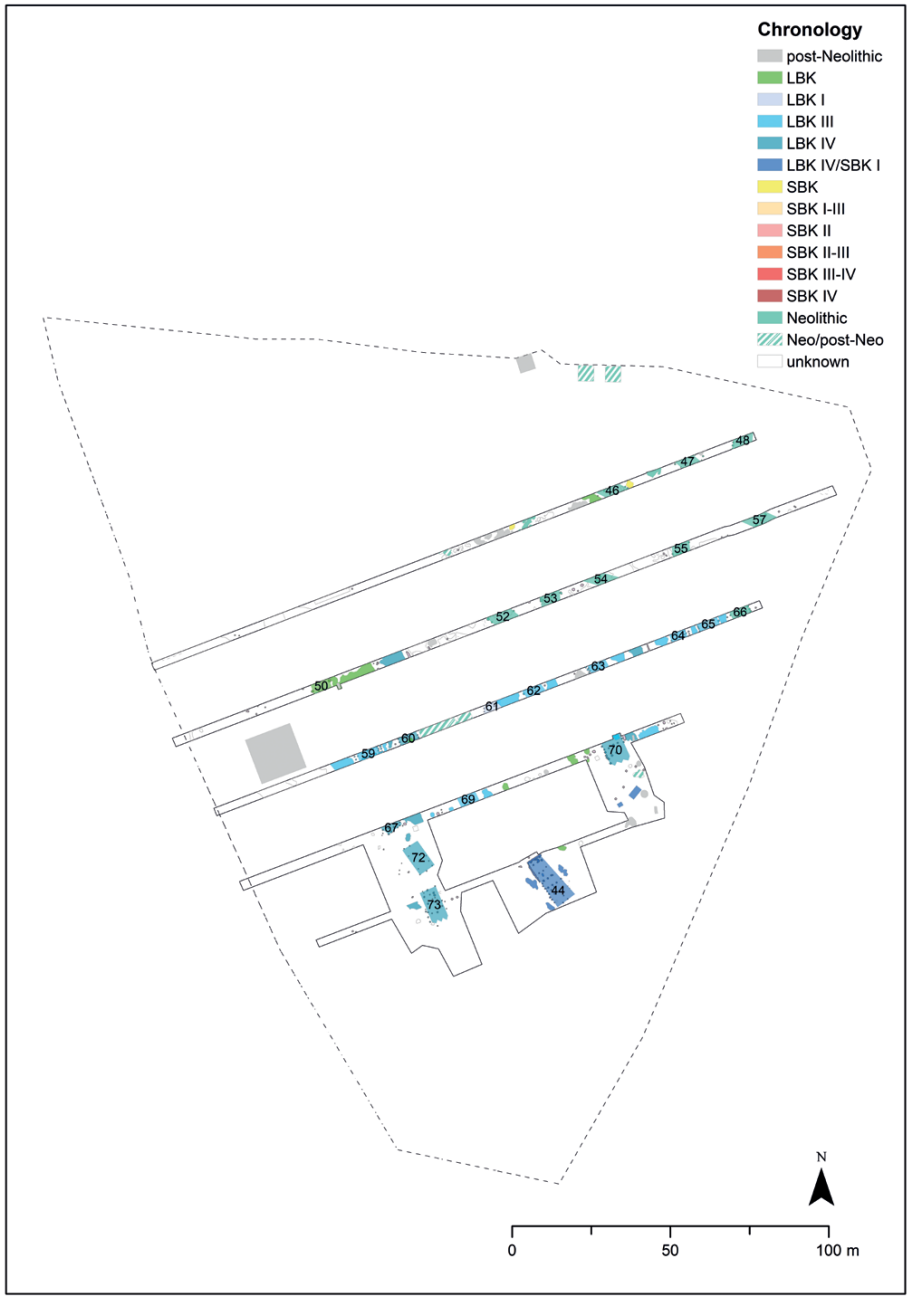

Figure 5.43c. Dating of Neolithic sunken features on the Hrdlovka settlement area on the chronological levels of the LBK culture stages (LBK I – IV) and SBK culture phases (SBK I – V) or their intervals.

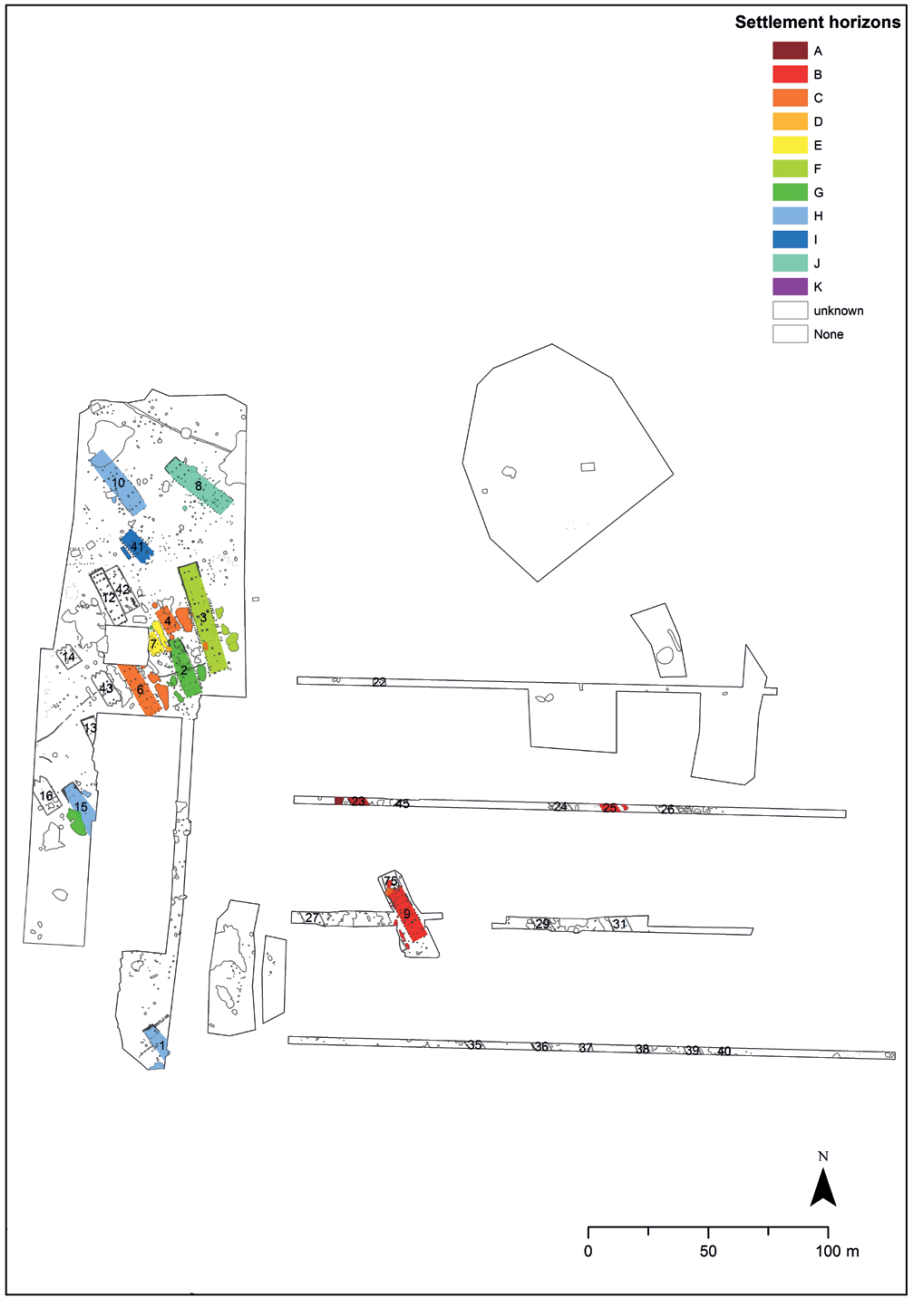

Figure 5.44a. Settlement horizons of the Hrdlovka site.

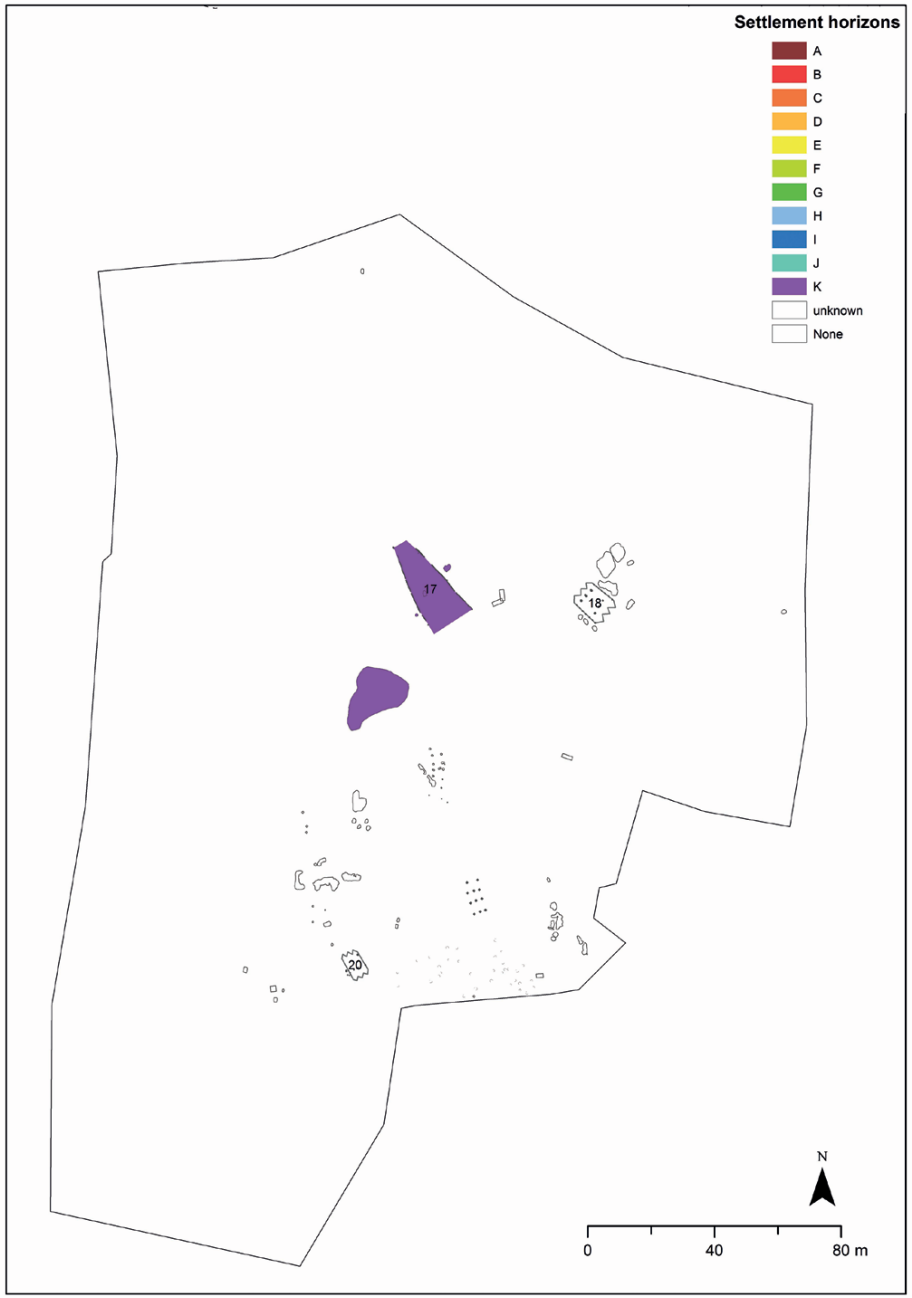

Figure 5.44b. Settlement horizons of the Hrdlovka site.

Figure 5.44c. Settlement horizons of the Hrdlovka site.

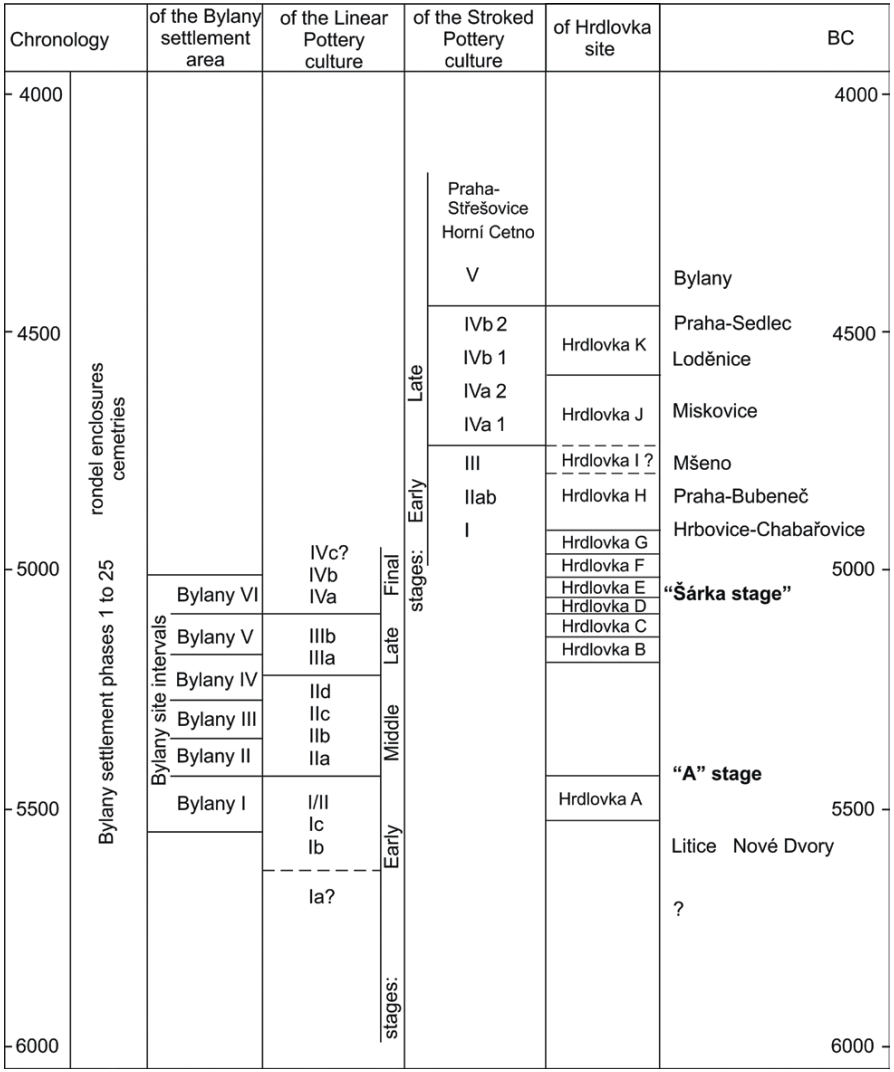

Figure 5.45. Position of Hrdlovka settlement horizons in the chronological scheme of Bohemian Neolithic (based on Pavlů – Zápotocká 2013, Fig. 5)

6. LITHIC INDUSTRY

Petr Šída

6.1. Palaeolithic Intrusions in Lithic Assemblages

In the Neolithic assemblages from Hrdlovka, several Palaeolithic artefacts were recorded. Their presence is not altogether surprising. Palaeolithic artefacts in Neolithic contexts are present in Bohemia (e.g. Turnov-Ohrazenice, Turnov-Mašek garden, Šída 2007), their formal low frequency seems to be a result of recognisability rather than actual presence. Palaeolithic artefacts can indicate former on-site settlement activity in the Neolithic site or an intentional gathering of Palaeolithic artefacts by the Neolithic people during agricultural treatment of soil. We cannot exclude intentional reutilisation of Palaeolithic artefacts, especially if we know about a reutilisation of older Neolithic polished lithic tools in the Late Neolithic workshops (e.g. Turnov-Ohrazenice, Turnov-Mašek garden, Šída 2007).

In the Hrdlovka lithic assemblage one Middle Palaeolithic and six Epipalaeolithic artefacts have been recorded. Its determination was made by an indirect attribute of eolisation, but also by some typological observations (tools).

6.1.1. The Middle Palaeolithic

The Middle Palaeolithic period is represented by flake core with two striking platforms, which is made from Bečov quartzite (Tab. 5.3: 1). The dimension of the artefact is 11.8 cm x 8.3 cm x 7.05 cm. The core is intensively eolised, which refers to air exposition in glacial conditions. Raw material originated from the Písečný vrch (Fridrich 1984). Cloes analogies can be found in the context of the Late Acheulean sites in Bečov, especially in Bečov IV (Fridrich – Sýkorová 2005) or Stříbro (Břicháček – Šída 2015).

6.1.2. The Epipalaeolithic

The Epipalaeolithic assemblage from Hrdlovka was distinguished by a presence of weak patination in some cases by light eolisation, typical for this period (but not every artefact of this period is patinated and visible). In order of such criteria, 6 artefacts were set off (Fig. 6.1), however, other Epipalaeolithic intrusions (unpatinated artefacts) cannot be excluded. In such cases some debitage should be recorded only, which could not influence the Neolithic assemblage structure substantially. The Epipalaeolithic debitage was recorded in 5 cases. One artefact is an amorphous fragment, 3 partly retouched blades (e.g. Tab. 5.3: 3). It is made from the Bavarian chert bearing raw material surface (extension 5 %), other artefacts were made from the erratic flint. One blade was made from a raw material nodule (raw material surface extension 60 %). Other artefacts were made from stone fragments without remains of raw material surface. Artefacts were without any traces of overburning. Two blades with butt type A and E were recorded complete, in another two cases were preserved only as fragments (butt type C).

Retouched tools are recorded in one case (Federmesser – knife with arc side retouching (Tab. 5.3: 2). The item is made from SGS and it is without any traces of patination. This artefact was defined on the basis of typology – such artefacts do not exist in Neolithic assemblages. The Federmesser with a diameter 3.3 cm x 0.85 cm x 0.3 cm was made from a blade of type AB, the butt of this artefact has been retouched away. Analogous assemblages are evidenced across a vast area from eastern France, over

Germany to Bohemia. Dating of this cultural group is contemporaneous with the end of Allerød to the end of Younger Dryas. During cultural development Federmesser size diminishment is recorded from a scale of 5-10 cm at the beginning towards 3-4 cm at the end. In Bohemia, some analogies of Federmesser artefacts have been recorded in Svolínky (Svoboda 2001) or in Dolánky by Turnov (Šída 2004). The nearest site from Hrdlovka is Komořany by Most, where one Federmesser artefact of larger type has been recorded. In the last few years, a stratified site of this cultural group was discovered in the surroundings of the Velký Tisý Lake in South Bohemia, where some artefacts of the same size have been recorded inside a sand dune from the Younger Dryas. Sites could be contemporaneous with short amelioration in the middle of Younger Dryas oscillation.

6.1.3. Position of Palaeolithic Artefacts

Middle Palaeolithic flake core has been found in the Postneolithic feature 133 in Hrdlovka. The Epipalaeolithic artefacts were located in 6 different sunken features. They were concentrated in area SJ (feature 339 – LBK IIIb, feature 1091 – LBK IV/SBK I, feature 720 A – LBK IVa), one feature, 1644 (Neolithic/Eneolithic/La Tène), was situated in area Z. The chronological interval of sunken features, where artefacts were found (from LBK IIIb to SBK I) could indicate a period during which artefacts have been found, collected and transported at the Neolithic Hrdlovka. Despite lithic objects concentration, such location does not correspond with the typical configuration of the Epipalaeolithic sites. Aggregation of artefacts rather reflects narrow chronological intervals of features where objects have been secondarily deposited.

	Erratic flint	Bavarian chert	Total	%
Fragment	1		1	16.7
Blade	3		3	50
Blade locally retouched		1	1	16.7
Debitage	*4*	*1*	*5*	*83.3*
Federmesser	1		1	16.7
Types	*1*	*0*	*1*	*16.7*
Total	*5*	*1*	*6*	*100*
%	83.3	16.7	100	

Figure 6.1. The Epipalaeolithic lithics.

6.2. Linear Pottery and Stroked Pottery Culture

6.2.1. LBK I Stage

Lithic industry assemblage belonging to the oldest phase of the LBK I is the smallest in amount with only 7 artefacts (Fig. 6.2). Assemblage consists from 6 chipped artefacts and 1 polished tool (an axe).

	Erratic flint	Metabasite of Jizera Mountains	Total	%
Fragment	1		1	14.3
Blade	3		3	42.9
Flake	2		2	28.6
Debitage	*6*	*0*	*6*	*85.7*
Types	*0*	*0*	*0*	*0*
Axe		1	1	14.3
Polished industry		*1*	*1*	*14.3*
Total	*6*	*1*	*7*	*100*
%	85.7	14.3	100	

Figure 6.2. The LBK I stage – lithics.

Chipped Industry
Chipped industry represents debitage artefacts only. All artefacts are made from erratic flint, 2 artefacts bear remains of raw material surface of chipped industry (1 with raw surface, 1 eolised fragment). Assemblage consists of 1 amorphous fragment, 2 flakes and 3 blades. Only one fragment is burnt. Raw material surface is presented on a flake in the shape of eolised raw surface extension of 40 % and on the blade, where raw material surface is in an extension of 20 %. This blade has use wear traces on the edge. Blades are presented only in a fragmentary state. One blade of fragment type A, one blade of type AB and one of type B. Butt types, if preserved, are more complex in comparison with flakes. Blades have an adjustment of type D and E, flakes have an adjustment of type B and C.

Polished Industry
Polished industry is represented by one axe made from the metabasite of the Jizera Mountains type. It is a fragment of the hoof-like axe, 7.15 cm in length, 4.2 cm width and 2.1 cm high. Each artefact from the LBK I belongs to the area of house 23, LBK I stage, horizon Hrdlovka A (Tab. 5.4).

6.2.2. LBK III Stage

Lithic industry from the LBK III stage belongs to the larger assemblages. 154 artefacts represent it. There are 78 individual pieces (66 debitage and 12 retouched tools) of chipped industry, 8 polished artefacts and 68 artefacts of group of other industries.

	Erratic flint	Skršín quartzite	Bečov quartzite	Tušimice quartzite	Kamenná Voda quartzite	Total	%
Fragment	1	13	1			15	19.2
Blade	6	21				27	34.6
Bladelike flake		1				1	1.3
Flake	3	16		2	1	22	28.2
Core	1					1	1.3
Debitage	*11*	*51*	*1*	*2*	*1*	*66*	*84.6*
Laterally retouched blade		1				1	1.3
Blade truncated by straight terminal and oblique basal retouching		1				1	1.3
Blade truncated by straight terminal retouching				1		1	1.3

	Erratic flint	Skršín quartzite	Bečov quartzite	Tušimice quartzite	Kamenná Voda quartzite	Total	%
Blade truncated by terminal notch		1				1	1.3
Blade with notches	1					1	1.3
Scraper	1	1		1		3	3.8
Splinttered piece	1					1	1.3
Burin on terminally retoouched blade	1					1	1.3
Chisel		1				1	1.3
Ventral sidescraper		1				1	1.3
Types	*4*	*6*		*2*		*12*	*15.4*
Total	*15*	*57*	*1*	*4*	*1*	*78*	*100*
%	19.2	73.1	1.3	5.1	1.3	100	

Figure 6.3. The LBK III stage – chipped industry.

Chipped Industry

Dominant raw material from this stage of the Hrdlovka settlement is made up of the northwest Bohemian quartzites (80.8 %). The largest group is the Skršín type quartzite, represented by 57 individuals (73.1% of assemblage). Other quartzites are represented only marginally: four pieces of quartzite Tušimice type (5.1 %), quartzite Bečov and Kamenná Voda is represented only by one item (1.3 %). Only one artefact has a raw material surface. The remaining 15 artefacts (19.2%) were made from erratic flint, 3 of them bear the raw surface of nodule (Fig. 6.3).

Altogether 66 artefacts (84.6%) are debitage. The dominant group is blades, represented by 27 pieces (34.6 %), and followed by flakes (23 pieces, 29.5 %). Amorphous fragments are represented in 15 pieces (19.2%) and by one a core (1.3 %). There are 12 retouched artefacts (types) (15.4 %), 3 artefacts are scrapers and 3 artefacts are blades with terminal retouching (3.8% of assemblage, 25% of types). Blades with terminal retouching were used as inserted sickle blades. Other artefacts are represented by one individual only (1.3% of assemblage, 8.3% of tools): 1 laterally retouched blade, 1 blade with notches, 1 splintered piece, 1 burin, 1 chisel, 1 ventral sidescraper (Tab. 5.5: 1-6). The last four categories of tools are not quite typical in the Neolithic assemblages.

Altogether 8 artefacts have been burnt (10.3 %). Of the four artefacts with raw material surfaces there are 2 blades. They are completed by one core and one splintered piece. Six artefacts have use wear traces – 4 blades (with 2 blades bearing sickle gloss), blade truncated by straight terminal and oblique basal and laterally retouched blades have a sickle gloss as well. Sickle gloss is also recorded on two blades: 1 blade is truncated by straight terminal retouching and 1 blade is truncated by terminal notch. There are 8 sickle inserts altogether.

In the assemblage there are 17 blades in a fragmentary state (63 %), 3 pieces are fragments of type A (butt B, E and G), two fragments of type AB (butt B and D), fragments of type B have been recorded six times, BC and C have been recorded three times. Tools are made on fragments of type B (4x), 1 on fragments of type A (butt E), AB (butt C), BC and C. Two tools were made from flakes (butt C and E).

The ratio between blade fragments A:B:C is 5:11:3, after tools recalculation is ratio 7:17:5, which reasonably reflects balanced quantity, no categories missing in the prevailing (fragments of type B could have originated from a complete blade several times, therefore its quantity in assemblages is about two times higher). Complete blades should be ordered according to their butt reutilisation. Type B is recorded in the case of 3 blades, type C in the case of 3 blades, type C in the case of 5 blades, type D in the case of 2 blades. We can determine also types of butt in case of flakes. Type B is recorded in case of 7 flakes, type C is recorded 5 times, type D has been recorded once, type E twice and

in 8 cases a determination was impossible. As usual in the Neolithic context simpler modifications of butts are common, which can be related with characteristics of cores and notably with debitage techniques.

Polished Industry

This group of artefacts consists of 8 pieces, all made from a metabasite of the Jizera Mountains type (Fig. 6.4). A hoof-like wedge has been recorded twice, the fragments of an axe four times, and the fragment of an axe, which was used as hammerstone, has been recorded once (Tab. 5.5: 7, 8, 10). One fragment is a flake of metabasite, which probably originated during work with semiproducts.

	Metabasite of Jizera Mountains	%
Hoof-like wedge	2	25
Axe	4	50
Hammerstone/Axe	1	12.5
Flake	1	12.5
Total	*8*	*100*

Figure 6.4. The LBK III stage – polished industry.

Other Industries

In the assemblage querns and grinders (48 pieces, 70.6%) (Fig. 6.5) dominate. They are recorded in the lower and upper parts, and the majority are undetermined fragments (39 pieces). A substantial portion of fragments was burned (70.8 %). In the assemblage millstone (3 pieces) and millstone unused semiproduct (1 x) is presented. The dominant raw material is silicified sandstone (50 %), followed by silicified conglomerate (10.4 %), conglomerate (14.6%) and quartz porphyre (8.3 %). Occasionally different varieties of sandstone, quartzite, granite and quartz have been evidenced. The source of the quartz porphyre can be located in the area of the Žernoseky outcrop, although a source of silicified sandstone and conglomerate is not quite clear. This matter includes Cretaceous sediments thickened by hydrothermal solutions. Formations are located close to large disruptions (e.g. Lausitian disruption), but in volcanic areas as well. The origin of silicified sandstone and conglomerate in the České Středohoří Mountains is highly probable.

In the assemblage there are 6 whetstones in several varieties (8.8 %). Fine-grained sedimentary stone was used for these kinds of artefacts . Assemblage is completed with 8 manuports of different matter. There are 4 thermal fragments of silicified conglomerate recorded, which can be connected with the secondary use of discarded grinders after the use of some kind of pyrotechnological process. One fragment of amorphous quartzite with a similar process has been documented. The last artefact of this assemblage group is a specific fragment of basalt wharve 2.9 cm large (Tab. 5.5: 9).

The Hrdlovka Horizon B is comprised of 31 artefacts: 5 have been located in the near vicinity of house 9, 6 artefacts have been located around the house 62, 3 around house 65 and 16 around house 25. One artefact cannot be affiliated with any house. The Hrdlovka Horizon C comprises 100 artefacts: 8 artefacts are located around the house 4, 13 artefacts are located around the house 59, 10 artefacts around the house 69 and 18 artefacts around the house 4. Altogether 51 artefacts cannot be affiliated with any house .

	Arkosa sandstone	Coarse-grained sandstone	Fine-grained sandstone	Kaolinite sandstone	Kaolinite conglomerate	Sandstone	Conglomerate	opuka	Silicified sandstone	Silicified conglomerate	Metamorfed qurtzite	Granite	Basalt	Quartz	Quartzite	Quartz porphyre	slída	Total	%
Quern	1						2				1							4	5.9
Grinder									1									1	1.5
Millstone		2			1	1	5		21	5						4		39	57.4
?									1			1			1			3	4.4
Semiproduct of millstone									1									1	1.5
Millstones	*1*	*2*			*1*	*1*	*7*		*24*	*5*	*1*	*1*			*1*	*4*		*48*	*70.6*
Whetstone with groove			1															1	1.5
Flat-concave whetstone			1															1	1.5
Double concave whetstone								1										1	1.5
Flat whetstone						1												1	1.5
Whetstone						*1*												*1*	*1.5*
Grindstone						1												1	1.5
Whetstones			2			3		1										6	8.8
Fragment											1							1	1.5
Thermal fragment										4								4	5.9
Manuport				1				1		3	1			1			1	8	11.8
Wharve													1					1	1.5
Total	*1*	*2*	*2*	*1*	*1*	*4*	*7*	*2*	*24*	*12*	*3*	*1*	*1*	*1*	*1*	*4*	*1*	*68*	*100*
%	1.5	2.9	2.9	1.5	1.5	5.9	10.3	2.9	35.3	17.6	4.4	1.5	1.5	1.5	1.5	5.9	1.5	100	

Figure 6.5. The LBK III stage – other industries.

6.2.3. LBK IV Stage

The lithic stone assemblage belonging to the IV. Stage of LBK is small, represented by only 25 artefacts. 16 pieces of chipped industry (15 pieces of debitage and 1 retouched tool - type), 4 polished artefacts and 5 other artefacts have been presented here.

Chipped Industry

In this stage only quartzites from northwest Bohemia were used (Fig. 6.6). The most frequent is Tušimice quartzite, in the lower extent a Skršín type is common, and the quartzite of Kamenná Voda appears only occasionally. Three artefacts from the quartzite of Tušimice type have raw material surface preserved.

In the assemblage debitage dominates, retouched tools are present in a lower amount. The most frequent in debitage are blades (8 pieces, 50% assemblage, and 53.3% debitage), followed by flakes with 6 pieces and one amorphous fragment. Types are represented only by 1 individual – the blade is truncated by oblique terminal retouching. This blade bore use wear traces and sickle gloss, so it was used as a sickle insert (Tab. 5.6: 1). Traces of burning are seen in only 3 artefacts from this chipped industry group. Remains of raw material surface bears 2 blades and 1 flake from Tušimice quartzite. In every case the extension is small, only 5-10%. Beside the above-mentioned blade, other artefacts are without use weare traces. Sickle gloss is documented also in the case of one flake from Tušimice quartzite (Tab. 5.6: 3). This case is a good example of how typological (types) and functional (really used) groups of tools cannot coincide. From 8 blades there are 7 fragments and only one blade is complete. Fragments of type AB and C are presented three times, fragment of type B ones. The retouched blade is made of a fragment of type B. Assemblage of the LBK IV stage is too small to evaluate the structure of blades. The butt of blades type is possible to evaluate in the case of 4 blades. The butt of type B is recorded twice and type C and type E once. Flakes have an adjustment of: once A, once B and once C, an adjustment of type D has been recorded three times.

	Skršín quartzite	Tušimice quartzite	Kamenná Voda quartzite	Total	%
Fragment	1			1	6.3
Blade	1	6	1	8	50
Flake	2	4		6	37.5
Debitage	*4*	*10*	*1*	*15*	*93.8*
Blade truncated by oblique terminal retouching		1		1	6.3
Types		*1*		*1*	*6.3*
Total	*4*	*11*	*1*	*16*	*100*
%	25	68.8	6.3	100	

Figure 6.6. The LBK VI stage – chipped industry.

Polished Industry

The assemblage is comprised of 4 artefacts only (Fig. 6.7; Tab. 5.6: 2, 4). A hoof-like wedge is presented twice. An axe has been recorded once. The last polished artefact is a fragment of a large polished artefact, whose secondary use was a hammerstone. All artefacts were made from metabasite of the Jizera Mountains type.

Other Industries

The group forming the other industries consists only of 5 artefacts (Fig. 6.8). There are 3 millstones made from different kind of sandstone. Quern, indifferent millstone and indifferent burnt fragments of millstone represent particular artefacts. The remaining two artefacts are one retoucher and one manuport of quartzite.

The lithics of the Hrdlovka D horizon is comprised of 15 artefacts, 13 artefacts are associated spatially with house 72, and the remaining 2 artefacts cannot be spatially associated. Only 5 artefacts can be joined with the Hrdlovka E horizon One artefact could be associated with house 60, 1 artefact with house 7 and 3 artefacts could be connected with house 67. Five artefacts could be associated with horizon D and E together only. Two artefacts from this last group could be associated with house 73.

	Metabasite of Jizera Mountains	%
Hoof-like wedge	2	50
Axe	1	25
Hammerstone/ polished tool	1	25
Total	*4*	*100*

Figure 6.7. The LBK VI stage – polished industry.

	Fine-grained sandstone	Coarse-grained sandstone	Silicified sandstone	Quartzite	Total	%
Millstone	1				1	20
Querns		1			1	20
Millstone?			1		1	20
Millstones	*1*	*1*	*1*		*3*	60
Retoucher				1	1	20
Manuport				1	1	20
Total	*1*	*1*	*1*	*2*	*5*	*100*
%	20	20	20	40	100	

Figure 6.8. The LBK VI stage – other industry.

6.2.4. Remaining LBK Lithics

The assemblage of lithics belonging to the LBK stage generally is only comprised from 31 artefacts (17 pieces of chipped industry – 13 pieces of debitage and 4 retouched tools), 8 artefacts are polished artefacts and 6 artefacts are from group described as other industries.

Chipped Industry
Raw material in this group (Fig. 6.9) of chipped industry is determinated by quartzites from northwest Bohemia, namely Skršín quartzite (58.8 %), Tušimice quartzite (11.8 %) and porcelanite (5.9 %), followed by erratic flint (17.6 %) and burnt silicite (5.9 %). Raw material surface is present on 3 artefacts.

In the assemblage debitage dominates (76.5 %), followed by types (23.5 %). The most frequent are amorphous fragments (6 pieces, 35.3 % of assemblage, and 46.2 % of debitage), the next category are flakes (4 pieces, 23.5. % of assemblage, and 30.8 % of debitage). The assemblage is completed by two blades (11.8 % of assemblage, and 15.4 % of debitage) and one core.

Types are represented by 4 pieces (2 retouched flakes, one laterally retouched blade, and a fragment of a retouched blade). Burnt artefacts are evidenced in 4 pieces. Raw material surface bears 2 amorphous fragments and one flake (extension on flake is 5 %). Use wear traces are evident only in one case – a laterally retouched blade. Two blades are fragments of type B and C. The laterally retouched blade is complete, its butt has a type D adjustment. Flakes have an adjustment of type A and C (1x and 1x) and type B (2x).

Polished Industry
The group of polished industry is represented by 8 artefacts (Fig. 6.10; Tab. 5.7). Axes are presented by 3 exemplars (one is broken, one burned). One artefact is a hoof-like wedge, which is completely preserved, its back is not completely finished, and gloss is apparent after handling. A fragment of undetermined polished industry is evidenced once, 1 flake from polished tool and 1 blade of metabasite, which originated from a semiproduct adjustment. All artefacts were made from metabasite of the Jizera Mountains type. The last artefact is a drilled pendant made of slate.

Other Industries
This group of artefacts is represented by 6 items (Fig. 6.11). Half of the items are millstones, half are whetstones.

Artefacts associated with LBK only (without stage or horizon) cannot be connected with any phase of settlement development. With house 26, 35 and 42 only 1 artefact is associated, the remaining 27 artefacts cannot be associated with any Neolithic house.

	Erratic flint	Skršín quartzite	Tušimice quartzite	Porcelanite	Burnt silicite	Total	%
Fragment	1	3	1		1	6	35.3
Blade	1	1				2	11.8
Flake		2	1	1		4	23.5
Core	1					1	5.9
Debitage	*3*	*6*	*2*	*1*	*1*	*13*	*76.5*
Laterally retouched blade		1				1	5.9
Retouched blade		1				1	5.9
Retouched flake		2				2	11.8
Types	*0*	*4*	*0*	*0*	*0*	*4*	*23.5*
Total	*3*	*10*	*2*	*1*	*1*	*17*	*100*
%	17.6	58.8	11.8	5.9	5.9	100	

Figure 6.9. The LBK remaining lithics – chipped industry.

	Metabasite of Jizera Mountains	Slate	Total	%
Hoof-like wedge	1		1	12.5
Axe	3		3	37.5
Polished tool	1		1	12.5
Flake of polished tool	1		1	12.5
Blade	1		1	12.5
Drilled pendant		1	1	12.5
Total	*7*	*1*	*8*	*100*
%	87.5	12.5	100	

Figure 6.10. LBK remaining lithics – polished industry.

	Iron sandstone	Fine-grained sandstone	Sandstone	Metamorfed quartzite	Quartzite	Total	%
Quern	1			1		2	33.3
Grinder					1	1	16.7
Millstones	*1*			*1*	*1*	*3*	*50*
Flat whetstone		1	1			2	33.3
Flat-concave whetstone		1				1	16.7
Whetstones	*0*	*2*	*1*	*0*	*0*	*3*	*50*
Total	*1*	*2*	*1*	*1*	*1*	*6*	*100*
%	16.7	33.3	16.7	16.7	16.7	100	

Figure 6.11. LBK remaining lithics – other industries.

6.2.5. Transitional LBK IV/SBK I Phase

Assemblage of lithic industry from the transitional LBK/SBK phase is the largest at the Hrdlovka site. It is comprised of 291 artefacts. Composition of this assemblage is 213 pieces of chipped industry (162 debitage, 51 types), 15 polished artefacts and 63 items from a group of other industries.

Chipped Industry

In this phase raw materials dominate from northwest Bohemia, shaping 64.3 % of the entire assemblage (Fig. 6.12). The largest group is Skršín quartzite with 30 % followed by Tušimice quartzite with 27.7 %. Quartzite of Kamenná Voda and Bečov are represented rather marginally (3.8 and 1.9 %). Quartzites are added with porcelanite with 0.9 %. Erratic flint is presented with 33.3 %, completed with limnosilicite (0.5 %), burnt and therefore indeterminate silicite (1.9 %). Raw material surface is presented on 26 artefacts (12.7 %).

Altogether 162 artefacts are debitage (76.1 %). Blades are dominated with 64 individuals (30 %), flakes (64, 30 %) represent the same amount. Amorphous fragments are represented by 32 pieces (15 %) and debitage is completed by 2 pieces of cores (0.9 %).

There are 51 types in assemblage (23.9 %). Retouched blades are represented by 26 items, nine of which are blades with lateral retouching (Tab. 5.8: 6, 15, 16 with sickle gloss) and the remainingones are represented by different variants of truncated blades (6 with sickle gloss, Tab. 5.8: 1, 7, 16). Scrapers are presented 13x (6.1 %, 25.5 %, Tab. 5.8: 4, 10-11). Two scrapers are made on laterally retouched blades, one piece also with transversal retouch bears sickle gloss (Tab. 5.8: 17). Remaining types are represented by 3 notches (Tab. 5.8: 5), retouched flakes and retouched amourphous fragments, 2 borers (Tab. 5.8: 18) and 1 splintered piece (Tab. 5.8: 8).

Burns are evidenced in 12 cases (5.6 %). Raw material surface was found on 12 flakes, 6 blades, and 8 retouched tools.

Macroscopic use weare traces have been recorded on 17 blades, two of which bear sickle gloss. Another two blades express sickle gloss. All these blades were used as functional tools, but there have not been retouched. Blades with straight terminal retouching bear use wear traces in 7 cases (2 with sickle gloss). The remaining four bear only sickle gloss. Some level of use wear traces bear 11 terminally retouched blades from 17 (64.7 %), meaning more than half. In view of the fact that this form of artefacts served as inserts in sickles, the absence of use and wear traces is surprising. Either the tools were not used or they were used only for a short time. Scrapers on blades with straight terminal retouching bear use wear traces and sickle gloss, and were used irregularly as a sickle blades.

Altogether 56 blades have been found in a fragmentary state (87.5 %). Fragment of type A is represented 15x. The ration between blade fragments A:B:C is 35:35:8. After the recalculation of tools

this ration is 55:67:17. This ratio indicates a deficit of fragments C (terminal parts), which were not discarded in this phase of the Hrdlovka development. The reason could be the input of blades without terminal parts on the settlement (it corresponds with an absence of cores in assemblage) or their processing in a different (unexcavated) part of the settlement.

	Erratic flint	Skršín quartzite	Tušimice quartzite	Kamenná Voda quartzite	Bečov quartzite	Porcelanite	Limnosilicite	Burnt silicite	Total	%
Fragment	6	14	7		1	2	1	1	32	15
Blade	27	16	17	2	1			1	64	30
Flake	15	20	19	2	2			2	60	28.2
Bladelike flake	2	1	1						4	1.9
Core		1	1						2	0.9
Debitage	*50*	*52*	*45*	*4*	*4*	*2*	*1*	*4*	*162*	*76.1*
Blade with cross terminal and basal retouching	1								1	0.5
Blade with straight terminal retouching	2								2	0.9
Blade with straight terminal. arc basal and lateral retouching	1								1	0.5
Blade with oblique cross retouching	2		1						3	1.4
Blade with oblique terminal retouching	1		1						2	0.9
Blade with oblique terminal retouching and lateral notch	1								1	0.5
Blade with oblique terminal and straight basal retouching		1							1	0.5
Bade with terminal retouching	2								2	0.9
Blade with terminal notch	1								1	0.5
Blade with oblique basal and lateral retouching			1						1	0.5
Blade with oblique basal retouching			1						1	0.5
Blade with lateral retouching		4	4	1					9	4.2
Blade with cross retouching		1							1	0.5
Retouched blades	*11*	*6*	*8*	*1*	*0*	*0*	*0*	*0*	*26*	*12.2*
Scraper	5	2	3	1					11	5.2
Scraper on blade with lateral retouching	1								1	0.5
Scraper on blade with oblique terminal and lateral retouching			1						1	0.5
Scrapers	*6*	*2*	*4*	*1*	*0*	*0*	*0*	*0*	*13*	*6.1*
Notch	1	1	1						3	1.4
Borer		2							2	0.9
Splintered piece	1								*1*	0.5

	Erratic flint	Skršín quartzite	Tušimice quartzite	Kamenná Voda quartzite	Bečov quartzite	Porcelanite	Limnosilicite	Burnt silicite	Total	%
Retouched flake	1	1		1					*3*	1.4
Retouched fragment	1		1	1					*3*	1.4
Types	*21*	*12*	*14*	*4*	*0*	*0*	*0*	*0*	*51*	*23.9*
Total	*71*	*64*	*59*	*8*	*4*	*2*	*1*	*4*	*213*	*100*
%	33.3	30	27.7	3.8	1.9	0.9	0.5	1.9	100	

Figure 6.12. Transitional LBK IV/SBK I phase – chipped industry.

Polished Industry

Artefacts from this group are 15 altogether (Fig. 6.13). Metabasite of the Jizera Mountains type (93.3 %) dominates as raw material. For the first time new raw material has been recorded. It is a microdiorite (6.7 %) of unknown origin. Two times the natural surface of raw material on metabasite fragments has been recorded.

Axes are presented in 5 individuals, all made from metabasite (Tab. 5.8: 13, 20). Three axes are burnt. Three items are a hook-like wedge (Tab. 5.8: 19, 23) and three exemplars are indeterminable fragments of polished industry. A fragment of a bored axe completes finished polished tools. The collection contains two unpolished semiproducts from the metabasite of Jizera Mountains type (Tab. 5.1; Tab 5.8: 21, 22) and finally a polished flake of polished tool, which served as knife.

	Metabasite of the Jizera Mountains	Microdiorite	Total	%
Hoof-like wedge	3		3	20
Axe	5		5	33.3
Bored axe	1		1	6.7
Polished tool	2	1	3	20
Semi product	2		2	13.3
Polished flake of polished tool	1		1	6.7
Total	*14*	*1*	*15*	*100*
%	93.3	6.7	100	

Figure 6.13. Transitional LBK IV/SBK I phase – polished industry.

Other Industries

Querns and grinders dominate the assemblage with 31 individuals (49.2 %) (Fig. 6.14). Querns and indeterminate fragments (5x) have been recorded. A large portion of artefacts have been burned. The dominating raw material is sandstone (41.9 %), followed by conglomerate (19.4 %) and quartz porphyre (16.1 %). Occasionally different sandstones, quartzite, quartz and metabasite are evidenced. The source of quartz porphyre is possible to localize in the area of the Žernoseky outcrop. The source of sandstone and conglomerate could be found in common Cretaceous sediments, which could be located in the České Středohoří Mountains.

Five items are whetstones (7.9 %) made from fain-grained and coarse-grained sandstones. The assemblage is completed by 6 manuports from different rocks. 10 thermal fragments of sandstone, orthogneiss, and quartz with traces of some kind of the pyrologic process have been recorded.

The Hrdlovka horizon F is represented by 16 artefacts (10x around the house 3, 5x around house 44). One artefact cannot be spatially affiliated. The Hrdlovka horizon G is represented by 111 artefacts, 80 artefacts are located around house 2. 30 artefacts cannot be spatially affiliated. 164 artefacts cannot be connected with any horizon of Hrdlovka site.

	Arkosa sandstone	Coarse-grained sandstone	Quartz sandstone	Iron sandstone	Sandstone	Conglomerate	Glaukonite cnglomerate	Quartz porphyre	Metabasite of Jizera mounain	Metamorfed quartzite	Orthogneiss	Gneiss	Mica-schist	Quartzite	Quartz	Total	%
Quern	1	6	1		1	1	1	4		1						16	25.4
Millstone		3				1		1								5	7.9
?		2				2			1					1		6	9.5
Semiproduct of quern		1														1	1.6
Semiproduct of grinder		1				1										2	3.2
Semiproduct of millstone						1										1	1.6
Millstones	*1*	*13*	*1*		*1*	*6*	*1*	*5*	*1*	*1*	*0*	*0*	*0*	*1*	*0*	*31*	*49.2*
Flat whetstone					2											2	3.2
Concave whetstone	1															1	1.6
Flat-concave whetstone		1			1											2	3.2
Whetstones	*1*	*1*	*0*	*0*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*5*	*7.9*
Fragment		2								2	1				3	8	12.7
Flake										1					1	2	3.2
Hammerstone															1	1	1.6
Manuport		1	1	2	2											6	9.5
Thermal fragment					1						1	2	1	1	4	10	15.9
Total	*2*	*17*	*2*	*2*	*7*	*6*	*1*	*5*	*1*	*4*	*2*	*2*	*1*	*2*	*9*	*63*	*100*
%	3.2	27	3.2	3.2	11.1	9.5	1.6	7.9	1.6	6.3	3.2	3.2	1.6	3.2	14.3	100	

Figure 6.14. Transitional LBK IV/SBK I phase – other industries.

6.2.6. SBK I-III Stages

The lithic assemblage from the older SBK stage is represented by only 46 artefacts. 41 individuals of chipped industry (33 of debitage, 7 types, 1 hammerstone), 2 artefacts from the group of polished industry and 3 artefacts from the group of another industry are present.

Chipped Industry

In these stages of the Hrdlovka development erratic flint (51.2 %) prevails slightly in comparison with the local northwest Bohemian sources (48.8 %). Among them Skršín quartzite dominates (31.7 %), followed by Tušimice quartzite (14.6 %) and Kamenná Voda quartzite (2.4 %). In the assemblage debitage (80.5 %) prevails, followed by types (17.1 %), and completed by hammerstone made of Tušimice quartzite (Fig. 6.15).

In the debitage group flakes prevail with 15 pieces (36.6 % of assemblage, 45.5 % of debitage), followed by blades (one of core edge, 12 pieces, 29.2 % of assemblage, 36,4 % of debitage) and are completed by three pieces of fragments and cores (7.3 % of assemblage, 9.1 % of debitage). One of the three cores was used secondarily as a hammerstone.

7 artefacts present types. Retouched blades have only one individual – a blade with an oblique terminal and arc basal retouching with sickle gloss (Tab. 5.9: 1). Scrapers are presented only in four cases (one is double, Tab. 5.9: 2-3, 6). The remaining tools are burin on blade (Tab. 5.9: 5) and retouched flake (Tab. 5.9: 4). Burnt is only hammerstone made from quartzite of Tušimice type. Use wear traces are present on burin, sicle gloss prevails only on truncated blade.

	Erratic flint	Skršín quartzite	Tušimice quartzite	Kamenná Voda quartzite	Total	%
Fragment	2	1			3	7.3
Blade	7	1	3		11	26.8
Blade of core edge			1		1	2.4
Flake	6	7	1	1	15	36.6
Core	1	1			2	4.9
Core/hammerstone	1				1	2.4
Debitage	*17*	*10*	*5*	*1*	*33*	*80.5*
Blade with oblique terminal and arc basal retouching		1			1	2.4
Scraper	2	1			3	7.3
Double scraper	1				1	2.4
Burin on blade	1				1	2.4
Retouched flake		1			1	2.4
Types	*4*	*3*	*0*	*0*	*7*	*17.1*
Hammerstone			1		*1*	2.4
Total	*21*	*13*	*6*	*1*	*41*	*100*
%	51.2	31.7	14.6	2.4	100	

Figure 6.15. SBK I-III stages – chipped industry.

Polished Industry

Polished industry is represented by only two items. The first is a polished tool made from metabasite, the second is a flake from the same material, which documents the reutilisation of older artefacts.

Other Industries

Another industry is represented only by three querns from quartz sandstone, conglomerate and quartz porphyre (Tab. 5.9: 8). All are fragmented and burnt.

8 artefacts represent the Hrdlovka horizon H of settlement development. Two are associated with house 1 and six were found around house 10. Altogether 38 artefacts can be associated with the older SBK stage only.

6.2.7. SBK IV Stage

Only 52 artefacts represent lithic assemblage from the younger SBK, 31 items of chipped industry (25 of debitage, 8 types), 2 artefacts from the group of polished industry and 17 artefacts from another industry.

Chipped Industry

In these stages of Hrdlovka development local sources from northwest Bohemia (81.8 %) (Fig. 6.16) prevail. Among them Skršín quartzite dominates (69.7 %), followed by Tušimice quartzite (12.1 %). Erratic flint is represented only marginally (12.1 %). In the assemblage debitage (75.8 %) prevails, followed by retouched tools (24.2 %).

In the debitage group blades and fragments prevail with 8 pieces (24.2 % of assemblage, 32 % of debitage), followed by flakes (6 pieces, 18,2 %, 24 %) and cores (9.1 %, 12 %).

8 items represent types. 3 individuals – laterally retouched blade and two truncated blades, present retouched blades. There is only one scraper borer, notch and notch on blade. Four artefacts are burnt (12.1 %). Use wear trace can't be found on any artefact (Tab. 5.10: 1-4).

Polished Industry

Only two individuals represent polished industry. The first is a fragment of a polished tool, which is reutilized as grinder (burnt), the second is an axe made from basalt.

Other Industries

In the assemblage of the other industries group querns and grinders dominated with 12 items (70.6 %), with the grinders belonging to the group of polished industry the number changes to 13. Recorded are querns (7x) and grinders (3x) completed by 2 semiproducts, which were not used. Some of grinders are burnt (3x). Among raw material different sandstones prevail (61.5 %), followed by quartz porphyry (23.1 %) and conglomerate (7.7 %). The source of the quartz porphyre is possible to localize in the area of the Žernoseky outcrop. Source of sandstone and conglomerate could be found and common among the Cretaceous sediments, which were located in the České Středohoří Mountains. Three items were whetstones (17.6 %) made from fine-grained sandstones (Tab. 5.10: 5-11). The assemblage is completed by 1 manuport from iron sandstone from different rocks (Fig. 6.17).

The Hrdlovka horizon J comprises 27 artefacts, 24 artefacts are connected with house 8. Three artefacts should be connected with house 17. Altogether 17 artefacts cannot be associated with any horizon of the Hrdlovka site. Millstones from house 8 were the subject of special study (Beneš et. al 2015).

	Erratic flint	Skršín quartzite	Tušimice quartzite	Burnt silicite	Quartz	Total	%
Fragment		6	2			8	24.2
Blade	1	5		1	1	8	24.2
Flake	1	4	1			6	18.2
Core	1	2				3	9.1
Debitage	*3*	*17*	*3*	*1*	*1*	*25*	*75.8*
Blade with lateral retouching	1					1	3
Blade with straight basal retouching		1				1	3
Blade with oblique basal retouching		1				1	3
Scraper			1			1	3
Borer		1				1	3
Notch		2				2	6.1
Notch on retouched blade		1				1	3
Types	*1*	*6*	*1*	*0*	*0*	*8*	*24.2*
Total	*4*	*23*	*4*	*1*	*1*	*33*	*100*
%	12.1	69.7	12.1	3	3	100	

Figure 6.16. SBK IV stage – chipped industry.

	Coarse-grained sandstone	Fine-grained sandstone	Sandstone	Quartz sandstone	Conglomerate	Quartz porphyre	Iron sandstone	Slate	Total	%
Quern	1		2		1	3			7	41.2
Grinder			3						3	17.6
Semi product of grinder	1			1					2	11.8
Millstones	*2*	*0*	*5*	*1*	*1*	*3*	*0*	*0*	*12*	*70.6*
Flat whetstone		1							1	5.9
Concave whetstone		1							1	5.9
Whetstone			1						1	5.9
Whetstones	*0*	*2*	*1*	*0*	*0*	*0*	*0*	*0*	*3*	*17.6*
Thermal fragment								1	1	5.9
Manuport							1		1	5.9
Total	*2*	*2*	*6*	*1*	*1*	*3*	*1*	*1*	*17*	*100*
%	11.8	11.8	35.3	5.9	5.9	17.6	5.9	5.9	100	

Figure 6.17. SBK IV stage – other industries.

6.2.8. Remaining SBK Lithics

The assemblage of undetermined stroke pottery culture contained only 9 artefacts. These included 4 pieces of chipped industry (2 pieces of debitage – blade and flake, and two pieces of types – retouched blade and retouched fragment; Fig. 6.18), 1 polished artefact (axe made of metabasite of Jizera Mountains type; Fig. 6.19; Tab. 5.11: 1) and 4 artefacts of other industry group (Fig. 6.20). Chipped industry was made up of Skršín quartzite (3 pieces) and Tušimice quartzite (1 piece). The other industry group was presented half by querns and half by fragments made of sandstone, quartz and quartzite (Tab. 5.11: 2). No artefact was burnt.

It wasn't possible to relate these artefacts to any phase of the Hrdlovka site, 6 of them could be related to houses 39 and 43.

	Skršín quartzite	Tušimice quartzite	Total	%
Blade		1	1	25
Flake	1		1	25
Debitage	*1*	*1*	*2*	*50*
Blade with oblique terminal, basal and lateral retouching	1		1	25
Retouched fragment	1		1	25
Types	*2*	*0*	*2*	*50*
Total	*3*	*1*	*4*	*100*
%	75	25	100	

Figure 6.18. Remaining SBK lithics – chipped industry.

	Metabasite of Jizera Mountains	Total	%
Axe	1	1	100
Total	*1*	*1*	*100*
%	100	100	

Figure 6.19. Remaining SBK lithics – polished industry.

	Coarse-grained sandstone	Sandstone	Metamorphed quartzite	Quartz	Total	%
Quern	1	1			2	50
Fragment			1	1	2	50
Total	*1*	*1*	*1*	*1*	*4*	*100*
%	25	25	25	25	100	

Figure 6.20. Remaining SBK lithics – other industry.

6.2.9. Remaining Lithics from the Neolithic period

In this group artefacts related with the Neolithic are presented. It wasn't possible to determine the phase they came from. It consisted of 137 artefacts – 93 pieces of chipped industry (76 pieces of debitage and 17 types), 10 polished tools and 34 artefacts of another industry group.

Chipped Industry

Raw materials from northwest Bohemia prevail with Skršín quartzite with 51.6 %, Tušimice with 21.5 % and Bečov and Kamenná Voda with 1.1 %. The rest of the artefacts were made of erratic flint (20.4 %), plattensilex and burnt silicite (2.2 %). In the debitage group blades dominated with 32 pieces followed by flakes with 25 pieces and fragments with 18 pieces. The assemblage was completed by one core. Types are presented by 17 pieces. Retouched blades with 8 pieces dominated, 4 scrapers and 1 scraper on a laterally retouched blade, borer, notch, triangle and retouched fragment (Fig. 6.21). A total of 13 artefacts were burnt (14 %). Use wear traces were present on 8 artefacts and sickle gloss was present on 6.

	Erratic flint	Skršín quartzite	Tušimice quartzite	Bečov quartzite	Kamenná Voda quartzite	Plattensilex	Burnt silicite	Total	%
Fragment	4	9	4	1				18	19.4
Blade	8	12	9		1	1	1	32	34.4
Flake	2	19	3				1	25	26.9
Core		1						1	1.1
Debitage	*14*	*41*	*16*	*1*	*1*	*1*	*2*	*76*	*81.7*
Blade with lateral retouching	1							1	1.1
Blade with double lateral retouching		1						1	1.1
Blade with oblique terminal and basal retouching	1							1	1.1

	Erratic flint	Skršin quartzite	Tušimice quartzite	Bečov quartzite	Kamenná Voda quartzite	Plattensilex	Burnt silicite	Total	%
Blade with oblique terminal and straight basal retouching		1						1	1.1
Blade with straight basal retouching			1					1	1.1
Blade with oblique basal retouching			1					1	1.1
Truncated blade		1						1	1.1
Blade with oblique basal and terminal retouching		1						1	1.1
Retouched blades	*2*	*4*	*2*	*0*	*0*	*0*	*0*	*8*	*8.6*
Scraper	2		1			1		4	4.3
Scraper on blade with lateral retouching			1					1	1.1
Borer	1							1	1.1
Notch		1						1	1.1
Triangle		1						1	1.1
Retouched fragment		1						1	1.1
Types	*5*	*7*	*4*	*0*	*0*	*1*	*0*	*17*	*18.3*
Total	*19*	*48*	*20*	*1*	*1*	*2*	*2*	*93*	*100*
%	20.4	51.6	21.5	1.1	1.1	2.2	2.2	100	

Figure 6.21. Remaining lithics from Neolithic period – chipped industry.

Polished Industry

There is a total of 10 pieces of artefacts in this group, all of them made of metabasite from the Jizera Mountains type. There are two hoof-like wedges, two axes (Tab. 5.12), a fragment of a polished tool, borehole core, semi product and two flakes made during the reutilisation of an older industry (Fig. 6.22). One of the hoof-like wedges is burnt.

	Metabasite of Jizera Mountains	%
Hoof-like wedge	2	20
Axe	2	20
Polished flake of polished tool	1	10
Fragment of polished tool	1	10
Borehole core	1	10
Semi product	1	10
Flake	2	20
Total	*10*	*100*
%	100	

Figure 6.22. Remaining lithics from Neolithic period – polished industry.

Other Industries

This group is represented by 34 artefacts. There are 18 millstones, 10 whetstones and 6 fragments. Different kinds of sandstones dominate as raw material (Fig. 6.23).

	Coarse-grained sandstone	Fine-grained sandstone	Quartz sandstone	Sandstone	Sandy spongolite	Conglomerate	Quartz porphyre	Fonolite	Metamorfed quartzite	Quartz	Total	%
Quern	6		2	1		1	4		2		16	47.1
Grinder	1										1	2.9
Semi product of quern	1										1	2.9
Millstones	*8*	*0*	*2*	*1*	*0*	*1*	*4*	*0*	*2*	*0*	*18*	*52.9*
Flat whetstone				2							2	5.9
Concave whetstone				2	2						4	11.8
Convex concave whetstone		1		1							2	5.9
Whetstone				1				1			2	5.9
Whetstones	*0*	*1*	*0*	*6*	*2*	*0*	*0*	*1*	*0*	*0*	*10*	*29.4*
Fragment				3				2		1	6	17.6
Total	*8*	*1*	*2*	*10*	*2*	*1*	*4*	*3*	*2*	*1*	*34*	*100*
%	23.5	2.9	5.9	29.4	5.9	2.9	11.8	8.8	5.9	2.9	100	

Figure 6.23. Remaining lithics from Neolithic period – other industries.

6.3. Evaluation of the Lithics Assemblage

Raw Material

The following figures show the raw material structure of the chipped industry. In the LBK I stage the assemblage was too small and conclusions could not be made. In the LBK III stage Skršín quartize dominated, completed by erratic flint and, on a smaller scale, also by other northwest Bohemian quartzites. The most distinctive change could be seen in the LBK IV stage and in the transitional stage LBK IV/SBK I, when the ration of Tušimice quartize notably increased and the ration of erratic flint decreased. In the younger stages Tušimice quartzite again decreased. In the end of the Hrdlovka Neolithic development Skršín quartzite increased while the erratic flint ratio decreased. A distinctive increase of Tušimice quartzite probably could be associated with the beginnings of its mining acquisition (Figs. 6.24 and. 6.25).

	LBK I	LBK III	LBK IV	LBK IV/SBK I	SBK I-III	SBK IV
SGS - erratic flint	100	19.2	0	33.3	51.2	12
Skršín quartzite	0	73.1	25	30	31.7	69.7
Tušimice quartzite	0	5.1	68.8	27.7	14.6	12.1
Bečov quartzite	0	1.3	0	1.9	0	0
Kamenná Voda quartzite	0	1.3	6.3	3.8	2.4	0
Burnt silicite	0	0	0	1.9	0	3
Other	0	0	0	1.4	0	3
Total	100	100	100	100	100	100

Figure 6.24. Ratio changes in raw material of chipped industry at Hrdlovka.

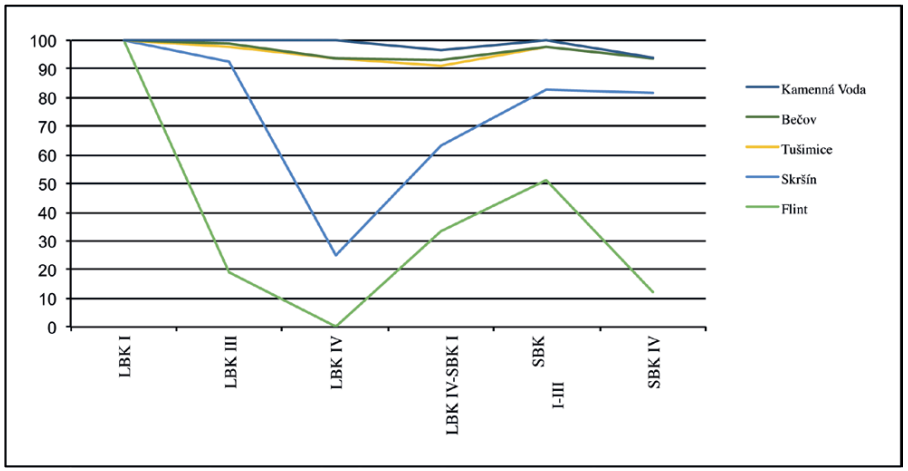

Figure 6.25. Graph of ratio changes in raw material of chipped industry at Hrdlovka.

The metabasite of the Jizera Mountains typedominated in all the Neolithic development of the Hrdlovka site. The first different raw material was recorded in the transitional LBK IV/SBK I stage. This could be related to the time, when quarrying activity in the Jizera Mountains declined.

The raw materials for other lithic industries, namely for querns and grinders originated from the near vicinity of the Hrdlovka site, e.g. quartz porphyry, different sandstones and conglomerates. The majority of such material can be found in the České Středohoří Mountains. Raw materials in the form of pebbles from longer distances originated from terraces of water streams in the Krušné Hory Mountains. The most distant ones are represented by the metabasite of the Jizera Mountains type and erratic flint. Remaining materials were from a closer distance of 30 kilometres.

Lithics

The structure of the stone industry is represented in the following figures (Figs. 6.26 and 6.27). Differences between the stages in the Hrdlovka development are relatively small. In the LBK III stagemore querns and grinders were recorded. in the LBK IV stage more retouched tools were evidenced. In the older SBK culture stage more debitage was recorded. At the end of the Hrdlovka development more querns and grinders should be evidenced. Differences are not substantial and should be regarded as normal fluctuation.

	LBK I	LBK III	LBK IV	LBKIV/SBK I	SBK I-III	SBK IV
Debitage	85.7	43	60	55.7	71.7	48.1
Types	0	8	4	17.5	15.2	15.4
Polished tools	14.3	5	16	5.2	4.3	3.8
Millstones	0	31	12	10.7	6.5	23.1
Other heavy duty industry	0	13	8	11	2.2	9.6
Total	100	100	100	100	100	100

Figure 6.26. Ratio changes in lithics composition in Hrdlovka.

The value case of feature 838 from Hrdlovka represents a unique deposition of grinding stones, spatially associated with longhouse 8 (see Chapter 8.4).

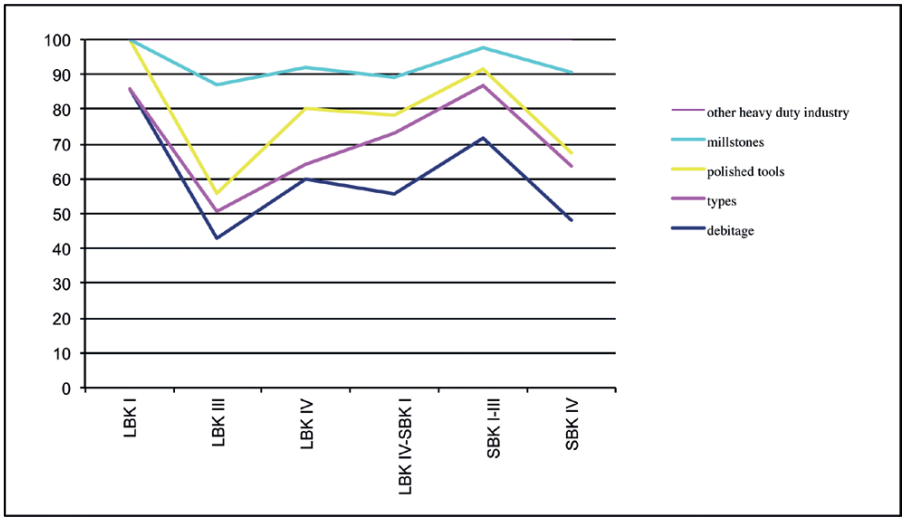

Figure 6.27. Graph of ratio changes of lithics composition in Hrdlovka.

On an analytical basis of workshop areas from the Bohemian Paradise region (Český Ráj) (Šída 2007), the difference between production and consumption areas could be suggested. The structure of stone industry in the common habitat settlement area comprises up to 55% of discarded objects from production (debitage without blades) and 5-40% of objects discarded from non-production activities (retouched tools). The situation at the Hrdlovka site is depicted in Fig. 6.28. All stages of the Hrdlovka site development. according to lithic structure, can be defined as typical consumption (non-productive) activity site with a low level of differentiation.

	LBK I	LBK III	LBK IV	LBKIV/SBK I	SBK I-III	SBK IV
Waste of chipped industry production	50	50	43.8	46	52.5	51.5
Blades	50	34.6	50	30	30	24.2
Waste of other working (living) activities	0	15.4	6.3	23.9	17.5	24.2
Total	100	100	100	100	100	100

Figure 6.28. Stone industry in Hrdlovka. Ration between production and consumption characteristics of waste composition.

7. ARCHAEOZOOLOGY

Lenka Kovačiková

7.1. Taphonomic Analysis

The poor state of preservation (mainly caused by weathering) and the high degree of the fragmentation of faunal remains (Fig. 7.1) seriously affected the identification rates and comparing samples against one another. The proportion of damaged and abraded bones caused by chemical and physical agents varied among chronological levels (LBK III: 61.7 %, LBK IV: 33.9 %, LBK IV/SBK I: 74.4 %, SBK II: 83.3 % and SBK IV: 81.8 %). The share of heavily weathered bone remains expressed in the total amount of osteological material in every chronological level was the highest in the LBK IV/SBK I (35.7 %) and did not exceed 5 % in the LBK IV and SBK II (Fig. 7.2). The animal bones were usually small. Fragmentation of osteological material was high in all of the features and obviously exceeded 90 % in each period (Fig. 7.1). The large numbers of solid tooth splinters of domestic ungulates were also registered, especially in the LBK IV/SBK I and two SBK periods (50 – 100 % of NISP, Fig. 6.2). On the contrary, the proportions of tooth splinters of same taxa in the LBK assemblages was considerably lower than 20 % of NISP, with the exception of numerous caprine teeth in the LBK III (69.6 %, Fig. 7.2). The bones marked by the infiltration of mineral elements into porous skeletal tissues (permineralization) were also observed (Fig. 7.1). The permineralized elements considerably preponderated in the SBK II (26.8 %). The proportion of root etching and carnivore tooth marks on the bone surfaces (gnawing) did not exceed 0.6 % of remains for all periods.

Low frequencies of traces connected to human activities were found. The presence of butchering marks and bone tools in the Hrdlovka deposits was the highest in the LBK III (1.3 %) and SBK IV (3 %) levels. A total of six bone objects (LBK III and LBK IV) were classified as awls or into the worked category including items that could not be typed under any classic typology. Burnt bone remains occurred sporadically in some archeaological structures – more in the LBK periods (1.3 %) than in the LBK IV/SBK I (4.2 %) and SBK IV (9.1 %, Fig. 7.1).

We can sum up that the taphonomical history of all the assemblages is dissimilar depending on the micro-environmental conditions and that the degree of the preservation of osteological material varied both between features and periods. Given the above, the assemblages are difficult to compare.

% N	LBK III	LBK IV	LBK IV/SBK I	SBK II	SBK IV
Fragmentation	94.7	91.8	96.1	95.5	84.8
Weathering 1	13.5	8.2	20.1	24.4	54.5
Weathering 2	23.9	21.7	18.6	54.7	6.1
Weathering 3	10.0	0	15.4	4.2	21.2
Weathering 4	14.3	4.1	20.2	0	0
Permineralization	0.1	0.9	3.1	26.8	0
Root etching	0	0.6	0.0	0.3	0
Gnawing	0.6	0	0	0	3.0
Burning	1.3	1.3	4.2	0	9.1
Butchering	0.6	0	0	0	3.0
Bone tools	0.7	0.3	0	0	0
Total (N)	712	318	805	287	33

Figure 7.1. Results of taphonomic analysis at Hrdlovka in different chronological levels.

	% teeth (*Bos* sp.)	% teeth (*Ovis/Capra*)	% teeth (*Sus* sp.)	% slightly weathered	% heavily weathered
LBK III	20	69.6	25	37.4	24.3
LBK IV	16.7	19.4	12.5	29.9	4.1
LBK IV/SBK I	100	100	88.9	38.8	35.7
SBK II	67.7	66.7	50	79.1	4.2
SBK IV	66.7	0	100	60.6	21.2

Figure 7.2. Proportion of tooth fragments of main domesticates and proportion of slightly and heavily weathered osteological finds in the different chronological levels.

7.2. Taxonomic Analysis

A detailed archaeozoological analysis investigated 2155 animal bones, teeth, and their fragments, namely 712 bones from the LBK III, 318 from the LBK IV, 805 from the LBK IV/SBK I, 287 from the SBK II and 33 from the SBK IV (Fig. 7.3). It is necessary to accept that the size of the assemblage from the SBK IV period was too small to provide reliable information about animal husbandry strategies. Only a small part of animal remains found in the Neolithic archaeological features, on average 18.8 %, could be matched to one of eight species. The studied osteological material primarily contained bone and teeth fragments of domestic animals (on the average 93.3 %): cattle (*Bos taurus*), pigs (*Sus domesticus*), sheep (*Ovis aries*) or goats (*Capra hircus*). The species ratios based on NISP for these domestic mammals are summarized in Figures 7.3 and 7.4. Very few caprine bones from Hrdlovka could be identified to a species level, only sheep remains were recorded in the LBK culture. A higher proportion of sheep than goats is usually taken as an indicator of good grazing areas (Dahl – Hjort 1976). In tree faunal samples (LBK III, LBK IV/SBK I and SBK II) the remains of domestic cattle were the most numerous. On the contrary, the majority of caprine bones were recorded in the LBK IV. The subsequent stages of the occupation of Hrdlovka (LBK IV/SBK I and SBK II) were connected with the dominant occurrence of cattle bones again. Remains of pigs were identified at least frequently. Based on obtained osteological data, the local pig breeding played a slightly more important role in the LBK III and LBK IV (ca. 13 % of NISP) than in the LBK IV/SBK I and SBK II (at the maximum 2 % of NISP).

On the surface of some bones of the above-mentioned domestic animals cut marks were registered (Fig. 7.1). This can provide some information on the behavior of the Neolithic farming community. The butchering marks generally proved skinning, disarticulation and filleting, e.g. on the blade of cattle (LBK III) resulting from the removal of meat from this element. In addition, the cut marks on two astragalus of cattle (LBK III and SBK IV) represented skinning.

Animal species (NISP)	**LBK III**	**LBK IV**	**LBK IV/SBK I**	**SBK II**	**SBK IV**	**Total**
Cattle (*Bos taurus*)	30	18	142	28	9	227
Sheep (*Ovis aries*)	2	4	0	0	1	7
Sheep/goat (*Ovis/Capra*)	21	32	56	15	0	124
Pig (*Sus domesticus*)	10	8	1	1	0	20
Aurochs (*Bos primigenius*)	2	0	1	0	0	3
Red deer (*Cervus elaphus*)	0	1	0	0	0	1
Roe deer (*Capreolus capreolus*)	1	0	0	0	0	1
Wild boar (*Sus scrofa*)	0	0	0	1	0	1
Cattle/aurochs (*Bos* sp.)	5	0	1	3	0	9
Pig/wild boar (*Sus* sp.)	2	0	8	1	1	12
Total (determined)	**73**	**63**	**209**	**49**	**11**	**405**
% (determined)	**10.3**	**19.8**	**26**	**17.1**	**33.3**	**18.8**
Animal categories (N)	**LBK III**	**LBK IV**	**LBK IV/SBK I**	**SBK II**	**SBK IV**	**Total**
Large-sized mammal	35	14	51	40	8	148
Medium-sized mammal	13	22	11	4	0	50
Small-sized mammal	1	0	0	0	0	1
Undetermined mammal	589	219	534	194	14	1550
Undetermined bird	1	0	0	0	0	1
Total (undetermined)	**639**	**255**	**596**	**238**	**22**	**1750**
% (undetermined)	**89.8**	**80.2**	**74**	**82.9**	**66.7**	**81.2**
Total (all animal remains)	**712**	**318**	**805**	**287**	**33**	**2155**

Figure 7.3. List of all taxa recovered in the faunal assemblage from Hrdlovka in the different chronological levels. NISP – number of identified specimens, N – number of unidentified specimens.

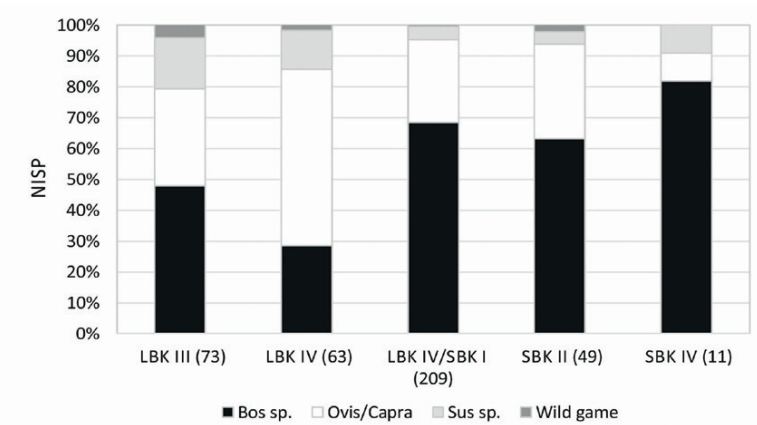

Figure 7.4. Comparison between the species frequencies (% NISP). NISP totals for each chronological level are represented in brackets.

Wild mammals were not very common, they represent less than 5 % of the identified vertebrate fauna, and ranged between 4.1 % of NISP (LBK III) and 0.5 % of NISP (LBK IV/SBK I). The identified taxa of hunted mammals were aurochs (*Bos primigenius*), red deer (*Cervus elaphus*), roe deer (*Capreo-*

lus capreolus) and wild boar (*Sus scrofa*). We can exclude a continuous decrease of the proportion of bones of wild game from the early to the late Neolithic period (Fig. 7.4). The Neolithic landscape was composed of forest clearings and culturally exploited forests incorporated within the pre-culture landscape framework (Peške 1994a). The farming colonization influenced the spreading of open habitat at the expense of forests (Ložek 2007, 68). An archaeozoological analysis of the collection of faunal remains at Hrdlovka did not only suggest the hunting activities of the prehistoric people living here but primarily an occurrence of wild Artiodactyls in the proximity of the settlement. Their environmental requirements included discontinuous broadleaved and mixed woods (Anděra – Geisler 2012: 247–257).

7.3. Lifespan of Domestic Animals

The collection of age data assembled for main domestic animals (Fig. 7.5) was very poor and the results have a particularly informational character. More data has been obtained from the LBK periods (LBK III and LBK IV). Cattle during the LBK settlement occupation is characterized by a higher proportion of calves and subadult animals slaughtered between 6 and 30 months. Sexually mature cattle (older than three years) are represented by only one individual. This animal was determined by the degree of the epiphyseal fusion of limb bones. A slaughter of calves at about weaning age (between 6 and 9 months) could suggest a management strategy that promoted milk exploitation (Peške 1994b). The teeth of 2–4 year old animals in turn indicated the exploitation cattle for meat. The adult cattle slaughtered after reaching sexual maturity are more numerous in the later phases of settlement occupation (LBK IV/SBK and SBK IV). This finding is partially distinct from the LBK periods. The adults kept alive after four years could support a milk exploitation model. The teeth of cattle who survived more than 11 years have also been documented in the later period (LBK IV/SBK I).

Among the sheep and goat remains, only sheep bones (Fig. 7.3) were clearly documented. The caprine (sheep) herds were most likely exploited for various ends – meat and secondary products in the LBK periods (data for later periods are very limited). In the obtained dataset (Fig. 7.4) we can distinguish the younger animals slaughtered between one and two years and the adults kept alive after four years. Animals slaughtered before six months and adults older than six years have not been proven. The adults could indeed reflect breeding females kept for both reproduction and milk exploitation (e.g. Helmer – Vigne 2004).

The bone remains of pigs were much more abundant in the LBK III and LBK IV than in the following chronological levels (Fig. 7.4). Most of the pigs can be categorized into two groups - young (between six months and one year) and subadult (between one and two years). These results indicate a pig meat exploitation when the subadults were killed during and at the end of the period of a rapid weight growth. Only one animal older than two years (Fig. 7.5) was present in the LBK IV period.

Chronological level	Domestic animals	Age at death
LBK III	Cattle (*Bos taurus*)	Teeth: 5-30 m, 24-30 m; epiphyseal fusion: > 12 m, > 3.5 y
	Sheep and goats (*Ovis/Capra*)	Teeth: 1-2 y, 4-6 y; epiphyseal fusion: < 10 m, <2.5-3y, < 3-3.5 y
	Pigs (*Sus domesticus*)	Teeth: < 12 m, 10-14 m, 12-16 m; epiphyseal fusion: < 2 y, < 3.5 y
LBK IV	Cattle (*Bos taurus*)	Teeth: 5-7 m, 6-7 m, 6-30 m; epiphyseal fusion: > 12-18 m.
	Sheep and goats (*Ovis/Capra*)	Teeth: 1-2 y, 4-6 y; epiphyseal fusion: > 6-8 m, > 10 m, 3-3.5 y, < 3-3.5 y, > 3-3.5 y
	Pigs (*Sus domesticus*)	Teeth: 30-36 m; epiphyseal fusion: 1 y
LBK IV/SBK I	Cattle (*Bos taurus*)	Teeth: 5-18 m, < 30 m, 40-50 m, 5-9 y, > 11 y; epiphyseal fusion: > 12-18 m
	Sheep and goats (*Ovis/Capra*)	Teeth: 2-8 y
	Pigs (*Sus domesticus*)	Teeth: 8-22 m
SBK II	Pigs (*Sus domesticus*)	Teeth: 6-24 m
SBK IV	Cattle (*Bos taurus*)	Teeth: 5-24 m, 5-6 y

Figure 7.5. Cattle, sheep/goats and pigs age at death based on teeth and degree of epiphyseal fusion of bones.

7.4. Regional Comparison

The subsistence of people at Hrdlovka was based on agricultural production. The pattern of animal husbandry is associated with an economy based on self-sufficiency, extensive rather than intensive agriculture. The site shows a mixed pattern of animal husbandry, with cattle or sheep as the most commonly identified species. Pigs usually make up 13.7 % or less of the Hrdlovka faunal assemblages. The representation of the bones of cattle and caprines differs between the LBK and SBK period. Cattle was the principal farming species from LBK IV/SBK I until SBK IV (68 to 82 %) in comparison with sheep and goats, whose bones were more abundant in the earlier LBK chronological levels (particularly in the LBK IV; 51.4 %). The frequencies of bones from cattle and caprines fluctuating over time (LBK versus SBK), as seen at Hrdlovka, has not yet been documented in Bohemia. The analogous trends were described in Hrobčice (Vondrovský et al. 2015). However, in the case of this site we have results only for the early and late stages of SBK periods (more sheep and goats remains are in the earlier stage than later) and archaeozoological finds for LBK period are unfortunately missing. Within the younger Neolithic period in Bohemia, on the basis of previously studied osteological assemblages, a decrease of cattle breeding and an increase of sheep and goats are more frequent phenomena (e.g. Peške 1991; Kovačiková – Daněček 2008; Kovačiková 2009; Kovačiková et al. 2012). In general, the evidence for stock keeping can show a regional variation and seems to be mainly dependent on local environmental conditions. Cattle need sufficient drinking water and good pasture more than sheep and goats (Dahl – Hjort 1976). Thus, the fluctuation in cattle and small ungulates bones representation between the different Neolithic periods can reflect the availability of these resources.

No reliable inferences can be made about the slaughtering strategies but the acquired ageing data based on both the epiphyseal fusion of the limb bones and dental eruption and wear indicate the several utility directions of cattle and caprines from the Hrdlovka excavation. Most of the livestock were raised for local consumption and used for a variety of purposes. Aside from the primary use (exploitation of meat), the study recorded efforts at long-term use of these animals (apparently for secondary products such as milk, hair, probably traction and manure). Similar results were obtained from the other Neolithic assemblages of today's Bohemia (Kovačiková et al. 2012). The hunting of wild fau-

na was negligible in all chronological levels at Hrdlovka. The absence of finds of small game species (e.g. hare) can be attributed to taphonomy, not to the fact that these animals were not purposely hunted. The species spectrum and bone frequencies of game animals recorded for Hrdlovka is very similar to that of contemporary Neolithic settlements in the territory of today's Czech Republic (Rulf 1991; Kovačiková et al. 2012), where it is interpreted as evidence for opportunistic hunting in proximity of the habitation area (the share of determined bones from hunted game does not usually exceed 10 %).

Our results suggest that it depends on where the settlements were situated. Obtained knowledge from archaeozoological analysis is increasingly leading to the fact that during the Neolithic a single model for farming did not exist on the territory of today's Bohemia. Over time changes in the farming system were either not proceeded or were conducted at different times in different directions and could have been caused by various factors.

8. LONGHOUSES

Jaromír Beneš, Václav Vondrovský, Michaela Ptáková, Petr Šída

8.1. Construction

The analysis of architecture at the Hrdlovka site is limited by the results of field excavation. The possibility to describe specific attributes of architecture differs depending on the preservation of the state of individual longhouse ground plans. Therefore, no fixed assemblage for the analysis of architecture has been established, but the input set of ground plans has changed with respect to the preservation of a given attribute.

The legibility of a ground plan is determined by the preservation of its components, postholes and trenches. Their recording is mostly influenced by the quality of overburden at the beginning of field excavation. Risks of overburden to the subsoil level have already been reflected elsewhere (e.g. Sigl 2006; Ernée 2008). For the purposes of the illustration of the rate in which the overburden could have influenced the resulting image, a cumulative histogram for maximal recorded depths of all sunken features, i.e. pit as well as postholes (Fig. 8.1), was created. Unfortunately, this value was available only for 642 sunken features (31 % of the total number). As it is apparent the hypothetical 5 cm deeper overburden would destroy the traces of 51 sunken features (7.9 % of analysed assemblage). If the level were 10 cm deeper, it would not be possible to record 178 sunken features (27.7 % of analysed assemblage). We should also bear in mind the information loss in the case of deeper features, which would otherwise have been recorded, but the upper parts of their infill would have perished. The poor legibility of some ground plans was most probably caused by the mechanical overburden of the excavated area. For example the preservation of house 10's side walls is rapidly changing right on the borderline between area SJ 2 and its subsequent enlargement SJ 2h, i.e. between two overburden actions.

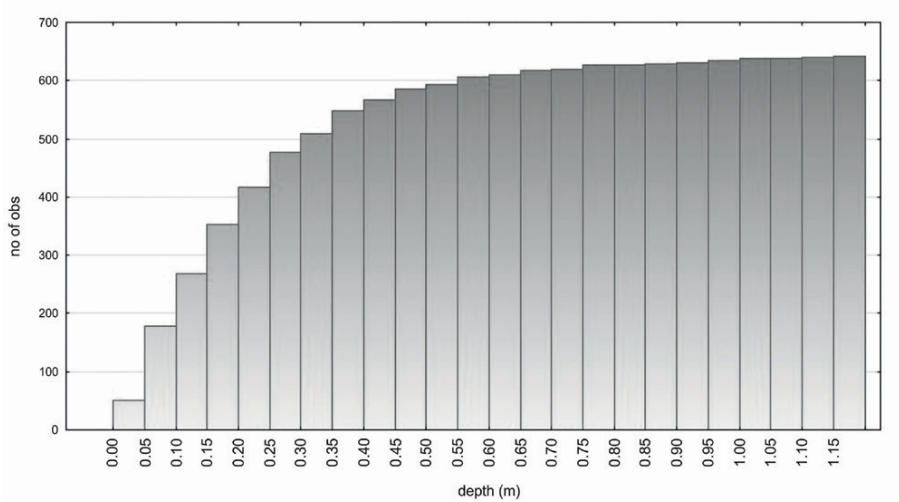

Figure 8.1. Cumulative histogram for the maximal recorded depths of all sunken features (categories in 0.05 m steps).

The total length and width was reliably determinable only in the case of eleven longhouse ground plans. This group can be divided in several categories (Fig. 8.2). The buildings were small in size (ground plans 4, 7 and 72) and represented the *Kleinbau* type (Modderman 1970), the house being comprised of only one section. In the middle size group (ground plans 2, 9, 12, 42 and 44) there was a mix of two- and three-sectional houses. The ground plan going beyond the assemblage average was undoubtedly house 3, the *Grossbau* type with a length of 46.4 m. It was assigned in one group together with house 8, which also crossed the bordering length of 30 m. Ground plan 17 remains out of the classification. Its trapezoidal construction made this ground plan significantly wider than the others, which was caused by different building principles at the end of the Neolithic period (Pavúk 2012).

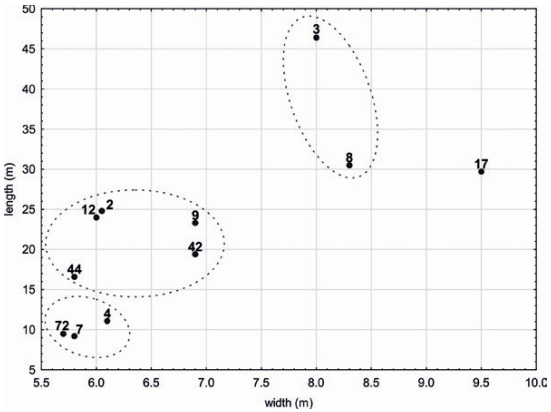

Figure 8.2. Comparison of the total length and maximal width of well--preserved longhouse ground plans. In case of non-rectangular ground plans the average width was taken into account.

Despite the poor preservation and incomplete excavation of a major part of the recorded ground plan, some interesting situations may be observed in detail. The Hrdlovka site has been mentioned in literature so far particularly due to the well-preserved construction details of Neolithic architecture (Beneš 1991b, 34; Pavlů – Zápotocká 2013, 61). On the cross-sections of longhouse postholes usually darker imprints of former posts were sporadically observed. These were a result of the decomposition of the post in the hole or from the re-filling of the posthole after the post was taken out. The second possibility is supported by, however sporadic, a presence of daub pieces right in the dark imprints in longhouse postholes 72, 386, 404 1535, 1540 and others (Fig. 8.3). According to imprints recorded for example in postholes 211, 352 and 417 we can assume that round timbers were used. Nevertheless, rectangular imprints were also documented (e.g. postholes 418 and 645), which indicate chiselled or chopped timbers (Fig. 8.4). Such techniques are known from the preserved constructions of Neolithic wells (Tegel et al. 2012) or they are documented in the form of negative imprints in daub fragments (Řídký et al. 2012, 667, Obr. 27).

The post imprints were observed in 68 Neolithic postholes at the Hrdlovka site. Now we will focus on the relation between the diameter of post (max1) and posthole diameter (max2),[1] specifically if the size of the posthole is directly proportional to the size of the inserted post and what size of post can be expected by a specific diameter of posthole. Chronological horizons were not distinguished in this analysis. It is assumed that elemental building techniques for erecting posts were comparable (if not identical) during a major part of the Neolithic period. The correlation value (r=0.67) shows a positive relation between the two variables, however it is not as strong, as expected (Fig. 8.5). The regression equation predicts that the post makes up about 40 % (39.15 %) of the posthole diameter. This value is naturally quite generalized, the differences in dimensions could be highly variable from only 6 cm (posthole 1271: max1=0.2 m; max2=0.26 m) to nearly 1 m (posthole 386: max1=0.47 m; max2=1.44 m).

[1] The largest recorded diameters were counted.

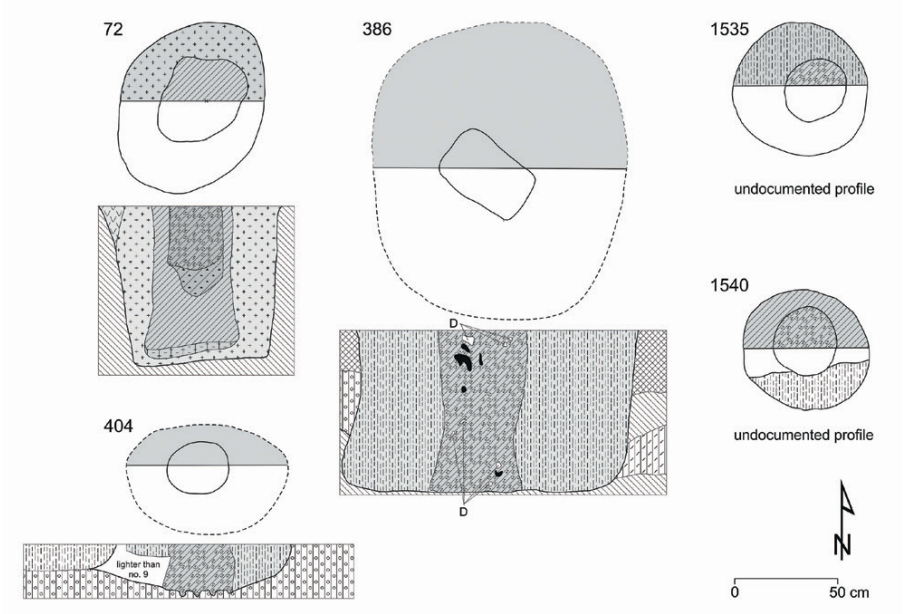

Figure 8.3. Longhouse postholes with recorded darker imprints and daub. Ground plans and cross-sections.

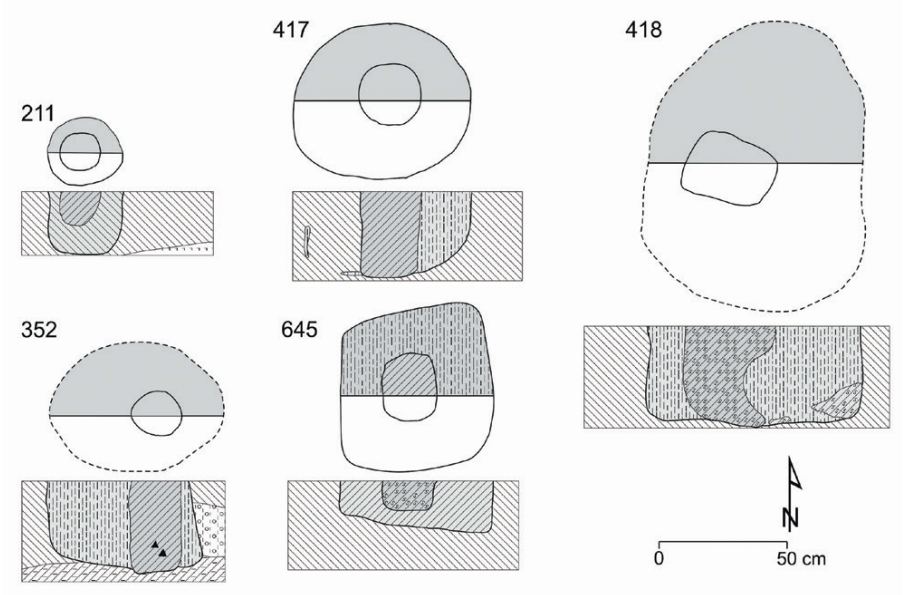

Figure 8.4. Longhouse postholes evidencing the use of round and chiselled/chopped timbers. Ground plans and cross-sections.

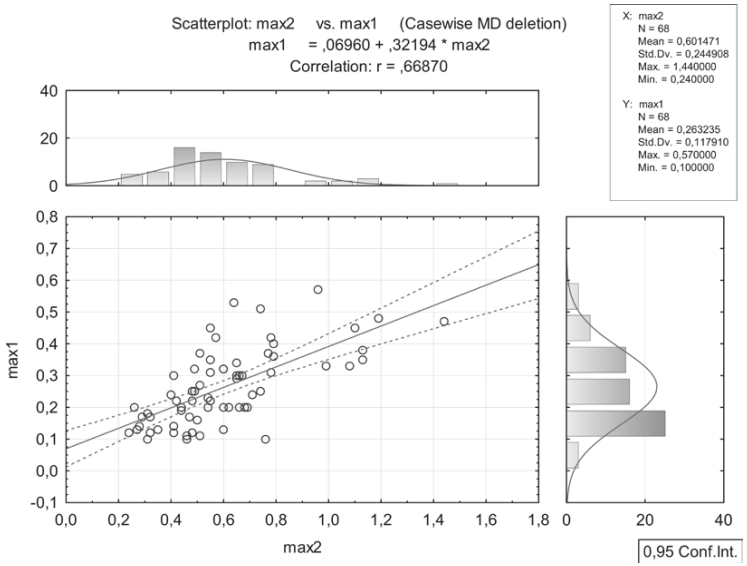

Figure 8.5. Correlation of imprints (max1) and posthole diameters (max2).

An interesting detail in Neolithic longhouse construction is represented by the doubling of postholes, which was documented at the Hrdlovka site as well. The direct overlapping of two individual postholes was recorded, but the cases of minimal distance between postholes were more frequent. Here doubling is identified on the basis of assumed construction splices, which were reconstructed by spline lines connecting individual elements of the ground plan (see Catalogue of houses). It follows that the complete predominance of house inner rows among the cases of doubling (Fig. 8.6) is, to a certain extent, caused by the way of identification. However, the doubling of load-bearing elements of Neolithic houses should be considered. The reason for this might lie in the increasing of load bearing capacities as it is observed in some front sections of LBK houses (Coudart 2015, 314–315). On the other hand, the doubling was observed also in other house sections at the Hrdlovka site, which brings us to the possible replacement of posts during the reparation of house construction.

ground plan	location	postholes
2	inner row	217, 218
2	inner row	219, 220
2	inner row	227, 228
2	inner row	327, 328
3	southern wall	1231
9	inner row	632, 633
9	inner row	628, 629
10	inner row	1542, 1543
12	inner row	1052, 1053
12	inner row	1054, 1055
18	inner row	1263
44	inner row	1793, 1794

Figure 8.6. Overview of recorded doubled postholes in the frame of longhouse ground plans.

The potential reconstructions and the determination of the time span over which individual houses were occupied is one of the crucial issues of Neolithic archaeology. Several models have been proposed on the basis of ceramics from loam pits, radiocarbon data, or the construction of the longhouses. The estimates fluctuate from 25 years (Modderman 1970; Pavlů et al. 1986; Stehli 1989) to 100 years and more (Beneš 2004; Rück 2009).

A substantially longer duration than 25 years is indirectly indicated by the high durability of oak wood, recorded for an experimentally reconstructed longhouse in Oerlinghausen and by the direct observation of dendrochronological data and the durability of wooden construction from later historical periods in the lower Rhine region (Schmidt et al. 2005). The most important statement of B. Schmidt and colleagues is based on the pottery chronology of the overlapping of LBK houses in the lower Rhine region. They argue that 99 % of houses overlapping did so only once. In such cases, the chronological difference between the lower and upper house varied in the region of between 75 and 150 years, on average 85 years (Schmidt et al. 2005, table 4). A long duration of longhouses is also indirectly supported by palaeoecological arguments concerning the devastating effect of oak felling in the LBK period. More frequent and repeated tree felling events, which are assumed in the 'shorter duration' model, would have seriously exhausted natural oak woodland and could have caused a substantial limitation of building activity (Beneš 2004). However, the experimental buildings show that wooden posts placed in the soil for about 40 years suffer from humidity and heavily decompose (Lauermann et al. 2013). We can suppose that in some cases the inhabitants chose partial reparation before the ultimate abandonment of the house.

As well as in the case of postholes, the wooden element imprints were distinguishable from the infill in the northern wall trenches of Neolithic houses as well, namely in ground plans 1, 3, 8, 12, 15 and 44. The permeation of individual profiles with preserved and well documented imprints (Fig. 8.7) helps us to imagine the original construction of this specific part of Neolithic longhouses. Even the trench width is highly variable, the wall itself occupies only part of the trench infill. The best-preserved imprints were recorded in ground plan 1 (sunken feature 173, Tab. 3.16). This situation can be interpreted as chopped or chiselled planks placed by the inner trench wall. In the trench ground plans laterally placed postholes were further observed. These were the remains of posts, which supplemented and reinforced the whole wall construction.

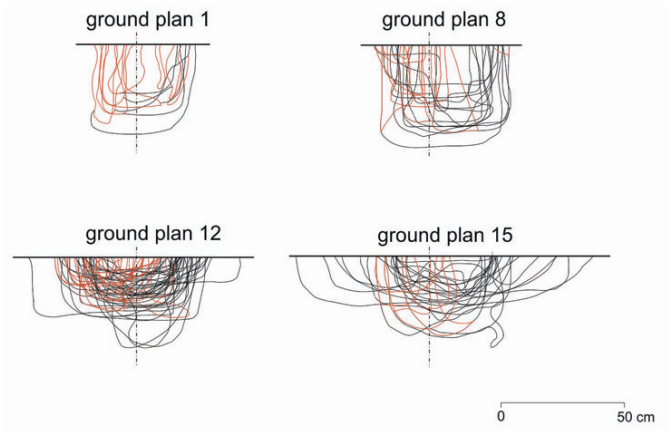

Figure 8.7. Permeation of northern wall trench profiles (black) with preserved and well documented imprints (red).

8.2. Orientation

The reasons for the orientation of the LBK and post-LBK Neolithic houses have long been a traditional issue for investigation (e.g. Pavlů et al. 1986; Pásztor – Barna 2015). It is generally agreed that the position of the house is constrained by environmental and non-environmental factors. The orientation of LBK houses towards a specific cardinal direction was perceived as an adaptation against prevailing wind direction or other climatic effects (Marshall 1981). This hypothesis has been refuted by Elke Mattheusser (1991), who offered broad evidence and a detailed analysis from across the LBK stage's distribution. She suggested cultural reasons for LBK houses orientation and underlined that gradual differences exist between western regions, where a northwest–southeast orientation of houses prevails, and more eastern areas, where houses are aligned north–south or northeast–southwest.

At Hrdlovka the orientation (azimuth) represents the only attribute, which was determinable in the case of incompletely excavated longhouse ground plans as well. Even if there is a threat of wrong azimuth reading mainly in the buildings partially excavated at the linear 3 m wide trenches (areas V and Z), we assume that the potential error is not so significant as to influence the analysis.[2] The average deviation of Hrdlovka site longhouses is 29.7° to the west. We can state that the Hrdlovka houses keep a north and northwest orientation, which is fully in agreement with the canonical architectural customs of the LBK and post-LBK period. The highest deviation was recorded at ground plan 54 (α=74.5°), in the inverse values the most deviated ground plan was 48 (α=5.5°). No pattern in orientation and the location of the houses in the frame of settlement area was observed. Both mentioned extremely oriented ground plans were located at the Z area and their mutual distance is about 65 m.

Observing the houses orientation on the level of settlement horizons (Fig. 8.8), there is apparent no chronological development. Significant differences were recorded even in the frame of individual horizons, for example in the Hrdlovka E horizon, where the variance between highest and smallest deviation amounts to 28.2°.

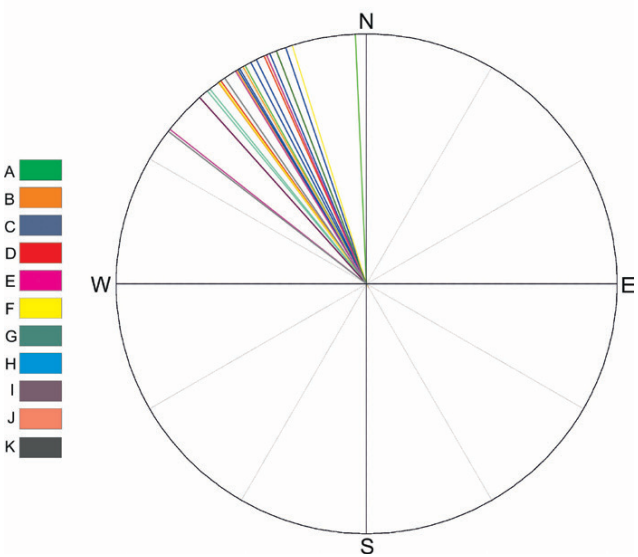

Figure 8.8. Orientation of longhouses in settlement horizons.

[2] The ground plan deviation (α) is defined as an angle included by the house longitudinal axis and north-south axis (azimuth 0°). The deviation acquires positive numbers in western direction, by contrast negative in eastern direction, which respects the prevailing orientation of houses at Hrdlovka. Analysis was performed in the extending GIS module Maplesoft Polar Plot Parameters (v. 1.0.253).

This is the reason only more generalised chronological levels corresponding with the elemental phases of Neolithic architecture (classic LBK, early SBK, late SBK) will be used in the following analysis. Furthermore, the transitional LBK/SBK phase is also classified here, which is well documented in the Hrdlovka longhouse assemblage. Although the resulting values (Fig. 8.9) may evoke orientation towards the west increasing in time, the result is distorted by an uneven number of analysed ground plans in individual categories. The late SBK period is represented by only two houses. Simultaneously, this category evinces the highest value of standard deviation, which refers to the problem of averaging in the analysis of longhouse orientation.

period	mean [°]	SD [°]
classic LBK	28.02	9.08
LBK/SBK	24.83	9.9
early SBK	34.73	7.28
late SBK	43.44	12.63

Figure 8.9. Mean and standard deviation of longhouse orientation classified according to the main development stages of Neolithic architecture.

The problematic of orientation can also be, however, traced on the level of a single longhouse ground plan. Different orientation, i.e. asymmetrical deviation from the main ground plan axis, is usually observable in the rear section of the house delimited by the northern wall trench (Rück 2009, 160). At Hrdlovka this phenomenon was documented at ground plans 2 and 8. The rear section of house 2 is deviated 5.9° northwards from the house longitudinal axis. In the case of house 8 the deviation accounts to 6.1°.

8.3. Interior Activities

The floor, i.e. original "living" surface, of Neolithic longhouses remains an enigma, because it was not recorded in any excavated ground plan.[3] Floor absence is usually explained by the erosion of the original surface (Whittle 1996, 163), but it could indicate a raised floor (Rück 2009, 170–177) or the existence of residential second storeys (Czerniak 2016). Together with the floor layers we are missing any artefactual evidence of domestic activities performed inside the house. The interpretation of sunken features with daub in the interior of the Postoloprty house as ovens (Soudský 1969) has been recently rejected (Lička 2012). Thus the only rare evidence of interior facilities is represented by the sunken storage vessel found at Bylany *in situ* inside the ground plan of house 96 (Květina – Hrnčíř 2013, 326). Another interesting situation was recorded at Hrdlovka in the frame of longhouse ground plan 7. On the level of overburden a quern was found between postholes 719 and 726 a quern (Fig 8.10). Its arrangement could indicate *in situ* position. The grinding of cereals or other ingredients, as part in *chaîne opératoire* for food preparation, represents activity significantly connected with the house and defining the concept of *domus* (Hodder 1990). Thus the presence of quern in the house interior is not surprising, even if the grinding itself could take place outside, in the house surroundings. However, if attention will be again paid to the field situation, any other artefacts or settlement layers, which would support the *in situ* interpretation, are missing.

In tracking the longhouse interior agency the method of phosphate analysis is also available. At Hrdlovka, longhouse 44 was sampled during the excavation in 1990. A one-metre sampling grid covered the whole ground plan and its closest surroundings. In order to gain a more precise result, the

[3] Despite the fact that there is some evidence of preserved Neolithic settlement layers, but not in the house interior (e.g. Bickle 2013, 155).

Figure 8.10. Part of the ground plan of house 7 with the quern found *in situ*.

grid inside the house was increased to half a metre. According to the methodology of A. Majer (relative method of phosphate analysis; Majer 1984; 2004, 215–221) the samples were taken from a depth of at least 10 cm below the level of the overburden, because phosphate in archaeological contexts is usually detectable below its original source.

The resulting image (Fig. 8.11) shows phosphate concentrations along the western house wall. Simultaneously the phosphate concentration extends through the rear as well as central house section, therefore, it can be supposed that the activity pattern in these two parts was not different, at least concerning the activities producing a phosphate signal. The phosphate analyses in longhouse interiors were usually focused on the problem of possible livestock stalling, where it is supposed that soil fertilization by animal excrements could produce significant phosphate concentration. However, phosphate in an archaeological context can also come from wood ash produced by hearths and ovens (Hejcman et al. 2011, 342), which complicates the results interpretation. Except for the origin of phosphate concentrations, questions also arise in connection with the spatial accuracy of the signal. It can reflect the epicentre of activity, as well as its periphery, when the phosphate producing material was deposited rather in places of low activity. In this respect, we should pay our attention to the area of the southern gable wall, where the house entrance is usually expected (Coudart 2013), but no phosphate concentration was recorded here. Further, if we admit that house 44 belongs to "complex" houses as suggested by L. Czerniak (2016), the long deposition of phosphate could reflect the existence of two social units with the same type of disposal activity.

Up until now, not many phosphate analyses of Neolithic longhouses have been published, therefore the comparison of house 44 with data obtained from architecturally and chronologically identical ground plans is problematic. At the early LBK houses of Enkingen, Schwanfeld, and Eitzum in Germany (Stäuble – Lüning 1999) no signal along the wall was observed. However, no difference between the three sections of the houses was observed either. In the house interiors, concentrations were observed along the boundaries of the individual sections. This could correspond with phosphate deposition on the periphery of source activity. Contrarily, at Vaihingen (Lienemann 1998) the phosphate signal indicates different activities for the rear, central, and front sections, which was well documented in the case of houses 20 and 35. The sampling of larger areas comprising longhouse ground

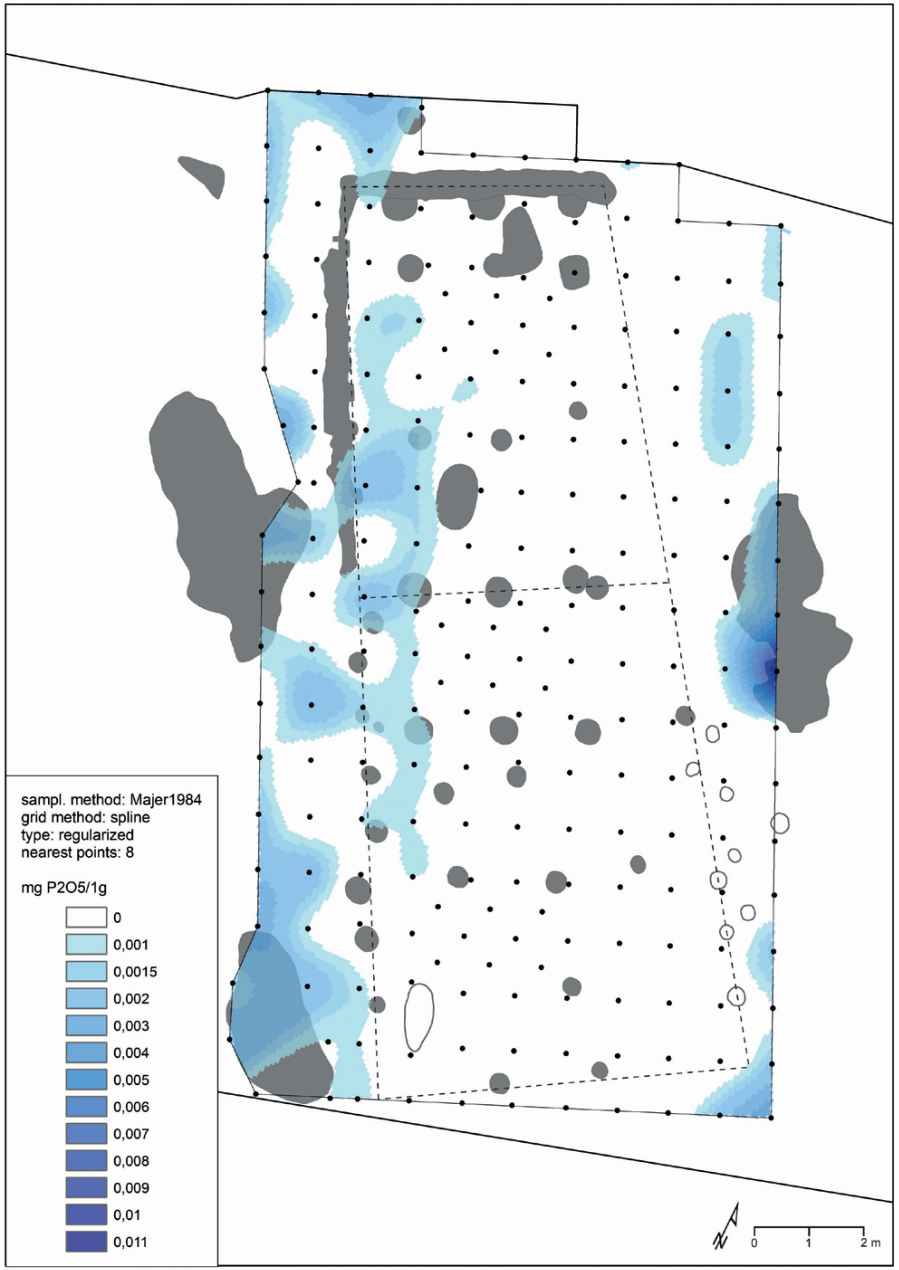

Figure 8.11. Phosphate analysis of ground plan 44.

plans and broader surroundings at Altdorf-Aich, Lower Bavaria, points out that the ground plans themselves appear to be poor in phosphate in comparison with the surroundings, where, according to results interpretation, stock-keeping fences and ovens were located. Also building pits high phosphate values contrast with the longhouses, which is a logical consequence of their assumed refuse function. In this respect, the data obtained at Hrdlovka, where longitudinal pits contain a higher amount of P_2O_5, are in agreement. At Altdorf-Aich, the only phosphate concentration in the house interior was located in the middle section of ground plan 2.

As it is obvious, published phosphate analyses of individual Neolithic longhouses evince high variability with only poor indications of some common pattern variability in human activities taking place in distinct parts of the house.

8.4 Querns Deposition

An extraordinary situation was discovered in feature 838, which can be associated with house 8. Feature 838 and longhouse 8 were situated in the northern part of the excavated area SJ (Fig. 8.12). The sunken feature 838 can be described as a roughly oval settlement pit with a maximum depth of 50 cm and a prolonged extension towards the northwest (Fig. 8.13). The character of feature 838's infill could be described as a mixture of coarse yellow and dark brown gobbets. This observation contrasted with the infill of the majority of the common Neolithic features at the Hrdlovka site, which contained a homogeneous fine-grained dark infill. The bottom was straight and regular; it constituted a slightly banked plane from southeast to northwest.

The sample of animal bone from the context under the grinding stones deposition has been radiocarbon dated to 4620–4458 cal BC, which corresponds to the relative ceramic chronology. Both these sources point to the Late SBK period.

An extraordinary situation was noticed in its centre, where an accumulation of 35 grinding stones, and particularly their fragments, was located. The stones were arranged as a circular structure in one layer starting ca. 10 cm beneath the infill's upper limit and ca, 10-15 cm above the feature's bottom. During the field excavation only samples of the grinding stones were collected (Fig. 8.14). They were deposited separately outside of the main artefactual assemblages, without any processing or surface cleaning. They were identified by matching individual stones with field excavation photography.

The deposition of grinding stones divided the feature 838 infill vertically in two contexts. The upper part and the deposition layer did not contain any finds except for one rare ceramic fragment, but the lower context differed: it contained the vast majority of finds such as ceramic fragments, animal bones, daub and a small amount of charcoal. The only structure visible in the grinding stones layer was an oval posthole, indicating a half-post situated in the eastern part of the accumulation. According to its spatial arrangement the posthole could be said to be surrounded by particular grinding stone fragments. The infill of the posthole was a typical dark soil, which differed from the rest of the infill of feature 838. According to its spatial position the posthole could be considered part of house 8's eastern wall, but the mutual relationship of both of these structures is discussed in another place in detail (Beneš et al. 2015).

The collection of macrolithic artefacts from feature 838 is a specific assemblage. These artefacts were deposited in the sunken feature – posthole - and together make one unit. Most of them were fragments of used querns and grinders combined with other macrolithic artefacts. There are four querns in the assemblage (Tab. 5.2 and 5.10: 7, 9, 10, 11). Two of them are also made from sandstone, while the remaining two are from quartz porphyry from Žernoseky (20 km from the site). All of them were used and broken and one had been burnt. There are three grinders (Tab. 5.2 and 5.10: 5, 6, 8), of which one is made from a fragment of quern. All are made from cretaceous pebble sandstone coming from the

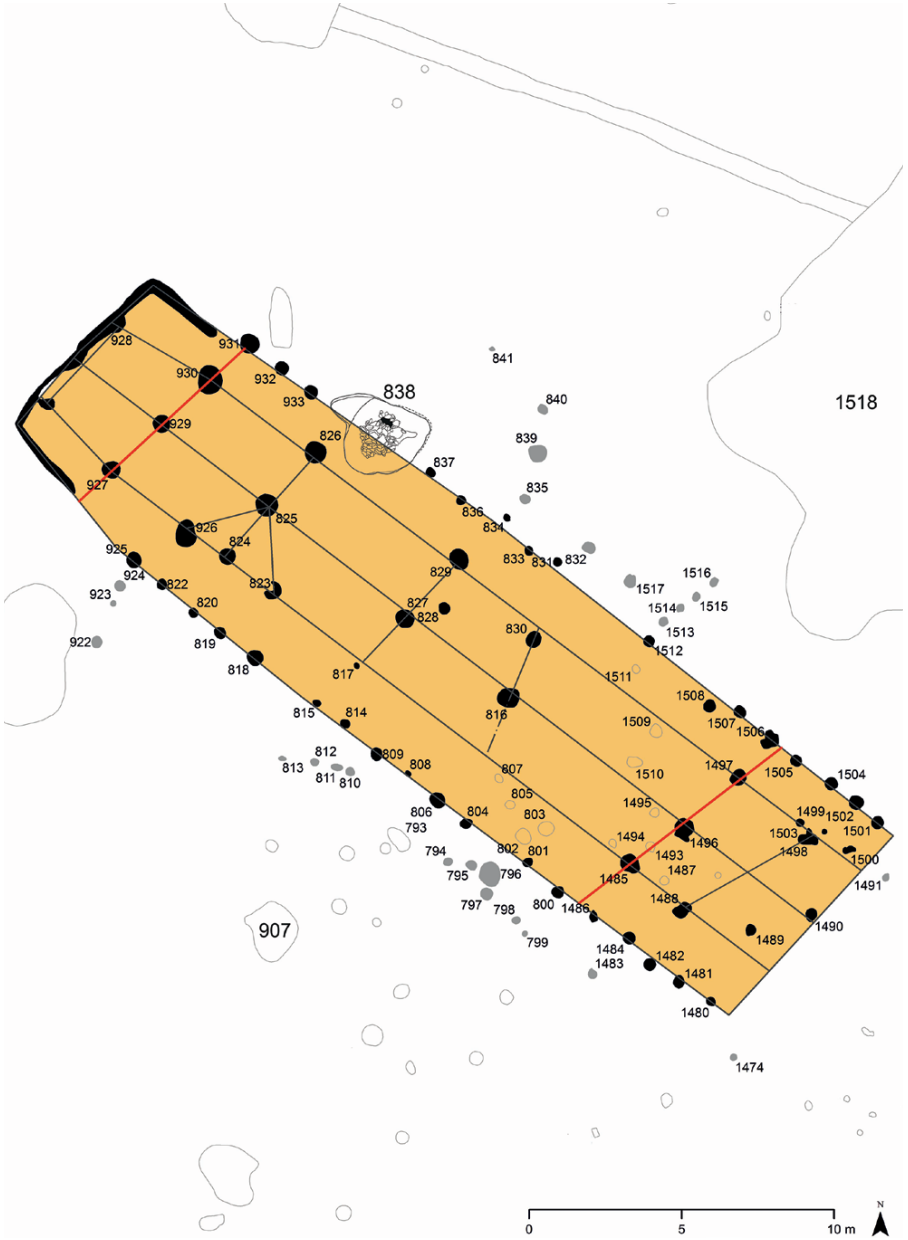

Figure 8.12. Longhouse 8 with feature 838.

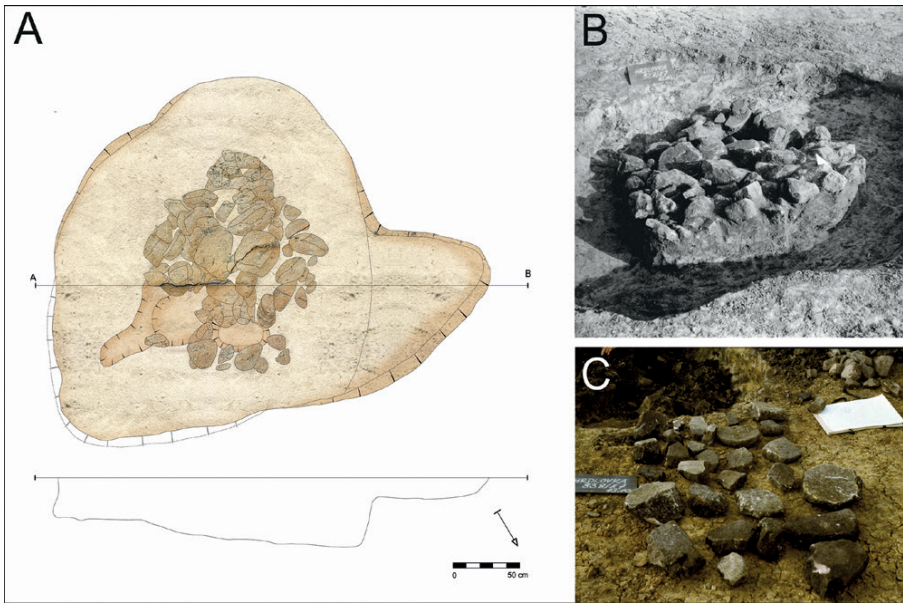

Figure 8.13. Deposition of querns and grinders from feature 838. Ground plan (A), querns before (B) and after excavation (C).

edge of a cretaceous basin (about 20 km from the site). One remaining artefact is a fragment of gneiss pebble broken by thermal shock. This piece was used in some kind of pyro-technological process.

Grinding stone deposition in feature 838 was subject to particular analysis (see Beneš et al. 2015 for further argumentation). The relationship between feature 838 and house 8 is crucial to trace for feature interpretation. There are three possibilities. First of all, feature 838 with the posthole enclosed by grinding stones is an integral part of longhouse 8, forming part of its eastern wall. In that sense, the deposition of grinding stones is a single action that was made during the house's construction. It is not quite excluded that feature 838 is older than house 8 or younger, however, the first possibility seems to be more probable. To investigate this relationship a series of arguments appeared.

No.	Type	Artefact	Work surface length	Work surface width	Height 1	Heig ht 2	Long profile type	Width profile type	Weight kg	Material
5	BA2	grinder	120	145	58	58	BB1	BC3?	1.4	sandstone
6	BA2	grinder	135	170	45	40	BB3	BC3	1.9	sandstone
7	LA1	quern	160	160	80	65	LC3	LB2	3.3	sandstone
8	BA2	grinder	225	170	55	50	BB3	BC1	2.7	sandstone
9	LA3	quern	340	240 and 180	150	95	LD3	LB2	10.9	sandstone
10	LA1	quern	290	220	120	95	LC3	LB2	9.3	quartz porphyry
11	LA1	quern	120	270	110	100	LC3	LD3	6.1	quartz porphyry

Figure. 8.14. Querns and grinders preserved in collection. Long and width profile types after Řídký et al. 2012.

The house 8 was dated to the Late SBK period, however, its construction is not typical example of Late SBK architecture (see Chapter 9). The posthole in feature 838 (despite the fact of a little asymmetry) may have its position in the eastern wall of house 8. Focusing on feature 838, its longitudinal axis with a northwest extension is in concordance with the eastern house wall's orientation. The feature infill was different from other settlement pits in its character. The layer of mixed colouring of yellow and dark soil may give evidence of a short time filling process, when the material was artificially deposited in the pit contrary to long-term organic waste deposition producing dark homogeneous infills.

With respect to the hoard itself, the number of grinding stones in feature 838 highly exceeds the expected amount of these tools used simultaneously in a single household, which is estimated on the basis of ethnographic parallels as being three at most (David 1998; Hamon – Le Gall 2013). Therefore, it could be supposed that the hoard is an assemblage of tools from several households, maybe all households of the settlement in the given period. House 8 could consequently be considered as exceptional in this context, because its construction may have been reinforced by such an exceptional act. The house itself can be understood as a symbolic space being the centre of domestic activities (living, manufacturing, processing and storing of food, etc.) and a feminine element. As such the house represents a specific enclosed place, separating the household from its surroundings. The issue of ritual behaviour can be observed especially in the case of construction sacrifices connected with the birth/creation of the house (Hodder 1990; Bradley 2001; Naumov 2013; Beneš et al. 2016). The fact that grinding tools were used, heavily fragmented and one was even burnt, may also indicate their transition from every-day using into sacralised context.

The phenomenon of the hoard deposition is not exceptional in the context of the European Bandkeramik. Its roots can be followed over the LBK back to the Balkan Early Neolithic (Makkay 1989; 2002; Chapman 2000, 112–121). The deposition of hoards within the house interiors and their near vicinity is known from the LBK as well as the post-LBK period (Soudský 1969; Lička 1981; Makkay 1986; Hamon 2008). From the Czech Republic, except Hrdlovka, there is only one SBK hoard of semi-finished grinding stones that was excavated in Holubice, in the Prague-west district. Contrary to Hrdlovka, here no spatial relation to the house ground plan was observed (Kovačiková – Daněček 2008).

Focusing specifically on the grinding stones deposition, this phenomenon is observed particularly in the western zone of the Bandkeramik distribution. The grinding stone hoard and a hoard of polished stone tools was connected with the ground plan of a longhouse in Goseck, Germany (Bertemes – Northe 2010, 22, Fig. 17 and 22). Seven settlements of the Paris Basin and Hainaut region in Belgium have delivered grinding stone hoards of the LBK and Villeneuve-Saint-Germain-Blicquy culture dated between 5200 and 4600 BC. These hoards are always linked with domestic areas and are discussed in terms of their symbolic value. The grinding stone hoards are situated frequently in lateral building pits, twice in isolated pits associated with the house and, finally, were located inside the house in two cases. Nevertheless, the number of grinding stones in individual deposits does not exceed amount of ten (Hamon 2008).

Feature 838 represents unique deposition with its grinding stones and is spatially associated with longhouse 8. The relation between feature 838 and longhouse 8 remains uncertain, however, the evidence mainly supports the scenario that the grinding stones were deposited during a single house building action, maybe as a building offering.

9. THE HRDLOVKA SITE IN THE CONTEXT OF THE CENTRAL EUROPEAN NEOLITHIC

Václav Vondrovský

9.1. Period of Linear Decoration

The Hrdlovka settlement area was already occupied from the early phases of the Neolithic period. However, the only undisturbed situation of this horizon is represented by sunken feature 559 and ground plan 23, which were excavated only partially, therefore no construction details can be observed to support or exclude the dating of this longhouse in the mentioned horizon. Also the dating of house 61 is rather problematic, thus the architecture of the Early LBK horizon cannot be documented. Other traces of the Hrdlovka A horizon are rather sporadic, represented only by rare intrusions in the younger features infill. On the basis of the significant decoration style GAMA and its spatial distribution (Fig. 9.1), the epicentre of the Hrdlovka site's earliest occupation can be set in the frame of the V area. The features containing ceramic assemblages of the Middle LBK stage (LBK II) have not been identified, but it cannot be excluded that occupation of this period was located somewhere outside of the excavated area.

The uninterrupted sequence of the Hrdlovka site has its beginning in the Late LBK stage (LBK III), when the settlement was significantly enlarged and took up the overburden areas SJ, Z and V (Fig. 9.2). The highest amount of features and construction complexes was observed particularly in the C horizon dated back to the LBK IIIb phase. Naturally, it doesn't have to be a reflection of former occupation density, but rather a distorted image made by possibilities, which defined the field excavation and related chronological analysis.

It should be noted that some decoration components, having most probably their origin out of Bohemia, can be recorded already since the C horizon. As the first, the ceramic individual ID 11557 from feature 1934 can be mentioned (Tab 4.104). In its decoration the technique of music-notes in the form of double nail impressions placed sparsely along the line was identified (Tab. 4.6: technique 479). Further upper complementary ornamentation in a "V" form with three impressions on the edge (Tab. 4.6: complementary motifs 339) was noted. Analogies come from the area of southern Bavaria, where this technique, as well as a complementary motif are relatively common (Alteglofsheim-Köfering and Landshut-Sallmansberg sites: Brink-Kloke 1992, Taf. 3:2050-49, Taf. 23:4032-313, Taf. 74:341-237, Taf, 95:712-1; Stephansposching site: Pechtl 2009a, Taf. 18:387-41, Taf. 62:972E-5, Taf. 67:1057-2). Also the isolated feature 1955 is loosely assigned to the LBK III stage. Its ceramic assemblage contained another ceramic individual (Tab. 4.107: ID 12030) bearing an untypical decoration, which extended the list of current descriptive codes for Bohemian Neolithic pottery (Tab. 4.6: technique 247). This band, filled by two to three long punctures, has already been noticed in the frame of the Podkrušnohoří region (Malé Březno site: Šumberová 1995, tab. 1:39, tab. 2:17,18; Most site: Pavlů – Zápotocká 2013, Fig. 8:1), but it is also frequent in sites west of Bohemia (e.g. Alteglofsheim-Köfering and Straubing-Lerchenhaid sites: Brink-Kloke 1992, Taf. 1:2001-0, Taf. 44:32-2; Stephansposching site: Pechtl 2009a, Taf. 73:1136-1; Dresden-Prohlis site: Link 2014b, Taf. 63:972-28). Considering its occurrence in feature 559 of the Hrdlovka A horizon, the higher chronological variance of this technique can be assumed. The above-mentioned cases might point to influences coming from the western areas of Linear Pottery culture.

The architecture of the whole developed LBK period is characterised by well-preserved ground plans 6, 7 and 9. They do not deviate from the common schemes typical for architecture of this chronological level (cf. for example Pleinerová – Pavlů 1979; Květina – Pavlů 2007). Also ground plans 12 and 42, even though they were not assigned to any settlement horizon, can be loosely dated to the classic LBK period. In the case of the first mentioned house, the rear section foundation trench was

Figure 9.1. Spatial distribution of decoration style GAMA *(kernel density method, search radius 20, natural breaks classification)*.

Figure 9.2. Spatial distribution of linear ornamented ceramics *(kernel density method, search radius 20, natural breaks classification)*.

in the northern part accompanied by a line of posts, which might be a roof supporting construction. This element is relatively rare (see Frirdich et al. 2015, Fig. 4:a), the posthole lines connected with the northern wall trenches are usually observed only along the side walls of the trench, often as prolonged lines of house longitudinal wall doubled construction (cf. Dresden-Prohlis site: houses 2 and 3, Link 2014b). Furthermore, houses 12 and 42 are located in close vicinity, with a very similar orientation and their side walls (rather assumed than observed in field) overlap. M. Lička is dealing in similar cases observed on the SBK settlement area of Mšeno with an idea of double-houses (Lička 1989). Contrary to the Mšeno site, the ground plans in Hrdlovka are comparable in size and construction type, thus none can be considered as an extension accompanying the standard ground plan of the Neolithic longhouse. House's 12 and 42 position was most probably created by the overlapping of two undistinguished settlement horizons of the Linear Pottery culture. In this chronological constellation these construction complexes have been drawn in the second chronological model.

9.2. Period of Transition

The position of the Hrdlovka F and G horizons in the chronological analysis evokes an image of assemblages, which arose in the transition between linear and stroked pottery decoration. This period has been described in detail by analysis of ceramic assemblages from Hrbovice-Chabařovice site, about 20 km northeast from Hrdlovka (Zápotocká – Muška 2007; Zápotocká 2009b). Also Dresden-Prohlis, located in the Saxonian Dresdner Basin, is representative of the transitional period. In addition to pottery, the Dresden-Prohlis site provided a representative assemblage of longhouse ground plans (Link 2012; 2014b). At these sites, pottery decoration of individual and parallel double-strokes was used as an independent technique significant for the LBK/SBK transition. The strokes were organised in rectilinear motifs, which prefigured the classic SBK chevrons (sometimes as a zigzag). Vessel shapes were mostly hemispherical, hemispherical with a S-shape profile, and pear-shaped vessels – all with rounded bottom.

The assemblages of horizons F and G at the Hrdlovka site evince a slightly different pattern. The significant decoration of individual and parallel double-strokes is nearly missing, however, there are several linking points. At first, in all three assemblages the linear decoration still persists (Hrbovice--Chabařovice: 4.7 %; Dresden-Prohlis, house 9: 15.2 %). In addition to strokes indicating the very onset of SBK decoration, a high ratio of an advanced techniques of strokes was also recorded. To compare, at Hrbovice-Chabařovice the small alternating double-strokes makes up 28 %, but in the Dresden-Prohlis house 9 the assemblage was not identified. The relief ornamentation is still present in the F and G horizons as well as at Hrbovice-Chabařovice. It vanished just in the assemblages of fully developed SBK culture (Zápotocká – Muška, 2007, 61–62; Link 2014b, 82–86). In the Hrdlovka F horizon there should also be noticed incised lines accompanied at one side by thick individual strokes (Tab. 4.10: technique 06; Tab. 4.74: ID 1833, 1836, 1845 and others), which was organised in curvilinear motifs. Even without the significant decoration, the Hrdlovka F and G horizons evince attributes of late LBK, but also early SBK culture, which leads to dating back to the period of transition. Ceramics of the Hrdlovka G horizon comprise the advanced techniques in a higher proportion, particularly the alternating double-strokes, therefore this horizon was defined as succeeding F. It is reflected also in the correspondence analysis, where the Hrdlovka G assemblage is closer to the pottery production of the fully developed SBK from the Vchynice and Hrobčice site.

Despite the above listed arguments, we should also bear in mind the possible risk of data distortion caused by the formation process. It might affect the archaeological material and result in the image of mixed ceramic assemblages with linear as well as stroked pottery (cf. Frirdich et al. 2015). Furthermore, the analysis of all the sites is burdened by low numbers of ceramic individuals with determinable decoration. The hypothesis that the Hrdlovka F and G horizons represent an assemblage

of mixed origin can also be supported by the presence of chronologically diverse techniques such as wide groove (GAMA style) and multiple strokes. Also the taphonomic analysis of osteological material shows a significantly high degree of damage in these horizons. Consequently, the species determination was possible to perform only in the case of teeth, the most resistant osteological material. Therefore, we cannot exclude that all the material entered the investigated contexts during heterogeneous depositional and post-depositional processes. Unfortunately, the method of excavation (see above) did not allow studying formation processes with respect to the individual sunken features.

Longhouse ground plans 2, 3 and 44 were assigned to the Hrdlovka F and G horizons. Despite the fact that the architecture doesn't have as much of a chronological sensibility in comparison to pottery decoration, general trends can be traced. We should bear in mind that the Hrdlovka settlement area was not excavated to the full extent, therefore many houses might remain unrecorded. Excavated ground plans are most probably only part of the original number of contemporaneously built longhouses.

Searching for comparable assemblages in northwest Bohemia, only one poorly preserved longhouse ground plan at Hrbovice-Chabařovice site was documented, therefore the Dresden-Prohlis site is the only suitable option. T. Link considers that the transition between late Linear and early Stroked Pottery Culture could be traced by the shift from regular or slightly trapezoid ground plans with irregular but thicker inner rows to slightly convex ground plans (navi-form) and regularly arranged posts. Both types are constructed with double side walls. Further *antes* have often been recorded (Link 2014b, 182; Link 2015, 355). Also longhouse ground plans of the Eythra site can support the above-mentioned trends. Although pottery assemblages pointing to the LBK/SBK transition has not been documented here, the ground plans of the late LBK and early SBK were identified on the basis of construction typology (Frirdich et al. 2015). The late LBK houses are characterised by an overall rectangular shape with a larger rectangular northern section. The setting of inner posts is relatively thick and the bent arrangement occurs in the central part. The early SBK ground plans are slightly convex in ground plan, the number of cross rows is significantly decreased and the northern section is remarkably shorter. Houses of both chronological levels have got doubled construction of the side walls (Frirdich et al. 2015, Fig. 4).

The architecture of the Hrdlovka settlement area follows the same trajectory. Rectangular or slightly trapezoid ground plans, where the inner rows evince irregular setting (houses 3 and 44), were transformed in buildings with slightly convex side walls and loose inner posts. In the case of house 3, the pseudo-Y arrangement of the cross row in the central section was recorded, which is common in LBK houses of southeast Bavaria (Pechtl 2010). On the other hand, differences in the length of the house rear sections, respectively the wall trenches, can be found. While at Dresden-Prohlis houses with very short northern sections were also recorded (e.g. houses 4 and 23), at Hrdlovka they are comparable by their size with the central sections. However, the above-mentioned attributes themselves cannot be considered as simply determinative. The doubled wall, whether in regular or irregular form, can serve as an example. This element is found to be characteristic particularly since the Early SBK period (Končelová – Květina 2015, 435), but it has been noticed even in the LBK horizons at Dresden-Prohlis (ground plans 6, 10 and 17) and also at Hrdlovka (ground plans 59, 63 and 73). We are not able to strictly delimit this phenomenon either spatially. Even the double-post walls are most common in the Saxony and Eastern Bavaria regions (Link 2014c, Abb. 3), this technique was also used in Bohemia and the Rhineland region (e.g. von Brandt 1988, 77; Coudart 1998, 153; Jeunesse et al. 2007, 51). It was also exceptionally recorded in the distant Chelmno region of Poland (Werra 2010).

Continuing in the comparative approach, the extremely long house 3 from Hrdlovka does not have any analogy at Dresden-Prohlis. The house size could be understood as an expression of the economic or social status of its inhabitants, particularly the northern part is considered as the most expressive one (Pavlů 2014a, 22). These northern sections are relatively large in comparison with other parts of the Hrdlovka houses. On the other hand, the building of the large house might express

the attempt of builders to face the unfavourable situation in a broader community providing better economic base. However, there is no direct evidence for any breaking point in the socio-economic structure at the site. This assumption is supported by the artefactual and ecofactual assemblages recovered from the pits accompanying the house walls, which is not exceptional in any regard.

Although current evidence offers only hints about how the LBK terminated and what the transition to the succeeding cultures was like, a number of scholars have convincingly argued for the rapid end of the LBK (e.g. Faruggia 2002), also associated with an unstable socio-political interlude recognised by violent conflicts. Mass violence is documented for example at Talheim, Schletz or other sites (Wahl – König 1987; Wild et al. 2004; Teschler-Nicola 2012; Wahl – Trautmann 2012; Meyer et al. 2015). What's interesting is the fact that all violent or violent-like evidence is recorded only in the western area of the LBK with the exception of the Schletz site, which is located in the eastern part of Central Europe. Such kinds of ritual performances may point to some level of social change concentrated in the Danubian region. In the Bavarian, Elbe region and eastward areas this kind of evidence is missing. The Hrdlovka site may represent another site providing data on uninterrupted development from linear to stroked ornamentation, thus accompanying the sites of Hrbovice-Chabařovice and Dresden-Prohlis, where this transitional phase has been well documented. According to our data, the transition cannot be seen as a result of crisis, which is fully in agreement with the area of east central Europe. Similar to Hrbovice-Chabařovice, there are attributes of advanced stroked ornamentation at Hrdlovka along with linear decoration, which may suggest a slightly different mode of transition than in Dresden-Prohlis, where direct evolution in pottery decoration, even on a household level, has been recorded. This might suggest the possibility of a different mode of SBK style diffusion in both regions. On the other hand, the common occurrence of architectural attributes creating constructions of individual houses is comparable and evinces a similar shift in time on the larger area of northwest Bohemia and Saxony and Eastern Bavaria. This image may be caused by the character of the chronological setting in Neolithic architecture, which does not reach such sensitivity as pottery decoration. Moreover, the durability and life span of a single house could reach about 100 years (Schmidt et al. 2005). Therefore, the processes of change viewed by the scope of architecture are hidden in chronological indifference.

9.3. Period of Stroked Decoration

The Hrdlovka site sequence continues with the H horizon to the developed stroked ornamentation (the Early SBK stage). Contrary to the previous, the occupation of the SBK culture is not significantly observed in the Z area, but on the other hand it spreads in the form of loosely placed buildings to the B area (Fig. 8.3). In the ceramic assemblage of H horizon a quite uniform range of decoration can be observed, where the double-strokes arranged in chevron motifs clearly dominate. Exceptionally different kinds of decoration made by the double-pointed implement, which was used not for strokes, but for lines organised in typical chevrons (Tab. 4.10: technique 08; Tab 4.75: ID 6524, 6547; Tab. 4.76: 6574), were noticed. This can be regarded as evidence of individual deviation from the routine in pottery production, rather than a full-bodied decoration technique.

Houses 1 and 15, which represent the architecture of the Early SBK period, already have trapezoid ground plans, house 10 was not preserved in a sufficient state, but its ground plan might be described as slightly naviform. Doubled walls were noticed in the case of house 1, they are only supposed in the case of house 15 while a simple wall line delimited house 10.

Probably the most interesting construction element is the enclosure (?) running out of both longitudinal walls of house 1. Unfortunately, its ground plan was not completely excavated, hence we are not able to reconstruct the whole extent and form of the enclosure. The doubled lines of the western part might be the foundation for a construction type known, for example, from Papua New Guinea,

Figure 9.3. Spatial distribution of stroke ornamented ceramics (*kernel density method, search radius 20, natural breaks classification)*.

where the space between the two lines of posts is filled by stacked logs or chopped planks (Lemonnier 2012, 24). The construction of the house 1 enclosure is relatively massive, the diameter of postholes fluctuate around 0.33 m,[1] even though the size of the postholes does not have to correspond with the dimension of the post. The eastern line was constructed as a simple line of postholes, whereas an occasionally interrupted trench supplements the western part. Structures like these are usually seen in the case of LBK houses interpreted as livestock fences (Lüning – Reisch 2011, 251). Nevertheless, it could also be used as fences for keeping animals without access to the fenced field (Dalidowski et al. 2016, 73–74). If so, the question arises, why are these situations so rare in the archaeological record, when keeping stocks was an integral part of the Neolithic economy. Thus according to some scholars the enclosure had a rather symbolic or cultic function (Pavlů 2000, 277). Searching for post-LBK analogies, which are chronologically closer, the fence-like structures connected individual houses arranged in one row at Jaroměř (Burgert 2015, houses 2 and 3) or the Kolín sites (Končelová – Květina 2015, Fig. 2), but it was also noticed at the LBK settlements (Altdorf-Aich: Euler 2011; Targowisko: Czerniak 2013). Therefore the posthole line can indicate the existence of other longhouse ground plans in unexcavated area beyond the edge of the trench.

There are doubts in the chronological determination of the Hrdlovka I horizon that did not reveal a sufficient amount of chronologically significant material. Nevertheless, it seems to be most possible that I precedes the Hrdlovka J horizon dated to the SBK IVa phase. In the ceramic decoration stroking techniques typical for this period, such as tremolo strokes, wide double-strokes and multiple strokes, occur. The following K horizon, the last level of the Hrdlovka site sequence, is similar in the range of decoration techniques. However, contrary to other Late SBK settlements in the region of Podkrušnohoří, Rössen strokes were also noted. Their origin can be found in the post-LBK culture of the same name, which was located particularly at the area of present-day Germany. The evidence of contact with western regions can be thus traced through the nearly whole chronological sequence of the Hrdlovka site. The transport of salt from central parts of Germany, which has already been assumed for the Neolithic period, could be an inhibitor of these contacts with necklaces of marble beads from Sázava-Bílý Kámen as counter value (Zápotocká 1984; Saile 2012).

The Late SBK horizons of the Hrdlovka site are represented by the well-preserved ground plans 8 and 17. Despite the similar chronological level, their construction is very different. House 8 belongs to the type of post construction with a simple line wall and quite thick inner rows. The simultaneous use of the simple line combined with the Y-shape in the construction of the first inner row of the house's central part can be considered as a rarity. The above listed attributes are not typical for Late SBK houses and rather point to the architecture of classic LBK houses in the Bohemian region (Pavlů et al. 1986, 383–394). On the other hand, the trapezoidal shape of the short northern rare section, which is asymmetrically connected to the main house axis (cf. Libenice: Steklá 1961; Eythra: Frirdich et al. 2015), and the absence of classic larger building pits flanking the longitudinal house walls in particular, is evidence for Late SBK dating (Končelová – Květina 2015). Furthermore, the analogy to house 8 can be found in the house 2 from the Vchynice site dated to the Late SBK period (Řídký et al. 2013, 239, Obr. 1).

On the other hand, house 17 is constructed only by the circumferential foundation trench, which is usually preserved only at the longer walls. The inner posts are very rare, often they are even missing as in the case of house 17. Houses of this construction are documented at the very end of the Neolithic in the Bohemian region (cf. Březno u Loun: Pleinerová 1984; Kolín: Končelová – Květina 2015; Postoloprty: Soudský 1955), as well as in the other regions of Germany (cf. Končelová 2013, Obr. 2). Considering the presence of Rössen strokes in the assemblage of the associated feature 1339, there is an interesting linkage between house 17 of Hrdlovka and the houses of the Rössen culture (e.g. Günther 1976).

A situation, which is similar to the Hrdlovka J and K horizons, was recorded at the Late SBK site of Jaroměř in eastern Bohemia. Two settlement horizons were distinguished there: the first was comprised by houses of post construction close to house 8 from Hrdlovka, whereas the second group dated back to the SBK IVb phase and was characterised by ground plans with a foundation trench (Burgert et al. 2014, 31–37, Obr. 1). By contrast to Jaroměř, at Hrdlovka we are missing a higher amount of preserved ground plans, which would allow us to distinguish groups of houses with identical construction.

[1] The depth of postholes was not documented during field excavation.

9.4. The Issue of Regional Development

The specifics of pottery ornamentation development are quite well described in the individual regions of the Bohemian Neolithic, although rather on the level of quantitative representation (Pavlů – Zápotocká 1979). During the chronological analysis of the Hrdlovka site the emphasis was put on the inductive approach to the data. However, a problem arose during attempts to synchronize the settlement area with the development of the surrounding region. Although the representative assemblages from other sites in northwest Bohemia were used for this task, this may nevertheless be the origin of the vicious circle of our cognition. The independent self-dependent regional chronology is missing so far and the dating of referential assemblages was therefore often performed right on the image of general development in Neolithic Bohemia, which is based particularly on the research of the Bylany site in the case of LBK (Pavlů 1977; Pavlů et al. 1986) and on the representative assemblages of various regions in the case of SBK pottery (e.g. Horáková-Jansová 1938; Zápotocká 1993).

Direct comparison per analogiam considerably deforms possible chronological and spatial variability. As I. Pavlů points out, the basal categories of our cognition represents time and space, but in their comprehending we can fall to undue schematisation and simplification (Pavlů 2014b). If the settlement phases Hrdlovka D and Bylany VI are identically dated to the LBK IV period, it does not ensure that these horizons are really synchronous. This approach however arises from the absence of another methodological alternative and from theoretical foundations of current archaeological chronology.

The chronological distribution of decoration styles seems to be close to the model of individualistic continuum.[2] The gradient is represented by time whereas the decoration styles are expressed by unimodal curves with normal distribution. This theoretical approach was the foundation of the Hrdlovka site chronological analyses, when the method of unimodal detrended correspondence analysis was used. On the other hand, the analysis of ceramic assemblage from the Bylany site suggests that the concept of gradual commencement and descent of decorative styles may not be appropriate (Květina – Končelová 2011, 205–206), although it can be caused by the way of excavation, when only some sections of the whole settlement area were recorded. Some settlement horizons thus might pass unnoticed. In the case of Hrdlovka it is documented by an absence of assemblages, which would correspond to the chronotypological image of the LBK II stage.

The issue of pottery styles distribution is inseparably connected with the idea of the overall mobility of Neolithic communities and their mutual contacts. Cultural milieu defined by linear pottery comprised large areas of central Europe, but this seeming uniformity fell to pieces – regional groups/cultures – at the end of the 6th millennium. However, it is questionable whether or not this process does not represent only an intensification of latent diversity in the frame of LBK (Modderman 1988). It is the pottery, its decoration in particular, whose attributes are generally uniform across the LBK area, but different in qualitative as well as quantitative aspects on a regional scale.

The model of a sedentary society with a low rate of mobility was formed particularly with respect to the transition from a mobile hunter-gatherer way of life to an agricultural one. Nevertheless, there are several indications providing a slightly different image of Neolithic society. The first sphere represents the stable isotope analyses, which indicate a higher mobility of women and suggesting

[2] This concept is usually used in the ecology of plants (Austin 1985, 40–44, Figure 1).

a patrilocal organisation of the Neolithic population (Bickle – Whittle 2013, 367–370). This shows to be an important aspect in the issue of pottery production know-how, because women were employed in the production of these artefacts according to ethnographic observations (Arnold 1985). We can suppose that women coming to the settlement through marriage performed the spatial transfer of pottery decoration (Strien 2000, 33). This model is also supported by the analysis of pottery forming methods and archaeozoological remains at the Cuiry-lès-Chaudardes site (Gomart et al. 2015). The second sphere is a testimony of artefacts themselves. There is evidence of long distance transport of lithic raw materials (Přichystal 1985; Šída 2014; Burgert 2016; Burgert et al. 2016 and others) as well as final artefacts (Zápotocká 1984), even though it can be interpreted as a result of the *down-the-line-trade* (Renfrew – Bahn 2000, 368) with many participants in the chain, which could erase information about the origin of artefacts (Květina et al. 2015). We can suppose that in case of pottery, unlike with stone industry, where raw material sources played a significant role, it was needed to transfer know-how itself, respectively the people who hold the know-how (Chapman – Gaydarska 2011; Tichý 2014). Surprisingly, there is more evidence of imports in pottery from the later periods of Neolithic, when the initial uniformity of a linear complex should be fragmented in regional groups (Pavlů – Zápotocká 2013, 109–110). It is probable that roots lie in different capabilities for import detections in the relatively unified linear pottery in contrast to the more regionally differentiated post-LBK period.

At Hrdlovka several elements, which are not typical for the area of Bohemian Neolithic, were identified in the ceramics assemblage. It can be considered either evidence of sporadic imports unfitting the homogeneity of the local production (cf. Zápotocká 1967; 2004; Vondrovský et al. 2015, 468) or, contrarily, a reflection of specific development in the wider area, in which Hrdlovka was located. The second availability was supported by evidence of the common development in the Podkrušnohoří region (Hrbovice-Chabařovice, Hrdlovka) and Dresden Basin (Dresden-Prohlis). Therefore, the decorative elements, which lie out of the common spectrum of the Bohemian Neolithic, should be considered as an organic part of the Hrdlovka pottery production.

10. CONCLUDING REMARKS

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Hrdlovka was one of the regularly dispersed Neolithic settlements in the drainage area of the Loučenský Stream running from the Ore Mountain slopes to the Bílina River. The site as well as a major part of the initial landscape was unfortunately destroyed by open cast mine activity at the beginning of the 1990's. The landscape was highly preferred by the Neolithics for occupation due to the suitable local environmental conditions. Significant palynological evidence in northern Bohemia defines the vegetation here as a mosaic with patches of open pine-birch and oak forest and steppe grassland until the Neolithic period, when landscape became more open. The largest water body of the region, close to the Hrdlovka site, was a formed by the postglacial and early Holocene Komořany Lake. The settlement area was investigated in the frame of the Lomský and Loučenský Stream Project, which shows that the average extension of the Neolithic sites could be estimated to 25 hectares. However, only part of the assumed total extent of the Hrdlovka settlement was excavated, because the rescue campaign suffered from a lack of time. A large-scale sampling strategy has been used to acquire optimal knowledge and to make a compromise between the demand to investigate the maximal extent of the site and record the situations in detail. Therefore main attention was paid to the SJ area, where archaeological activity had the character of comprehensive digging and the remaining areas of the site were investigated a bit faster.

The different materials and aspects of the Neolithic site have explored a wide range of different themes and research questions:

1. The chronological analysis of the Hrdlovka settlement area was based particularly on the ceramics and spatial relations of archaeological features. The beginnings of the Hrdlovka settlement occupation can be traced back to the early stage of LBK. There is, however, poor evidence of this period in the form of intact situations. The LBK I ceramics was often recorded as an intrusion in younger assemblages. The contexts of the LBK II stage are missing completely. It cannot be excluded that occupation of this period was located beyond the borders of the excavated area and was therefore not recorded. The fluent settlement sequence starts with the B horizon, dated (most probably) to the LBK IIIb phase and terminating in the late SBK stage by the K horizon synchronised to the SBK IVb phase.

   The assemblages of the Hrdlovka F and G settlement horizons represent a valuable source of information concerning the period of transition between the linear and stroked decoration of pottery. Hrdlovka may become, besides the Hrbovice-Chabařovice and Dresden-Prohlis sites, the next settlement area with a well-documented LBK IV/SBK I horizon, which can be observed not only in ceramics, but also in the construction of houses 2, 3 and 44. It was the employing of spatial relations of construction complexes 2 and 3 in chronological analysis, which allowed the distinguishing of two separate horizons in the frame of the LBK/SBK transitional period. Unfortunately, it was not possible to support the chronology of F and G horizons by absolute radiocarbon data. Their acquiring and reliability was a common problem limiting our research at Hrdlovka. The material of the Podkrušnohoří region (Hrbovice-Chabařovice and Hrdlovka) and Saxony (Dresden-Prohlis) can be considered as evidence of frequent contacts, which had an impact in the common development in this broader area, which resulted in the fluent emergence of the Stroked Pottery culture. This contrasts with the image in other regions of the Danubian Neolithic, where violent or violent-like evidence was recorded, leading to the concept of crisis in late LBK society. The assumption of frequent contacts does not necessarily have to be related to only the chronologically limited period of LBK/SBK transition. The evidence of influence from regions of present-day Germany were found in the form of pottery decoration

elements and marginally in architecture observed already from the Hrdlovka C horizon until the end of the settlement occupation. Thus, Hrdlovka, together with other sites in the region (Malé Březno, Vikletice) evidences significant linkage of the Podkrušnohoří region toward the west, despite the Ore Mountain barrier.

2. Lithic industry analysis resulted in some interesting statements concerning raw materials for chipped industry used in Hrdlovka in particular. In the LBK III stage Skršín quartzite dominates, completed by erratic flint and, on a smaller scale, also other northwest Bohemian quartzites. The most distinctive change could be seen in the stage of LBK IV and in the transitional stage LBK IV/SBK I, when the ration of Tušimice quartize notably increased and erratic flint decreased. In younger stages Tušimice quartzite again decreased. In the end of the Hrdlovka Neolithic development Skršín quartzite increased and the erratic flint ratio decreases. This transformation in the use of raw materials may be connected with the onset of Tušimice quartzite deep quarrying and the associated changes of economic ties in the close as well as distant surroundings. Dark green Metabasite of the Jizera Mountains type, which is typical for the vast area of Central Europe dominates in all phases of the Hrdlovka site in the polished industry production. The first different raw material was recorded in the transitional stage LBK IV/SBK I. It can be connected with time, when quarrying activity in the Jizera Mountains declined. Raw materials for other lithic industry namely for querns and grinders, originated in the near vicinity of the Hrdlovka site, e.g. quartz porphyry, different sandstones and conglomerates. The majority of such material can be searched for in the České Středohoří Mountains, east of Hrdlovka.
3. A detailed archaeozoological analysis investigated 2155 animal remains. Only a small part of them, on average 18.8 %, could be matched to the higher taxonomic ranks (species or genus). The low determination degree of archaeozoological assemblage was greatly influenced by the high level of the fragmentation of bones (mainly caused by weathering). The determined part of the osteological assemblage primarily contained bone and teeth fragments of domestic animals (on the average 93.4 %) such as cattle (*Bos taurus*), pigs (*Sus domesticus*), sheep (*Ovis aries*) or goats (*Capra hircus*). The identified taxa of hunted mammals (on the average 1.5 %) were aurochs (*Bos primigenius*), red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*) and wild boars (*Sus scrofa*). They indicate not only the hunting activities of prehistoric people living here but also the occurrence of wild ungulates in close proximity to Hrdlovka. The comparison between the domestic species frequencies on the particular chronological levels suggests the dominance of cattle remains in three stages: LBK III, LBK IV/SBK I and SBK II. On the contrary, the majority of caprine bones was recorded in the LBK IV stage. The proved *fluctuation of the* frequencies of cattle and caprine remains over time has not yet been documented in Bohemia. The identified remains of pigs were steadily rarer. The keeping of this omnivorous animal played a slightly more important role in the LBK III and LBK IV stages than in the transitional stage of LBK IV/SBK I and the SBK II stage. The limited collection of age data shows a higher proportion of calves and subadult cattle slaughtered before reaching the age of three during the LBK stage. By contrast, the slaughter of sexually mature cattle was more obvious later – in the transitional stage LBK IV/SBK and SBK IV stage. The teeth of adult cattle kept alive after four years could support a milk exploitation model. Since the LBK stage, sheep (or goats) were also most likely exploited for various ends – meat and secondary products. Butchering marks on some bone surfaces prove the process of cutting meat off of the bones.
4. The Hrdlovka site offered a significant assemblage of architecture concerning the periods of the classic LBK and particularly SBK culture. Elemental trends in construction development can be observed here. The classic LBK period is represented by rectangular ground plans, but toward the SBK period the higher variability occurs concerning trapezoid and naviform ground plans. This phenomenon could be explained as the end of conformity, which disappeared together with linear decoration. The final stage of longhouse construction represents the trapezoid ground plan formed only by trench-like side walls (house 17). However, retrospective reminiscences, such as in the case of ground plan 8, could also be observed. It seems to be reliably dated to the late SBK period on the basis of associated artefactual evidence. Short trapezoid northern section is in agreement with this dating, but the rest of the construction refers rather to earlier periods.

Moving beyond the common architectural features, longhouse 3, an extraordinarily long building structure with a length of 46.4 m, should be mentioned here. The unusual house size may point to the specific economic or social status of its residents. Interestingly, the analysis of architectural features, as well as artefacts and ecofacts recovered from the sunken features spatially associated with the house, indicate that this exceptional construction may be chronologically situated in the LBK/SKB transition, which does not give an image of any crisis in this period. On the other hand, we should also consider other variants. The building of the large house might express the attempt of builders to face the unfavourable situation in a broader community providing a better economic base

At the Hrdlovka site a prevailing northwest orientation was generally observed, which is in agreement with the geographical setting of the site. On the other hand, any chronological or intra-site spatial pattern of longhouse orientation was not observed. Tracing the frequent attributes of longhouse construction, one should notice the doubled posthole lines of side walls, particularly in the case of the SBK ground plans. Despite this construction type is not strictly fixed in time and space, the higher frequency is recorded in the Saxony and Eastern Bavaria regions. Also in the case of the inner post rows organisation the frequent occurrence of J or skew type could be noticed in the house central sections, which points to the specific needs of inhabitants for internal space arrangement.

The spatial organisation and agency in the house interior can also be investigated by phosphate analysis. In the case of house 44 in Hrdlovka, phosphate was concentrated along the internal western wall, which may indicate undifferentiated use of space within the longhouse rear and central sections. Also the hypothesis of livestock stalling in the house does not seem to be probable, because the houses themselves evince quite a poor signal in comparison with the garbage pits in the surroundings. This is one of the few linking points among the phosphate analysis results performed at several LBK sites across Europe, where no significant pattern of phosphate producing activities was recorded. The rare evidence of longhouse interior facilities represents the quern preserved probably *in situ* in ground plan 7.

The Hrdlovka site explores hints of ritual behaviour associated with the longhouse as well. Feature 838, contained a unique deposition of grinding stones spatially and probably also functionally associated with longhouse 8, can be supposed as an assemblage of tools from several households, maybe all of the households of the settlement in the given period. Therefore house 8 could be consequently considered as exceptional in this context, because its construction may have been reinforced by such an exceptional act.

Building on certain perspectives and approaches in the well-developed Neolithic archaeology of Central Europe, whatever the problems encountered during the Hrdlovka salvage excavation, this volume has attempted to present a huge set of primary data and engage with far-reaching questions about the fundamental nature of one distinctive Neolithic settlement area.

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12. CATALOGUE

12. 1. Plans

Tab. 1.1. Visualisation of spatial features

Tab. 1.2. Plan of the SJ and V areas. Available online on www.ff.jcu.cz/ustavy/uar/publikace.

Tab. 1.3. Plan of the B area. Available online on www.ff.jcu.cz/ustavy/uar/publikace.

Tab. 1.4. Plan of the Z area. Available online on www.ff.jcu.cz/ustavy/uar/publikace.

12. 2. Houses

The Hrdlovka settlement area offers a suitable assemblage for tracing Neolithic architecture and its chronological development. During the field excavation and shortly after, 71 ground plans of Neolithic longhouses were identified (Beneš 1991c, Fig. 1). These were labelled using Roman numerals. However, during the elaboration of the site general map in the GIS interface, this situation was revised. Overall 14 original ground plans1 were found doubtful. Labelling using Roman numerals was, in most cases, abandoned. This was especially due to the cases with high numbers (e.g. XXXIX, XLVIII, LXXIII), wherein the labelling became confusing. The rejected ground plans can be characterised as a random set of several postholes with no or only weak regular organisation (Fig. C2.1). On the other hand, one ground plan (no. 18), originally considered to come from the Bronze Age, was dated as Neolithic and one ground plan (no. 75) was newly identified. The Hrdlovka settlement area comprises 59 ground plans of Neolithic longhouses after the revision process.

Only a part of the Neolithic ground plans was excavated, the extent corresponding to the initial one. Deep ploughing or overburden during excavation probably disturbed some of them, thus more or less only deeper postholes of the houses' interior were preserved (e.g. Ground plan no. 72). In the other cases, entire parts of the ground plans were missing (no. 18, 41, 43 and others). Possibilities for tracing Neolithic architecture were also limited in areas V and Z with narrow line trenches. On the one hand, this system of excavation evinced an image of the overall extent of the settlement area and a number of houses, but on the other hand it does not offer suitable data for studying mutual spatial relations and chronology, because only small parts of the individual ground plans and associated sunken features were excavated.

Partial changes were also performed during the revision of individual ground plans. Due to long-term occupation, whether in the Neolithic, subsequent prehistoric periods or in the early Middle Ages, the image revealed by field excavation can be characterised as a multi-level mosaic of different chronological horizons. The legibility and interpretation of Neolithic ground plans became problematic because of the presence of younger or older postholes. Necessary data critique can be performed by marking the lines among the individual postholes, which should copy the main construction splices. The marking of lines was based on the general characteristics of Neolithic architecture: five longitudinal rows, various types of inner rows constellation, corridors dividing house parts, simple or doubled perimeter wall etc. (e.g. Pechtl 2009a, Abb. 109, Abb. 125; Cladders et al. 2012, Abb. 5; Link 2014b, 243–286). In the case of the Hrdlovka assemblage, only the postholes, which were possible to connect by splice line, were a priori considered as part of the ground plan. Remaining structures inside or outside the ground plan were labelled as non-contemporary. Therefore, the image of individual ground plans published in preliminary reports after the excavation and now might differ slightly (Fig. C2.2). To a certain degree, the defined ground plans are interpretations made by the individual scholar who performed the analysis.

[1] No. 5, 21, 28, 30, 32, 33, 34, 49, 51, 56, 58, 68, 71 and 76.

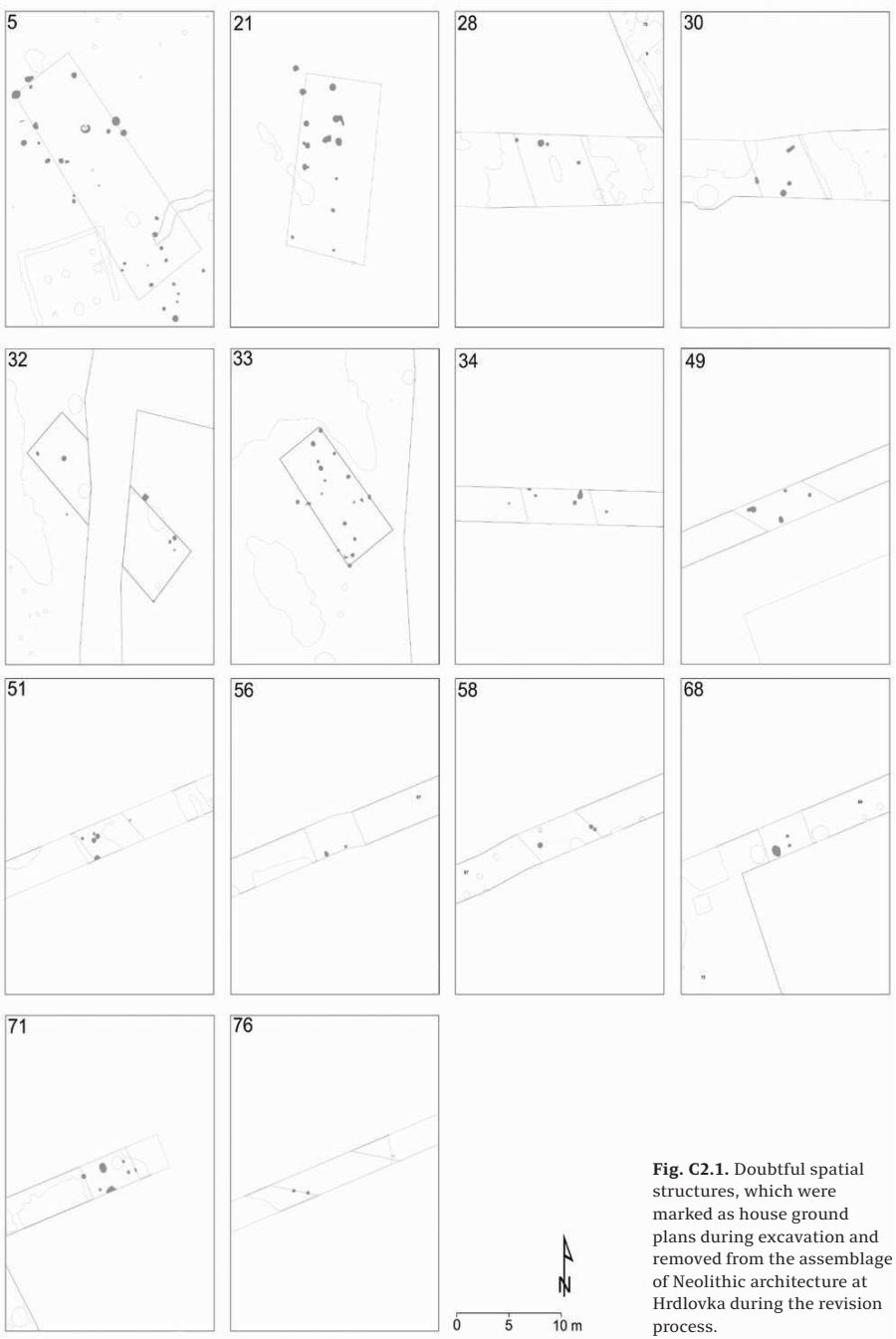


Fig. C2.1. Doubtful spatial structures, which were marked as house ground plans during excavation and removed from the assemblage of Neolithic architecture at Hrdlovka during the revision process.

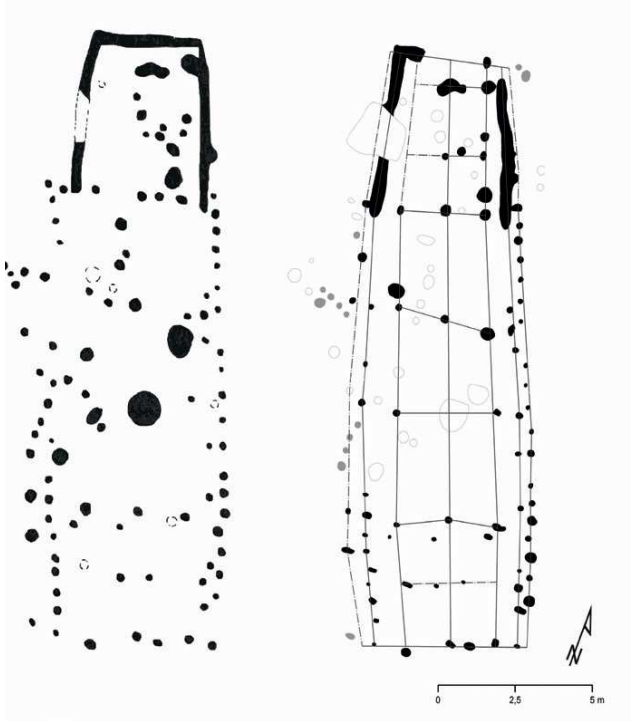


Fig. C2.2. Comparison of House 2 ground plan before (left) and after (right) the revision.

Ground Plan 1

Ground plan 1 was excavated only partially. The southern part of the house remained beyond the edge of overburden (Tab. 2.1). The dark infill of sunken features (trenches, postholes) present sharp contrast to the yellow tertiary clay (Fig. C2.3). The recorded part of the trapezoid ground plan was 15.8 m long and had an occupied area of 70.7 m2. The minimal house width measured at the northern gable wall was 4.6 m. The width of the ground plan at the edge of overburden was estimated to be 7.1 m. The rear and central sections were recorded, the existence of the front section remained doubtful.

A robust wall trench limited the northern rear section (length 4.3 m, area 21.5 m^2). The trench is slightly trapezoidal and orientated identically with the rest of the ground plan. Cross-sections in the western part revealed the dark "shadows" of the original wooden structures in the brown-yellow infill (Tab. 3.16). The central section of the house was preserved only in fragments, however, one inner transversal row arranged in an inverse "J" shape was recorded. The sidewall, constructed as doubled regular lines, was preserved only in the northwest part of the ground plan. Two posthole lines parallel to the house sidewalls represent the most remarkable component of Ground plan 1. The first line (postholes 144–155) was located by the eastern corner of the northern wall trench. Narrow trench 174, accompanying the simple line of postholes, was interrupted in the middle or recorded length. The trench was excavated only partially. The second line of postholes (852–861) was located by the opposite western house wall. The size and distance of postholes was very similar, but a trench did not accompany this line. These structures might indicate the existence of a fence or any other type of enclosure. Analogical situations were documented for example at the Jaroměř site, where the fence-like structures connected individual houses arranged in one row (Burgert 2015, houses 2 and 3). However, such a situation cannot be fully approved at Hrdlovka, because of the incomplete excavation of House 1 and the surrounding.

Location: Area SJ1b | Chronology: SBK II | Settlement horizon: Hrdlovka H

Fig. C2.3. Picture of the northern part of House 1 showing very good visibility of dark sunken structures in yellow tertiary clay.

Ground Plan 2

Ground plan 2 was well preserved and excavated in full extent (Tab. 2.2). The naviform house was 24.8 m long and occupied a total area of 162.9 m². The minimal width of 4.8 m was recorded at the northern gable wall. The maximal width of the ground plan was 7.3 m. All three house sections were identified, thus the ground plan can be classified as a *Grossbau* type (Modderman 1970), although the determination of the southern section is slightly questionable.

The northern rear section (length 6.5 m, area 35.4 m²) was limited by a slightly trapezoid wall trench, which was preserved only partially. The cross-sections of the eastern part recorded only a homogeneous dark infill (Tab. 3.20). The central section (length 13 m, area 91.6 m²) represents the largest part of the house. The spatial organisation of the inner post rows was quite loose and the postholes were generally smaller in diameter in comparison with other ground plans. It is questionable whether or not the skew arrangement of transversal row 277, 287A, 281 was intentional, because the deviation was not very strong. The front section (length 5.4 m, area 35.8 m²) was the smallest part of the ground plan.

Sidewalls were constructed by doubled lines of smaller postholes, which can be observed particularly in the eastern part. The western part was preserved rather fragmentarily. On the other hand, two regular lines of postholes accompanying the western side wall were recorded (270, 272, 273, 274, 275 and 239, 240, 241, 242). We consider them to be rather non-contemporaneous with the ground plan, because House 2 was located in the part of the excavated area with dense posthole patterns, even if similar rows were observed in the case of house 8 as well.

Location: Area SJ1a | Chronology: LBK IV/SBK I | Settlement horizon: Hrdlovka G

Ground Plan 3

The ground plan was well preserved and excavated completely (Tab. 2.3). It was 46.4 m long and occupied a total area of 361.5 m². It could thus be considered as one of the largest houses of the LBK and post-LBK cultural milieu (see Pechtl 2009b). The ground plan was rectangular, despite a slight difference between the northern (width 8 m) and southern gable wall (width 7.5 m). Taking into account the enormous length of the house, it may be an inadvertent deviation. Moreover, according to the principles of Neolithic architecture, the southern gable wall should be larger than the northern one in the case of trapezoidal ground plans. All three house sections were recorded, thus the house can be described as a *Grossbau* 1b type (Modderman 1970), a large tripartite house with a northern wall trench.

The northern rear section (length 14.5 m, area 114 m²) was limited by a trench, rectangular and orientated identically with the rest of the ground plan. Its western part slightly extends into the middle house section. In the northern wall trench postholes inserted into its body were identified. The postholes with a larger diameter were situated in the corners, the smaller ones between them at

a regular distance (as can be deduced from the situation in the southern part of the trench (Tab. 3.23). The trench was excavated by a method of longitudinal profiles, which did not provide such quality information as cross-sections used in other houses (e.g. 1, 12, 8). The central section (length 21.7 m, area 171.2 m²) was divided from the rear section by a corridor formed by inner transversal rows 403, 410 and 402, 404, 406. The posts in the central section are arranged in an inverse "J" configuration (Coudart 1998, Fig 13:3). Overall, the large size of the house was also mirrored in the particular inner postholes. The maximal recorded dimension reached even 1.25 m in diameter (Posthole 386). However the darker shadow of the original wooden post, which was clearly visible in contrast to the rest of the posthole infill, indicated that the post diameter itself varied between 40 and 45 cm. The front section was the smallest part of house 3 (length 10 m, 76.2 m²), however it still occupies a larger area than, for example, the one-sectional house 4.

The side walls were most probably doubled in their full length. The simple line pattern in the house front section seems to be caused by a different overburden depth, because this part was excavated in the season of 1989, unlike the rest of the ground plan excavated in the 1987 and 1988. Simultaneous use of simple and doubled walls at various house sections has, however, been also recorded (Brink-Kloke 1992, 62). The idea that a single line of postholes in the house front section indicated some lighter construction or an open space cannot be fully excluded (cf. Stäuble 2005, Coudart 2015). The dark "shadows" of side walls posts showed diameters between 15 and 20 cm. The southern wall was accompanied by two short projections called *antes*. An interesting detail is represented by one doubled posthole 1231 in the southern gable wall, which could be interpreted as reparation treatment, although it is also important to consider incoherent sands under the thin geological layer of the yellow clay, representing the bedrock in these locations. This situation could have forced builders to reinforce the construction.

Location: Area SJ1a, SJ1h | Chronology: LBK IV/SBK I | Settlement horizon: Hrdlovka F

Ground Plan 4

Ground plan 4 was excavated completely. The house was 11.1 m long, 5.8 m long and the interior occupied area was 66.1 m² (Tab. 2.4). Its construction was based on a rectangular shape without any observable sections, thus it can be assigned to the group of *Kleinbauten* (Modderman 1970). Three transversal rows in the interior were recorded, but only one (362, 353, 368) was completely preserved. The northeast part of the ground plan was damaged by sunken feature 392, but on its bottom the posthole of house 4 remained visible. Walls were well preserved in most parts of the perimeter. It was constructed as a single line of posts with a smaller diameter.

Location: Area SJ1a | Chronology: LBK IIIb | Settlement horizon: Hrdlovka C

Ground Plan 6

Ground plan 6 was excavated only partially. The northern part remained hidden beyond the trench edge. The recorded part was 23.5 m long. The house width fluctuated between 6.5 and 7.1 m, because only fragments of sidewalls were recorded (Tab. 2.5). The rectangular house was most probably divided into rear (unpreserved), central (length 16.7 m, area 111.3 m²) and front sections (length 6.8 m, area 48.3 m²), thus the house can be characterised as a *Grossbau* type (Modderman 1970). The inner transversal rows were mostly arranged regularly, but the inverse "J" arrangement in the central section and the bent row in the front part was also recorded. Despite the bad preservation statement of the sidewall, a single-line construction is assumed.

Location: Area SJ1a, SJ2h | Chronology: LBK IIIb | Settlement horizon: Hrdlovka C

Ground Plan 7

Ground plan 7 was recorded to a limited extent, the northwest part remained unexcavated (Tab. 2.6). The rectangular house was 9.2 m long and 5.8 m wide with a total area of 53.2 m². Its small dimensions point to a one-section division (*Kleinbau* type, Modderman 1970). The inner transversal rows

were preserved only in fragments, but their arrangement seems to be rather regular. The sidewalls were constructed as a single line of posts of smaller diameter. A grinding stone between the postholes 719 and 726 was found. Its arrangement could indicate *in situ* position, which might be interpreted as evidence of house floor niveau. However, any other evidence (further artefacts *in situ*, cultural layer) were not found.

Location: Area SJ 1a | Chronology: LBK IVa | Settlement horizon: Hrdlovka E

Ground Plan 8

The ground plan was excavated completely and it was well preserved (Tab. 2.7). It was 30.5 m long with a total area of 242.5 m^2. The ground plan represents the pseudo-rectangular type (Coudart 1998, Fig. 7:2) with a minimal width of 6.4 m and a maximal one of 8.3 m. All three sections were recorded. The northern section was small (length 3.7 m, area 24.2 m^2), divided from the central section by three robust postholes. This part, defined by the slightly trapezoid foundation trench, was asymmetrically joined with the rest of the house. The cross-sections of the trench yielded traces of wall construction, the dark soil "shadows" of original wooden elements (Tab. 3.34, Fig. C2.4). The central section (length 21.5 m, area 173.3 m^2) shaped the large robust space with several transversal post rows. A cluster of postholes was recorded, which was probably organised in a "Y" arrangement (Coudart 1998, Fig. 13:1), however one posthole is redundant. The front section was relatively small (length 5.3 m, area 43.3 m^2) and separated from the central section by a transversal post row, which was skew oriented to the main axis of the house. The sidewalls were formed by a single line of postholes.

The standard image of the Neolithic ground plan was accompanied by postholes forming regular line structures. A short row parallel to eastern wall was defined by postholes 1513, 1514, 1515, 1516 and 841, 840, 839 plus 835. Other shorter structures could be traced near the western wall created by postholes 922, 923, 924, 925 and 810, 811, 812, 813. Some posthole rows could also be observed within the frame of the ground plan of House 8 (e.g. 803, 805, 807). Therefore the association of these postholes lying in the direct vicinity and the house itself is questionable.

Furthermore, Ground plan 8 was spatially associated with Feature 838, where the extraordinary accumulation of 35 grinding stones and particularly their fragments took place. The sunken feature was a roughly oval settlement pit, maximally 50 cm deep, with a prolonged extension towards the northwest. The character of the infill could be described as a mixture of coarse yellow and dark brown gobbets. The bottom was straight and regular (Tab. 3.32). It constitutes a slightly banked plane from the southeast to the northwest. The grinding stones were arranged in the centre as a round structure in one layer starting ca. 10 cm beneath the infill upper limit and around 10–15 cm above the feature bottom.

Location: Area SJ1a, SJ1h | Chronology: SBK IVa | Settlement horizon: Hrdlovka J

Ground Plan 9

Ground plan 9 was recorded to a complete extent (Tab. 2.8). The house was 23.3 m long and 6.8 m wide occupying a total area of 159.4 m^2. The rectangular ground plan could be divided into rear (length 9.2 m, area 62.3 m^2), central (length 10.4 m, area 71.4 m^2) and front sections (length 3.7 m, area 25.7 m^2), which assigned the house to the group of *Grossbauten* (Modderman 1970). The northern wall trench delimiting the rear section was partially damaged by later sunken features. It was not excavated in the system of cross-sections. The spatial organisation of inner posts was regular with several evidences of doubling (postholes 67, 68, 628, 629, 632 and 633). The dense arrangement of inner transversal rows was observed in the rear and particularly front sections. Side walls were formed by a single line of loosely organised postholes.

Location: Area V1, V1a | Chronology: LBK IIIb | Settlement horizon: Hrdlovka B

Fig. C2.4. Cross-sections of the northern wall trench of House 8.

Ground Plan 10

Ground plan 10 was excavated to a complete extent, but the northern part was damaged by a later loam pit from the La Tène period. The house was 30.1 m long and maximally 7.1 m wide (Tab. 2.9). The ground plan had a naviform shape and central and rear sections were assumed (*Bau* type, Modderman 1970). Despite the distortion caused by the La Téne loam pit, some remains of the northern wall trench should be recorded, especially in the western part. Their absence may point to the construction of rear section walls by single postholes. The spatial organisation of bearing posts in the central section was regular. The side walls were preserved particularly in the southern part of the ground plan, where the navicular shape of the ground plan could be documented. Walls were constructed as a simple line of postholes of smaller diameter.

Location: Area SJ2a, SJ2h | Chronology: SBK II | Settlement horizon: Hrdlovka H

Ground Plan 12

Ground plan 12 was excavated completely (Tab. 2.10). The length of the house was 24 m, width 5.8 m with a total area 143.2 m^2. The rear (length 7.6 m, area 44.8 m^2) and central section (length 16.4 m, 98.4 m^2) of the rectangular house were recorded. According to these characteristics the house can be assigned as a *Bau* type (Modderman 1970). The ground plan of House 12 neighboured with Ground plan 42. Even both are very close to each other and similar in their length, orientation and share one longitudinal wall, the functional connection is not supposed and these houses are considered not to be contemporaneous.

The northern wall trench of House 12 was well preserved and delimited by the rear section, however it also partially intervened into the central section. The cross-sections of the trench allowed the distinguishing of the "shadows" of wooden construction from the rest of the infill (Tab. 3.37). The line of postholes accompanying the northern gable wall should also be noted. This construction is quite rare in Neolithic architecture. Irregularly distributed posts supported the central section of the house. Simple skew and bent rows (Pechtl 2010, Abb. 3) can be identified. Postholes 1595 and 1586 may document the strengthening of the construction or its reparation. The sidewalls were preserved only very fragmentarily, but we can assume a single-line construction.

Location: Area SJ2a, SJ2h | Chronology: LBK | Settlement horizon: unknown

Ground Plan 13

The remains of Ground plan 13 were recorded to a limited extent, because it was situated near the trench edge. Only the rear section delimited by the northern wall trench and two postholes in the interior were excavated. The length of the recorded remains was 11.5 m, width 5.5 m (Tab. 2.11). The house was most probably rectangular as suggested by the shape of the northern wall trench.

Location: Area SJ2a | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 14

The ground plan of House 14 was recorded only partially. The length of the preserved structure was 9 m, the house width was 6.8 m (Tab. 2.12). The excavated structure can be interpreted as a central section, thus the house can be reconstructed as a rectangular *Bau* or *Kleinbau* type (Modderman 1970). Inner post rows were preserved only in fragments, nevertheless suggesting a regular setting. The sidewalls were constructed as a single line of postholes.

Location: Area SJ2a | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 15

Ground plan 15 was recorded only partially. The rear section, represented by the trapezoidal northern wall trench and several postholes of the central section, was especially preserved. According to the preservation statement, the house length was estimated to be approximately 23.2 m. The width

of the northern wall was 5.3 m, the southern wall might be about 7.5 m wide (Tab. 2.13). The ground plan shape was most probably trapezoid, however, the combination of the rectangular central section with a trapezoidal rear section cannot be excluded. The contrast between the massiveness of the northern wall trench and a relatively small diameter of the postholes is remarkable. Traces of wooden constructions in the trench cross-sections marked by different infill colours were observed (Tab. 3.43). The position of Postholes 1146 and 1147 suggested that the sidewalls, which were not recorded at all, were constructed as doubled lines of postholes.

Location: Area SJ2a | Chronology: SBK II | Settlement horizon: Hrdlovka H

Ground Plan 16

The remains of Ground plan 16 were excavated only partially. The length of the recorded ground plan was 15.6 m and the house width was estimated to be 7.2 m (Tab. 2.14). The recorded structure most likely represents the central and particularly southern (front) section of a rectangular house. Only one complete transversal row in the house interior was preserved. The sidewalls were also excavated in a fragmentary statement. Despite this, the construction was determined as a simple line of postholes.

Location: Area SJ2a | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 17

Ground plan 17 was excavated completely. It is exceptional due to its construction in the context of the Hrdlovka site. The length of the naviform house was 29.7 m, the width of the rear wall 4.6 m and the front wall was 14.4 m wide (Tab. 2.15). The house area can be estimated to be 305.7 m^2. The ground plan was formed especially by two parallel sidewall longitudinal trenches. Postholes were recorded only exceptionally as projections of trenches or in their direction. In the house interior the postholes were completely missing, thus no internal division were observed.

Location: Area B | Chronology: SBK VIb | Settlement horizon: Hrdlovka K

Ground Plan 18

Ground plan 18 was preserved only partially. The length of the recorded part was 10.9 m and the width 8.5 m (Tab. 2.16.). The ground plan can be interpreted as the central section of a rectangular house. Two complete transversal rows in the house interior were preserved, evincing a regular setting of posts. Posthole 1263 can be seen as evidence of doubled posts or reparation. Sidewalls were constructed as a single line of posts.

Location: Area B | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 20

The preservation statement of Ground plan 20 was very poor. The length of the preserved fragment was estimated to be 8.9 m. The house width can be estimated to be ca. 5.5 m (Tab. 2.17). Only one fragment of inner transversal row of postholes and the remains of doubled sidewalls were identified. Other characteristics of the construction remain unknown.

Location Area B | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 22

The remains of Ground plan 22 were excavated only to the limited extent of a 3 m wide trench. Only a single sidewall posthole was preserved, therefore the house width could be only approximately estimated to 5 m (Tab. 2.18). Two transversal rows of inner bearing posts in an irregular setting could be observed. Due to the extent of the excavation, the original setting could not be determined.

Location: Area V4 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 23
The remains of Ground plan 23 were excavated only to the limited extent of the narrow linear area V3. The total length recorded was 3.7 m. The house width was estimated to be 6.7 m (Tab. 2.19), but the preservation statement was poor. The excavated part most likely represented the northern section of the house as Sunken feature 561 (northern wall trench) suggested. However, this situation can also be interpreted as sidewall trenches, which occurred in this period.

Location: Area V3 | Chronology: LBK I | Settlement horizon: Hrdlovka A

Ground Plan 24
The remains of Ground plan 24 were excavated only to the limited extent of the narrow linear trench. The total length of the ground plan was recorded as 4.2 m, the house width was estimated to be 6 m (Tab. 2.20). The house interior and western side wall were damaged by the sunken feature 571, thus only two inner postholes were recorded. On the contrary, the eastern sidewall, constructed as single line of postholes, was well preserved.

Location: Area V3 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 25
The remains of Ground plan 24 were excavated only to the limited extent of the narrow trench. The ground plan was preserved in a length of 3.6 m and a width of 6.2 m (Tab. 2.21). Most probably the house central section was uncovered. Three inner transversal rows were observed: one complete with an irregular bent setting (Pechtl 2010, Abb. 3:5) and two recorded in fragments. The sidewalls were constructed as a single line of posts.

Location: Area V3 | Chronology: LBK IIIb | Settlement horizon: Hrdlovka B

Ground Plan 26
The remains of Ground plan 26 were excavated only to the limited extent of the narrow trench. The total length recorded was 3.8 m. The postholes of sidewalls were not preserved, therefore the house width was only estimated to be circa 6.7 m (Tab. 2.22). The ground plan was created by 4 postholes of large diameter, which formed the inner post rows.

Location: Area V3 | Chronology: LBK | Settlement horizon: unknown

Ground Plan 27
The remains of Ground plan 27 were excavated only to the limited extent of the narrow linear trench. The total length of the ground plan was recorded to be 6.4 m. The house width was estimated to be 7.2 m (Tab. 2.23). Only the fragment of one inner post row and the remains of a sidewall were recorded, pointing to a doubled construction.

Location: Area V1 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 29
The remains of Ground plan 29 were excavated only in to the extent of the trench. The preserved length of the ground plan in narrow trench was maximally 6.5 m. The width of the house was estimated to be 6 m (Tab. 2.24). The part of the house central section was most probably recorded, where the irregular setting of inner posts could be identified, but due to the limited excavation, it was not possible to determine the type or setting ("Y" as well "pseudo-Y" are possible, Coudart 1998, Fig. 13). The inner organisation of the house front section was formed by dense transversal rows. Sidewalls were preserved only in fragments, therefore their construction cannot be determined.

Location: Area V1 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 31
The remains of Ground plan 31 were excavated only to the limited extent of Area V1. The recorded length of ground plan was 7 m. The house width was reconstructed to 6.5 m (Tab. 2.25). Only 5 postholes formed this ground plan, therefore no detail of construction could be identified.

Location: Area V1 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 35
The remains of Ground plan 35 were excavated only to the limited extent of the narrow trench. The length recorded was 3.9 m. The width was estimated to be 5.6 m (Tab. 2.26). The preservation statement was poor, but postholes of inner bearing posts and sidewalls postholes could be identified. These were extraordinarily large in diameter.

Location: Area V2 | Chronology: LBK | Settlement horizon: unknown

Ground Plan 36
The remains of Ground plan 36 were excavated only to the limited extent of the narrow trench. The total recorded length of the ground plan was 3.5 m, the width could be estimated to be approximately 6.2 m (Tab. 2.27). The excavated part most probably represented the remains of the northern rear and central sections. This was supported by the presence of the northern wall trench. The transversal row in the central section was irregularly organised, but the precise determination could not be performed.

Location: Area V2 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 37
The remains of Ground plan 37 were excavated only to the limited extent of a 3 m wide linear trench. The ground plan was formed by only 7 postholes. Despite this, the house width could be estimated to be 5 m (Tab. 2.28). The trapezoidal shape could not be excluded. The sidewalls were probably constructed as a single line of postholes.

Location: Area V2 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 38
The remains of Ground plan 38 were excavated only to the limited extent of the narrow trench. The ground plan was recorded to have a total length of 3.3 m and a width of 4.6 m (Tab. 2.29). The spatial organisation of the inner posts evinced a closer unspecified irregular setting. Sidewalls were most probably constructed as a single line of postholes.

Location: Area V2 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 39
The remains of Ground plan 39 were excavated only to the limited extent of area V2. The ground plan was recorded to have a length of 3.4 m. The width was 5 m (Tab. 2.30). The excavated part most probably represented the central house section. Only incomplete remains of the inner transversal rows were recorded. On the eastern side a single line construction of house wall was excavated, but the western wall suggested doubled construction.

Location: Area V2 | Chronology: SBK | Settlement horizon: unknown

Ground Plan 40
The remains of Ground plan 40 were excavated only to the extent of the narrow linear trench, therefore its total length was 3 m. The width can be estimated only approximately (4 m), because the sidewall was not preserved (Tab. 2.31). The ground plan was actually formed by only one complete and one partially preserved inner transversal row of postholes.

Location: Area V2 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 41

The Ground plan of house 41 was excavated completely, however, the preservation of the southern parts was poor. The recorded ground plan was 14.3 m long, with a minimal width of 6.4 m and maximal 6.6 m (Tab. 2.32.), therefore it might be trapezoidal in its shape. The excavated structure could be interpreted as a complete rear section without a northern wall trench and the remains of the central sections. The internal construction was based on regular inner post rows. The association of the large Posthole 1392 to the house ground plan was determined as doubtful. The outer walls were formed by the doubled lines of postholes in an irregular setting.

Location: Area SJ2a, SJ2h | Chronology: SBK | Settlement horizon: Hrdlovka I

Ground Plan 42

Ground plan 42 was excavated completely with a total length of 19.4 m. The house width could only be estimated in an interval from 6.4 to 6.9 m (Tab. 2.33), because we are facing a bad preservation statement. The western sidewall especially was probably destroyed during the building of House 12, which is closely adjacent. Even though both ground plans were very close in their length and orientation, the functional connection was not supposed and the houses are not considered to be contemporaneous.

In the rectangular Ground plan 42 all three house sections were recorded, which puts the house in the group of *Grossbau* types (Modderman 1970). The northern wall trench delimiting the rear section was preserved only partially. The inner rows of the central section evinced a regular setting, contrary to the front section, where the post rows are thick and formed by postholes with a large diameter.

Location: Area SJ2a, SJ2h | Chronology: LBK | Settlement horizon: unknown

Ground Plan 43

The ground plan was poorly preserved, therefore only some parts were recorded in a total length of 15.2 m. The house width could be approximately estimated to be 6.7 m (Tab. 2.34), but only a small part of the eastern sidewall was preserved. The shape of the ground plan remains unknown. The majority of the recorded postholes could be interpreted as remains of inner post rows, most probably from the house central section.

Location: Area SJ2a, SJ2h | Chronology: SBK | Settlement horizon: unknown

Ground Plan 44

Ground plan 44 was excavated completely (Tab. 2.35). The infill of sunken features was well visible in the yellow clay. The ground plan was 16.6 m long with a minimal width of 4.7 m and maximal 6.9 m, therefore trapezoidal in shape (type 4 according to Coudart 1998, Fig. 7). The house occupied a total area of 96 m^2. The rear (length 7.5 m, area 38.7 m^2) and central (length 9.1 m, area 57.3 m^2) house sections could be identified, assigning the building to the *Bau* type (Modderman 1970).

The rear section was limited by the wall trench, which is slightly trapezoidal and oriented identically with the central section. The northern wall trench was well preserved in the northern and western limit, where "shadows" of wooden construction represented by the dark soil contrasting with the lighter infill could be observed (Fig. C2.5), but the eastern part of the wall trench was missing. The postholes 1784, 1786 and 1787 were interesting, representing the inner transversal row implemented in the northern wall trench. The setting of the inner postholes was regular. The side walls were constructed by doubled lines of postholes as is shown by the poorly preserved part of the eastern wall.

This ground plan was tested using phosphate analysis. A one-meter phosphate sampling grid covered the whole interior of the building and its closest surroundings. In order to gain a more precise result, the grid inside the house was increased to half a meter.

Location: Area Z3, Z3a | Chronology: LBK IV/ SBK I | Settlement horizon: Hrdlovka F

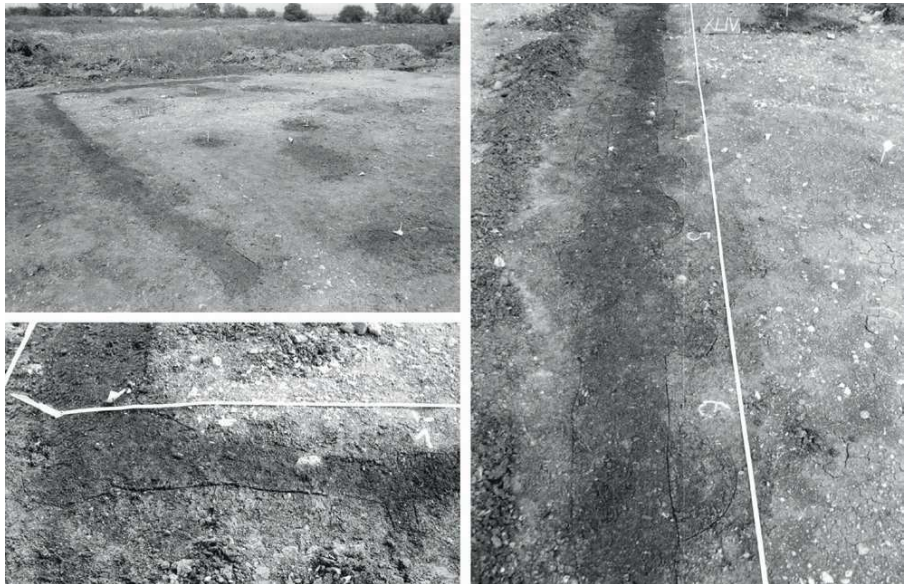


Fig. C2.5. Details of the northern wall trench of Ground plan 44.

Ground Plan 45

The remains of Ground plan 45 were excavated to the limited extent of the linear area V3 in the length of 3.8 m. The width of the ground plan could be estimated to be 5.9 m (Tab. 2.36.). Only the northern wall trench with posthole projections was recorded. No other structures were recorded. The acute angle in the eastern corner of northern wall trench should be noticed.

Location: Area V3 | Chronology: Neolithic | Settlement horizon unknown

Ground Plan 46

The remains of Ground plan 46 were excavated only in the frame of the narrow linear trench. The ground plan had a length of 3.5 m, the width could be estimated to be 5.8 m (Tab. 2.37). The preservation statement was very poor, only one incomplete inner transversal row and two postholes were identified as remains of the eastern sidewall.

Location: Area V3 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 47

The ground plan was excavated to the extent of the narrow linear trench, therefore it was observable only in the length of 3 m. The width was 5.5 m (Tab. 2.38). The ground plan is formed by only 5 postholes, but it is possible to reconstruct one fragmentary inner transversal row and the remains of both sidewalls. The setting of western wall postholes might point to a doubled construction.

Location: Area Z1 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 48

The remains of Ground plan 48 were excavated only partially at the end of Area Z1. The length of the excavated part reached 2.9 m (Tab. 2.39). The width was determined to be approximately 5.9 m, because only the western wall was recorded. It was constructed by a single line of postholes.

Location: Area Z1 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 50
Remains of the ground plan were recorded only to the extent of the 3 m wide trench. The width of the house was about 6.1 m (Tab. 2.40). The ground plan was formed by one complete inner transversal row and two postholes considered to be part of the sidewalls. Their diameter was surprisingly higher than in the case of the inner postholes, but the ground plan was documented only in the 1:100 scale, therefore there could be some distortion.

Location: Area Z4 | Chronology: LBK | Settlement horizon: unknown

Ground Plan 52
The remains of Ground plan 52 were excavated only to the extent of the narrow linear trench. It was formed only by three postholes, which are interpreted as parts of the sidewalls. Despite the poor preservation statement, the structure was recognized as a ground plan during the Hrdlovka site revision. The house width was 7.2 m (Tab. 2.41).

Location: Area Z4 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 53
The ground plan was excavated only to the extent of the 3 m wide trench. The house width could be estimated to be circa 6.2 m (Tab. 2.42). The excavated part most probably represented the bordering part of the northern and central house sections. A small part of the northern wall trench and remains of inner rows were recorded. Two postholes on the eastern side may indicate a doubled construction of the outer walls.

Location: Area Z4 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 54
Remains of Ground plan 54 were excavated to the extent of the narrow linear trench. Only the three postholes forming the house inner post row were recorded, therefore the house dimensions were hard to reconstruct. We can only suppose that the width exceeded 4 m (Tab. 2.43).

Location: Area Z4 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 55
The remains of Ground plan 55 were excavated only partially to the extent of the narrow linear trench in the length of 3.2 m. The width of the ground plan could be estimated to be 5.7 m (Tab. 2.44). One inner transversal post row was completely preserved and also two postholes, which seemed to mark the sidewalls.

Location: Area Z4 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 57
The remains of Ground plan 57 were excavated only to the extent of the 2.5 m wide trench (Tab. 2.45). The width of the house exceeded 6 m, but the precise dimension could not be reconstructed, because the sidewalls were not recorded. Only three postholes forming one inner transversal row were preserved.

Location: Area Z4 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 59
The ground plan was excavated only to the limited extent of the 2.5 m wide trench, however some characteristics of the construction could be observed (Tab. 2.46). The house was about 6.9 m wide. The internal construction, represented by two complete rows, was based on mostly massive bearing posts. Doubled walls were preserved on both sides of the ground plan.

Location: Area Z2 | Chronology: LBK IIIb | Settlement horizon: Hrdlovka C

Ground Plan 60
The ground plan was excavated only partially, in the frame of the 2.5 m wide linear trench. The width of the well-preserved ground plan was 6.1 m (Tab. 2.47). One complete inner post row and the remains of a second inner post row were recorded. Both sidewalls could be reconstructed as single-line constructions. The ground plan was most probably rectangular in its shape.

Location: Area Z2 | Chronology: LBK VIa | Settlement horizon: Hrdlovka E

Ground Plan 61
The remains of Ground plan 61 were excavated only to the limited extent of the 2.5 m wide trench. The house width was about 5.4 m, but the eastern wall was missing (Tab. 2.48). The recorded inner post row might be organised in a closely unspecified irregular setting. The preserved part of the western wall pointed to a single-line construction.

Location: Area Z2 | Chronology: LBK I | Settlement horizon: Hrdlovka A

Ground Plan 62
The remains of Ground plan 62 were excavated to the limited extent of area Z2, thus only a 2.5 m long fragment was recorded. The house width could be estimated to be circa 6.2 m (Tab. 2.49). Two inner post rows were preserved. The southern one seemed to evince an irregular setting, however the original shape could not be determined due to the incomplete excavation.

Location: Area Z2 | Chronology: LBK IIIb | Settlement horizon: Hrdlovka B

Ground Plan 63
The ground plan was excavated to the extent of the narrow trench, thus the recorded part was only 2.5 m long. The house width was estimated to be circa 6 m (Tab. 2.50). In the interior only one incomplete post row was preserved. The doubled construction of the wall could be documented in the western side of the ground plan.

Location: Area Z2 | Chronology: LBK IIIb | Settlement horizon: Hrdlovka C

Ground Plan 64
The remains of Ground plan 64 were excavated only to the extent of the narrow linear trench, therefore only the 2.5 m long part was recorded. The house was 5.5 m wide (Tab. 2.51). The ground plan was created by just 5 postholes, which did not enable studying any details of the construction.

Location: Area Z2 | Chronology: LBK IIIb | Settlement horizon: Hrdlovka C

Ground Plan 65
The remains of Ground plan 65 were excavated only to the extent of the 2.5 m wide trench. The ground plan width was 6.7 m (Tab. 2.52). The inner part was destroyed by later sunken features. The well preserved western wall evinced a single-line construction.

Location: Area Z2 | Chronology: LBK IIIb | Settlement horizon: Hrdlovka B

Ground Plan 66
Ground plan 66 was excavated to the extent of the narrow trench, thus the recorded part was only 2.5 m long. The house width was estimated to be 6.2 m (Tab. 2.53). One incomplete post row and one large posthole were recorded in the interior of the house. These were considered to be part of the ground plan, however, its affiliation is doubtful. The well preserved eastern wall was constructed as a single line of posts.

Location: Area Z2 | Chronology: Neolithic | Settlement horizon: unknown

Ground Plan 67
Only the southern end of the ground plan was excavated, the rest remained out of the trench borders. The length of the excavated part was 3.3 m, the width of the ground plan could be estimated to be 5.3 m (Tab. 2.54). The internal construction was based on 3 rows of bearing posts. The weakly preserved western wall might point to the single-line construction.

Location: Area Z5, Z5-3a | Chronology: LBK IVa | Settlement horizon: Hrdlovka E

Ground Plan 69
The remains of Ground plan 69 were excavated to the limited extent of Area Z5. Only one inner post row was recorded (Tab. 2.55). The house width could be estimated to be circa 6 m, the outer walls were not identified. The length of the excavated part in the trench was 3.1 m.

Location: Area Z5 | Chronology: LBK IIIb | Settlement horizon: Hrdlovka C

Ground Plan 70
The ground plan was excavated in the frame of two areas, which might cause different levels of preservation. The excavated fragment of the ground plan could be interpreted as the central section of the longhouse. Postholes which were more southern were not preserved, therefore the southern end of the longhouse is missing. Posthole 2017 pointed to the first possibility. The length of the excavated part was 8 m. The width of the house could be estimated to 6, 6 m (Tab. 2.56). The internal construction was based on 3 regular post rows. The fragment of the western wall evinced the construction of single posts line.

Location: Area Z5. Z5-3b | Chronology: LBK IVa | Settlement horizon: Hrdlovka D

Ground Plan 72
The ground plan of House 72 was preserved only fragmentarily. The estimated dimensions were 9.5 m in length with a width of circa 5.6 m (Tab. 2.57). Despite the bad preservation statement (11 postholes in total), the ground plan might be interpreted as a rectangular house with only one section (*Bau* type, Moddermann 1970) and single-line walls. The postholes creating the ground plan were overall small in diameter.

Location: Area Z5-3a | Chronology: LBK IVa | Settlement horizon: Hrdlovka D

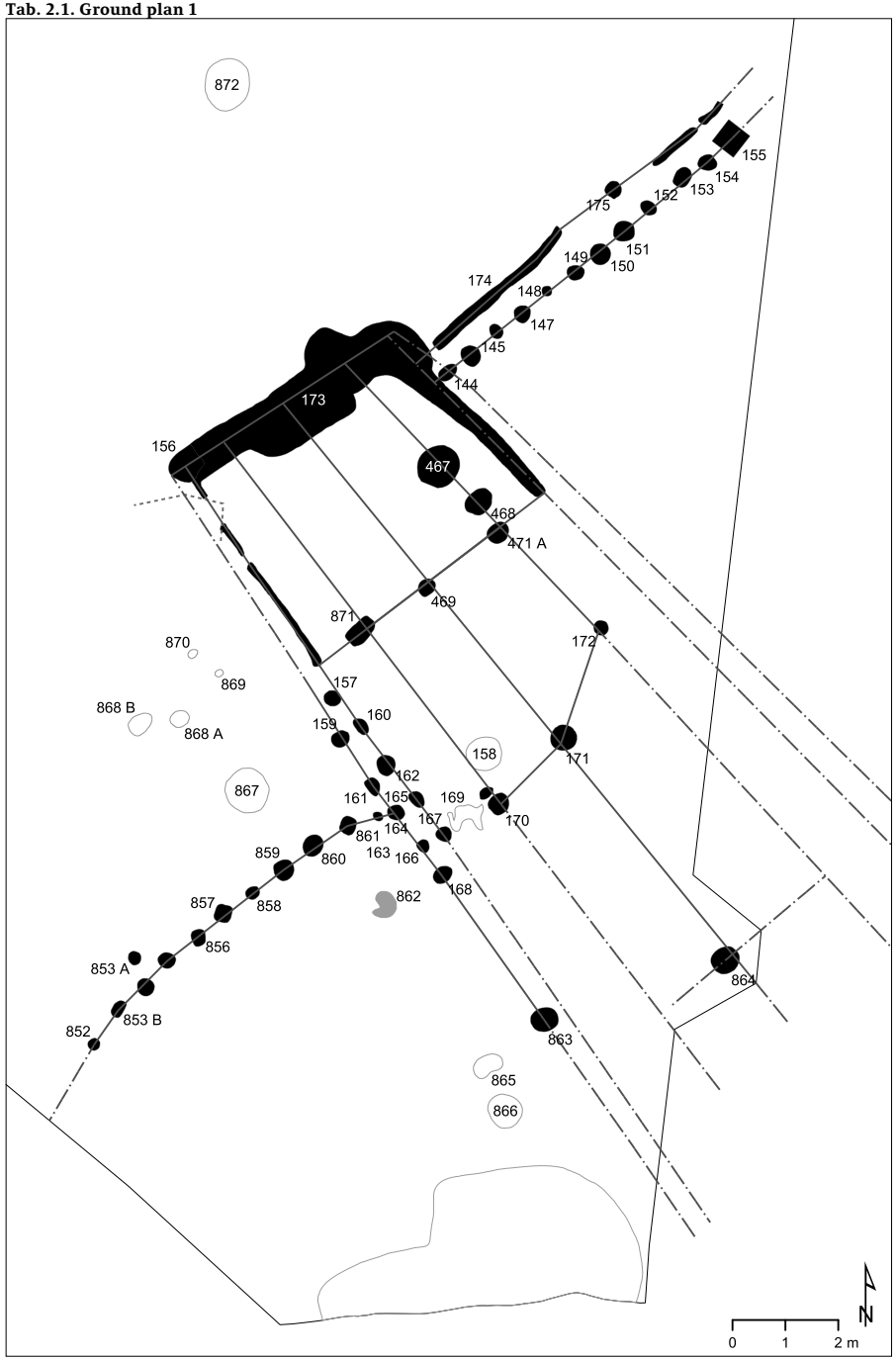
Ground Plan 73
The ground plan of House 73 was not completely preserved. The recorded fragment, which was 10.9 m long and 5.5 m wide, could be most probably interpreted as the central section of the longhouse (Tab. 2.58). The existence of the front and rear sections was doubtful. The rectangular construction of the house was based on 3 inner post rows. The position of the bearing postholes in the central section seemed to be in an inverse "J" setting (Coudart 1998, Fig. 13) or a deformed "Y" typical for the Bavarian region (Pechtl 2010, Abb. 3:7). The outer walls seemed to be constructed by doubled lines of posts, however, the evidence is weak.

Location: Area Z3, Z3a, Z5-3a | Chronology: LBK IV | Settlement horizon: unknown

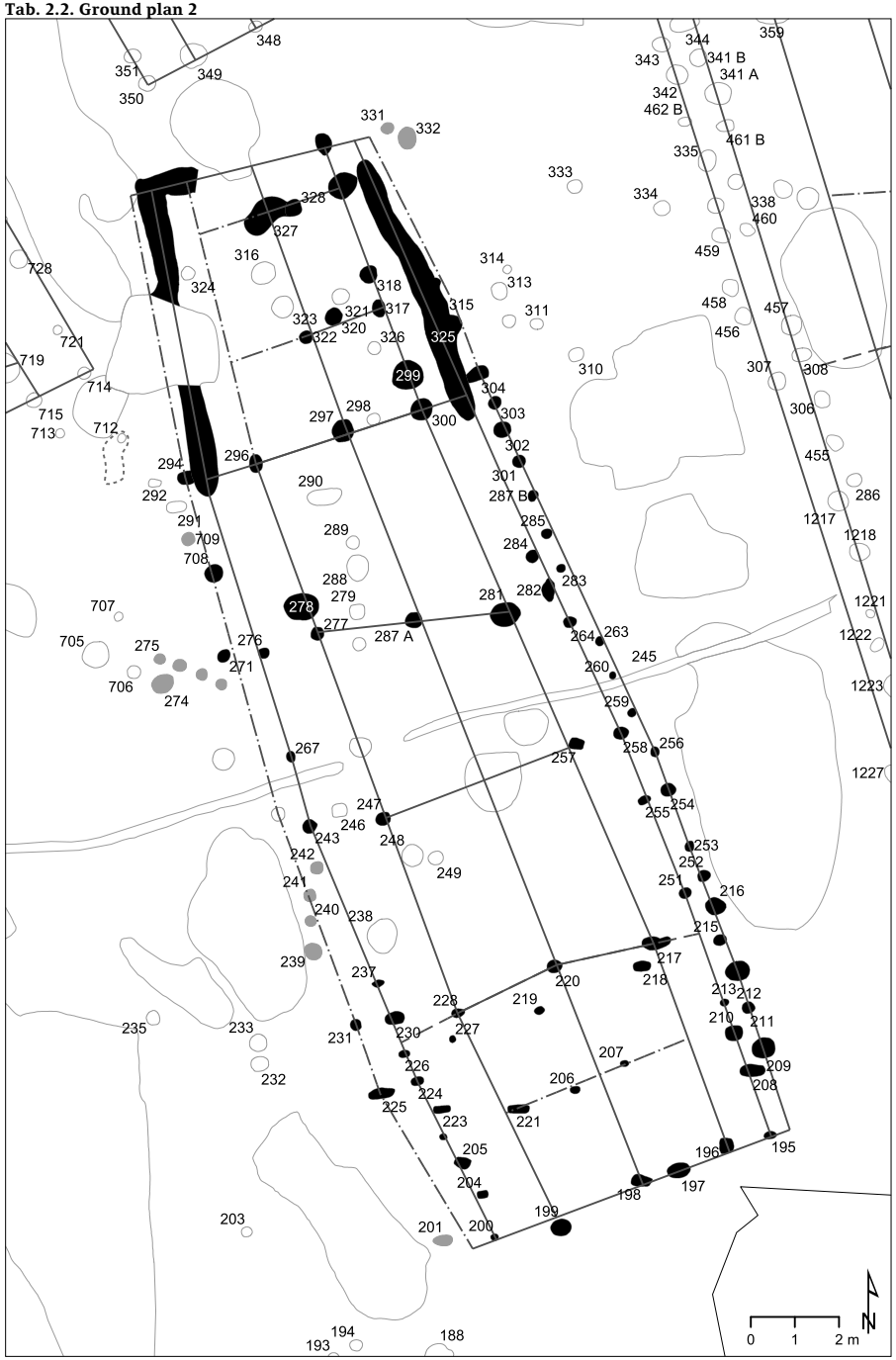
Ground Plan 75
The remains of Ground plan 75 were excavated only in its western part, because a large area of the house plan was damaged by chronologically later features. The length of the excavated ground plan part was approximately 8 m. Also the width could only be estimated to be ca. 6 m, because the eastern wall was missing (Tab. 2.59). It was only possible for us to reconstruct the outer western wall, which was constructed as a single posts row and a fragment of one inner transversal row.

Location: Area V1a | Chronology: Neolithic | Settlement horizon: unknown

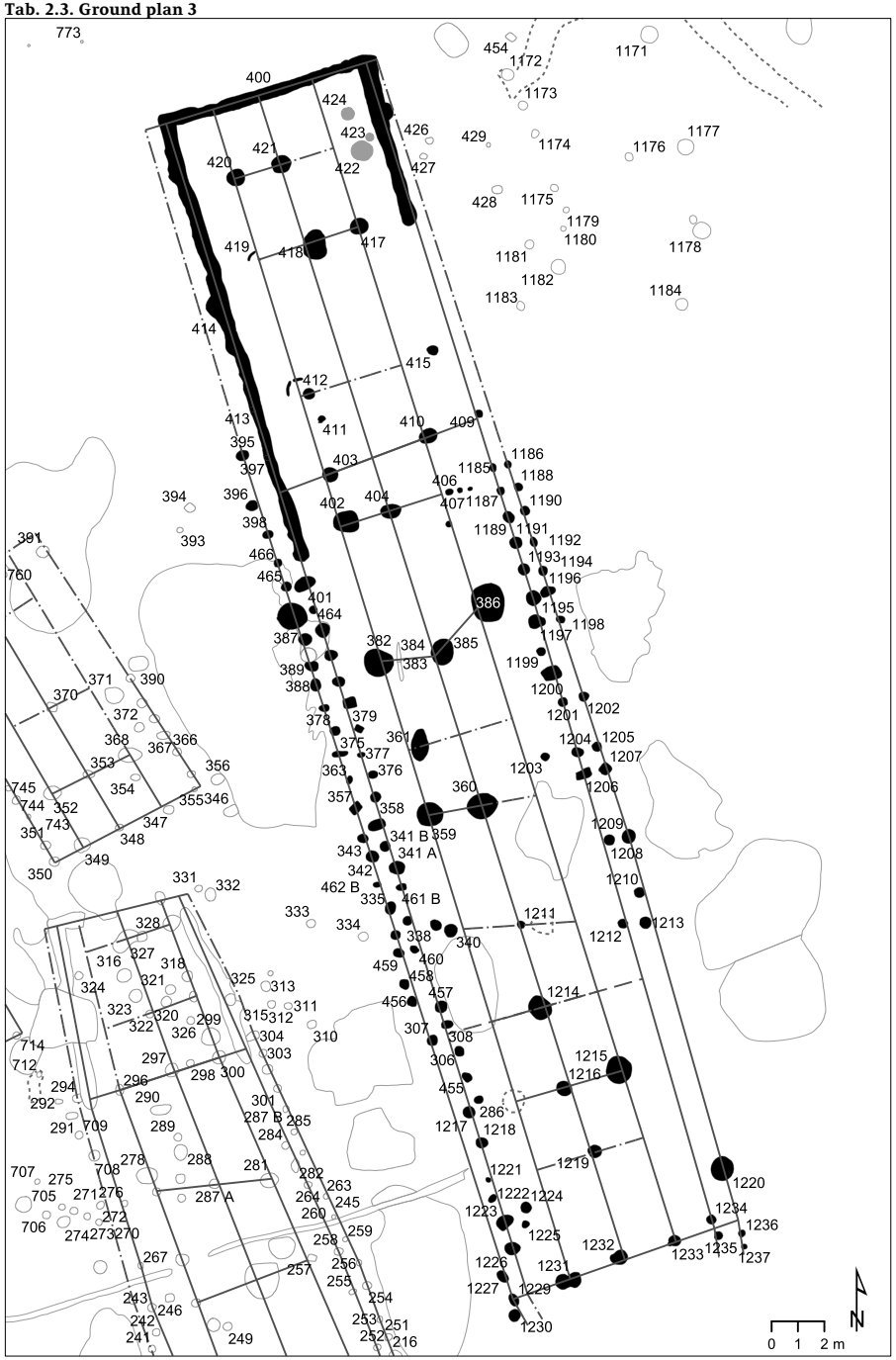
Tab. 2.1. Ground plan 1



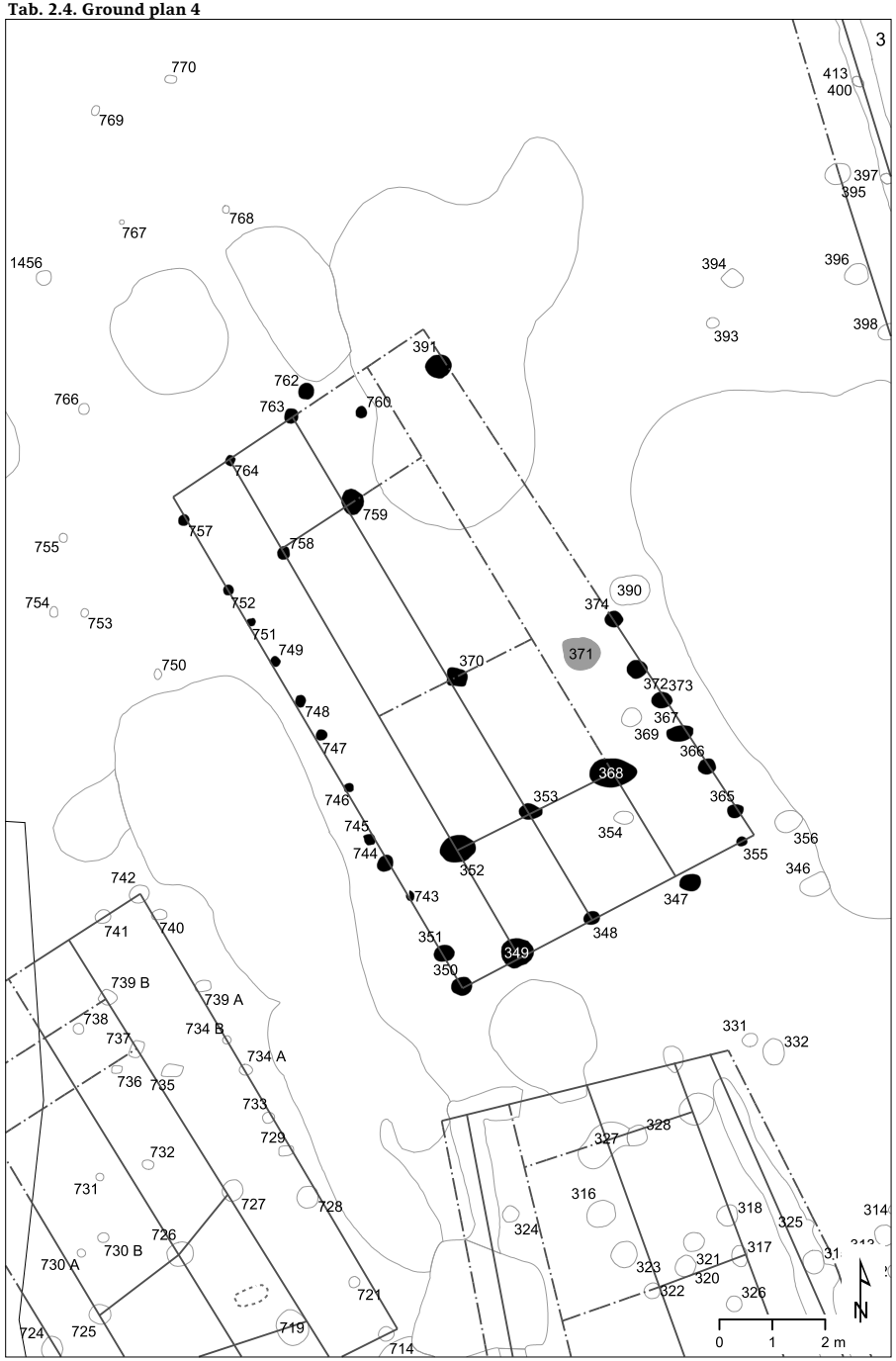
Tab. 2.2. Ground plan 2



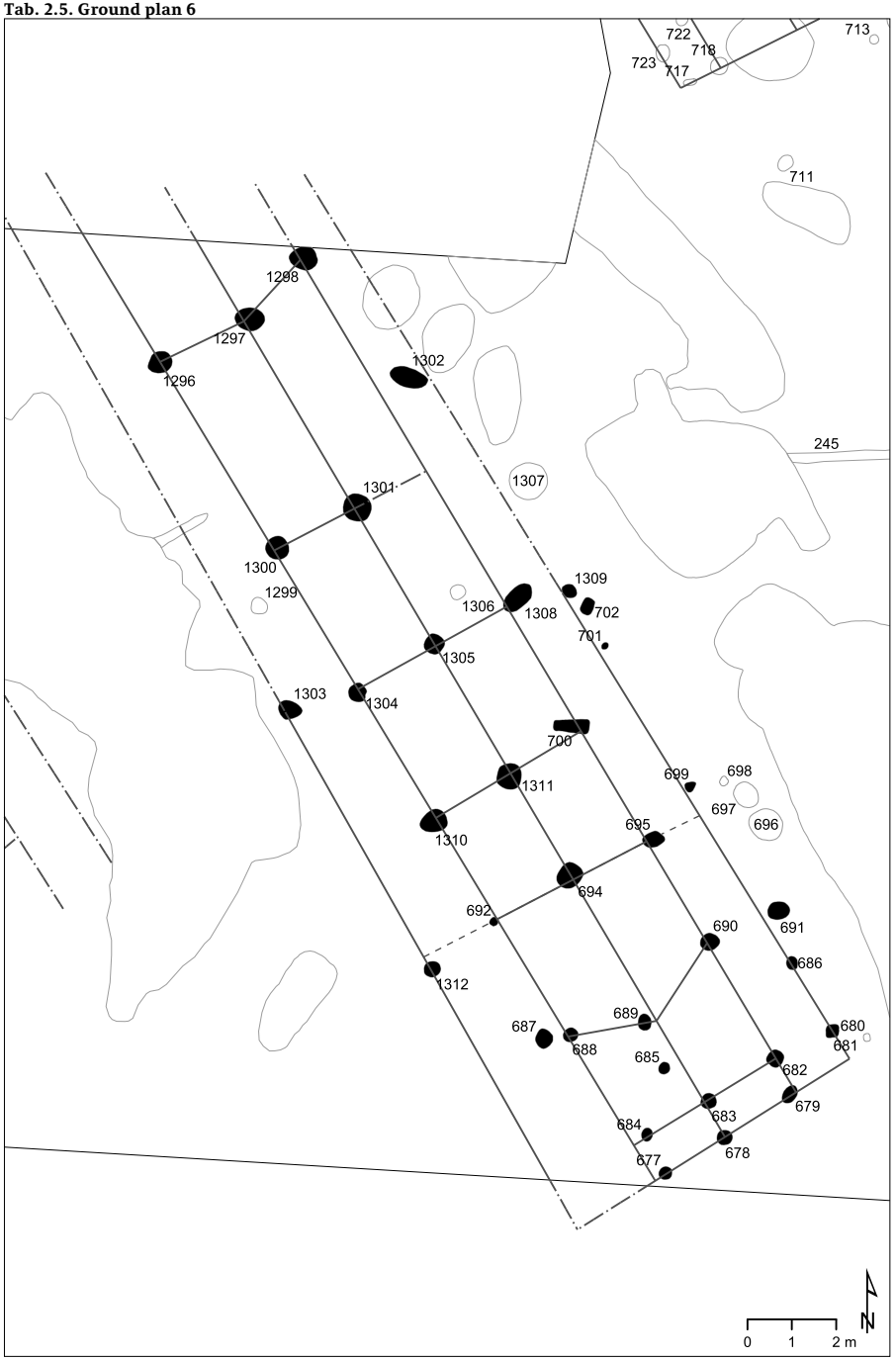
Tab. 2.3. Ground plan 3



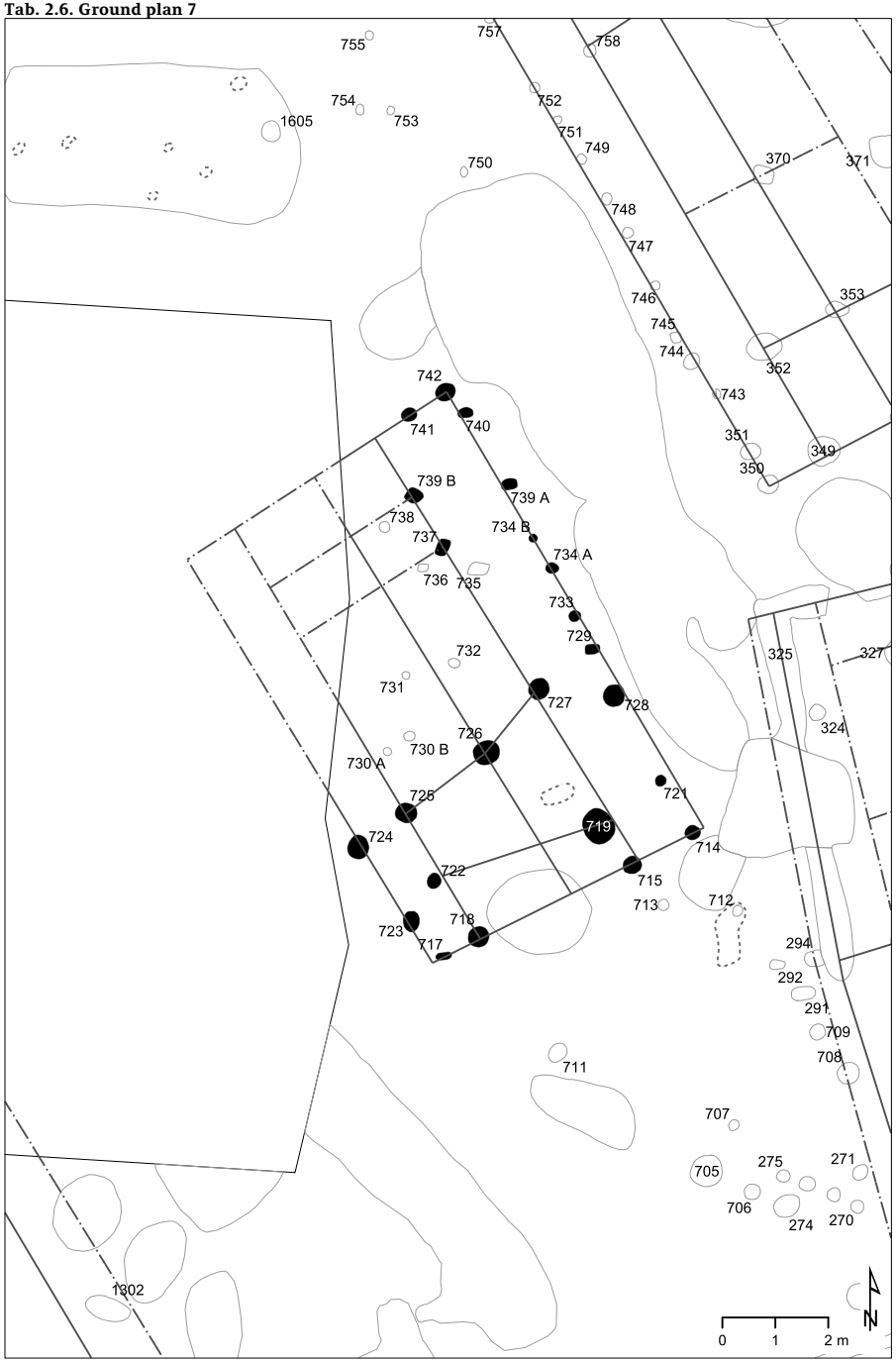
Tab. 2.4. Ground plan 4



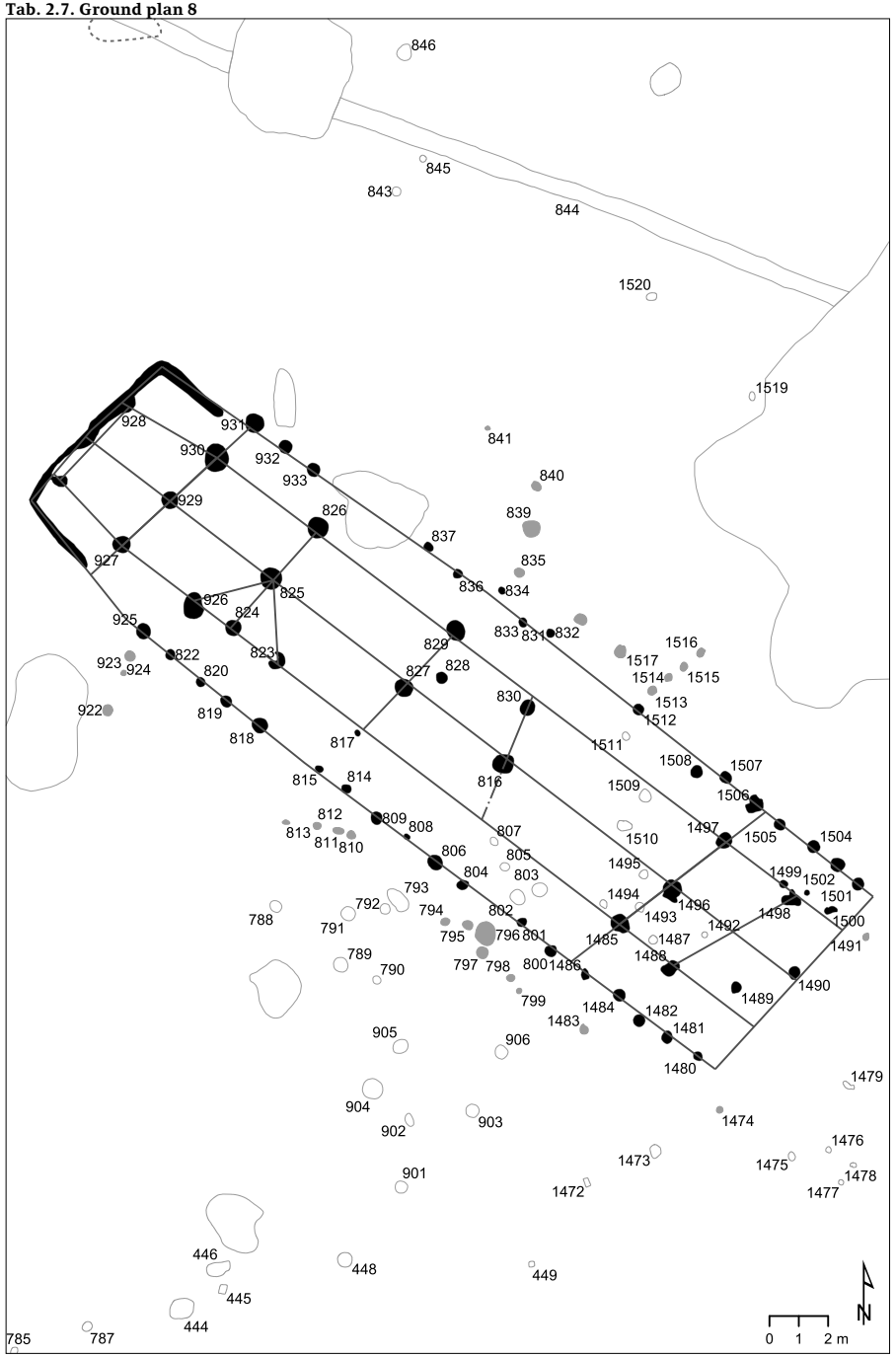
Tab. 2.5. Ground plan 6



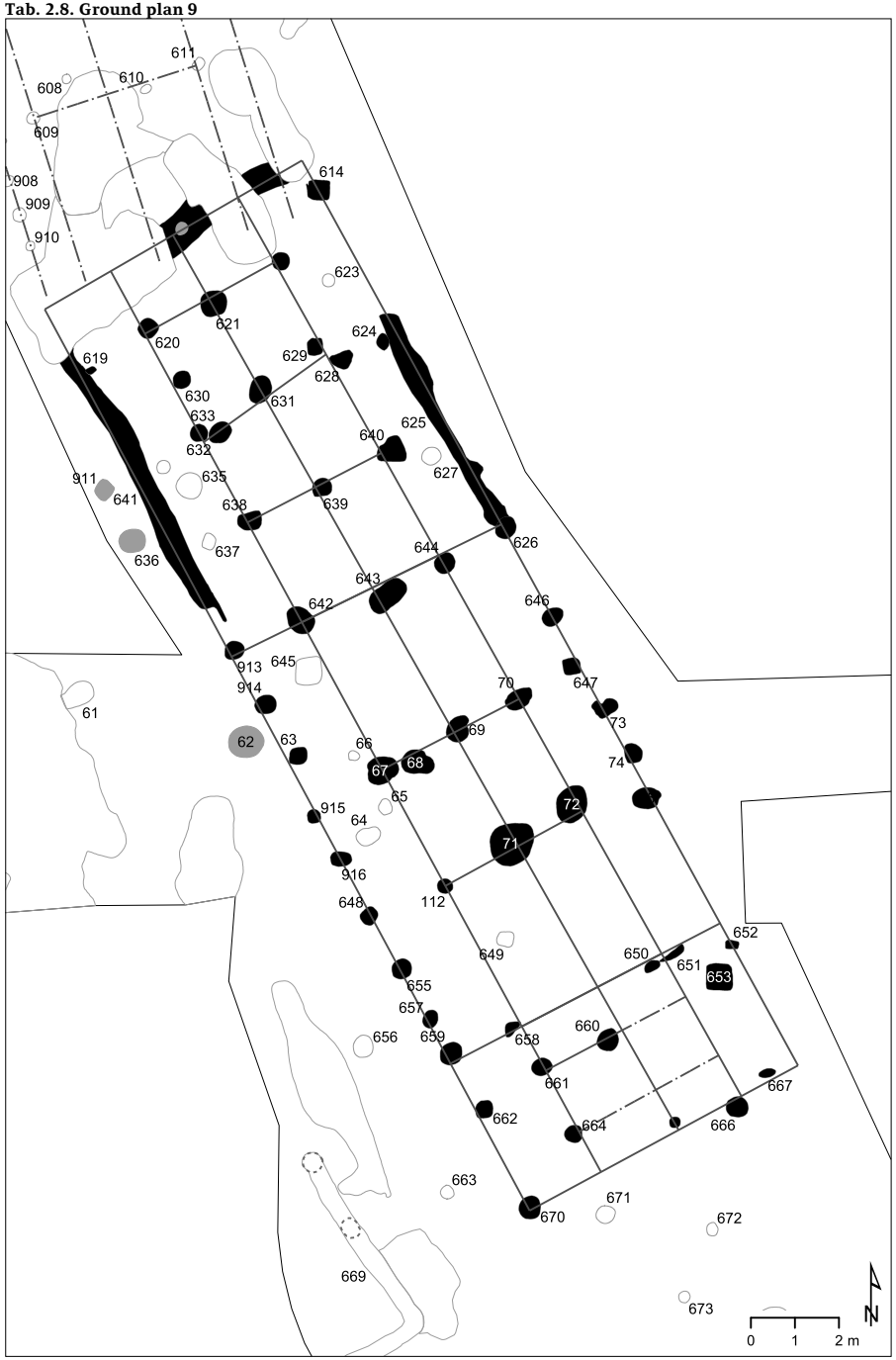
Tab. 2.6. Ground plan 7



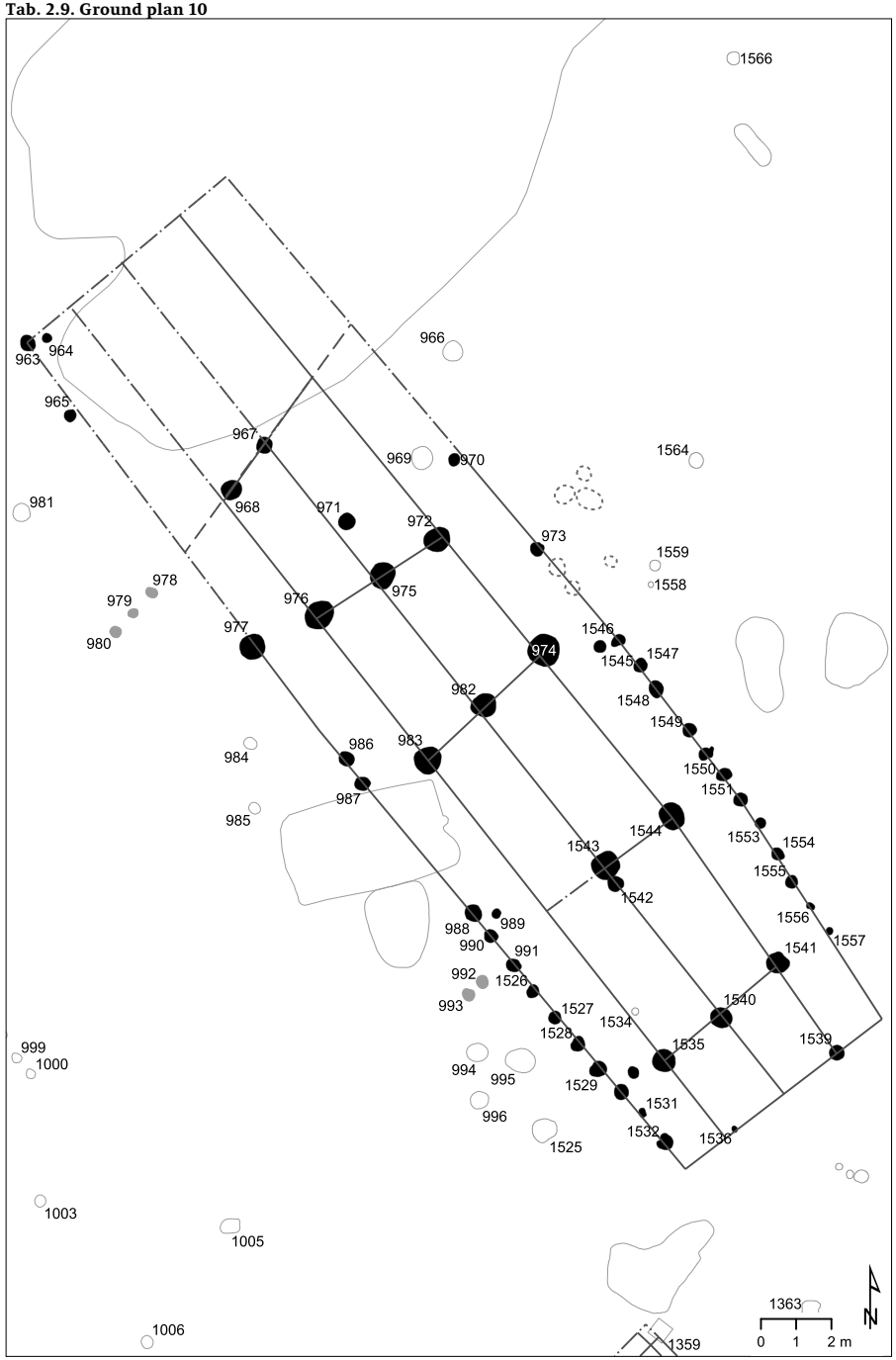
Tab. 2.7. Ground plan 8



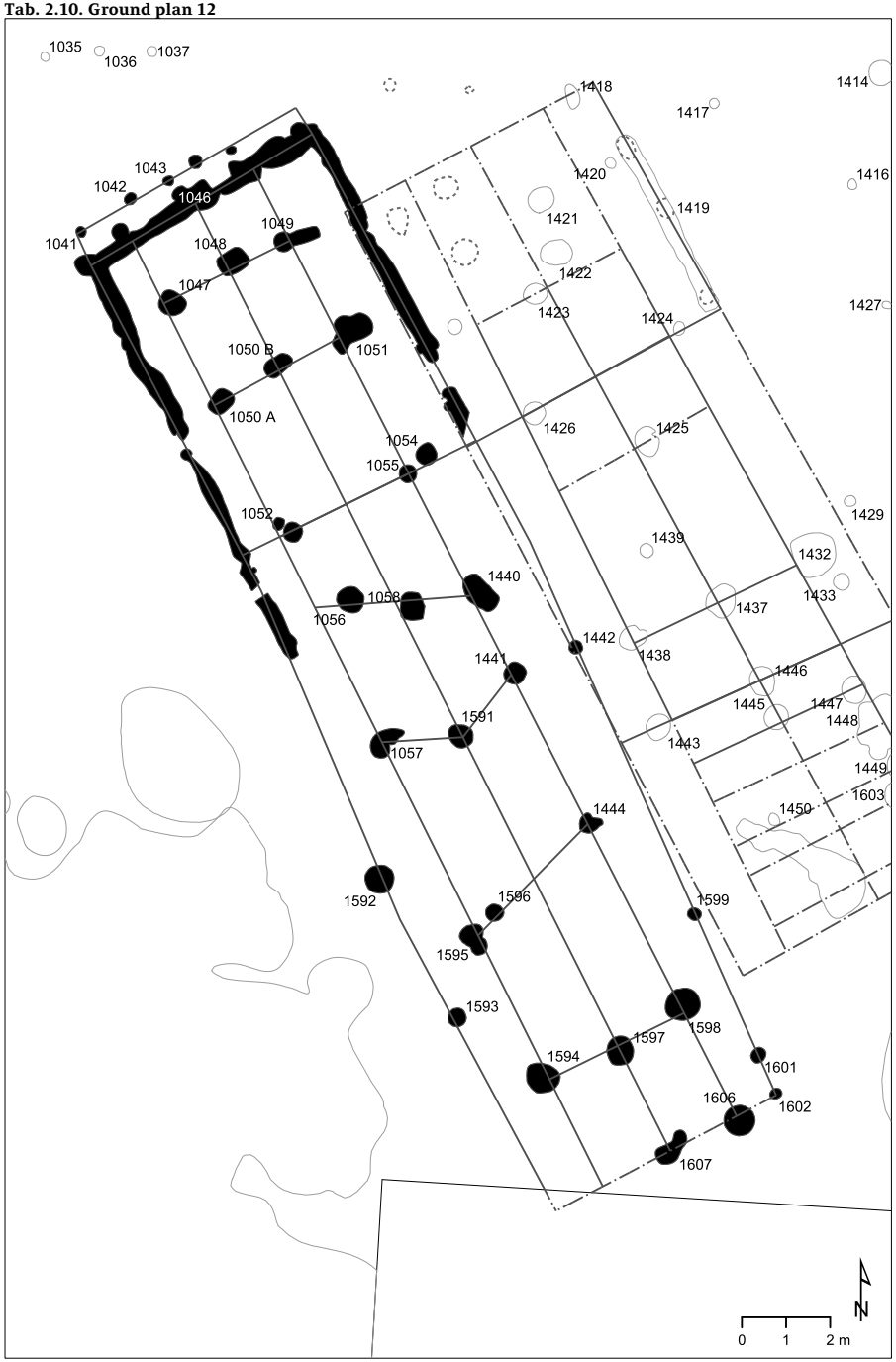
Tab. 2.8. Ground plan 9



Tab. 2.9. Ground plan 10



Tab. 2.10. Ground plan 12



Tab. 2.11. Ground plan 13

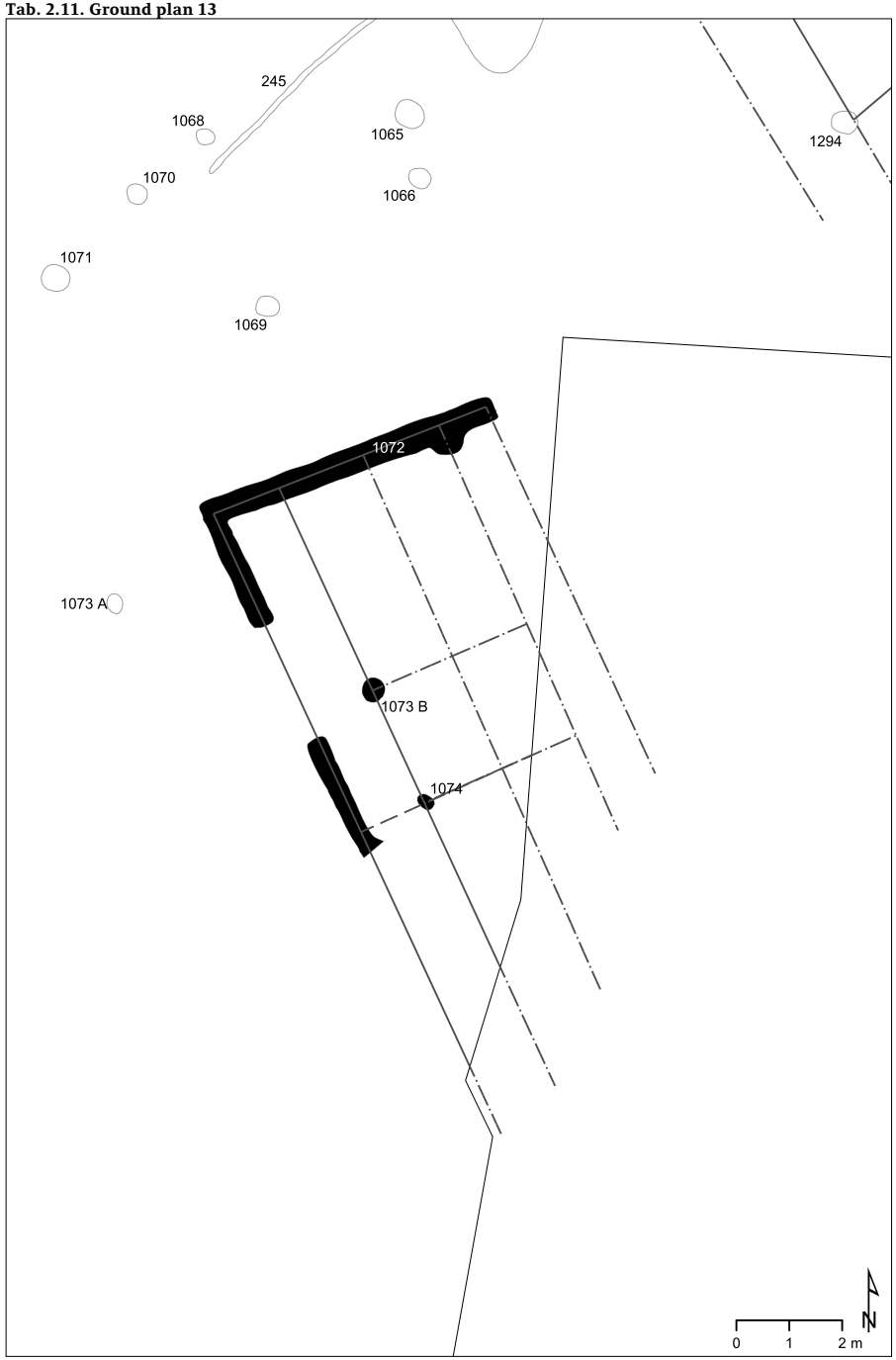
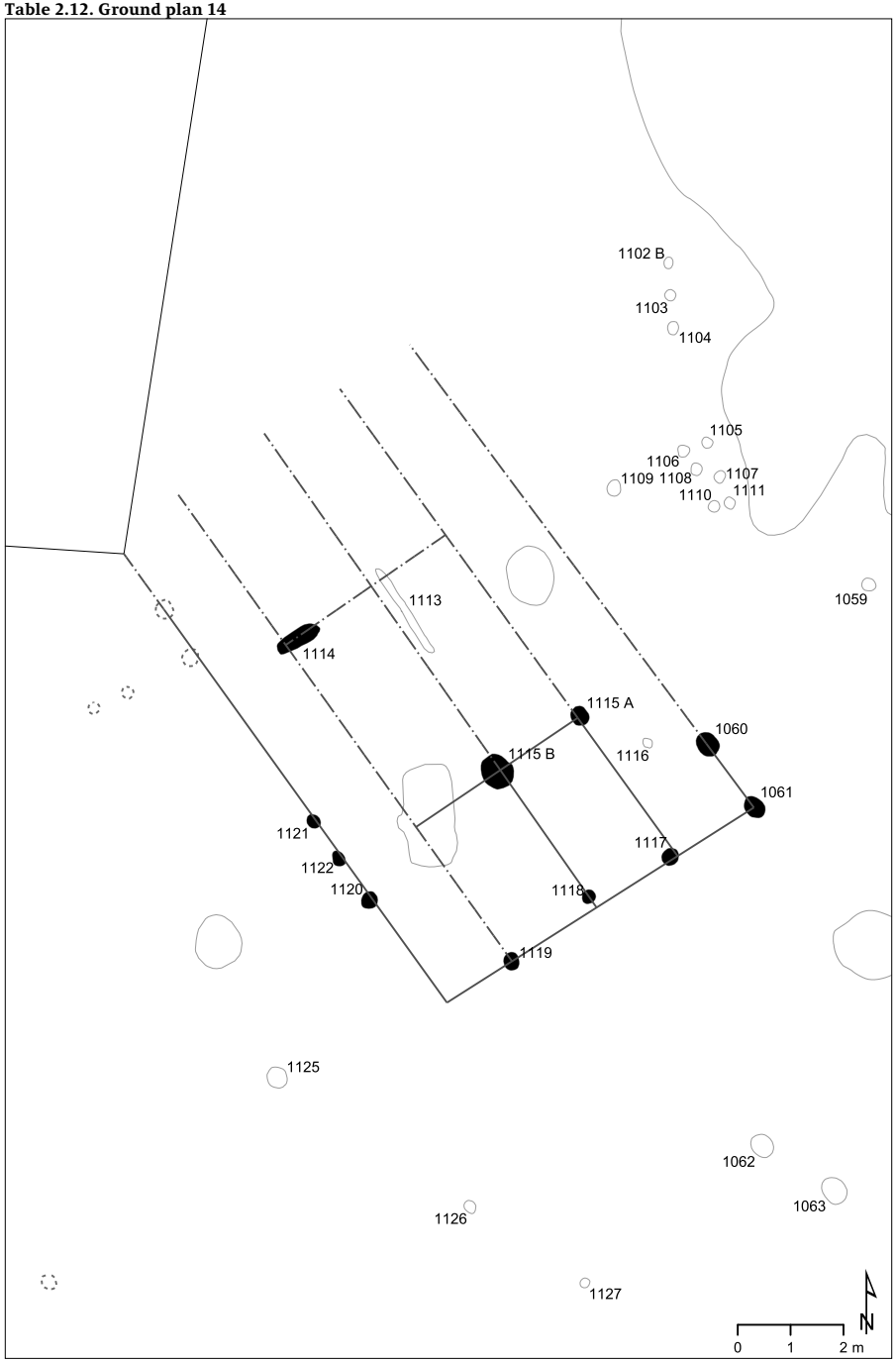
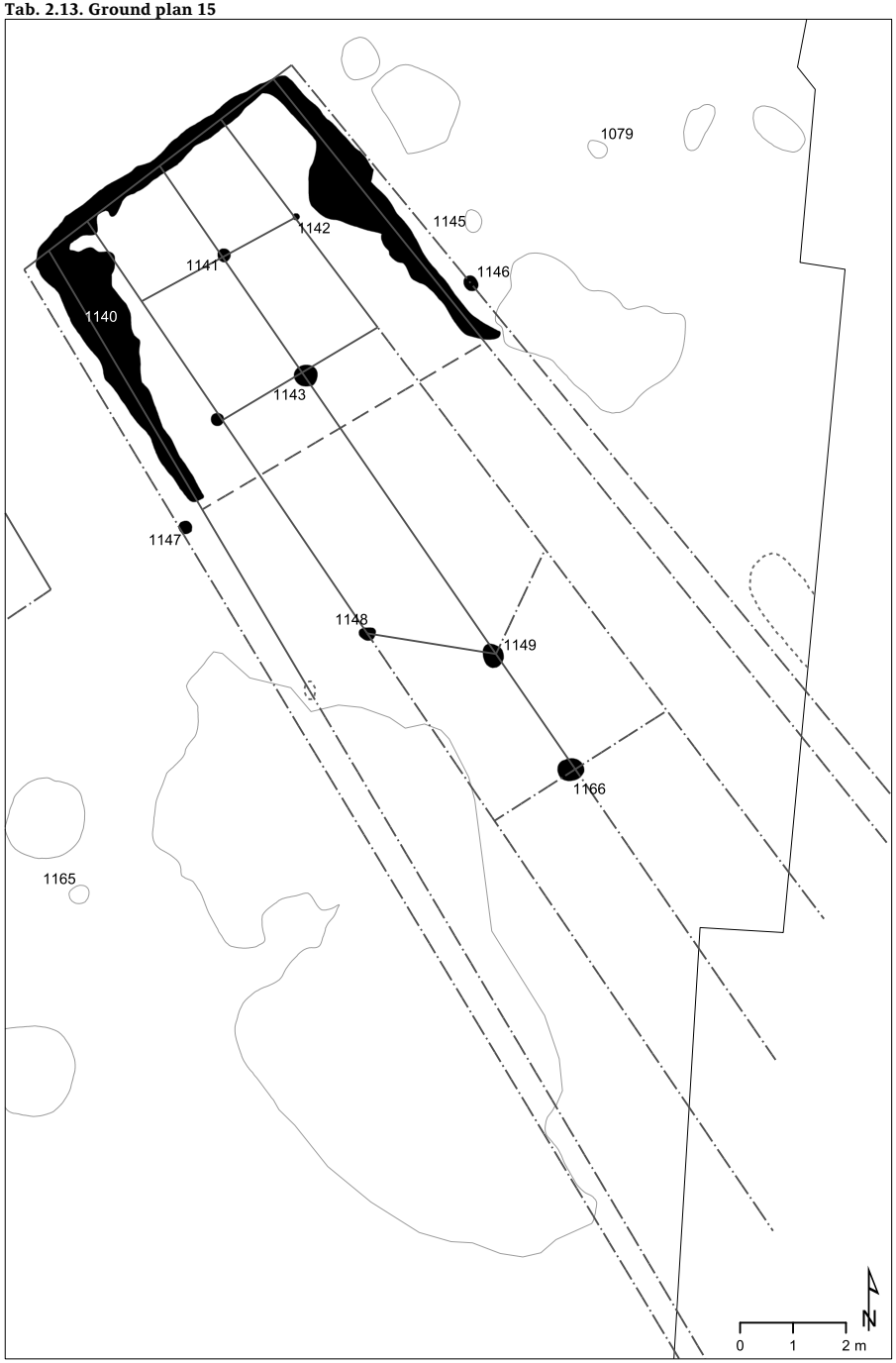


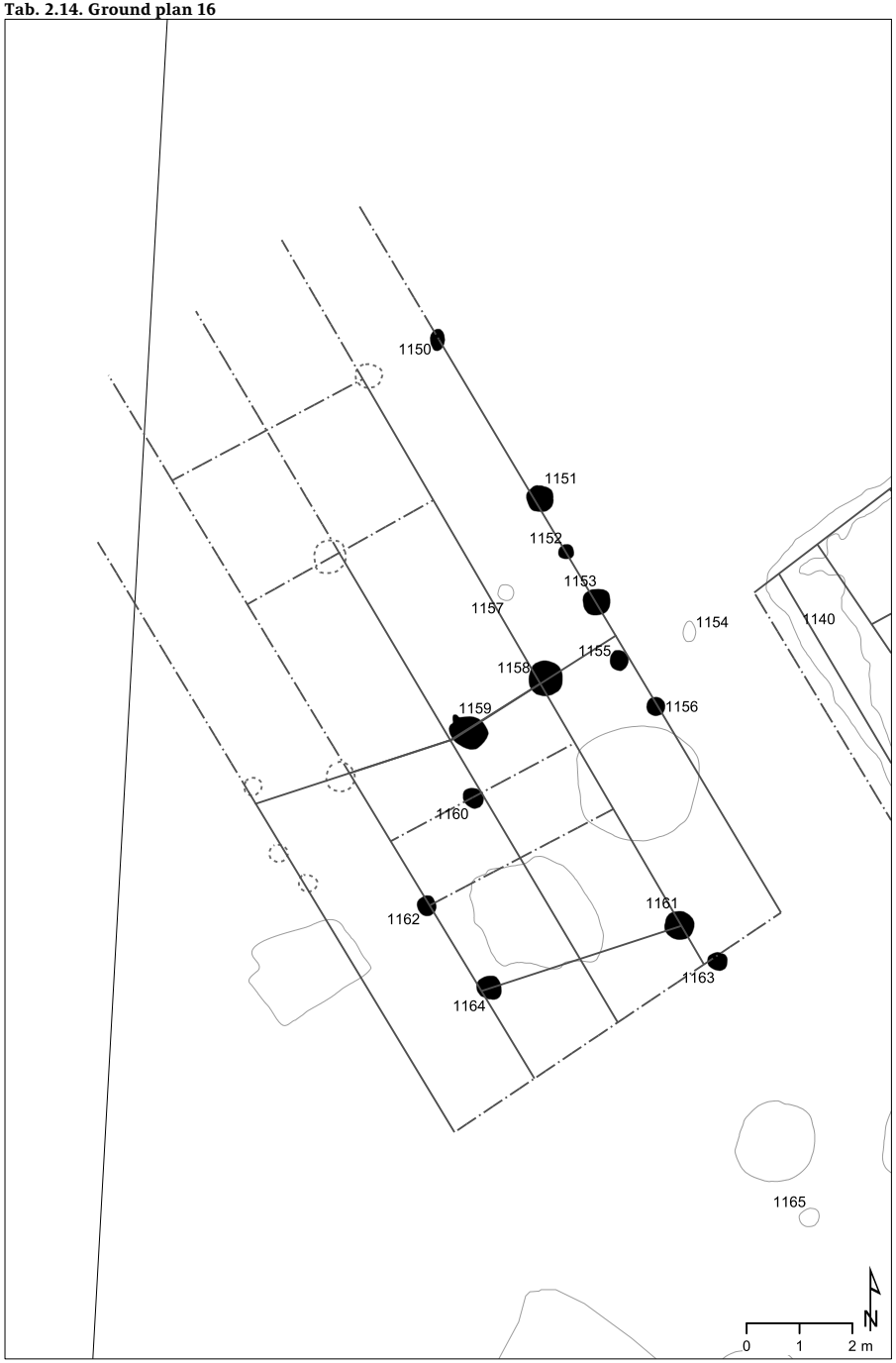
Table 2.12. Ground plan 14



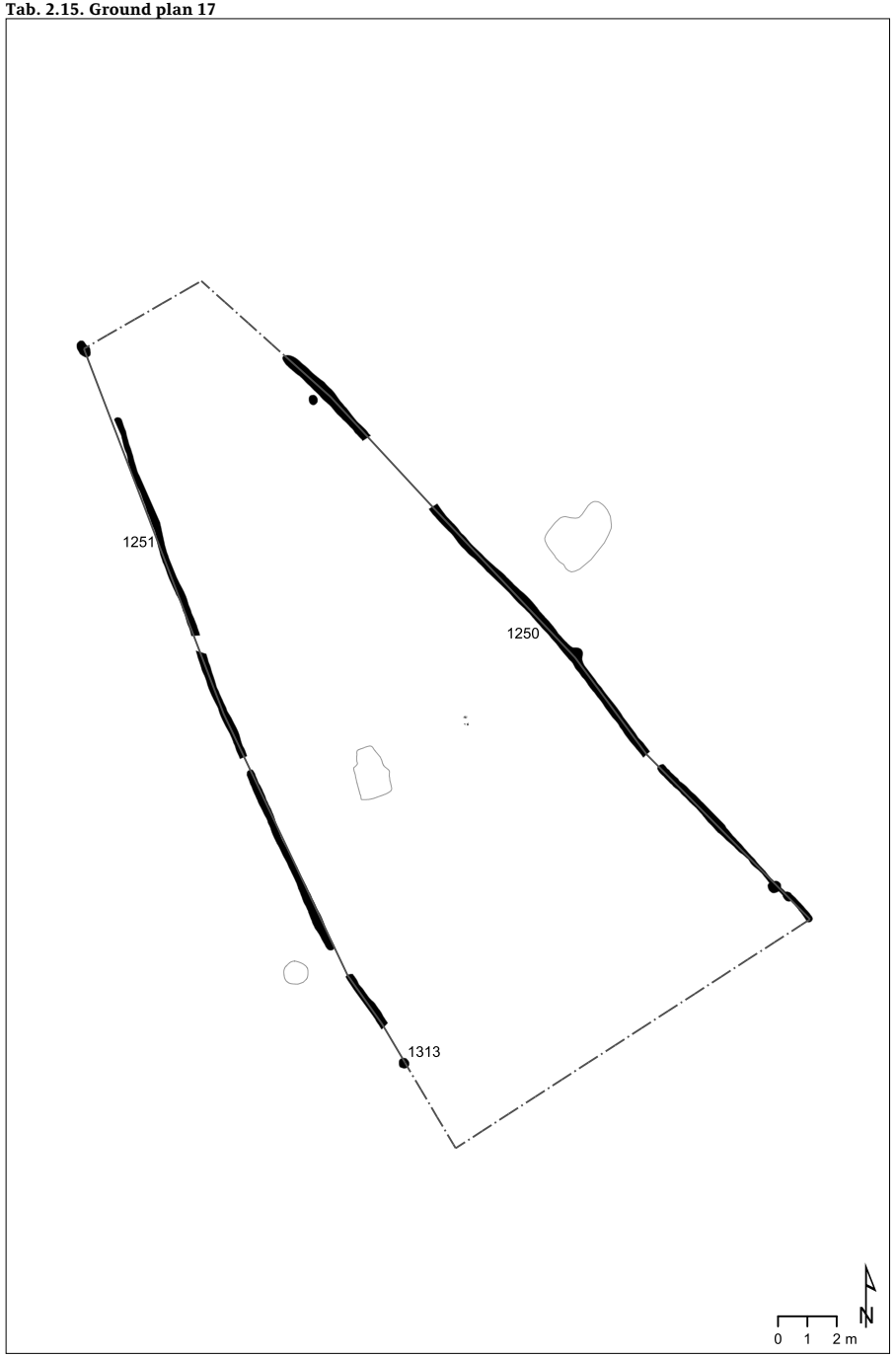
Tab. 2.13. Ground plan 15



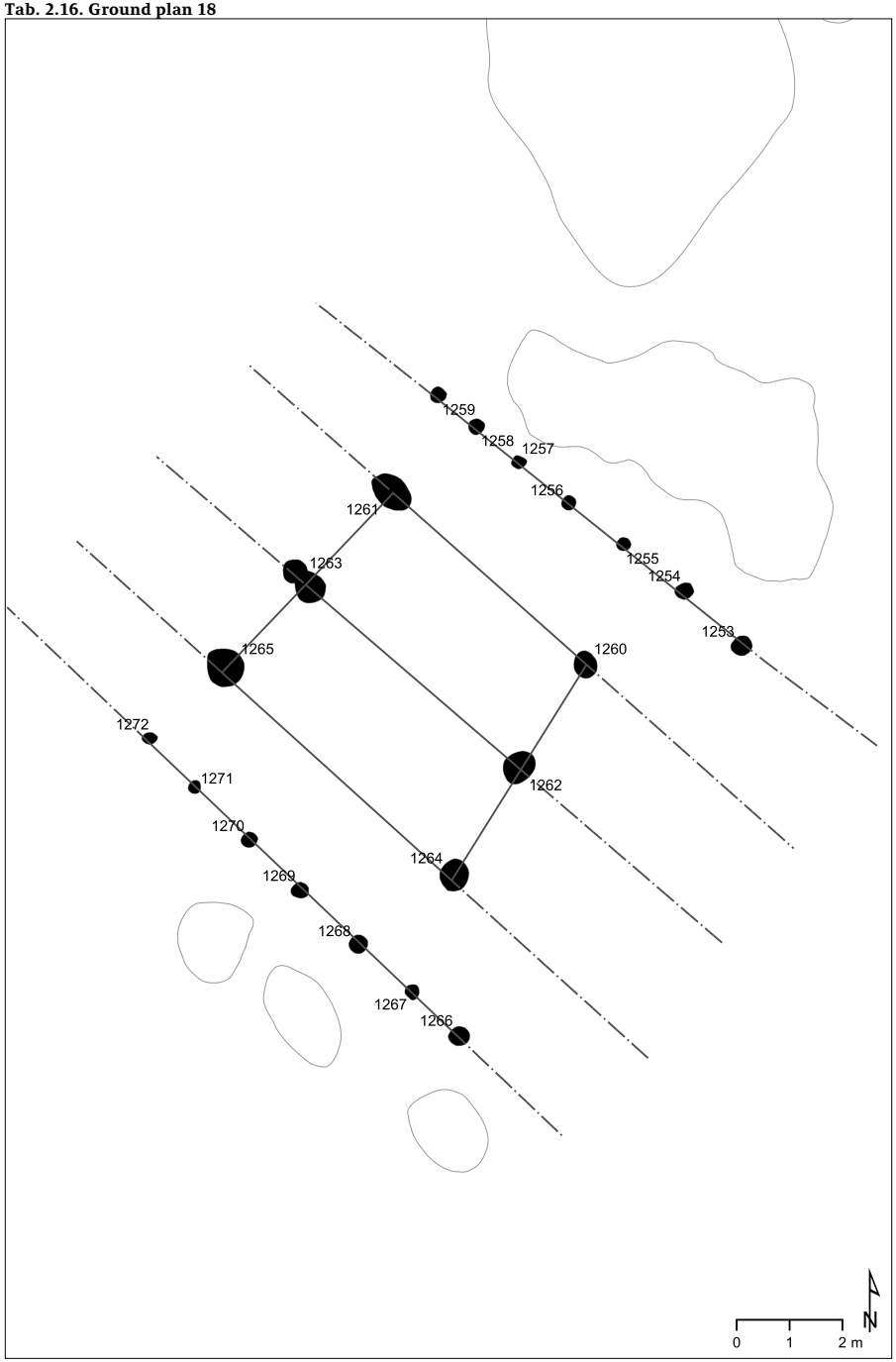
Tab. 2.14. Ground plan 16



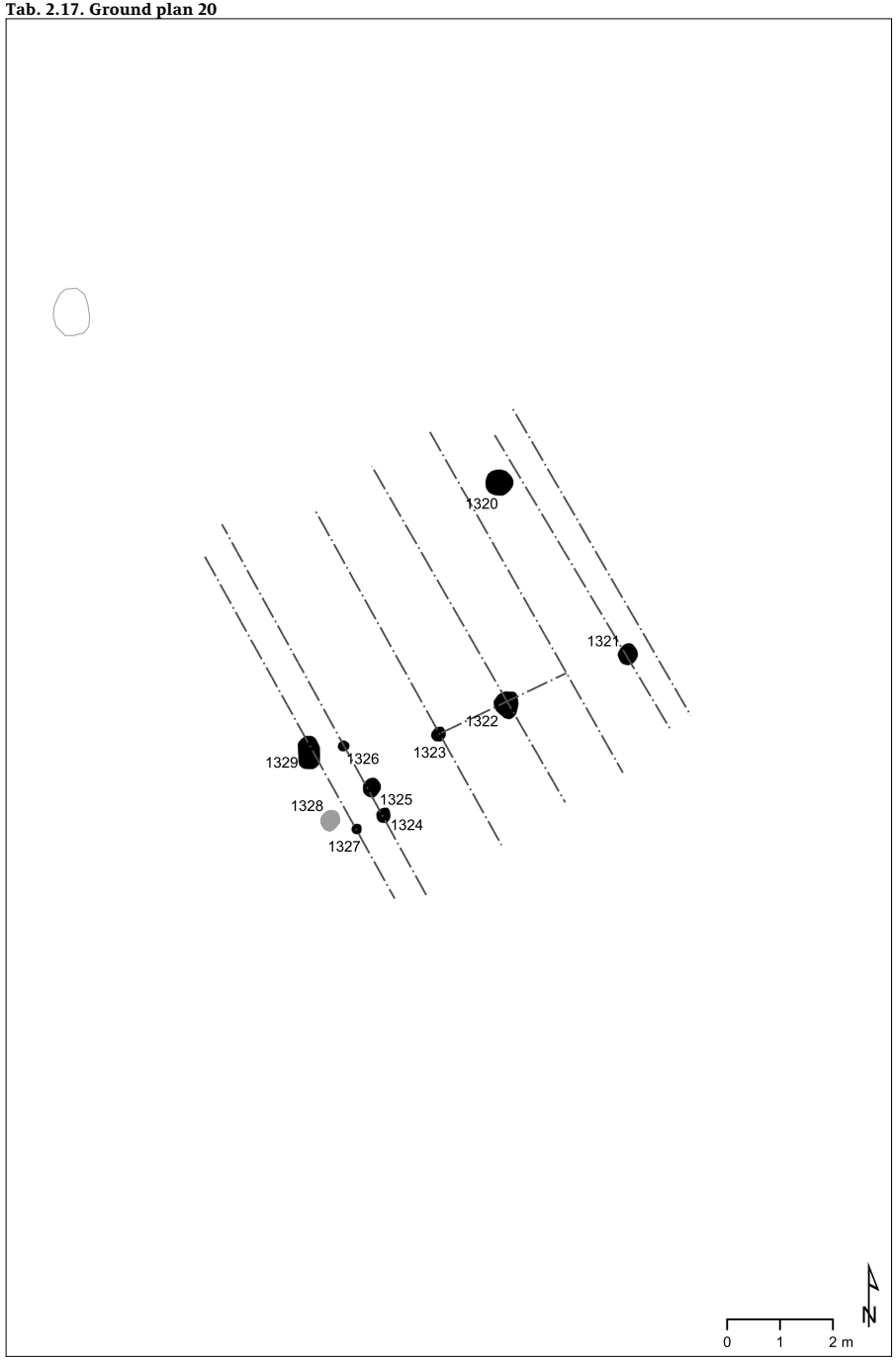
Tab. 2.15. Ground plan 17



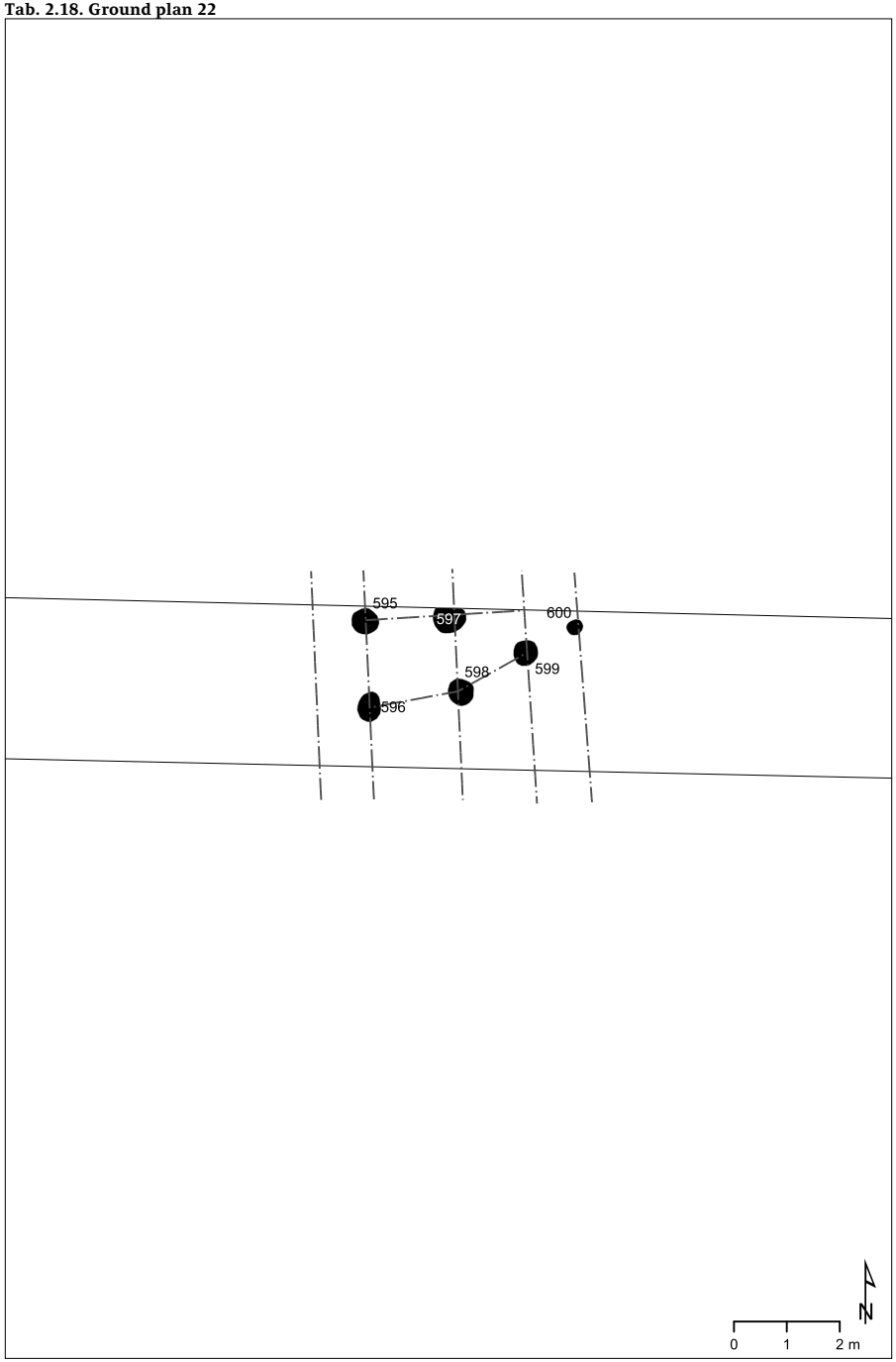
Tab. 2.16. Ground plan 18



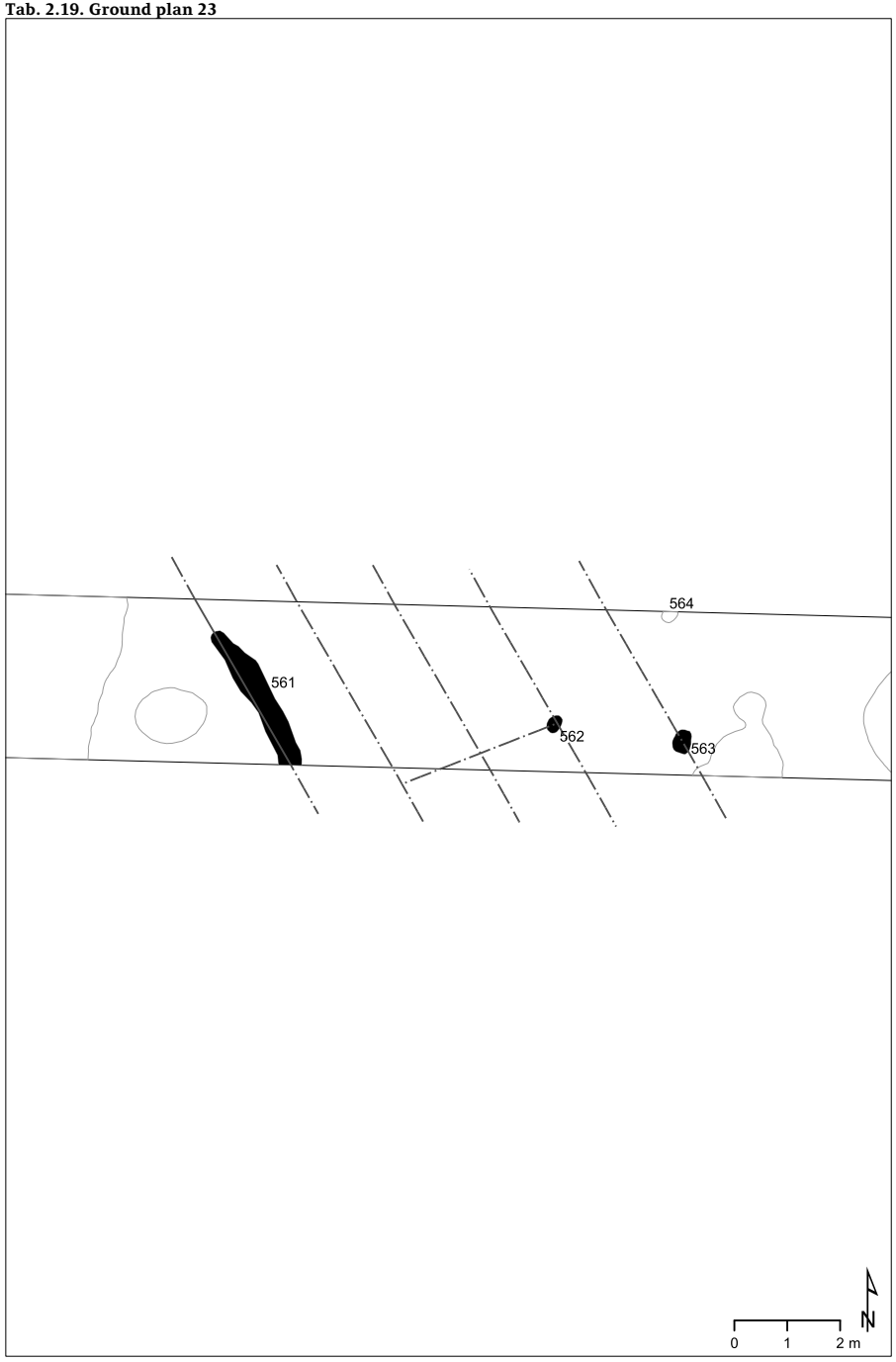
Tab. 2.17. Ground plan 20



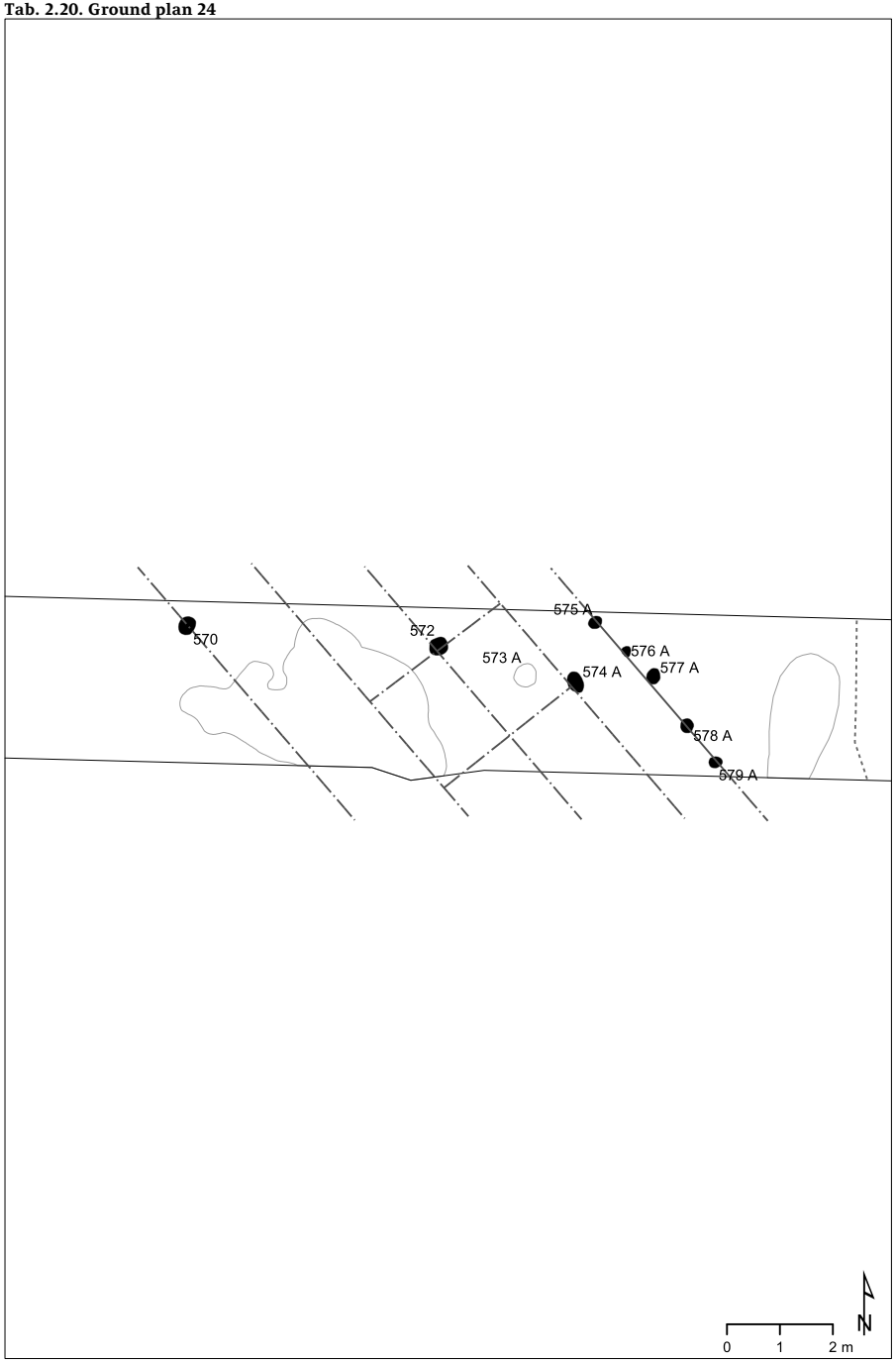
Tab. 2.18. Ground plan 22



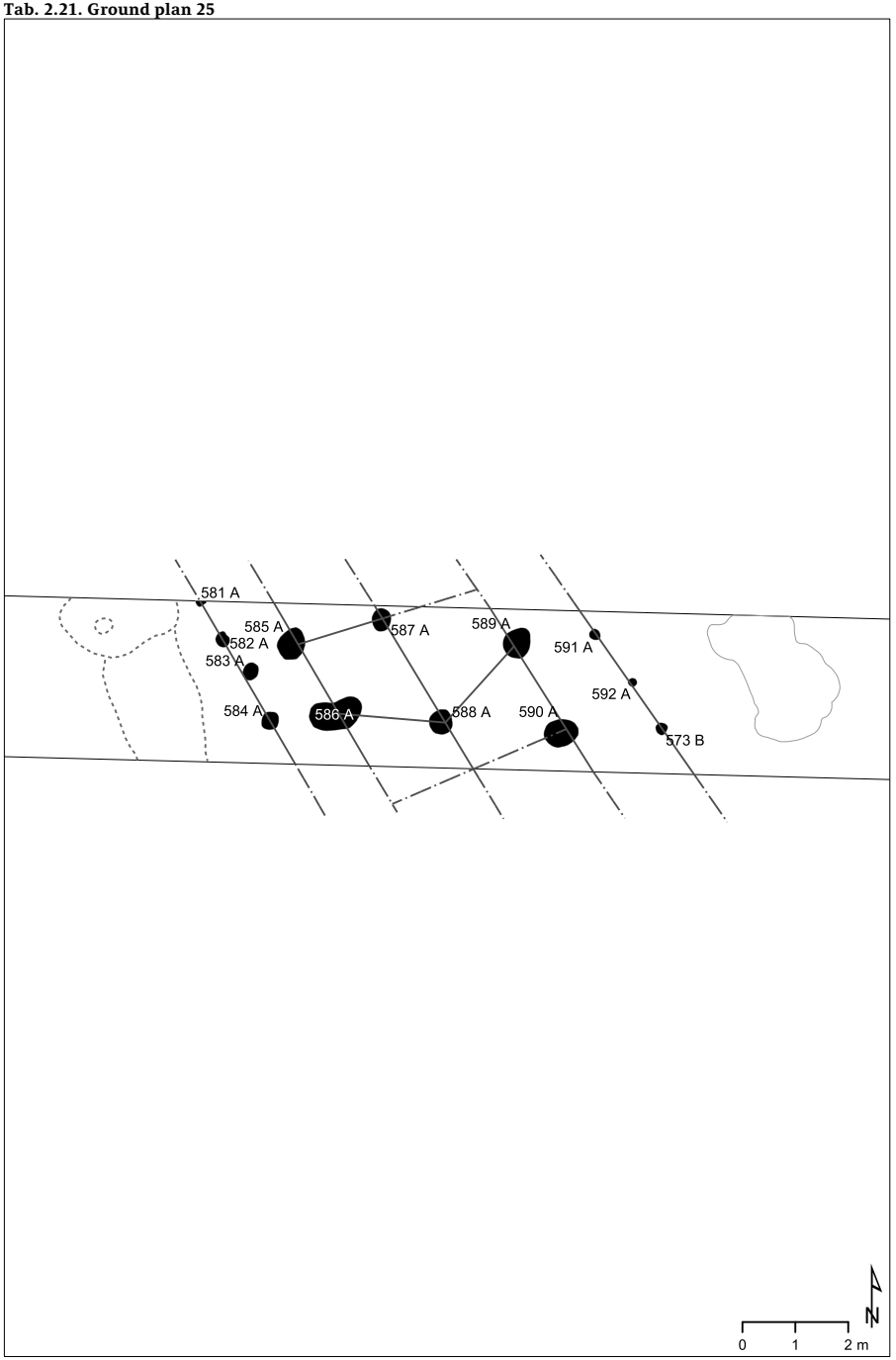
Tab. 2.19. Ground plan 23



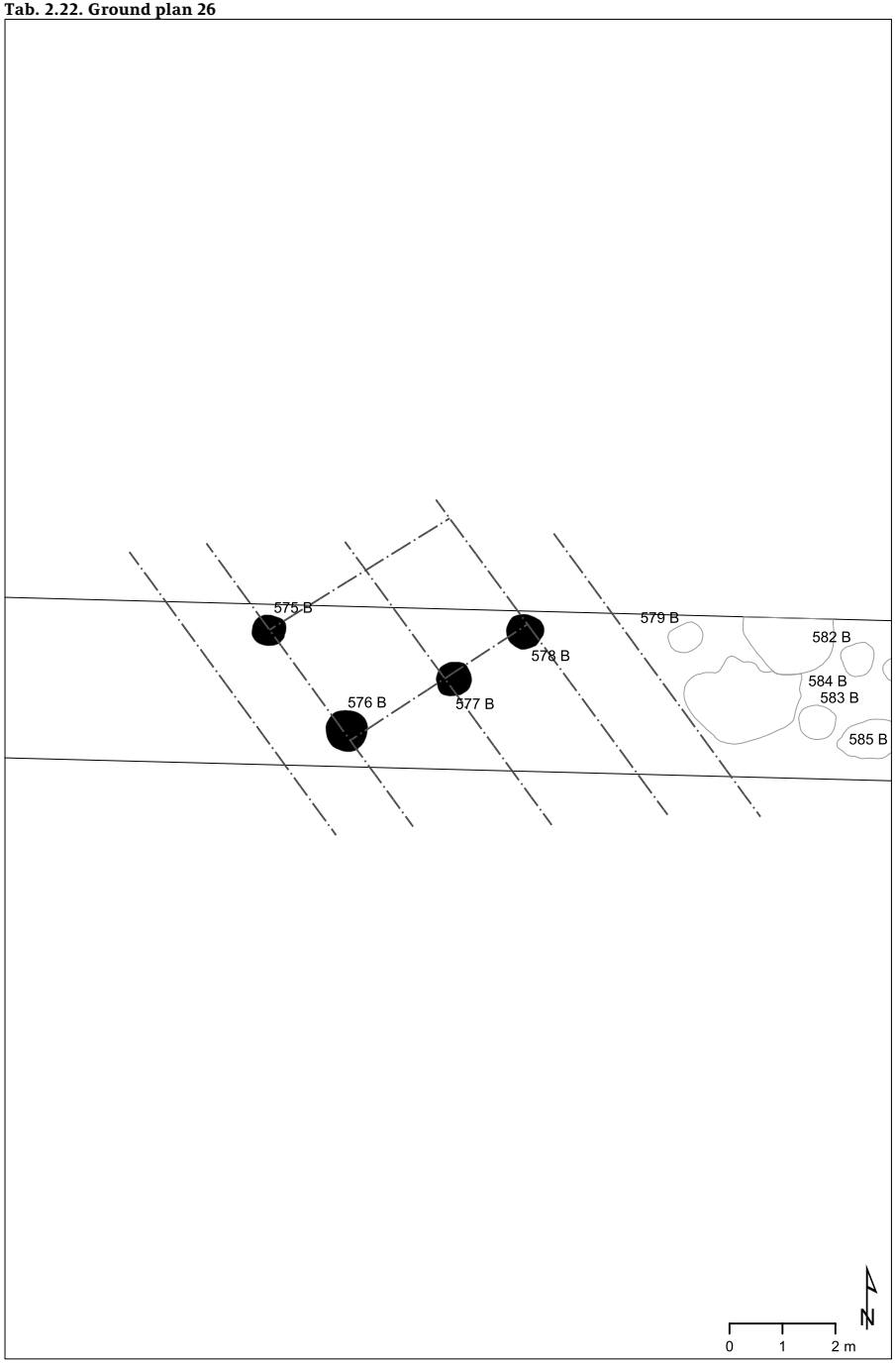
Tab. 2.20. Ground plan 24



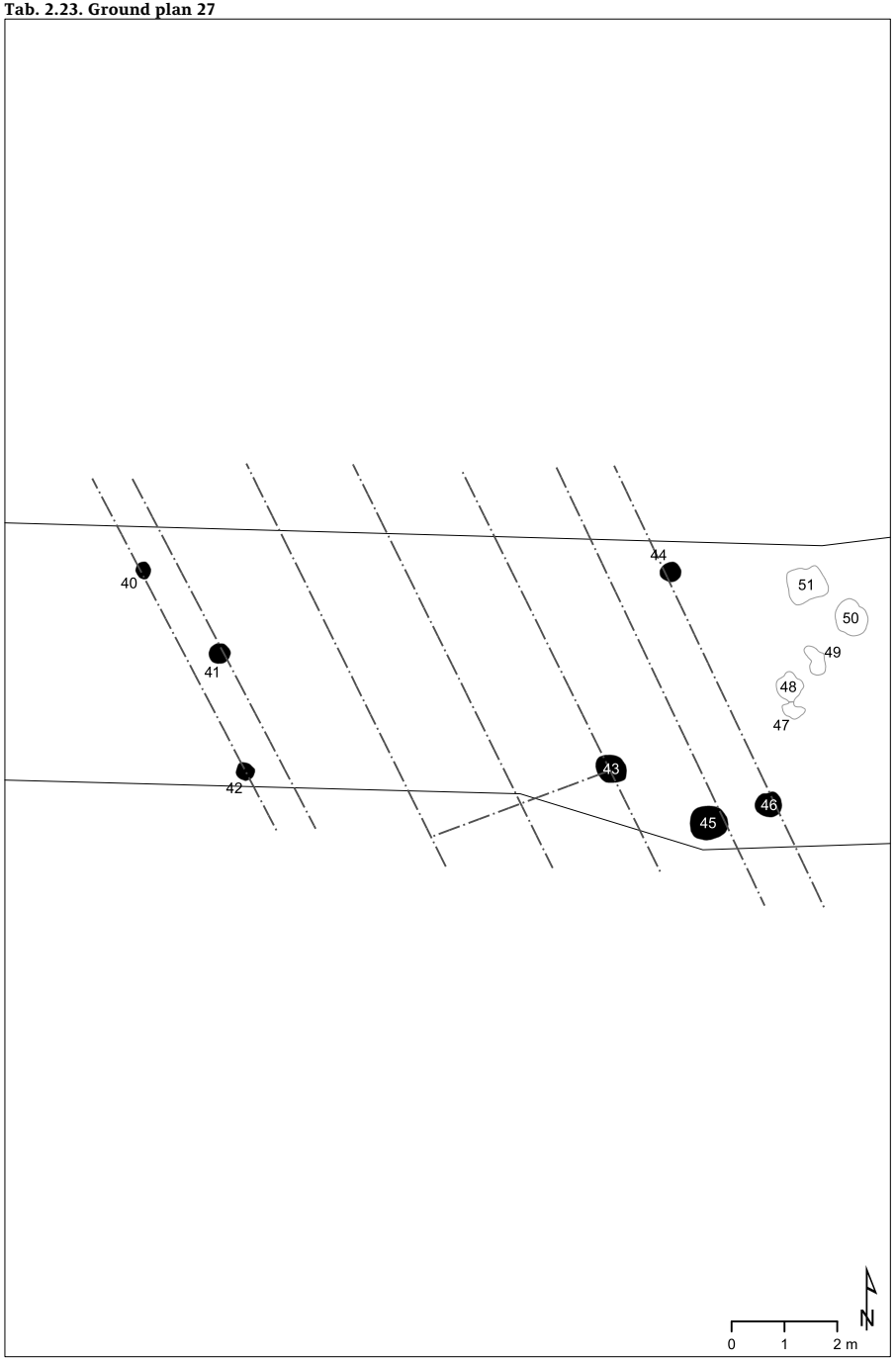
Tab. 2.21. Ground plan 25



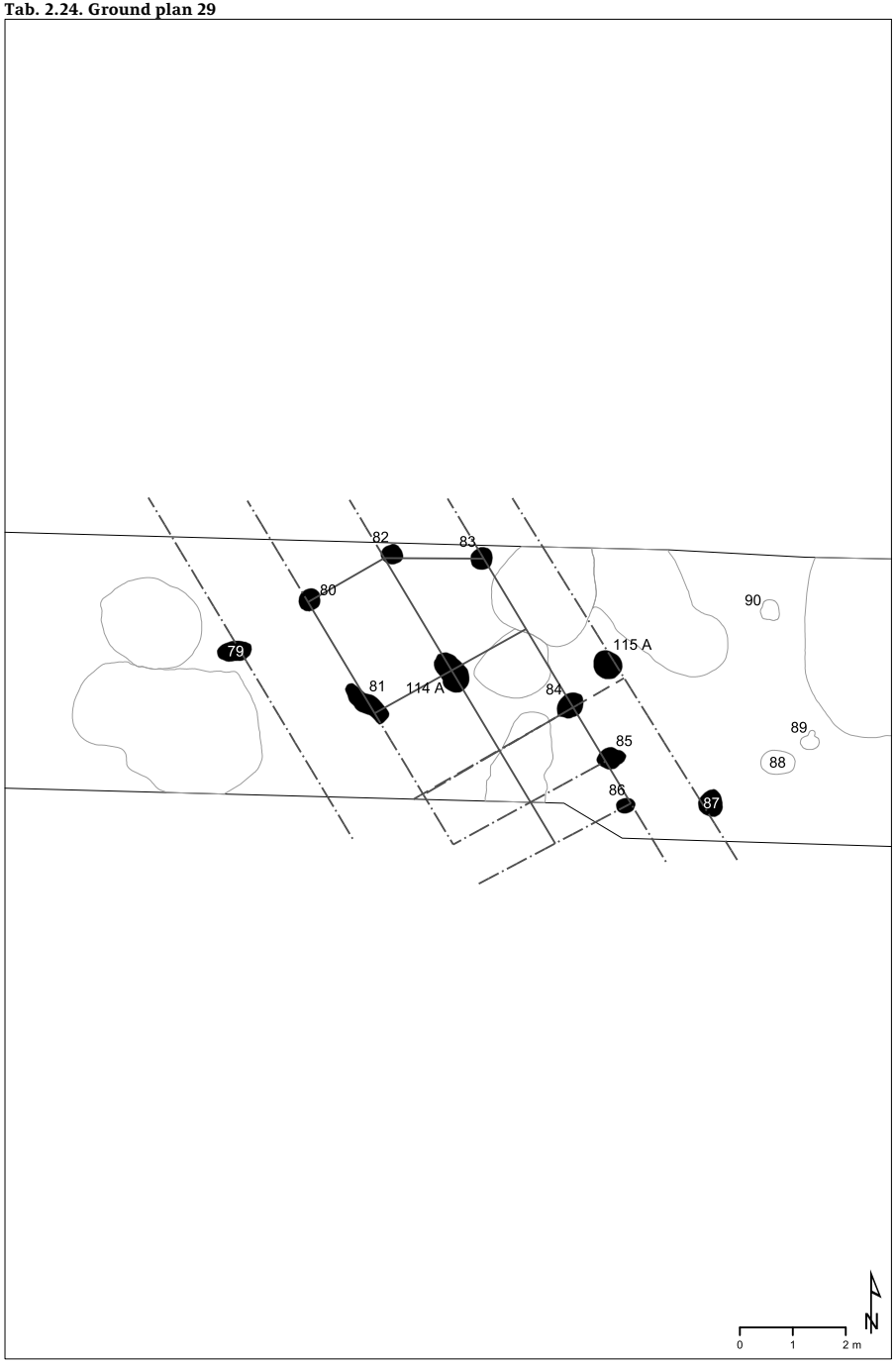
Tab. 2.22. Ground plan 26



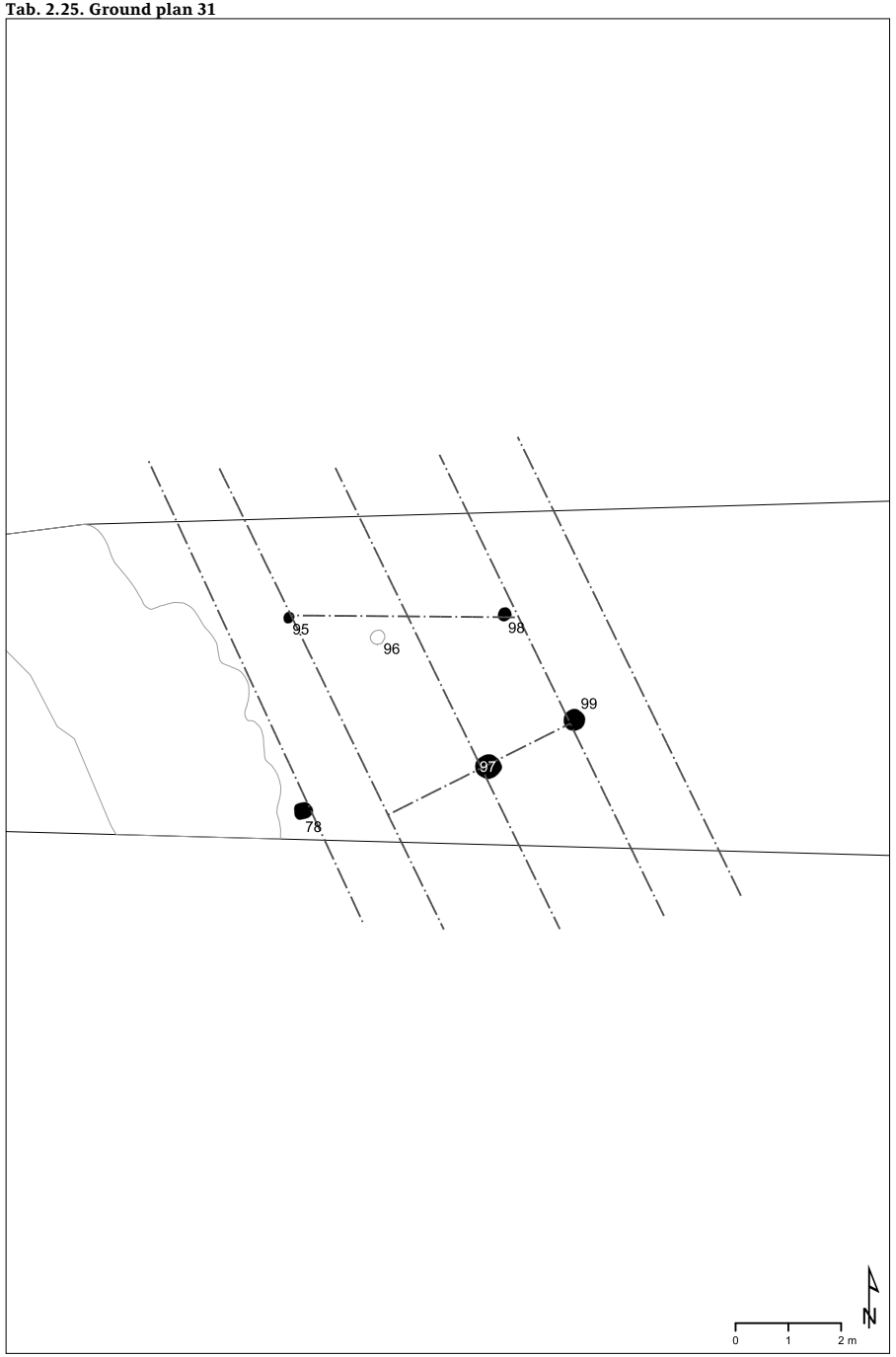
Tab. 2.23. Ground plan 27



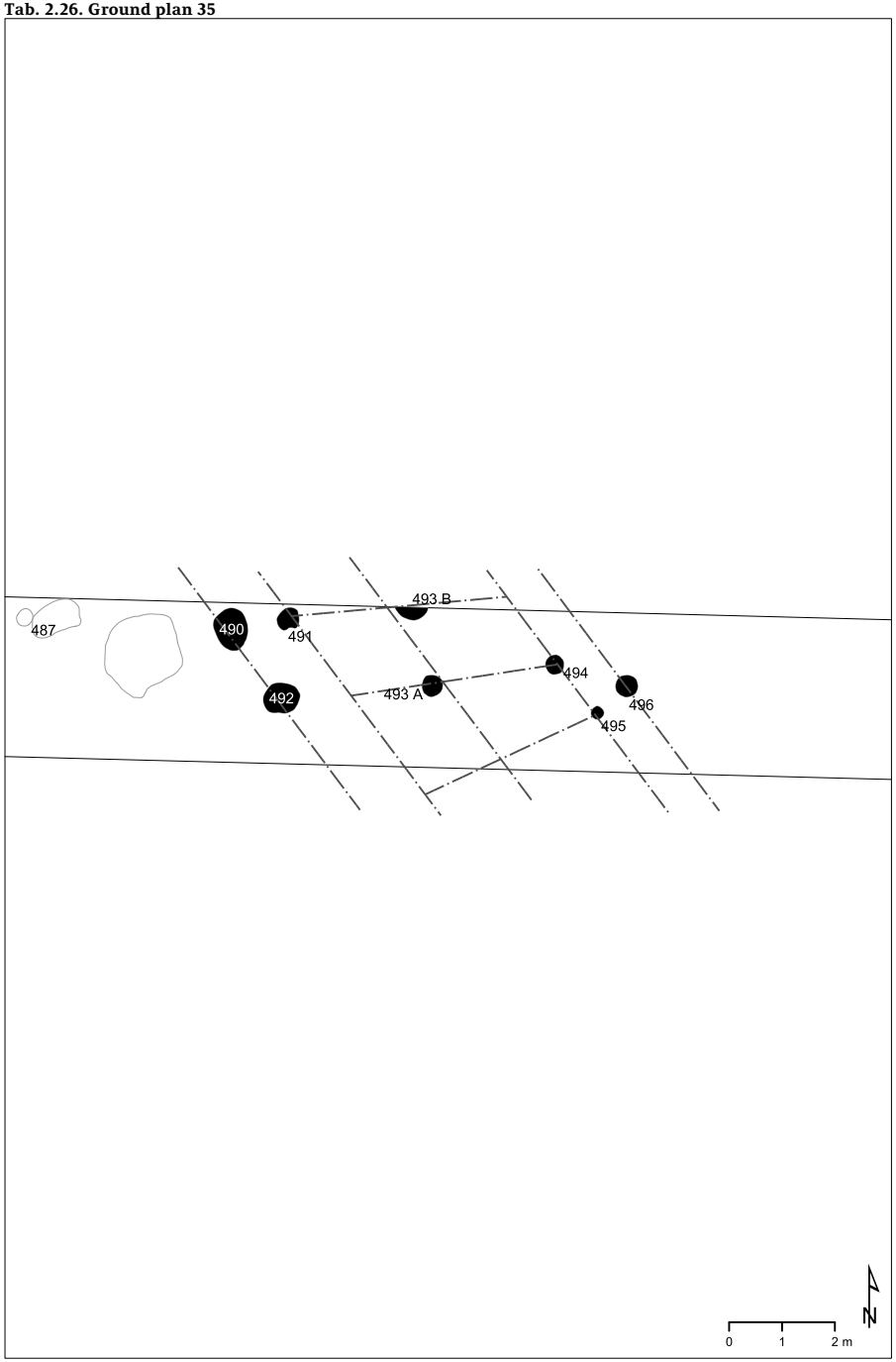
Tab. 2.24. Ground plan 29



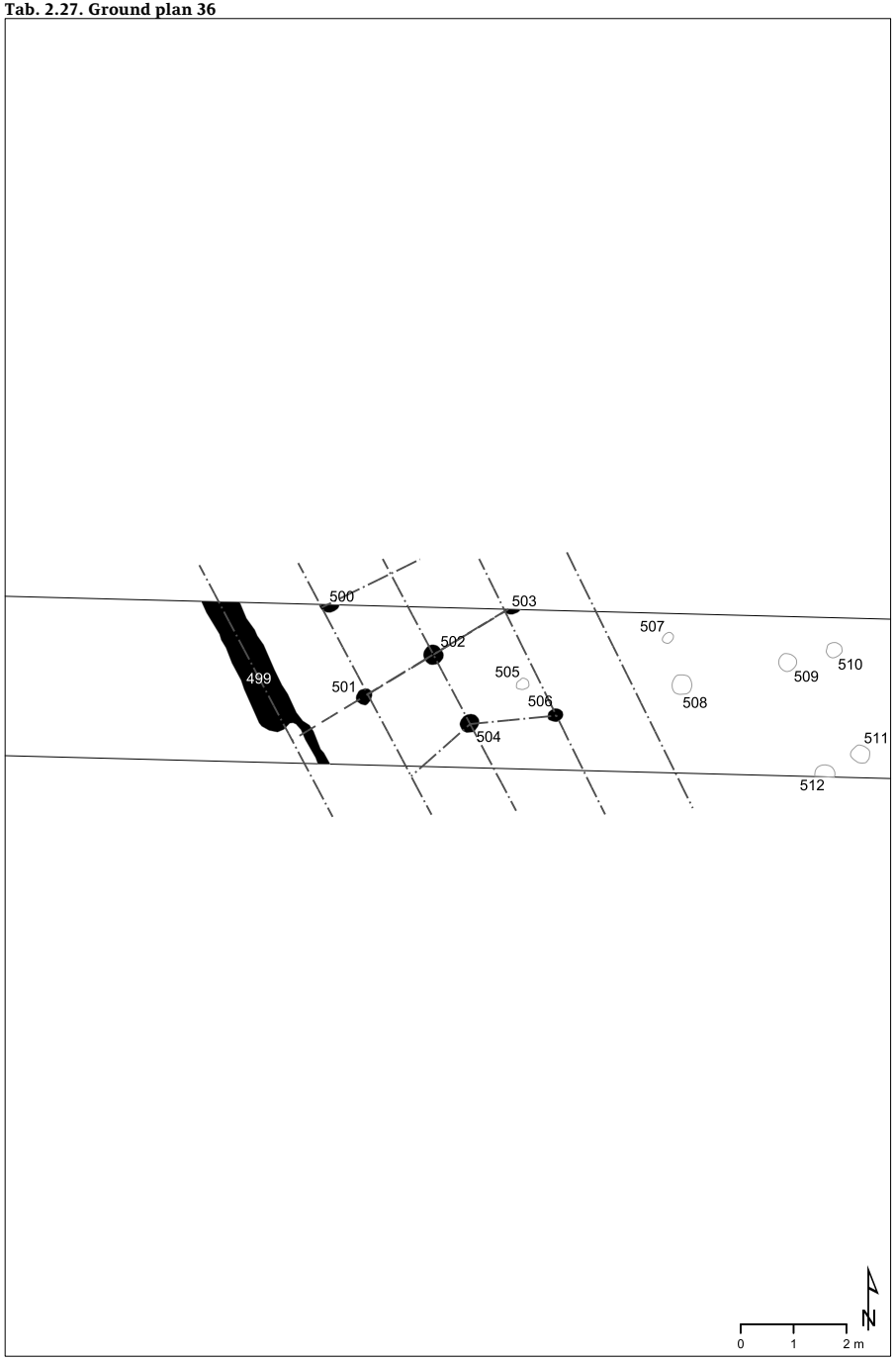
Tab. 2.25. Ground plan 31



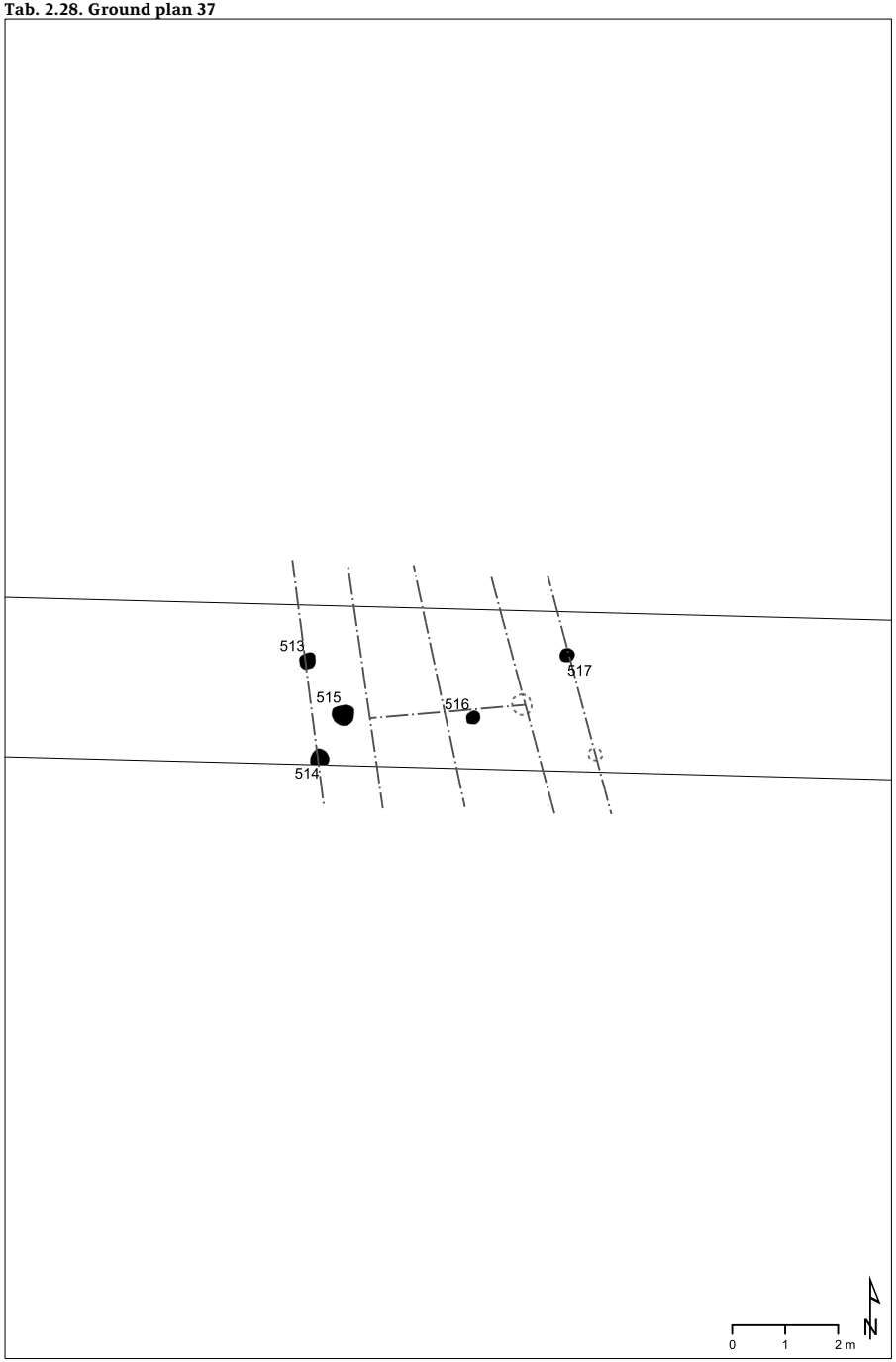
Tab. 2.26. Ground plan 35



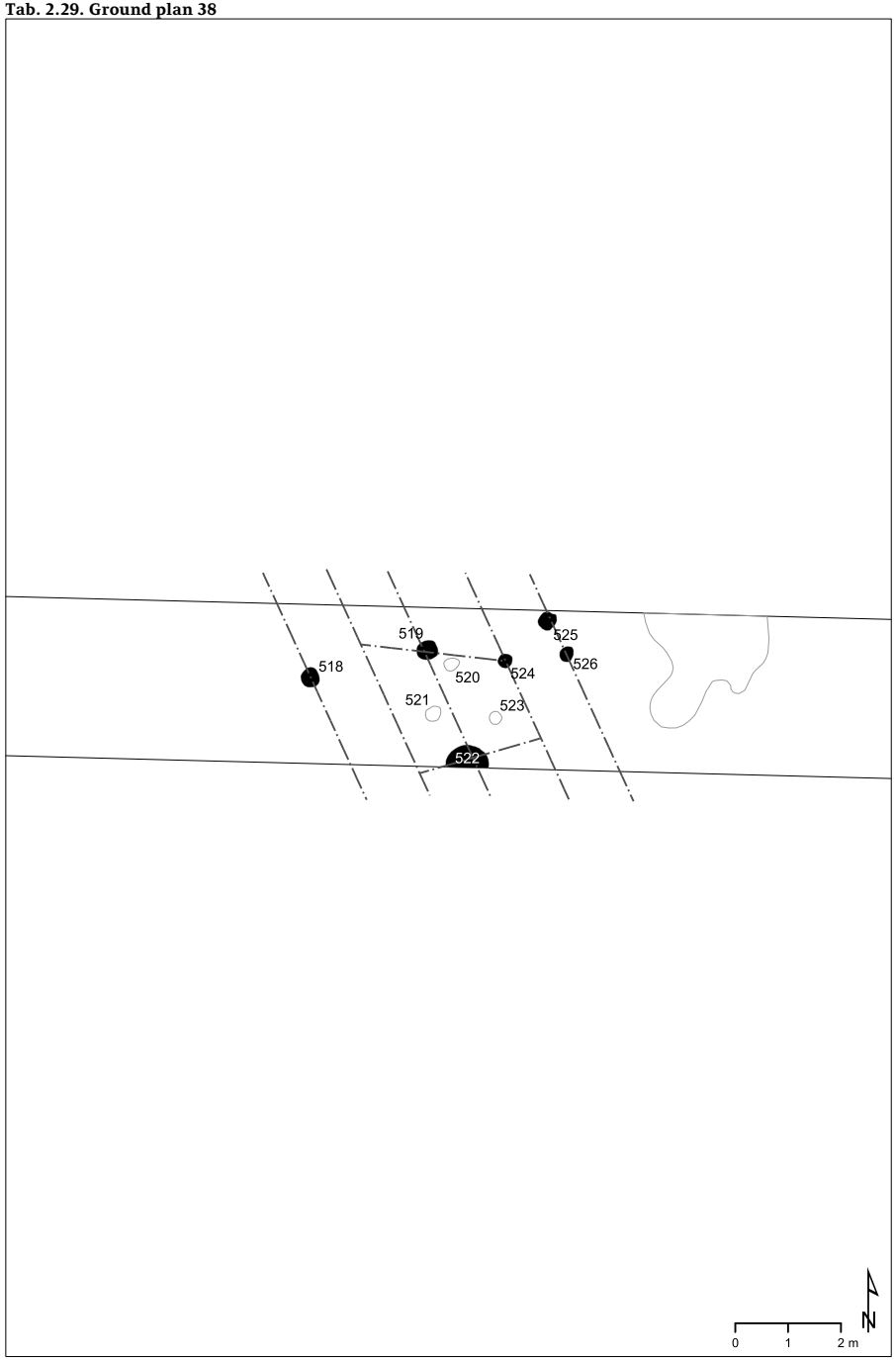
Tab. 2.27. Ground plan 36



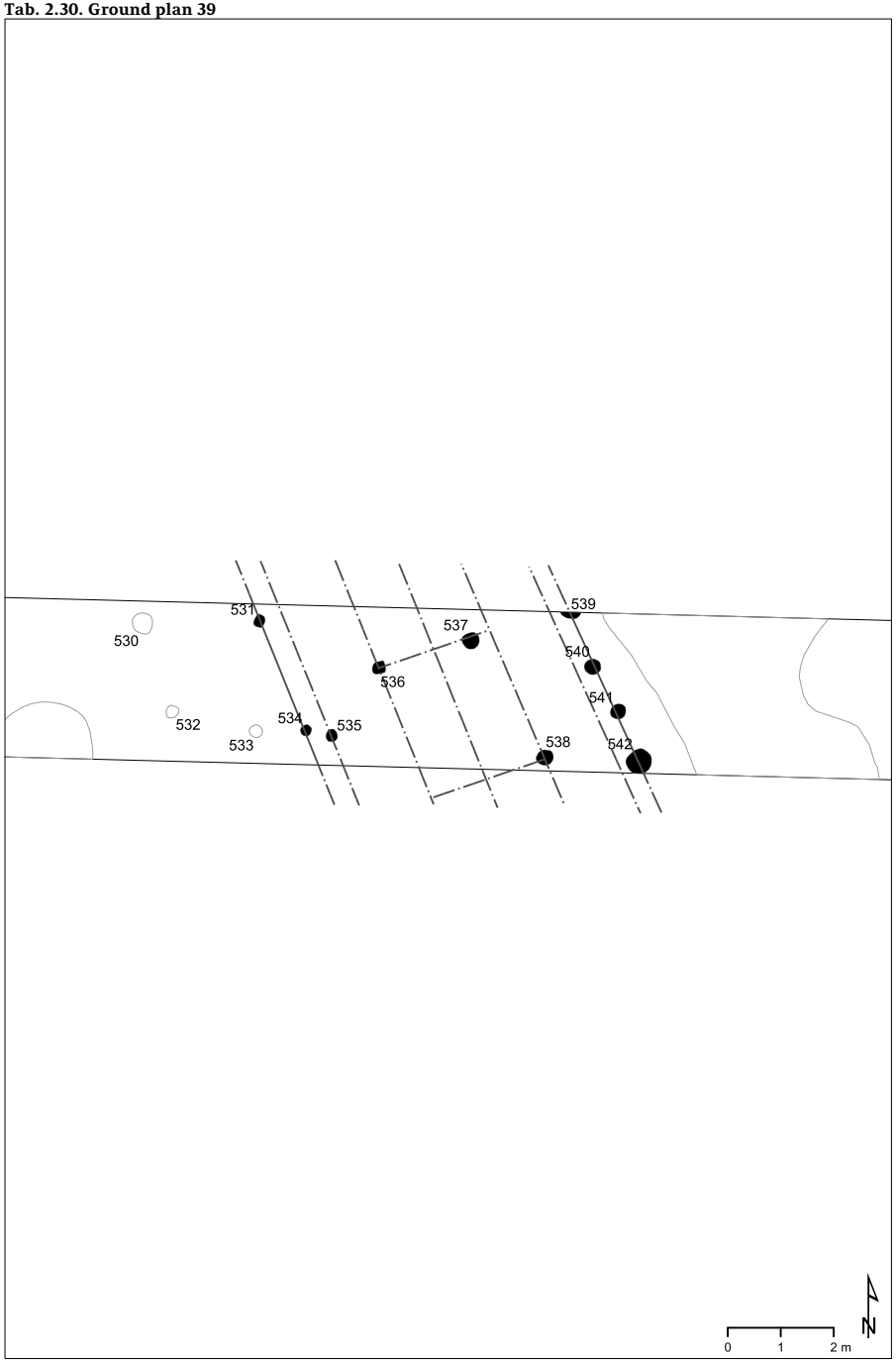
Tab. 2.28. Ground plan 37



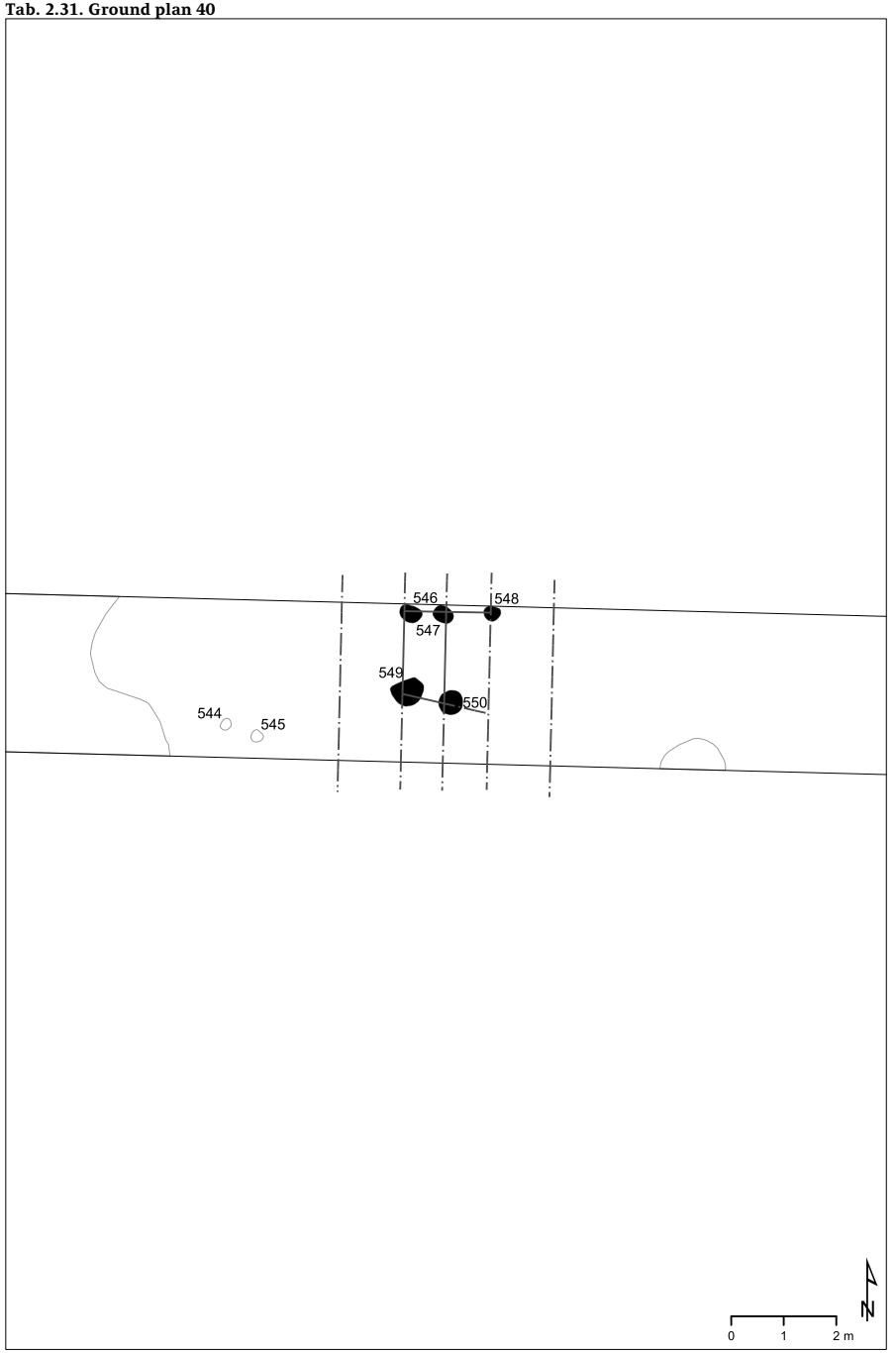
Tab. 2.29. Ground plan 38



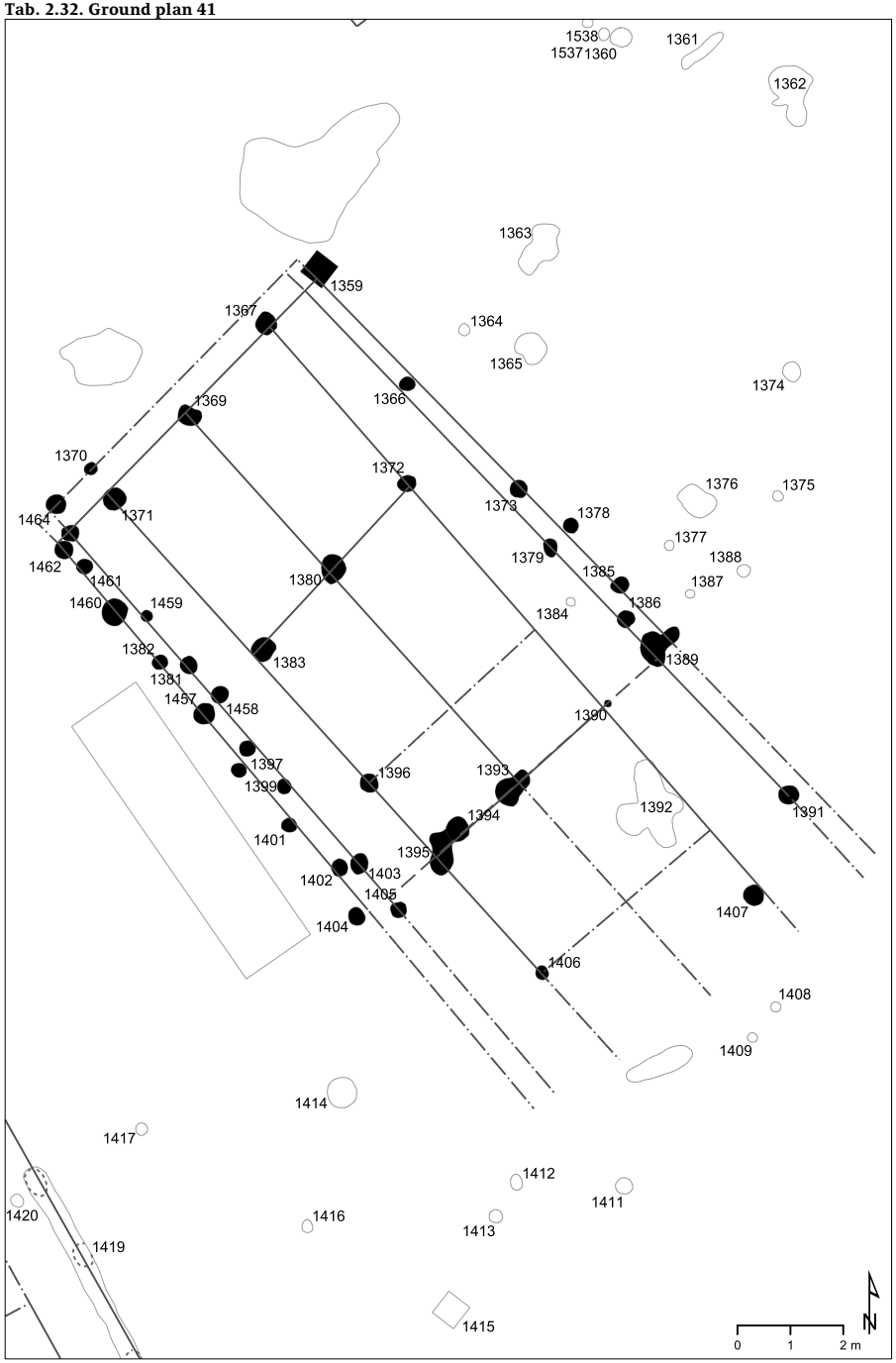
Tab. 2.30. Ground plan 39



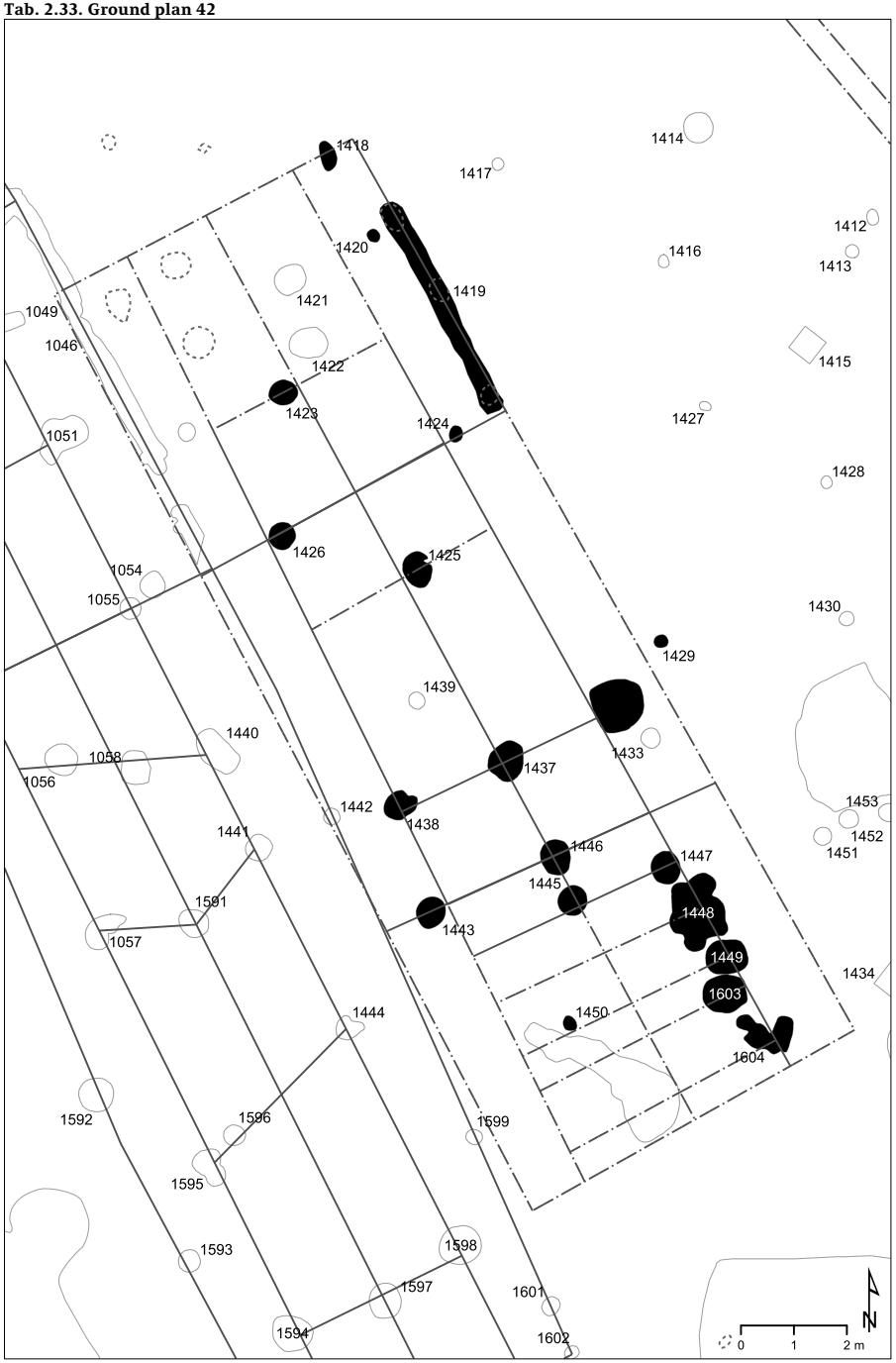
Tab. 2.31. Ground plan 40



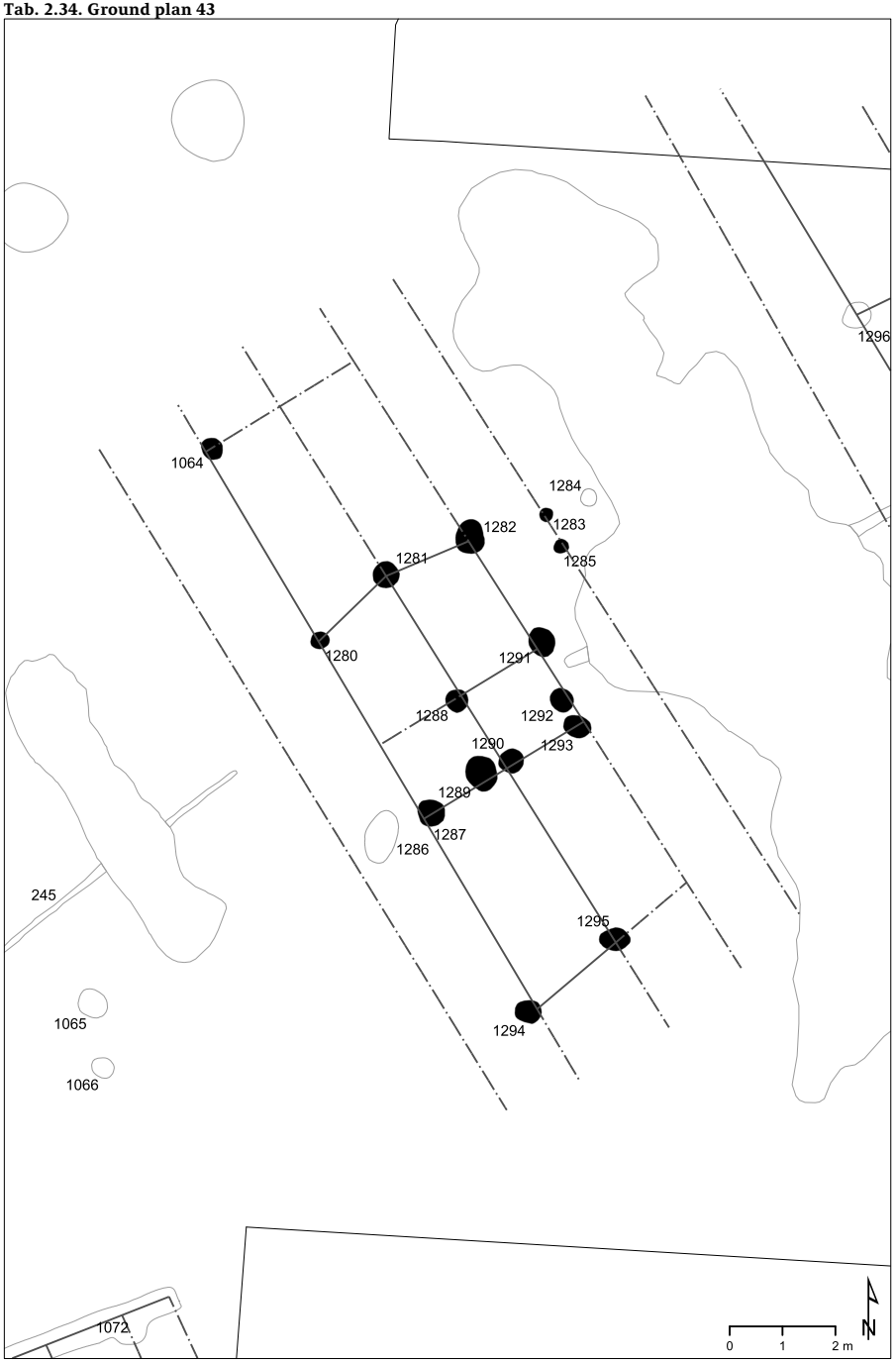
Tab. 2.32. Ground plan 41



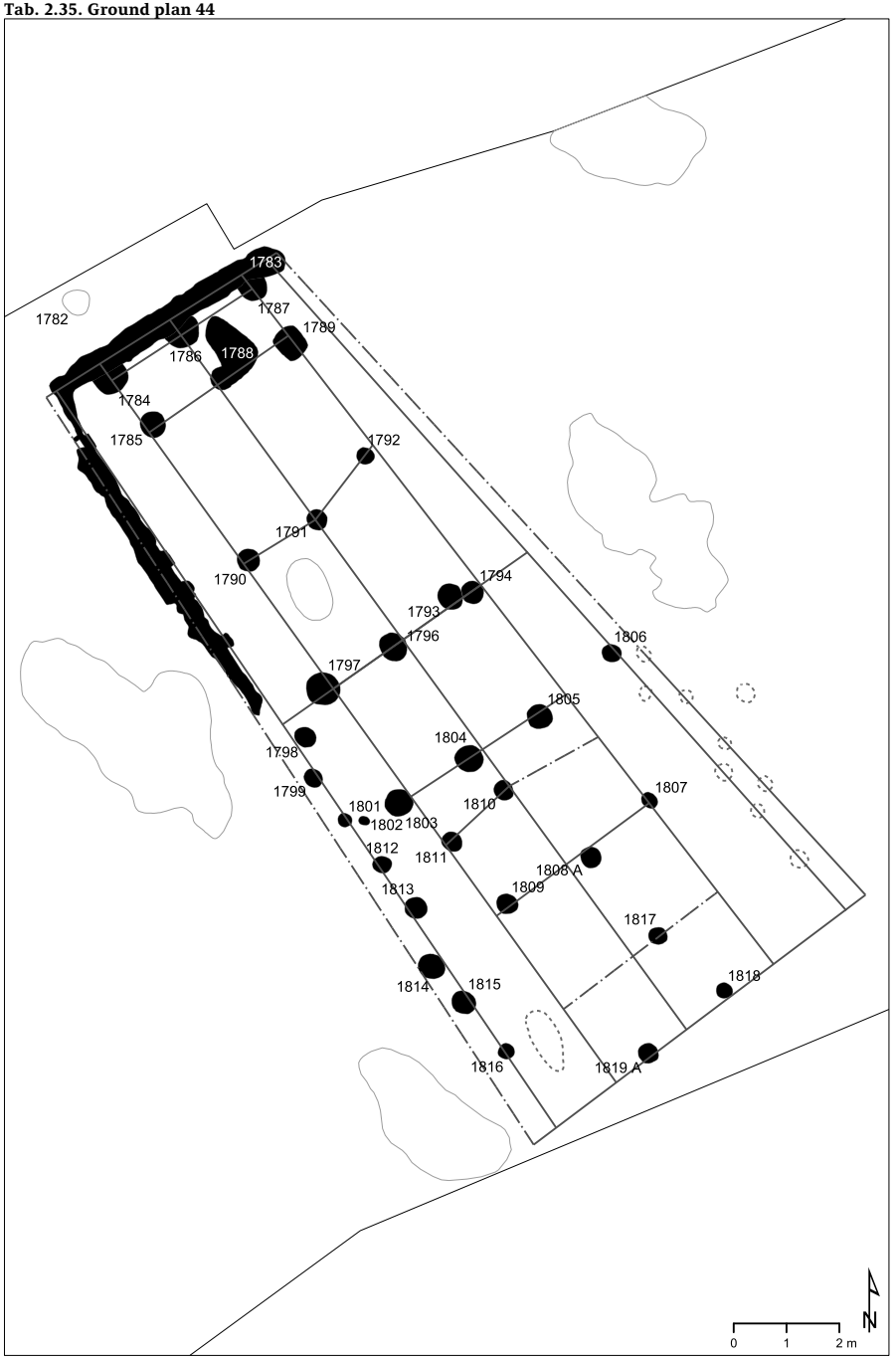
Tab. 2.33. Ground plan 42



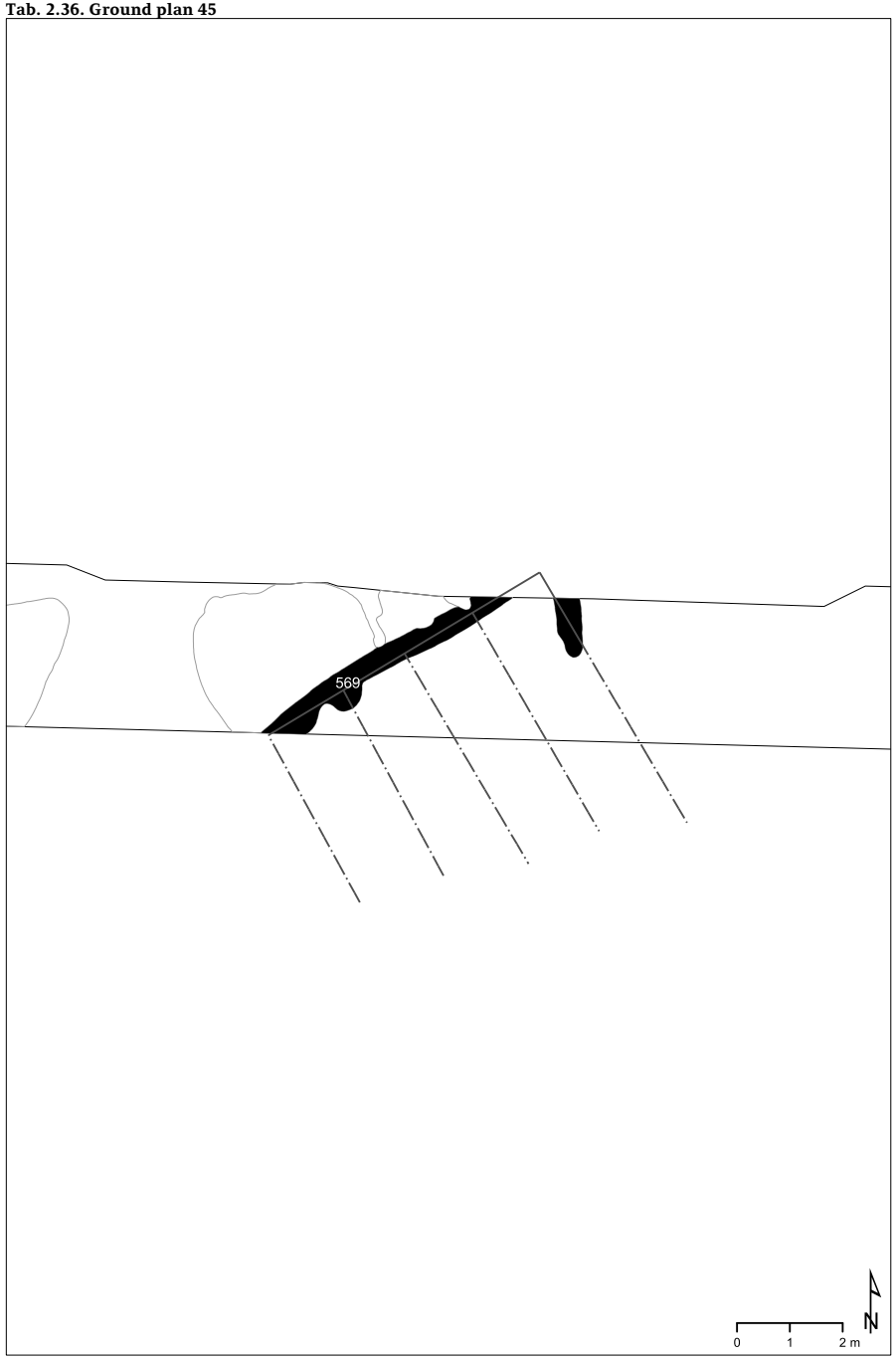
Tab. 2.34. Ground plan 43



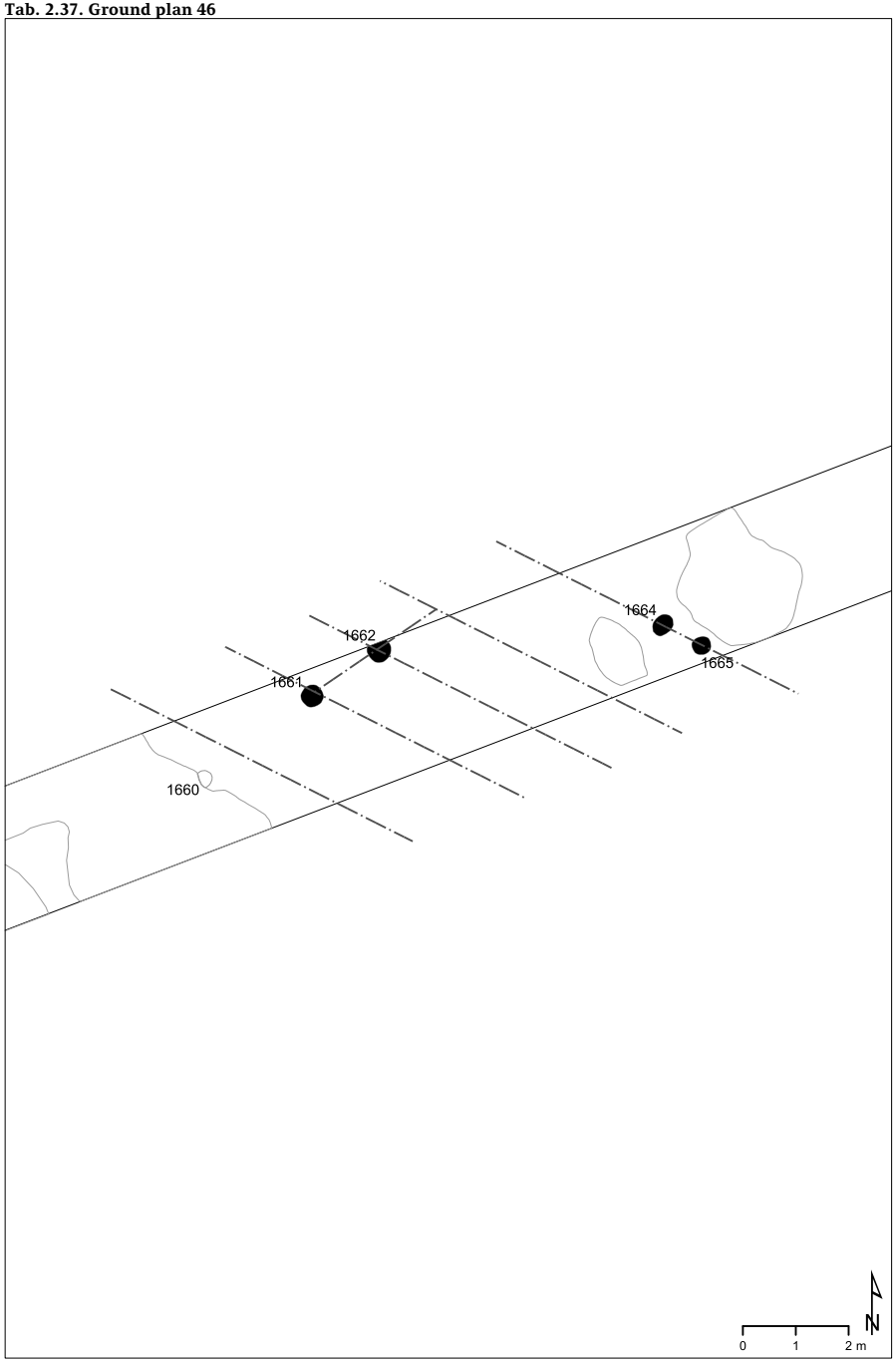
Tab. 2.35. Ground plan 44



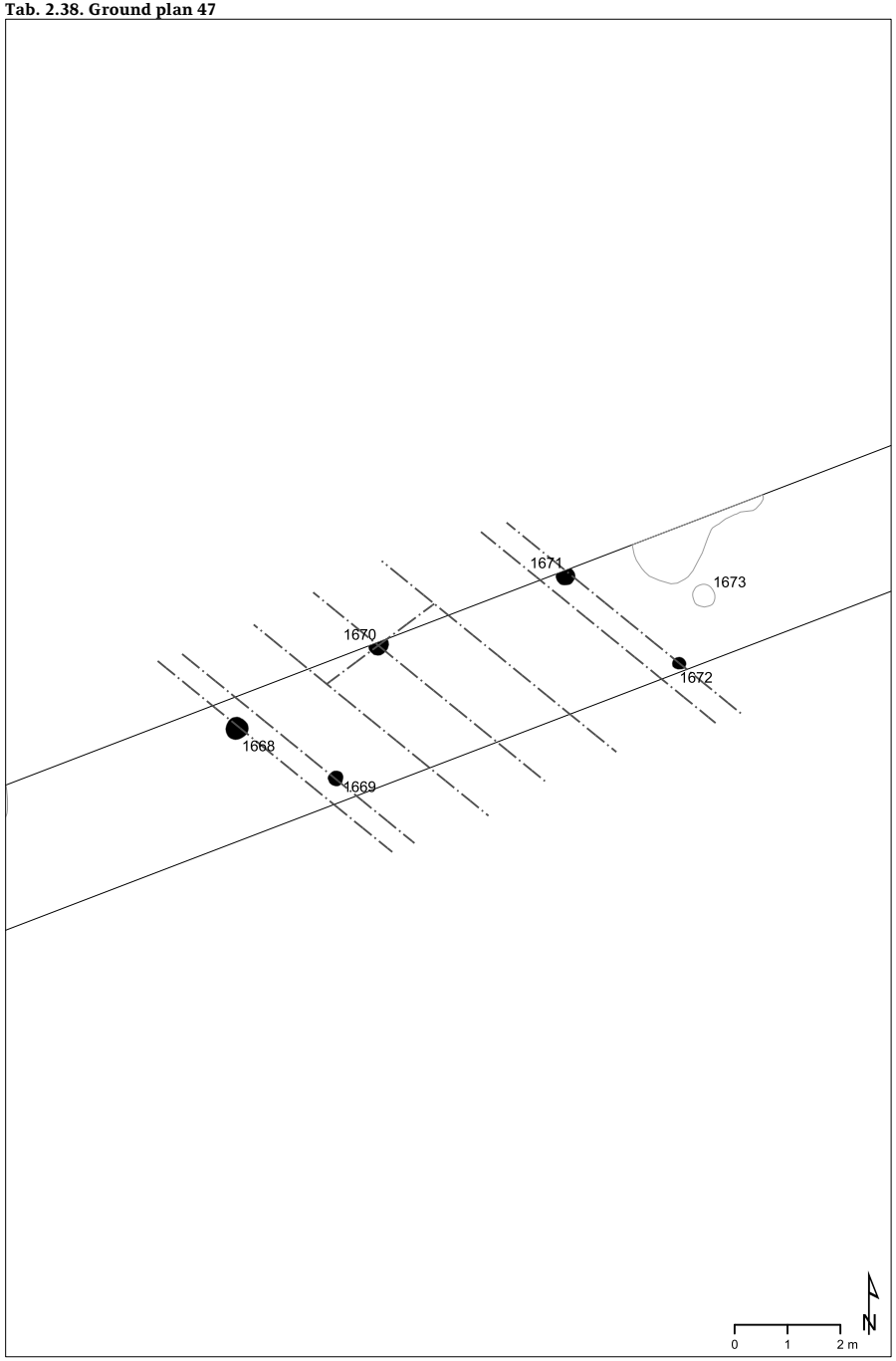
Tab. 2.36. Ground plan 45



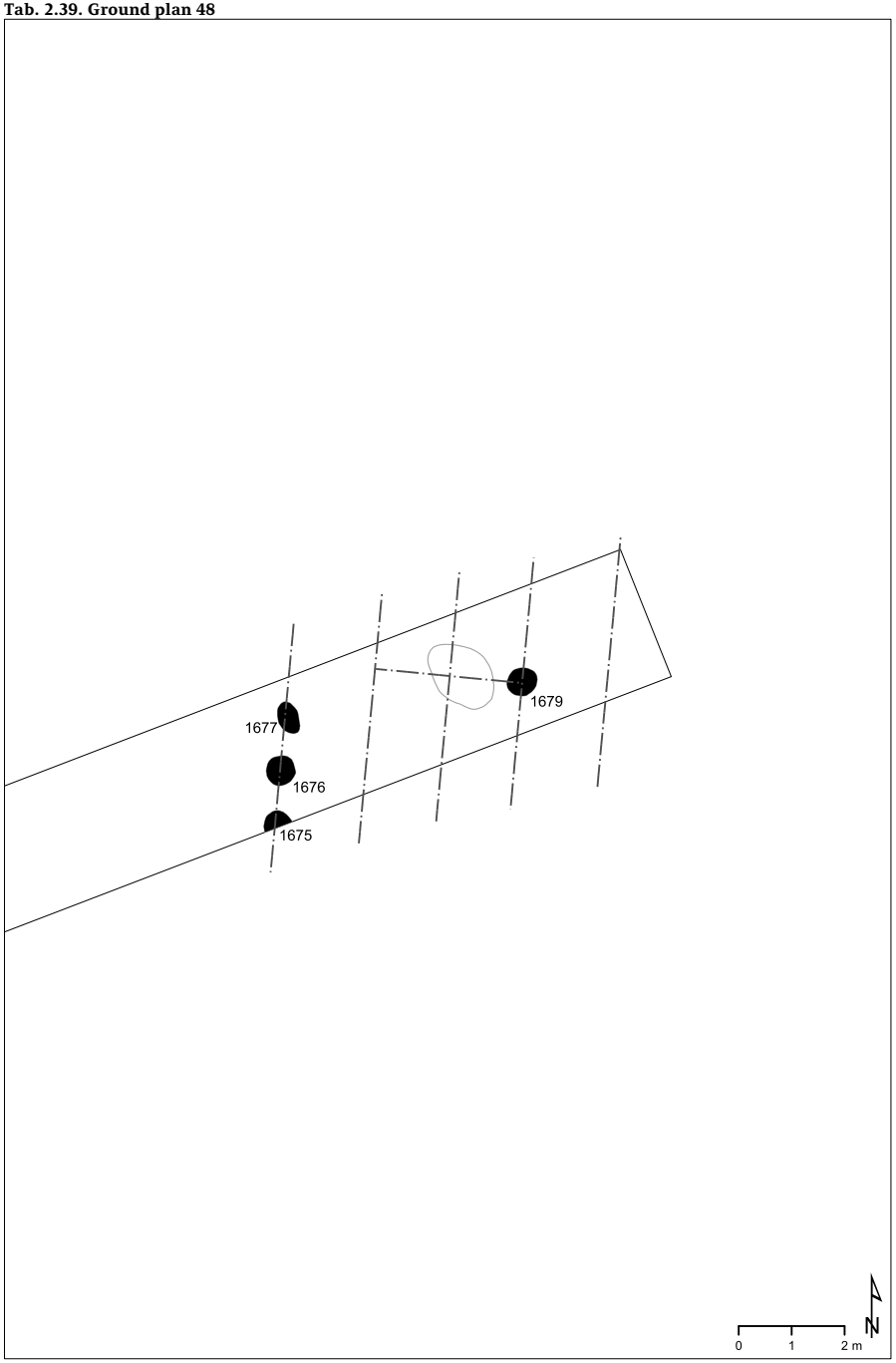
Tab. 2.37. Ground plan 46



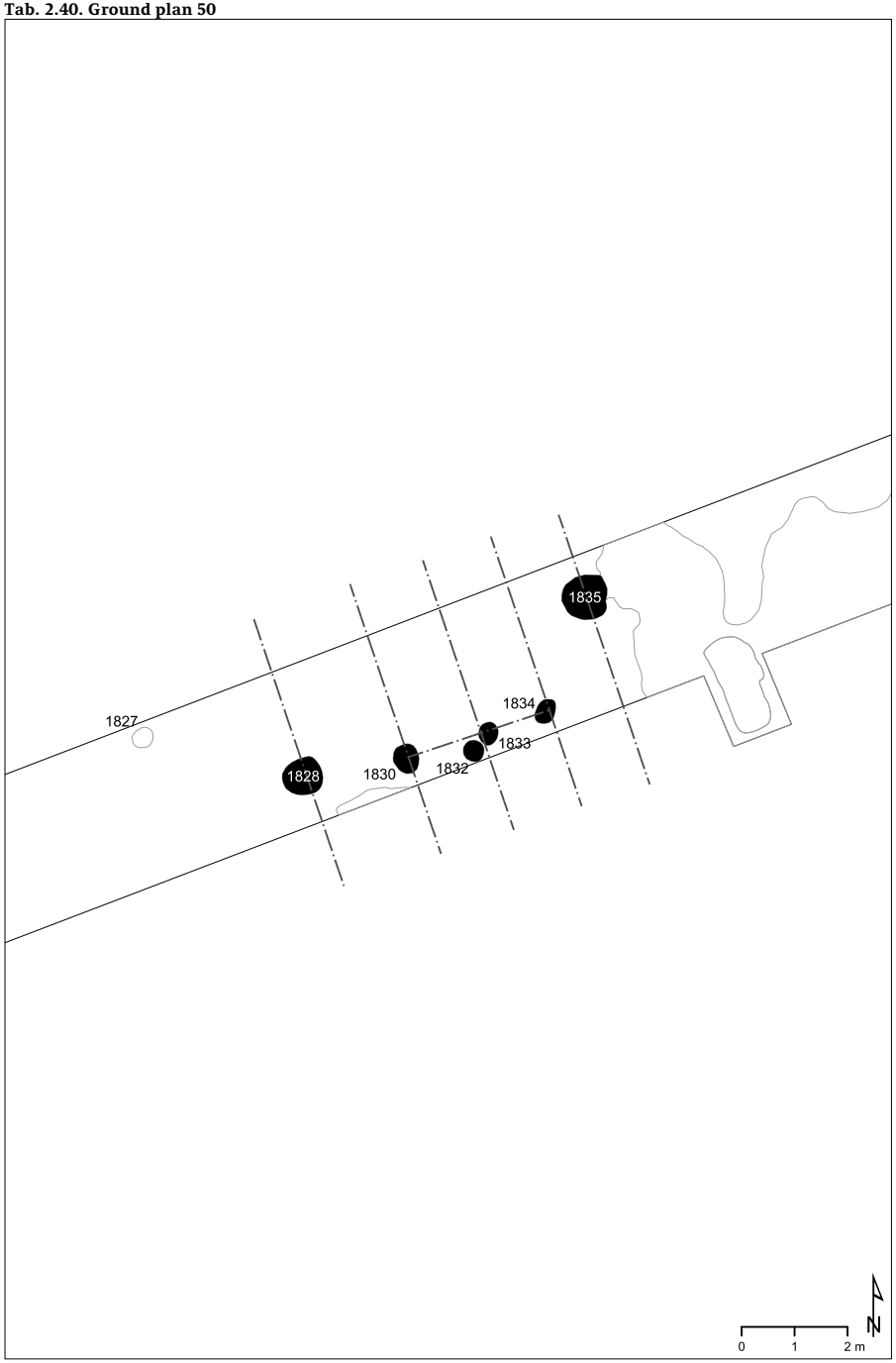
Tab. 2.38. Ground plan 47



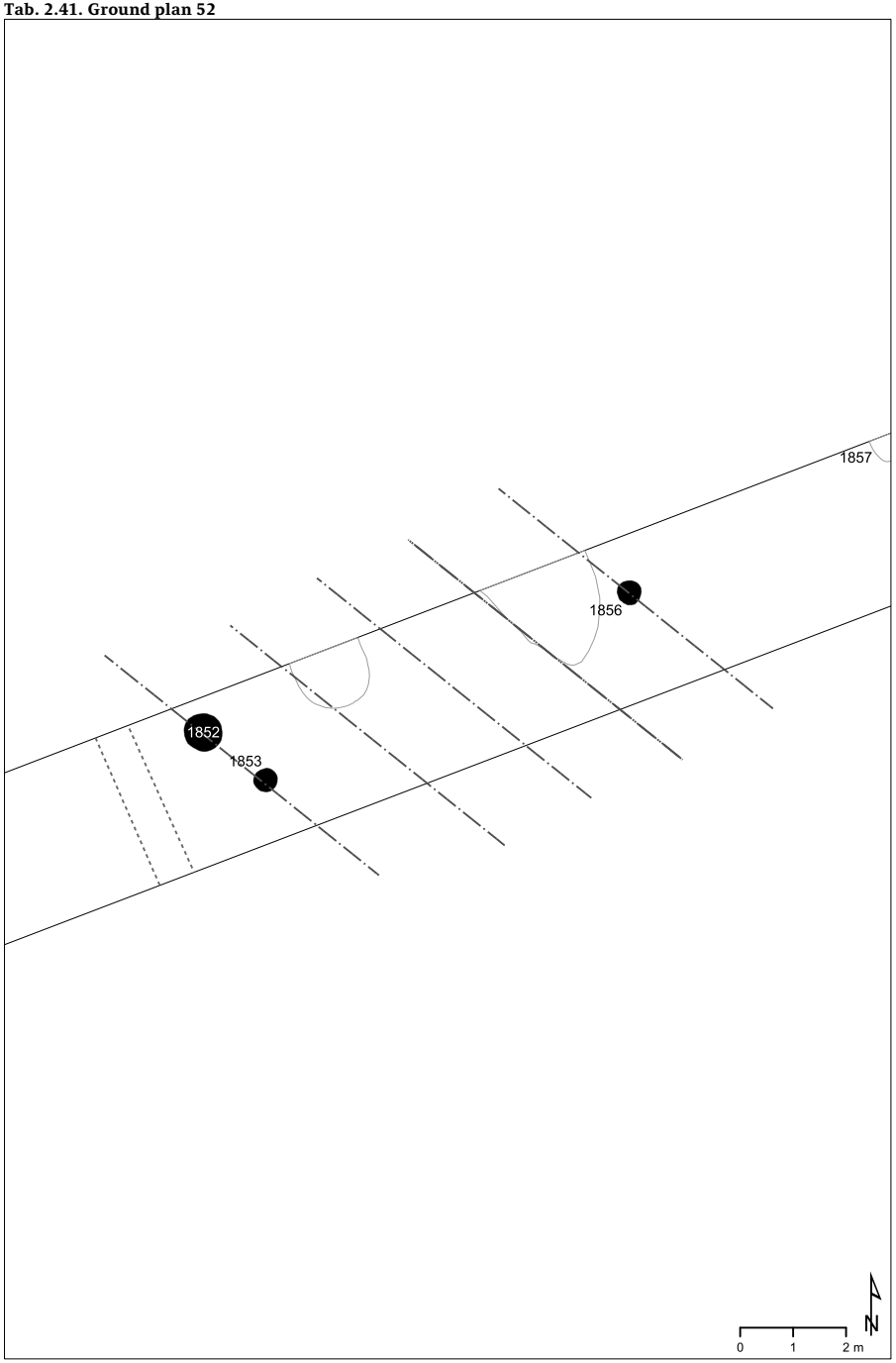
Tab. 2.39. Ground plan 48



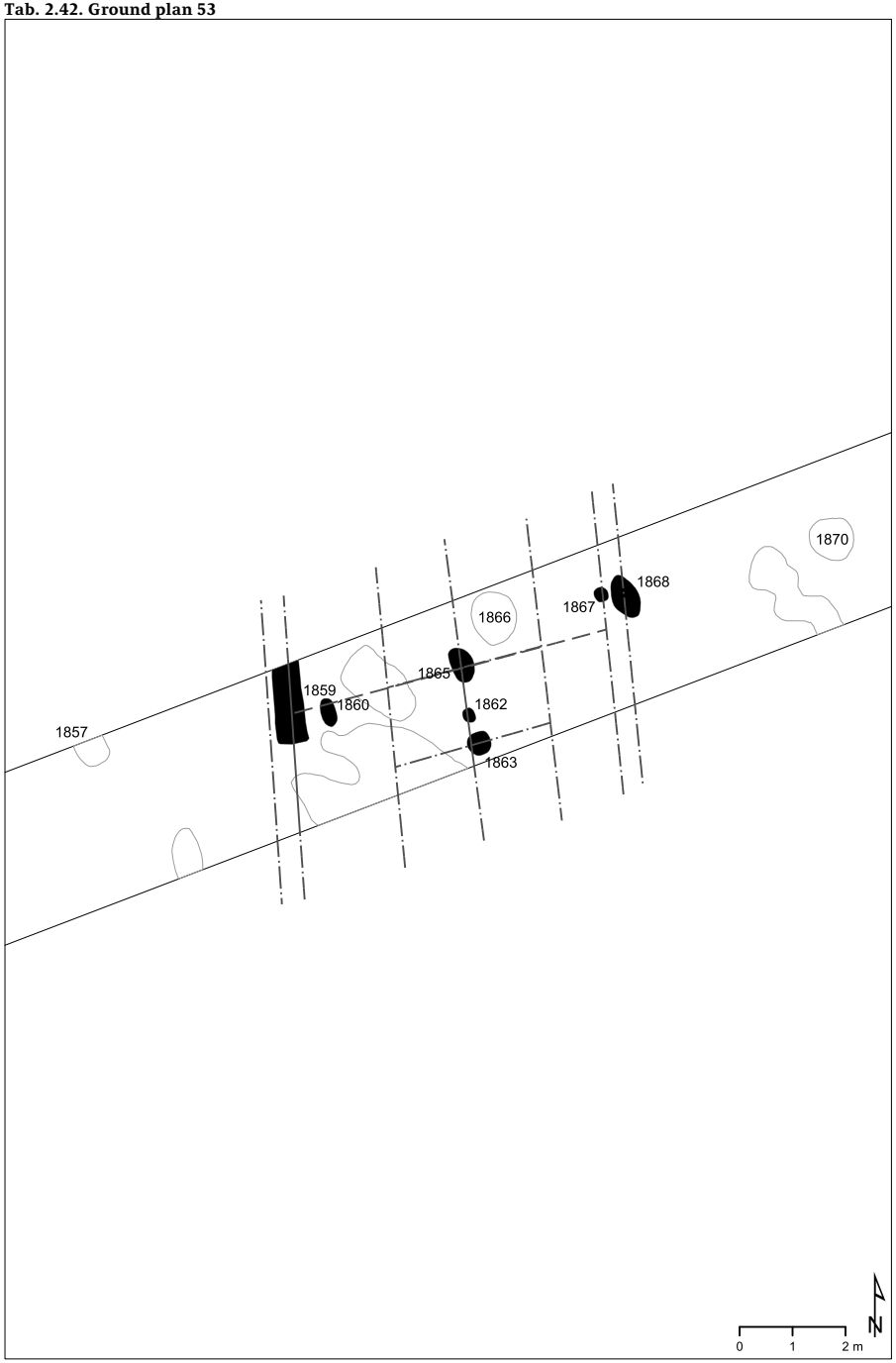
Tab. 2.40. Ground plan 50



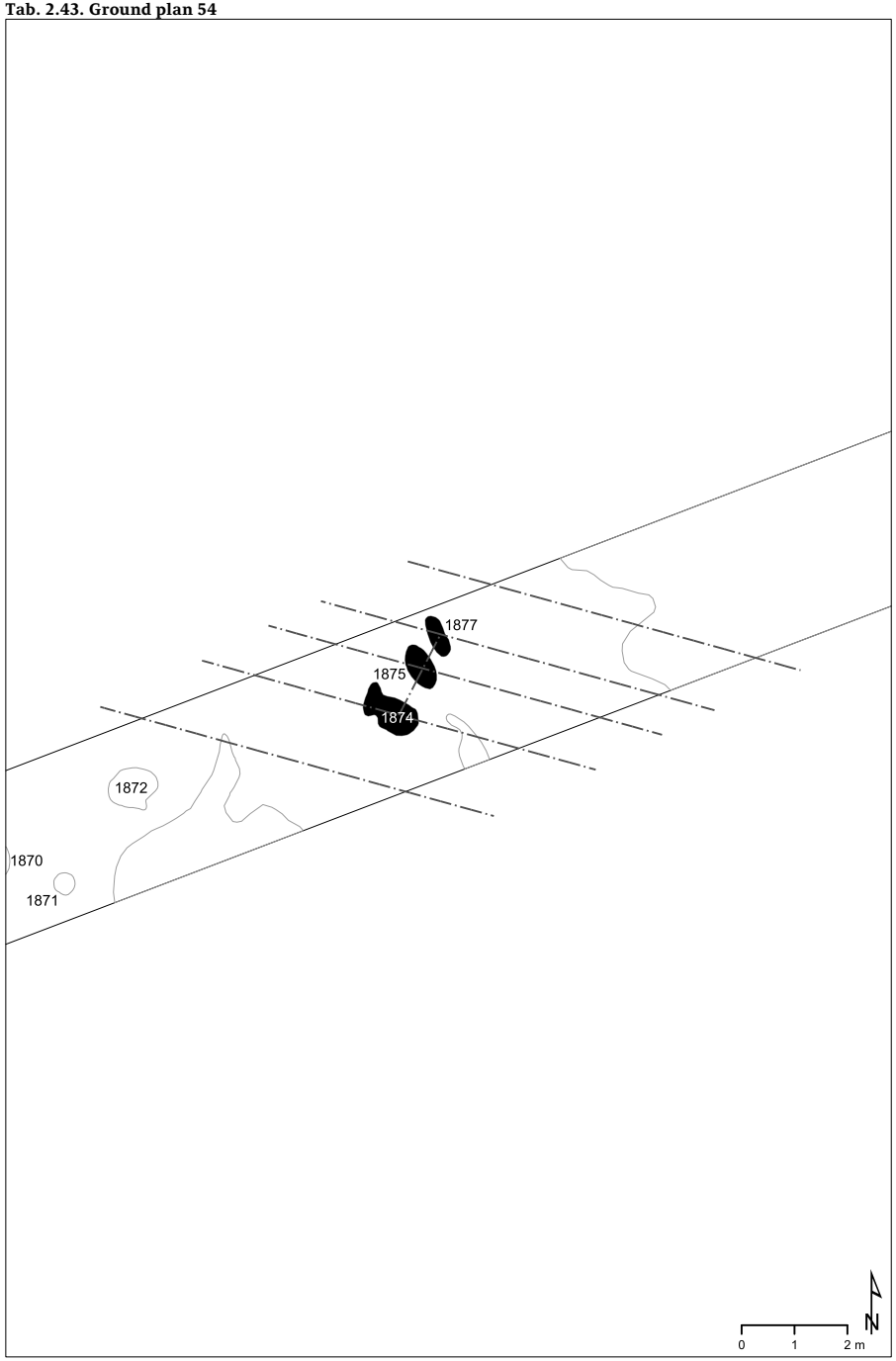
Tab. 2.41. Ground plan 52



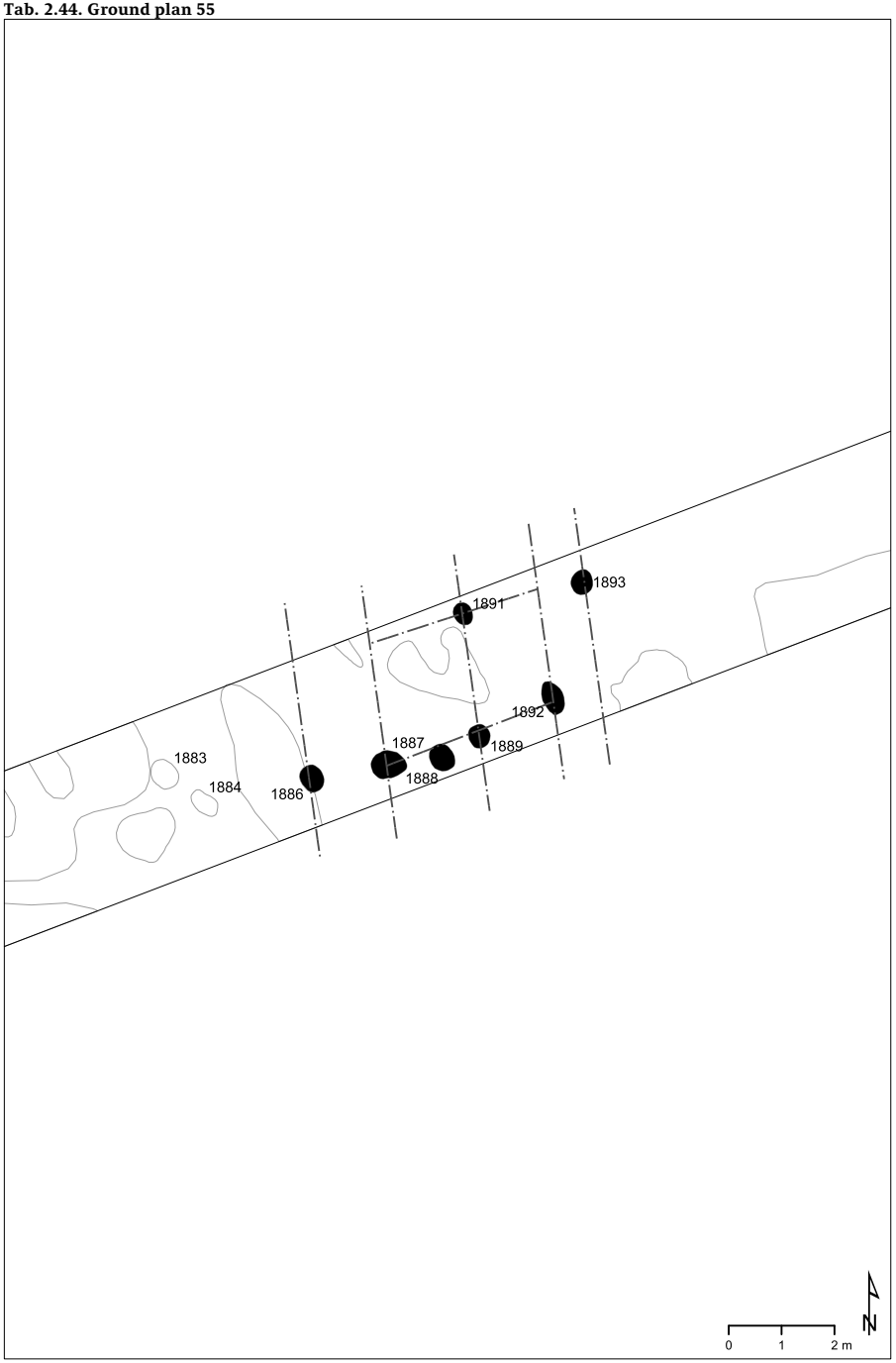
Tab. 2.42. Ground plan 53



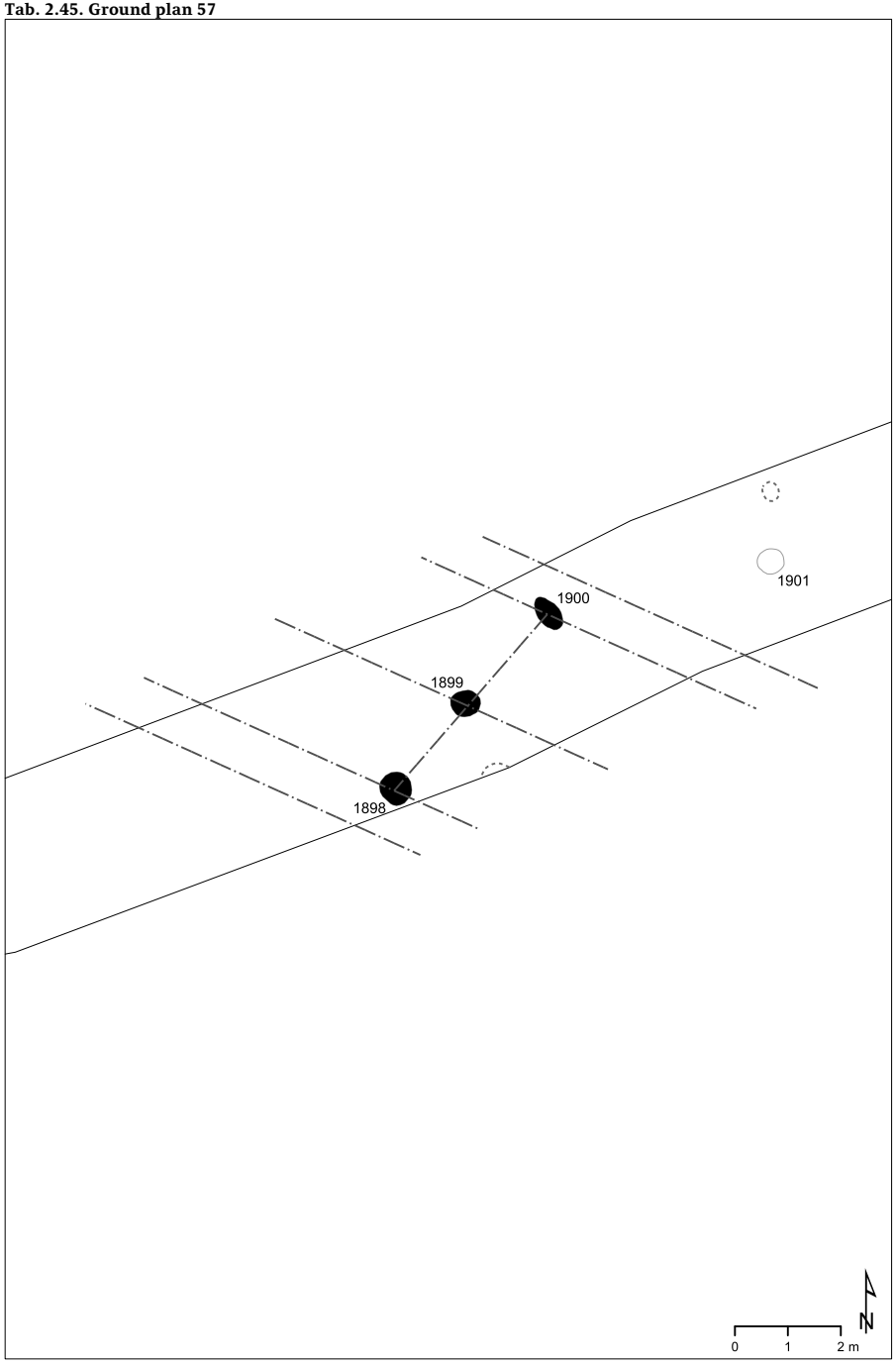
Tab. 2.43. Ground plan 54



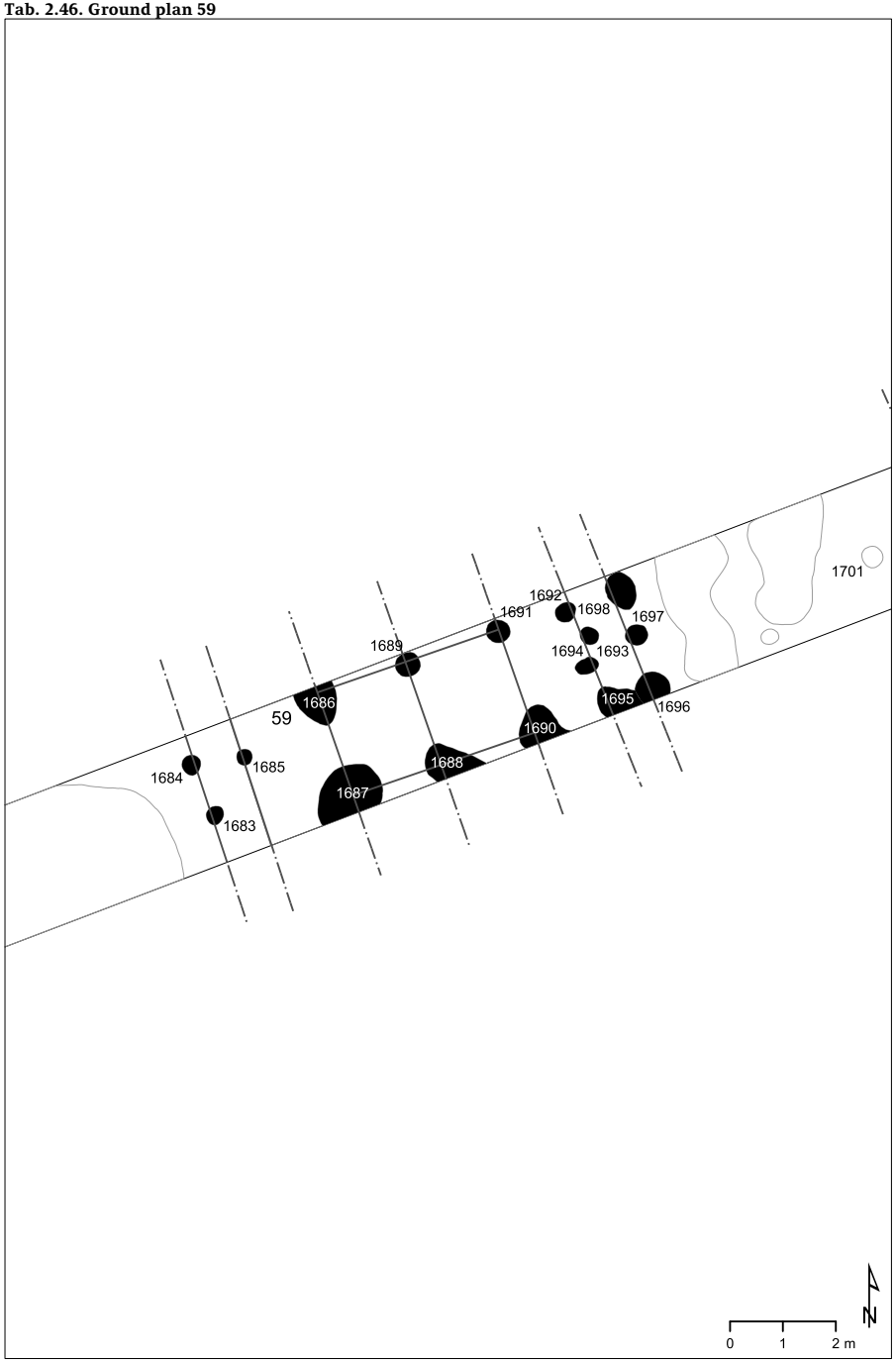
Tab. 2.44. Ground plan 55



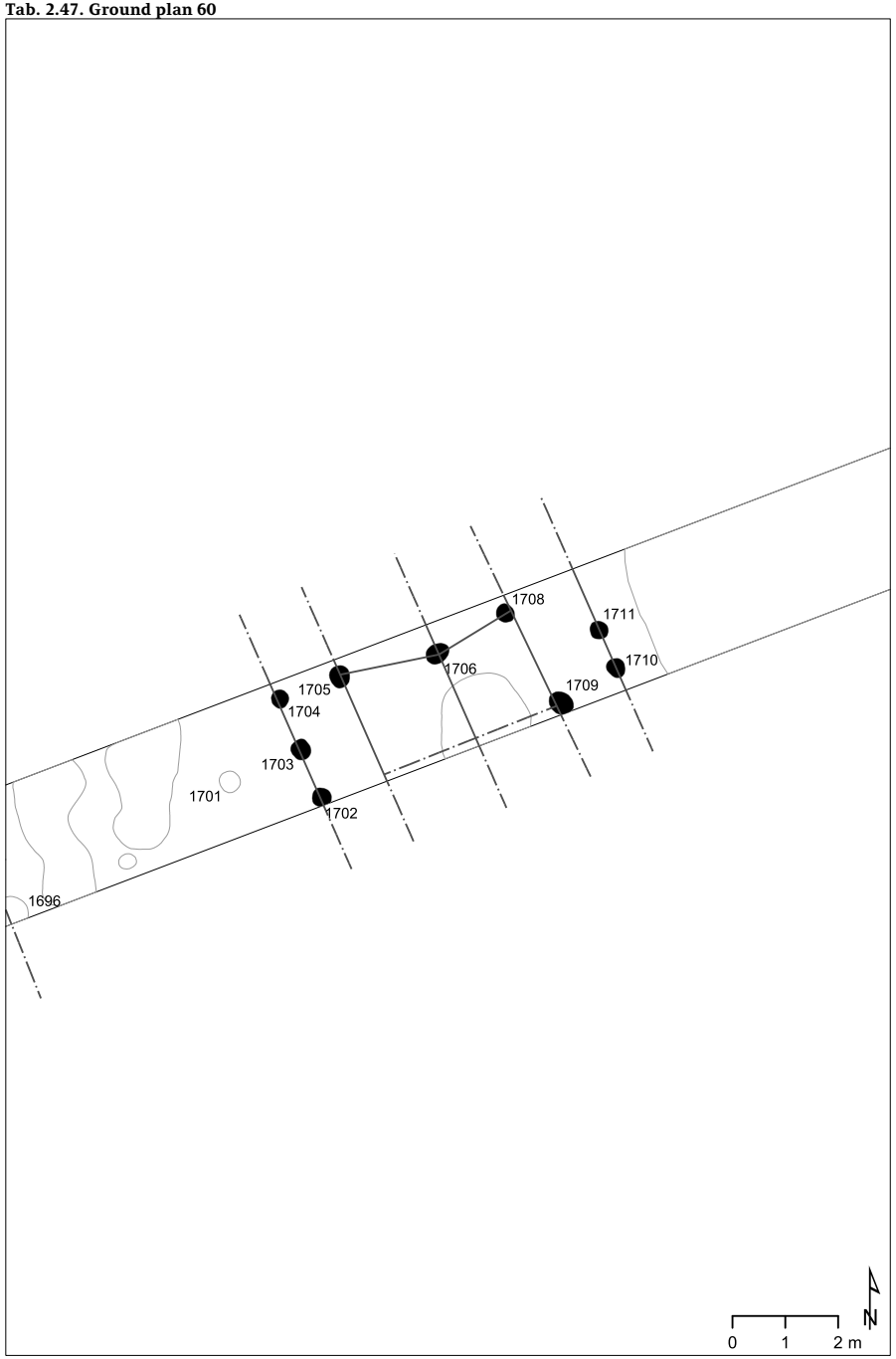
Tab. 2.45. Ground plan 57



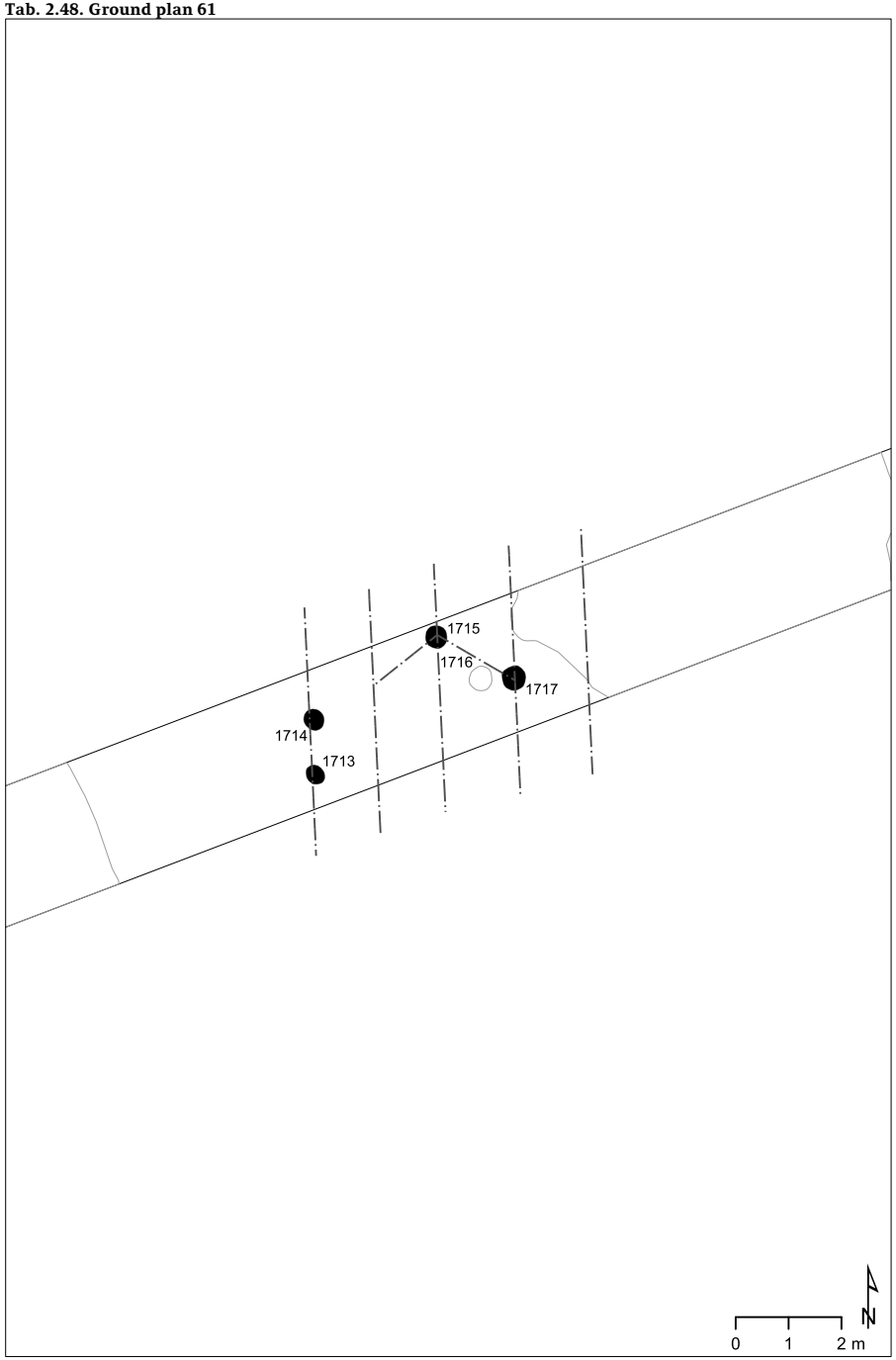
Tab. 2.46. Ground plan 59



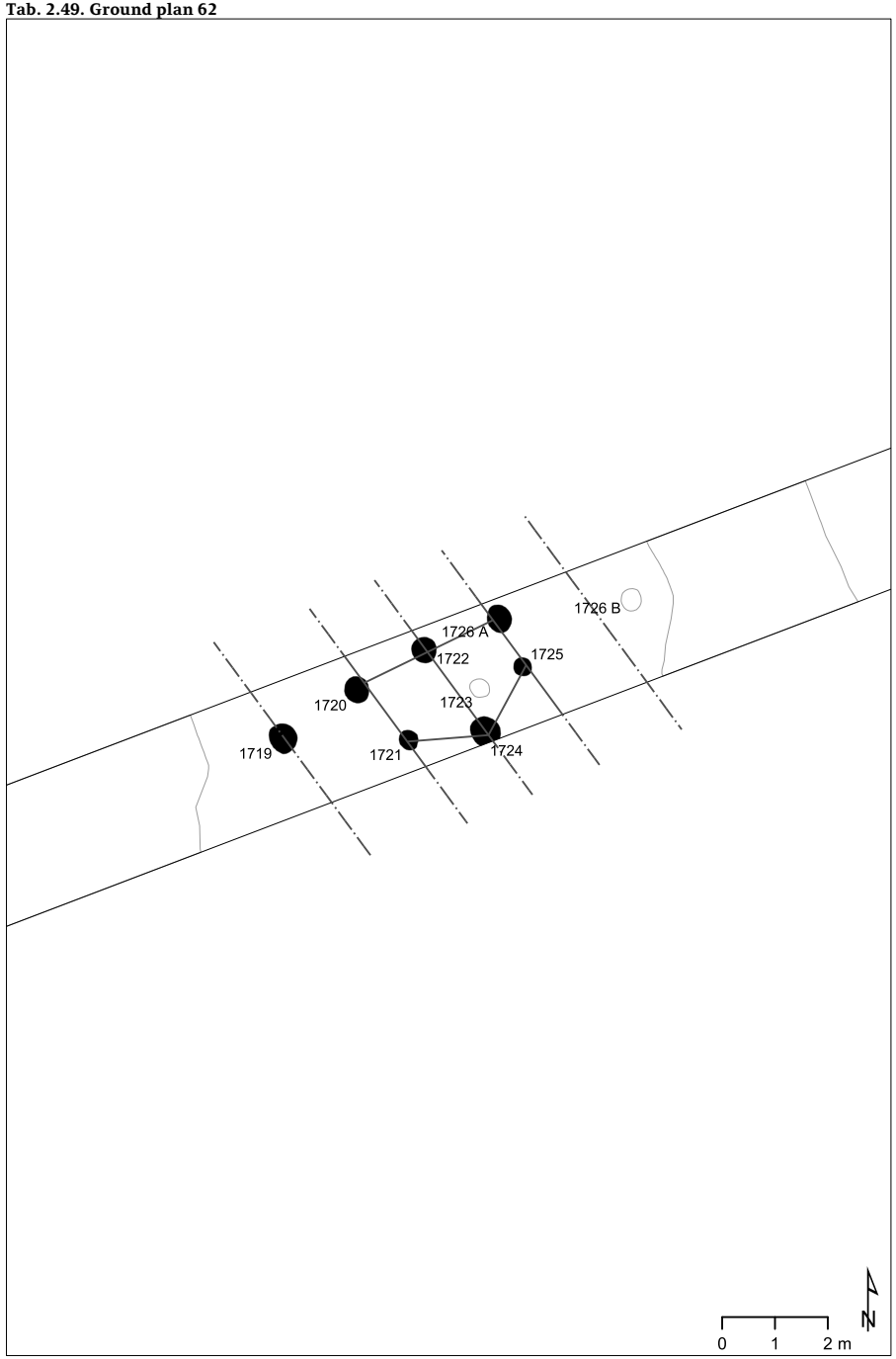
Tab. 2.47. Ground plan 60



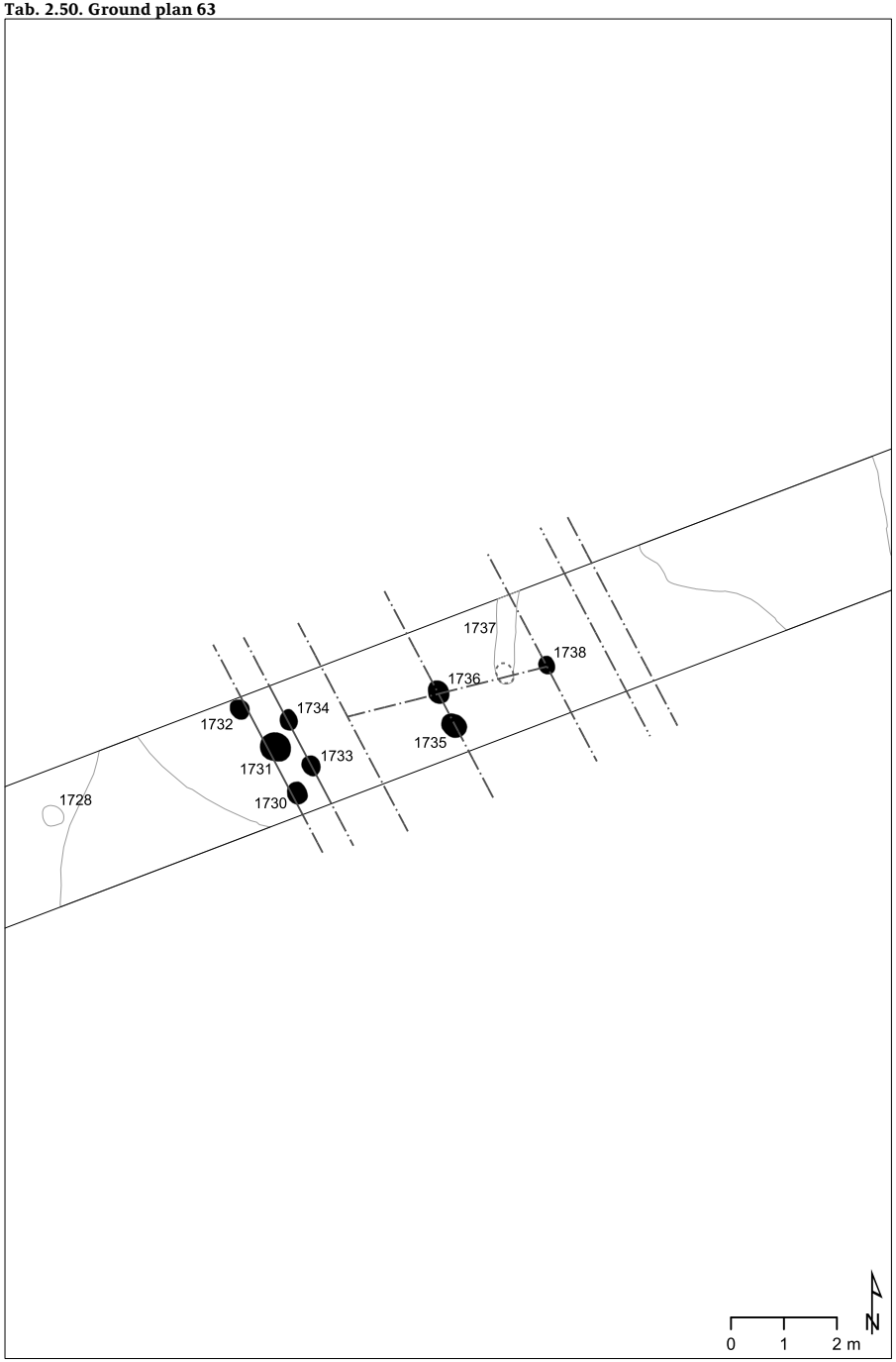
Tab. 2.48. Ground plan 61



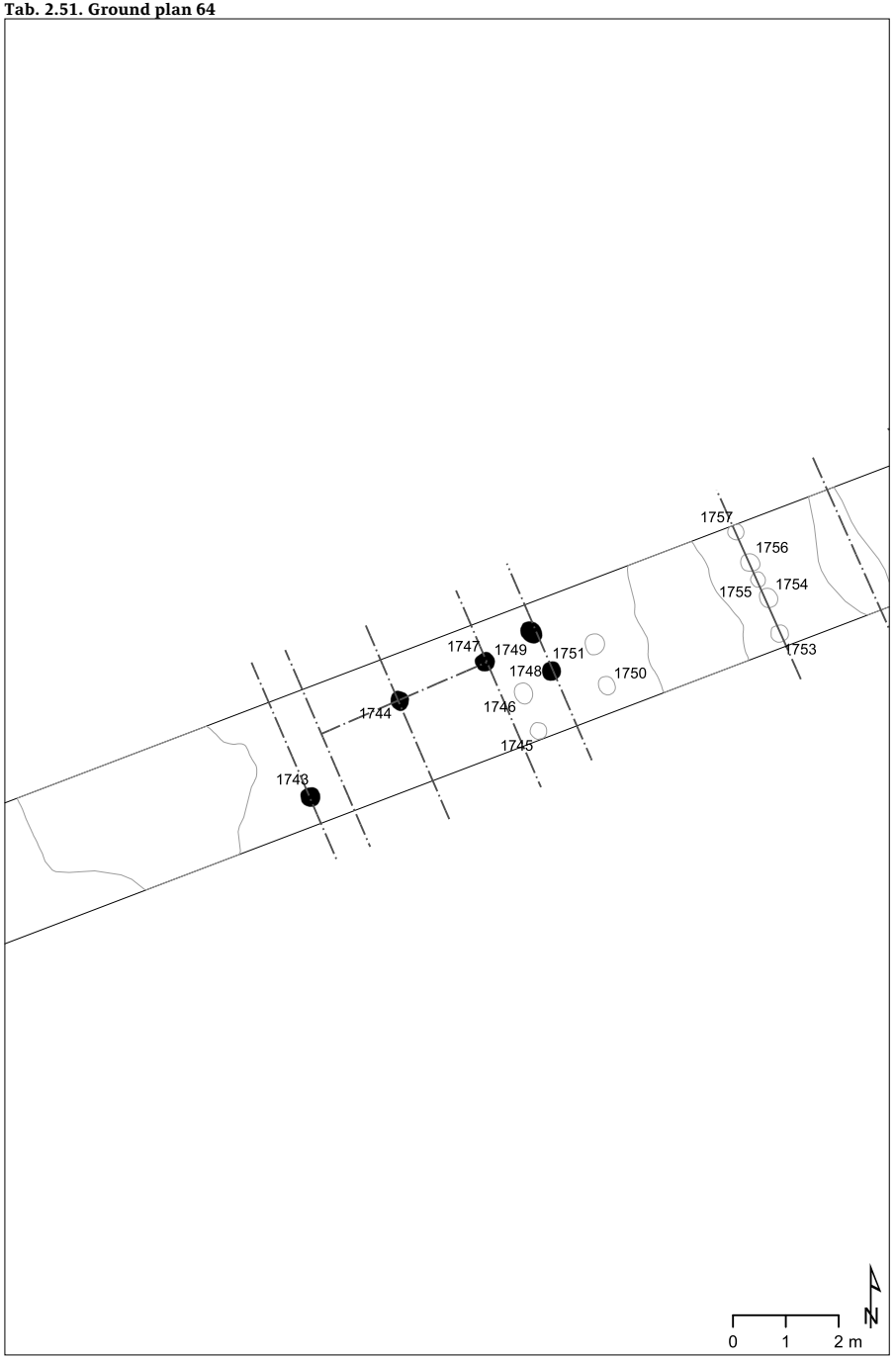
Tab. 2.49. Ground plan 62



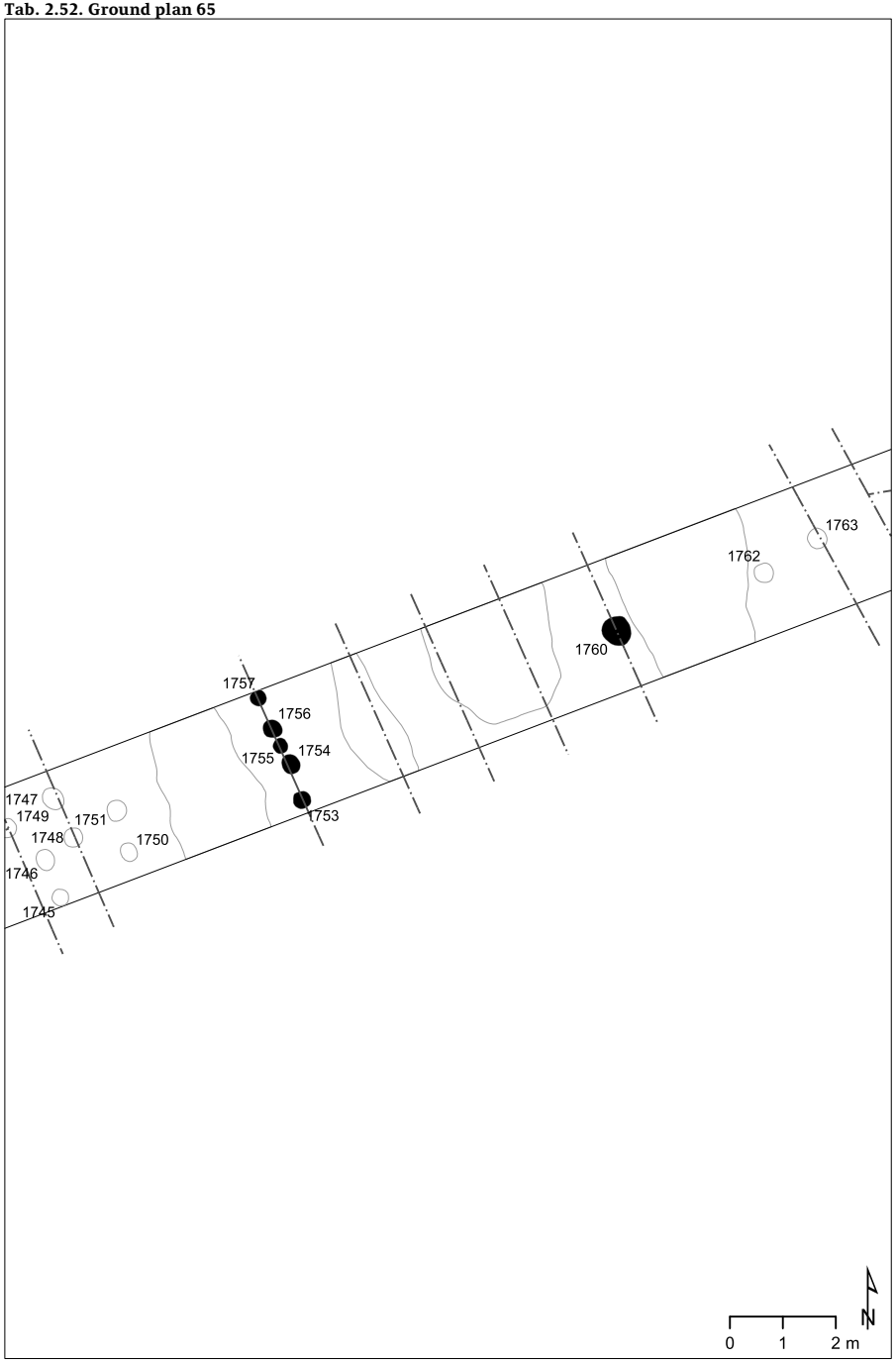
Tab. 2.50. Ground plan 63



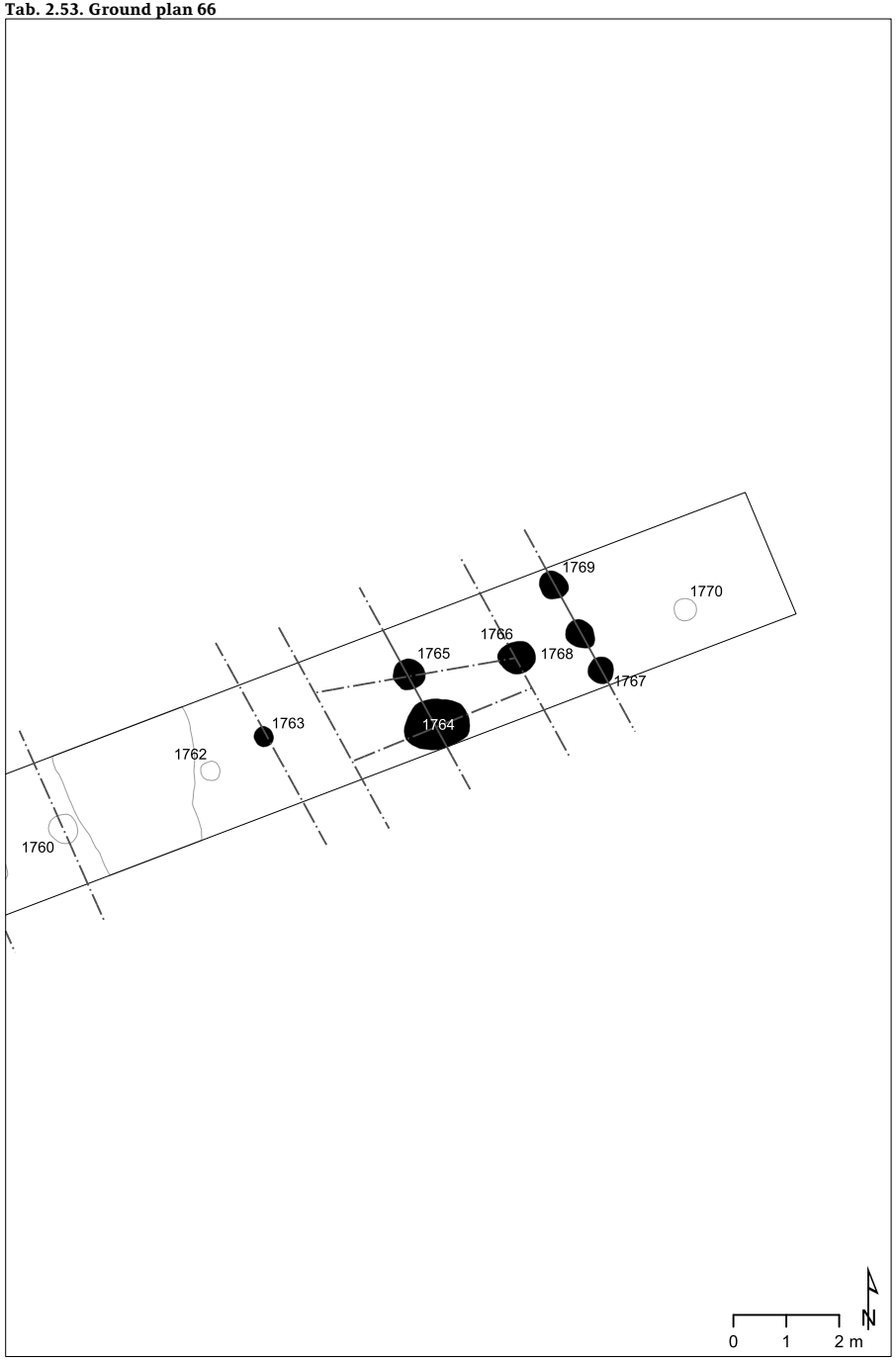
Tab. 2.51. Ground plan 64



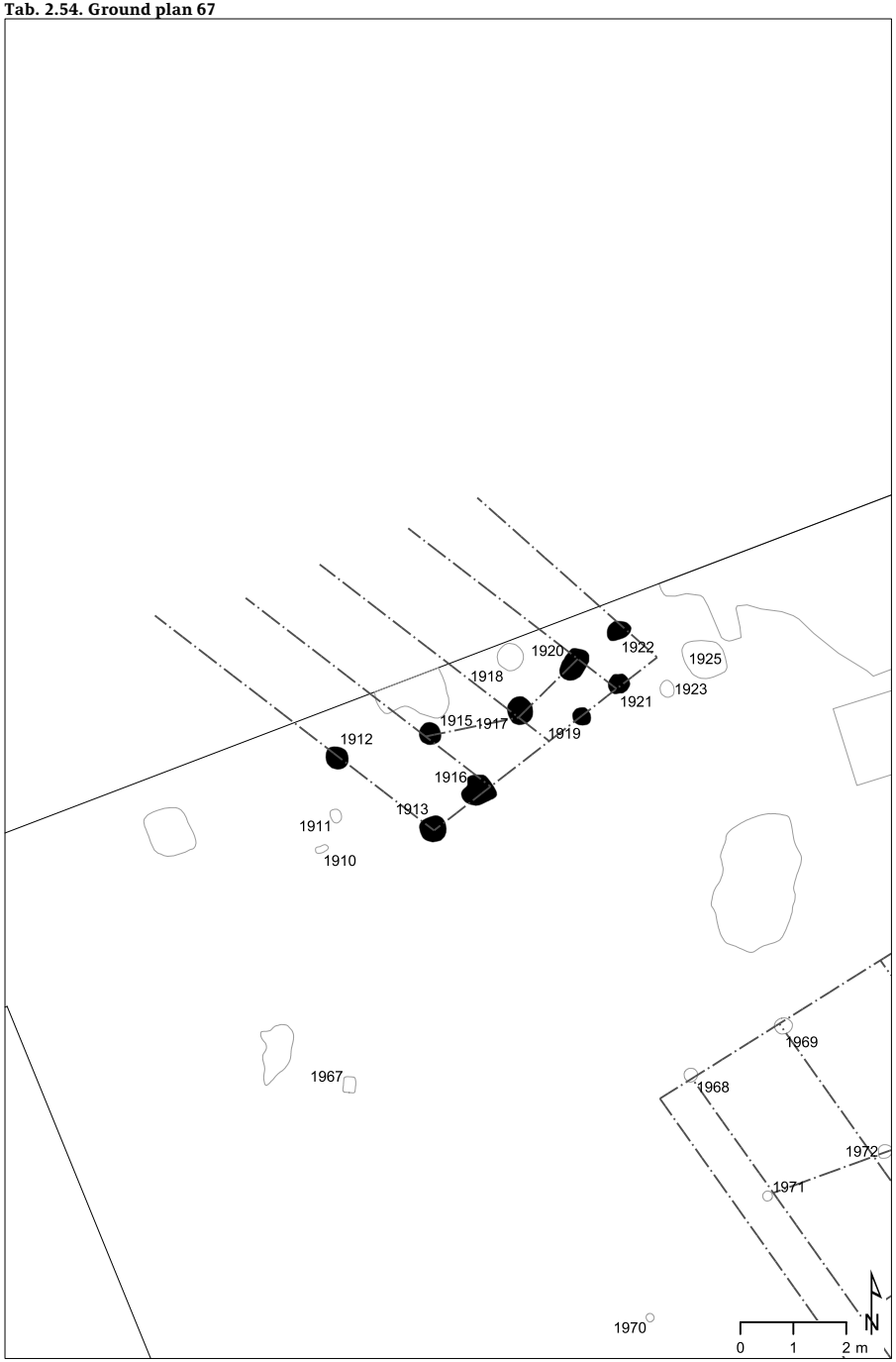
Tab. 2.52. Ground plan 65



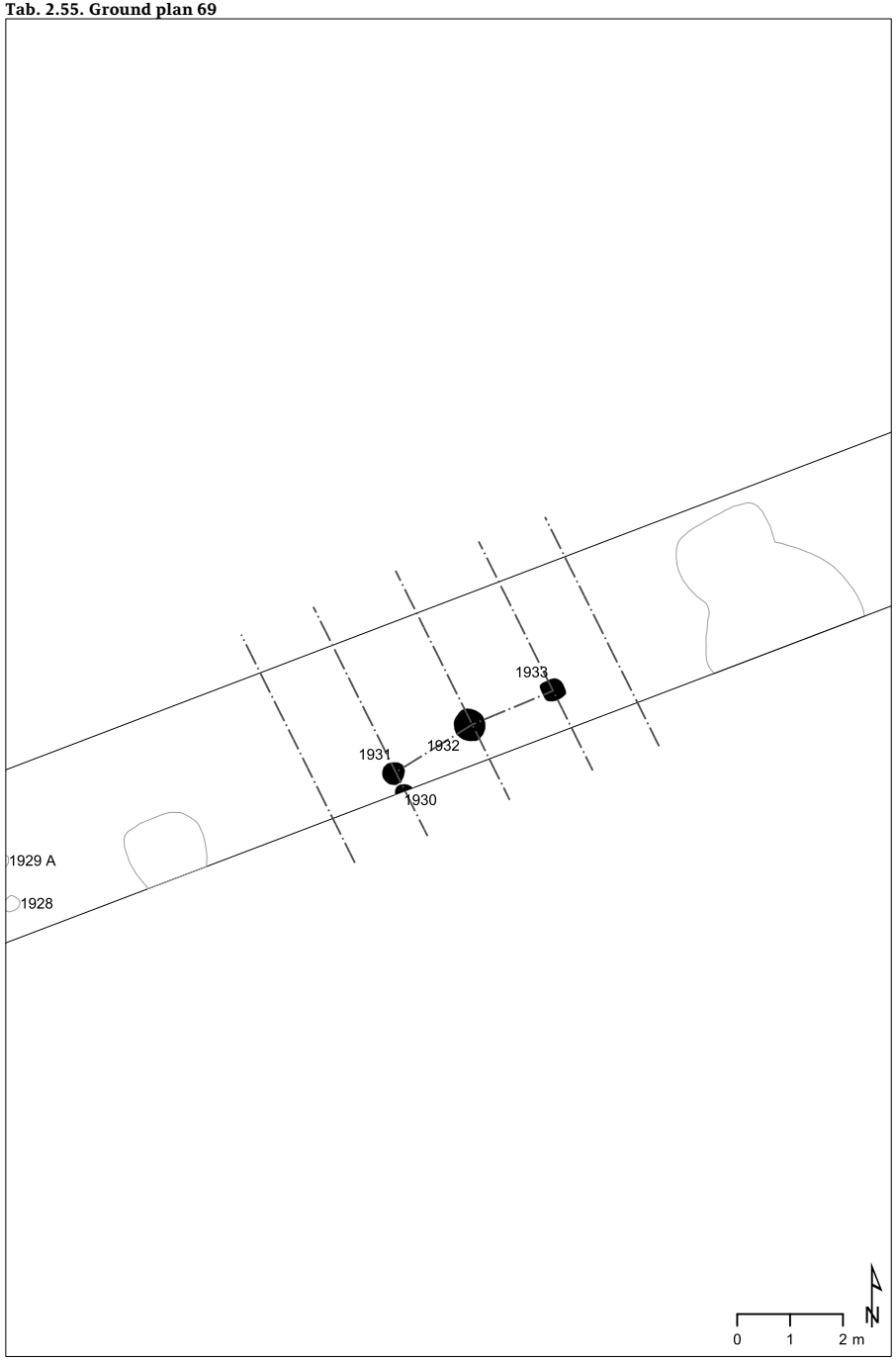
Tab. 2.53. Ground plan 66



Tab. 2.54. Ground plan 67

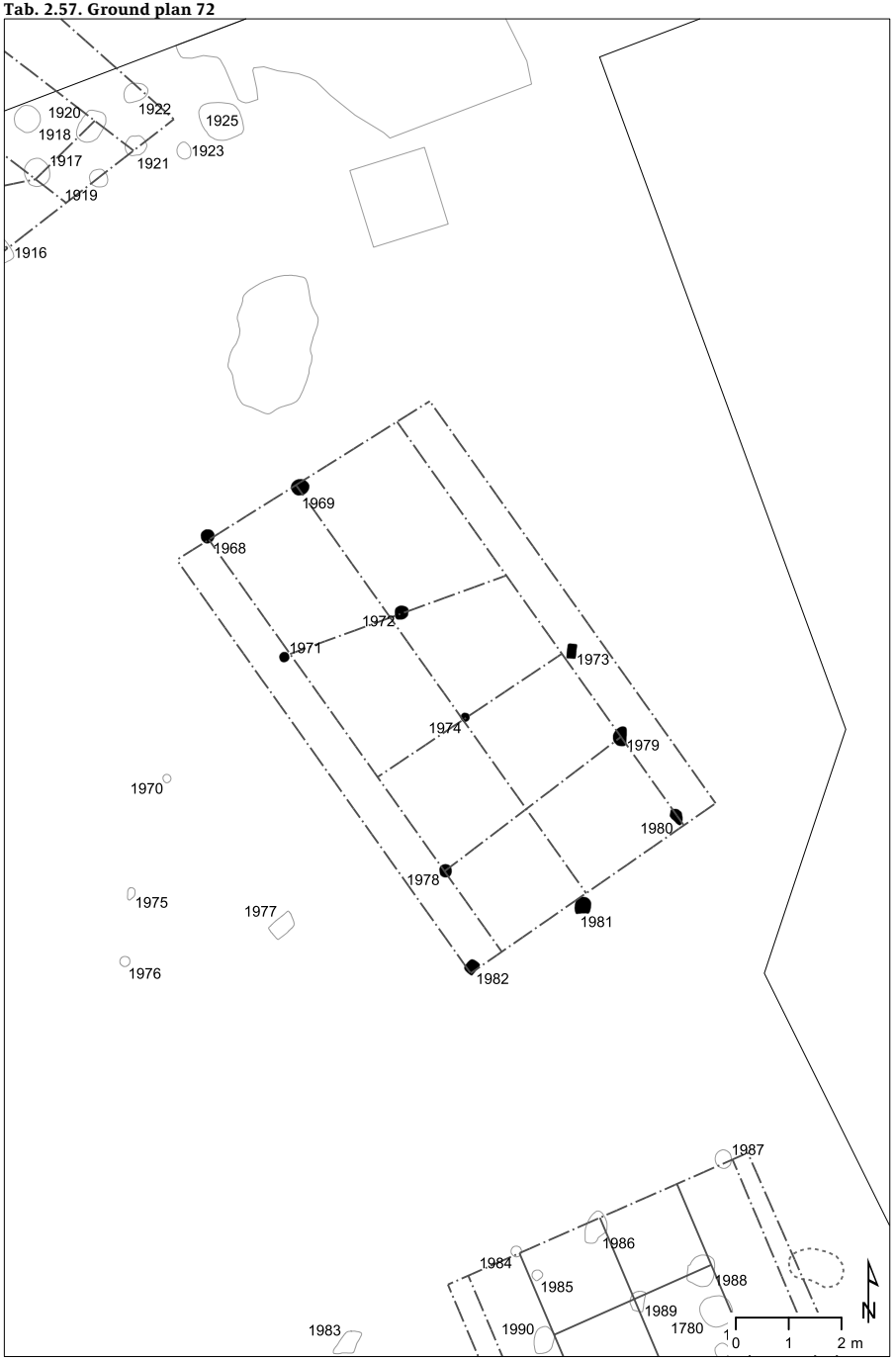


Tab. 2.55. Ground plan 69

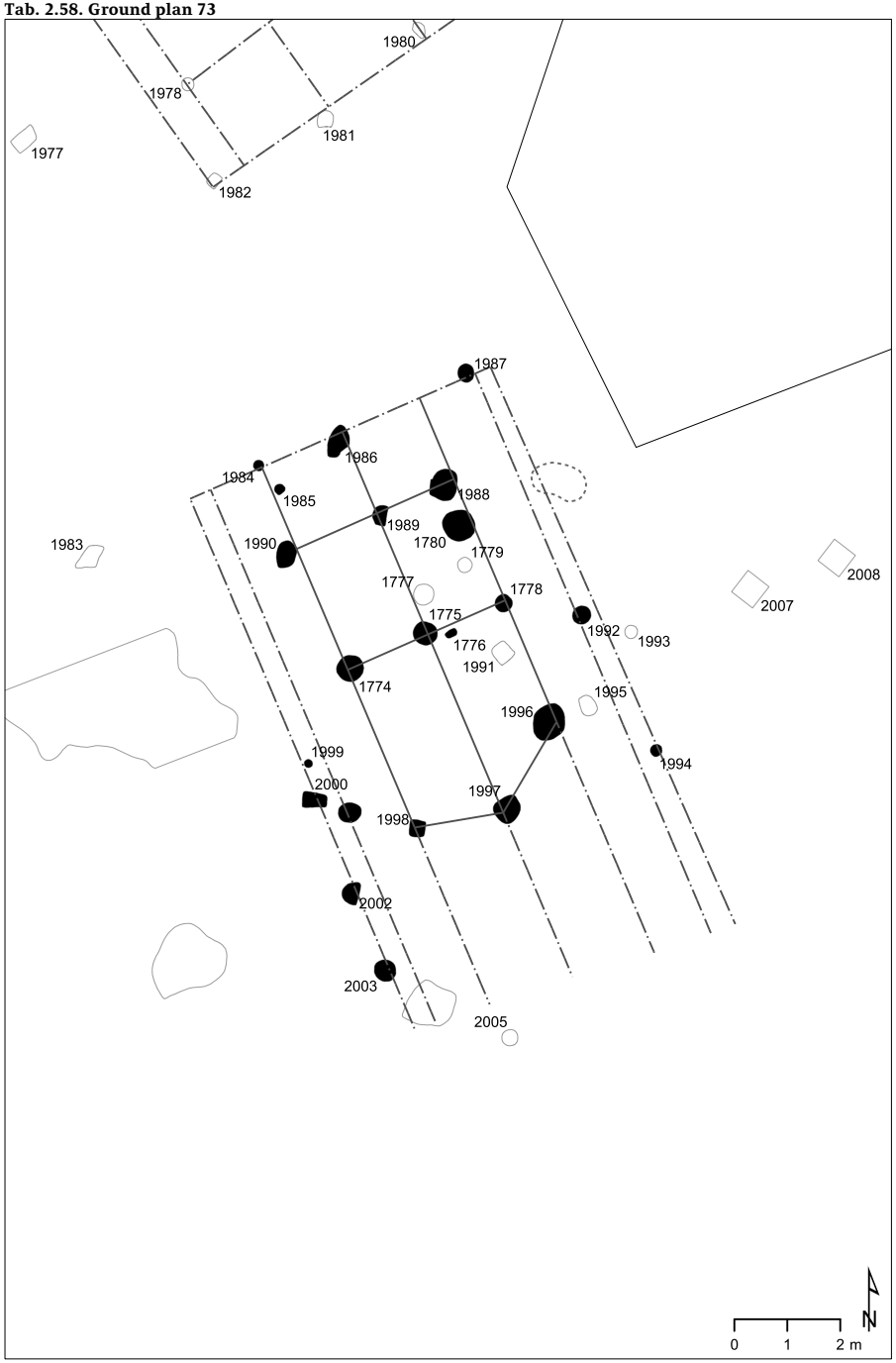


Tab. 2.56. Ground plan 70

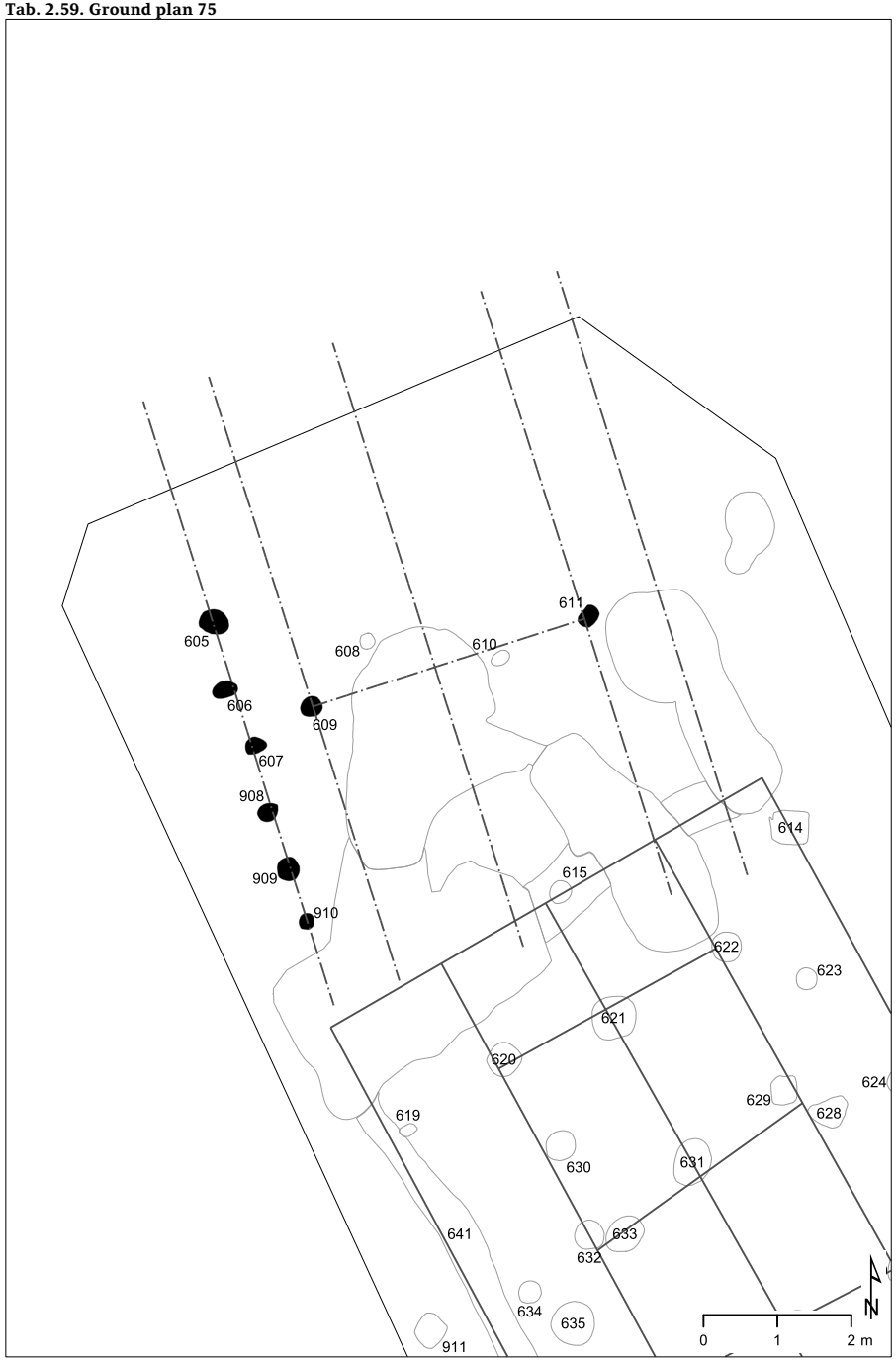
Tab. 2.57. Ground plan 72



Tab. 2.58. Ground plan 73



Tab. 2.59. Ground plan 75



12. 3. Sunken Features

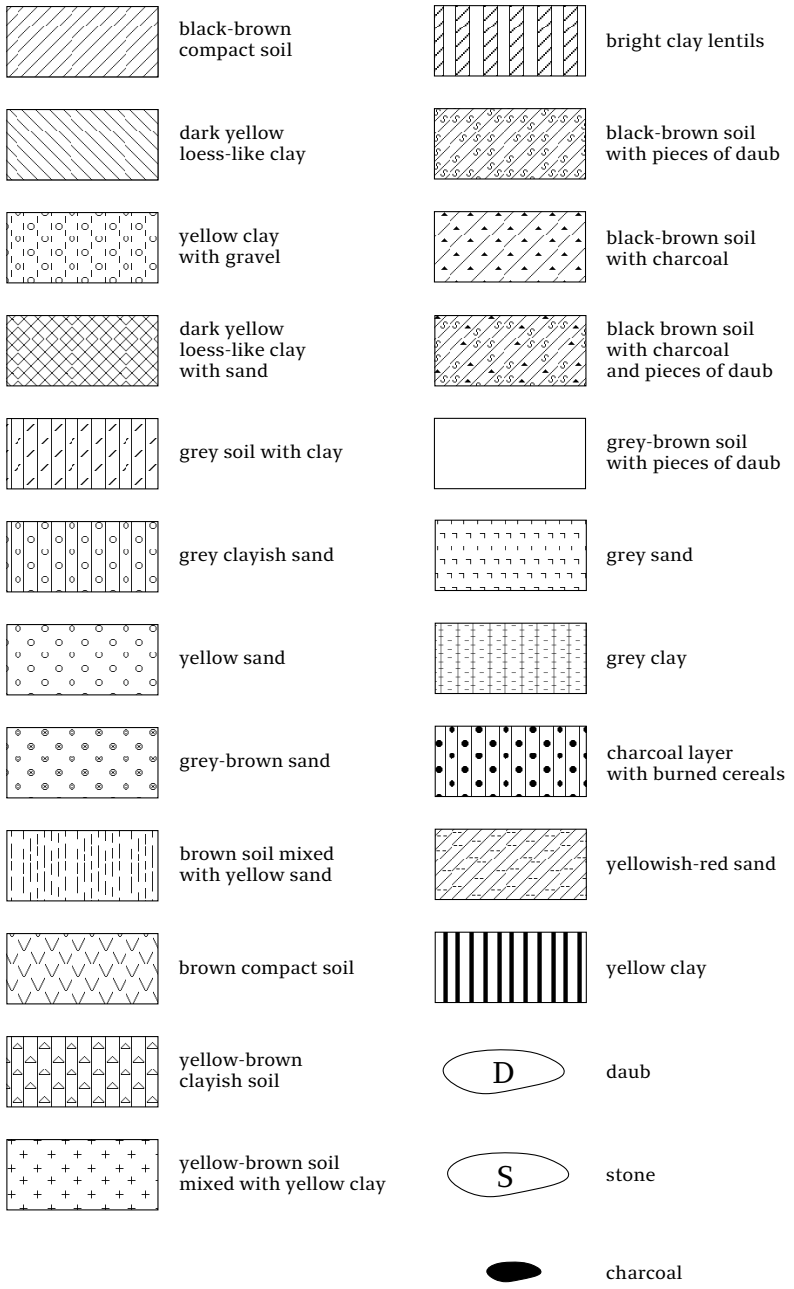
The identified archaeological features were labelled using Arabic numerals, accompanied by letters in those cases when different parts in the frame of one feature were found or a mistake in numbering occurred. During the excavation, the sunken features were clearly visible, because their dark colour contrasted sharply with the yellow Tertiary clay, shaping the typical subsoil of the Hrdlovka site. Hand-drawn field documentation was drawn up in the scales of 1:10, 1:20. In the (exceptional) case of larger situations, field documentation was drawn up in the scale of 1:50. The type of infill was described with the help of a graphical code. In the post-excavation processing, the hand-drawn documentation was transformed and processed in the virtual GIS interface.

The features can be divided into two different groups:

The **sunken features (pits)** at the Hrdlovka site are usually typical for the LBK and SBK milieu. They were shallow, dark in infill and conventionally large. The excavation in the horizontal direction was usually performed in two halves divided by the longitudinal axis of the sunken feature. In the vertical direction there was often no separation of contexts ("surface to base" system), exceptionally were the sunken features excavated in the system of mechanical layers (usually 20 cm thick).

The **postholes** are smaller in diameter and round in the ground plan. However, some of them are large with a more complex internal stratigraphy. The majority of postholes were excavated using a method of rectangular boxes in order to document their digging pits. Postholes are not depictured in this part of the catalogue, but they can be studied as a part of the catalogue of houses.

Tab. 3.1. Graphic codes of infill types



Tab. 3.2a. Characteristics of Neolithic sunken features.

feature no.	chronology	settlement horizon	type	season	area	documentation	infill character	infill type	posthole position	affinity			
										1	2	3	4
2	Neo	-	feature	1987	SJ 1b	1:10	layers	1; 11	-				
3	LBKIV/SBK I	-	loam pit	1987	SJ 1b	1:50	layers	1; 8	-				
4	LBK	-	feature	1987	SJ 1b	1:20	layers	18; 8	-				
5	LBK IV/SBK I	-	loam pit	1987	SJ 1b	1:20	layers	1; 2; 8	-				
7	Neo	-	posthole	1987	SJ 1b	1:10	compact	1	-				
28	SBK	-	feature	1987	SJ 1b	1:10	compact	10	-				
31	SBK	-	feature	1987	SJ 1b	1:20	compact	1	-				
37	Neo	-	feature	1987	SJ 1b	1:10	layers	1; 17; 3	-				
38	Neo	-	feature	1987	SJ 1b	1:10	compact	1	-				
43	Neo	-	posthole	1987	V 1	1:10	compact	1	interior	XXVII			
48	Neo	-	posthole	1987	V 1	1:10	compact	1	-				
49	Neo	-	posthole	1987	V 1	1:10	compact	1	-				
52	Neo	-	posthole	1987	V 1	1:10	compact	1	-				
53	Neo	-	feature	1987	V 1	1:10	compact	1	-				
54	Neo/KnovizC	-	pit complex	1987	V 1	1:20	layers	10; 12; 3	-				
55	Neo	-	posthole	1987	V 1	1:10	compact	1	-				
57	Neo	-	posthole	1987	V 1	1:10	compact	1	-	XXVIII			
60	Neo	-	feature	1987	V 1	1:10	compact	1	-				
62	LBK IIIb	B	posthole	1987	V 1	1:10	compact	1	W wall		IX		
71	LBK IIIb	B	posthole	1987	V 1	1:10	layers	1; 10; 12; 13; 19; 9	interior	IX			
72	LBK IIIb	B	posthole	1987	V 1	1:10	layers	1; 10; 12; 14; 15	interior	IX			
76	Neo	-	storage pit	1987	V 1	1:20	layers	1; 14	-				
82	Neo	-	posthole	1987	V 1	1:10	compact	1	interior	XXIX			
91	Neo	-	posthole	1987	V 1	1:10	compact	1	-	XXX			
101	Neo	-	feature	1987	V 1	1:20	compact	10	-				
102	Neo	-	pit complex	1987	V 1	1:20	layers	1; 10; 12	-		IX; XXVIII		61
103	LBK IIIb	B	feature	1987	V 1	1:20	layers	1; 10; 2	-	IX			
104	SBK III-IV	-	feature	1987	V 1	1:20	layers	1; 14; 2	-		XXIX		106
105	Neo	-	feature	1987	V 1	1:20	layers	1; 10; 2	-				XXIX
106	Neo	-	feature	1987	V 1	1:20	compact	1	-		XXIX		104
108	Neo	-	building pit	1987	V 1	1:20	compact	1	-	XXIX			113
109	LBK	-	storage pit	1987	V 1	1:20	compact	1	-				
110	Neo	-	building pit	1987	V 1	1:20	-	-	-			XXXI	
111	Neo	-	pit complex	1987	V 1	1:20	layers	1; 10; 11; 14; 9	-				
112	LBK IIIb	B	posthole	1987	V 1	1:10	compact	1	interior	IX			
113	SBK III-IV	-	feature	1987	V 1	1:20	compact	10	-				107; 108; XXIX
126	LBK	-	feature	1987	SJ 1b	1:20	layers	1; 10; 14; 22; 8; 9	-				

Tab. 3.2b. Characteristics of Neolithic sunken features.

feature no.	chronology	settlement horizon	type	season	area	documentation	infill character	infill type	posthole position	affinity			
										1	2	3	4
132	SBK I-III	-	feature	1987	SJ 1b	1:20	layers	14; 18; 4; 7; 9	-				
134	LBK	-	feature	1987	SJ 1b	1:20	layers	1; 17; 4; 9	-				
135	Neo	-	feature	1987	SJ 1b	1:20	layers	1; 14; 9	-				
141	SBK I-III	-	feature	1987	SJ 1b	1:20	compact	1	-				
189	LBK IIIb	C	building pit	1987	SJ 1a	1:20	compact	1	-	VI			
202	LBK IVb/SBK I	G	building pit	1987	SJ 1a	1:20	layers	1; 9	-	II			
217	LBK IVb/SBK I	G	posthole	1987	SJ 1a	1:10	layers	1; 9	interior	II			
228	LBK IVb/SBK I	G	posthole	1987	SJ 1a	1:10	compact	14	interior	II			
231	LBK IVb/SBK I	G	posthole	1987	SJ 1a	1:10	compact	1	W wall	II			
234	LBK IVb/SBK I	G	feature	1987	SJ 1a	1:100	-	-	-	II			
236	LBK IVb/SBK I	G	feature	1987	SJ 1a	1:20	compact	1	-	II			240; 241
250	SBK III-IV	-	storage pit	1987	SJ 1a	1:20	layers	1; 14	-			II	
252	LBK IVb/SBK I	G	posthole	1987	SJ 1a	1:10	compact	1	E wall	II			
253	LBK IVb/SBK I	G	posthole	1987	SJ 1a	1:10	compact	1	E wall	II			
257	LBK IVb/SBK I	G	posthole	1987	SJ 1a	1:10	layers		interior	II			
261	LBK IVb/SBK I	G	building pit	1987	SJ 1a	1:20	layers	1; 14; 15; 9	-	II			245
265	Neo	-	feature	1987	SJ 1a	1:10	compact	14	-			II	
288	Neo	-	posthole	1987	SJ 1a	1:10	compact	1	-				
300	LBK IVb/SBK I	G	posthole	1987	SJ 1a	1:10	compact	14	interior	II			
305	LBK	-	feature	1987	SJ 1a	1:20	compact	1	-		III		
325	LBK IVb/SBK I	G	ditch	1987	SJ 1a	1:20	compact	1	N ditch	II			329; 330; 720 A
329	LBK IIIb	C	feature	1987	SJ 1a	1:20	layers	1; 5; 9	-	IV			II
330	LBK IVa	D	feature	1987	SJ 1a	1:20	-	-	-				293; 720 A; II
339	LBK IIIb	C	feature	1987	SJ 1a	1:20	layers	1; 15; 17; 4	-			III	457
345	LBK IIIb	C	building pit	1987	SJ 1a	1:20	compact	1	-	IV			III
360	LBK IVb/SBK I	F	posthole	1987	SJ 1a	1:10	layers	1; 9	interior	III			
386	LBK IVb/SBK I	F	posthole	1987	SJ 1a	1:10	layers	14; 17; 9	interior	III			
392	LBK	-	feature	1987	SJ 1a	1:100	-	-	-				IV
402	LBK IVb/SBK I	F	posthole	1987	SJ 1a	1:10	layers	1; 9	interior	III			
430	SBK	-	feature	1987	SJ 1a	1:20	layers	1; 12	-		III		
447	LBK	-	feature	1987	SJ 1a	1:20	layers	1; 12	-				
457	LBK IVb/SBK I	F	posthole	1987	SJ 1a	1:20	compact	1	W wall	III			339
489	LBK	-	feature	1987	V 2	1:10	compact	1	-	XXXV			
543	SBK	-	building pit	1987	V 2	1:100	-	-	-	XXXIX			
554	LBK III	-	feature	1987	V 2	1:100	compact	-	-				
558	Neo	-	storage pit	1987	V 3	1:20	layers	1; 14; 15; 18	-				
559	LBK I	A	building pit	1987	V 3	1:20	layers	1; 2; 3; 9	-	XXIII			

Tab. 3.2c. Characteristics of Neolithic sunken features.

feature no.	chronology	settlement horizon	type	season	area	documentation	infill character	infill type	posthole position	affinity			
										1	2	3	4
565	LBK	-	feature	1987	V 3	1:100	-	-	-				XXIII
566	LBK	-	feature	1987	V 3	1:20	layers	1; 14; 2	-		XXIII		
567	Neo	-	feature	1987	V 3	1:20	layers	1; 2	-				XLV
571	Neo	-	feature	1987	V 3	1:20	layers	1; 2	-				XXIV
574 B	LBK IIIb	B	feature	1987	V 3	1:20	layers	1; 2	-	XXV			
580 B	Neo	-	feature	1987	V 3	1:20	layers	1; 2	-			XXVI	581 B
581 B	Neo	-	feature	1987	V 3	1:20	layers	1; 2	-	XXVI			580 B
586 B	LBK	-	feature	1987	V 3	1:20	compact	1	-	XXVI			
588 B	Neo	-	feature	1987	V 3	1:20	compact	1	-				
589 B	LBK	-	feature	1987	V 3	1:20	compact	1	-				
612	Neo	-	feature	1987	V 1a	1:100	-	-	-	LXXV			
613	LBK	-	feature	1987	V 1a	1:20	layers	1; 14; 15; 18; 2; 9	-				IX; LXXV
616	LBK	-	feature	1987	V 1a	1:20	layers	1; 14	-				IX; LXXV
617	LBK IIIb	B	feature	1987	V 1a	1:20	compact	1	-	IX			618; LXXV
618	LBK IIIb	C	feature	1987	V 1a	1:20	layers	1; 14	-				617; IX; LXXV
654	LBK IIIb	B	feature	1987	V 1a	1:20	layers	1; 14; 2	-	IX			
668	LBK IIIb	B	feature	1987	V 1a	1:100	-	-	-	IX		669	
703	LBK IIIb	C	feature	1987	SJ 1a	1:20	layers	1; 11; 6	-	VI			245
704	LBK III	-	feature	1987	SJ 1a	1:100	-	-	-		VII		
720 A	LBK IVa	E	building pit	1987	SJ 1a	1:20	layers	1; 14; 15	-	VII			330; 720 B; II
720 B	LBK IVb/SBK I	G	feature	1987	SJ 1a	1:100	-	-	-			VII	720 A
765	LBK IIIb	C	storage pit	1987	SJ 1a	1:20	layers	1; 17; 20; 22	-	IV			
838	SBK IVa	J	feature	1987	SJ 1a	1:20	layers	-	-	VIII			
850	SBK II	H	feature	1987	SJ 1b	1:20	compact	1	-	I			
907	SBK IVa	J	feature	1987	SJ 1a	1:100	-	-	-	VIII			
937	SBK II	H	feature	1988	SJ 2	1:20	layers	1; 9	-	X			
940	Neo	-	feature	1988	SJ 2	1:20	layers	10; 9	-				
945	Neo	-	loam pit	1988	SJ 2	1:20	layers	1; 11; 14; 2; 3; 6	-				
950	SBK	-	feature	1988	SJ 2	1:100	-	-	-	XLIII			245
1082	SBK II	-	feature	1988	V 0	1:20	compact	1	-				
1083	SBK III-IV	-	feature	1988	V 4a	1:20	compact	1	-				
1084	Neo	-	feature	1988	V 4a	1:100	compact	1	-				
1090 A	LBK IVb/SBK I	F	building pit	1988	SJ 1h	1:20	compact	1	-	III			
1090 B	LBK IVb/SBK I	F	building pit	1988	SJ 1h	1:20	compact	1	-	III			
1090 C	LBK IVb/SBK I	F	building pit	1988	SJ 1h	1:20	layers	1; 18	-	III			
1091	LBK IV/SBK I	-	feature	1988	-	-	-	-	-				
1092	LBK IVb/SBK I	F	feature	1988	SJ 1h	1:20	compact	1	-	III			

Tab. 3.2d. Characteristics of Neolithic sunken features.

feature no.	chronology	settlement horizon	type	season	area	documentation	infill character	infill type	posthole position	affinity			
										1	2	3	4
1093	LBK IVb/SBK I	F	feature	1988	SJ 1h	1:50	compact	1	-		III		
1094	LBK IV	-	storage pit	1988	SJ 2	1:20	compact	1	-			XV	XVI
1095	SBK II	-	storage pit	1988	SJ 2	1:20	compact	1	-			XVI	
1096	LBK IVb/SBK I	G	feature	1988	SJ 2	1:20	layers	1; 18; 2; 3	-				XV
1097	LBK	-	storage pit	1988	SJ 2	1:20	compact	1	-				
1098	Neo	-	storage pit	1988	SJ 2	1:20	compact	1	-				
1099	LBK	-	feature	1988	SJ 2	1:100	-	-	-				XVI
1100	Neo	-	loam pit	1988	SJ 2	1:20	layers	1; 2	-				
1101	SBK II	H	feature	1988	SJ 2	1:20	compact	1	-	XV			
1102 A	Neo	-	storage pit	1988	SJ 2	1:100	-	-	-				
1238	LBK IV/SBK I	-	building pit	1989	SJ 2h	1:100	-	-	-			VI	245; XLIII
1239	LBK IIIb	C	feature	1989	SJ 2h	1:100	compact	1	-	VI			
1247	SBK IVa	J	feature	1989	B	1:100	compact	10	-	XVII			
1250	SBK IVa	J	ditch	1989	B	1:20	layers	1	W wall	XVII			
1251	SBK IVa	J	ditch	1989	B	1:20	compact	1	E wall	XVII			
1252 B	Neo	-	feature	1989	B	1:100	-	-	-				
1253	Neo	-	posthole	1989	B	1:20	compact	1	E wall	XVIII			
1264	Neo	-	posthole	1989	B	1:20	layers	1; 4; 9	interior	XVIII			
1273	SBK II	-	feature	1989	B	1:100	-	-	-		XVIII		
1274	Neo	-	building pit	1989	B	1:20	layers	1; 9	-	XVIII			
1315	Neo	-	feature	1989	B	1:100	layers	-	-		XX		
1337	Neo	-	loam pit	1989	B	1:20	layers	1; 14; 9	-				
1339	SBK IVa	J	loam pit	1989	B	1:100	-	-	-	XVII			
1340	SBK II-III	-	feature	1989	B	1:20	-	-	-				
1341	SBK	-	feature	1989	B	1:50	-	-	-				
1358	SBK I-III	-	feature	1989	SJ 2h	1:20	compact	1	-		X		
1392	SBK IV	-	feature	1989	SJ 2h	1:10	layers	1; 10; 11; 12; 14; 9	-				
1394	SBK II-III	I	posthole	1989	SJ 2h	1:10	layers	1; 13; 15	interior	XLI			
1400	SBK II-III	I	building pit	1989	SJ 2h	-	-	-	-	XLI			
1420	LBK	-	posthole	1989	SJ 2h	1:100	-	-	interior	XLII			
1435	LBK	-	feature	1989	SJ 2h	1:100	-	-	-	XLII			
1468	Neo	-	feature	1989	SJ 2b	1:100	-	-	-				
1469	LBK	-	feature	1989	SJ 2b	1:100	-	-	-				
1518	Neo	-	loam pit	1989	SJ 1h	1:100	-	-	-				
1522	Neo	-	feature	1989	SJ 1h	1:20	-	-	-				
1634	LBK/Post-neo	-	feature	1989	Z	-	-	-	-				
1635	Neo/Post-neo	-	feature	1989	Z	-	-	-	-				

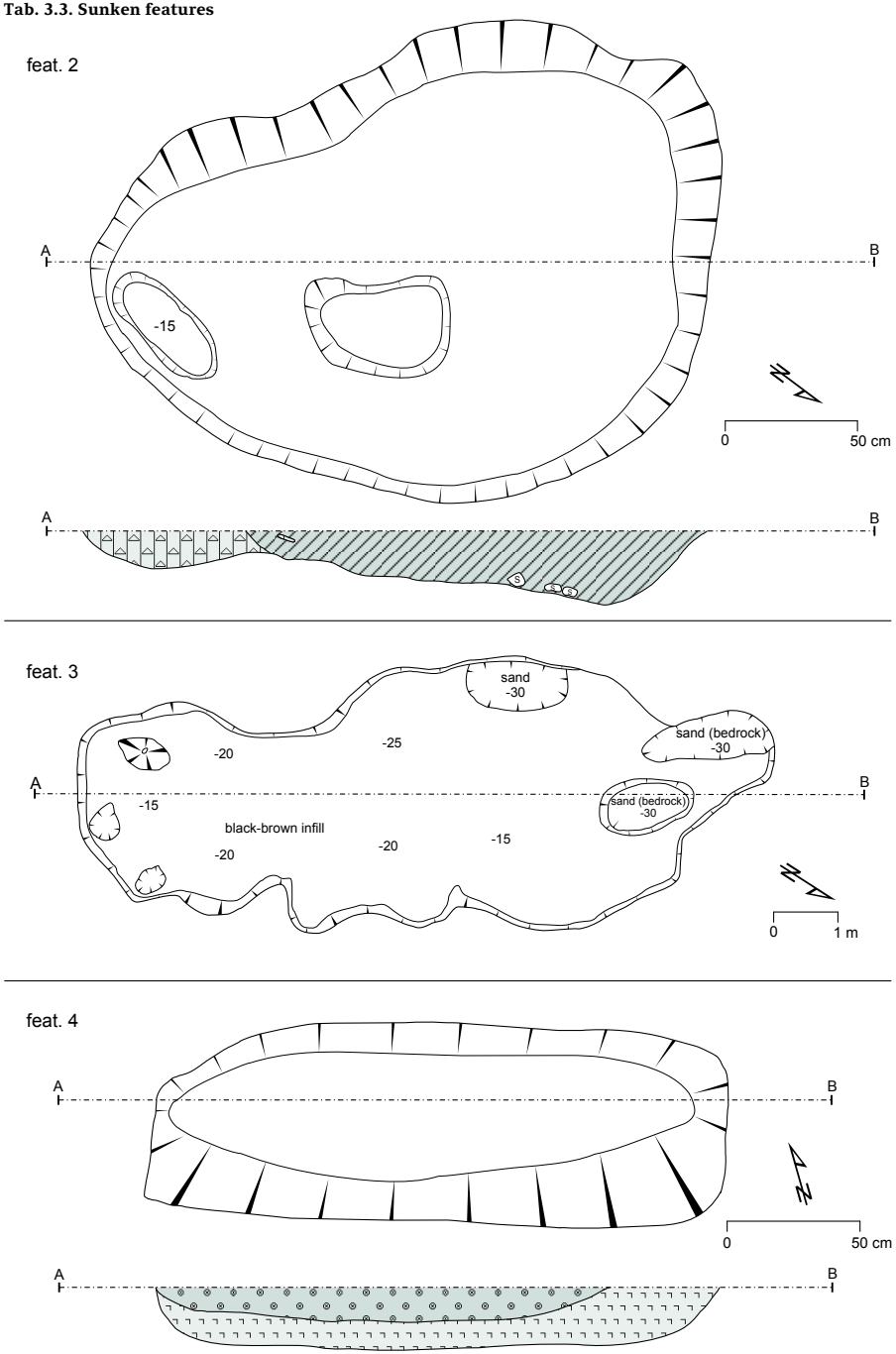
Tab. 3.2e. Characteristics of Neolithic sunken features.

feature no.	chronology	settlement horizon	type	season	area	documentation	infill character	infill type	posthole position	affinity			
										1	2	3	4
1644	Neo/Eneo/Lat	-	feature	1990	Z 1	1:20	layers	1; 2	-				
1646	SBK II	-	artificial trench	1990	Z 1	1:20	compact	1	-				
1655	SBK	-	feature	1990	Z 1	1:20	layers	1; 2	-				
1656	Neo	-	pit complex	1990	Z 1	1:20	layers	1; 2; 9	-				
1659	LBK	-	building pit	1990	Z 1	1:20	layers	1; 2	-	XLVI			1660
1666	SBK	-	feature	1990	Z 1	1:20	compact	1	-	XLVI			
1667	Neo	-	feature	1990	Z 1	1:20	layers	1; 21	-				
1682	LBK IIIb	C	loam pit	1990	Z 2	1:20	layers	1; 2	-	LIX			
1699	LBK IIIb	C	building pit	1990	Z 2	1:20	compact	1	-	LIX			
1700	LBK IVa	E	building pit	1990	Z 2	1:20	compact	1	-	LX			
1707	LBK	-	feature	1990	Z 2	1:20	layers	1; 2	-			LX	
1712	LBK/Eneo	E	pit complex	1990	Z 2	1:100	-	-	-				
1718	LBK IIIb	B	building pit	1990	Z 2	1:20	layers	1; 2	-	LXII			LXI
1722	LBK IIIb	B	posthole	1990	Z 2	1:100	-	-	interior	LXII			
1727	LBK IIIb	B	building pit	1990	Z 2	1:20	compact	1	-	LXII			
1739	LBK IIIb	C	feature	1990	Z 2	1:20	layers	1; 2	-	LXIII			
1740	LBK IV	-	feature	1990	Z 2	1:20	-	-	-				
1742	LBK IIIb	C	feature	1990	Z 2	1:20	-	-	-	LXIV			
1752	LBK IIIb	B	feature	1990	Z 2	1:20	-	-	-		LXV	LXIV	
1761	LBK IIIb	B	feature	1990	Z 2	1:20	-	-	-	LXV			
1773	LBK IV	-	feature	1990	Z 3	1:20	compact	1	-	LXXIII			
1800 A	LBK IVb/SBK I	F	building pit	1990	Z 3a	1:20	compact	1	-	XLIV			
1800 B	LBK IVb/SBK I	F	building pit	1990	Z 3a	1:100	compact	1	-	XLIV			
1808 B	LBK IVb/SBK I	F	building pit	1990	Z 3a	1:20	-	-	-	XLIV			
1819 B	LBK	-	feature	1990	Z 3	1:20	layers	1; 9	-				
1836	LBK	-	loam pit/building pit	1990	Z 4	1:100	-	-	-	L			1836 H
1842	LBK IV	-	feature	1990	Z 4	1:100	-	-	-				
1924	LBK IVa	E	building pit	1990	Z 5	1:100	compact	1	-	LXVII			
1926	LBK III	-	grave/storage pit	1990	Z 5	1:10	compact	1	-				
1929 B	LBK IIIb	C	feature	1990	Z 5	1:100	compact	1	-	LXIX			
1931	LBK IIIb	C	posthole	1990	Z 5	1:100	-	-	interior	LXIX			
1934	LBK IIIb	C	feature	1990	Z 5	1:20	compact	1	-	LXIX			
1935	LBK	-	feature	1990	Z 5	1:100	compact	1	-				
1940	LBK	-	feature	1990	Z 5	1:20	compact	1	-				
1941	LBK	-	feature	1990	Z 5	1:20	compact	9	-		LXX		
1951	LBK IIIb	C	feature	1990	Z 5	1:10	layers	-	-				LXX
1954 B	LBK IVa	D	feature	1990	Z 5	1:20	compact	1	-	LXX		1954 A	1954 C

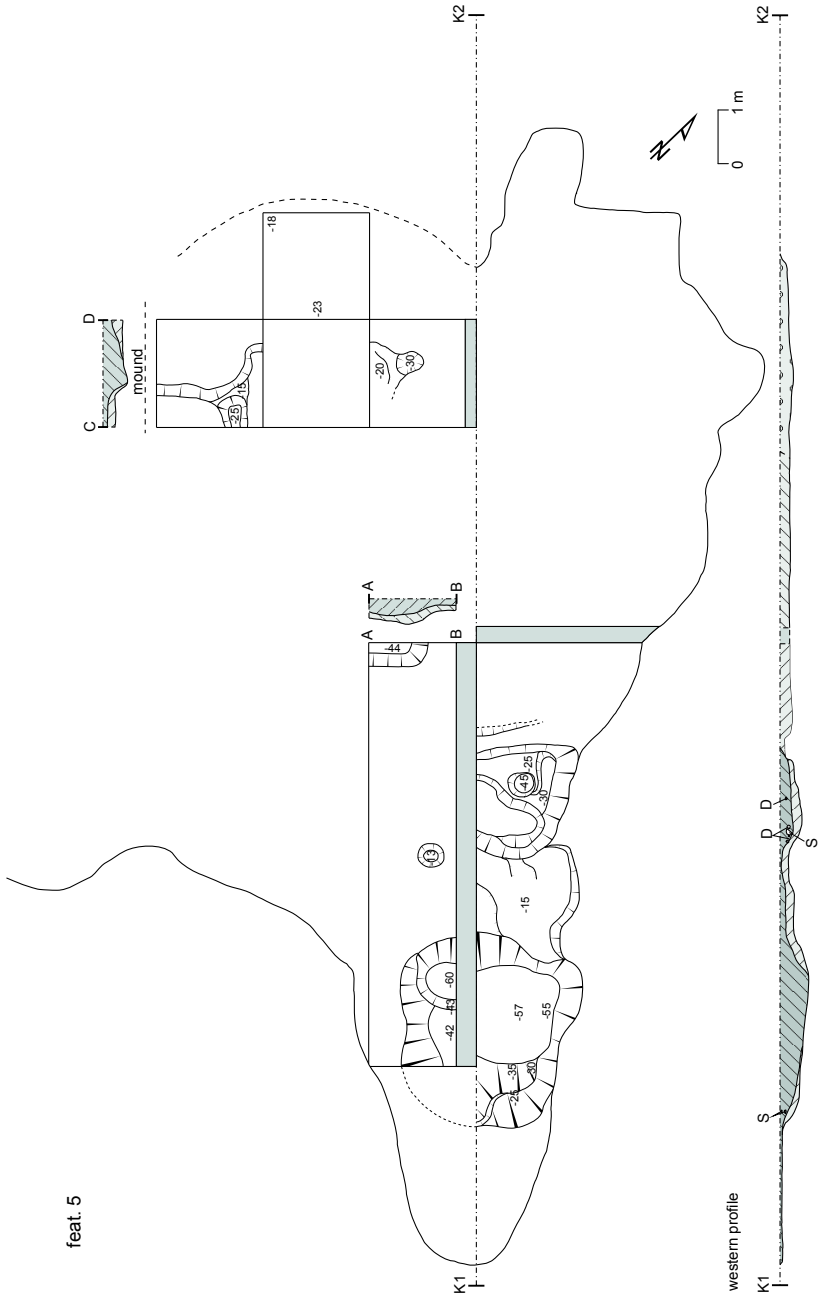
Tab. 3.2f. Characteristics of Neolithic sunken features.

feature no.	chronology	settlement horizon	type	season	area	documentation	infill character	infill type	posthole position	affinity			
										1	2	3	4
1955	LBK III	-	feature	1990	Z 5	1:20	-	-	-				
1964	LBK IVa	D	feature	1990	Z 5-3a	1:20	-	-	-	LXXII			
2009	LBK	-	feature	1990	Z 5-3b	1:20	compact	9	-				
2023	Neo/Post-neo	-	feature	1990	Z 5-3b	1:100	-	-	-			LXX	
2026	LBK IV/SBK I	-	feature	1990	Z 5-3b	1:10	layers	1; 4; 9	-				
2027	LBK IV/SBK I	-	feature	1990	Z 5-3b	-	-	-	-				

Tab. 3.3. Sunken features

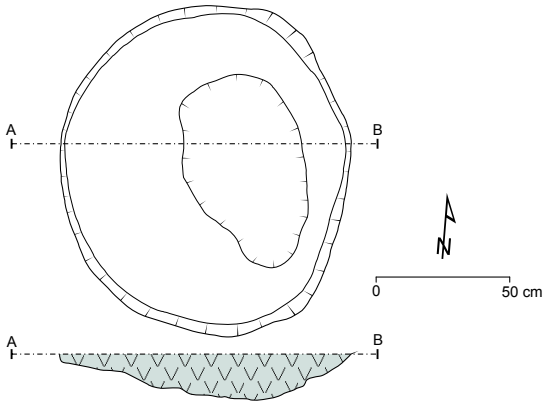


Tab. 3.4. Sunken features

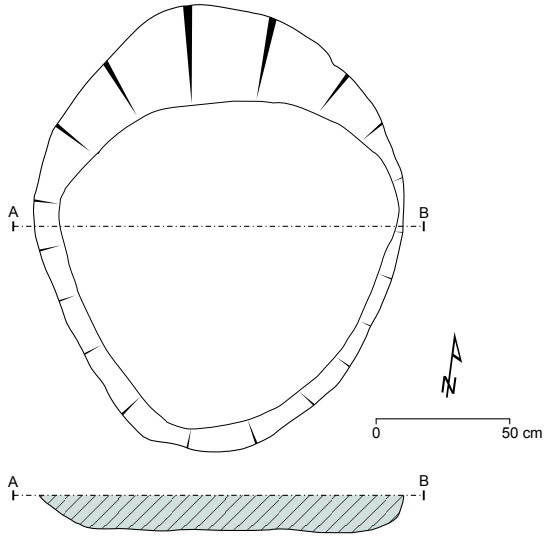


Tab. 3.5. Sunken features

feat. 28

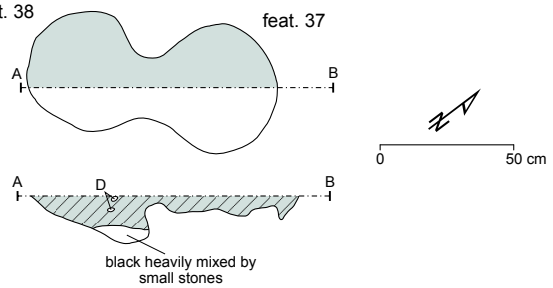


feat. 31



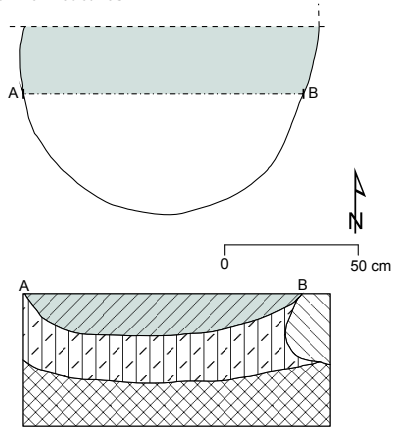
feat. 38

feat. 37

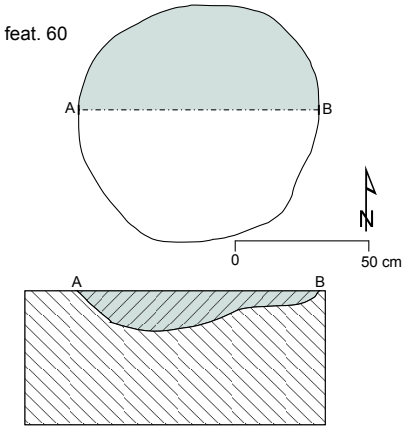


Tab. 3.6. Sunken features

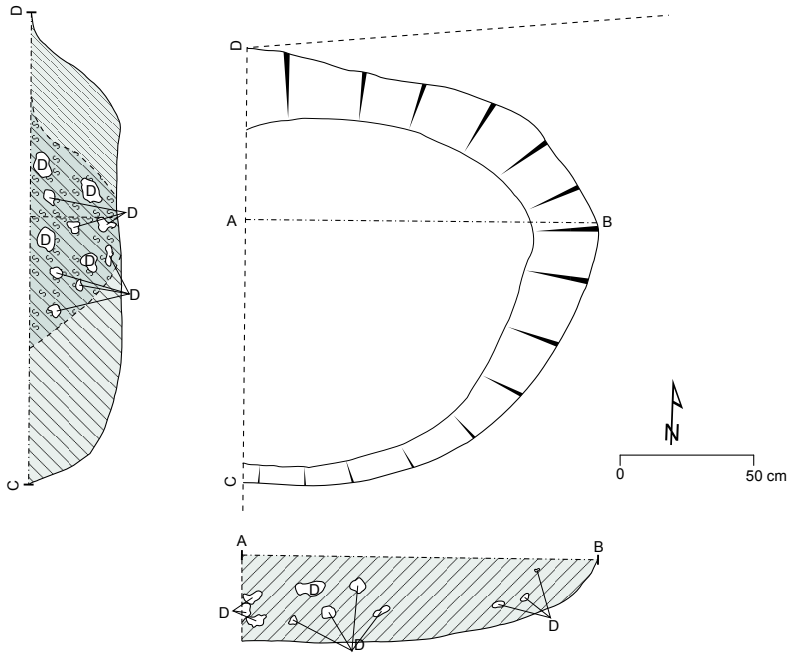
feat. 53



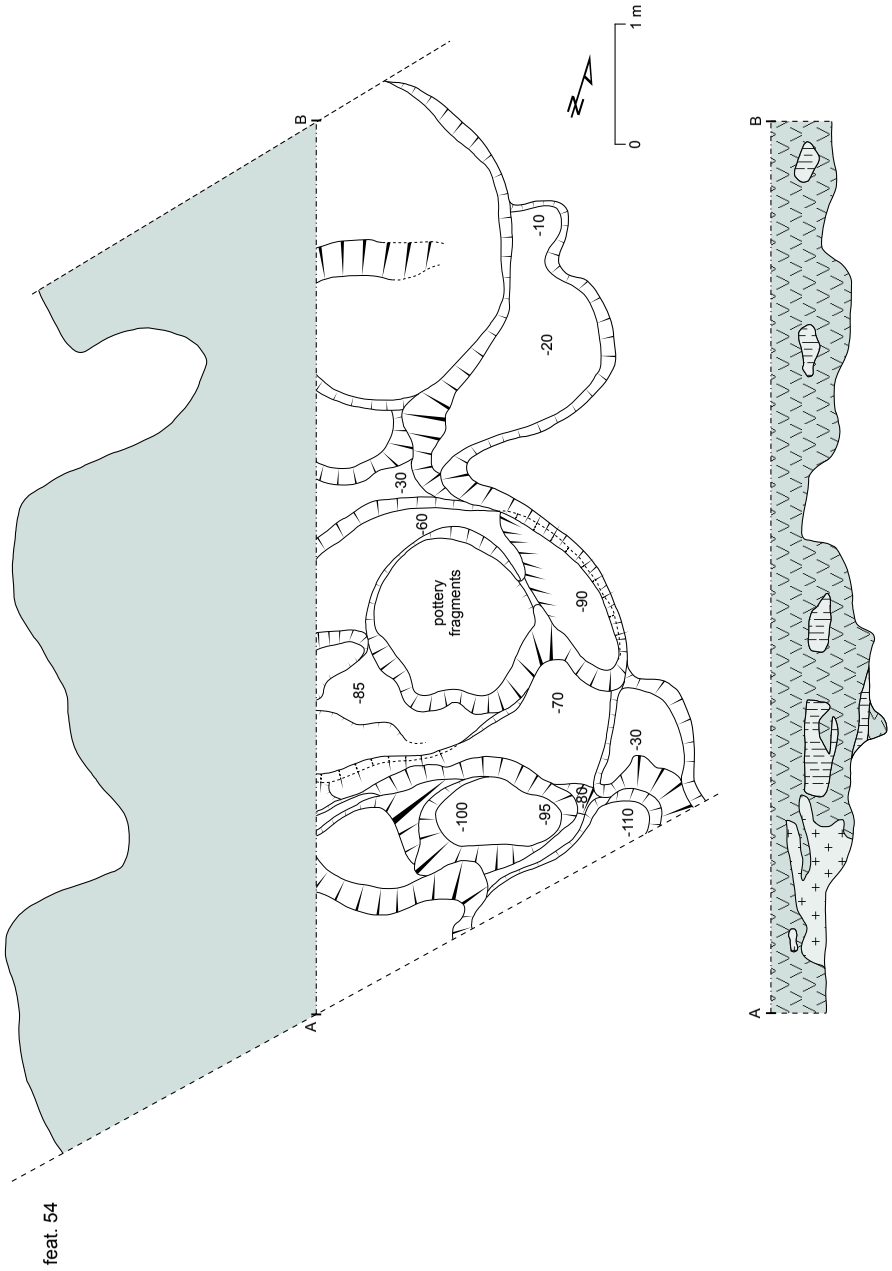
feat. 60



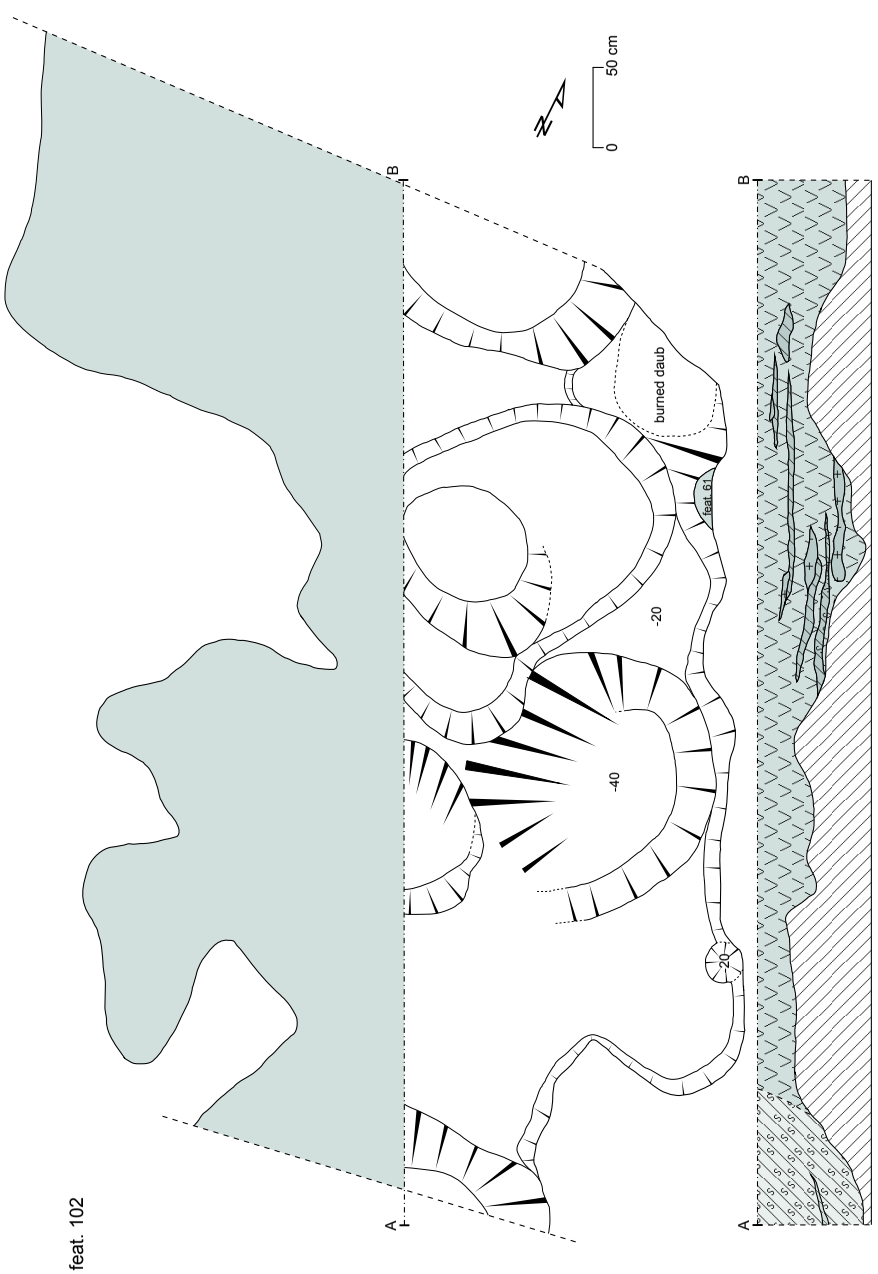
feat. 76



Tab. 3.7. Sunken features

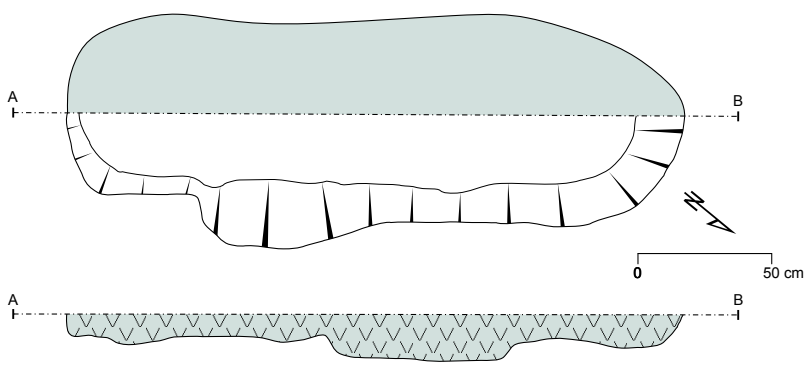


Tab. 3.8. Sunken features

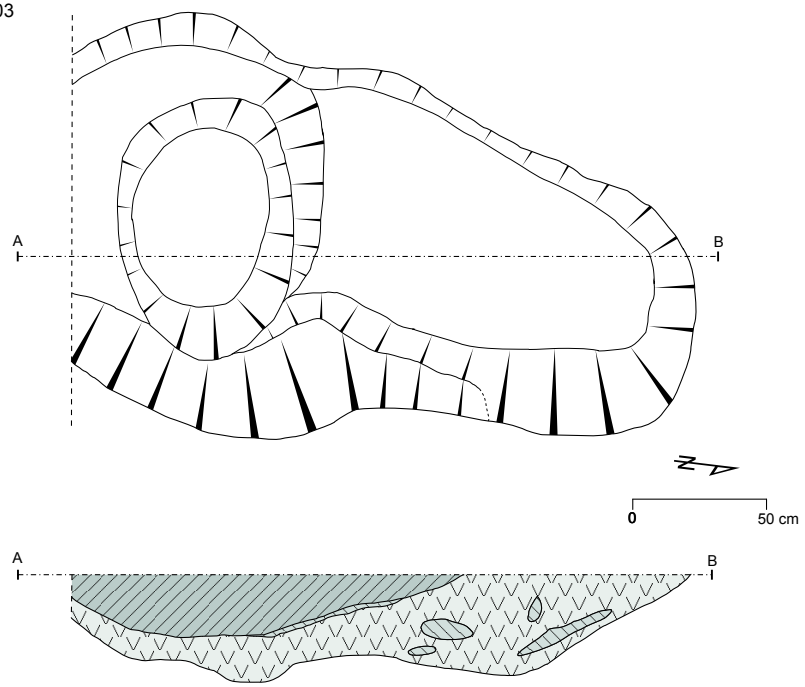


Tab. 3.9. Sunken features

feat. 101

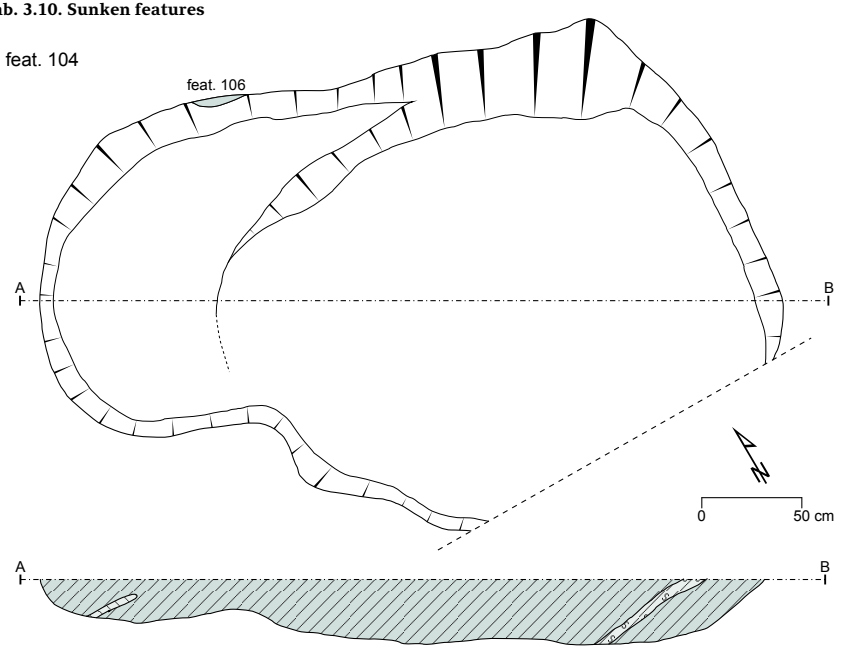


feat. 103

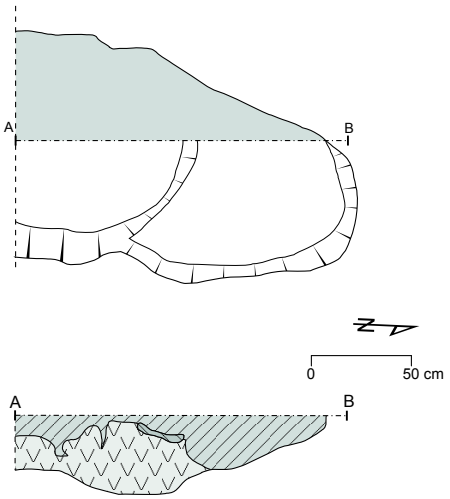


Tab. 3.10. Sunken features

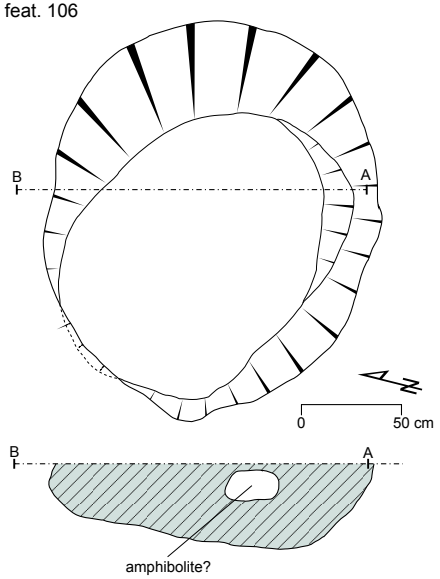
feat. 104



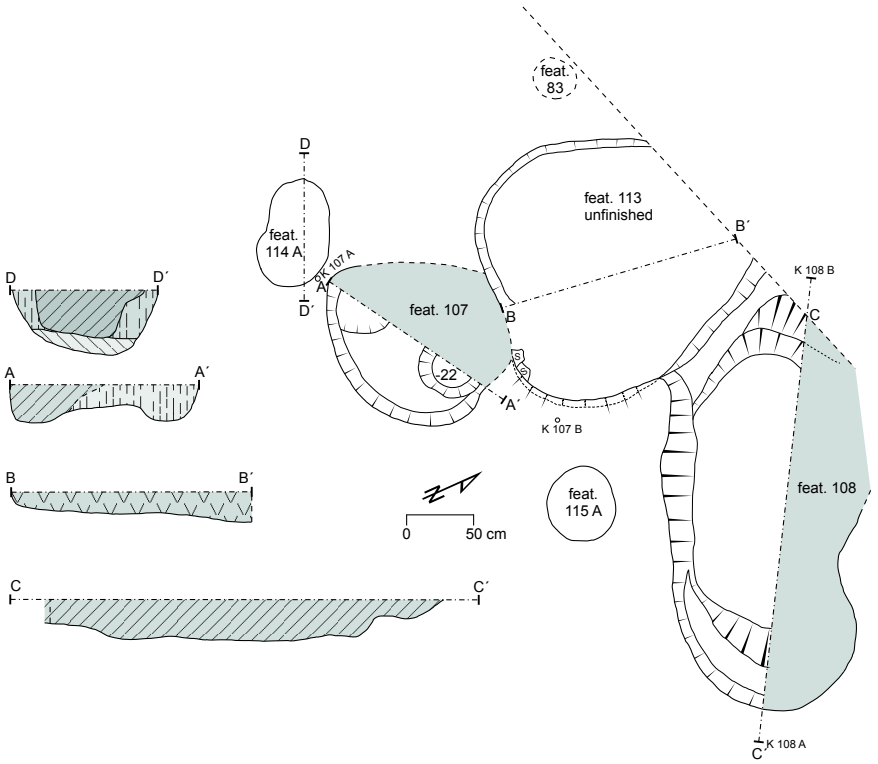
feat. 105



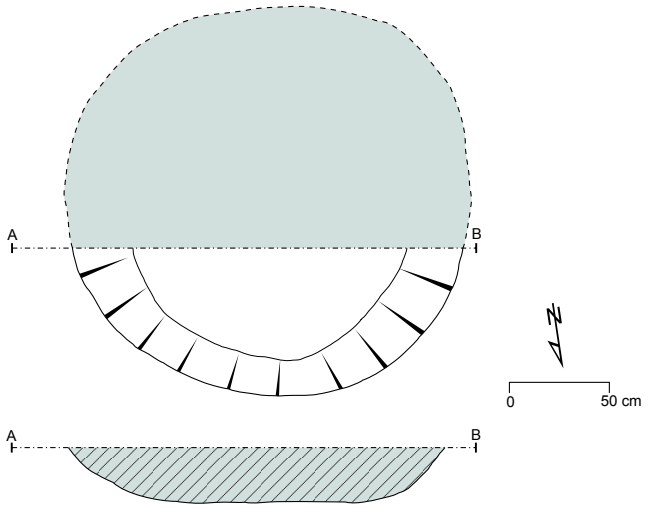
feat. 106



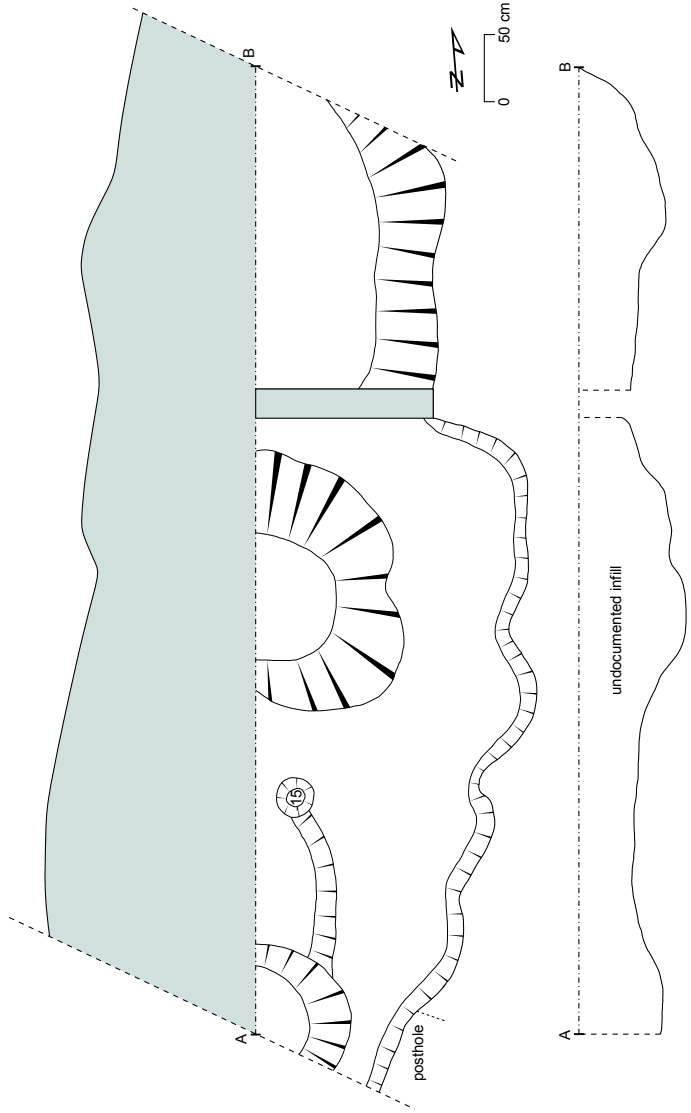
Tab. 3.11. Sunken features



feat. 109



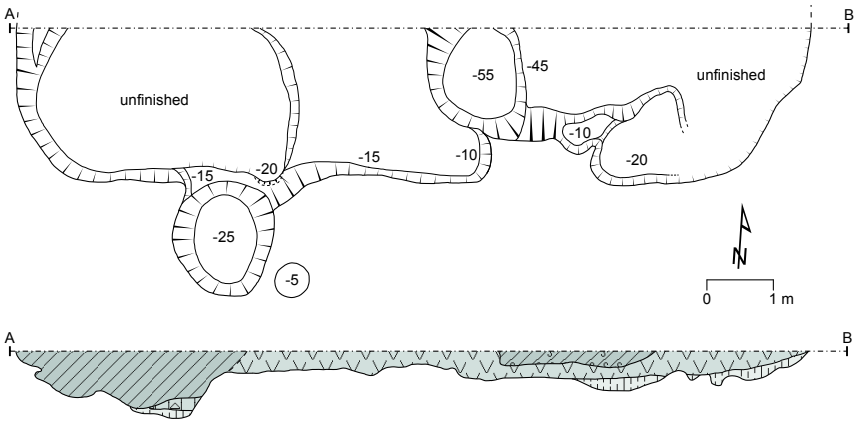
Tab. 3.12. Sunken features



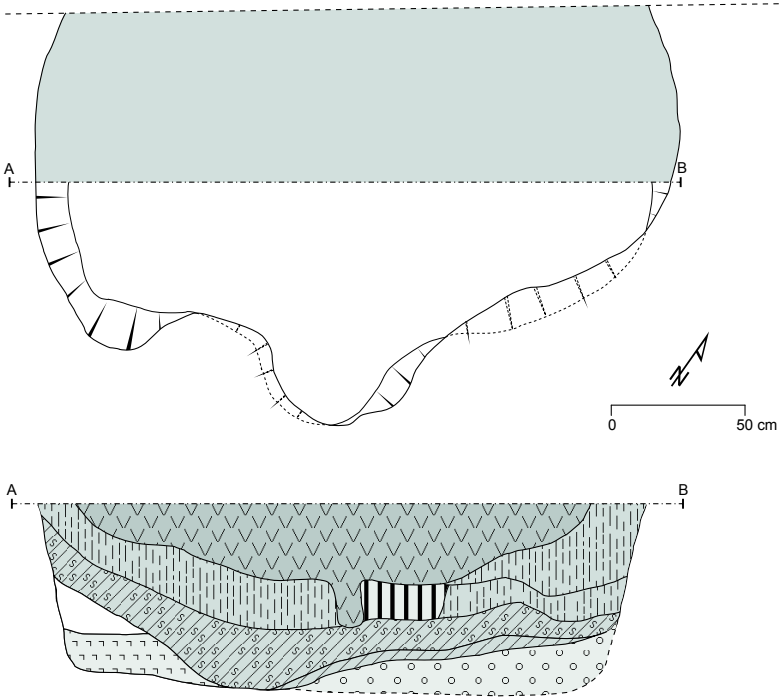
feat. 110

Tab. 3.13. Sunken features

feat. 111

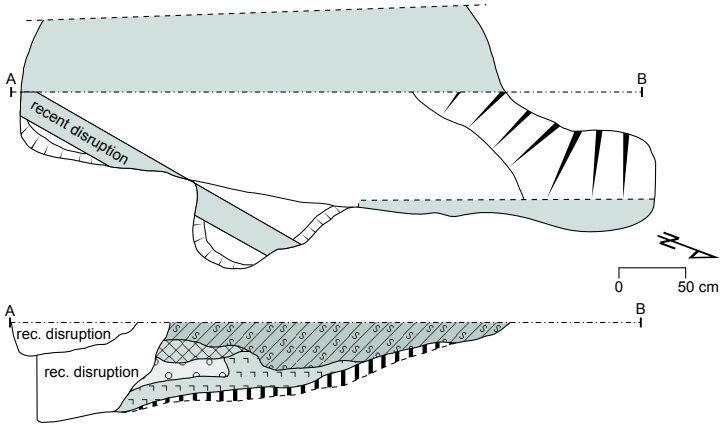


feat. 126

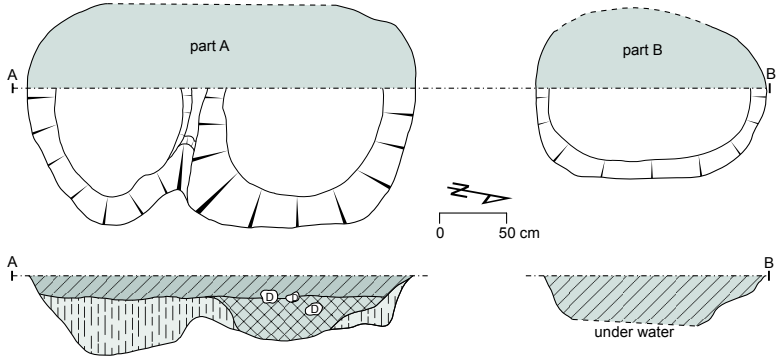


Tab. 3.14. Sunken features

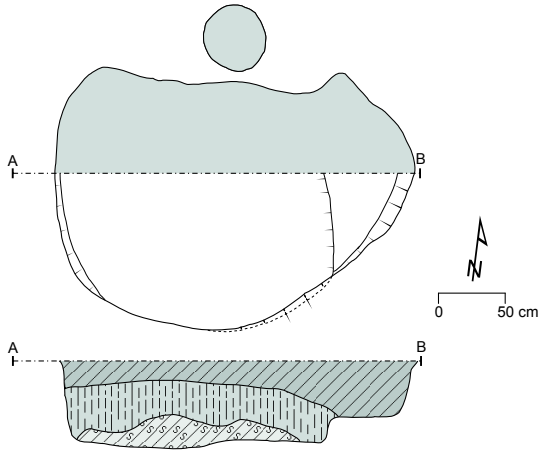
feat. 132



feat. 134

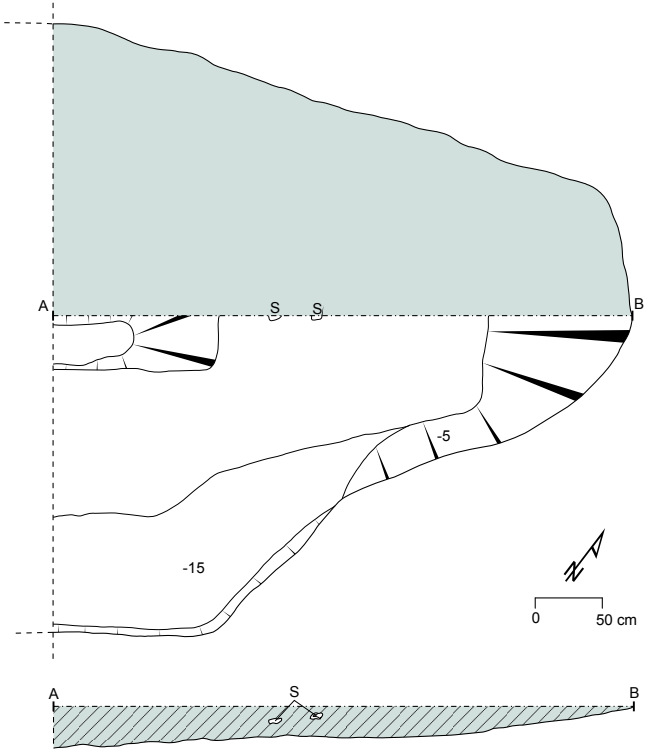


feat. 135

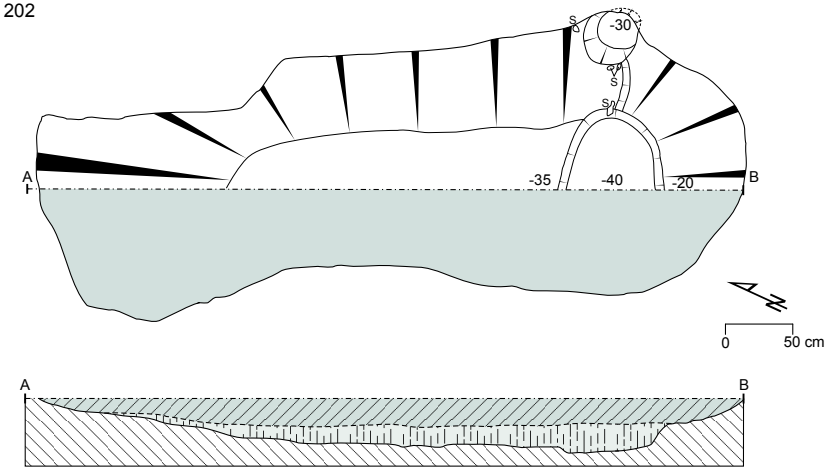


Tab. 3.15. Sunken features

feat. 141

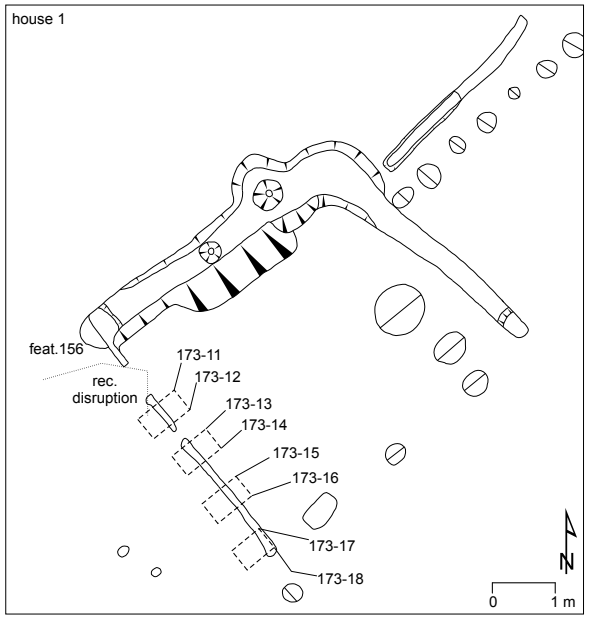


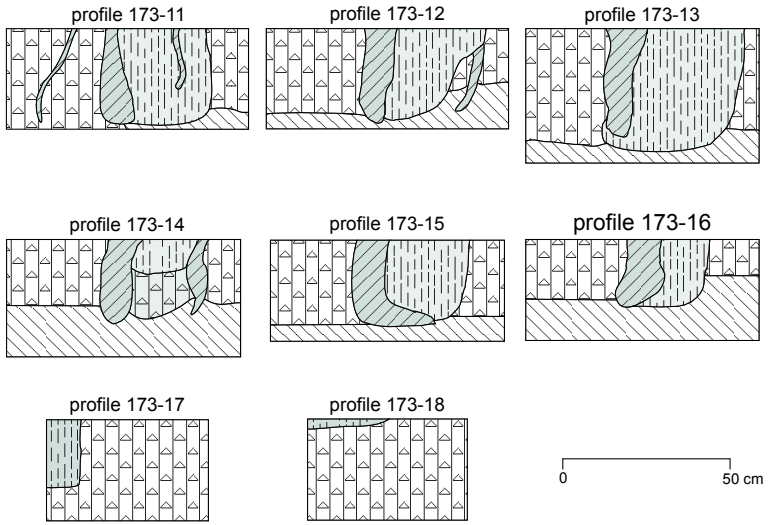
feat. 202



Tab. 3.16. Sunken features

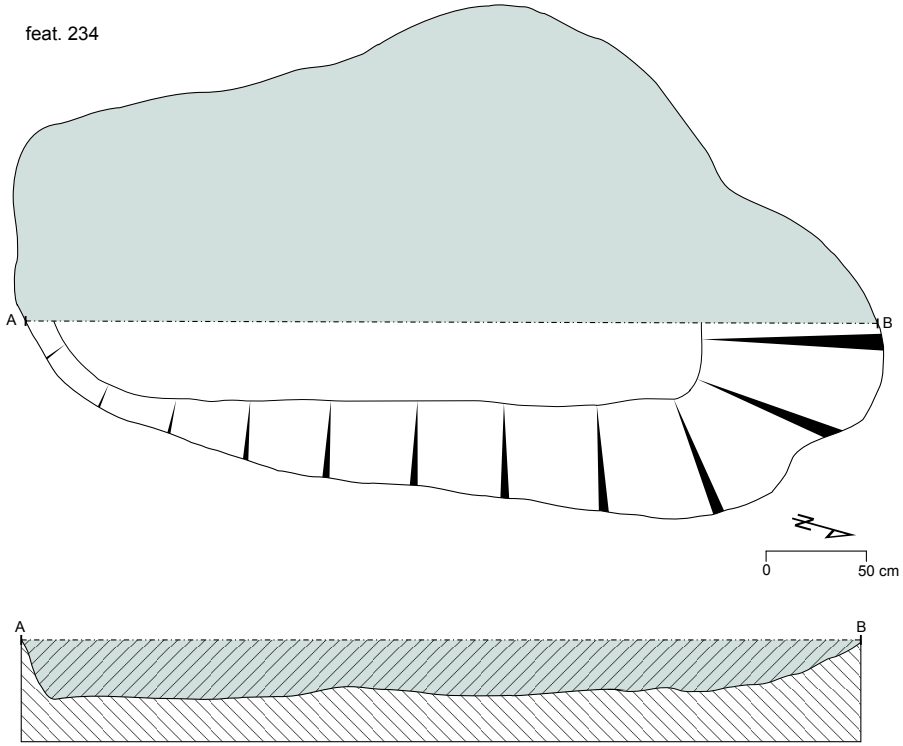
feat. 173 and 174



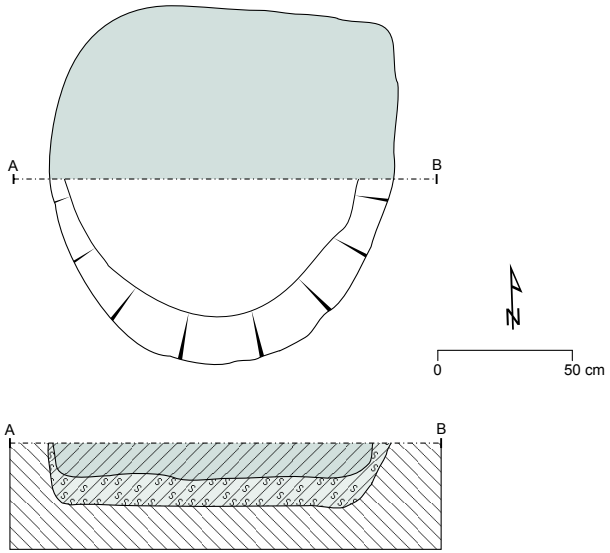


Tab. 3.17. Sunken features

feat. 234

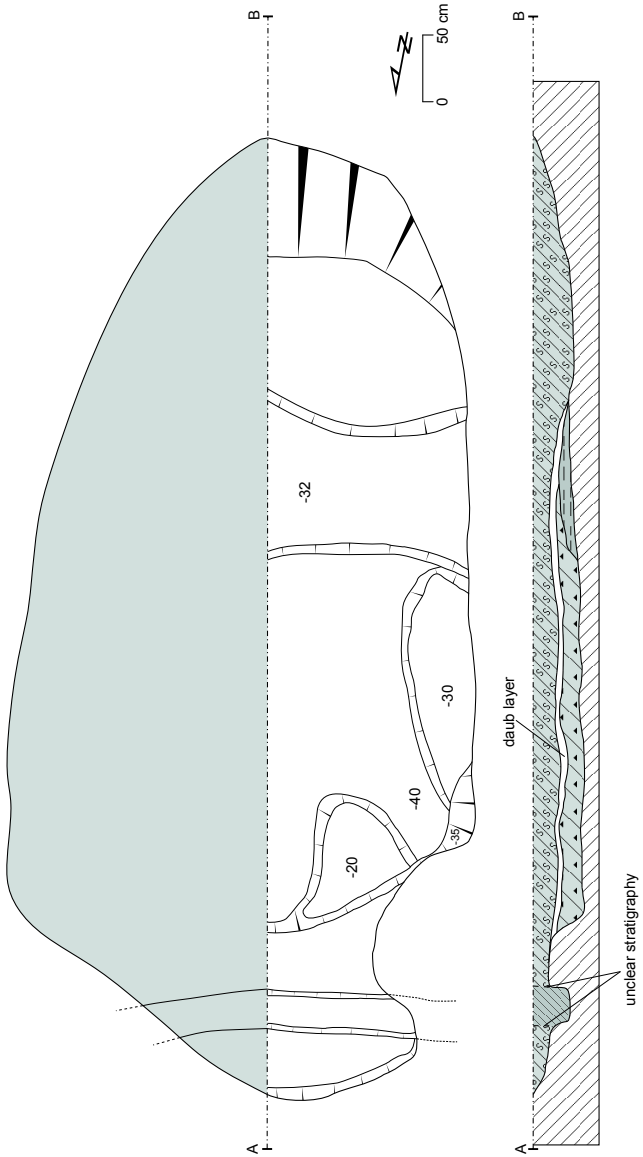


feat. 250



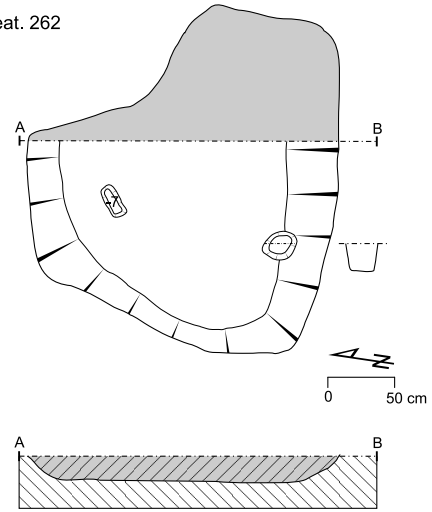
Tab. 3.18. Sunken features

feat. 261

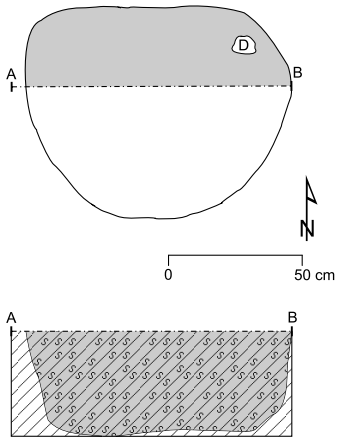


Tab. 3.19. Sunken features

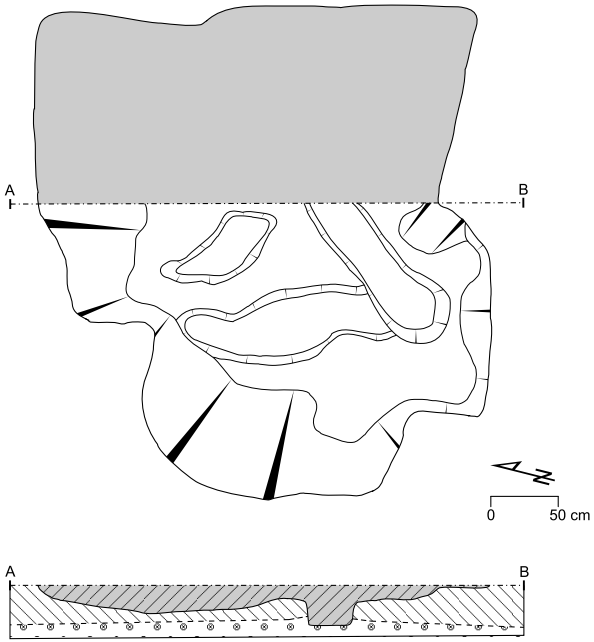
feat. 262



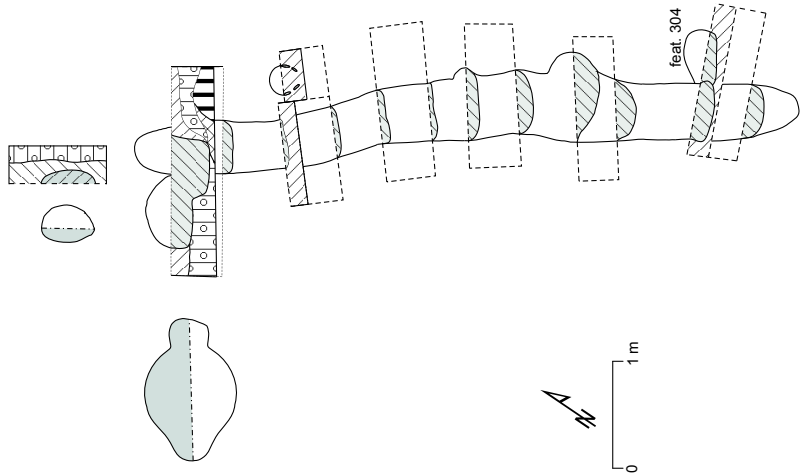
feat. 265

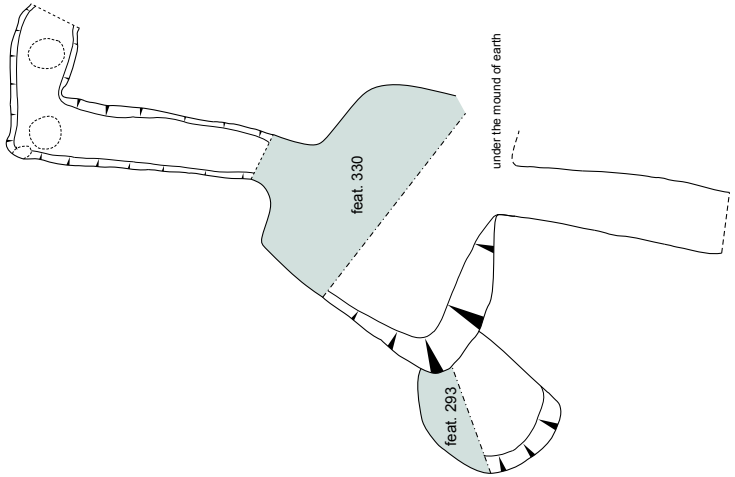


feat. 305



Tab. 3.20. Sunken features

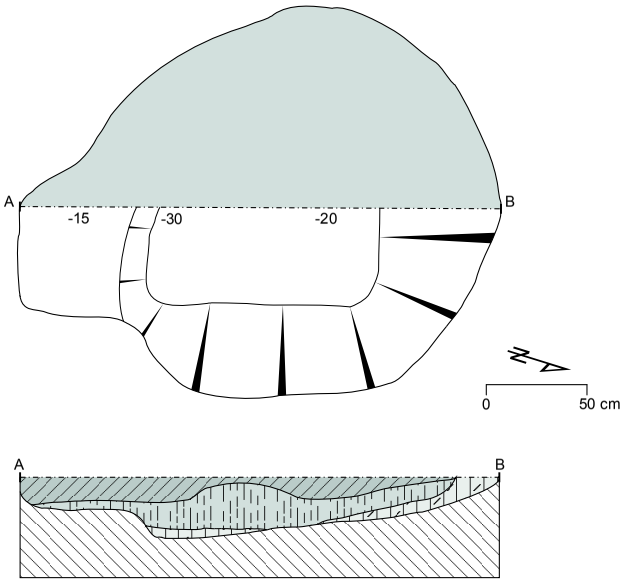




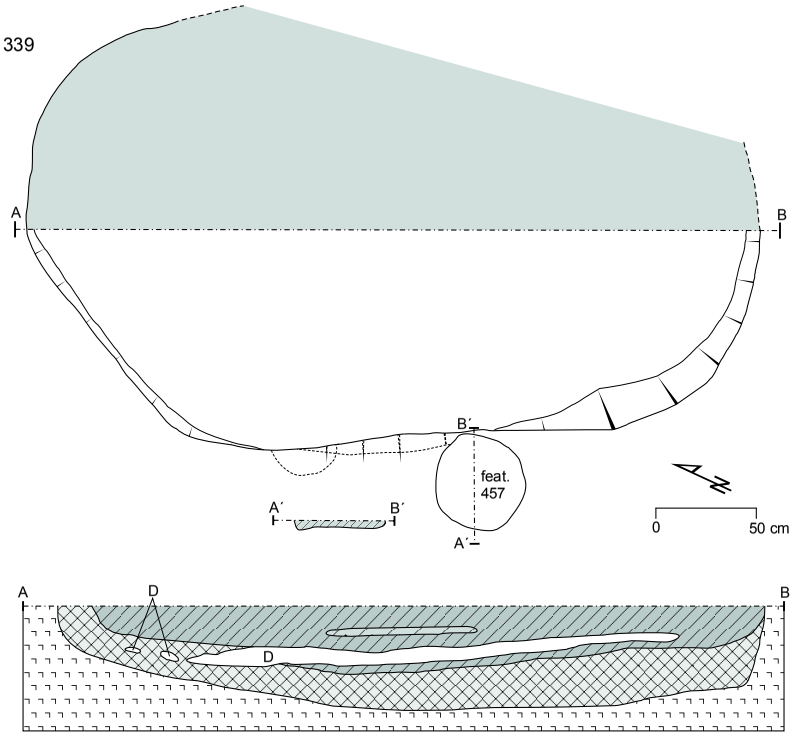
feat. 325
house 2

Tab. 3.21. Sunken features

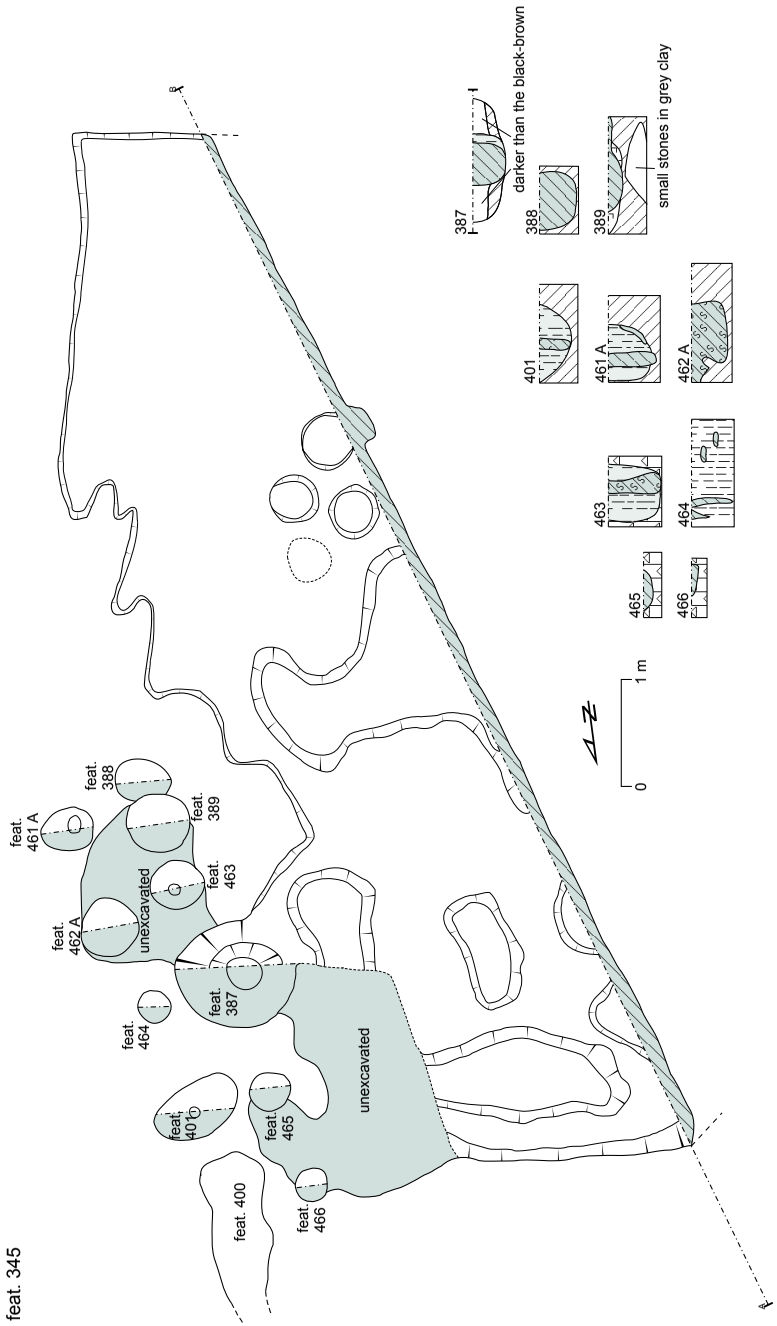
feat. 329



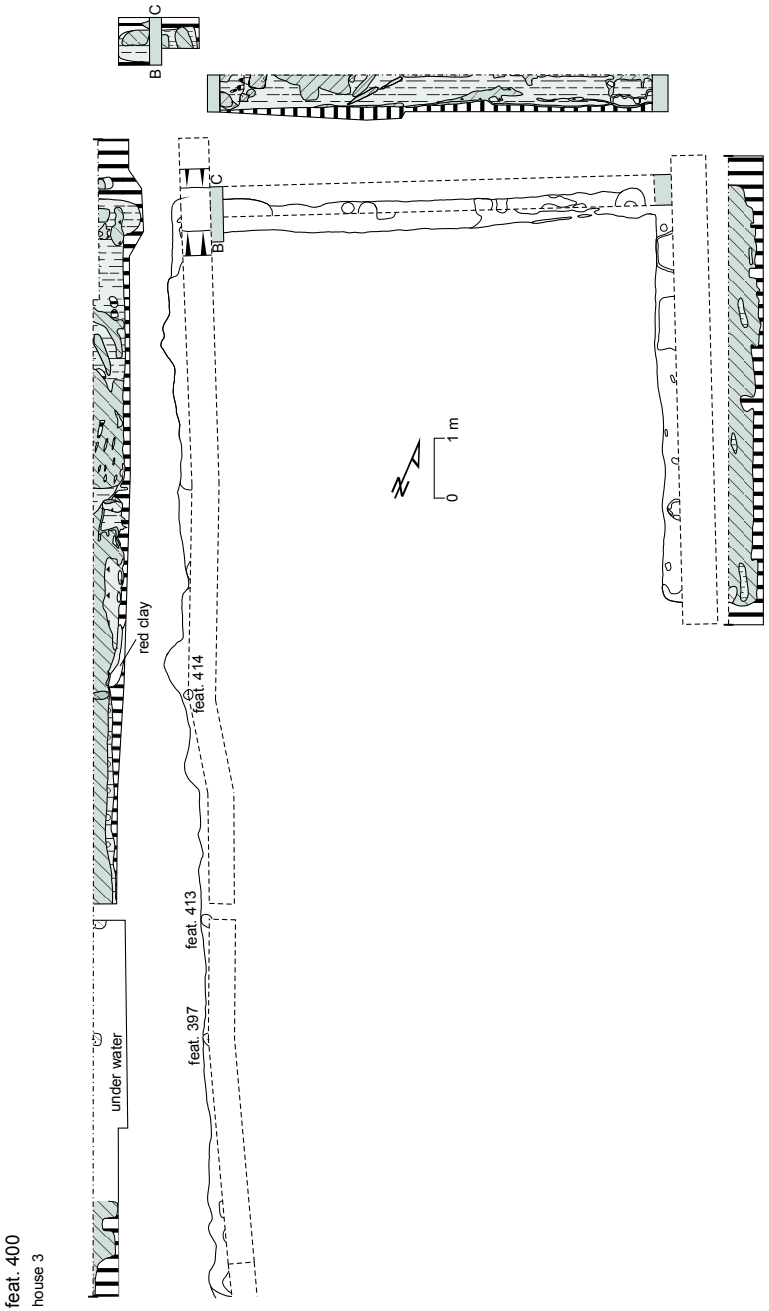
feat. 339



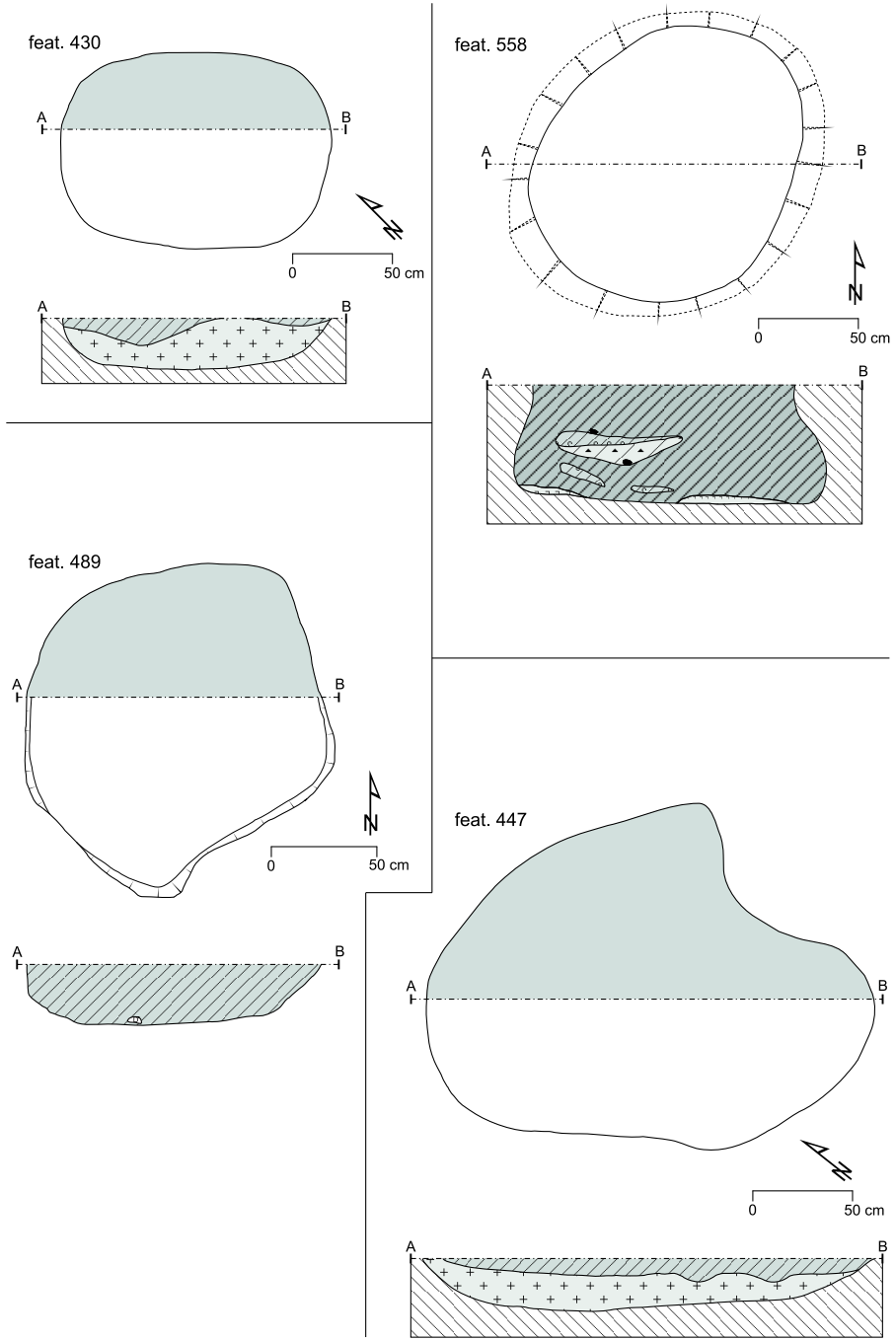
Tab. 3.22. Sunken features



Tab. 3.23. Sunken features

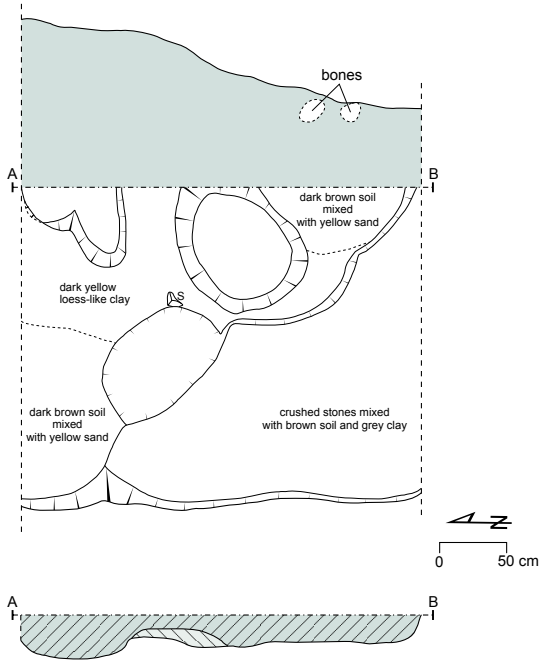


Tab. 3.24. Sunken features

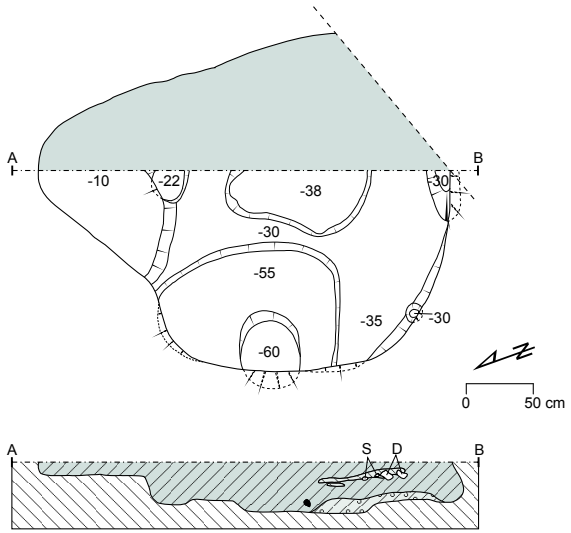


Tab. 3.25. Sunken features

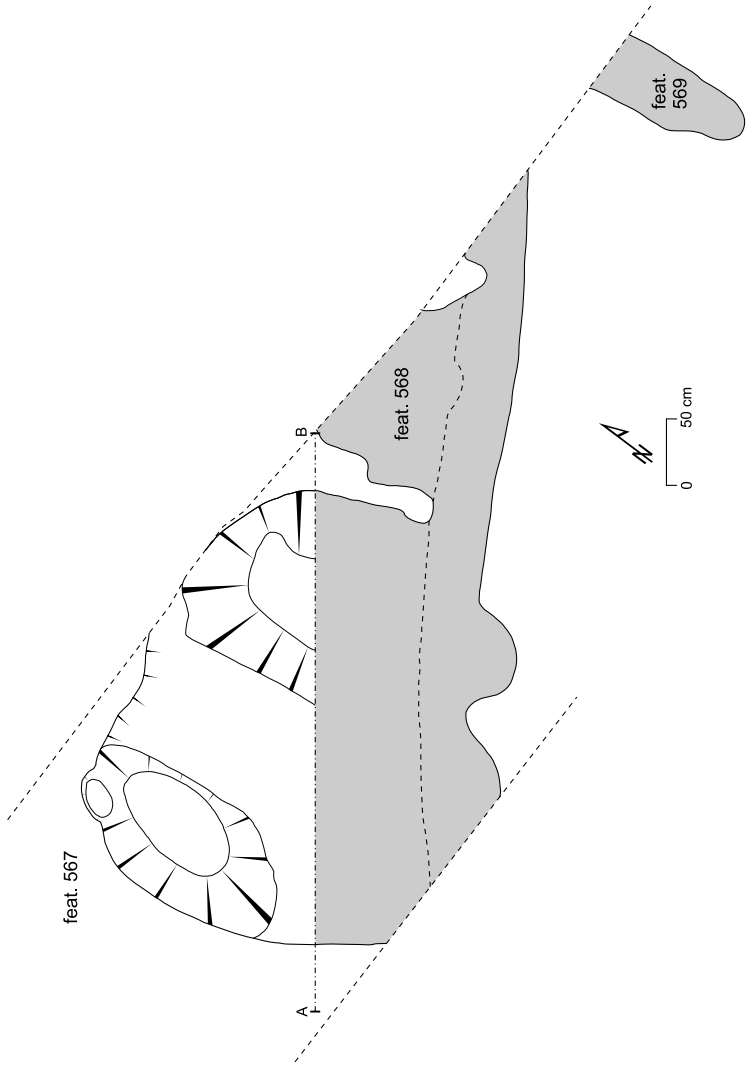
feat. 559



feat. 566

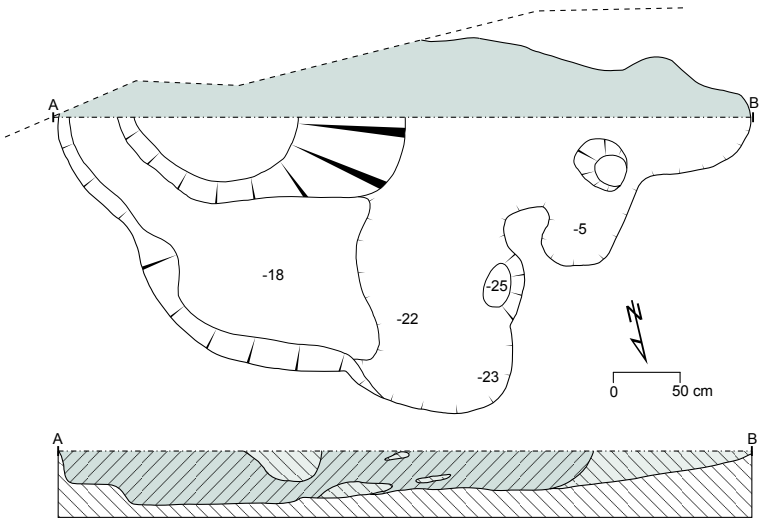


Tab. 3.26. Sunken features

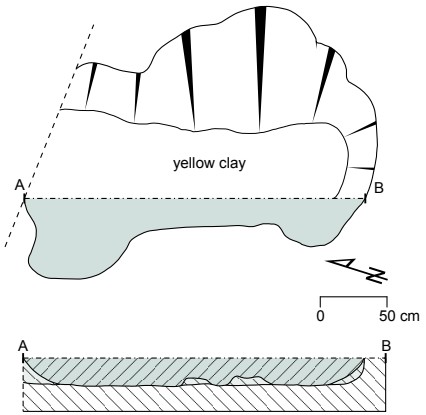


Tab. 3.27. Sunken features

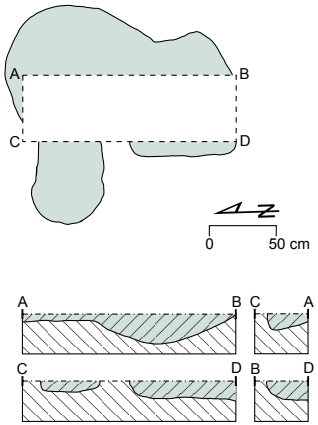
feat. 571



feat. 574 B

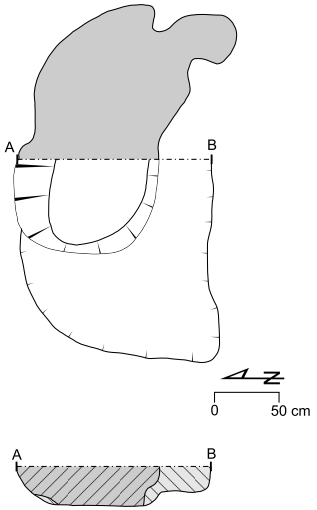


feat. 586 B

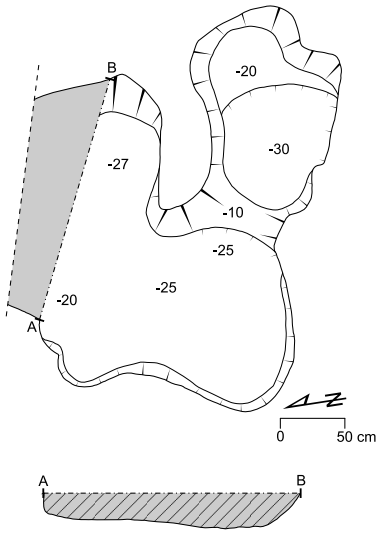


Tab. 3.28. Sunken features

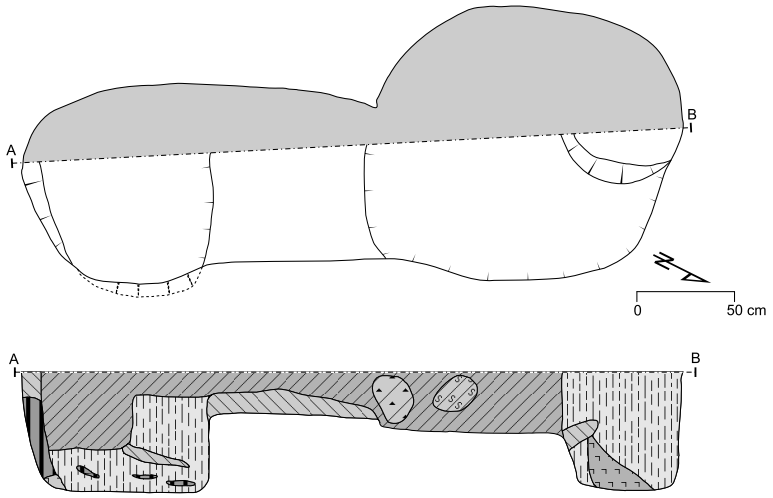
feat. 588 B



feat. 589 B



feat. 613



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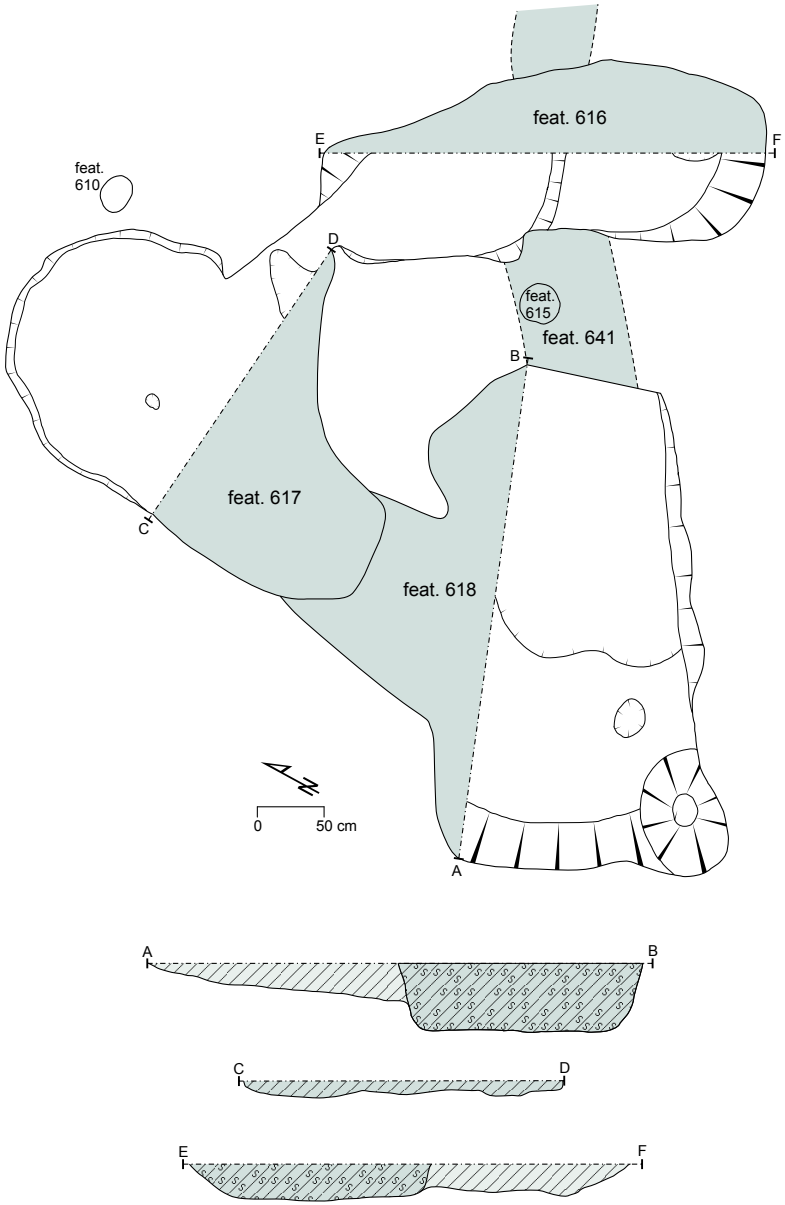
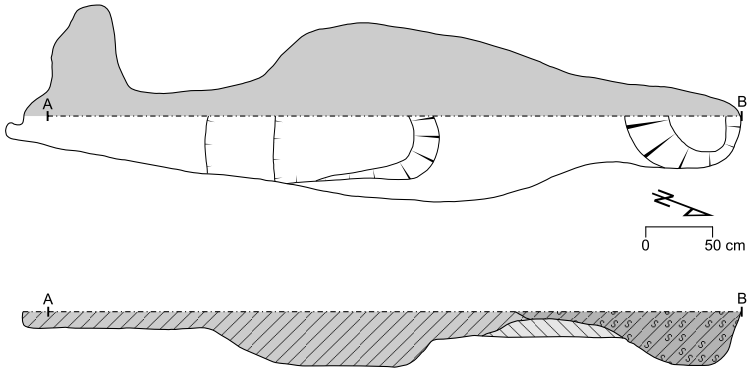
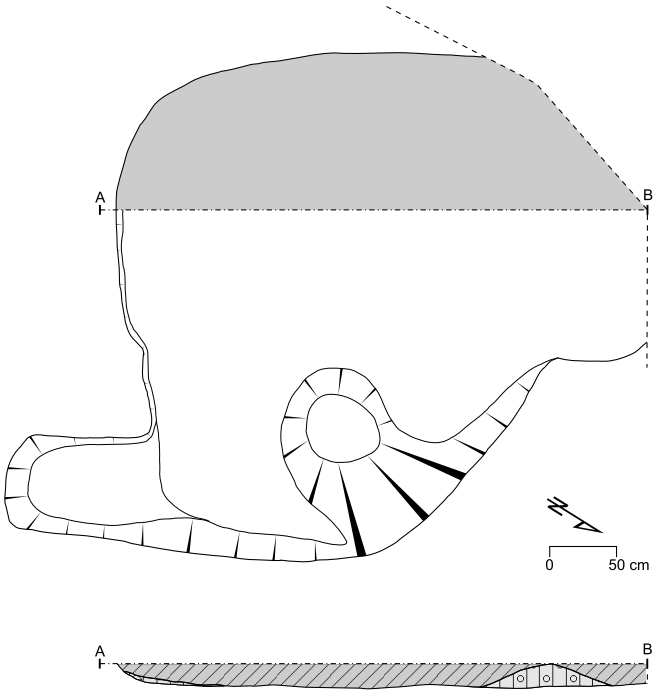


Tab. 3.30. Sunken features

feat. 654



feat. 703



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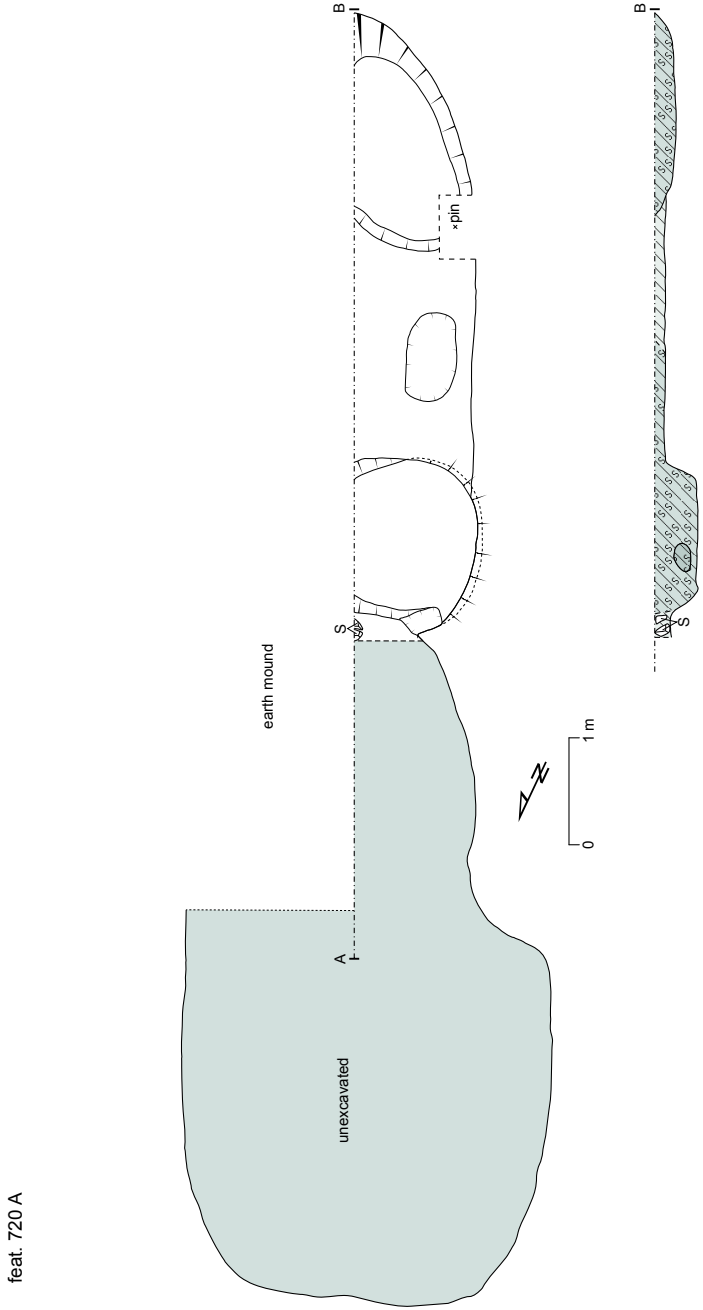

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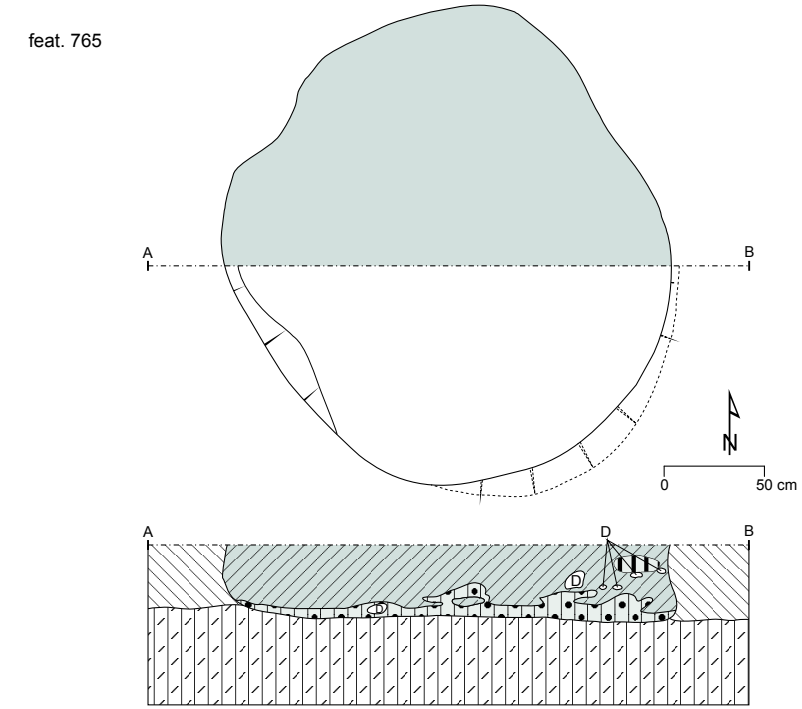

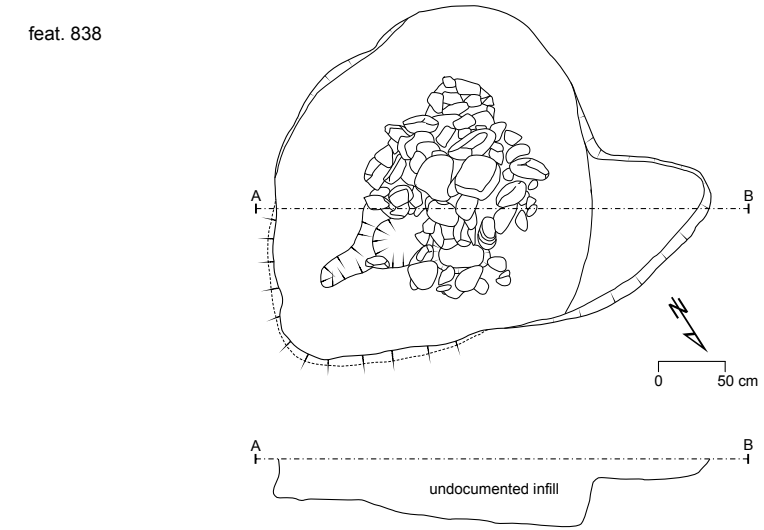

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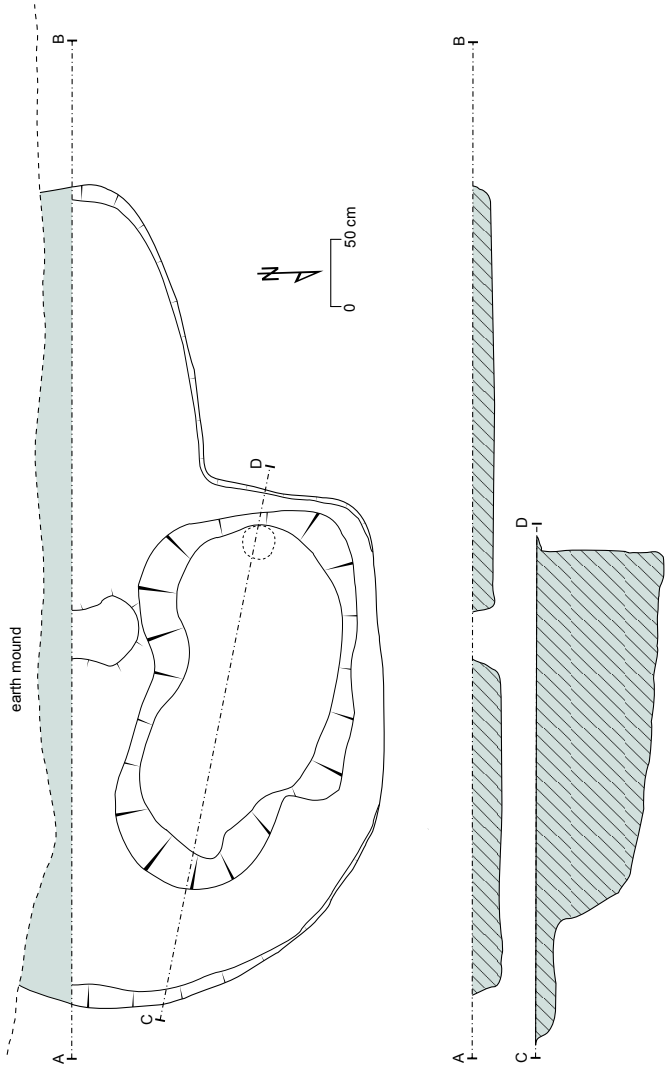
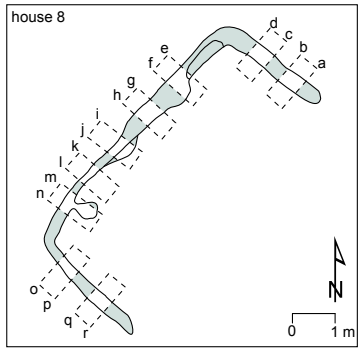
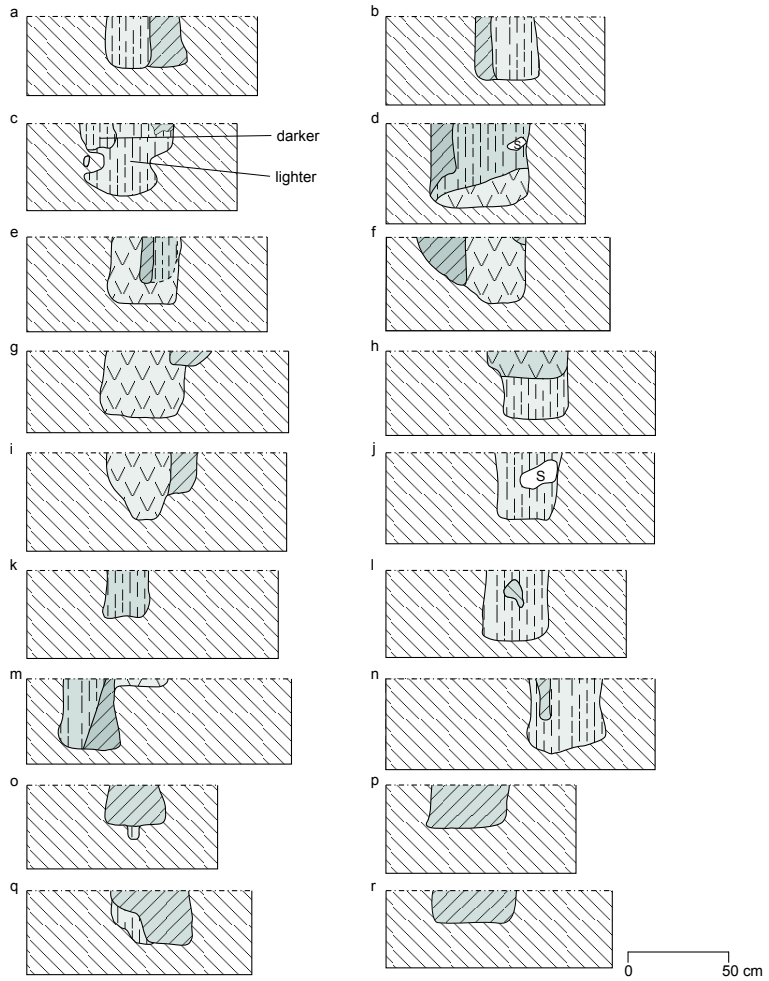


feat. 850

Tab. 3.34. Sunken features

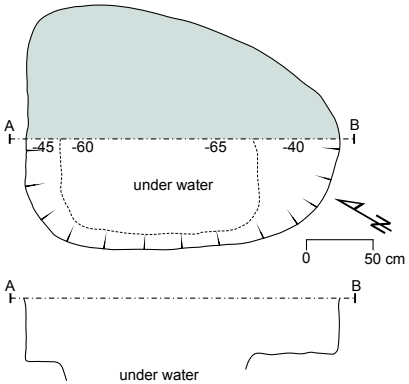
feat. 928



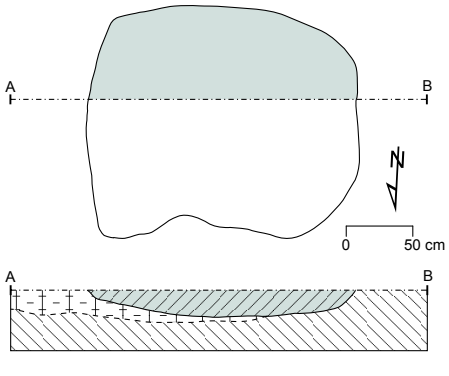


Tab. 3.35. Sunken features

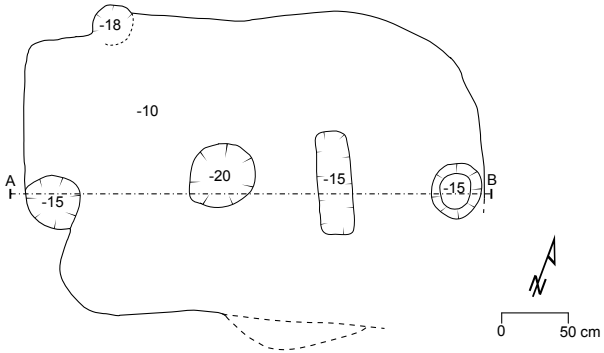
feat. 937



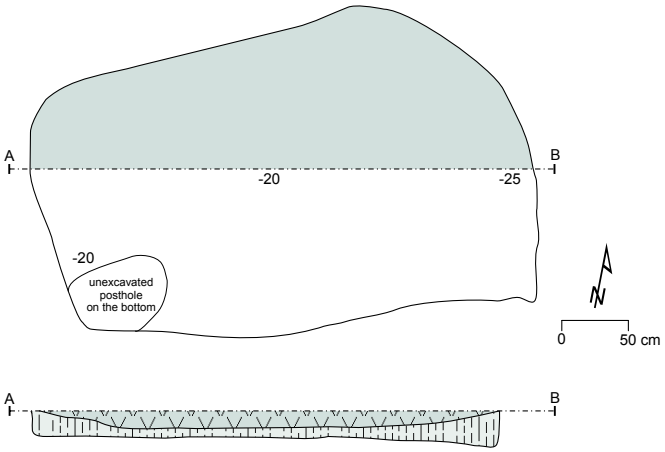
feat. 1082



feat. 1083



feat. 940



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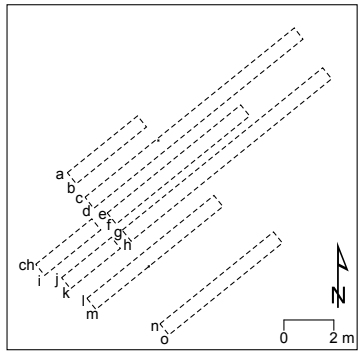
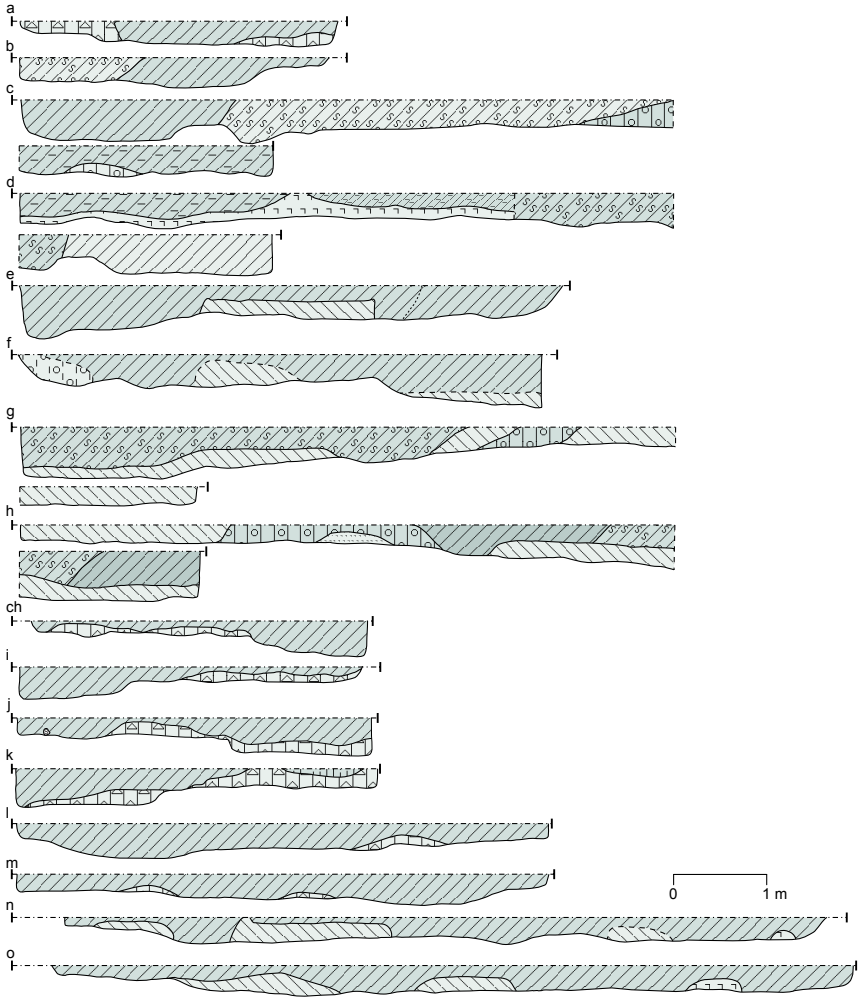
feat. 945





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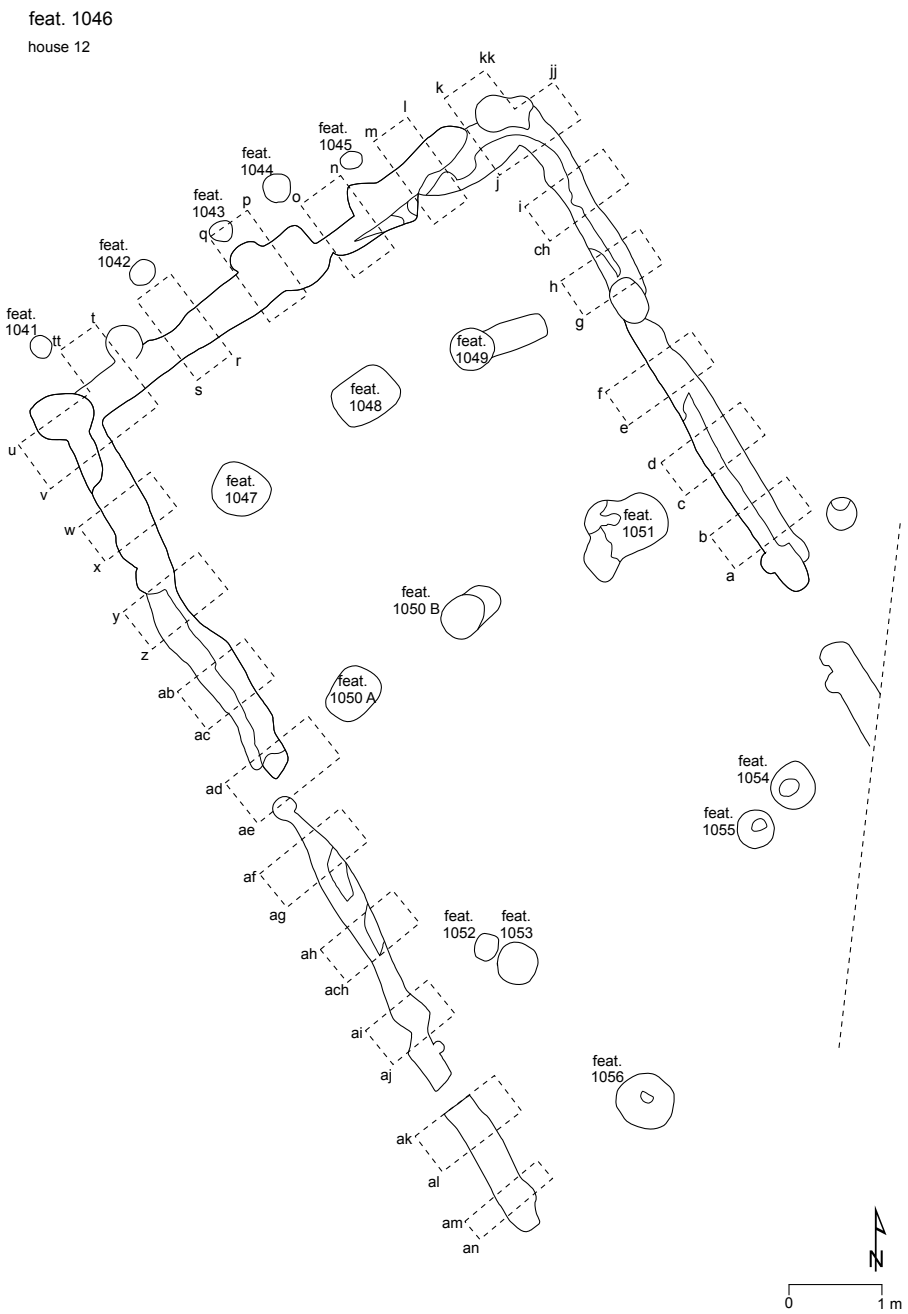

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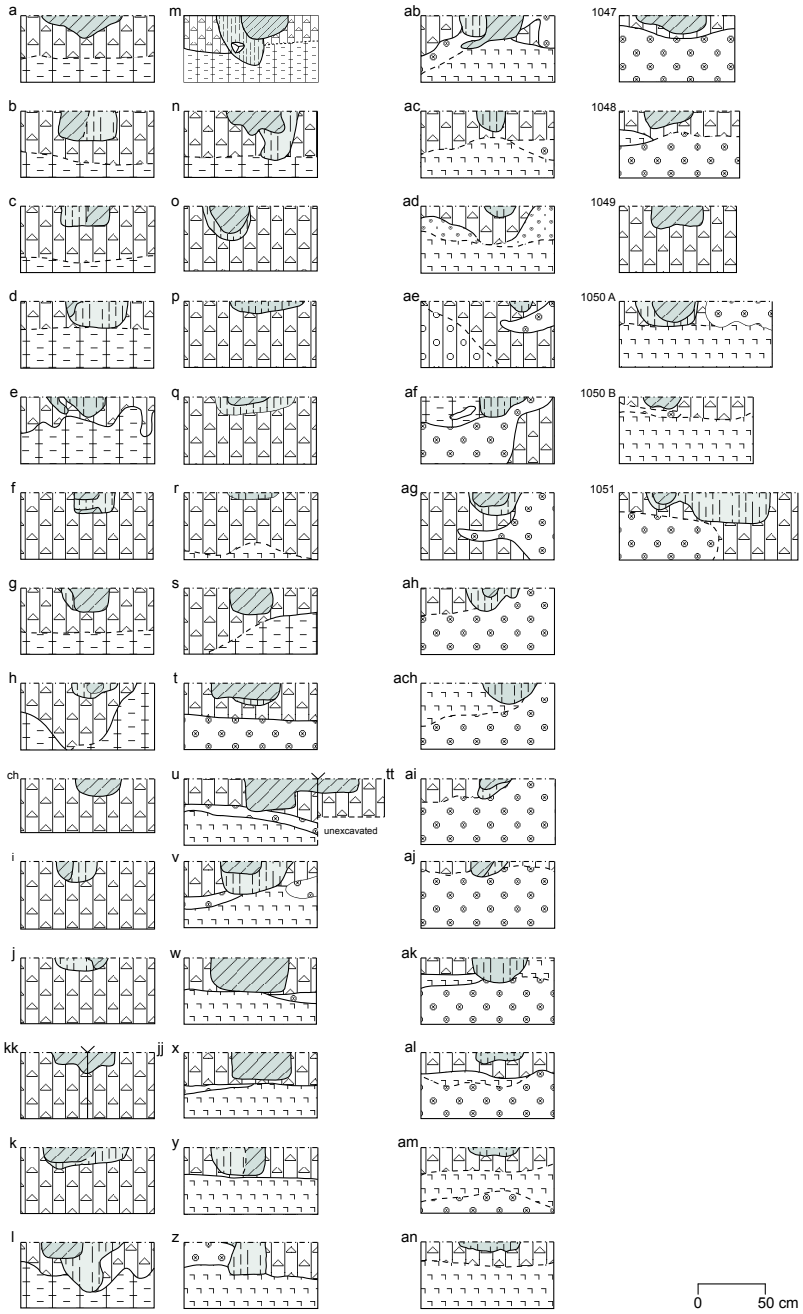

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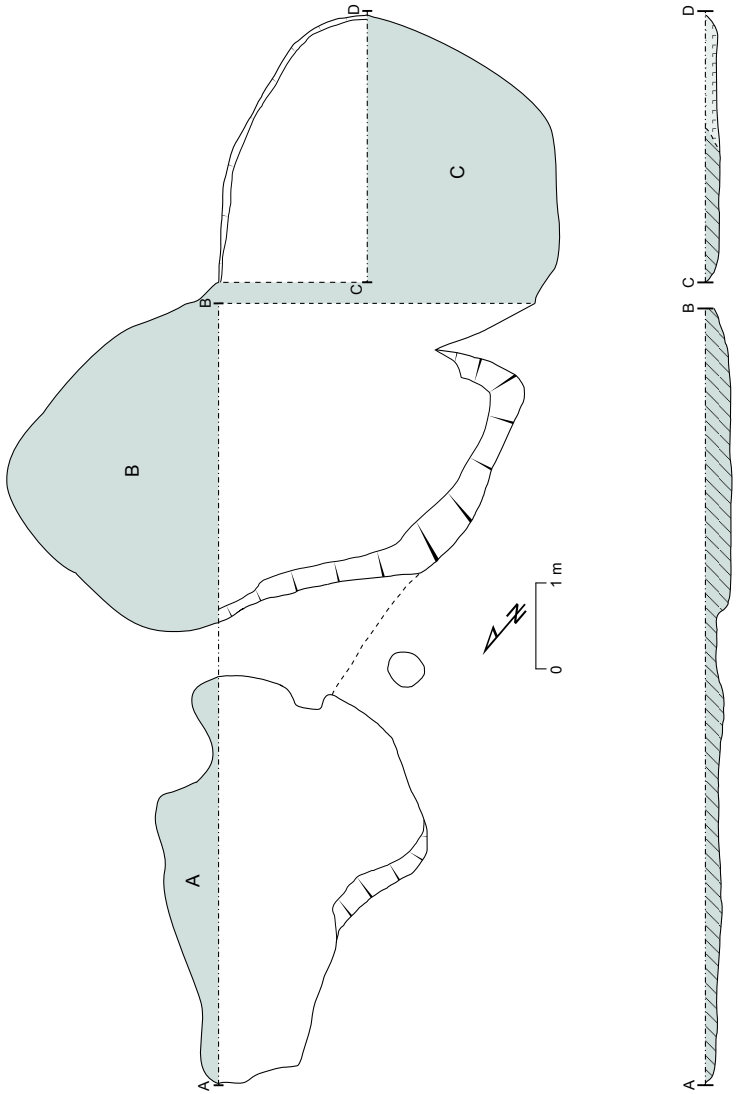
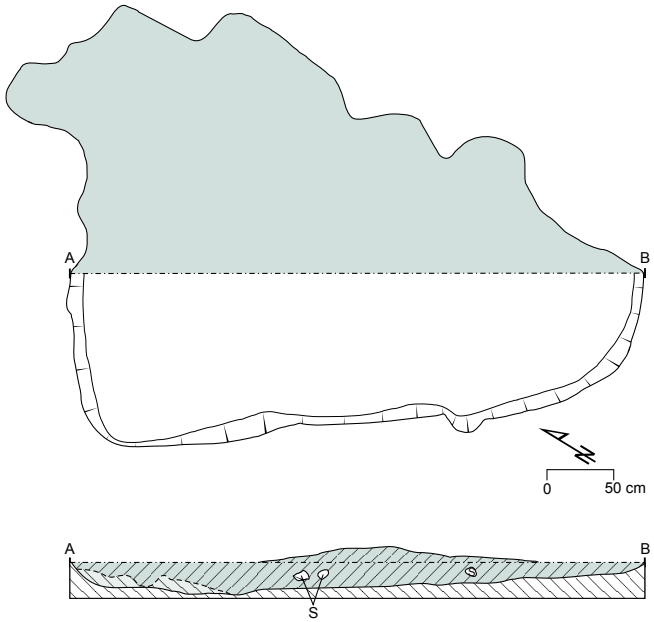


feat. 1090

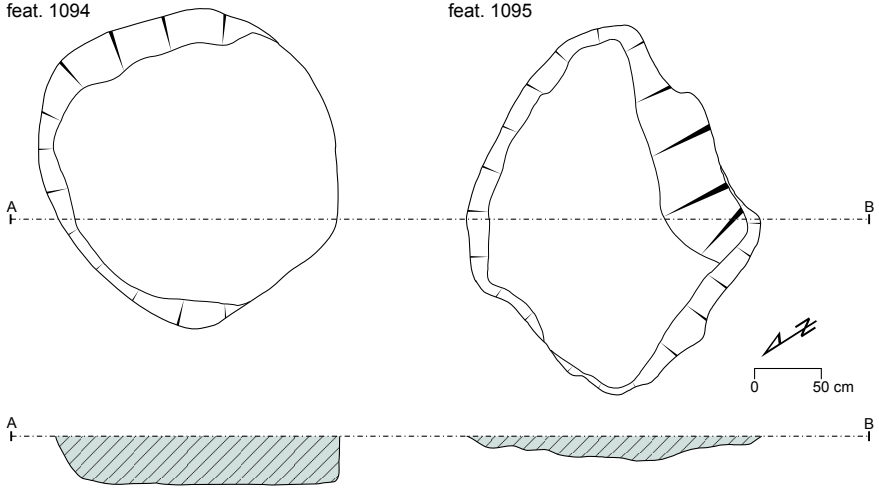
Tab. 3.39. Sunken features

feat. 1092



feat. 1094

feat. 1095



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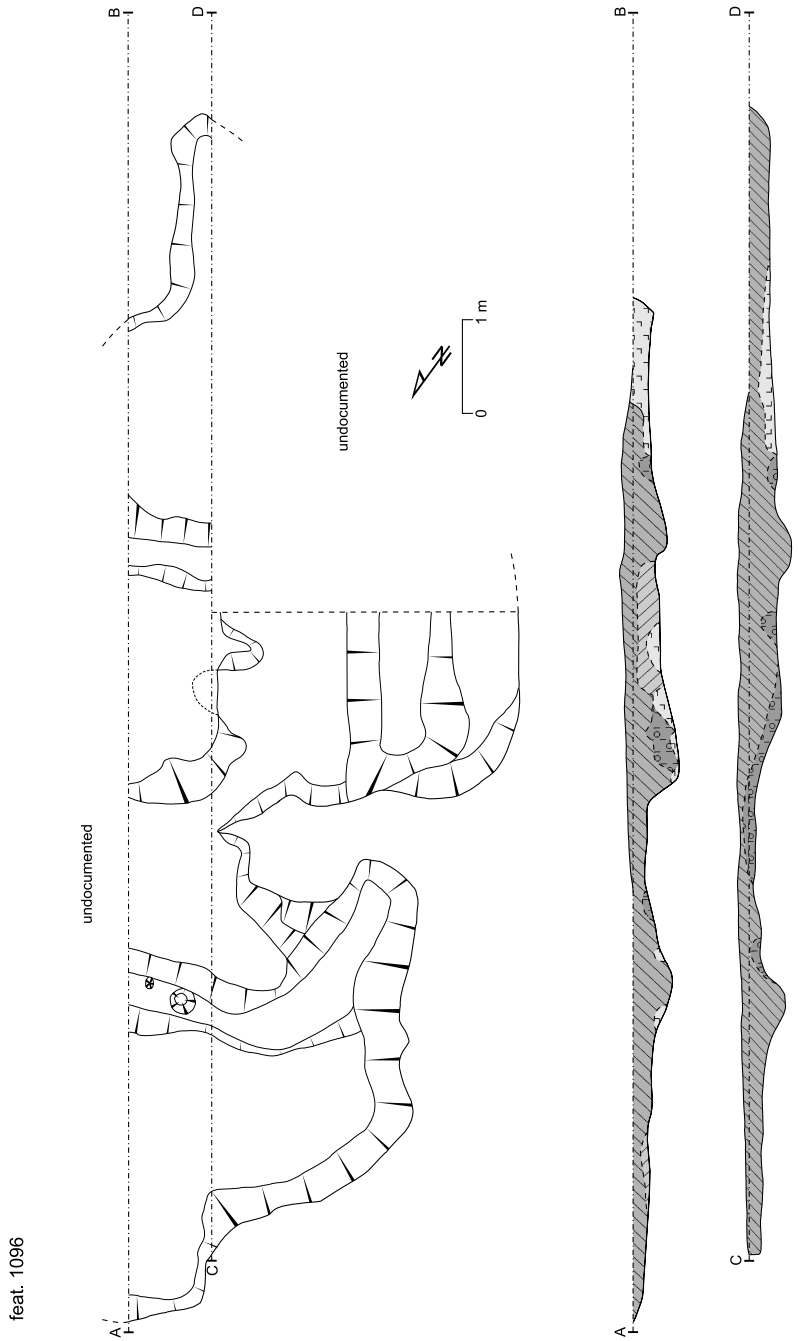

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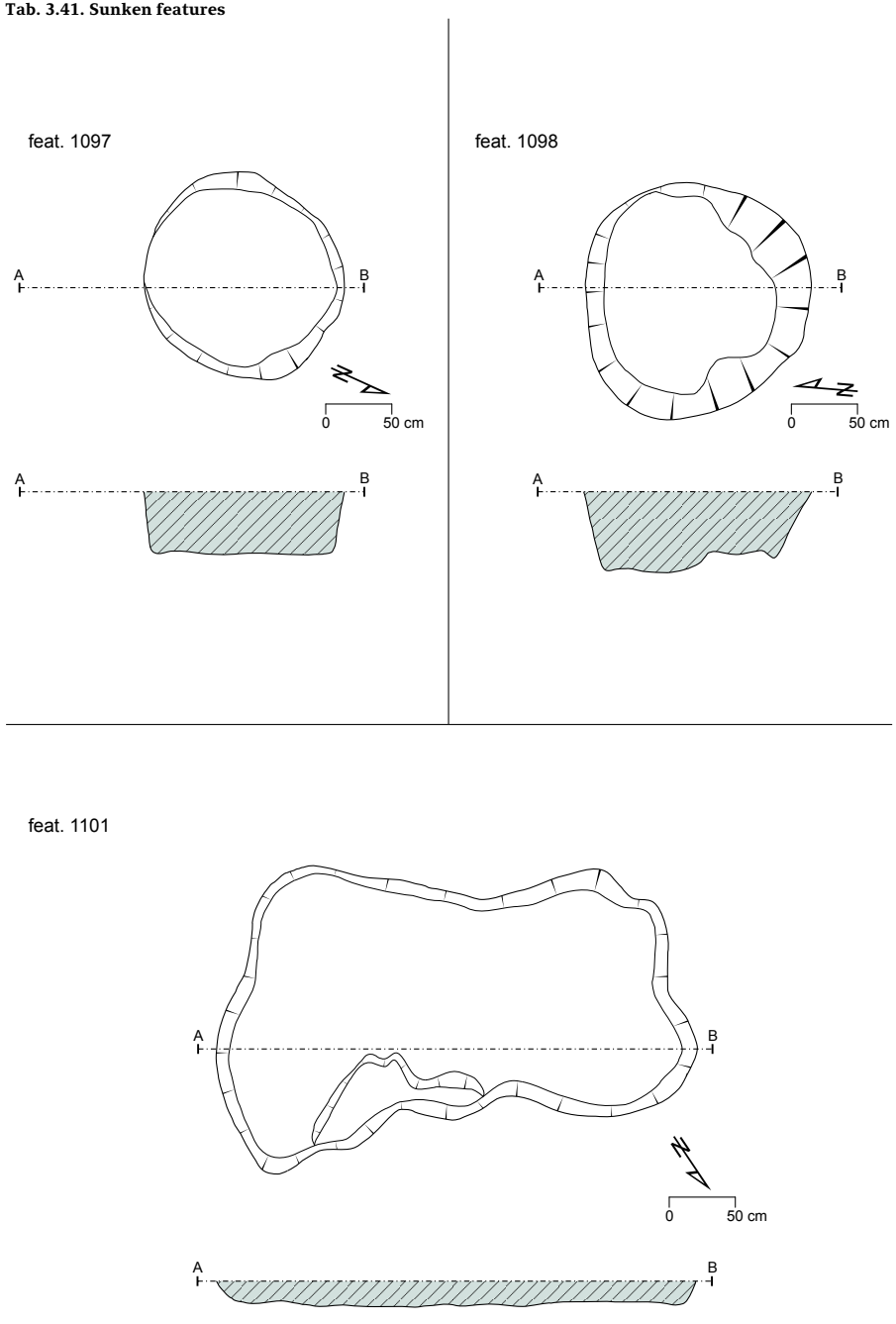

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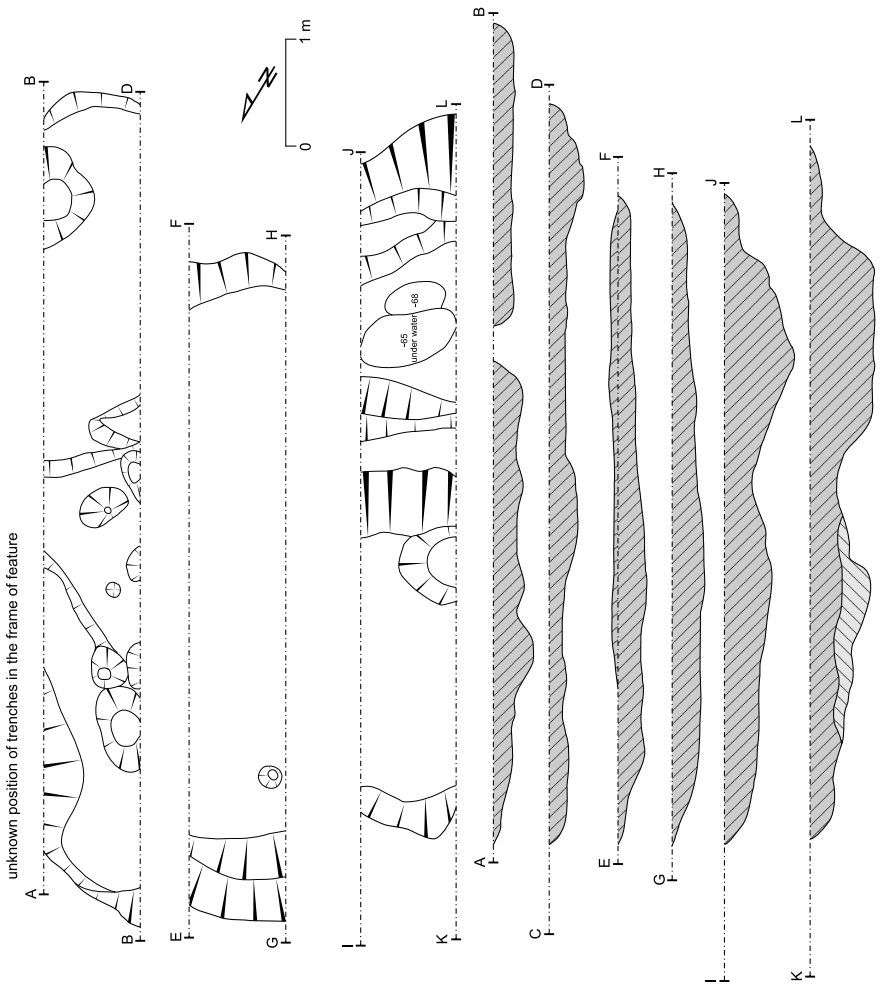

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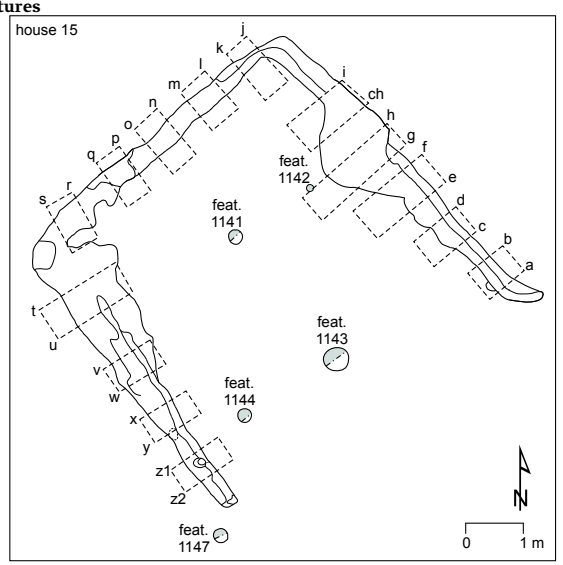
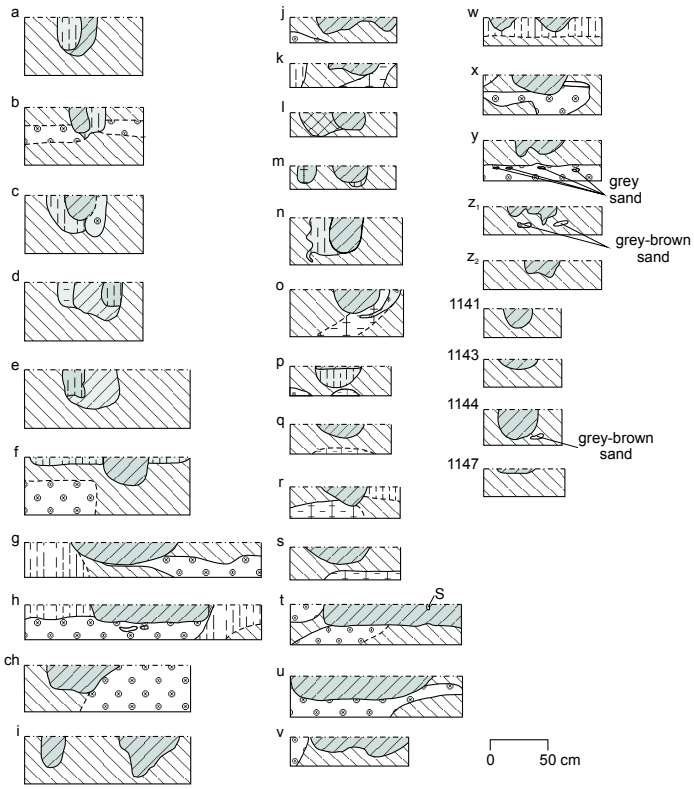
feat. 1140





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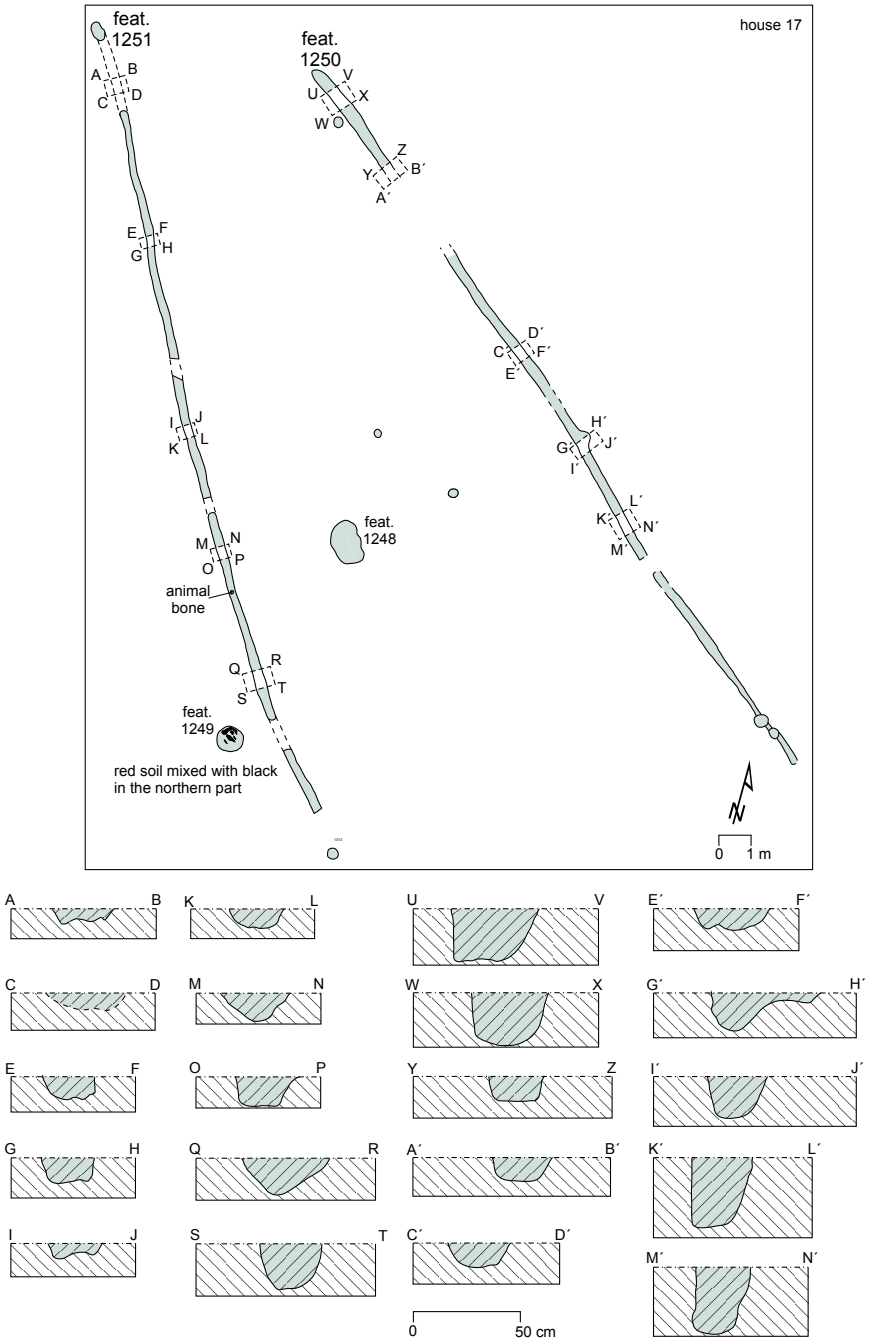
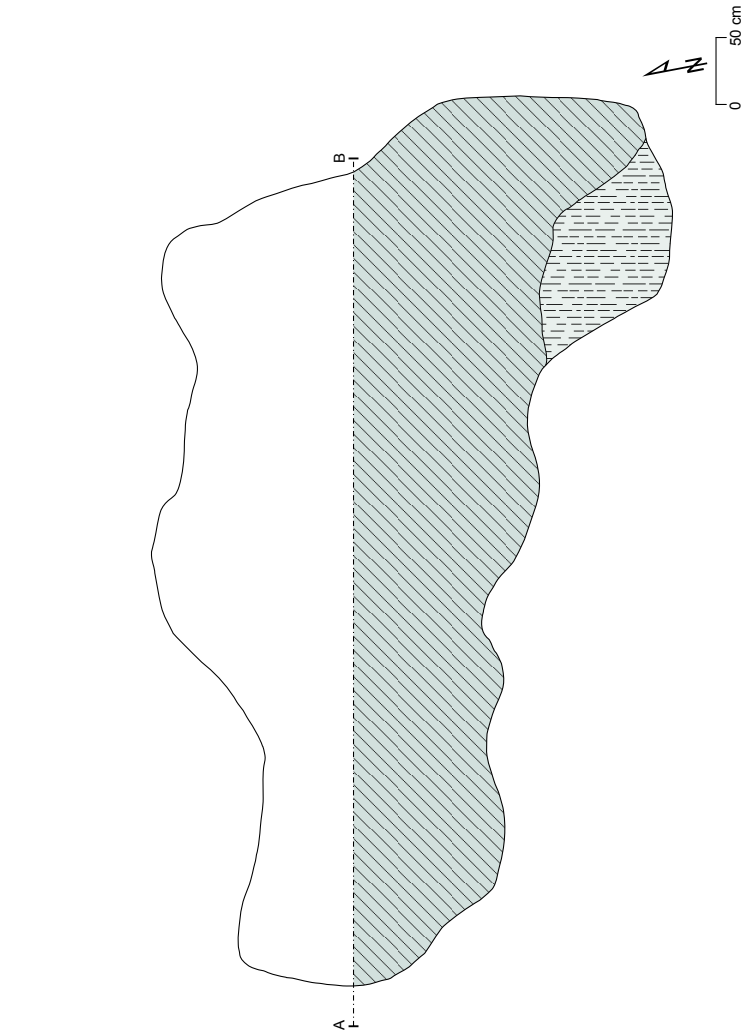
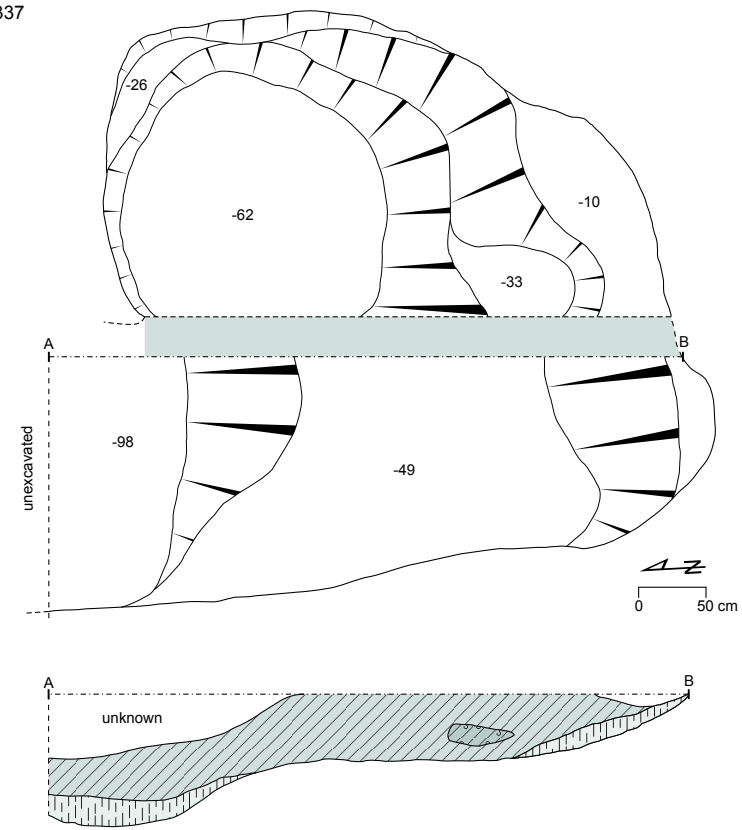


Tab. 3.45. Sunken features

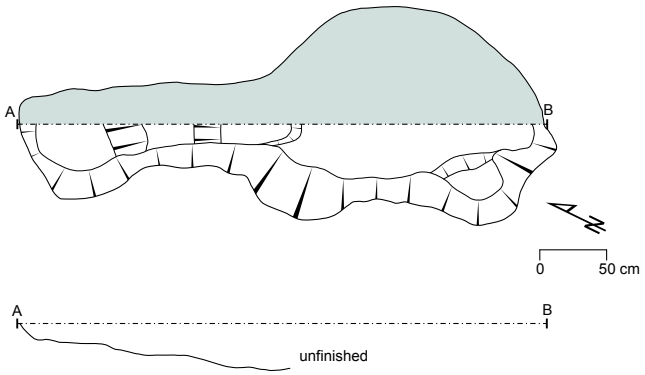


Tab. 3.46. Sunken features

feat. 1337

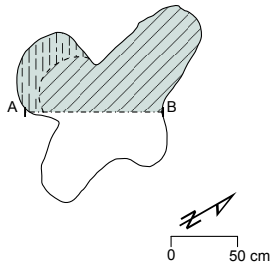


feat. 1340

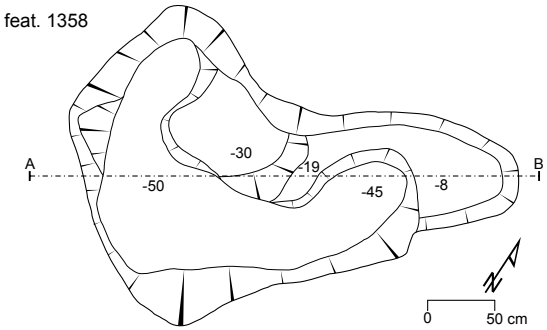


Tab. 3.47. Sunken features

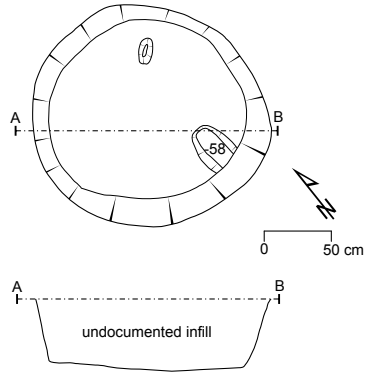
feat. 1392



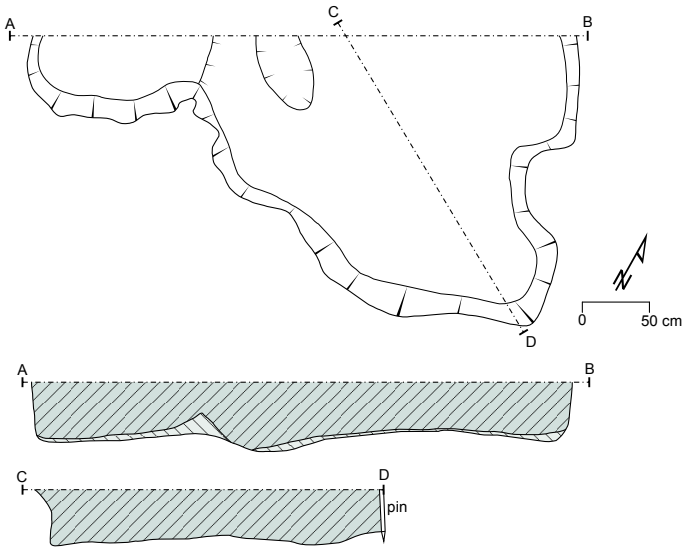
feat. 1358



feat. 1522

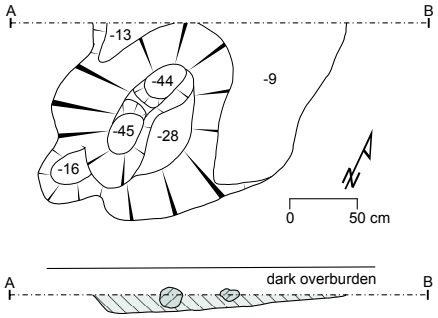


feat. 1644

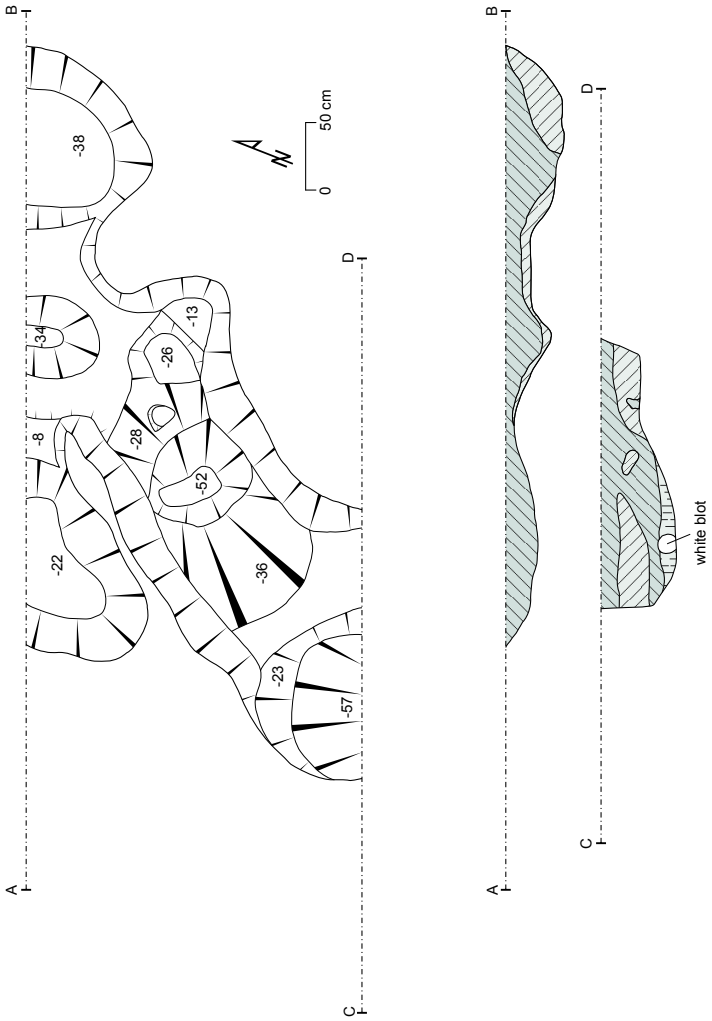


Tab. 3.48. Sunken features

feat. 1655



feat. 1656



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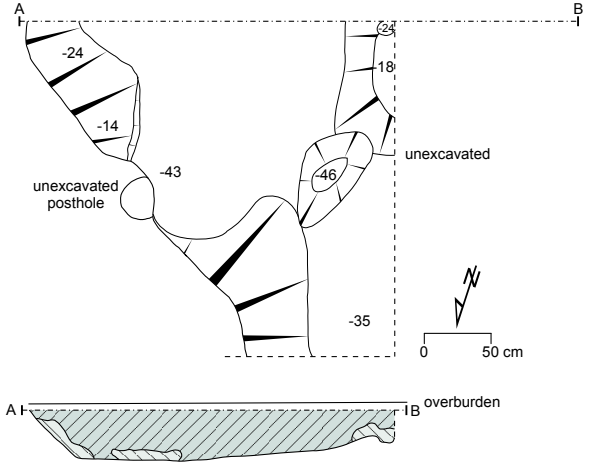
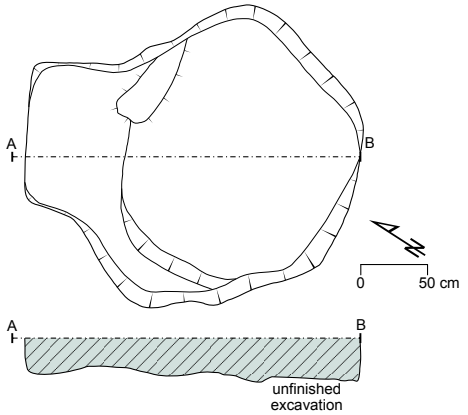
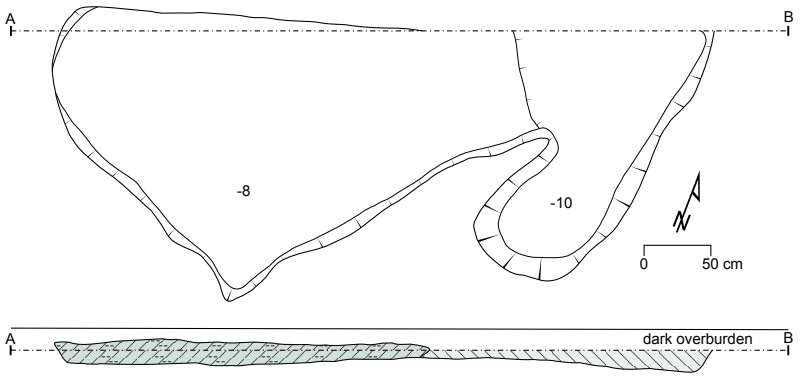
feat. 1659



feat. 1666



feat. 1667



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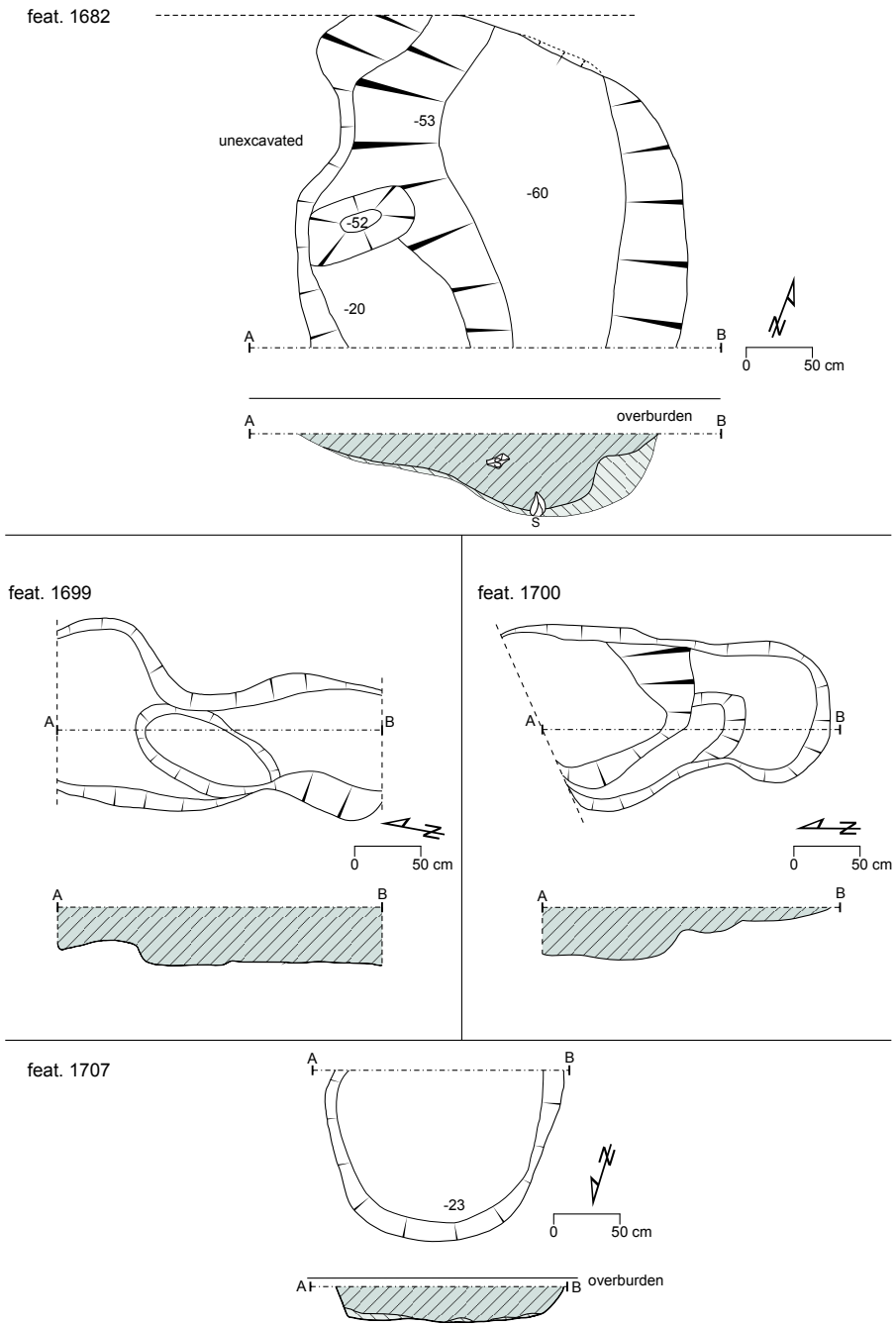

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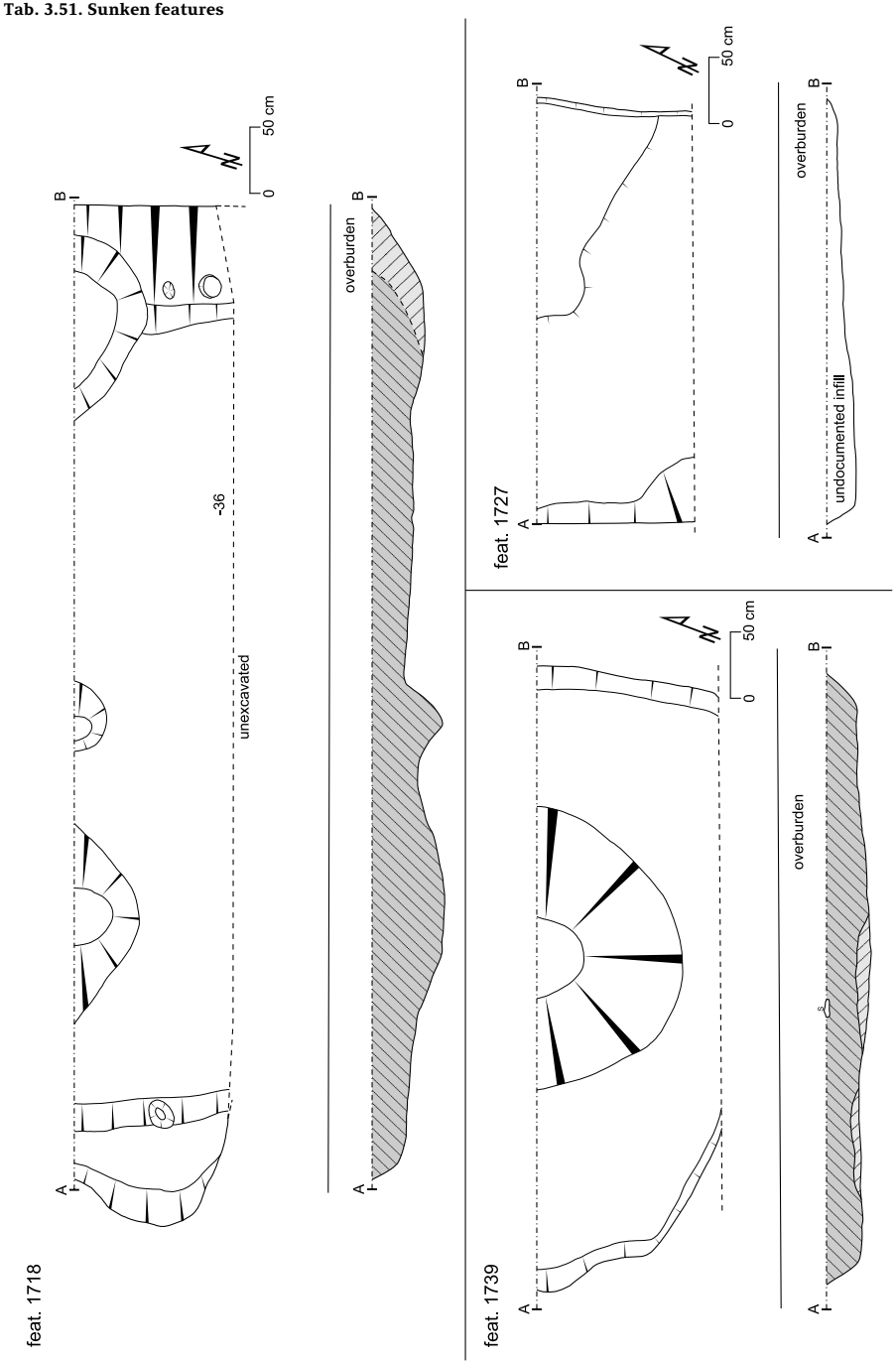
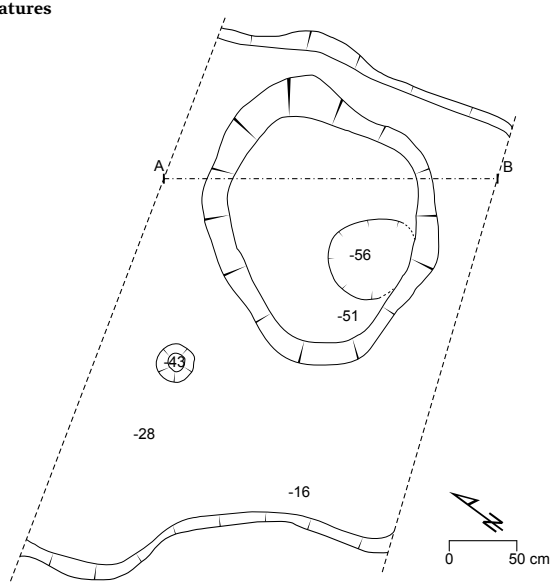
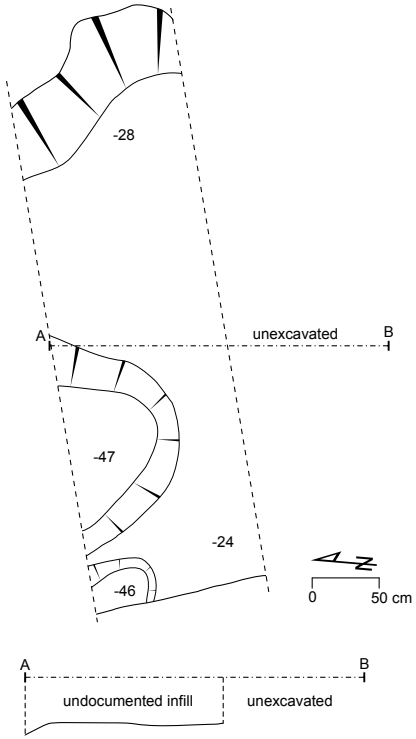


Tab. 3.52. Sunken features

feat. 1740

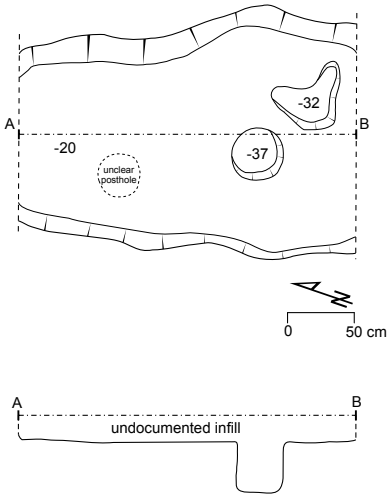


feat. 1742

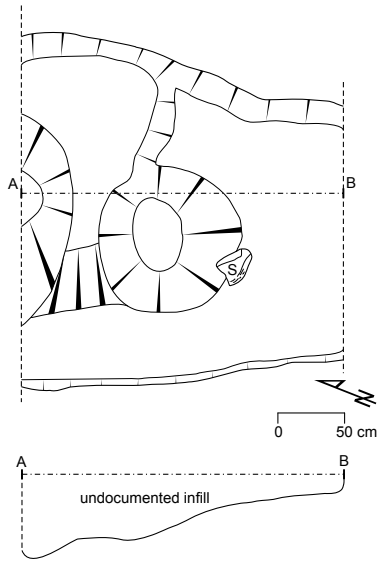


Tab. 3.53. Sunken features

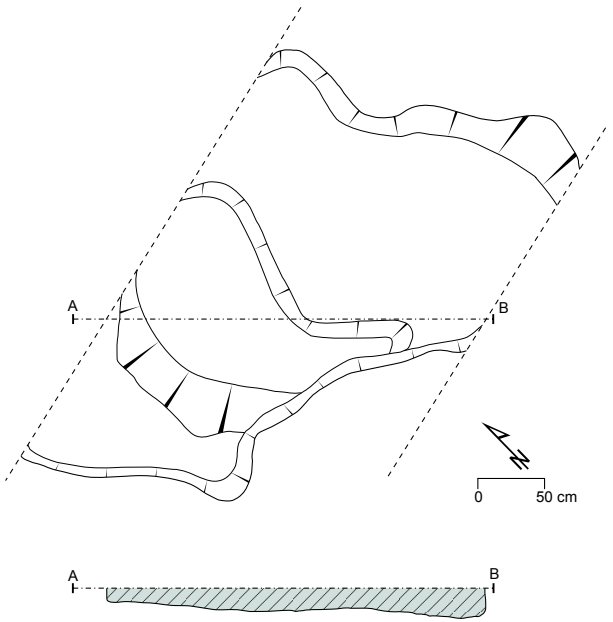
feat. 1752



feat. 1761



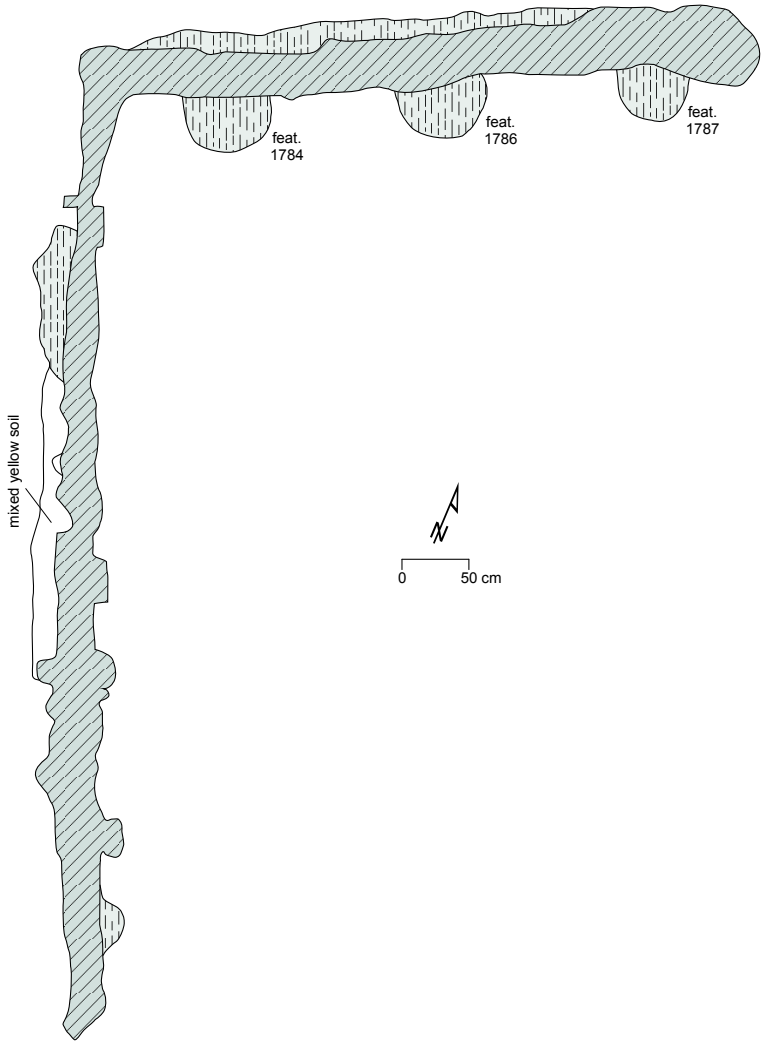
feat. 1773



Tab. 3.54. Sunken features

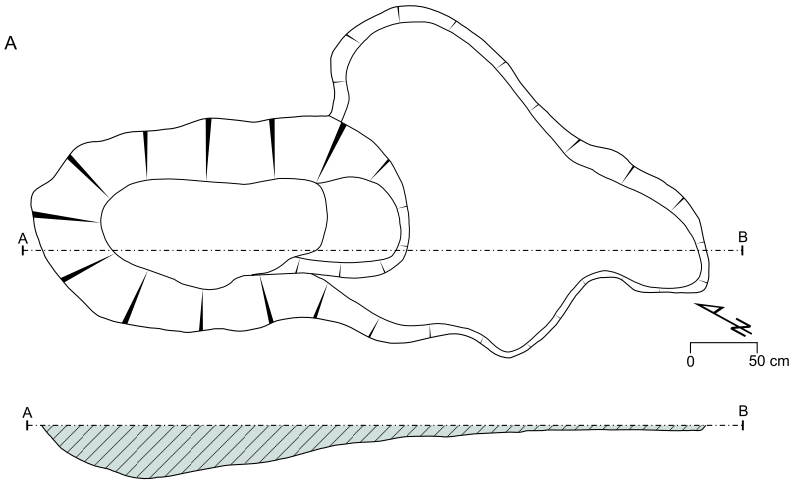
feat. 1783

house 44

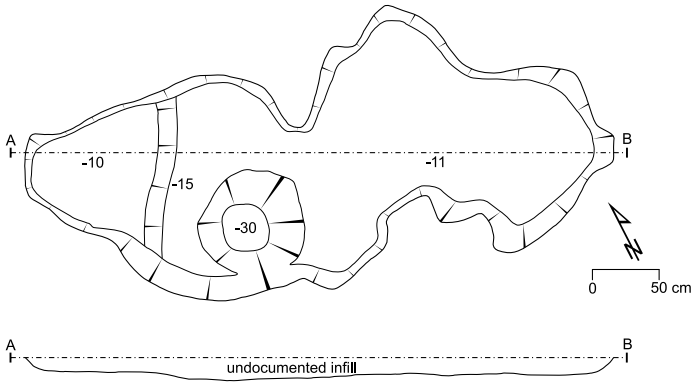


Tab. 3.55. Sunken features

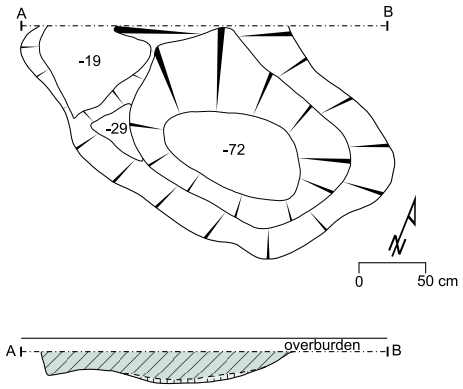
feat. 1800 A



feat. 1808 B

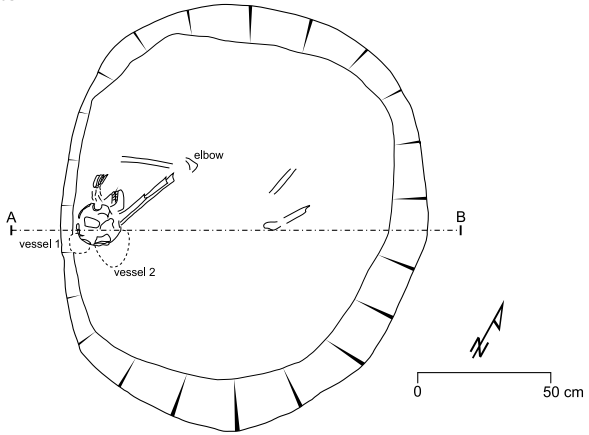


feat. 1819 B

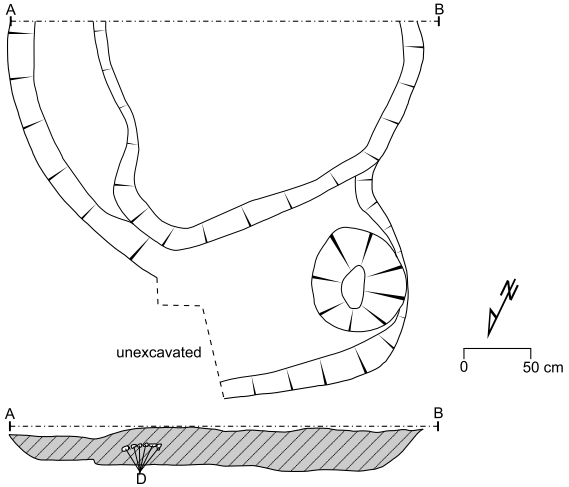


Tab. 3.56. Sunken features

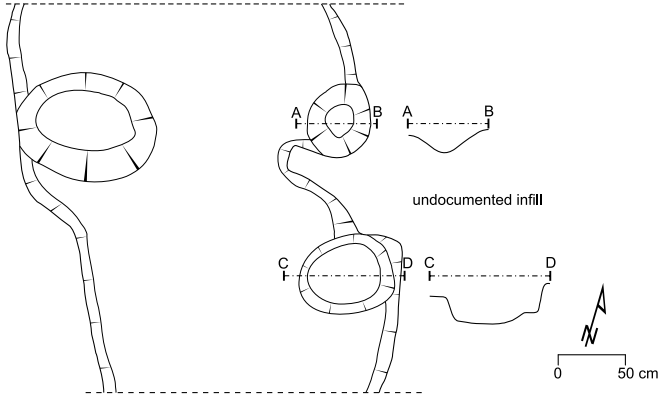
feat. 1926



feat. 1934

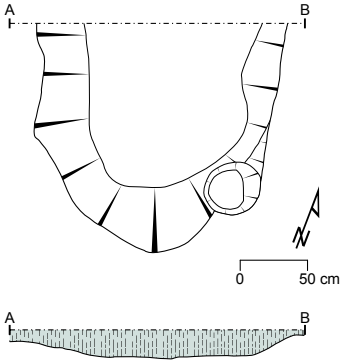


feat. 1940

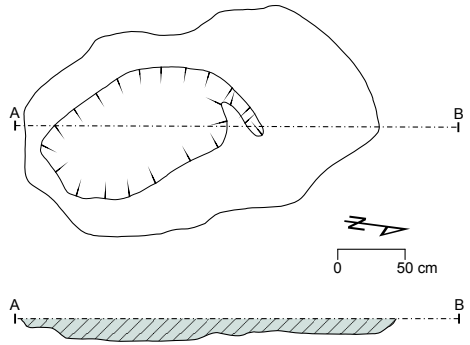


Tab. 3.57. Sunken features

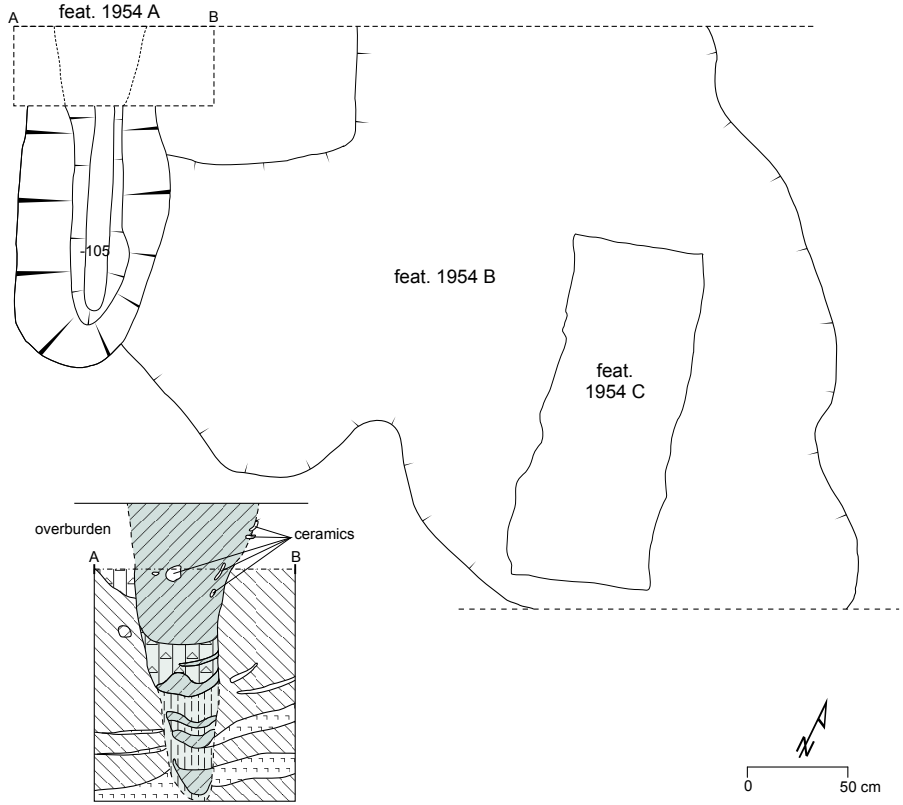
feat. 1941



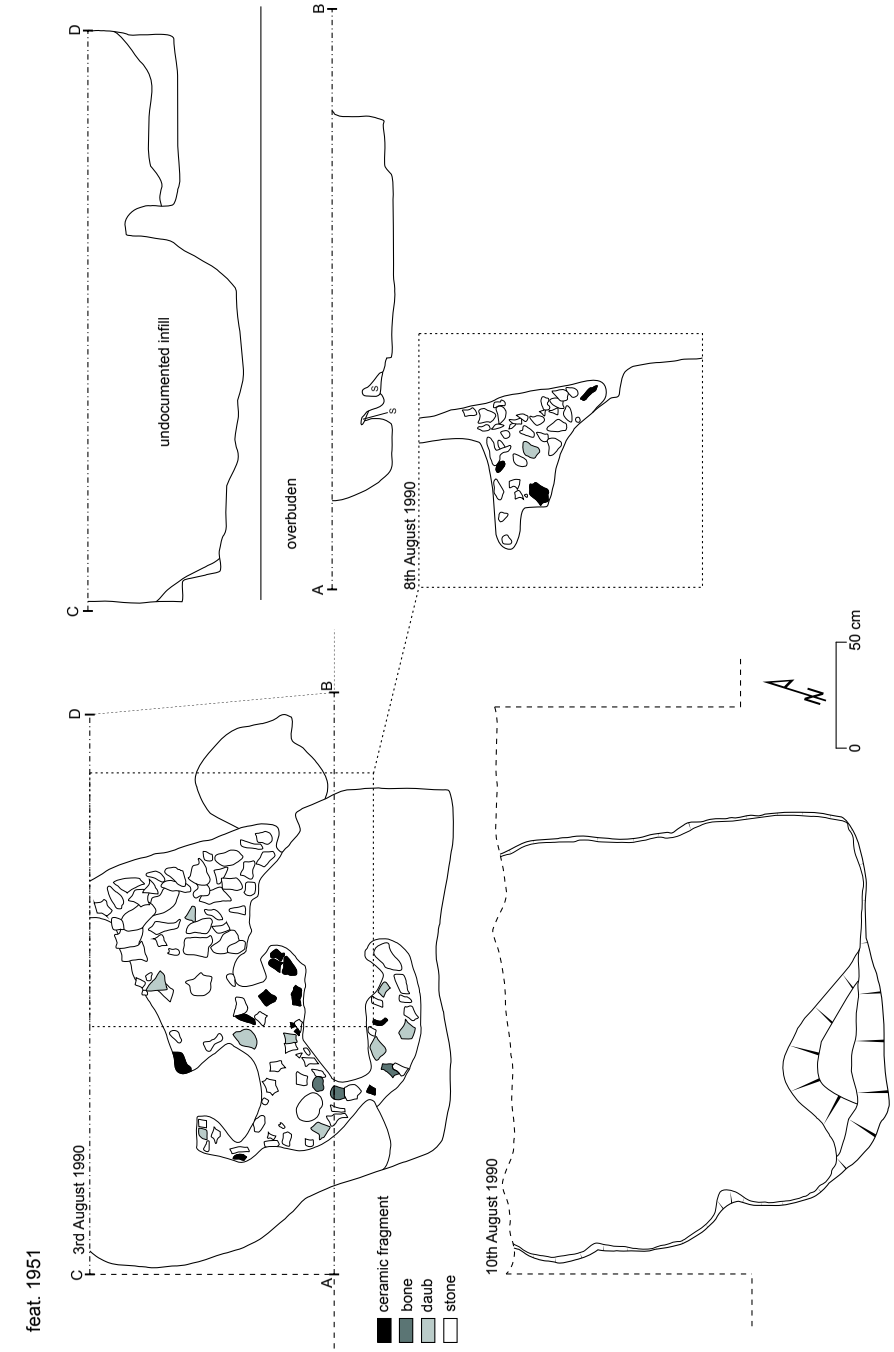
feat. 1964



feat. 1954 A

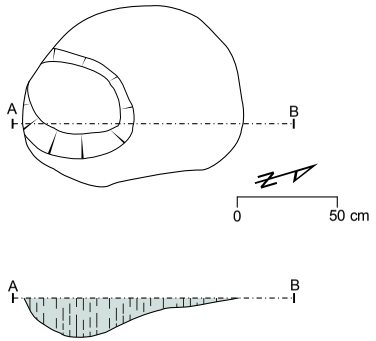


Tab. 3.58. Sunken features

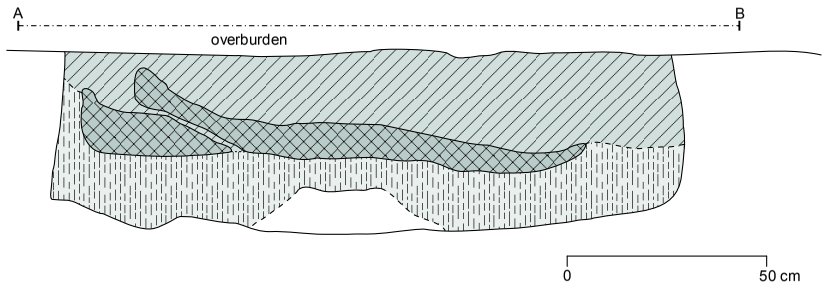


Tab. 3.59. Sunken features

feat. 2009



feat. 2026



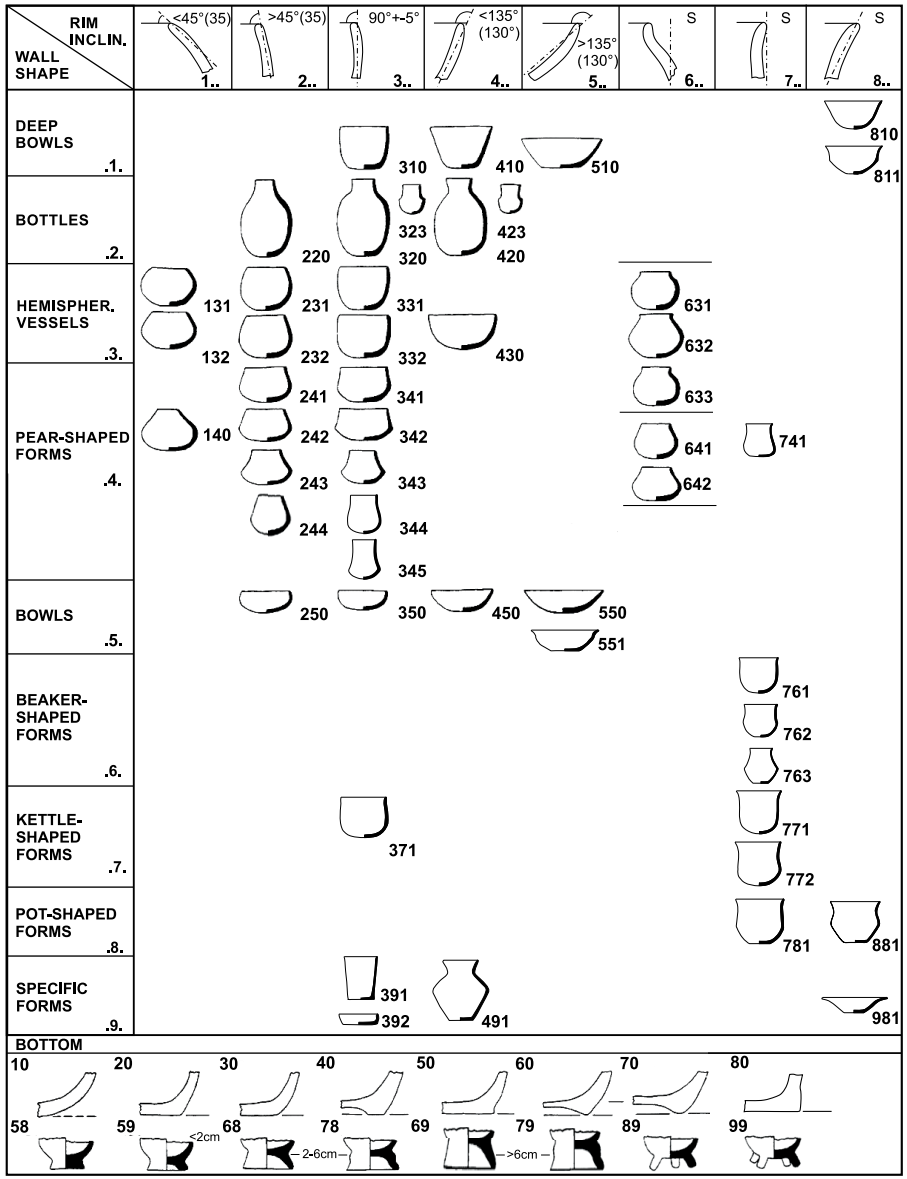
Tab. 4.1. Ceramic fabric and vessel surface treatment (Soudský 1967, modified).

decorated		undecorated		
11.		21.	organic admixture	muddy soft
12.		22.	organic admixture and small stones	muddy soft
13.		23.	weak organic admixture	muddy soft
33.		43.	organic admixture	washed soft
36.		46.	finely grained	washed soft
37.		47.	coarsely grained	washed soft
38.		48.	sandy	washed soft
53.		63.	organic admixture	washed hard
56.		66.	finely grained	washed hard
57.		67.	coarsely grained	washed hard
58.		68.	sandy	washed hard
74.		84.	coarse with small stones	unwashed sandy
75.		85.	fine with stones	unwashed sandy
77.		87.	coarsely grained	unwashed sandy
78.		88.	sandy	unwashed sandy
91.		01.	organic admixture	muddy hard
92.		02.	organic admixture and small stones	muddy hard
93.		03.	weak organic admixture	muddy hard
95.		05.	fine with stones	muddy hard
96.		06.	finely grained	muddy hard
97.		07.	coarsely grained	muddy hard
98.		08.	sandy	muddy hard

additional tempering		
..1		crushed ceramics
..2		small pieces of graphite
..3		graphitic clay
..4		weak mica admixture
..5		heavy mica admixture

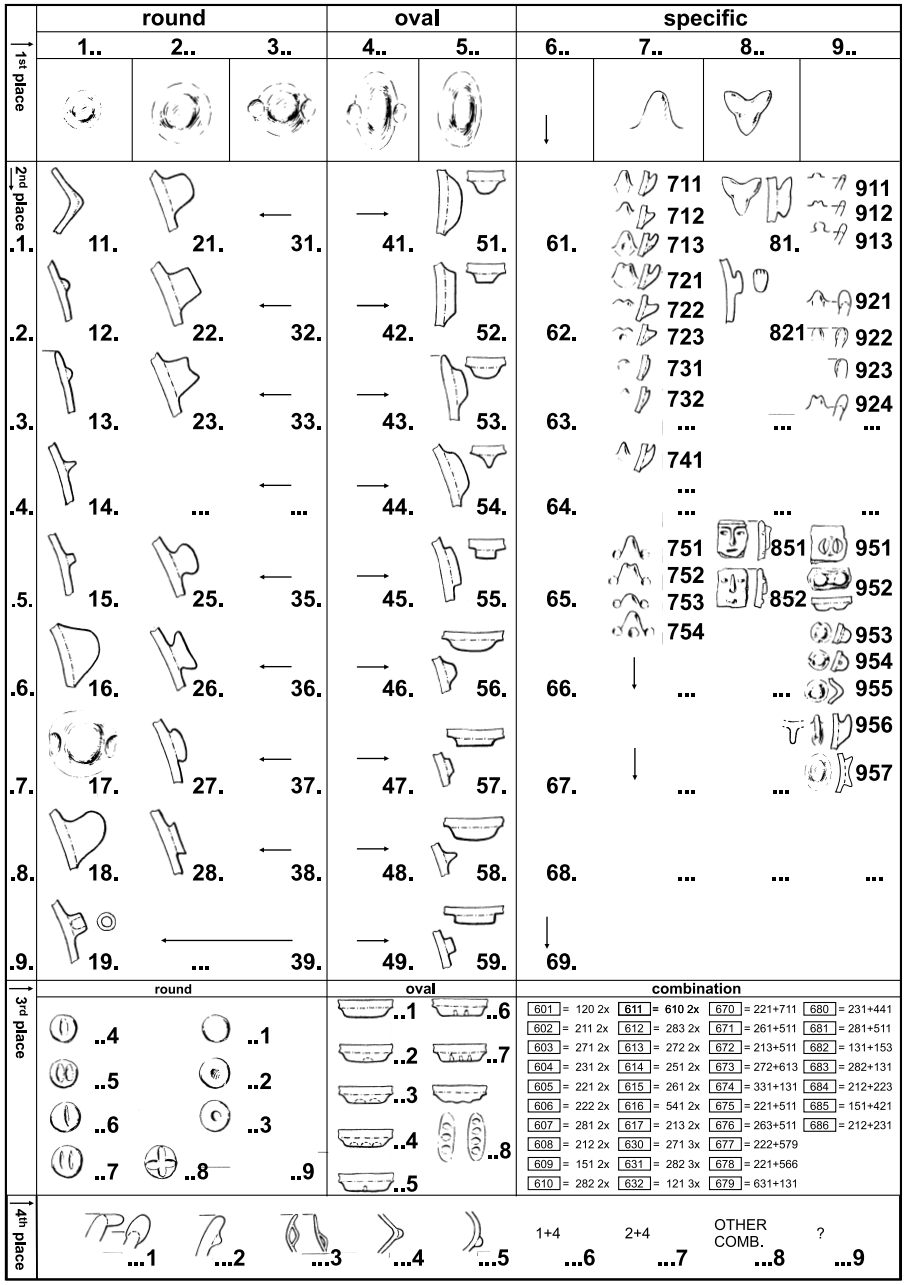
surface treatment		
10		engobe
20		polished engobe
30		oxidation red layer
40		coarse surface
50		semi-smoothed
60		smoothed
70		semi-polished
80		polished
81		combination 80+93
91		graphitic painting
92		red pigment
93		pitch impregnation
01		demaged

Tab. 4.2. Vessel shapes (Soudský 1967; Zápotocká 1998, modified).



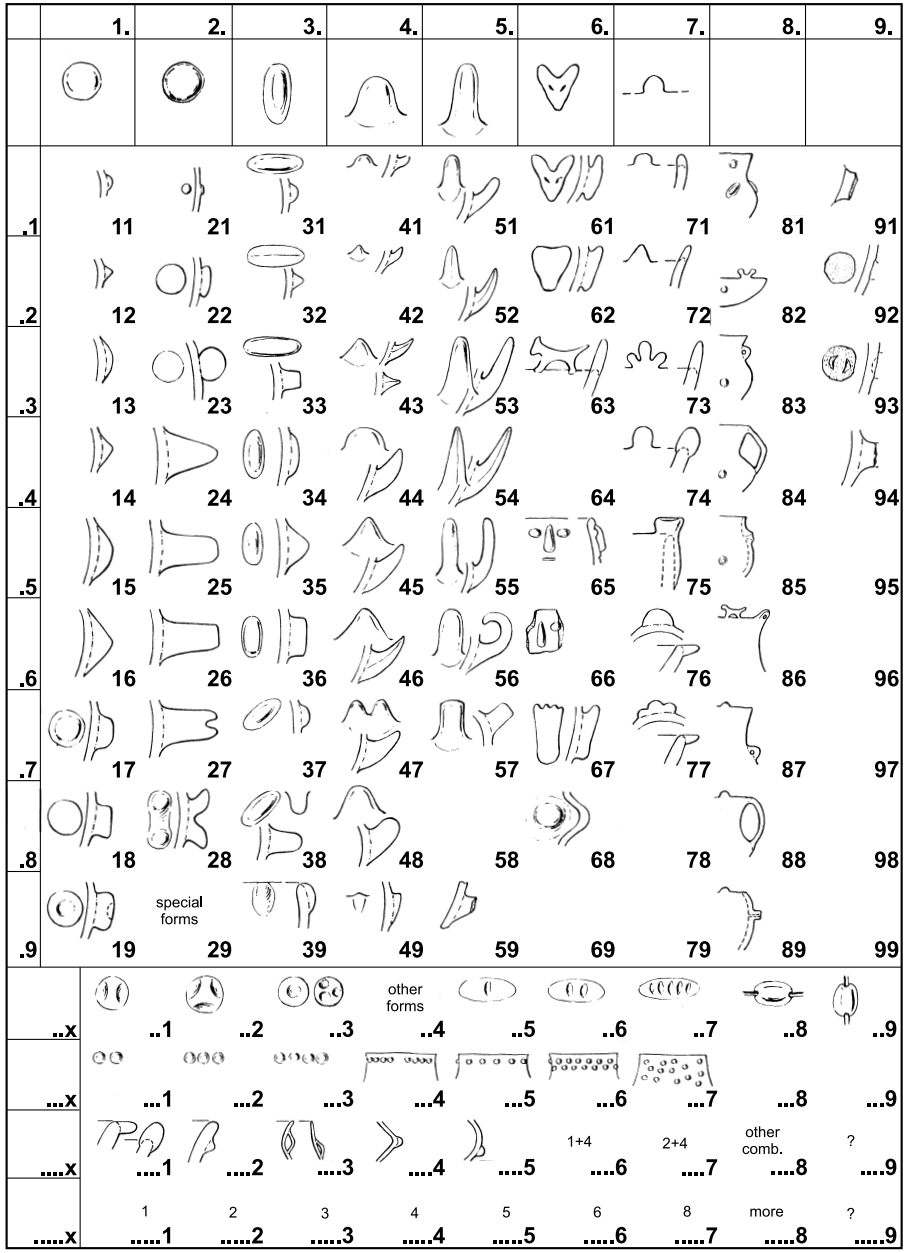
Tab. 4.3a. Knobs and projections (Pavlů – Zápotocká 1978, modified) – part L.

L...



Tab. 4.3b. Knobs and projections (Pavlů – Zápotocká 1978, modified) – part S.

S...



Tab. 4.4a Handles (Pavlů – Zápotocká 1978, modified) – part L.

L...

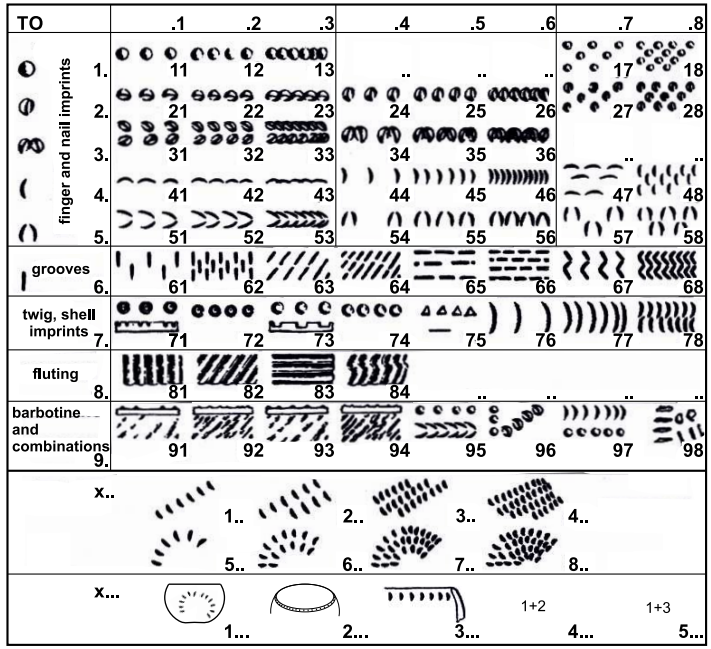
SHAPE \ DISTRIBUTION	UNRECOGNIZABLE	ROW	ZIG - ZAG	PITCHER
	? .1 .2 .3	.4 .5 .6	.7 .8 .9	
oval small horizontal 1.	plain 11 · body cut 12 · grooved/with finger prints 13	plain 14 · body cut 15 · grooved/with finger prints 16	plain 17 · body cut 18 · grooved/with finger prints 19	10
oval small vertical 2.	21 · 22 · 23	24 · 25 · 26	27 · 28 · 29	20
oval large horizontal 3.	31 · 32 · 33	34 · 35 · 36	37 · 38 · 39	30
oval large vertical 4.	41 · 42 · 43	44 · 45 · 46	47 · 48 · 49	40
tongue-shaped 5.	51 · 52 · 53	54 · 55 · 56	57 · 58 · 59	50
gabled 6.	61 · 62 · 63	64 · 65 · 66	67 · 68 · 69	60
pointed 7.	71 · 72 · 73	74 · 75 · 76	77 · 78 · 79	70
other shapes 8.	81 · 82 · 83	84 · 85 · 86	87 · 88 · 89	..
combination 9.	.. · .. · ..	.. · .. · ..	.. · .. · ..	..
fragment 0.	01 · 02 · ? 03	.. · .. · ..	.. · .. · ..	..

Tab. 4.4b Handles (Pavlů – Zápotocká 1978, modified) – part S.

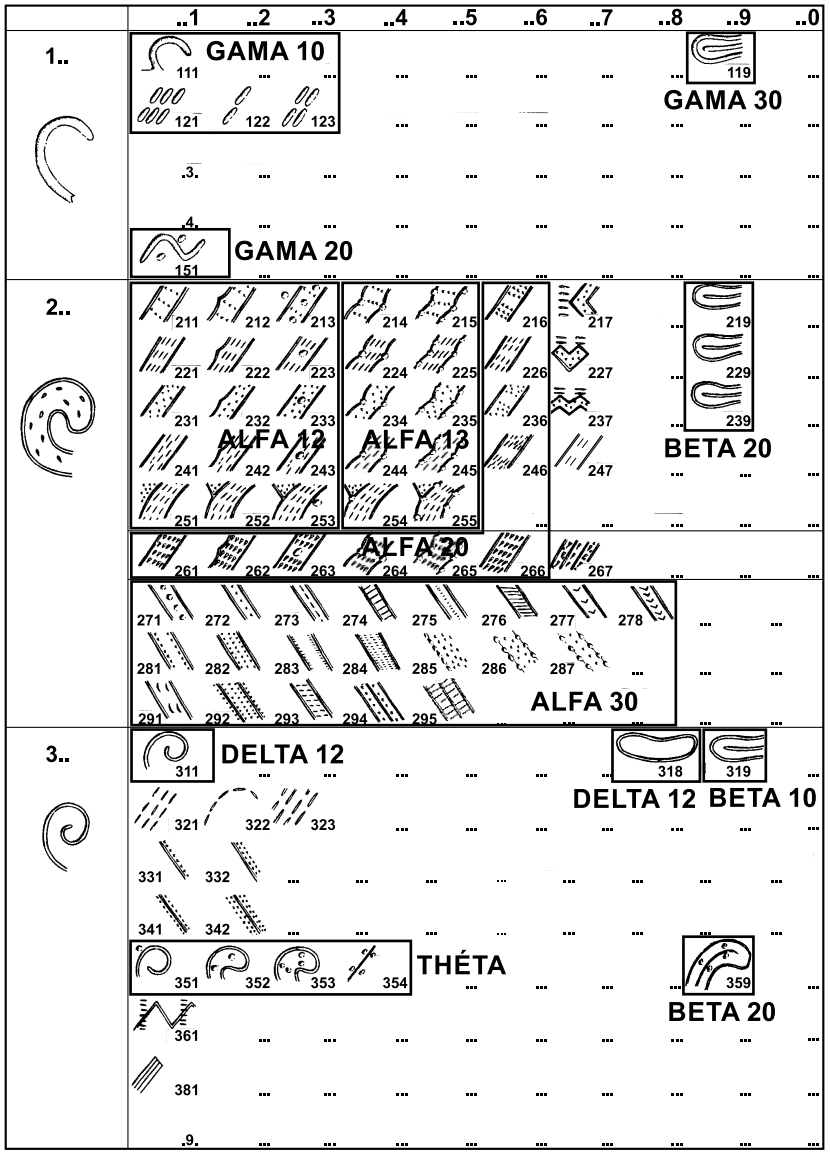
S...

	01.	02.	03.	00..	000.
0.1	011	021	031	001.	0001
0.2	012	022	032	002.	0002
0.3	013	023	033	003.	0003
0.4	014	024	034	004.	0004
0.5	015	025	035	005.	0005
0.6	016	026	036	006.	0006
0.7	017	027	037	007.	0007
0.8	018	028	038	008.	0008
0.9	fragment 019	fragment 029	039	009.	uncertain 0009

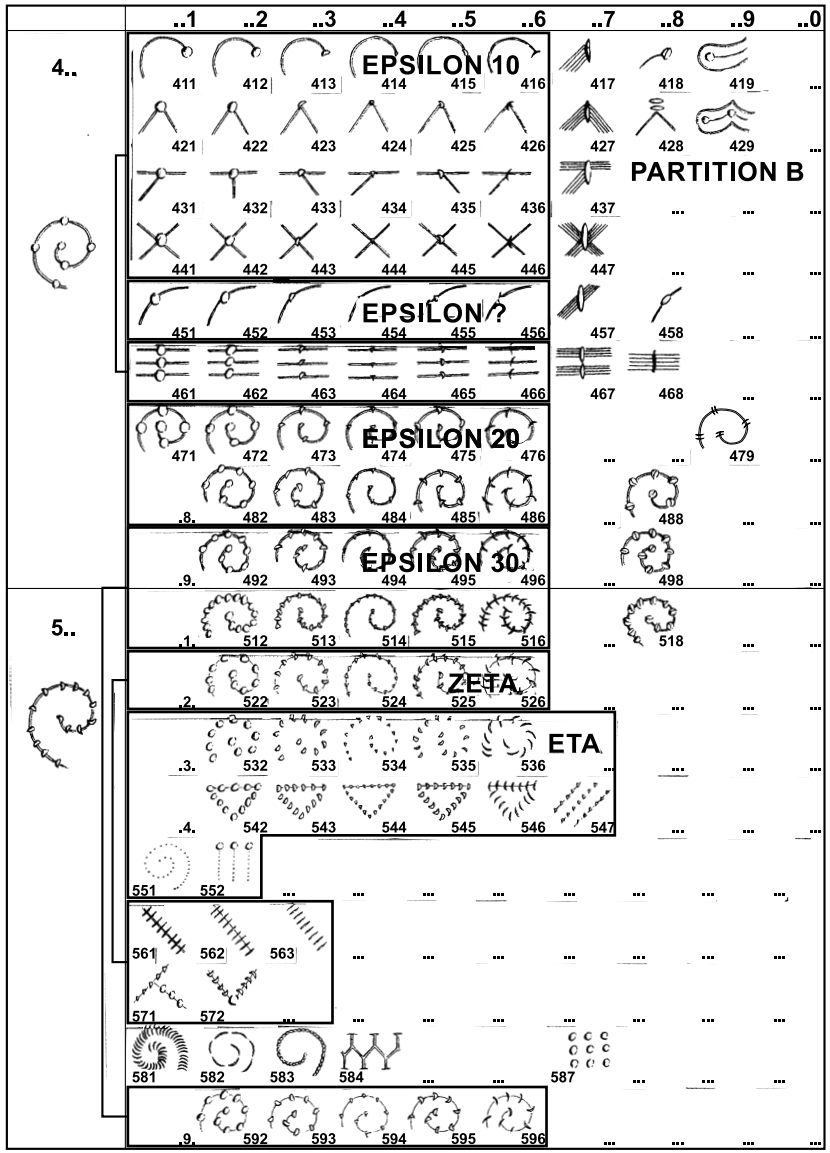
Tab. 4.5. Technical and relief ornamentation (Soudský 1967, modified).



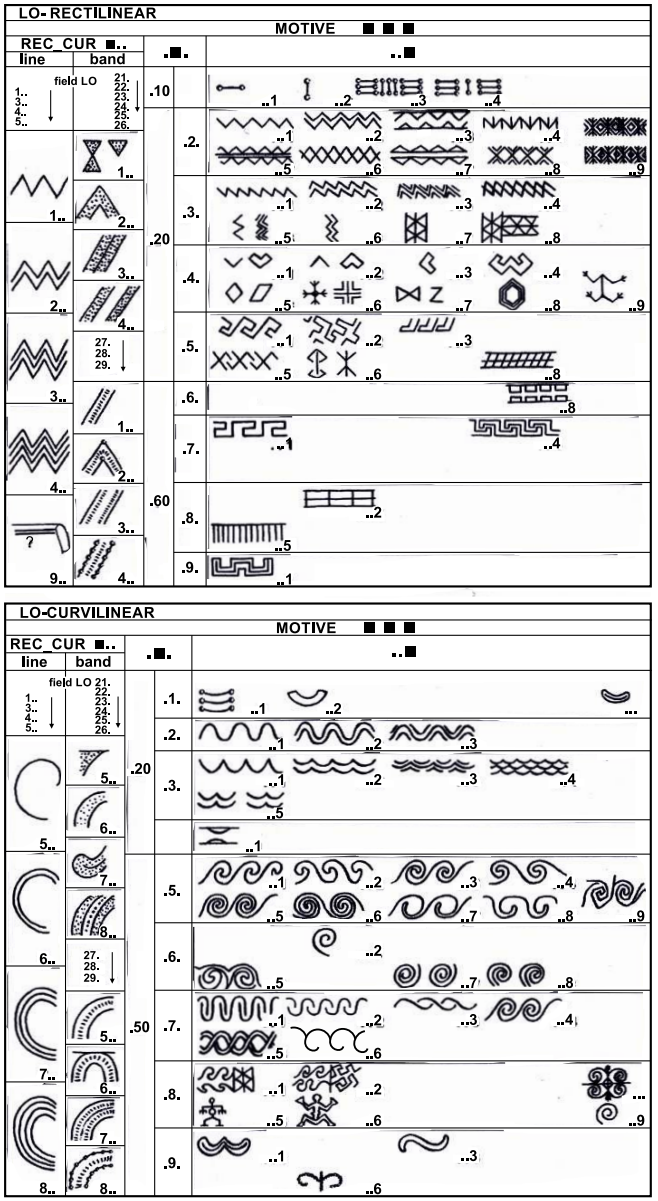
Tab. 4.6a. Techniques and styles of linear ornamentation (Pavlů – Rulf – Zápotocká 1986, modified) – part 1.



Tab. 4.6b. Techniques and styles of linear ornamentation (Pavlů – Rulf – Zápotocká 1986, modified) – part 2.



Tab. 4.7. Motives of linear ornamentation (Květina – Pavlů 2007, modified).

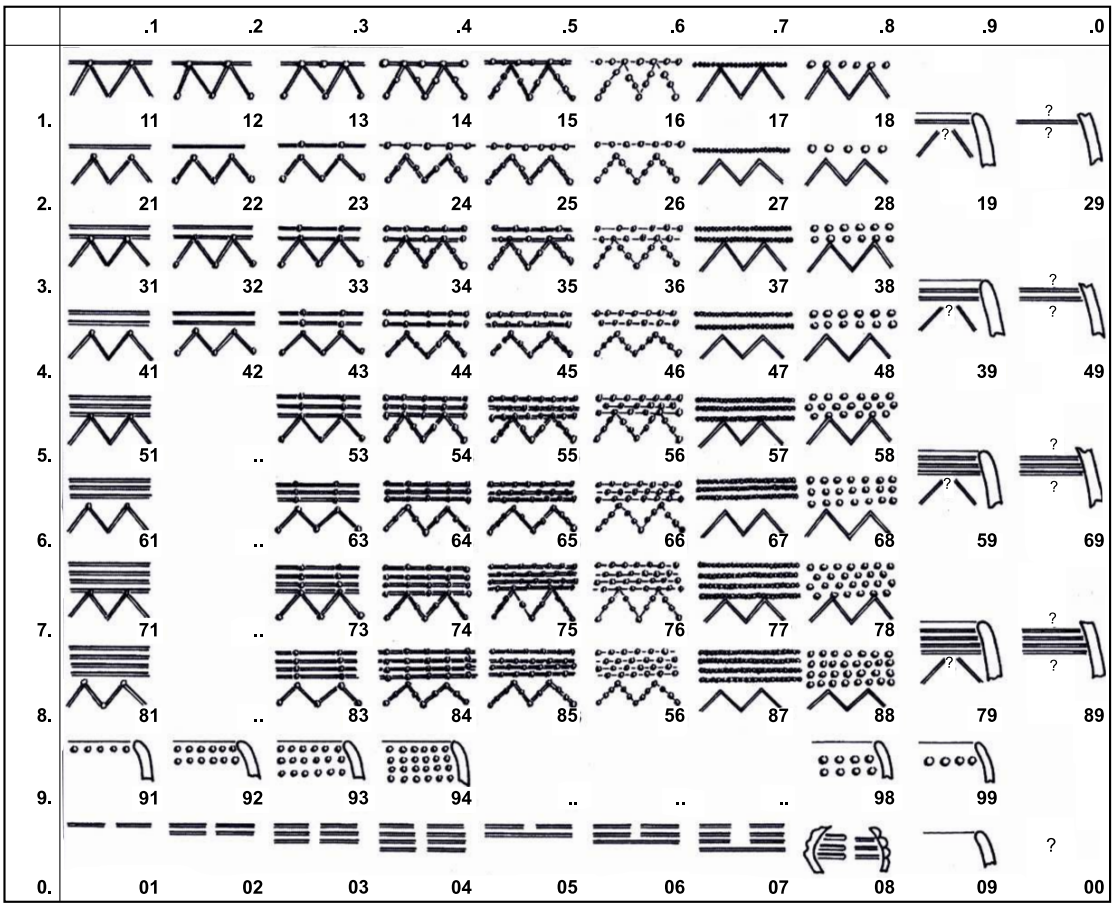


Tab. 4.8. Secondary (supplementary) motives of linear ornamentation (Květina – Pavlů 2007, modified).

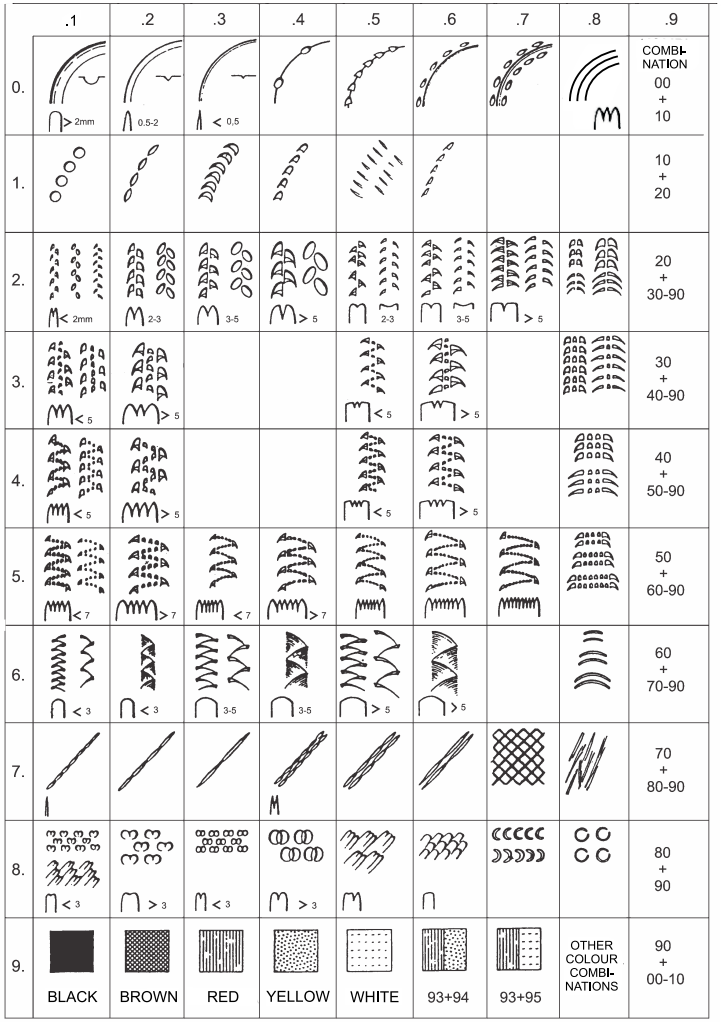
	..1	..2	..3	..4	..5	..6	..7	..8	..9
10.								108	
11.			113	114	115	116		118	
12.			123		125	126		128	
13.	131	132	133	134				138	139
14.								148	
15.									
16.								168	
17.									
18.								188	
19.									
20.			203						
21.	211	212	213		215		217	218	219
22.		222	223		225		227	228	229
23.	231	232	233	234	235	236	237	238	
24.		242			245		247	248	
25.							257	258	
26.							267		
27.							277		
28.							287		
29.							297	298	
30.									
31.						316	317	318	319
32.						326	327	328	
33.						336	337	338	339
34.							347		
35.						356	357		
36.							367		
37.						376	377		
38.									
39.									
40.									
41.	411	412		414	415		417	418	419
42.	421	422		424	425	426	427	428	
43.	431	432	433	434	435			438	439
44.	441	442		444		446			
45.	451	452	453	454		456	457	458	
46.	461	462		464		466		468	
47.	471	472	473	474	475	476	477	478	479
48.	481				485	486	487		
49.	491	492	493	494	495				
50.	501				505	506			
51.	511	512			515	516			
52.	521								
53.	531					536			
54.	541	542	543	544					
55.	551		553						

	..1	..2	..3	..4	..5	..6	..7	..8	..9
56.	561			564	565				
57.	571				575	576	577		
58.	581				585	586			
59.	591								
60.	601			604		606			
61.	611	612	613	614	615			618	
62.	621					626			
63.	631	632	633	634			637	638	
64.	641					646			
65.	651								
66.	661	662	663		665	666	667		
67.	671	672					677		
68.	681	682							
69.	691								
70.	701	702	703						
71.	711								
72.	721								
73.	731								
74.	741					746			
75.	751					756			
76.	761								
77.									
78.									
79.									
80.	801								
81.	811	812		814	815	816			
82.	821			824		826			
83.									
84.									
85.	851	852							
86.	861	862							
87.	871								
88.									
89.	891			894					899
90.									
91.	911	912							
92.		922	923						
93.		932							
94.	941	942	943	944	945	946	947	948	949
95.									959
96.									
97.									
98.									
99.					995				

Tab. 4.9. Lines below the rim accompanying the linear ornamentation (Květina – Pavlů 2007).



Tab. 4.10. Techniques a styles of stroked ornamentation (Zápotocká 1978, modified).



01 - 08 incised decoration (INCS)
11 - 16 individual strokes (INDV)
21 - 23 small alternating double-strokes (DBL_S_ALT)
24 wide alternating double-strokes (DBL_W_ALT)
25 - 26 small double-strokes made by tremolo technique (DBL_S_TRE)
27 wide double-strokes made by tremolo technique (DBL_W_TRE)
28 parallel double-strokes (DBL_PARA)
31 - 36
41 - 46 multiple strokes made by tremolo technique (MUL_TRE)
51 - 57
38,48,58 parallel multiple strokes (MUL_PARA)
61 - 68 tremolo strokes (TRE)
71 - 76 striated strokes (STRI)
81 - 86 Rössen strokes (ROSS)
91 - 98 painting (COL)

Tab. 4.11. System, main motiv, bands below the rim, deviding and supplementary motives of stroked ornamentation (Zápotocká 1998, modified).

SYSTEM	MAIN MOTIVE	BAND BELOW THE RIM	DIVIDING MOTIVE	SUPPLEMEN. MOTIVE
RIM **01**	CURVILINEAR **10**	**11** **12** **13** **14**	**11** **12** **13**	**11** **12** **13** **14**
RIM+BODY **02**	CHEVRON **20**	**21** **22** **23**	**21** **22** **23**	**21** **22** **23** **24**
RIM + BODY + BELLY **03**	VERTICAL BAND **30**	**31** **32** **33**	**31** **32** **33**	
RIM + SHOULDER + BELLY **04**	HORIZONTAL BAND **40**	**41** **42** **43**	**41** **42** **43** **44**	
RIM + SHOULDER+ BELLY + LOWER PART **05**	SKEW BAND **50**	**51** **52** **53** **54**	**51** **52** **53**	
BODY **06**	TRIANGLE **61** RHOMBUS **64** SQUARE **66**	**61** **62** **63**	**61** **62** **63**	INNER DECORATION **60**
SHOULDER **07**	ZIGZAG **71** CROSS **73**	**71** **72** **73**	**71**	
SHOULDER + BELLY **08**	OTHERS **80**	**81** **82**	BAND ON THE BELLY **80**	
SHOULDER + BELLY+ LOWER PART **09**	COMBINATION **90**	ABRADED **90**	MISSING **90**	

Tab. 4.12a. Characteristics of ceramic assemblages in individual sunken features.

feature no.	chronology	settlement horizon	ceramic IDs	sum of fragments	sum of individuals	weight (g)	refitted fragments	Neolithic individuals	post-Neolithic individuals	ceramic type		vessel part						decoration type				
										fine	coarse	whole	rim	wall	handle	knob	bottom	LO	SO	TO	RO	NO
2	Neo	-	8479-8513	39	35	396	8	35	-	22	13	-	2	34	-	-	1	2	4	1	-	28
3	LBK IV/SBK I	-	8514-9117	695	604	6552	149	602	2	330	272	-	60	556	-	18	21	15	96	3	1	487
4	LBK	-	9118-9120	3	3	69	-	3	-	2	1	-	-	3	-	-	-	1	-	-	-	2
5	LBK IV/SBK I	-	9121-9747	734	627	9347	176	627	-	306	321	-	73	575	3	20	17	33	103	12	1	478
7	Neo	-	9748	1	1	28	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
28	SBK	-	9749	1	1	1	-	1	-	1	-	-	-	1	-	-	-	-	1	-	-	-
31	SBK	-	9750-9754	5	5	30	-	5	-	3	2	-	-	5	-	-	-	-	1	-	-	4
38	Neo	-	9755-9756	4	2	55	3	2	-	-	2	-	-	2	-	-	-	-	-	-	-	-
43	Neo	-	2774	1	1	8	-	1	-	1	-	-	1	-	-	-	-	1	-	-	-	-
48	Neo	-	2775-2777	3	3	50	-	3	-	2	1	-	1	2	-	1	-	-	1	-	-	2
49	Neo	-	2778-2783	9	6	65	6	6	-	5	1	-	-	4	-	-	2	1	-	1	-	4
52	Neo	-	2784	1	1	13	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
53	Neo	-	2785-2791	8	7	80	2	7	-	6	1	-	2	5	-	-	-	1	1	-	-	5
54	Neo/KnovizC	-	2792-3760	1023	969	16911	109	763	206	455	308	-	126	629	7	13	45	141	22	27	3	570
55	Neo	-	3761-3775	27	15	228	13	15	-	9	6	1	1	10	-	1	2	-	2	-	-	13
57	Neo	-	3776-3778	4	3	23	2	3	-	1	2	-	1	2	-	-	1	-	1	-	-	2
58	-	-	3779	1	1	10	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
59	-	-	3780	1	1	6	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
60	Neo	-	3781	1	1	3	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
62	LBK IIIb	B	3782	2	1	14	2	1	-	1	-	-	1	-	-	-	-	-	-	-	-	1
71	LBK IIIb	B	3783-3784	2	2	60	-	2	-	1	1	-	1	2	-	-	-	1	-	-	-	1
72	LBK IIIb	B	3785-3787	3	3	83	-	3	-	-	3	-	-	3	-	-	-	-	-	-	-	3
76	Neo	-	3788-3792	5	5	57	-	5	-	2	3	-	1	4	-	-	1	-	-	-	-	5
82	Neo	-	3793	1	1	26	-	1	-	-	2	-	-	1	-	-	-	-	-	-	-	1
91	Neo	-	3794	1	1	9	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
101	Neo	-	3795-3798	4	4	59	-	4	-	1	3	-	-	4	-	-	-	-	-	-	-	4
102	Neo	-	3799-4214	463	416	6045	72	416	-	290	126	1	75	360	2	8	20	154	11	19	4	228
103	LBK IIIb	B	4216-4241	39	26	427	18	26	-	20	6	-	6	21	-	-	3	11	-	-	-	15
104	SBK III-IV	-	4242-4367	135	126	2600	14	126	-	79	47	-	31	99	-	2	9	8	27	2	1	88
105	Neo	-	4368-4370	3	3	35	-	3	-	-	3	-	-	3	-	-	-	-	-	-	-	3
106	Neo	-	4371-4378	4	4	168	-	8	-	3	5	-	3	7	-	2	-	1	1	-	-	6
108	Neo	-	4379-4387	9	9	104	-	9	-	2	7	-	1	8	-	1	-	-	-	1	-	8
109	LBK	-	4388-4394	8	7	116	6	7	-	1	6	-	1	7	-	-	-	1	-	1	-	5
110	Neo	-	4395-4495	122	101	1911	31	101	-	46	55	-	21	87	-	2	4	22	7	2	1	90
111	Neo	-	4496-5028	585	533	9158	76	533	-	326	207	-	91	443	6	14	42	42	84	17	1	389
112	LBK IIIb	B	5029-5030	2	2	19	-	2	-	1	1	-	1	1	-	-	-	1	-	1	-	-
113	SBK III-IV	-	5031-5058	60	28	1504	43	28	-	22	6	-	10	22	1	2	4	-	2	-	-	26
126	LBK	-	9757-9762	9	6	116	6	6	-	3	3	-	-	6	-	-	-	2	-	1	-	3
132	SBK I-III	-	9763-9821	71	59	1115	20	57	2	34	23	-	8	50	-	1	6	1	12	1	-	45
133	Post-neo	-	9822-9825	5	4	18	2	4	-	4	-	-	-	4	-	-	-	-	1	-	-	3
134	LBK	-	9826-9830	6	5	59	2	5	-	4	1	-	1	4	-	-	-	1	-	1	1	2
135	Neo	-	9831-9878	64	48	1751	26	47	1	16	31	-	3	43	-	2	3	6	1	2	1	37
141	SBK I-III	-	9879-9921	50	43	858	12	43	-	10	33	-	6	38	-	2	4	2	2	4	-	35

Tab. 4.12b. Characteristics of ceramic assemblages in individual sunken features.

feature no.	chronology	settlement horizon	ceramic IDs	sum of fragments	sum of individuals	weight (g)	refitted fragments	Neolithic individuals	post-Neolithic individuals	ceramic type		vessel part						decoration type				
										fine	coarse	whole	rim	wall	handle	knob	bottom	LO	SO	TO	RO	NO
189	LBK IIIb	C	1850-2010	239	161	2615	99	160	1	133	27	-	24	137	3	5	9	76	-	3	2	79
202	LBK IVb/SBK I	G	1-45	47	45	391	7	45	-	32	13	-	7	38	-	1	2	3	7	1	-	34
228	LBK IVb/SBK I	G	151-176	31	26	201	8	26	-	15	11	-	3	24	-	-	-	3	-	-	12	11
231	LBK IVb/SBK I	G	177-178	2	2	24	-	2	-	-	2	-	-	1	-	-	1	-	-	-	-	2
234	LBK IVb/SBK I	G	46	2	1	20	2	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
236	LBK IVb/SBK I	G	47-48	2	2	17	-	2	-	-	2	-	-	2	-	-	-	-	-	-	-	2
250	SBK III-IV	-	49-55	15	7	209	10	7	-	5	2	-	3	5	-	1	1	-	2	-	-	6
252	LBK IVb/SBK I	G	179	1	1	1	-	1	-	1	-	-	-	1	-	-	-	-	1	-	-	-
253	LBK IVb/SBK I	G	180-185	7	6	34	2	6	-	4	2	-	1	3	-	1	1	-	1	-	-	4
261	LBK IVb/SBK I	G	228-1353	1234	1126	16127	165	1126	-	667	459	-	193	889	-	38	78	32	183	10	13	889
265	Neo	-	186-211	27	26	314	2	26	-	1	25	-	-	18	-	2	8	-	-	-	-	26
288	Neo	-	212-225	14	14	47	-	14	-	14	-	-	2	12	-	-	-	-	-	-	3	11
300	LBK IVb/SBK I	G	226-227	2	2	35	2	2	-	-	2	-	1	1	-	1	-	-	-	-	-	1
305	LBK	-	1354-1365	16	12	66	6	12	-	12	-	-	2	11	-	1	1	9	-	-	-	3
325	LBK IVb/SBK I	G	56-60	6	5	27	2	5	-	4	1	-	1	5	-	-	-	1	-	1	-	3
329	LBK IIIb	C	61	1	1	10	-	1	-	1	-	-	-	1	-	-	-	1	-	-	-	-
330	LBK IVa	D	62-150	112	89	1236	38	88	1	74	14	-	22	74	1	-	1	17	-	2	-	69
339	LBK IIIb	C	1366-1451	120	86	1851	54	86	-	72	14	-	23	67	1	1	3	50	-	3	2	31
345	LBK IIIb	C	1452-1664	236	213	2943	39	213	-	148	65	-	43	164	1	5	17	86	1	5	10	111
392	LBK	-	2011-2031	22	21	284	2	21	-	9	12	-	5	16	-	1	1	2	-	2	1	16
402	LBK IVb/SBK I	F	1849	2	1	33	2	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
430	SBK	-	1665-1666	2	2	11	-	1	1	1	-	-	-	1	-	-	-	-	1	-	-	-
447	LBK	-	2032-2049	21	19	227	4	19	-	8	11	-	3	14	-	1	1	4	-	2	3	10
451	-	-	2050-2052	5	3	65	4	3	-	3	-	-	1	2	-	-	1	-	-	1	-	2
489	LBK	-	5266-5273	8	8	89	-	8	-	2	6	-	-	5	-	-	3	1	-	-	-	7
543	SBK	-	5274-5281	21	8	240	17	8	-	2	6	-	1	8	-	1	-	-	2	-	-	6
554	LBK III	-	5282-5335	67	54	843	20	54	-	30	24	-	8	40	-	2	11	12	-	-	-	42
558	Neo	-	5336-5382	67	47	1074	31	47	-	29	18	-	9	38	-	2	4	2	15	-	1	29
559	LBK I	A	5383-5640	342	258	11948	127	258	-	29	229	-	50	204	6	10	33	7	-	7	-	244
565	LBK	-	5641-5658	21	18	689	6	18	-	8	10	-	4	13	-	1	4	6	-	-	2	10
566	LBK	-	5659	1	1	56	-	1	-	1	-	-	-	1	-	-	-	1	-	-	-	-
567	Neo	-	5660-5679	22	20	244	4	20	-	8	12	-	2	18	-	-	-	1	2	1	-	16
571	Neo	-	5680-5689	17	10	551	10	10	-	-	10	-	1	7	1	1	3	-	-	-	-	10
574 B	LBK IIIb	B	5690-5779	120	90	812	44	90	-	74	16	-	7	69	-	1	2	29	-	2	1	58
580 B	Neo	-	5780-5782	6	3	25	5	3	-	2	1	-	-	3	-	-	-	-	-	-	-	3
581 B	Neo	-	5783	1	1	12	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
586 B	LBK	-	5784-5785	2	2	12	-	2	-	1	1	-	-	2	-	-	-	2	-	-	-	-
588 B	Neo	-	5786-5787	6	2	29	5	2	-	-	2	-	-	2	-	-	-	-	-	-	-	2
589 B	LBK	-	5788-5805	23	18	285	8	18	-	12	6	-	5	15	1	-	-	3	-	-	-	15
612	Neo	-	5059	1	1	166	-	1	-	-	1	-	-	1	-	1	-	-	-	-	-	1
613	LBK	-	5060-5085	45	26	501	26	26	-	16	10	-	8	21	-	2	-	4	-	1	1	20
616	LBK	-	5086-5103	23	18	158	9	18	-	10	8	-	1	16	-	-	2	2	-	-	1	15
617	LBK IIIb	B	5104-5126	30	23	462	12	23	-	14	9	-	2	21	-	-	2	10	-	4	-	9

Tab. 4.12c. Characteristics of ceramic assemblages in individual sunken features.

feature no.	chronology	settlement horizon	ceramic IDs	sum of fragments	sum of individuals	weight (g)	refitted fragments	Neolithic individuals	post-Neolithic individuals	ceramic type		vessel part						decoration type				
										fine	coarse	whole	rim	wall	handle	knob	bottom	LO	SO	TO	RO	NO
618	LBK IIIb	C	5127-5190	73	64	1364	16	63	1	36	27	-	5	55	-	1	7	15	-	4	1	44
654	LBK IIIb	B	5191-5234	51	44	690	12	44	-	30	14	-	8	37	1	2	3	18	-	1	-	25
668	LBK IIIb	B	5235-5265	48	31	716	26	31	-	8	23	-	4	24	-	1	6	1	-	1	-	29
703	LBK IIIb	C	2053-2243	225	191	1829	57	191	-	158	33	-	38	152	1	3	13	85	2	7	9	88
704	LBK III	-	2244-2380	167	137	1683	49	137	-	109	28	-	16	119	-	2	17	55	-	2	11	69
720 A	LBK IVa	E	2381-2412	51	32	431	27	32	-	19	13	-	3	30	-	1	1	13	-	-	-	19
720 B	LBK IVb/SBK I	G	2413-2442	32	30	479	3	30	-	23	7	-	3	24	-	-	5	3	2	-	-	25
765	LBK IIIb	C	4215	1	1	20	-	1	-	1	-	-	-	-	-	-	1	-	-	-	-	1
838	SBK IVa	J	2443-2516	88	74	1097	21	74	-	54	20	-	26	45	-	1	9	-	27	1	-	46
850	SBK II	H	9922-10004	98	83	1479	25	83	-	23	60	-	7	76	-	-	5	1	6	1	-	75
907	SBK IVa	J	2517-2773	314	257	3305	93	257	-	117	140	-	35	213	-	10	22	2	22	-	-	233
937	SBK II	H	6155-6206	73	52	966	30	52	-	40	12	-	10	46	-	5	1	3	16	-	-	33
940	Neo	-	6207	1	1	13	-	1	-	1	-	-	-	1	-	-	-	-	-	-	-	1
945	Neo	-	6208-6458	269	251	3206	31	242	9	95	147	-	20	220	-	3	9	3	17	4	1	217
950	SBK	-	6459-6470	20	12	223	14	12	-	3	9	-	4	8	-	1	-	-	1	2	-	9
1082	SBK II	-	5806-5824	43	19	236	29	19	-	12	7	-	5	14	-	-	3	-	6	-	-	13
1083	SBK III-IV	-	5825-5882	94	58	1315	47	58	-	38	20	1	8	51	-	1	3	-	19	1	-	38
1084	Neo	-	5883-5888	7	6	49	2	6	-	-	6	-	-	6	-	-	-	-	-	-	-	6
1090 A	LBK IVb/SBK I	F	1667-1674	11	8	128	4	8	-	8	-	-	1	7	-	-	1	5	-	-	-	3
1090 B	LBK IVb/SBK I	F	1675-1696	23	22	210	2	21	1	19	2	-	-	18	-	1	3	1	6	-	-	14
1090 C	LBK IVb/SBK I	F	1697-1796	102	100	1321	4	99	1	73	27	-	19	70	-	3	16	22	7	2	2	67
1091	LBK IV/SBK I	-	5889-6010	146	122	786	39	122	-	88	34	-	11	114	-	1	1	5	27	2	-	88
1092	LBK IVb/SBK I	F	1797-1848	61	52	705	13	52	-	37	15	-	3	44	-	2	5	12	9	2	3	26
1094	LBK IV	-	6471-6511	62	41	570	28	41	-	30	11	-	7	35	-	-	6	15	-	2	-	24
1095	SBK II	-	6512-6587	118	76	2280	64	76	-	59	17	1	10	65	-	2	3	2	27	1	-	46
1096	LBK IVb/SBK I	G	6588-7023	548	481	7067	110	475	6	238	237	-	55	427	2	11	19	28	56	6	21	364
1097	LBK	-	7069-7085	26	17	195	14	17	-	8	9	-	2	17	-	1	-	1	-	-	-	16
1098	Neo	-	7086-7104	21	19	122	4	19	-	15	4	-	2	18	-	-	-	2	1	-	-	16
1099	LBK	-	7105-7113	12	9	91	6	9	-	5	4	-	1	7	-	-	-	2	-	-	-	7
1100	Neo	-	7114-7406	343	293	2838	83	293	-	185	108	-	45	254	4	8	9	49	5	4	6	229
1101	SBK II	H	7407-7433	41	27	331	18	27	-	24	3	-	2	23	-	2	5	-	10	-	-	17
1102 A	Neo	-	7434-7474	98	41	4017	64	41	-	-	41	-	-	41	-	-	1	-	-	-	-	41
1238	LBK IV/SBK I	-	7475-8323	1068	849	18388	329	849	-	501	348	1	120	763	5	18	29	205	20	19	36	569
1239	LBK IIIb	C	8324-8330	7	7	38	-	7	-	6	1	-	2	5	-	-	-	1	-	-	-	6
1247	SBK IVa	J	12354-12357	4	4	48	-	4	-	4	-	-	2	3	-	-	-	-	1	-	-	3
1250	SBK IVa	J	12358	1	1	12	-	1	-	1	-	-	-	1	-	-	-	-	-	-	-	1
1251	SBK IVa	J	12359	1	1	8	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
1252 B	Neo	-	12360	7	1	213	7	1	-	-	1	-	1	1	-	1	-	-	-	-	-	1
1253	Neo	-	12361	4	1	8	4	1	-	1	-	-	-	1	-	-	-	-	1	-	-	-
1264	Neo	-	12362	1	1	16	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1
1273	SBK II	-	12363-12427	118	65	1005	69	65	-	44	21	-	7	61	-	2	-	-	6	-	-	59
1274	Neo	-	12428-12430	3	3	27	-	3	-	1	2	-	-	3	-	-	-	-	-	-	-	3
1315	Neo	-	12431-12432	2	2	6	-	2	-	2	-	-	-	2	-	-	-	-	-	-	-	2

Tab. 4.12d. Characteristics of ceramic assemblages in individual sunken features.

feature no.	chronology	settlement horizon	ceramic IDs	sum of fragments	sum of individuals	weight (g)	refitted fragments	Neolithic individuals	post-Neolithic individuals	ceramic type		vessel part						decoration type				
										fine	coarse	whole	rim	wall	handle	knob	bottom	LO	SO	TO	RO	NO
1337	Neo	-	12433-12489	74	57	833	24	56	1	21	35	-	6	48	-	-	3	2	1	-	2	51
1339	SBK IVa	J	12490-12784	324	295	3555	54	293	2	117	176	-	32	256	1	6	11	-	12	8	-	273
1340	SBK II-III	-	12785-12915	187	131	6864	85	131	-	48	83	-	19	110	-	1	10	1	21	-	-	109
1341	SBK	-	12916-12920	5	5	84	-	5	-	3	2	-	1	5	-	-	-	-	1	-	-	4
1342	-	-	12921-12935	20	15	1026	9	15	-	1	14	-	-	15	-	-	-	-	-	-	-	15
1343	-	-	12936-12953	21	18	291	6	18	-	2	16	-	-	18	-	-	-	-	-	-	-	18
1352	-	-	12954-12955	2	2	41	-	2	-	-	2	-	1	2	-	-	-	-	-	-	-	2
1358	SBK I-III	-	8331-8382	77	52	1244	38	52	-	36	16	-	8	44	-	1	5	-	21	-	-	31
1392	SBK IV	-	8383-8391	9	9	62	-	9	-	8	1	-	6	4	-	-	-	-	4	-	-	5
1400	SBK II-III	I	8412-8444	50	33	464	21	33	-	21	12	-	3	29	-	2	1	-	6	-	-	27
1435	LBK	-	8445-8478	50	34	512	23	32	2	26	6	-	7	29	-	-	-	9	-	2	-	21
1468	Neo	-	6011-6036	35	26	266	16	26	-	12	14	-	2	25	-	-	2	1	5	-	-	20
1469	LBK	-	6037-6039	9	3	18	7	3	-	3	-	-	-	3	-	-	-	1	-	-	-	2
1518	Neo	-	6040-6144; 8392-8411	134	125	1459	15	125	-	35	90	-	5	108	1	1	12	-	1	1	-	123
1522	Neo	-	6145-6154	12	10	128	3	10	-	3	7	-	1	9	-	-	1	-	-	-	-	10
1634	LBK/Post-neo	-	10005-10047	60	43	739	28	37	6	25	12	-	2	34	-	1	2	13	-	3	-	21
1635	Neo/Post-neo	-	10048-10082	47	35	486	19	32	3	23	9	-	6	27	-	-	1	13	2	-	-	17
1644	Neo/Eneo/Lat	-	10083-10429	375	347	4712	47	287	60	82	205	-	13	263	3	2	11	1	8	1	-	277
1646	SBK II	-	10430-10459	33	30	292	5	30	-	15	15	-	1	30	-	1	-	1	5	1	-	23
1655	SBK	-	10460-10465	11	6	182	7	6	-	2	4	-	1	6	-	-	-	-	2	-	-	4
1656	Neo	-	10446-10447	2	2	15	-	2	-	1	1	-	-	2	-	-	-	-	-	-	-	2
1659	LBK	-	10468-10472	5	5	62	-	5	-	5	-	-	-	5	-	-	-	2	-	-	-	3
1666	SBK	-	10473-10479	8	7	45	2	7	-	2	5	-	3	4	-	-	-	-	1	-	-	6
1667	Neo	-	10480-10491	14	12	117	3	12	-	4	8	-	1	12	-	-	-	-	-	-	-	12
1682	LBK IIIb	C	10492-10621	182	130	1941	80	130	-	84	46	-	18	119	-	1	3	46	-	2	4	78
1699	LBK IIIb	C	10622-10640	29	19	464	16	19	-	11	8	-	3	16	-	-	1	3	-	2	-	14
1700	LBK IVa	E	10641-10669	30	29	318	2	28	1	23	5	-	7	25	-	-	-	13	-	-	-	15
1707	LBK	-	10670-10683	22	14	172	14	14	-	7	7	-	3	13	-	1	-	4	-	1	-	9
1712	LBK/Eneo	E	10839-10861; 13071-13848	918	801	10011	192	759	42	354	405	-	102	673	7	6	32	126	-	19	15	599
1718	LBK IIIb	B	10670-10838	171	155	2061	29	153	2	99	54	-	20	136	-	3	7	50	-	5	2	96
1727	LBK IIIb	B	13849-13866	19	18	260	2	18	-	10	8	-	2	17	-	-	1	5	-	1	-	12
1739	LBK IIIb	C	10862-10904	60	43	812	25	42	1	21	21	-	12	34	-	1	2	11	-	2	2	27
1740	LBK IV	-	10905-10976	96	72	2119	35	72	-	38	34	-	14	68	-	3	-	16	1	5	8	42
1742	LBK IIIb	C	10977-11043	73	67	1012	9	66	1	31	35	-	16	59	-	4	1	20	-	7	1	38
1752	LBK IIIb	B	11044-11071	37	28	337	15	28	-	20	8	-	6	26	-	-	-	9	1	-	1	17
1761	LBK IIIb	B	11072-11149	93	78	1982	26	76	2	34	42	-	10	68	1	5	4	18	-	3	-	55
1773	LBK IV	-	11150-11166	20	17	154	5	17	-	13	4	-	4	16	-	1	-	6	-	1	-	10
1800 A	LBK IVb/SBK I	F	11200-11210	15	11	122	6	11	-	6	5	-	2	9	-	-	-	1	-	-	-	10
1800 B	LBK IVb/SBK I	F	11211-11245	54	35	2381	33	35	-	12	23	-	3	30	-	1	3	-	5	-	-	30
1808 B	LBK IVb/SBK I	F	11167-11199; 11686-11713	81	61	658	35	61	-	54	7	-	10	55	-	-	2	21	-	-	-	40
1819 B	LBK	-	11246-11283	58	38	614	28	38	-	25	13	-	2	37	-	-	-	9	-	1	-	28

Tab. 4.12e. Characteristics of ceramic assemblages in individual sunken features.

feature no.	chronology	settlement horizon	ceramic IDs	sum of fragments	sum of individuals	weight (g)	refitted fragments	Neolithic individuals	post-Neolithic individuals	ceramic type		vessel part						decoration type				
										fine	coarse	whole	rim	wall	handle	knob	bottom	LO	SO	TO	RO	NO
1836	LBK	-	11284-11316	43	33	397	14	33	-	15	18	-	4	28	-	2	2	6	-	1	1	25
1842	LBK IV	-	11317-11350	37	34	432	6	34	-	15	19	-	1	32	-	1	1	9	-	1	-	24
1924	LBK IVa	E	11351-11480	172	130	1526	66	130	-	75	55	-	16	120	-	5	2	33	1	1	5	91
1926	LBK III	-	11481-11517	86	37	243	63	37	-	37	-	1	2	35	-	-	-	14	-	-	-	23
1929 B	LBK IIIb	C	11518-11532	17	15	131	4	15	-	12	3	-	2	12	-	1	1	4	-	-	1	10
1934	LBK IIIb	C	11533-11685; 11720-11723	221	157	2339	95	157	-	107	50	-	26	133	1	3	9	47	-	4	2	104
1935	LBK	-	11714-11719	7	6	111	2	6	-	3	3	-	2	5	-	1	-	1	-	-	-	5
1940	LBK	-	11724-11775	77	52	490	33	52	-	46	6	-	10	44	-	-	3	13	-	-	-	39
1941	LBK	-	11776-11782	7	7	99	-	7	-	5	2	-	1	6	-	2	-	4	-	1	-	2
1951	LBK IIIb	C	11783-11947	201	165	3040	60	165	-	99	66	-	23	149	-	6	5	22	-	9	2	132
1954 B	LBK IVa	D	11948-12003	64	56	1081	15	56	-	36	20	-	9	50	-	-	2	12	-	1	-	43
1955	LBK III	-	12004-12181	218	178	3671	62	173	5	100	73	-	29	159	-	5	8	50	-	8	1	114
1964	LBK IVa	D	12956-13070	145	115	847	48	115	-	71	44	-	17	105	-	5	1	9	-	4	2	100
2009	LBK	-	12182-12183	2	2	20	-	2	-	1	1	-	-	1	-	1	-	1	-	-	-	1
2023	Neo/Post-neo	-	12184-12259	100	76	1623	34	70	6	35	35	-	8	61	-	3	5	11	1	3	2	53
2026	LBK IV/SBK I	-	12260-12320	92	61	1948	39	61	-	40	21	-	11	55	-	3	1	9	5	-	1	46
2027	LBK IV/SBK I	-	12321-12353	45	33	286	21	33	-	29	4	-	3	31	-	-	-	4	6	-	-	23

Tab. 4.13a. Linear and stroked decoration in individual sunken features.

feature no.	linear ornamentation																stroked ornamentation												
	AL12	AL13	AL20	AL30	BETA	GAMA	DEL12	EPS0	EPS10	EPS20	EPS30	THETA	ETA	ZETA	other LO	un spec.	INCS	INDV	DBL_S_ ALT	DBL_W _ALT	DBL_S_ TRE	DBL_W _TRE	DBL_ PARA	MUL_ TRE	MUL_ PARA	TRE	STRI	ROSS	other SO	unspec.
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2	-	-	-	-	-	-	-	-	2
3	1	-	2	1	-	-	3	1	-	-	-	-	-	1	-	6	-	1	63	1	24	-	-	1	-	-	-	-	1	5
4	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	3	-	-	1	-	-	18	-	-	-	-	-	-	-	-	11	-	2	89	1	1	-	-	-	-	-	2	-	2	6
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
53	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
54	1	-	4	9	-	3	65	4	2	2	-	3	-	-	-	48	-	-	16	-	6	-	-	-	-	-	-	-	-	-
55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
71	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
102	5	-	-	6	-	4	61	15	2	17	2	-	-	-	-	42	-	-	6	-	3	1	-	-	-	1	-	-	-	-
103	3	-	-	1	-	-	6	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
104	-	-	-	-	-	-	5	-	-	3	-	-	-	-	-	-	-	-	10	-	1	1	1	11	1	-	-	-	-	2
105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
106	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
110	2	-	2	-	-	-	3	3	-	1	-	-	-	-	-	11	-	-	5	-	1	-	-	-	-	-	-	-	-	1
111	1	-	1	1	-	-	19	2	-	-	-	-	-	-	-	18	-	1	30	6	5	6	-	27	1	3	1	-	-	4
112	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
113	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
126	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
132	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	8	2	1	-	-	1	-	-	-	-	-	-
133	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
134	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
135	-	-	-	-	-	-	1	-	-	-	-	-	-	-	4	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-
141	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-
189	9	-	5	12	-	-	20	1	1	3	-	-	-	1	-	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
202	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	1	-	1	5	-	1	-	-	-	-	-	-	-	-	-
228	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
231	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
234	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
236	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-
252	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
253	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-

Tab. 4.13b. Linear and stroked decoration in individual sunken features.

feature no.	linear ornamentation																stroked ornamentation												
	AL12	AL13	AL20	AL30	BETA	GAMA	DEL12	EPS0	EPS10	EPS20	EPS30	THETA	ETA	ZETA	other LO	un spec.	INCS	INDV	DBL_S_ ALT	DBL_W _ALT	DBL_S_ TRE	DBL_W _TRE	DBL_ PARA	MUL_ TRE	MUL_ PARA	TRE	STRI	ROSS	other SO	unspec.
261	-	-	-	8	-	-	4	4	-	1	-	-	-	3	-	12	-	2	134	-	44	2	-	-	-	-	-	-	1	-
265	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
288	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
305	-	-	2	-	-	-	1	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
325	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
329	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
330	-	-	-	5	-	-	6	3	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
339	14	-	1	8	-	-	4	6	-	6	-	-	-	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
345	5	-	3	15	1	-	42	3	-	3	1	-	-	1	-	12	-	-	1	-	-	-	-	-	-	-	-	-	-	-
392	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
402	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
447	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
451	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
489	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
543	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
554	-	-	1	1	-	-	3	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
558	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	4	-	10	-	-	1	-	-	-	-	-	-
559	-	-	-	-	-	3	-	-	-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
565	-	-	-	-	-	-	4	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
566	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
567	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1
571	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
574 B	3	1	-	4	-	-	10	1	-	-	-	-	-	1	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
580 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
581 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
586 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
588 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
589 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
612	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
613	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
616	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
617	3	-	1	-	-	-	2	1	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
618	-	-	2	2	-	-	5	2	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
654	2	-	2	-	-	-	8	-	1	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
668	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
703	9	-	5	16	-	-	21	2	1	-	2	-	-	-	3	27	-	-	-	-	2	-	-	-	-	-	-	-	-	-
704	6	-	3	3	1	-	21	1	1	-	2	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
720 A	-	-	-	-	-	-	8	1	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
720 B	1	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
765	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
838	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	7	-	-	-	3	-	7	-	-	5	-
850	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	3	-	3	-	-	-	-	-	-	-	-	-
907	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	8	2	-	1	-	4	-	7	-	-	-	-
937	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	4	-	12	-	-	-	-	-	-	-	-	-
940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
945	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	10	3	-	1	-	-	-	1	-	-	2	-
950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
1082	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	1	-	-	-	-	-	-	2	-
1083	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	1	1	-	-	-	-	-	-	1	1
1084	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Tab. 4.13c. Linear and stroked decoration in individual sunken features.

feature no.	linear ornamentation																stroked ornamentation												
	AL12	AL13	AL20	AL30	BETA	GAMA	DEL12	EPS0	EPS10	EPS20	EPS30	THETA	ETA	ZETA	other LO	un spec.	INCS	INDV	DBL_S_ ALT	DBL_W _ALT	DBL_S_ TRE	DBL_W _TRE	DBL_ PARA	MUL_ TRE	MUL_ PARA	TRE	STRI	ROSS	other SO	unspec.
1090 A	-	-	-	-	-	-	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1090 B	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	2	-	1	-	-	1	1	-	-	-	-	-
1090 C	-	-	-	2	-	-	7	1	-	1	-	-	-	2	-	9	-	-	6	-	-	1	-	-	-	-	-	-	-	-
1091	2	-	-	1	-	-	1	-	-	-	-	-	-	-	-	1	-	-	20	-	3	-	-	-	-	-	-	-	-	4
1092	1	-	-	2	-	-	2	2	-	1	-	-	-	-	-	4	8	-	-	-	-	-	-	-	-	-	-	-	1	-
1094	-	-	-	3	-	-	6	-	-	4	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1095	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	2	-	9	-	14	-	-	-	-	-	-	-	1	1
1096	-	-	-	2	-	-	7	6	-	3	-	-	-	-	1	9	-	1	34	-	15	-	-	-	-	-	1	-	-	5
1097	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1098	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-
1099	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1100	3	-	-	3	-	-	26	2	1	1	3	-	-	-	-	10	-	-	1	-	4	-	-	-	-	-	-	-	-	-
1101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	7	-	-	-	-	-	-	-	-	-
1102 A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1238	-	-	1	59	-	-	60	11	1	4	2	-	-	-	1	66	-	-	12	-	7	1	-	-	-	-	-	-	-	-
1239	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1247	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
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1251	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1252 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1253	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
1264	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1273	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	2	-	-	-	-	-	-	-	-	-
1274	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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1341	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
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1392	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	1
1400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	1
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1518	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
1522	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1634	-	-	-	2	-	-	6	1	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1635	-	-	-	-	-	-	6	-	-	1	-	-	-	-	-	6	-	-	2	-	-	-	-	-	-	-	-	-	-	-
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1646	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-
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1656	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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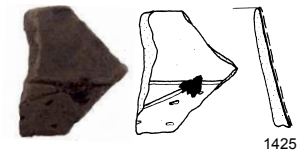
1667	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1682	1	-	1	2	-	-	15	10	-	2	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1699	1	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1700	2	-	-	-	-	-	3	1	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Tab. 4.13d. Linear and stroked decoration in individual sunken features.

feature no.	linear ornamentation																			stroked ornamentation												
	AL12	AL13	AL20	AL30	BETA	GAMA	DEL12	EPS0	EPS10	EPS20	EPS30	THETA	ETA	ZETA	other LO	un spec.	INCS	INDV	DBL_S_ ALT	DBL_W ALT	DBL_S_ TRE	DBL_W TRE	DBL_ PARA	MUL_ TRE	MUL_ PARA	TRE	STRI	ROSS	other SO	unspec.
1707	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1712	2	-	1	29	-	-	39	6	-	2	1	-	-	-	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1718	4	-	1	5	-	-	17	1	-	-	-	1	-	1	-	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1727	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1739	1	-	-	6	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1740	2	-	-	4	-	-	3	-	-	1	-	-	-	-	-	6	-	1	-	-	-	-	-	-	-	-	-	-	-	-
1742	2	-	-	5	-	-	5	-	-	-	-	-	-	1	-	7	-	-	1	-	-	-	-	-	-	-	-	-	-	-
1752	2	1	1	-	-	-	1	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1761	1	-	-	3	-	-	6	2	1	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1773	-	-	-	1	-	-	1	1	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1800 A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-	-	-	-	-	-	-
1800 B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
1808 B	-	-	-	-	-	-	4	2	2	2	-	-	-	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1819 B	-	-	-	-	-	-	1	1	-	1	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1836	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1842	-	-	-	1	-	-	3	-	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1924	1	-	-	4	-	-	4	4	-	1	-	-	-	-	1	18	-	1	-	-	-	-	-	-	-	-	-	-	-	-
1926	-	-	-	-	-	-	-	-	-	12	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1929 B	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1934	2	-	-	13	-	-	6	3	-	1	-	-	-	-	1	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1935	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1940	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1941	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1951	1	-	-	1	-	-	5	9	-	1	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954 B	1	-	-	4	-	-	2	1	-	2	3	-	-	-	1	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1955	2	-	1	6	-	-	13	3	2	1	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1964	-	-	-	-	-	-	1	1	-	-	2	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2023	1	-	-	2	-	-	4	1	-	-	-	-	-	-	-	3	-	-	-	-	1	-	-	-	-	-	-	-	-	-
2026	-	-	-	-	-	-	2	1	-	1	1	-	-	-	-	4	-	-	3	-	2	-	-	-	-	-	-	-	-	-
2027	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	1	1	-	4	-	1	-	-	-	-	-	-	-	-	-

Tab. 4.14a. New elements in ceramics description.

surface treatment 81 – combination of polishing and pitch impregnation (80+93)


1425


1822

surface treatment 93 – pitch impregnation


1421

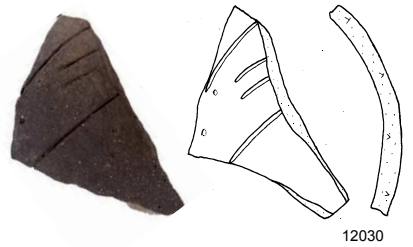

3385

linear pottery knobs L957 – large oval with boat-shaped frontal facet


4134

LO techniques 247 – middle wide band filled by 2 or 3 longer drawn punctures

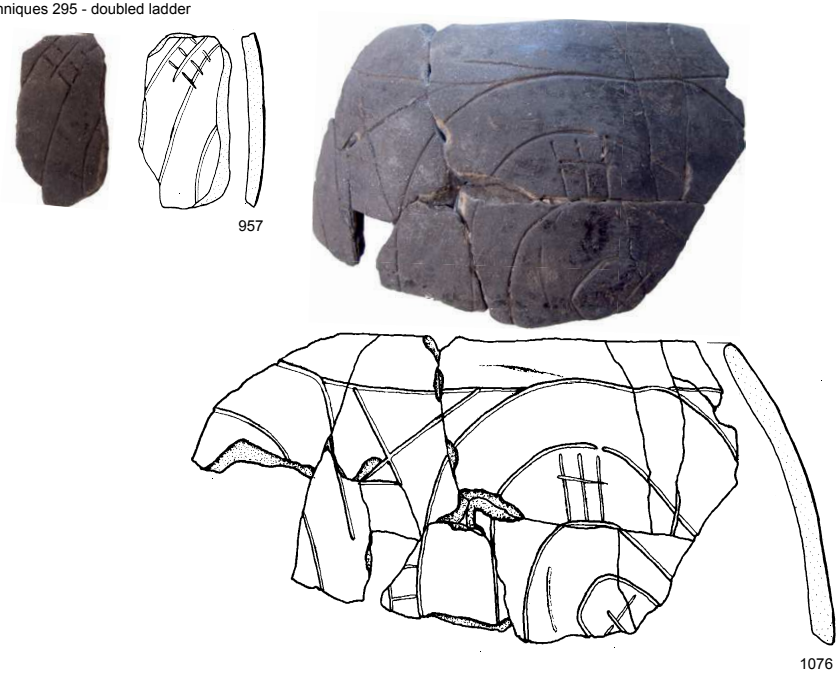

5489


12030

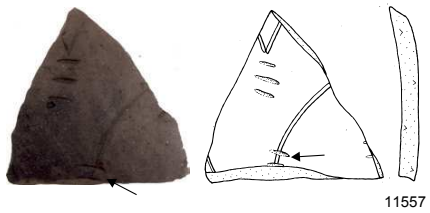
0 5 cm

Tab. 4.14b. New elements in ceramics description.

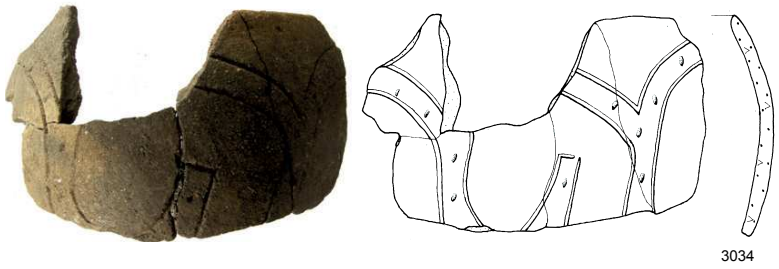
LO techniques 295 - doubled ladder



LO techniques 479 - music-notes in form of double nail impressions placed sparsely along the line



LO main motif .76 - simple curvilinear spiral running around the vessel

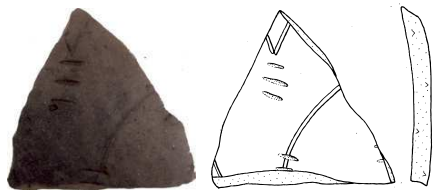


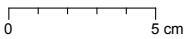
Tab. 4.14c. New elements in ceramics description.

LO secondary motifs 229 - two vertical lines with punctures

LO secondary motifs 245 - simple line running around the vessel accompanied by vertical with transversal lines

LO secondary motifs 339 - "V" motif accompanied by three punctures on the edge



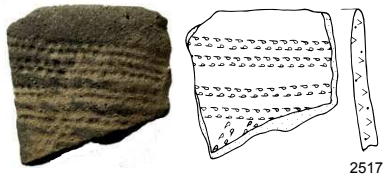


Tab. 4.14d. New elements in ceramics description.

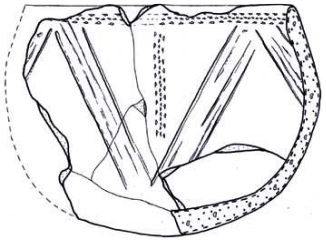
SO techniques 08 - incision by multi-pointed implement

6524

SO bands below the rim 14 - four horizontal bands of strokes

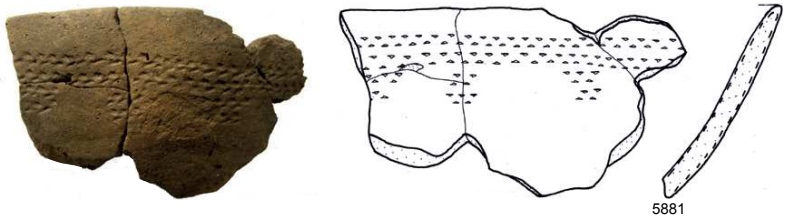


2517



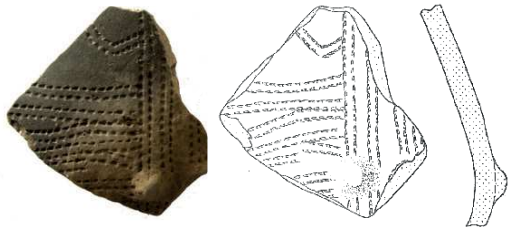
6547

SO bands below the rim 54 - horizontal band of strokes accompanied by pairs of short bands

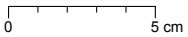


5881

SO dividing motif 44 - motif of raised hands

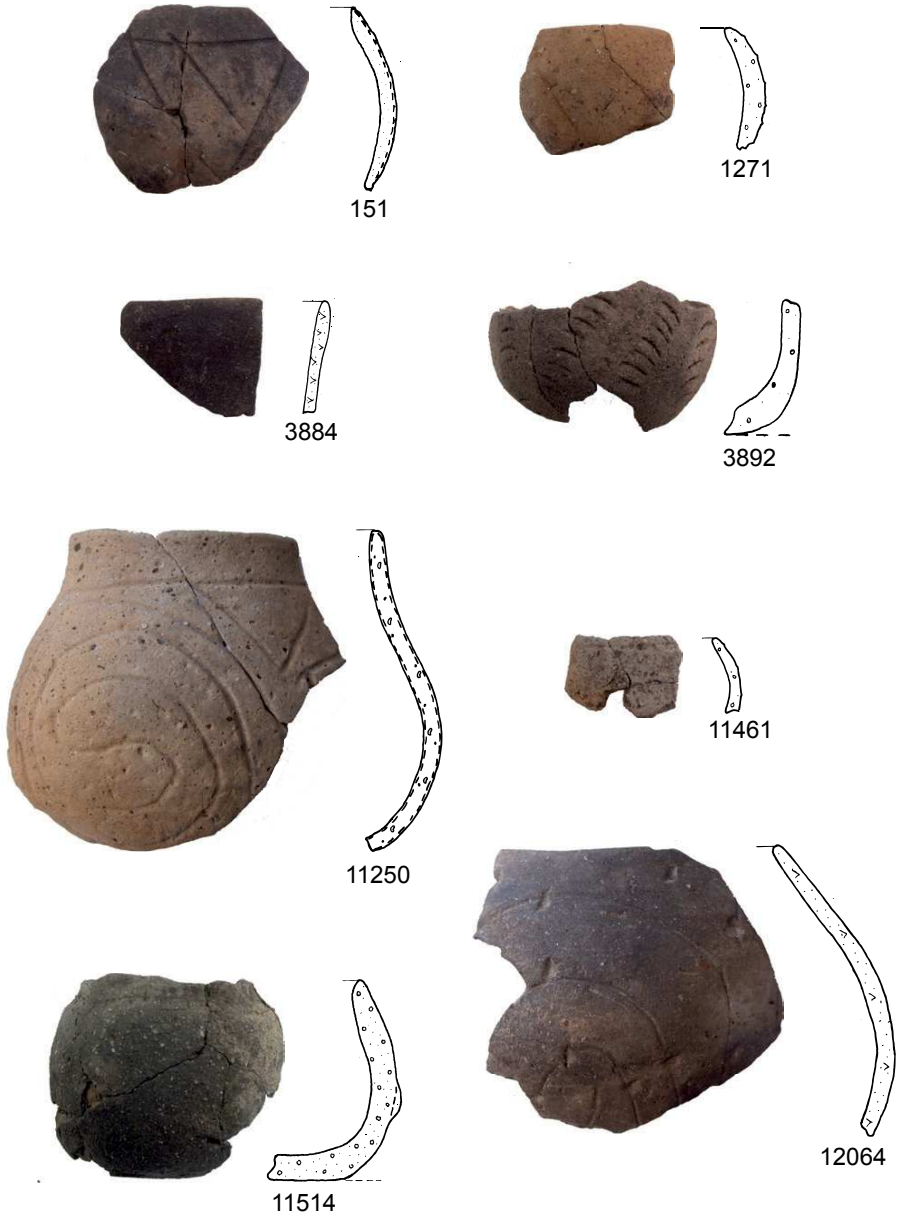


706

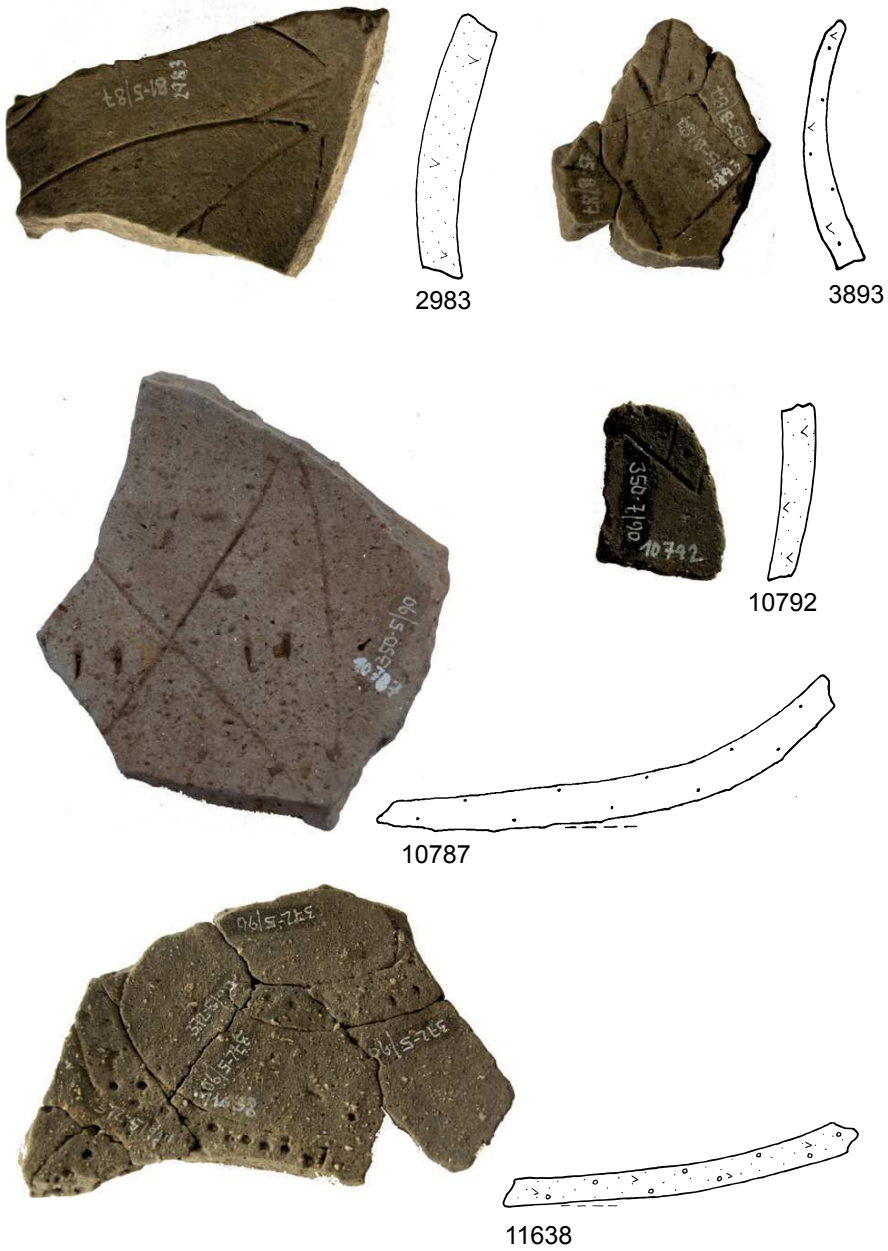


Tab. 4.15. Ceramic individual ID 7455

Tab. 4.16. Miniature vessels.

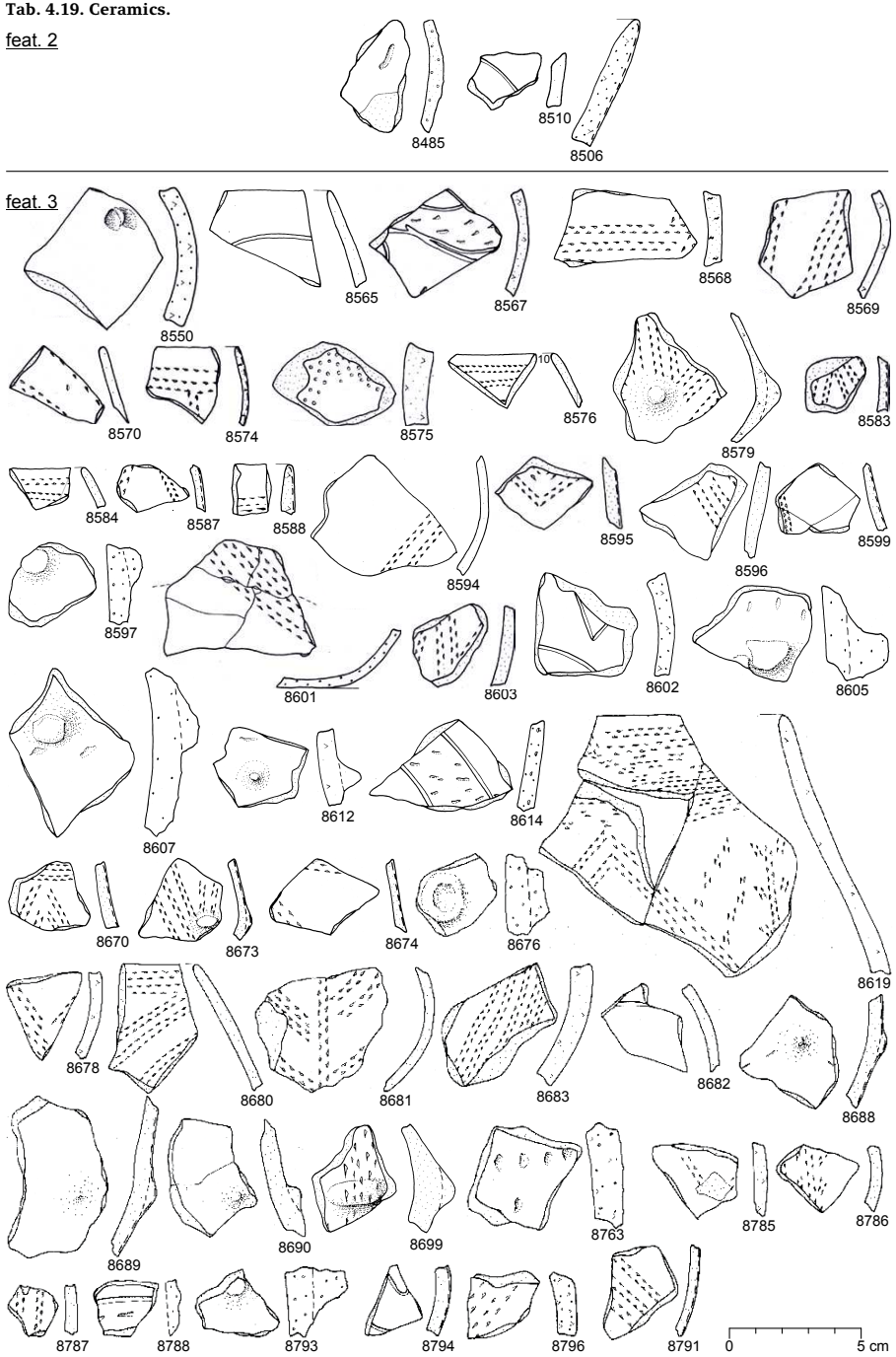


Tab. 4.17. Decoration of the vessels inner parts.



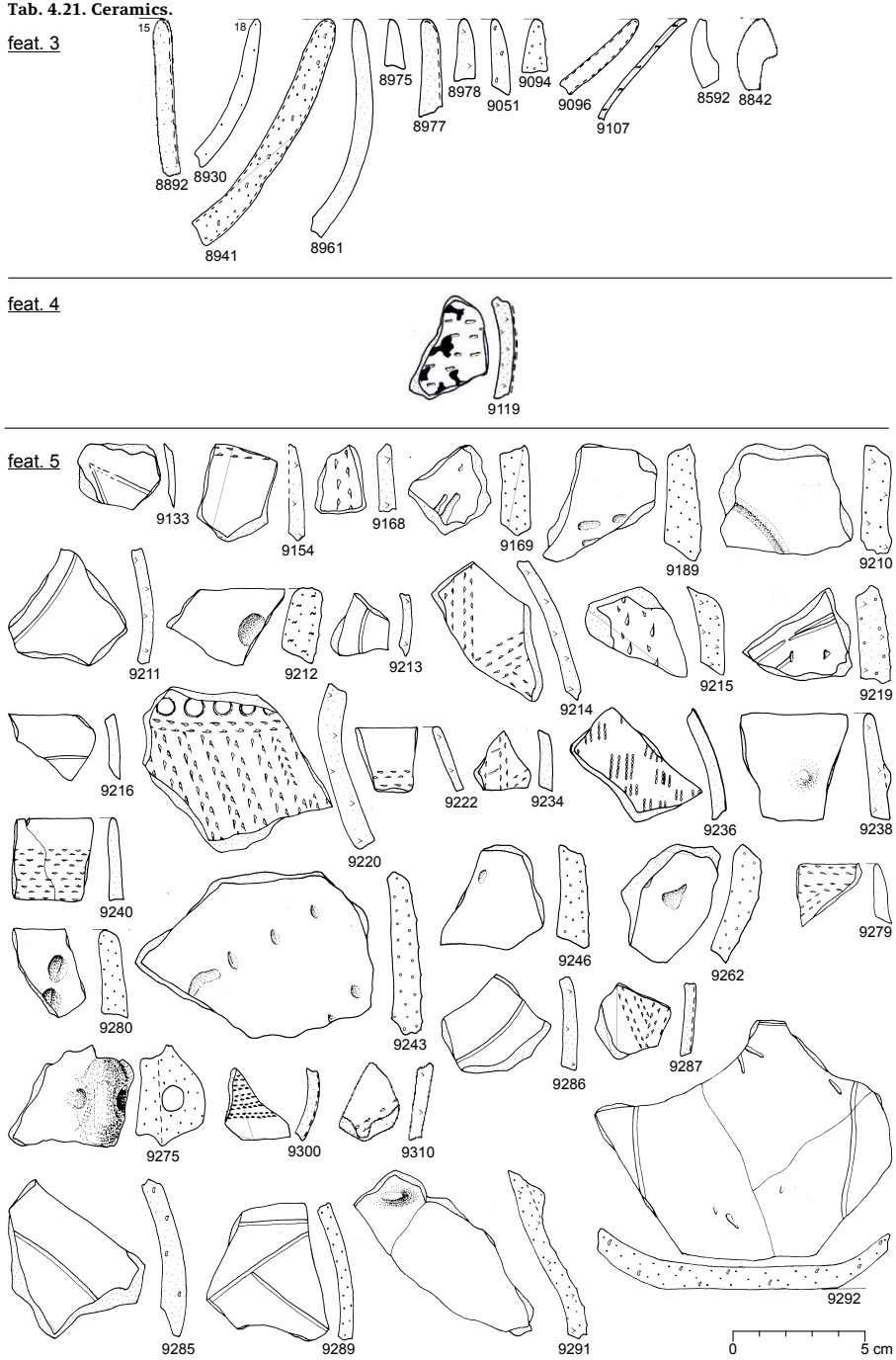
Tab. 4.18. Ceramic individual ID 1368

Tab. 4.19. Ceramics.



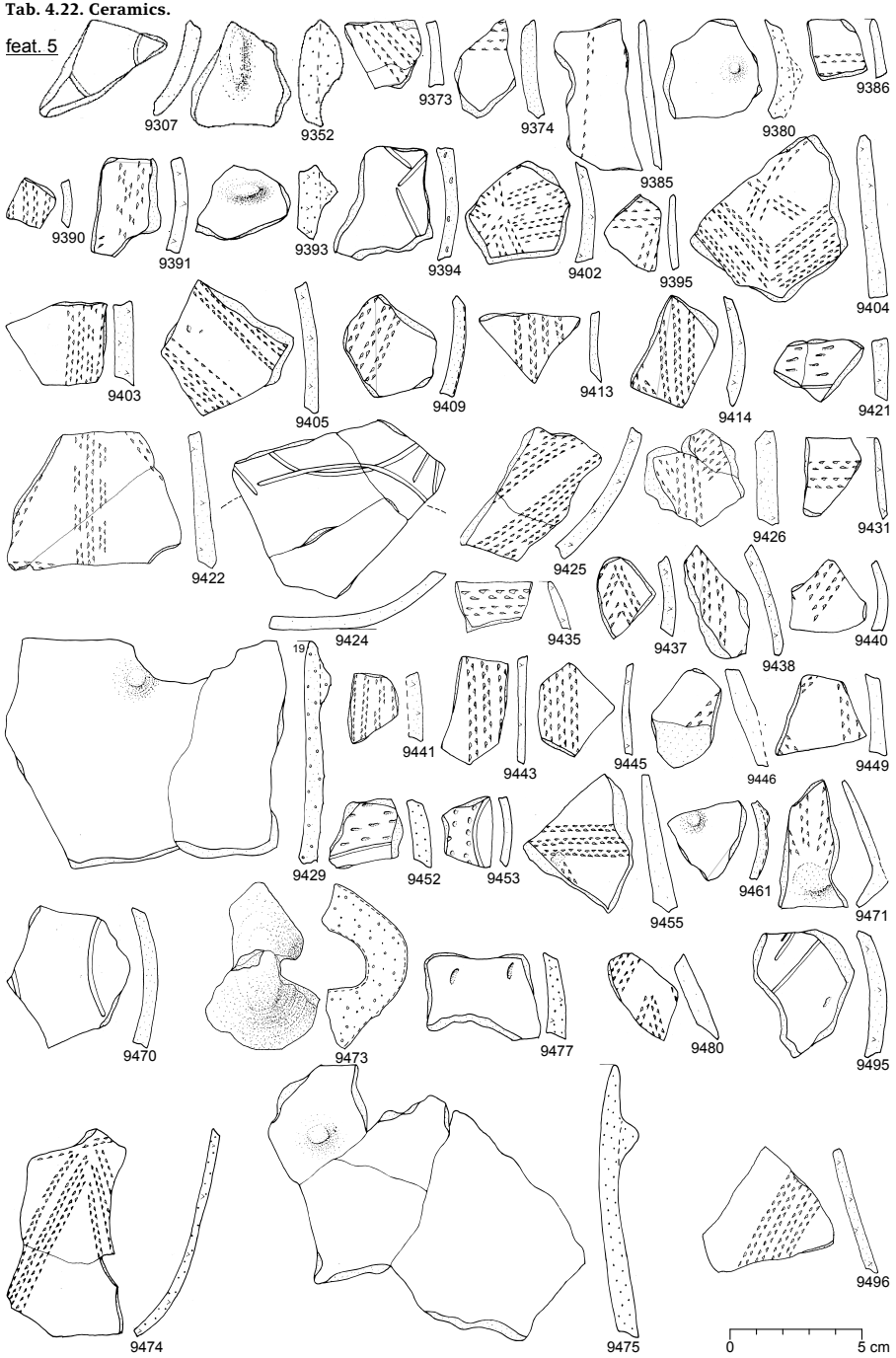
Tab. 4.20. Ceramics.

Tab. 4.21. Ceramics.



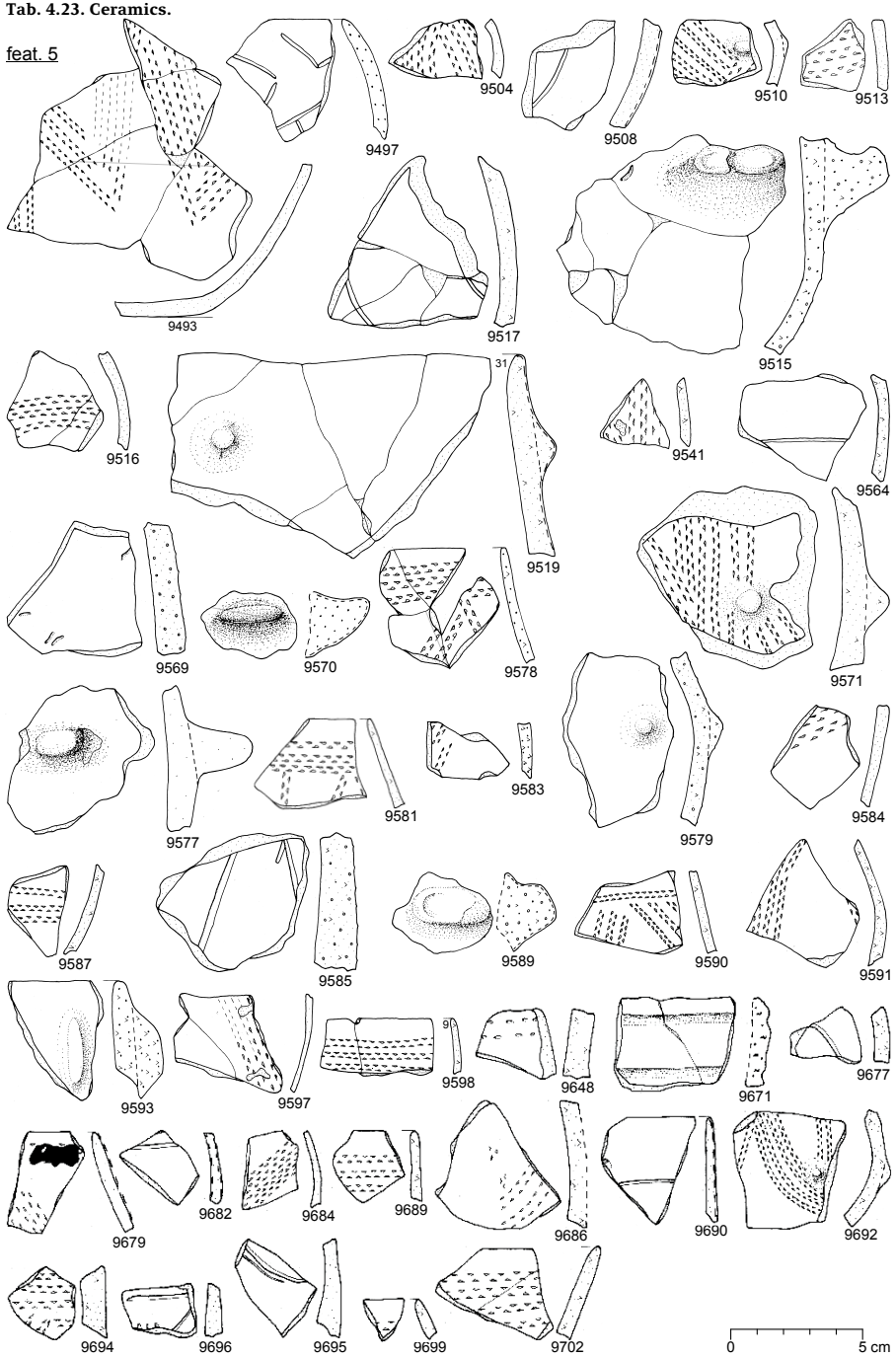
Tab. 4.22. Ceramics.

feat. 5

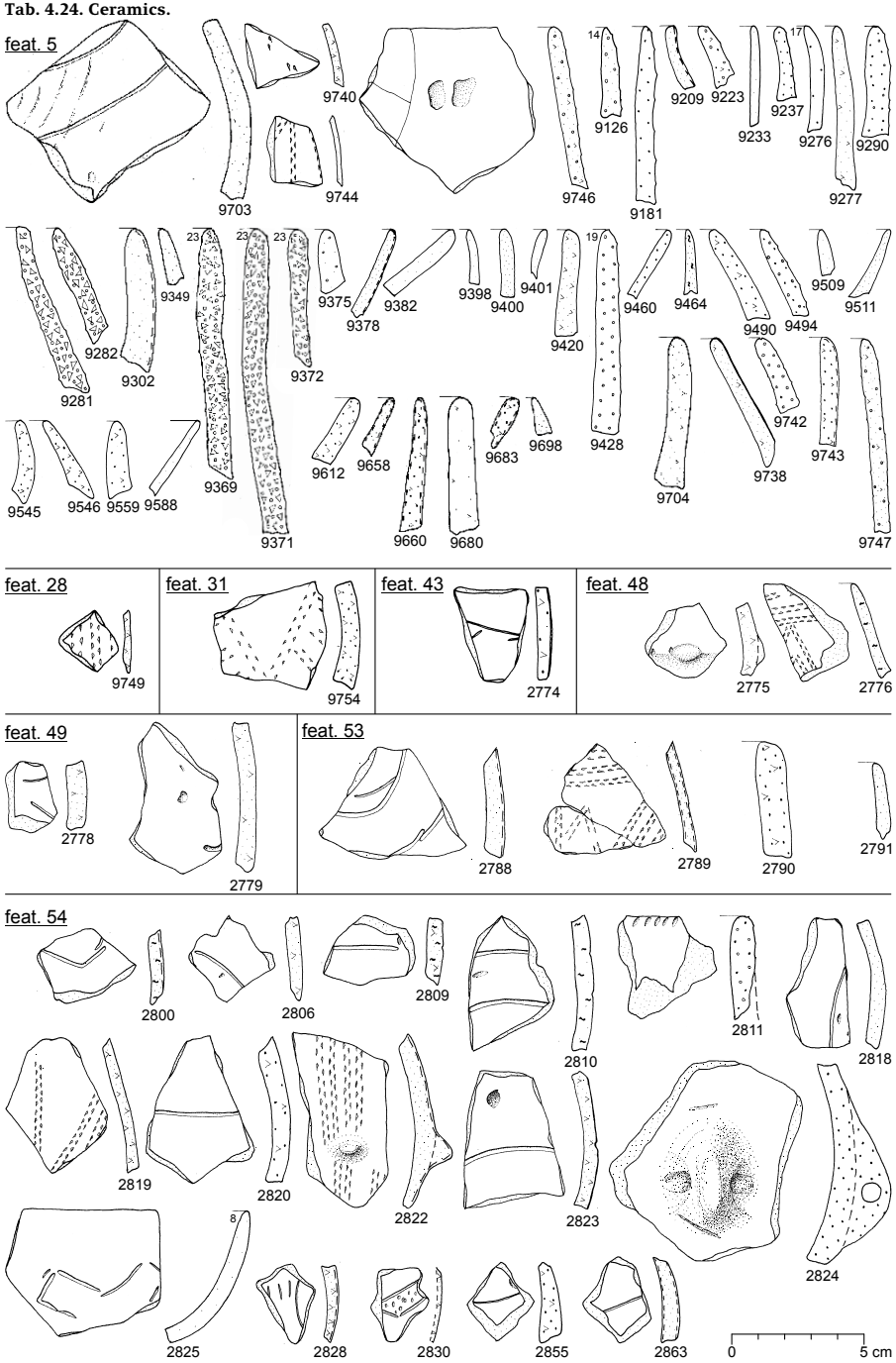


Tab. 4.23. Ceramics.

feat. 5



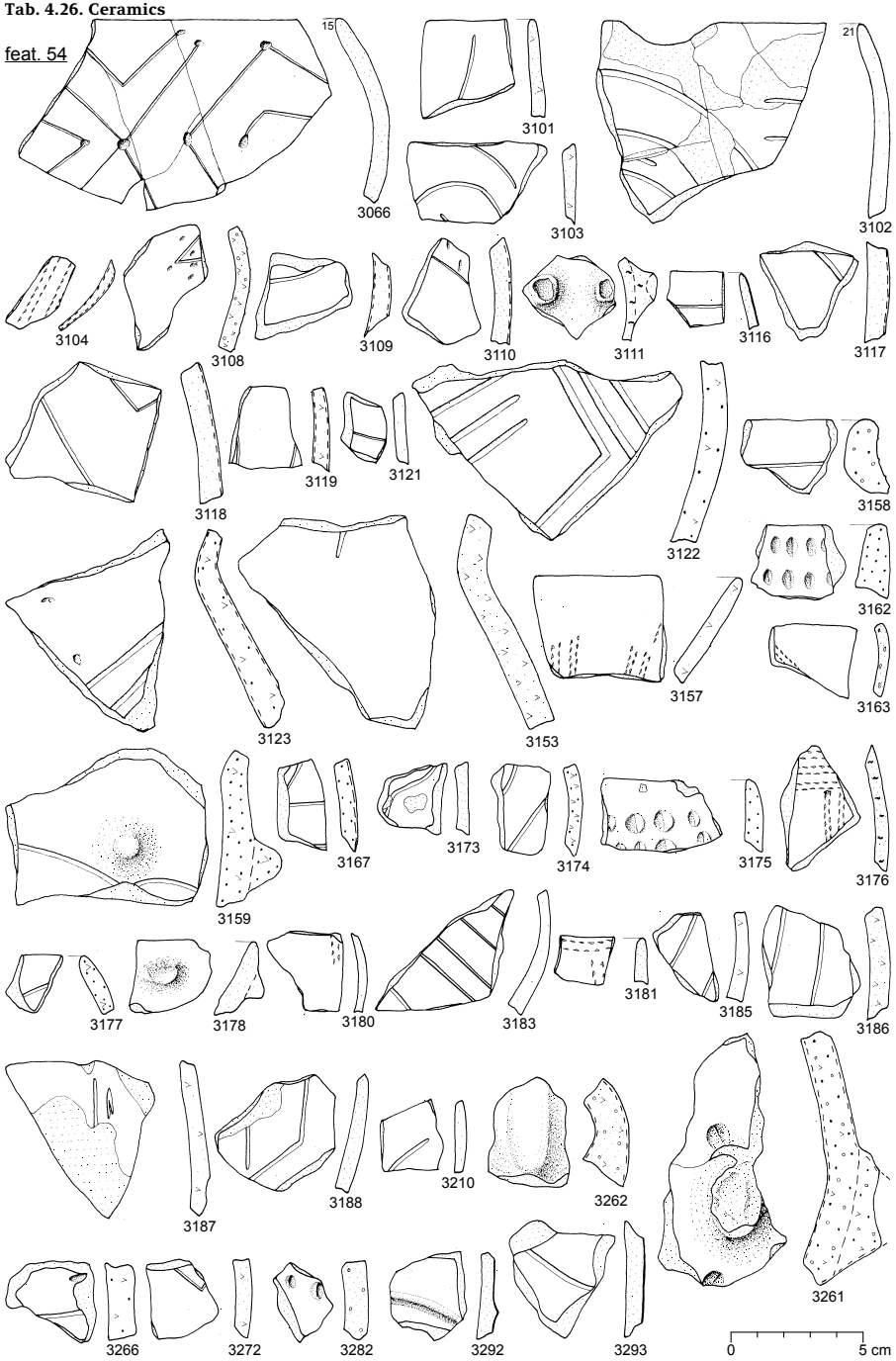
Tab. 4.24. Ceramics.



Tab. 4.25. Ceramics

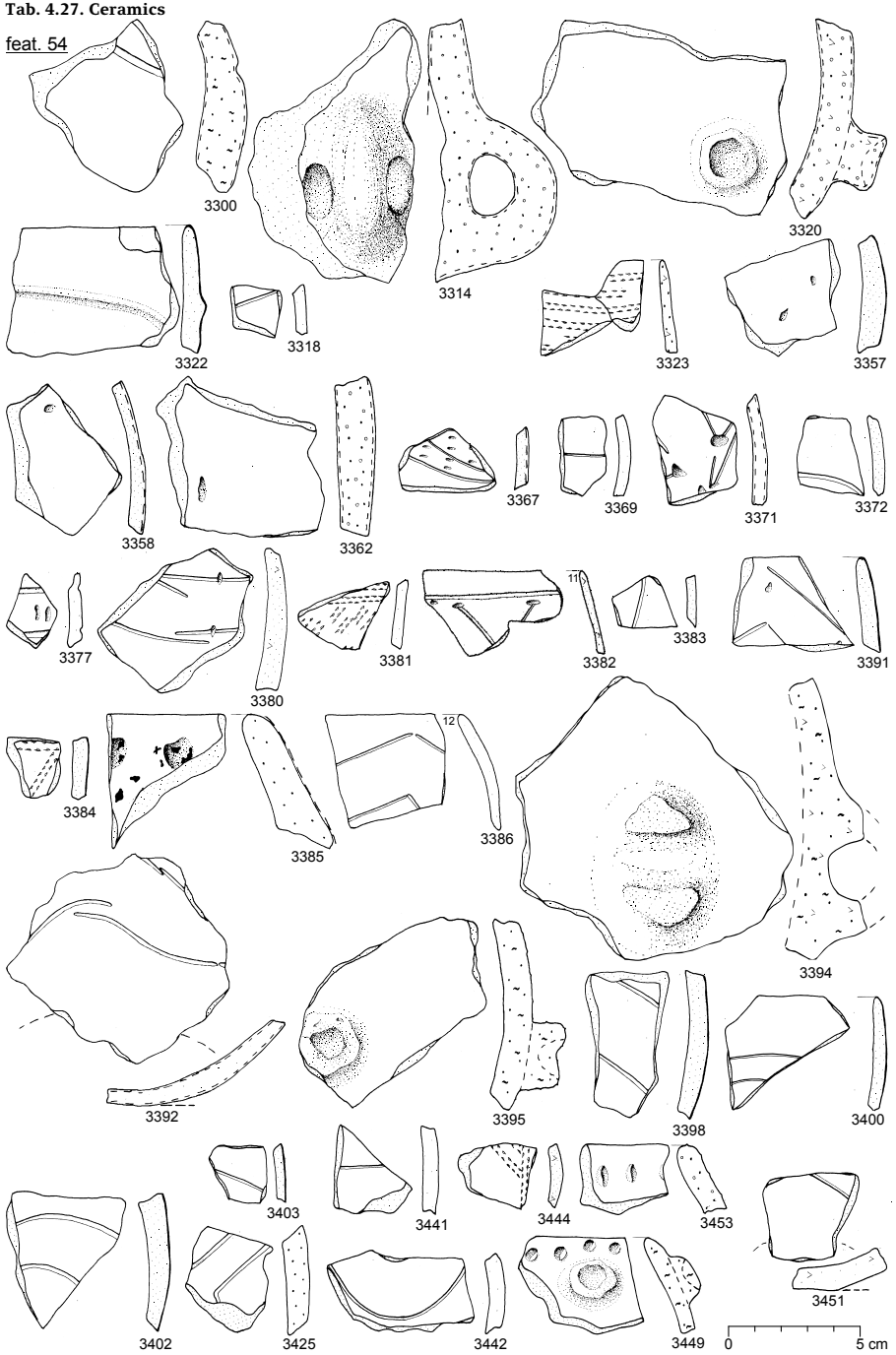
Tab. 4.26. Ceramics

feat. 54



Tab. 4.27. Ceramics

feat. 54



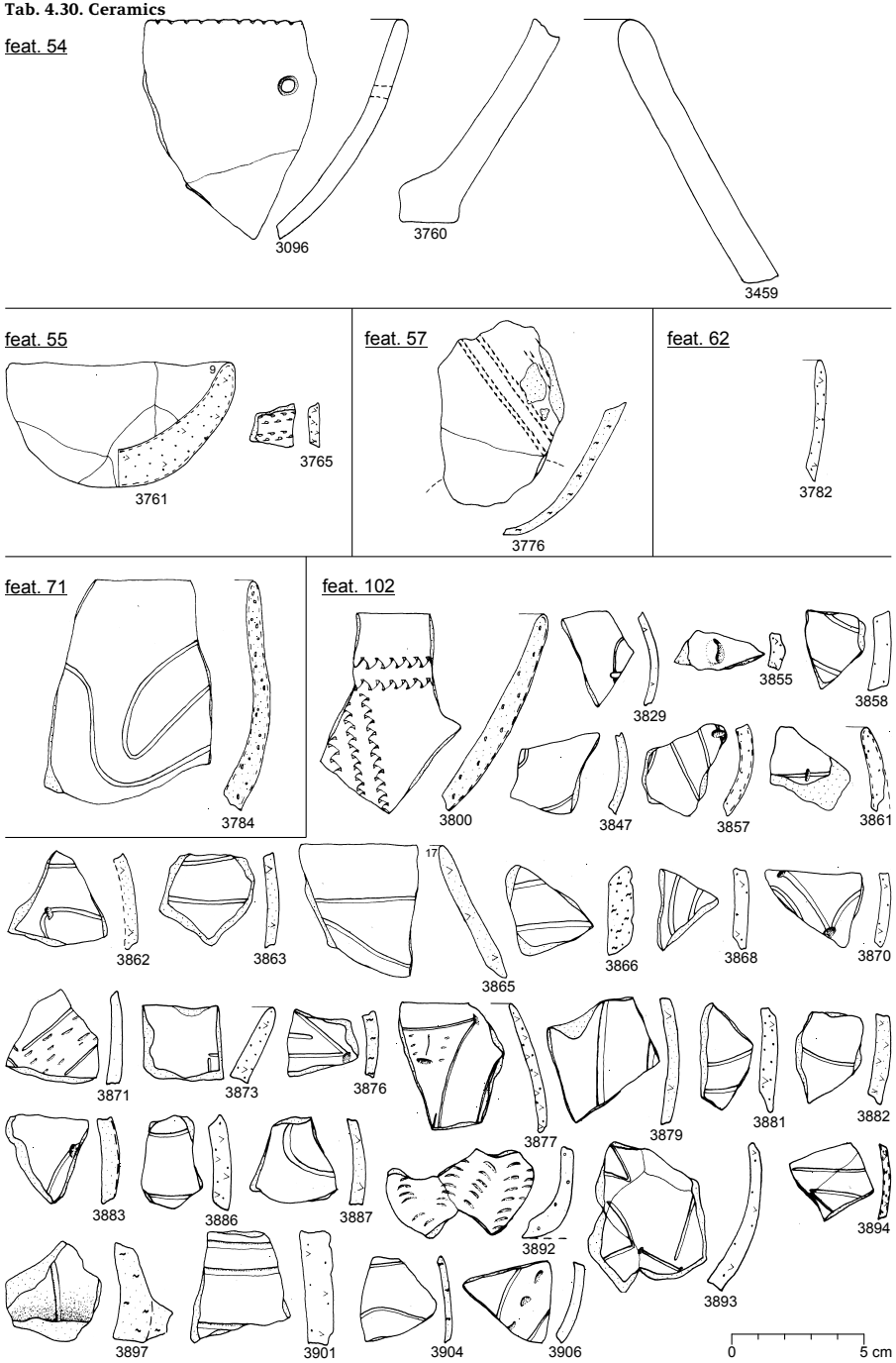
Tab. 4.28. Ceramics.

feat. 54

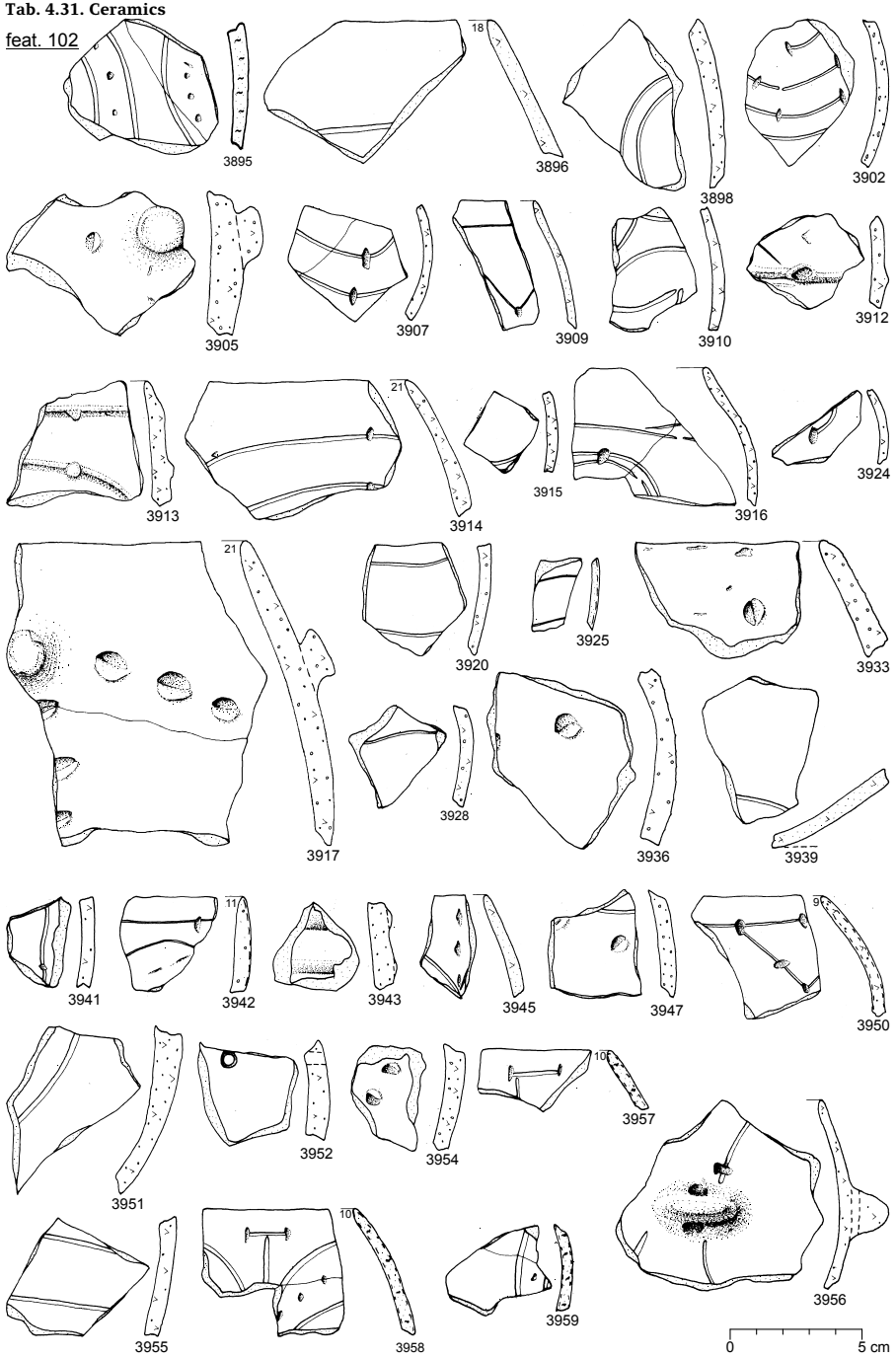
Tab. 4.29. Ceramics

feat. 54

Tab. 4.30. Ceramics



Tab. 4.31. Ceramics



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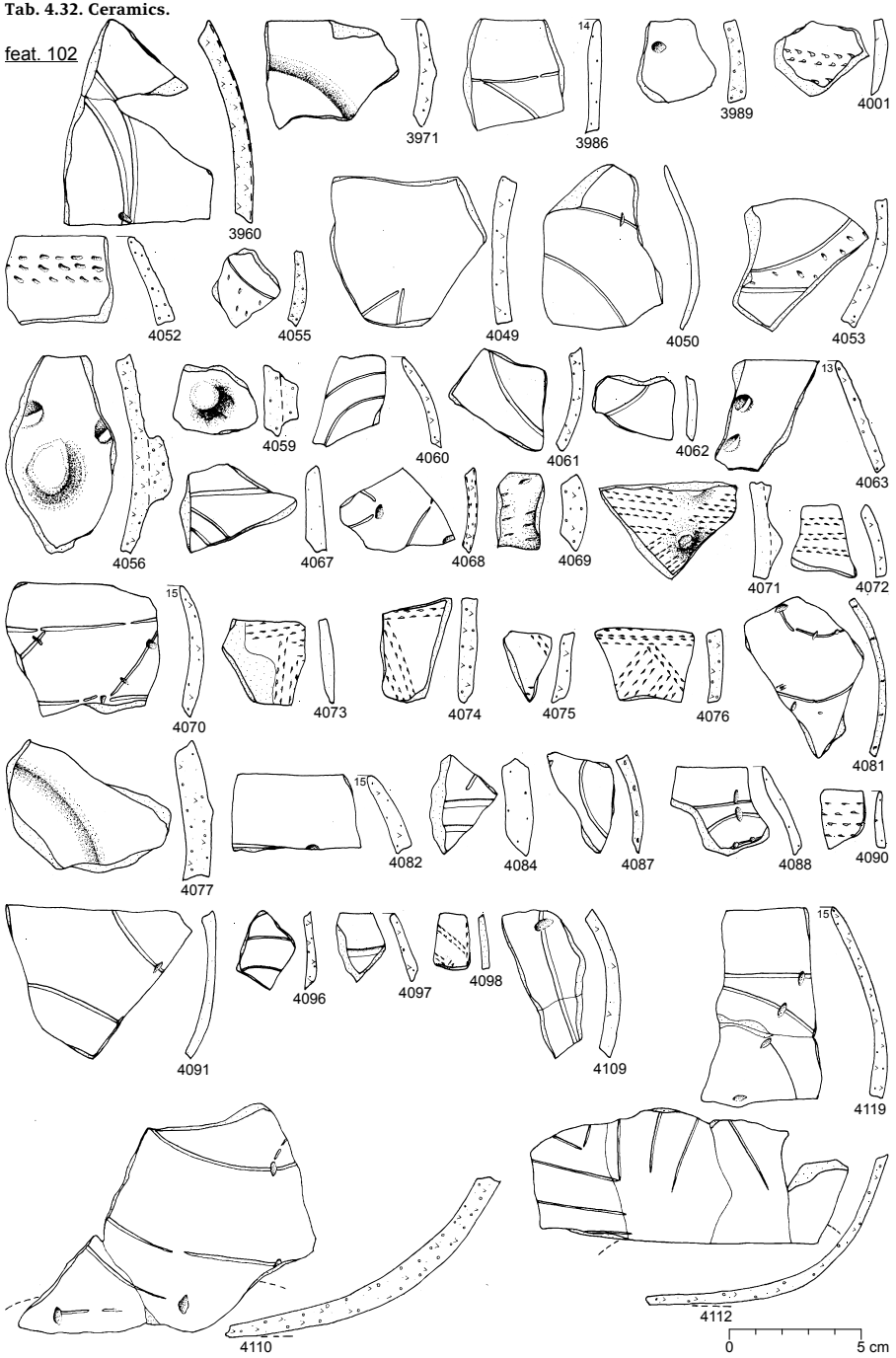
feat. 102



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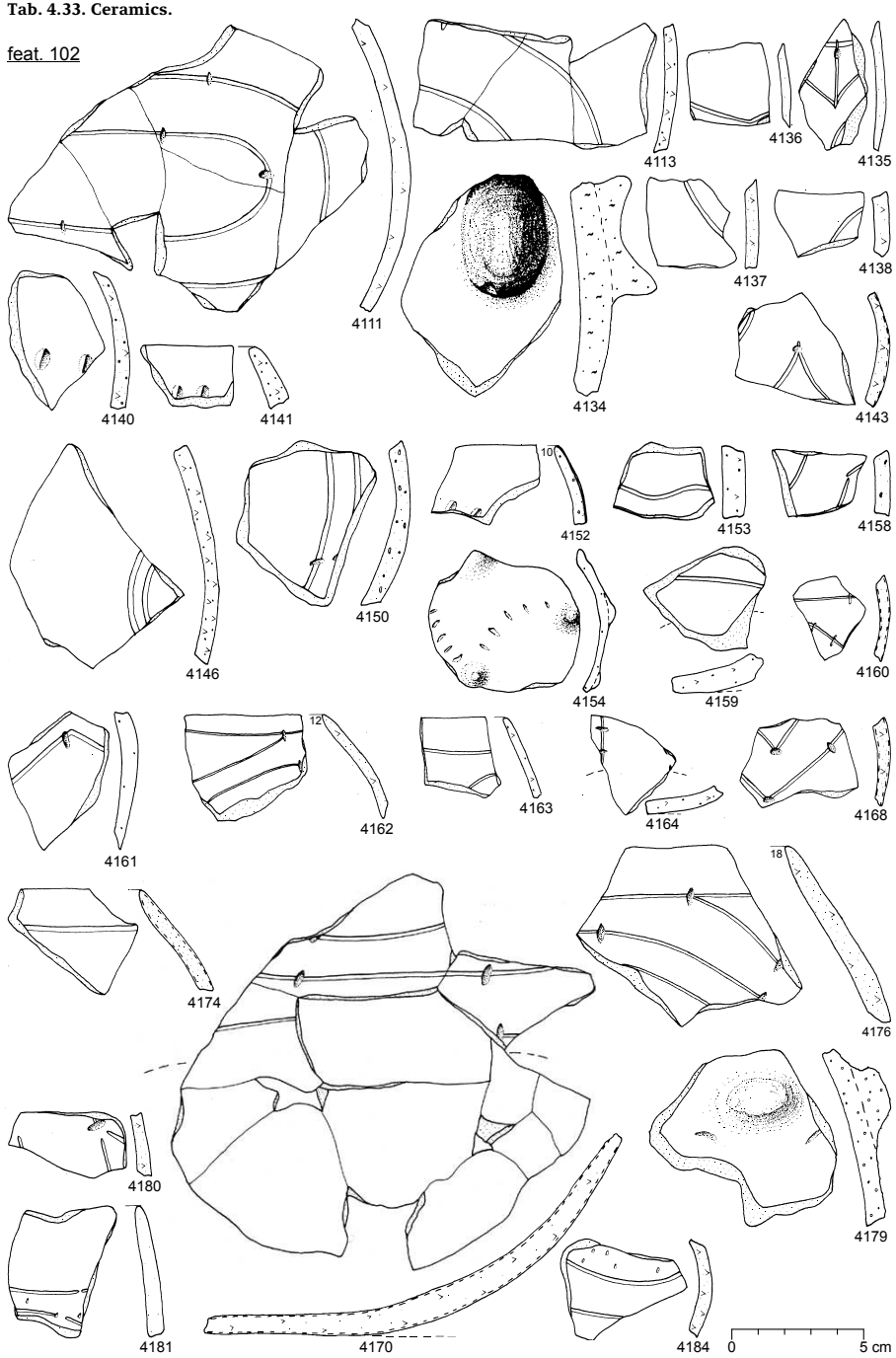
feat. 102



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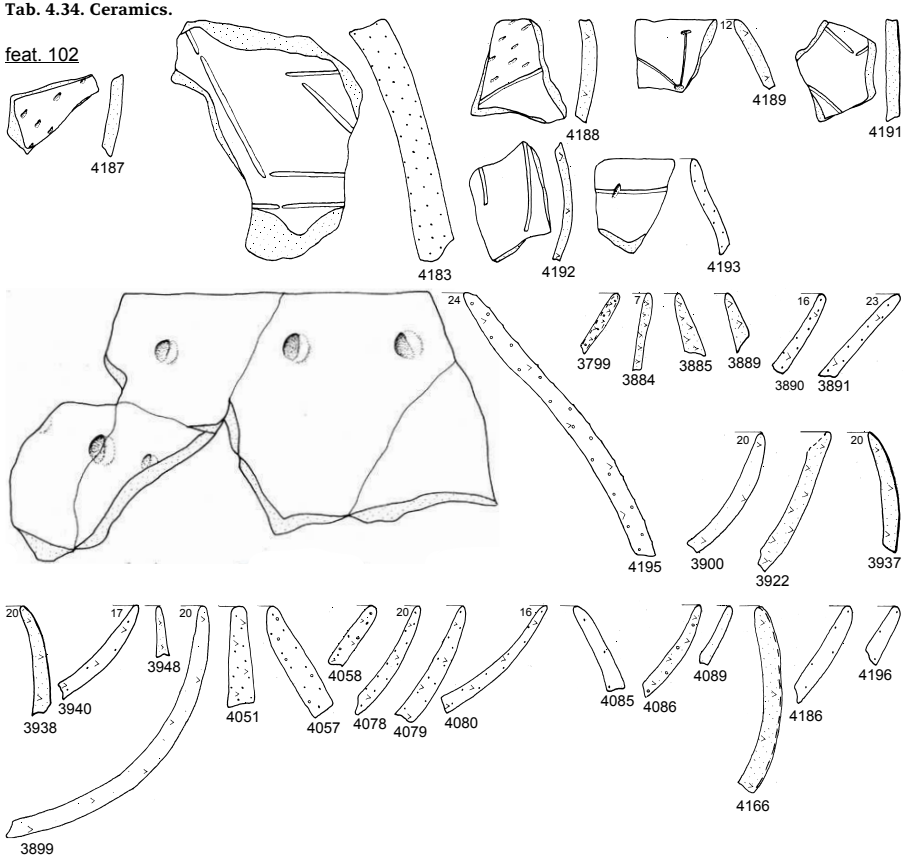

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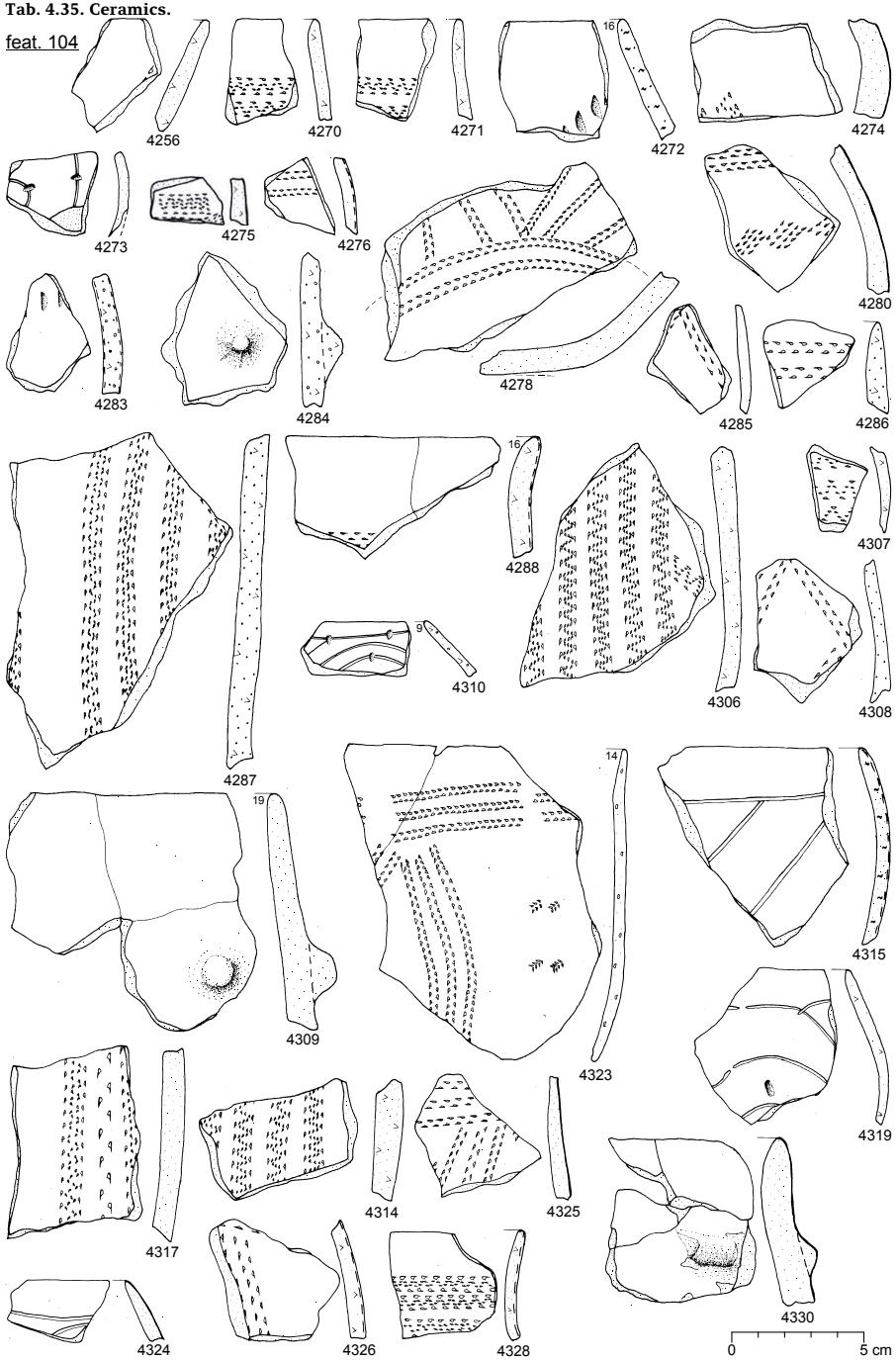

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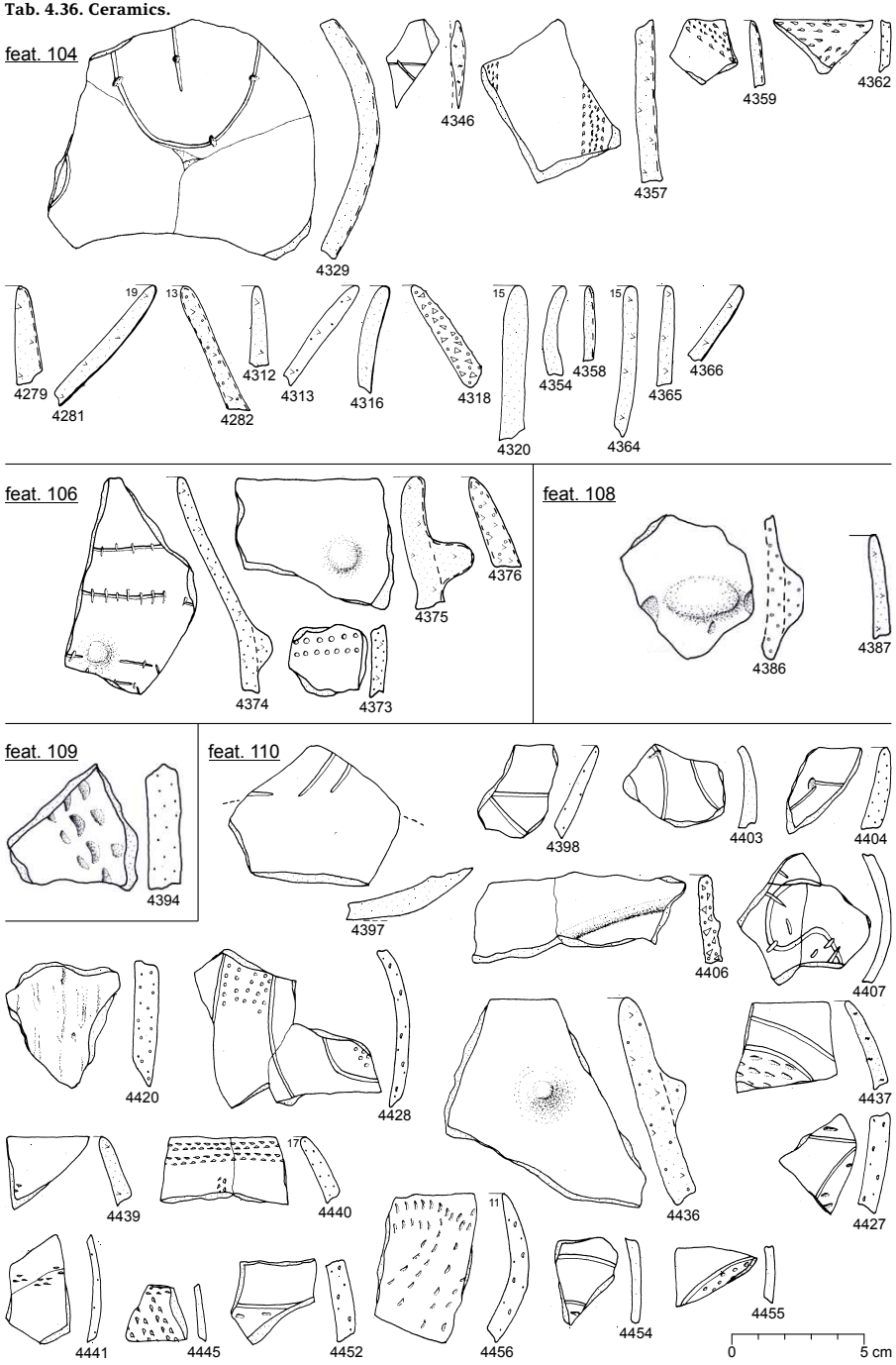

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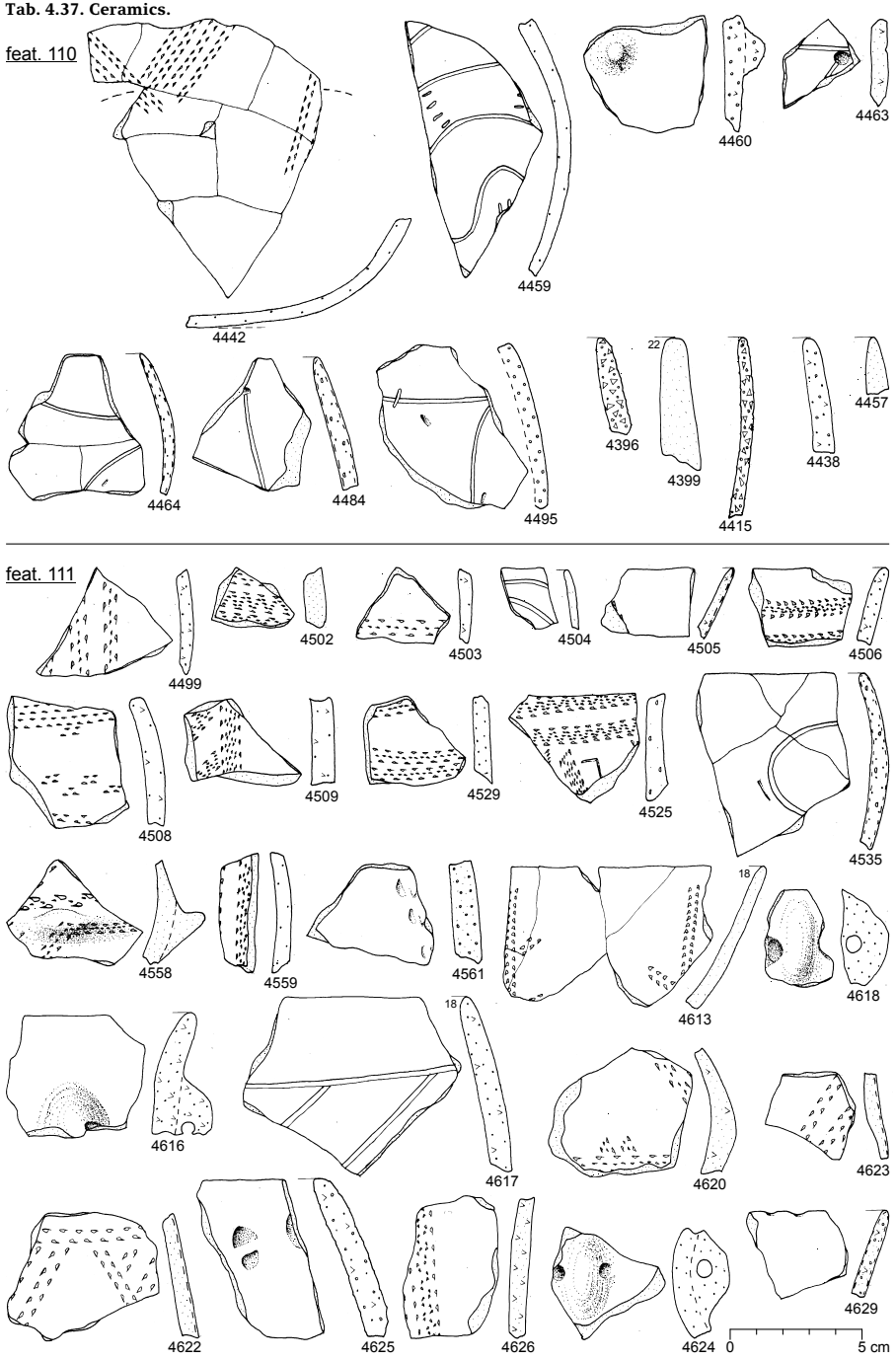

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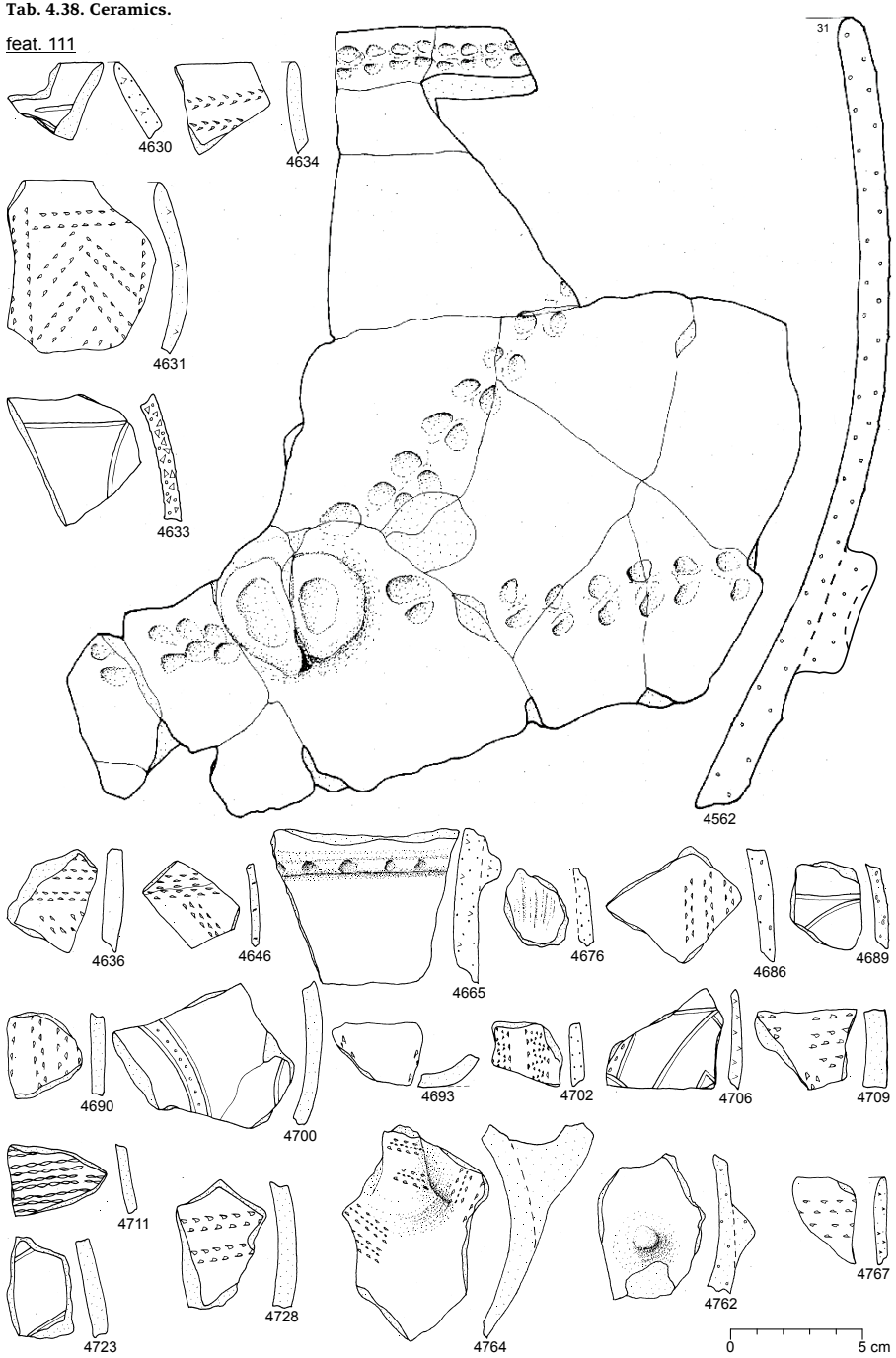
feat. 111



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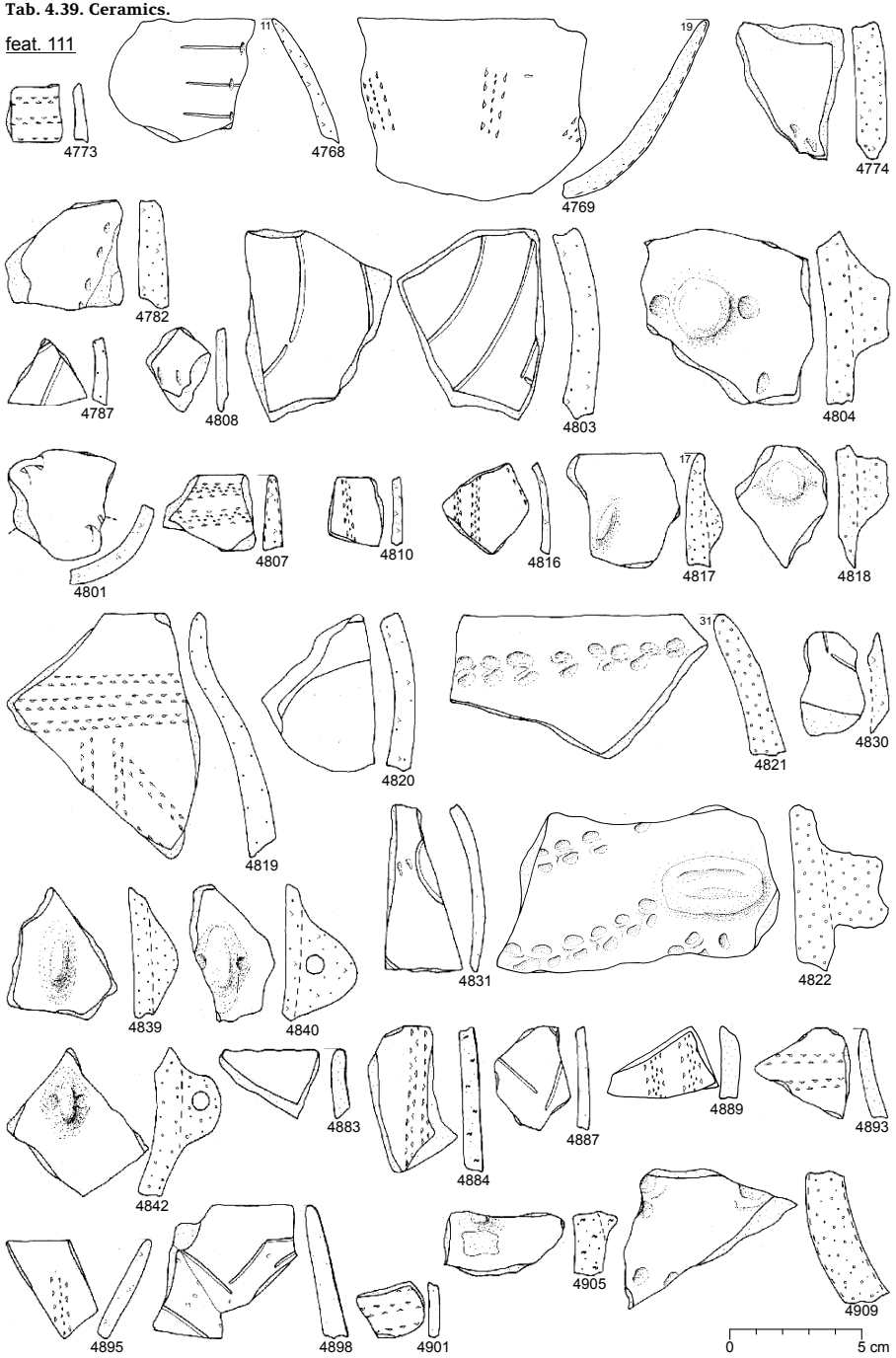

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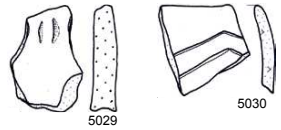
feat. 111

Tab. 4.41. Ceramics.

feat. 112



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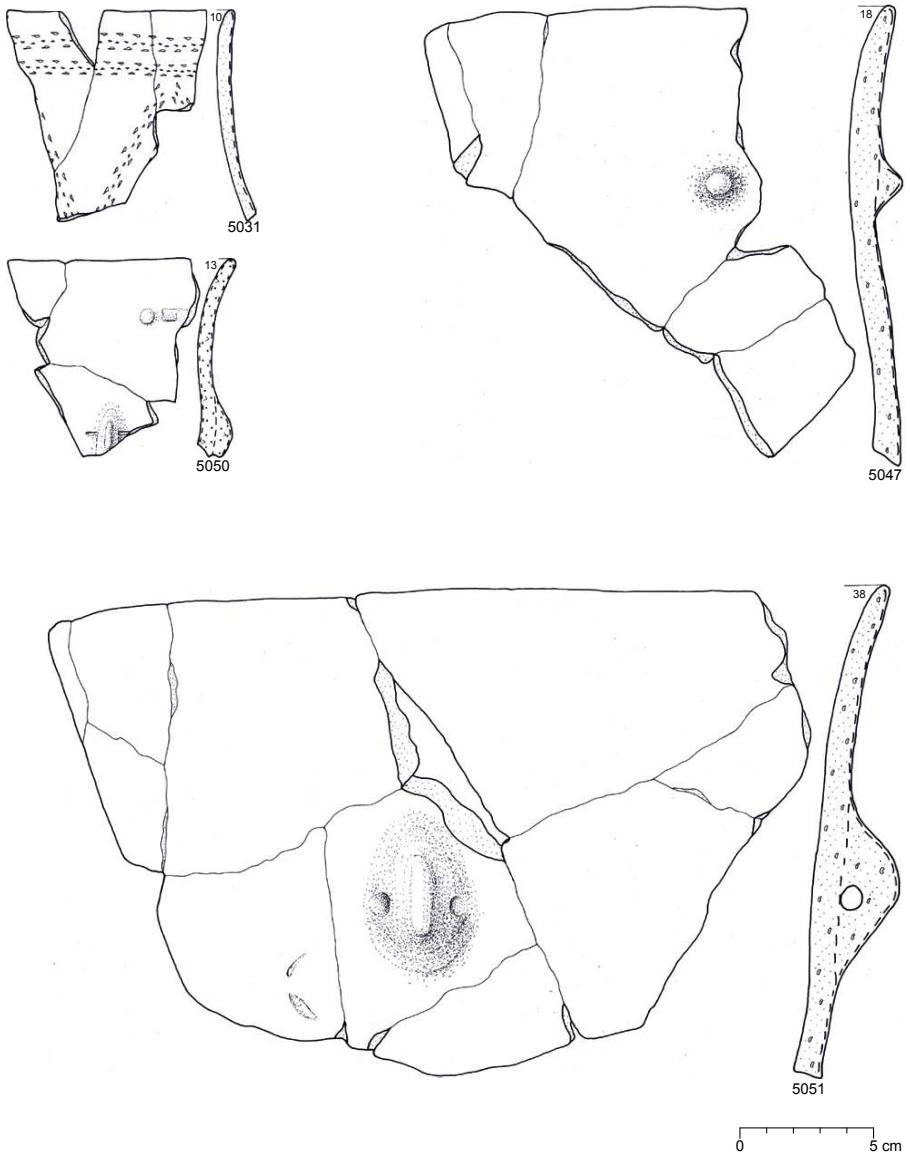

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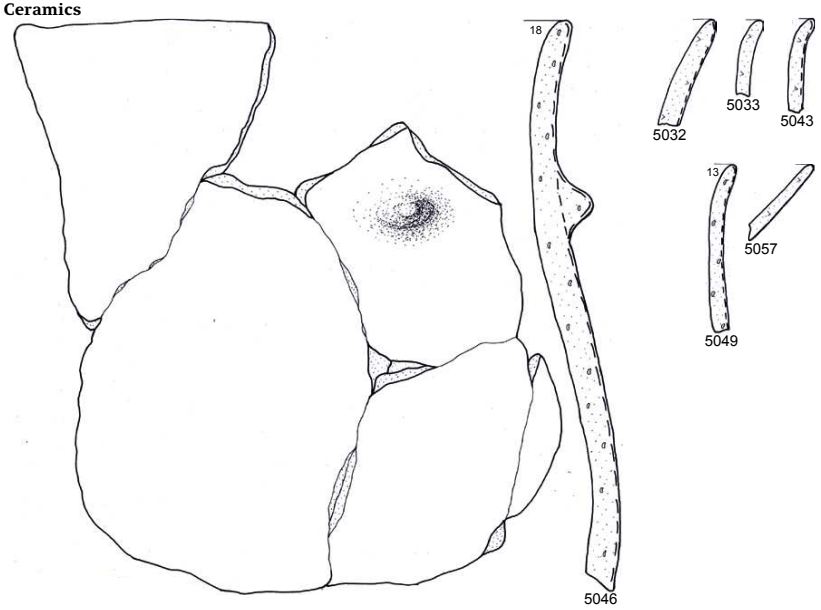

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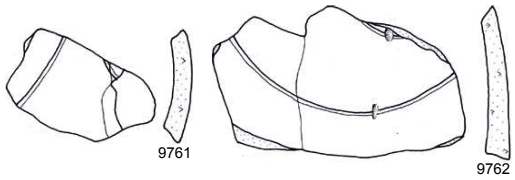

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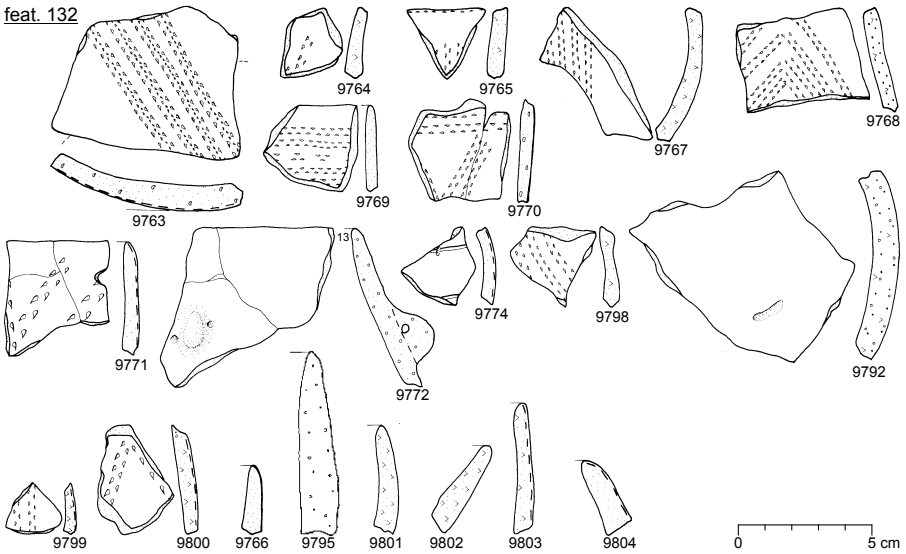

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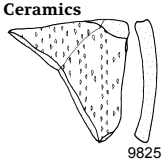

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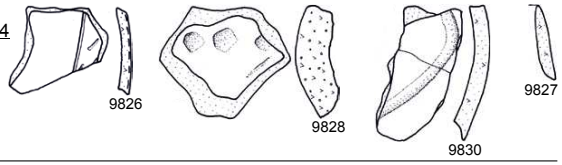

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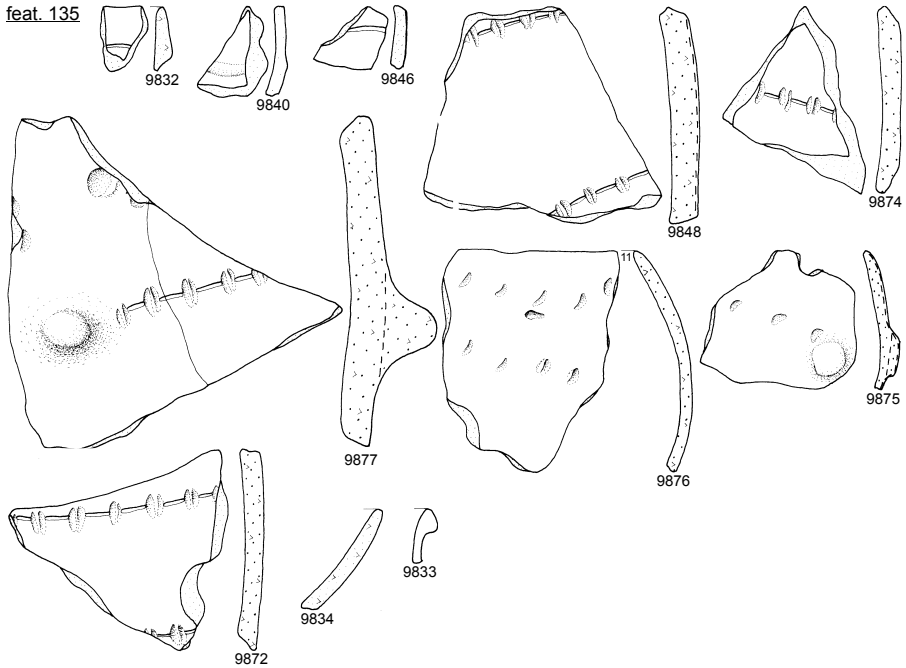

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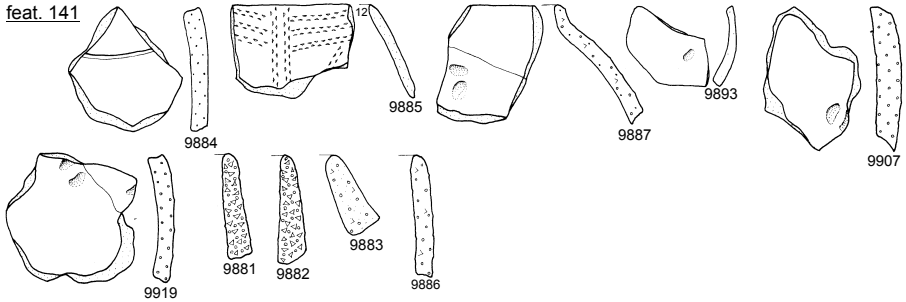

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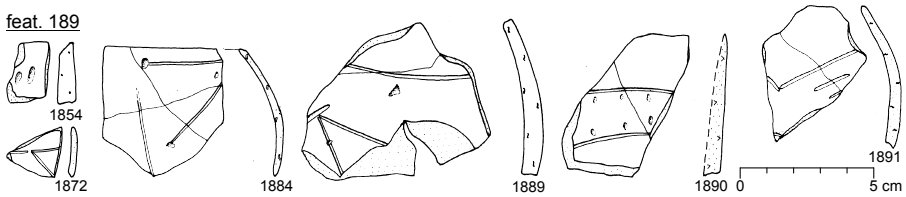

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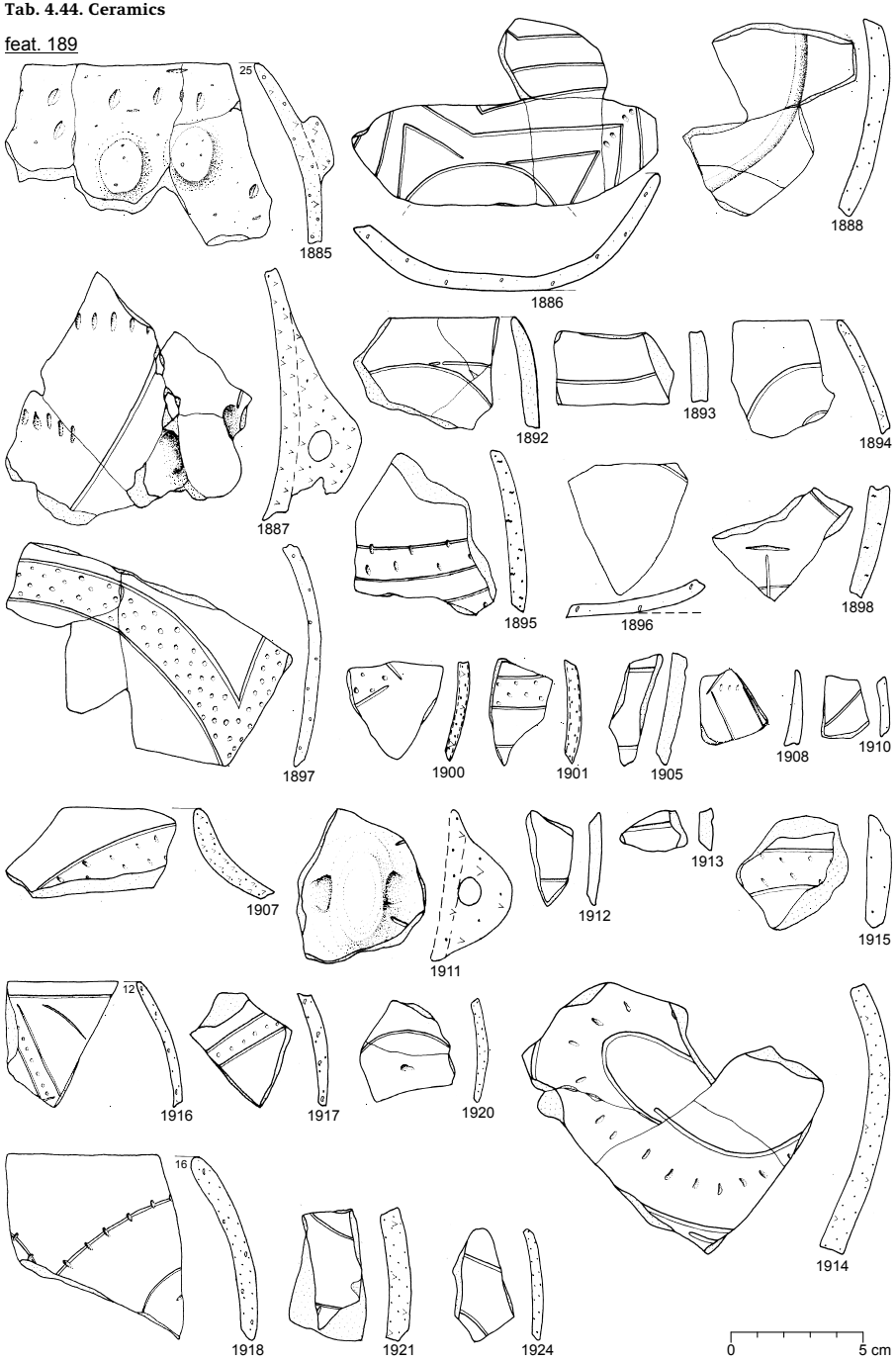

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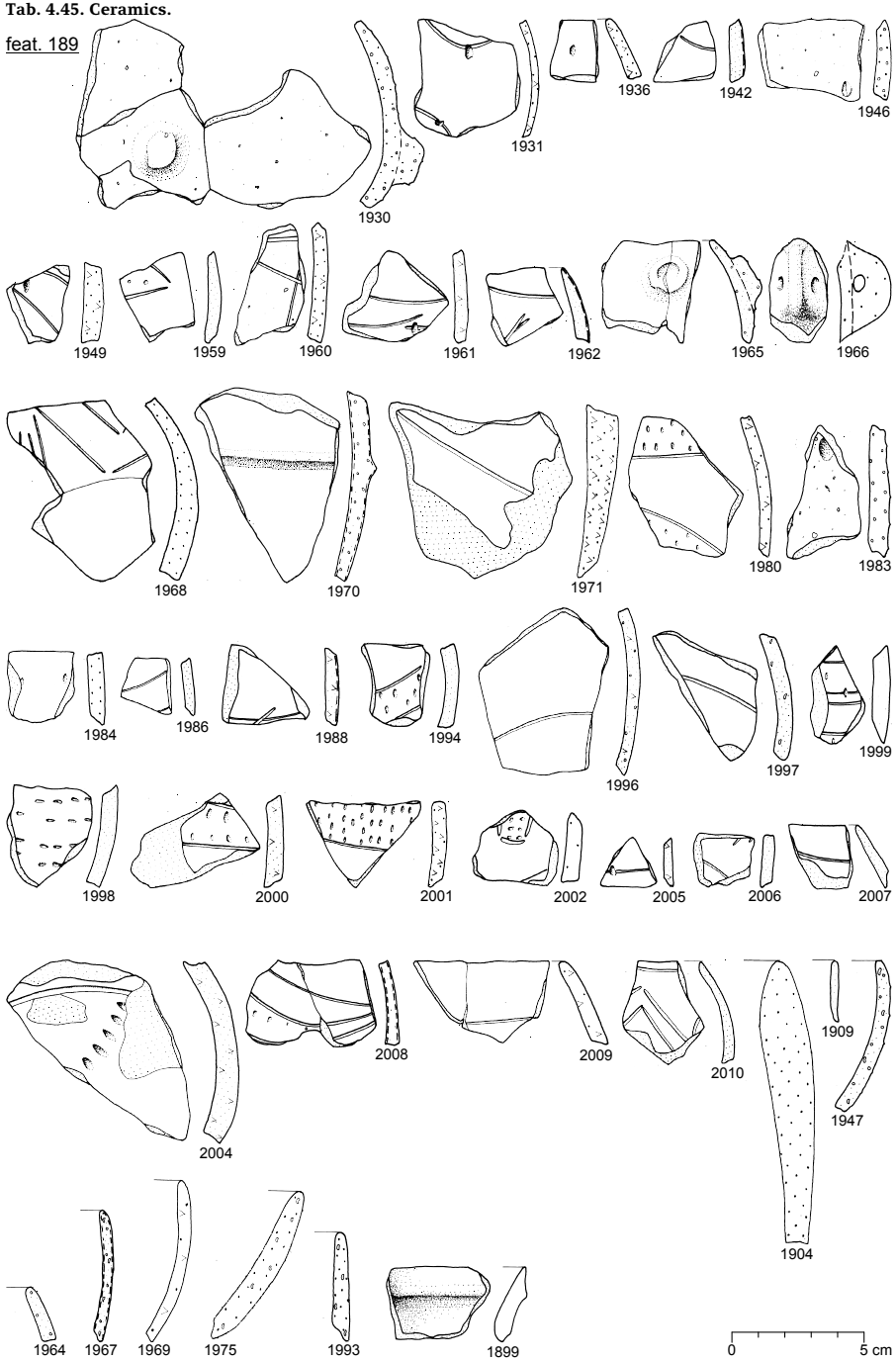

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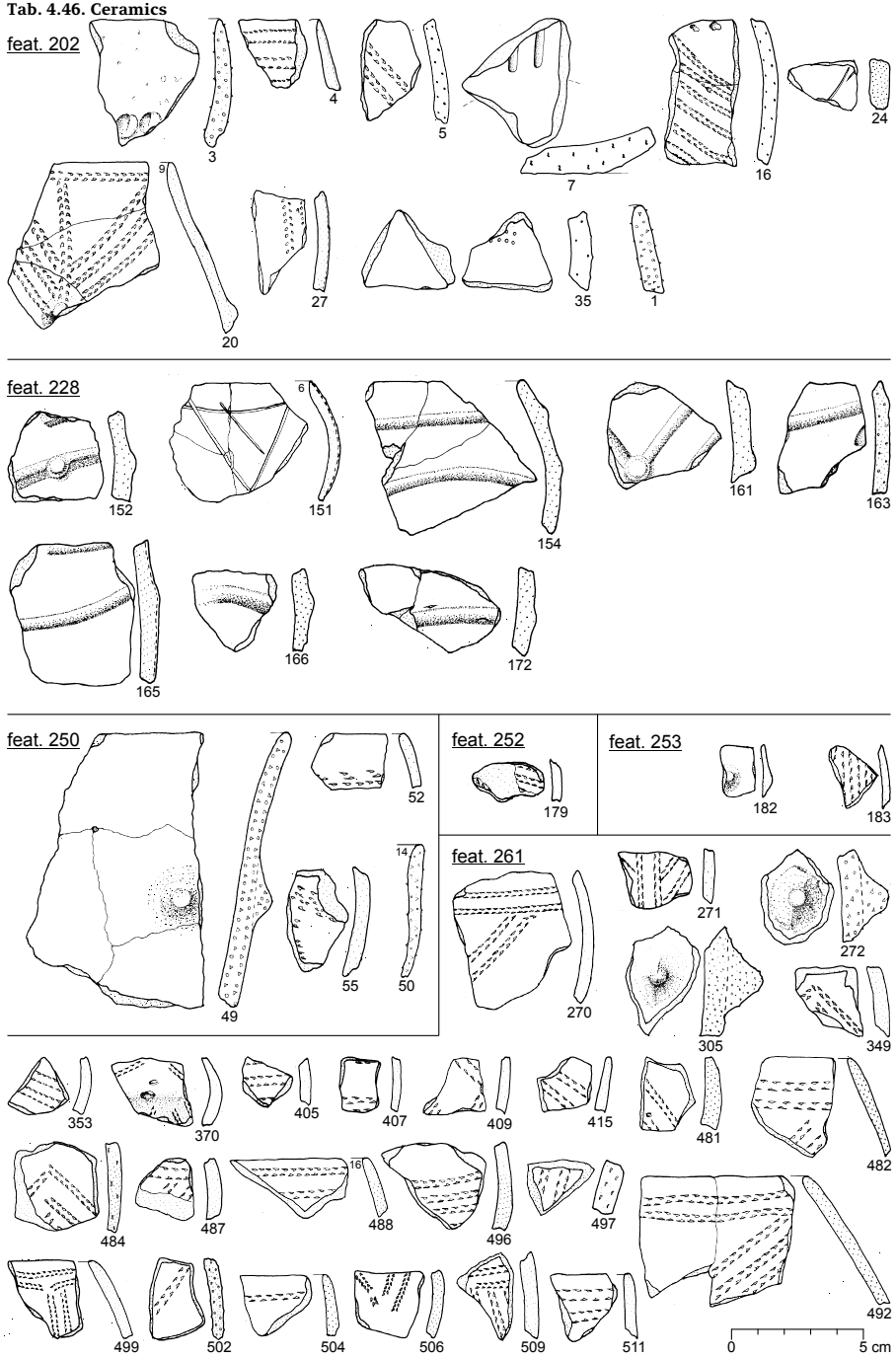

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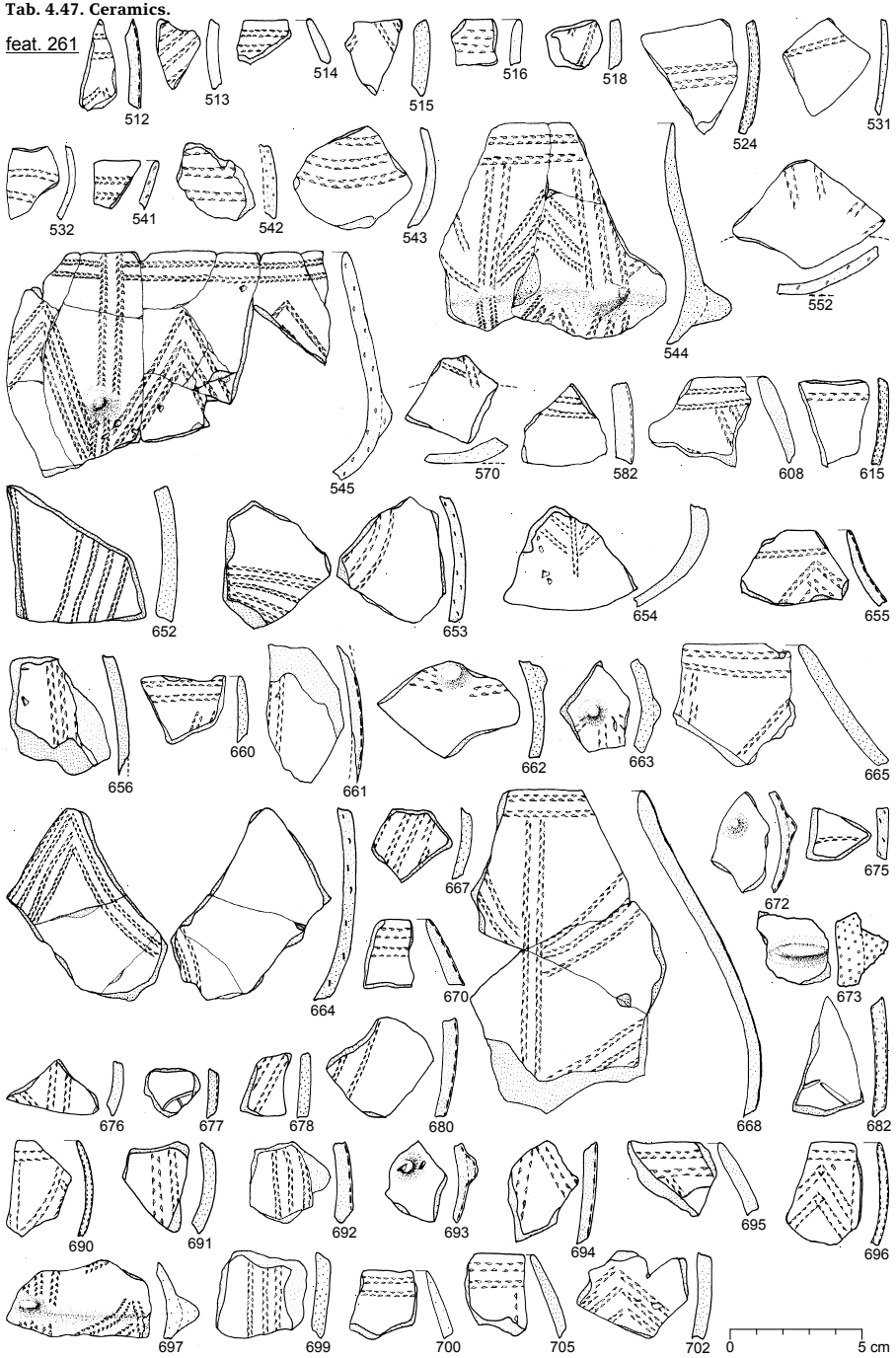

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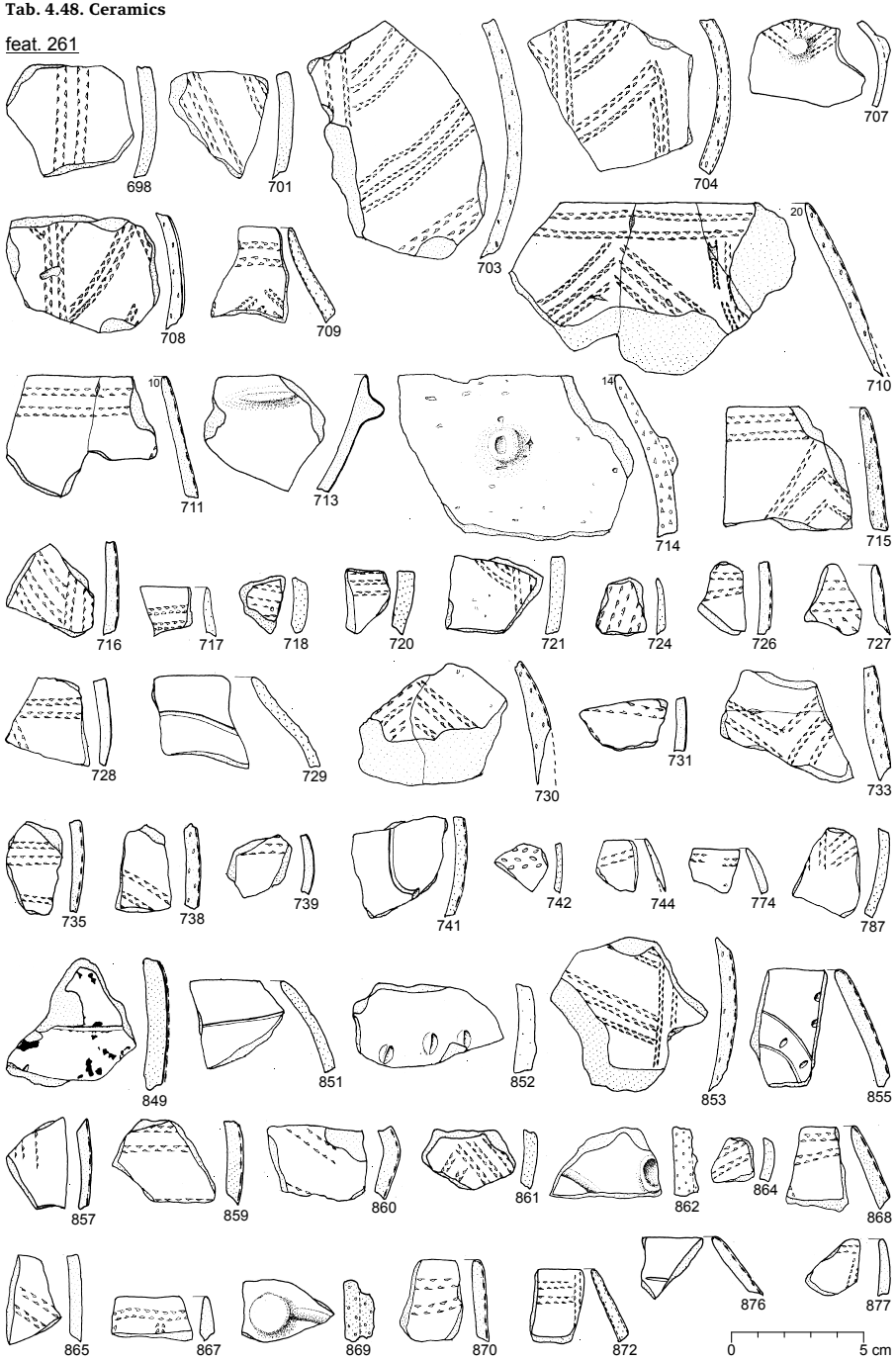

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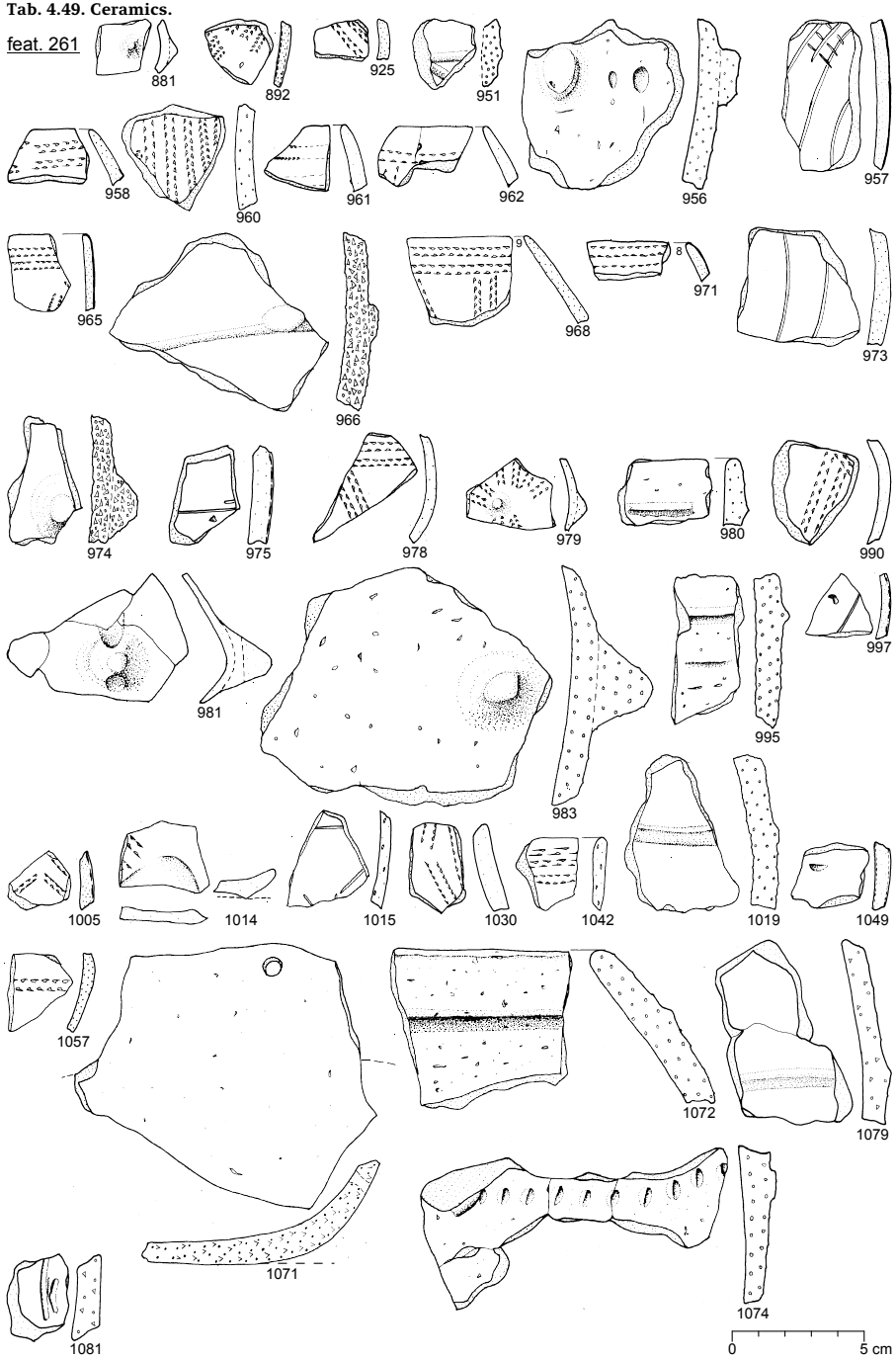

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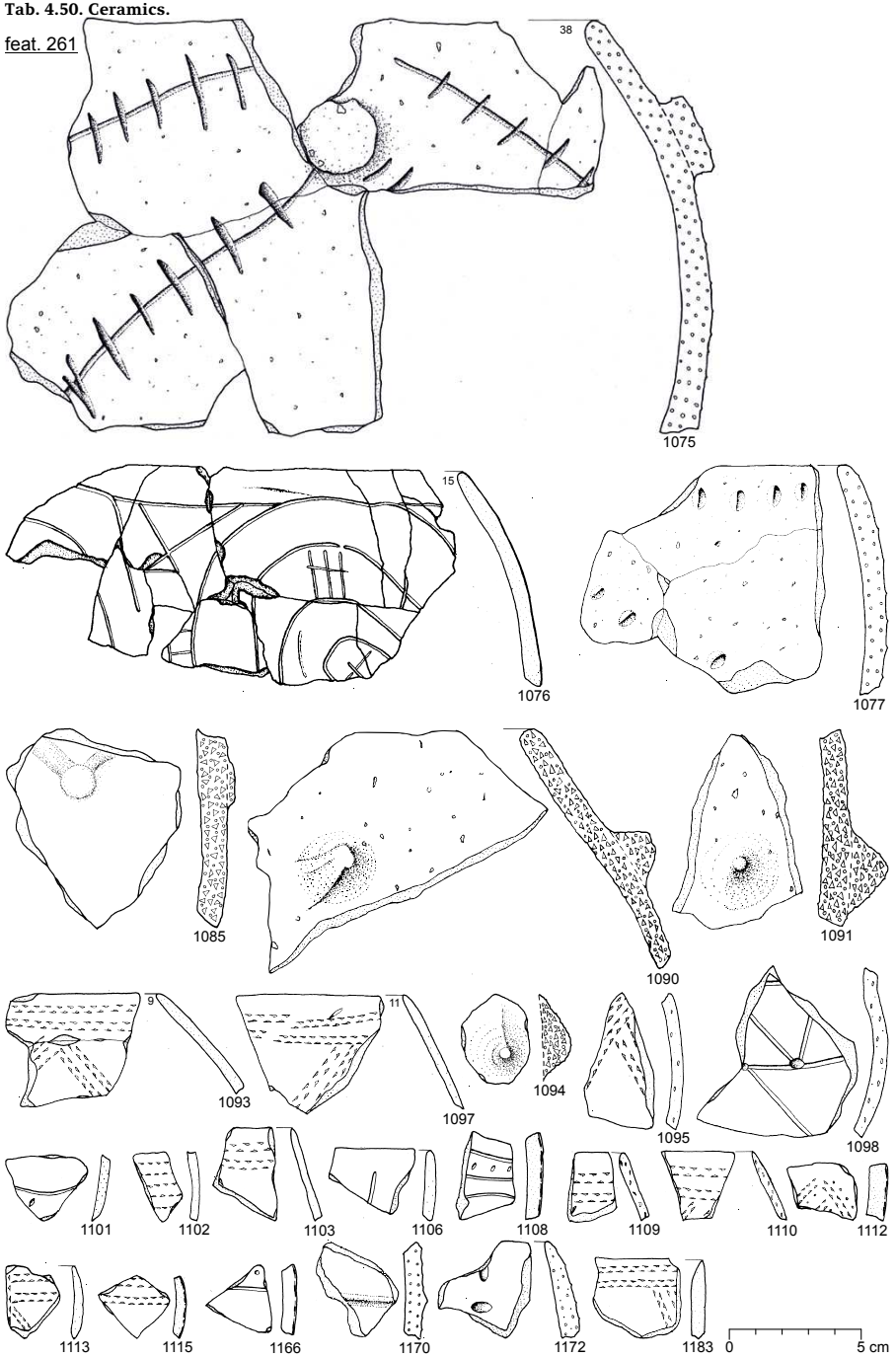

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feat. 261

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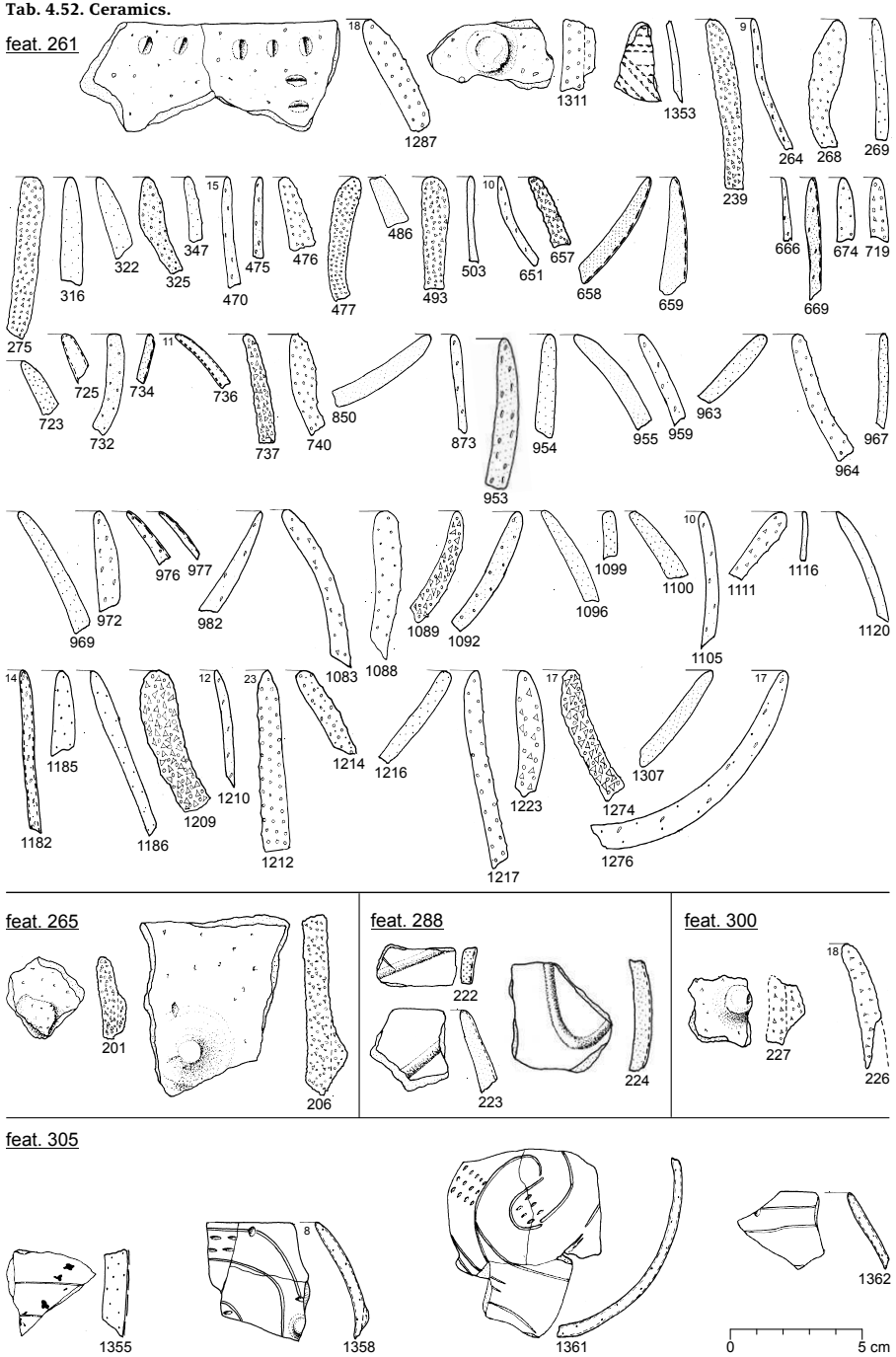

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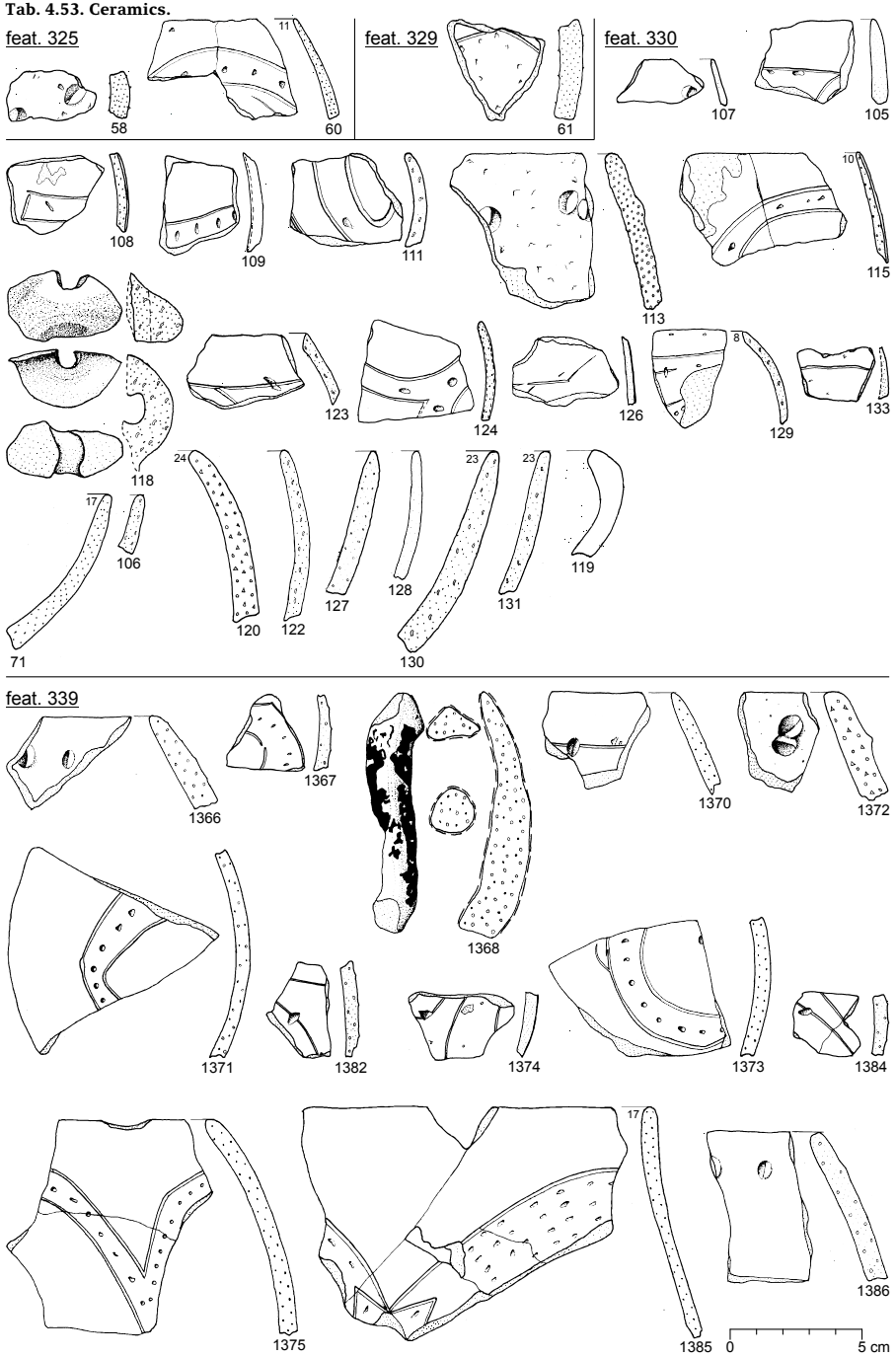

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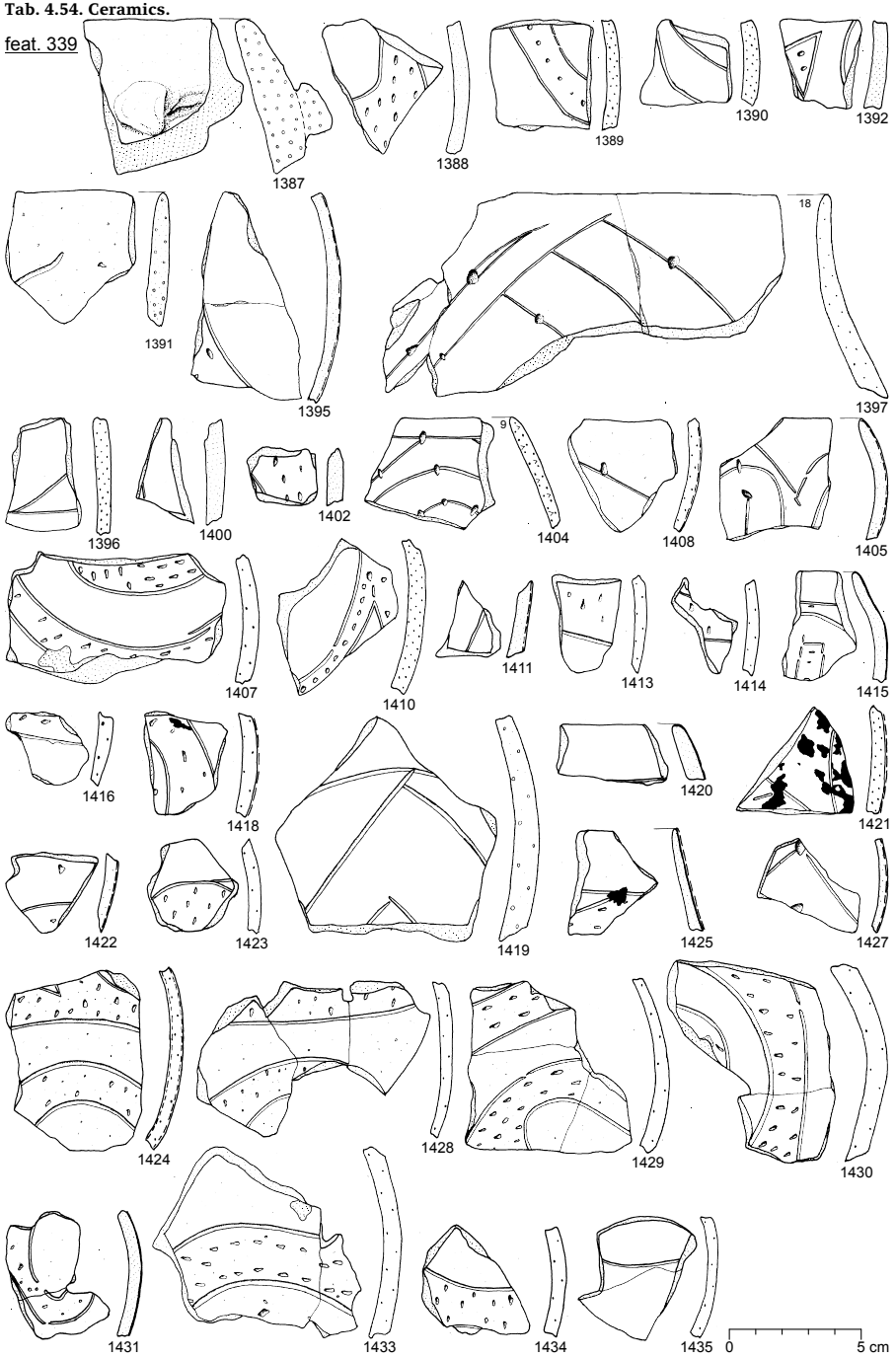
feat. 339



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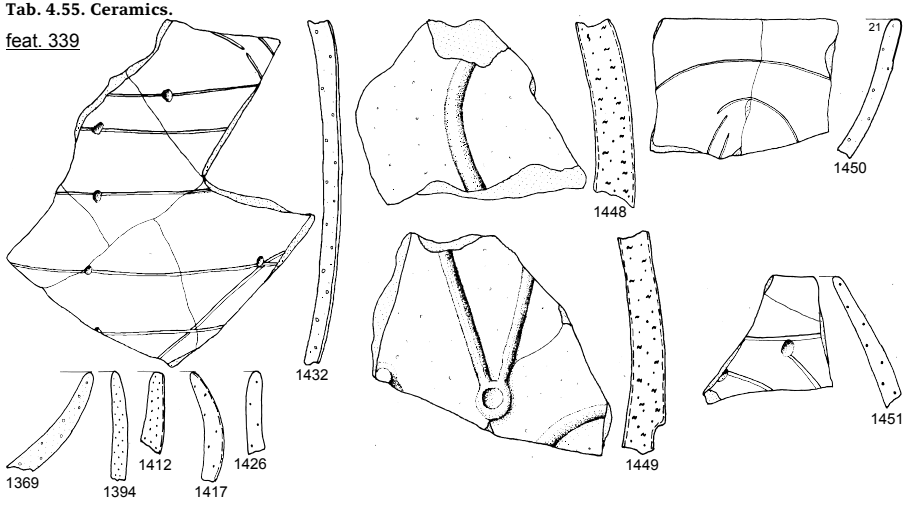
feat. 339



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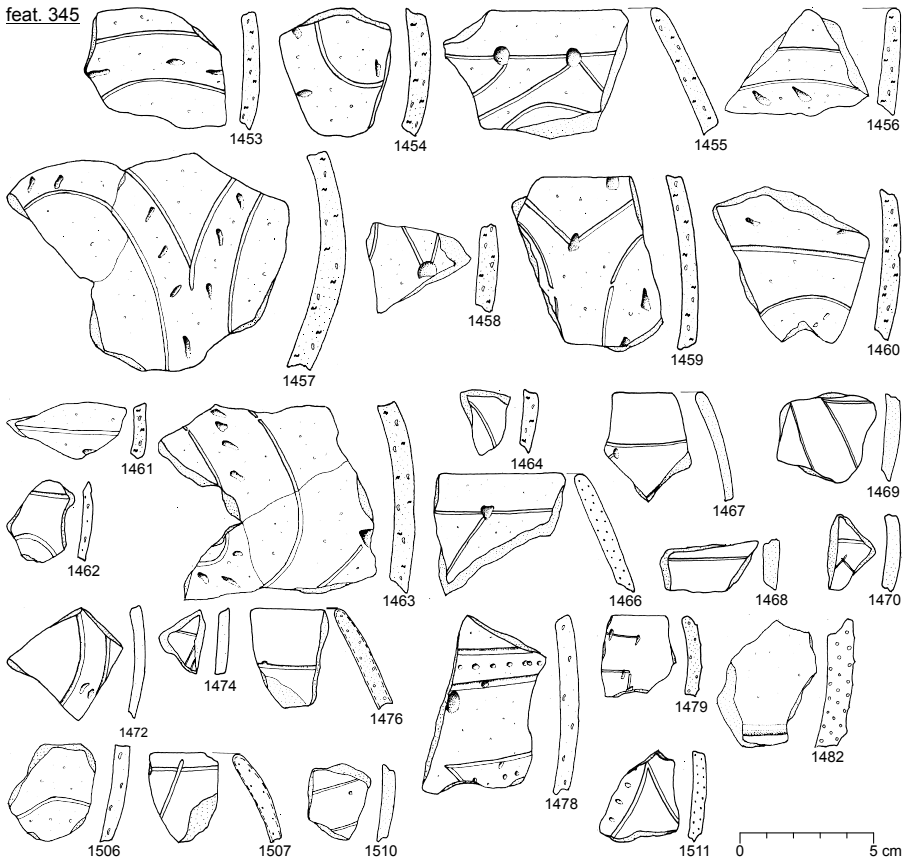

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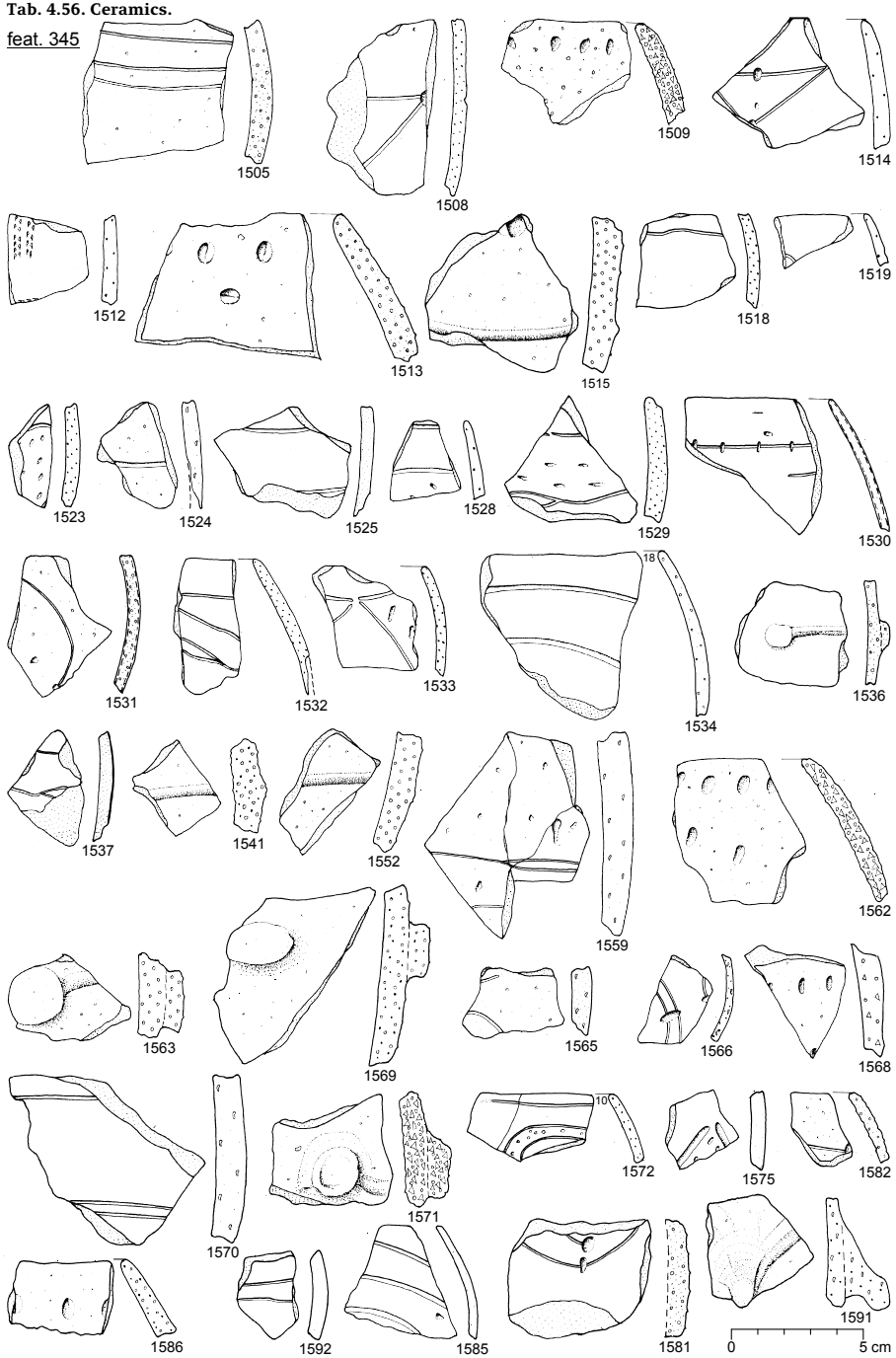

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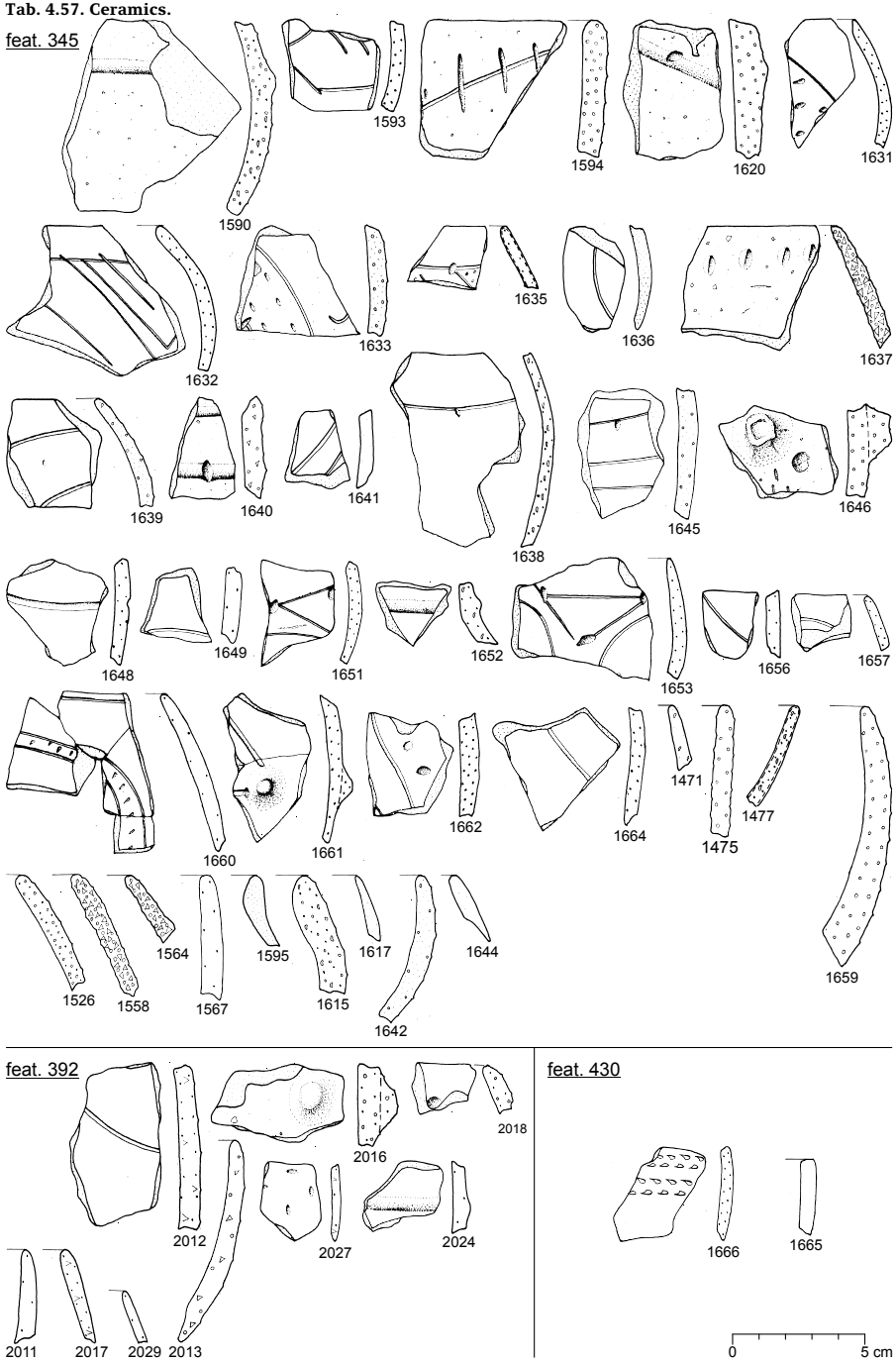

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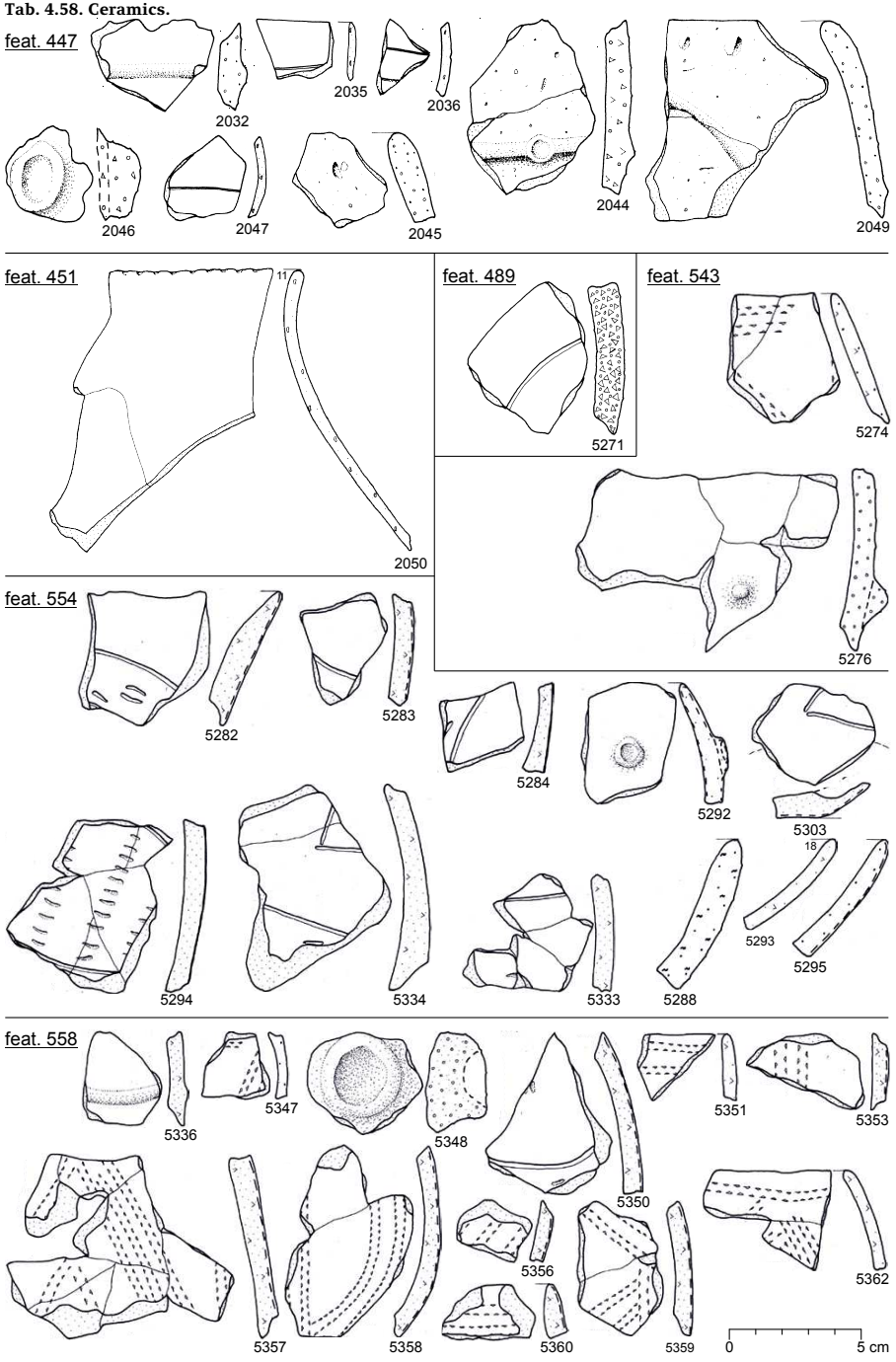

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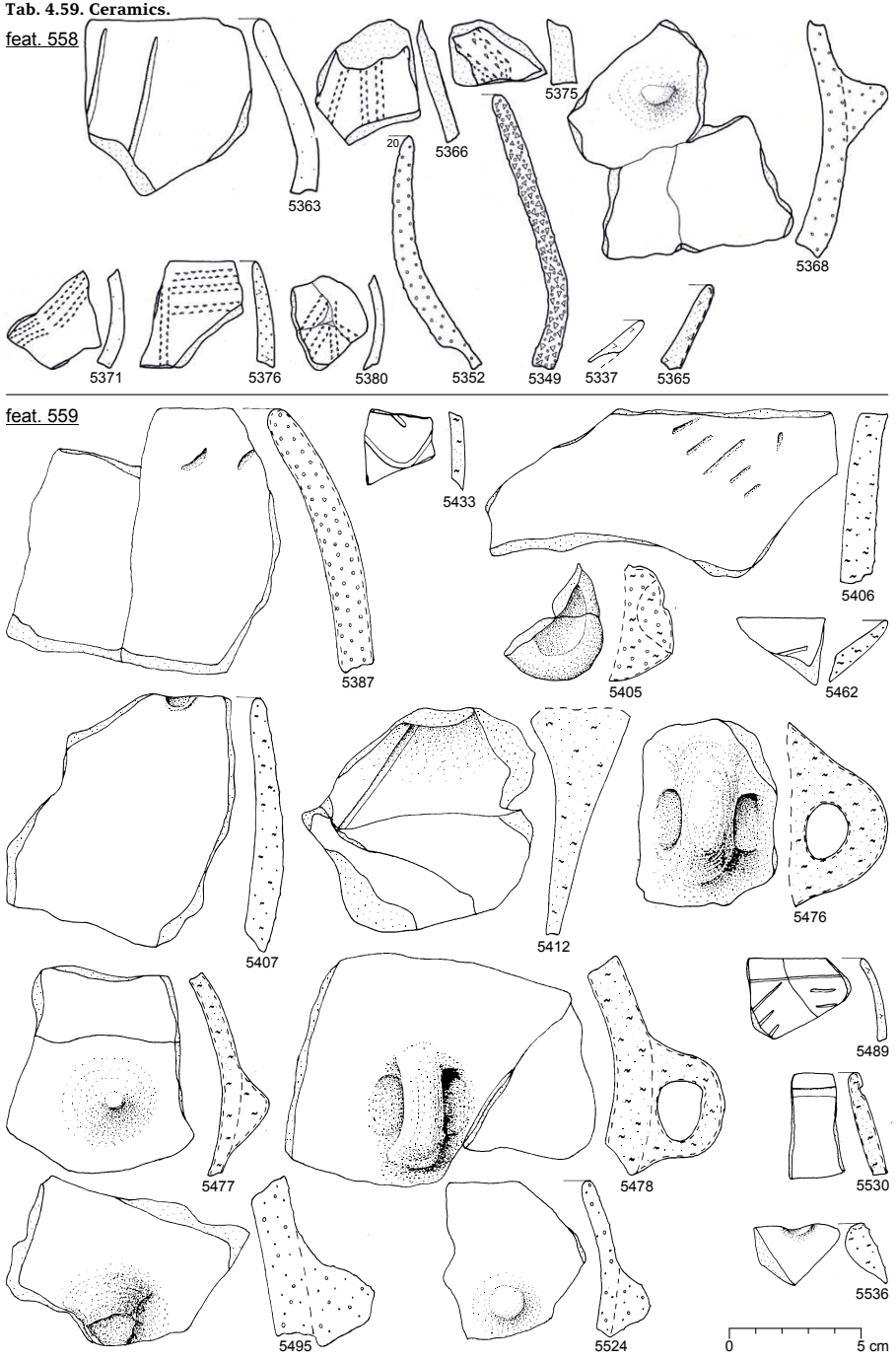

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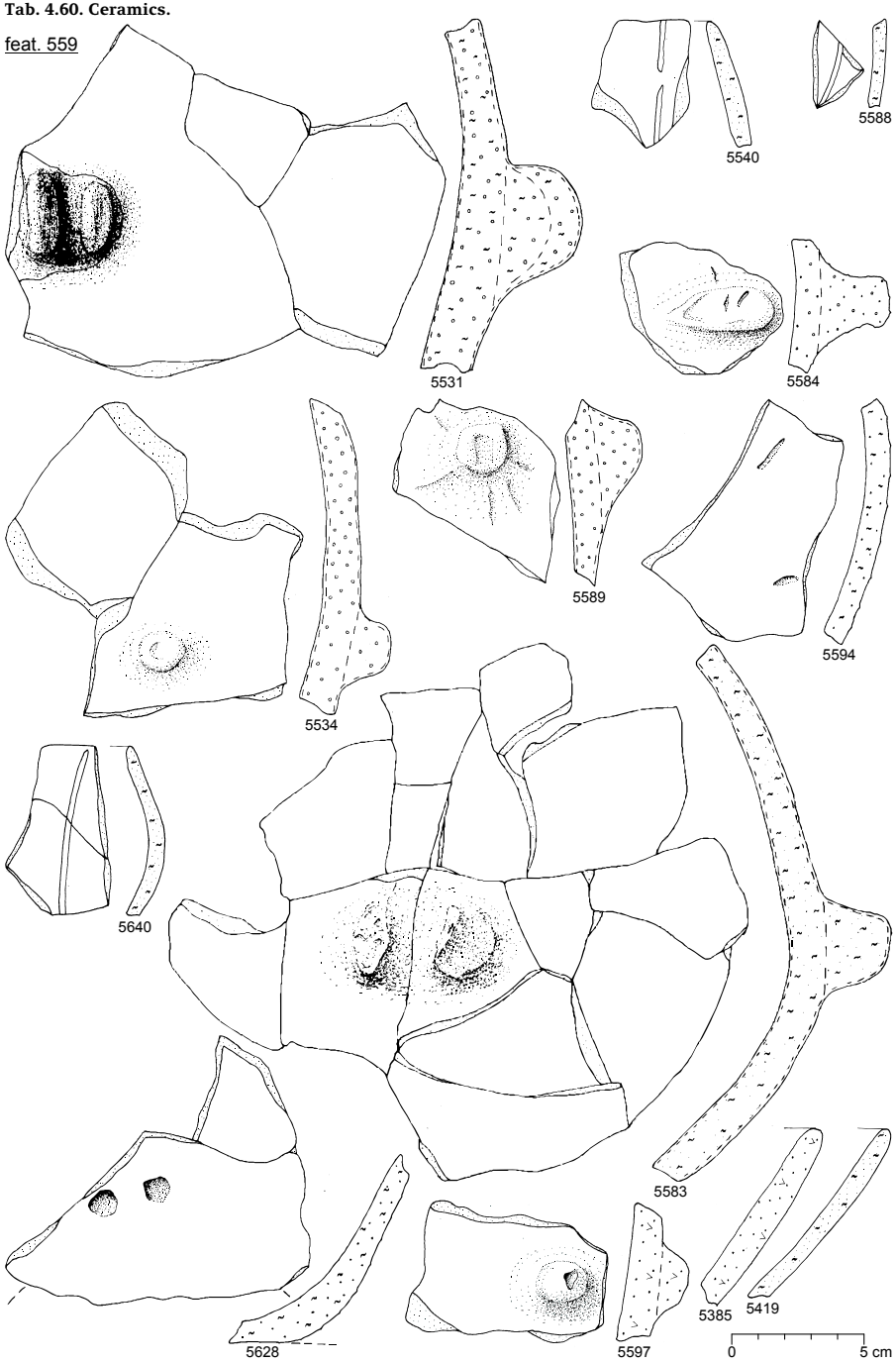

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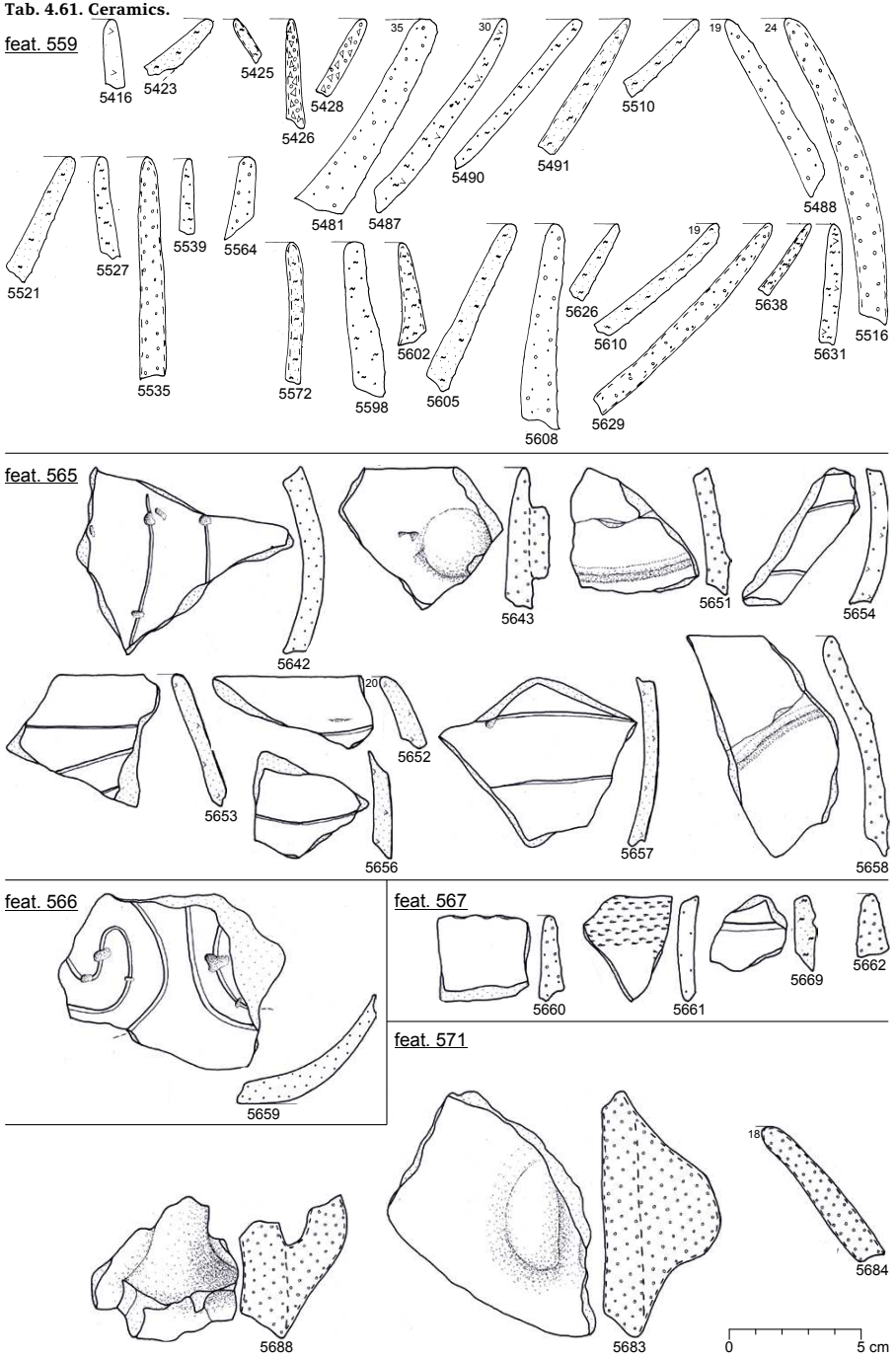

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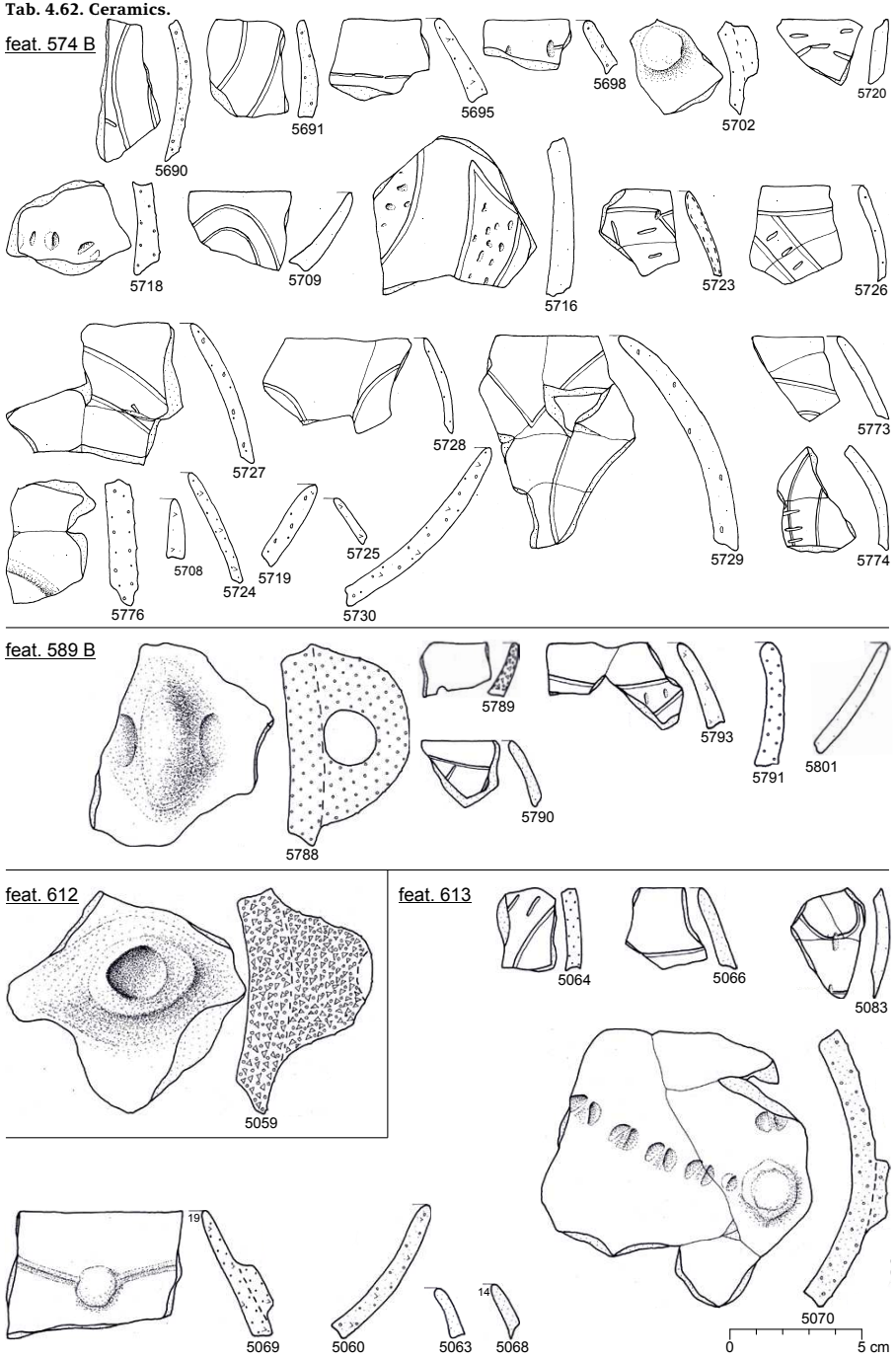

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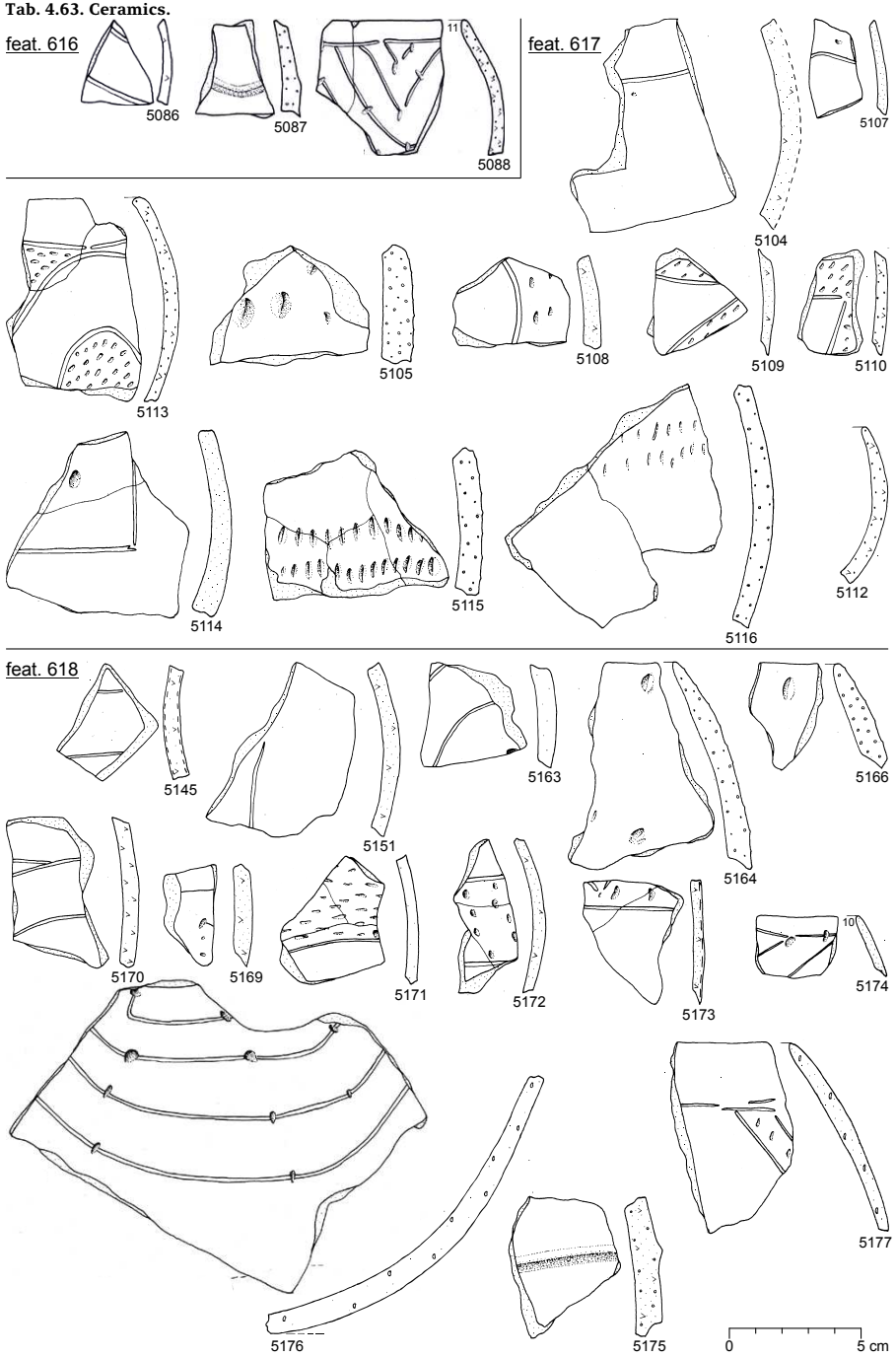
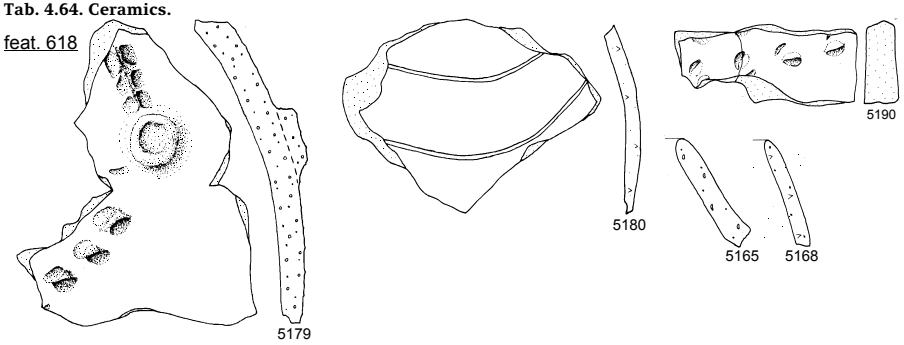
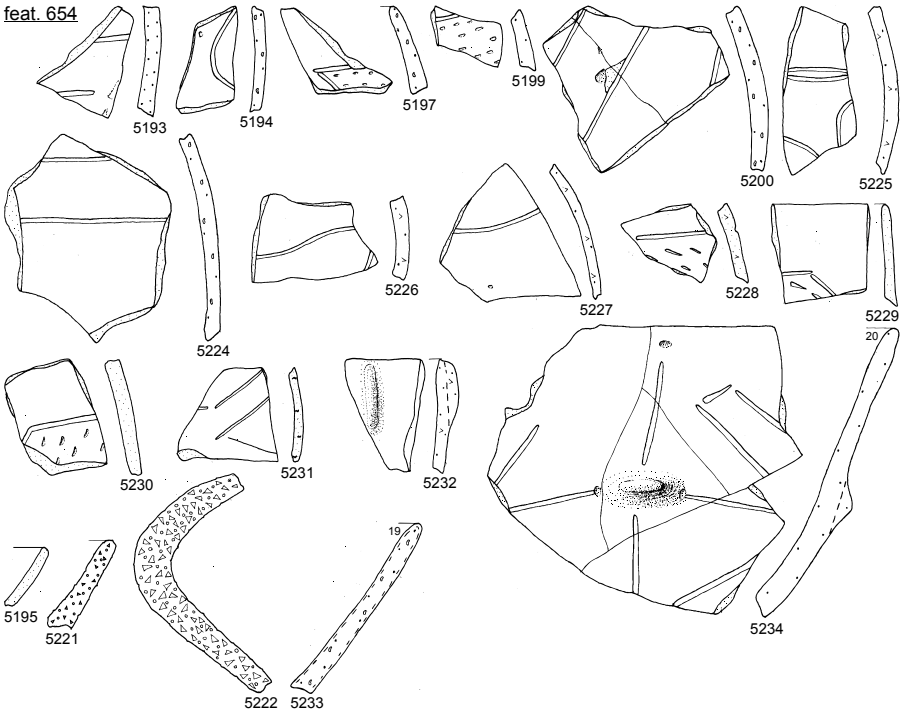


Tab. 4.64. Ceramics.

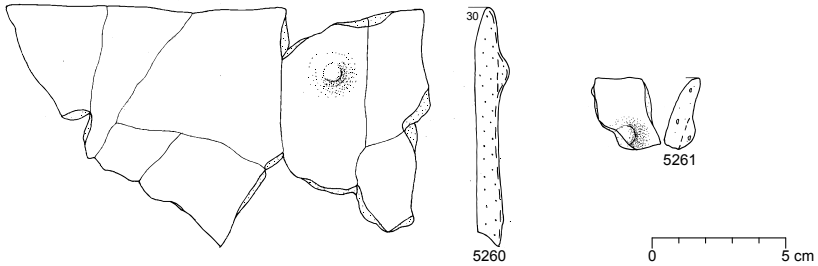
feat. 618



feat. 654



feat. 668



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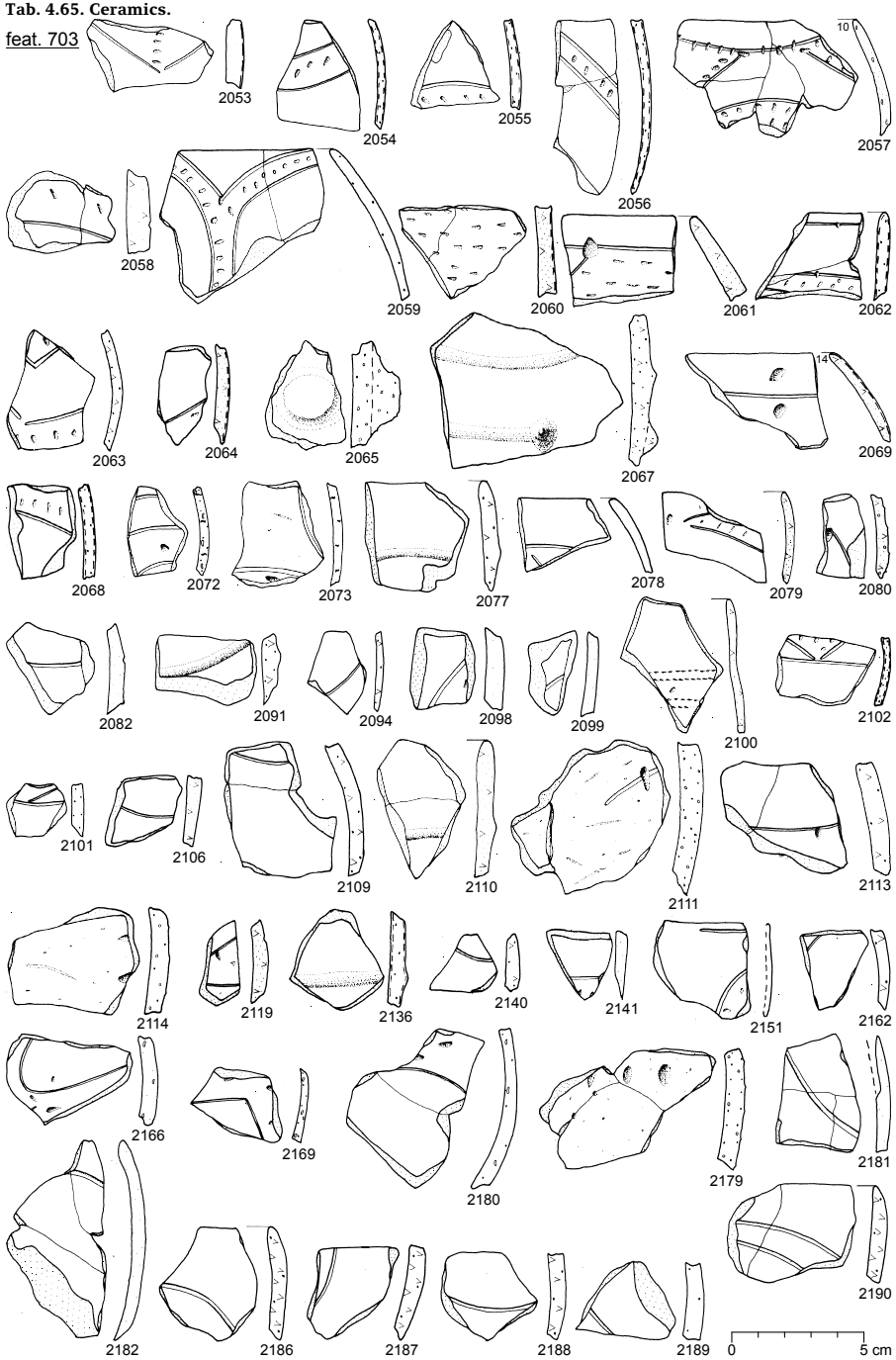
feat. 703



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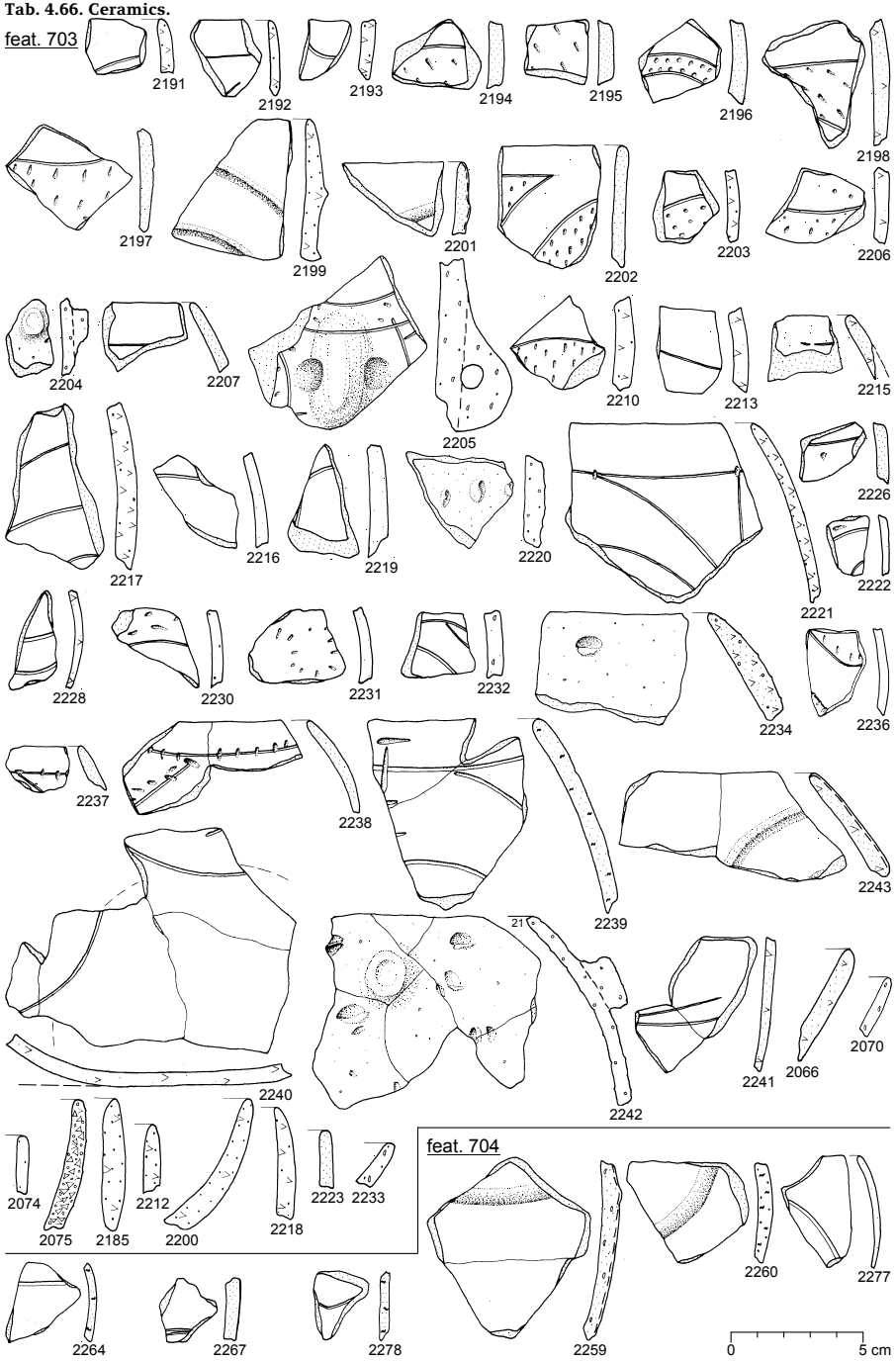

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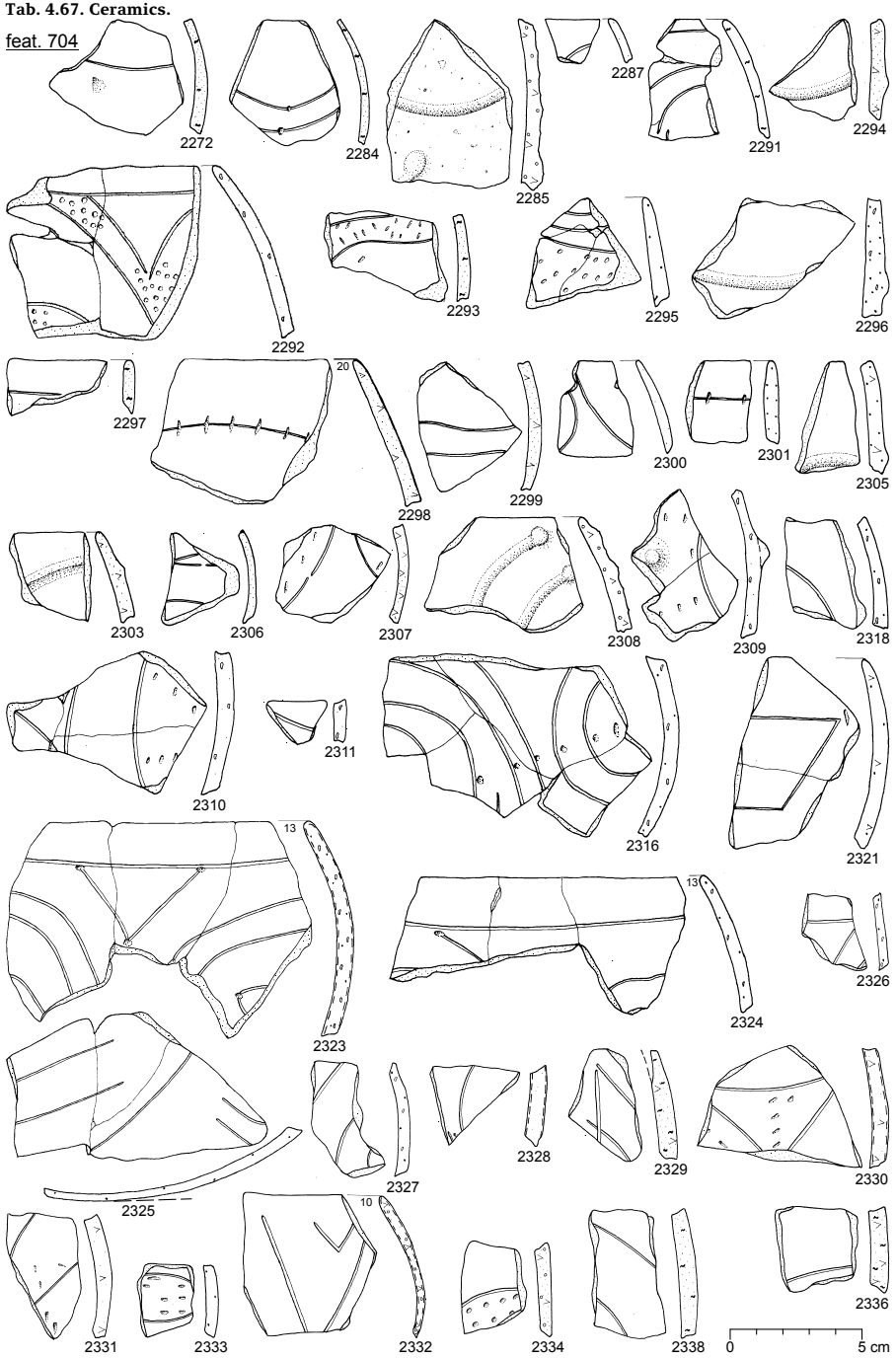

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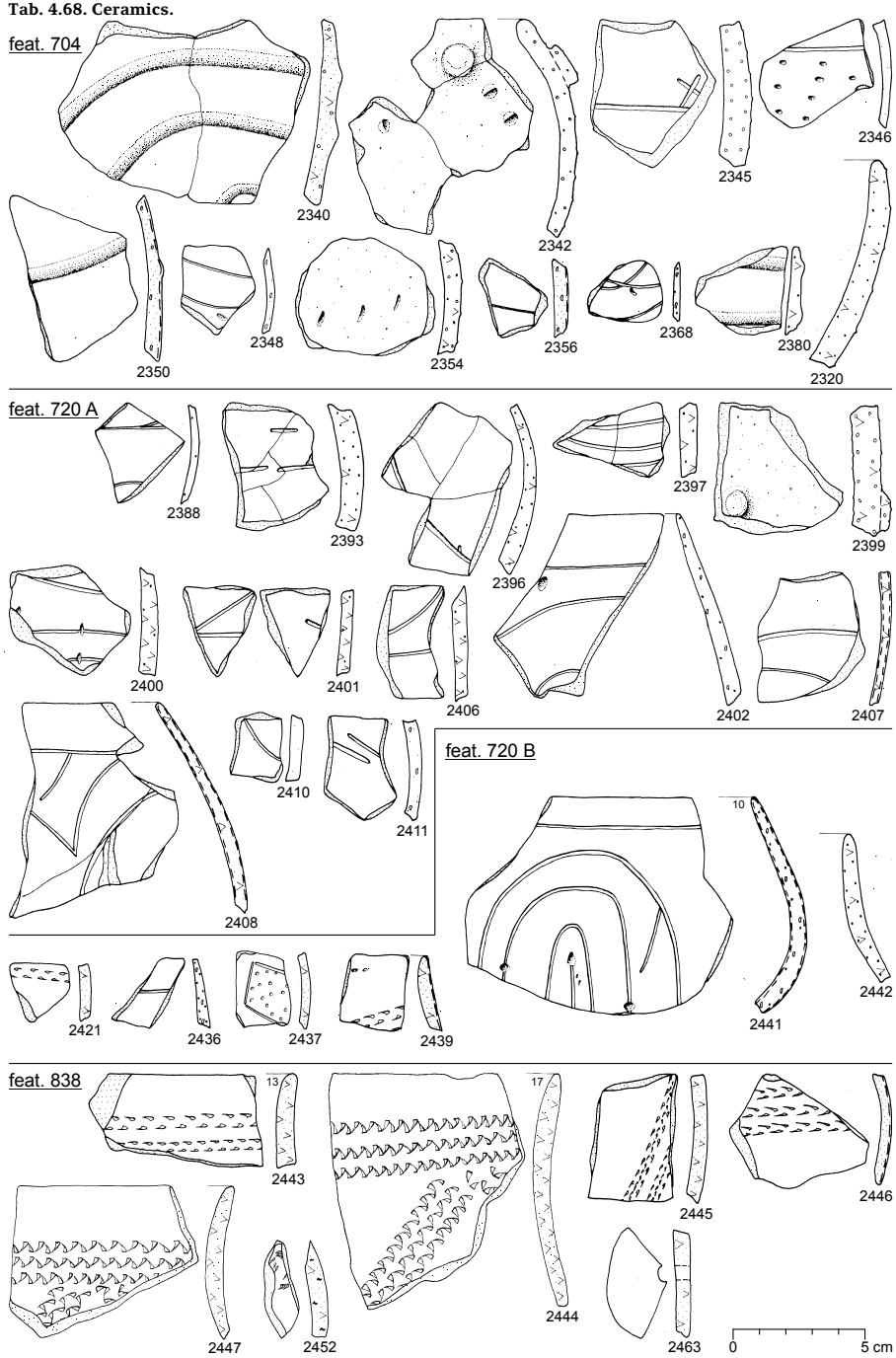

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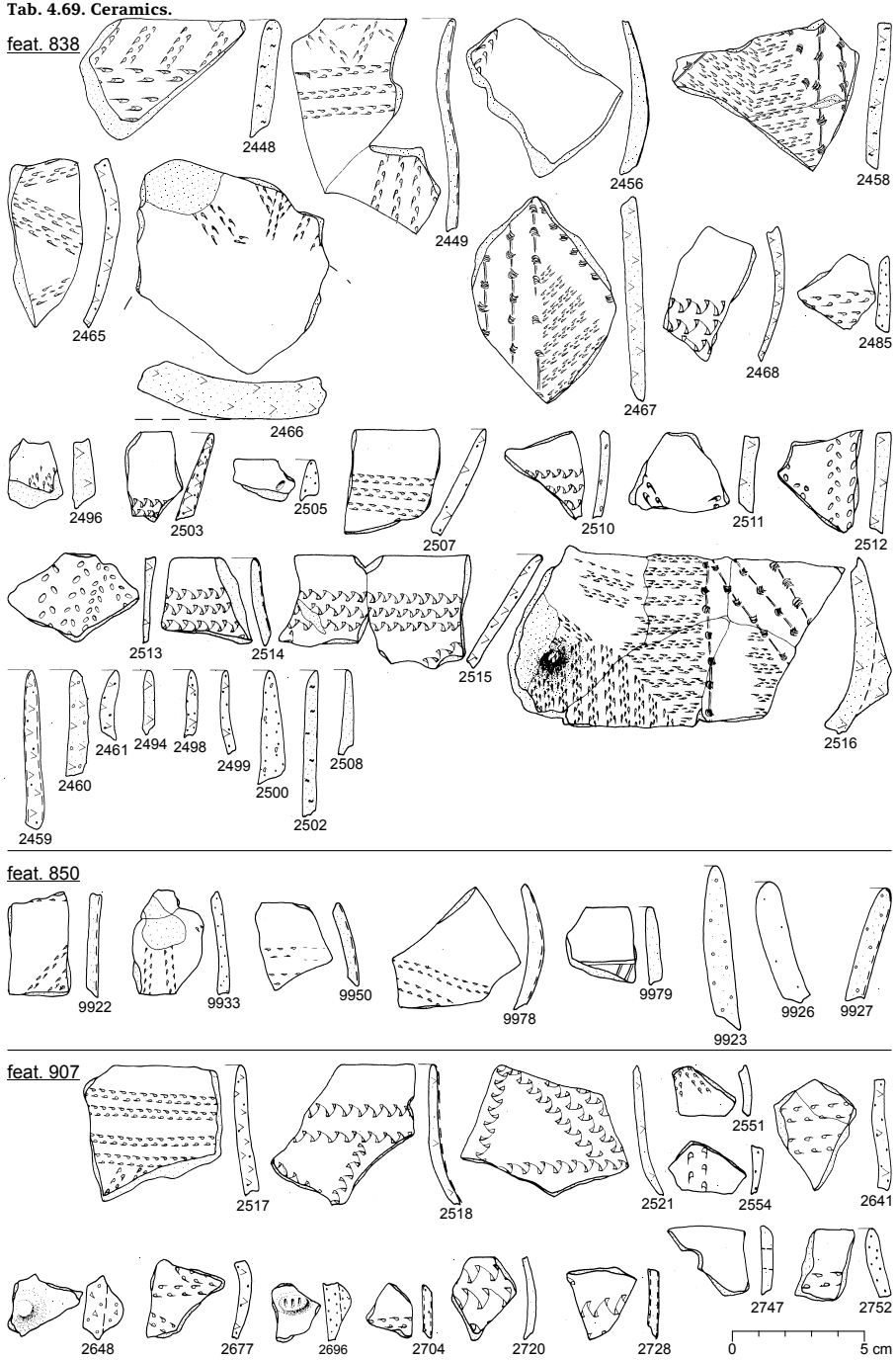

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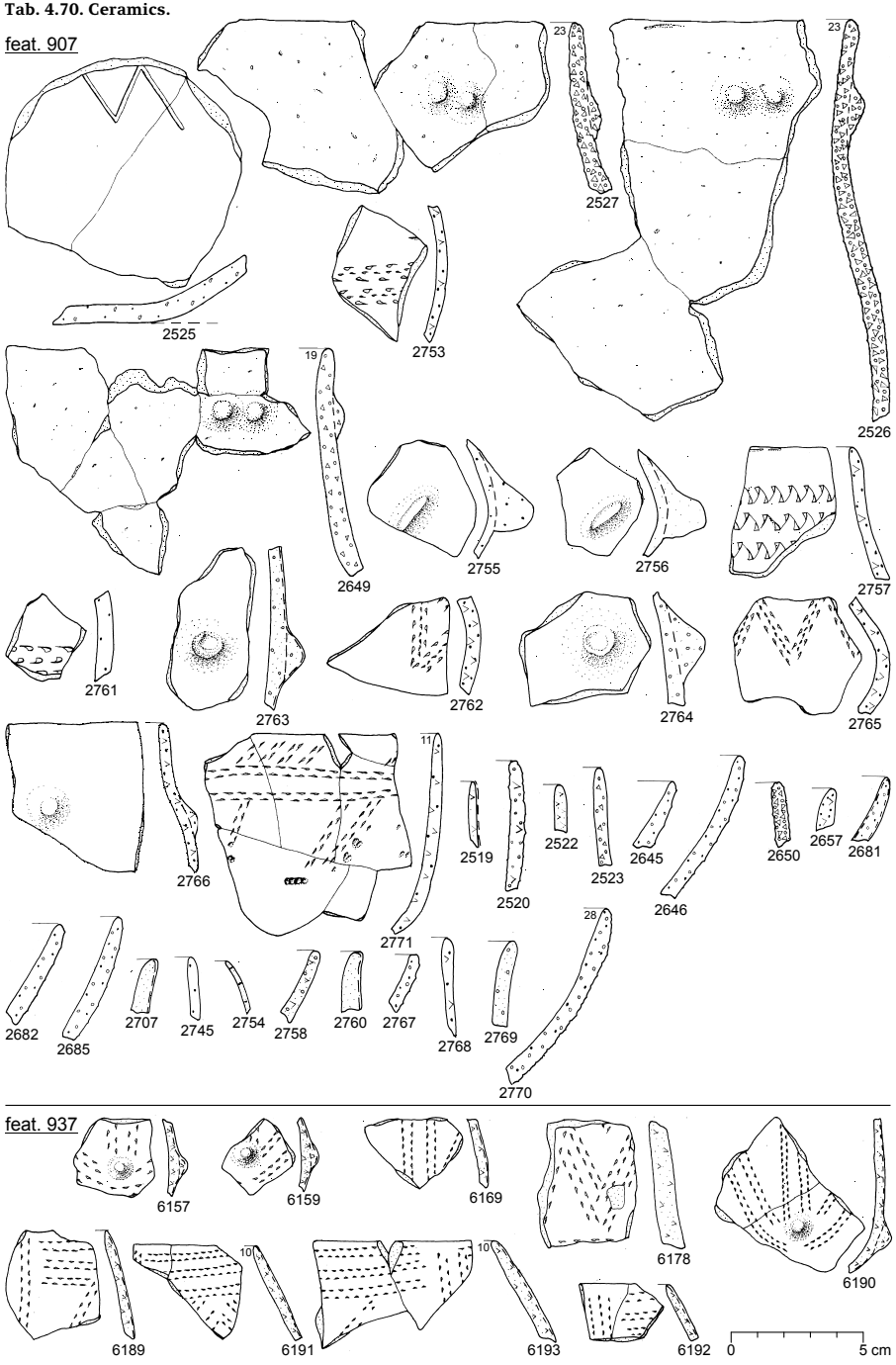

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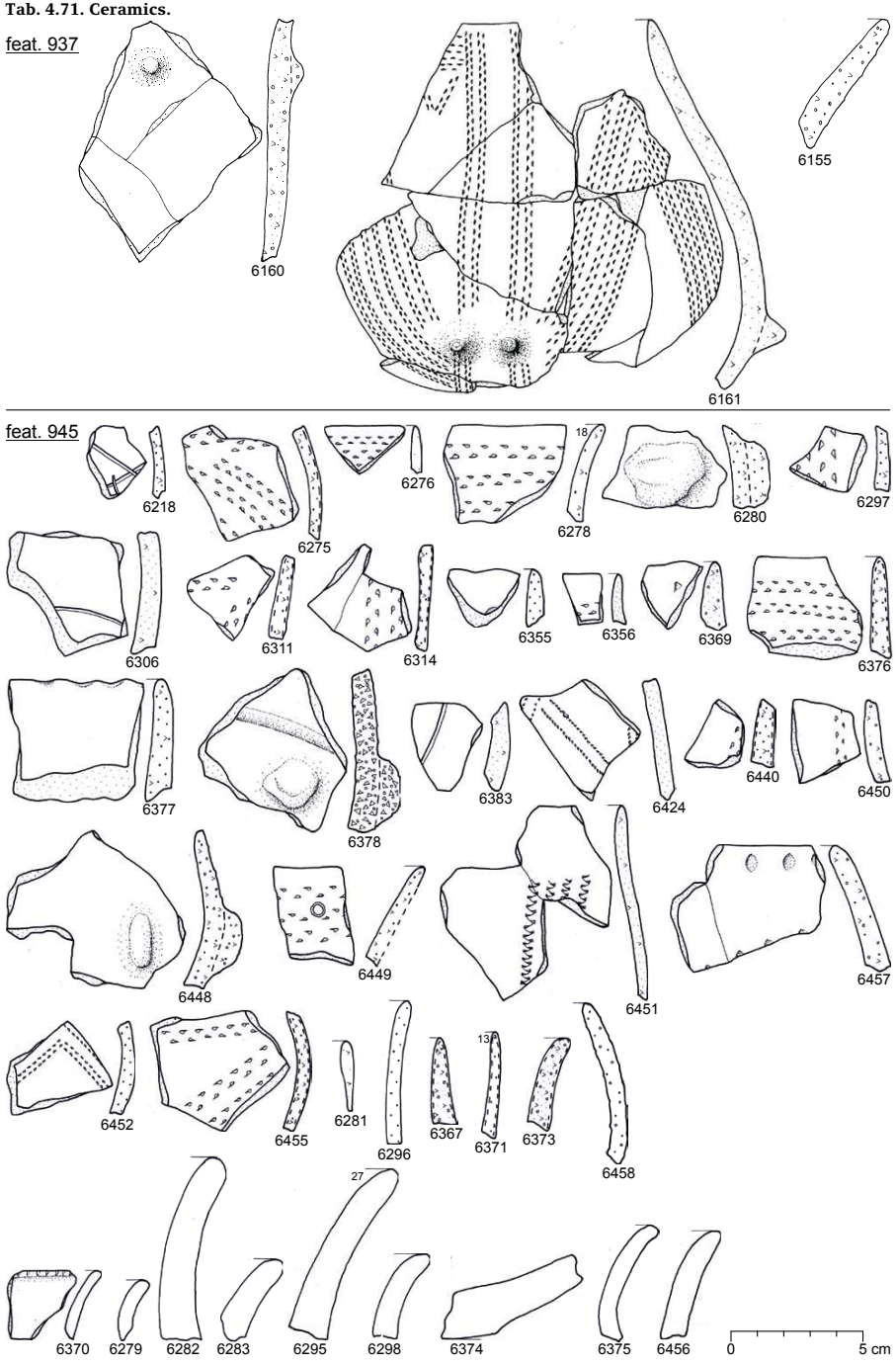

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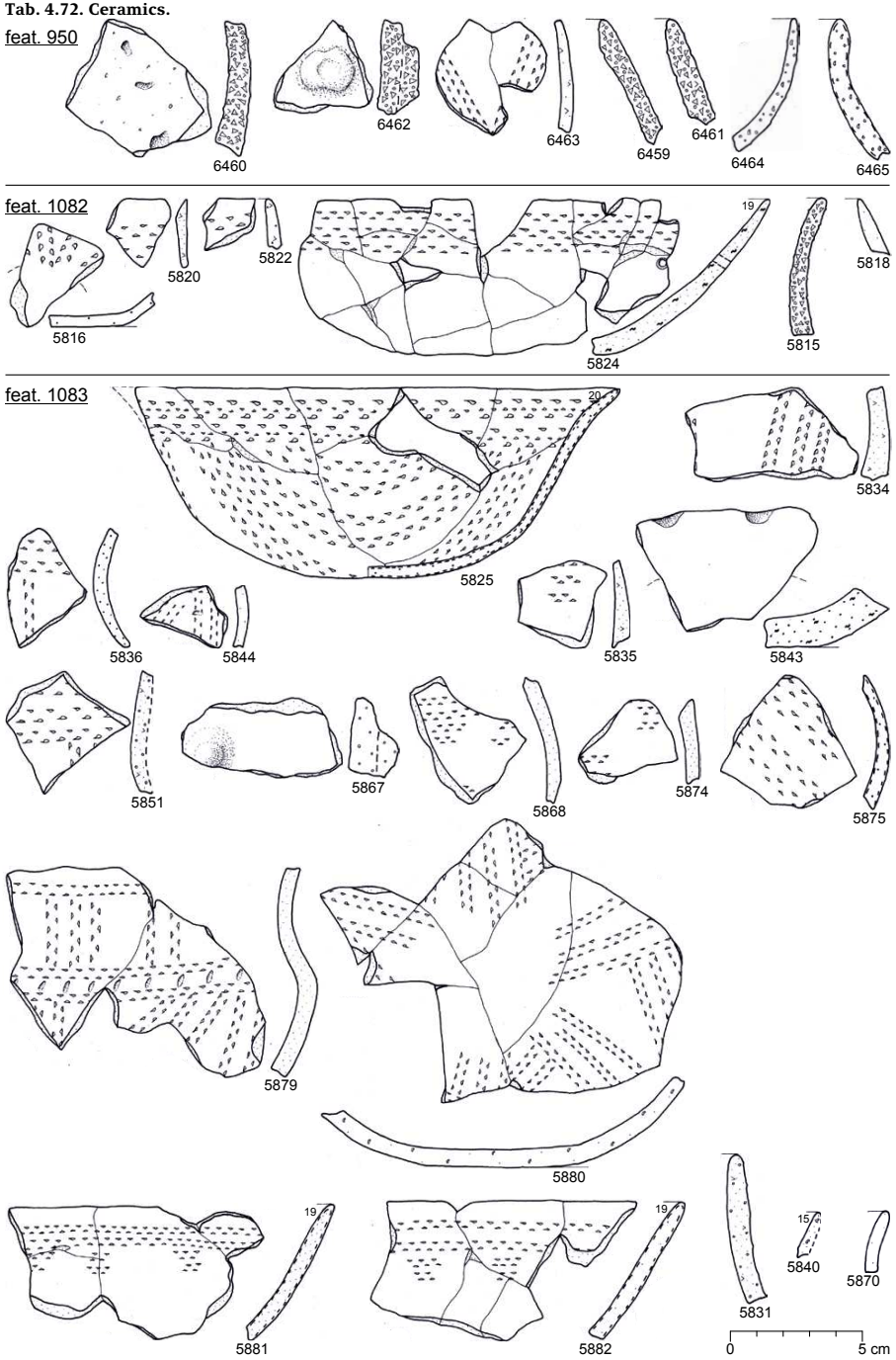

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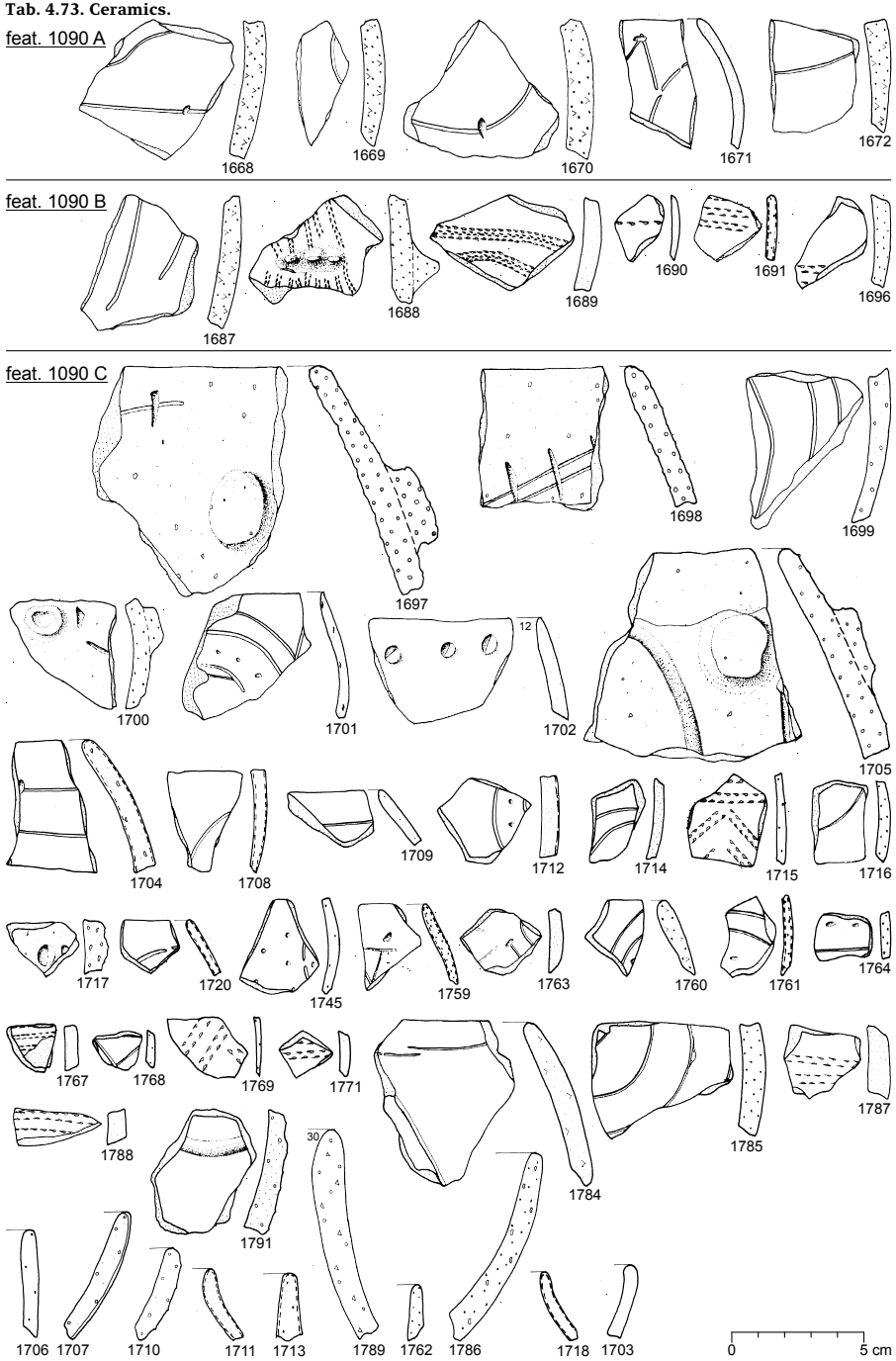

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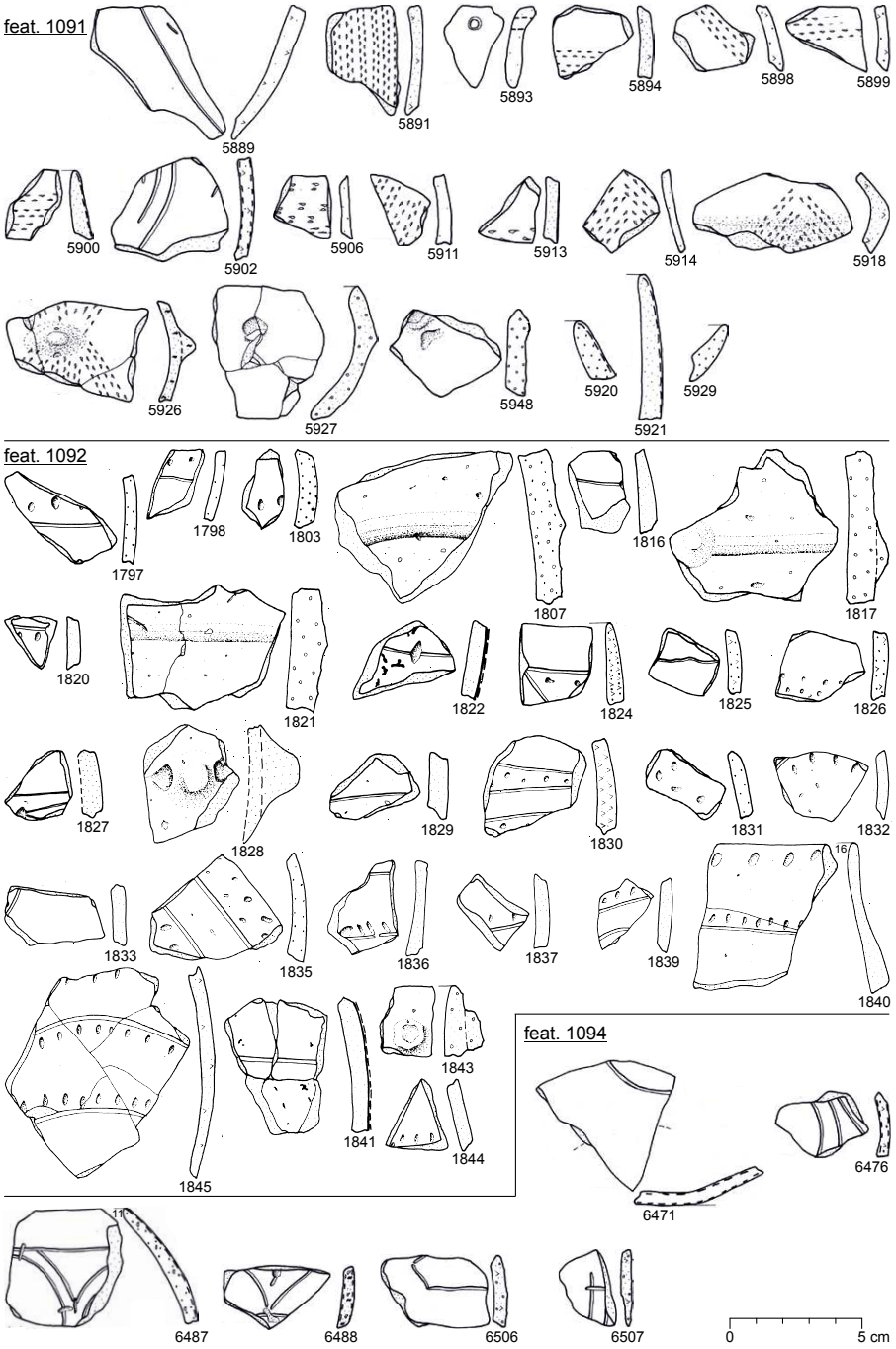

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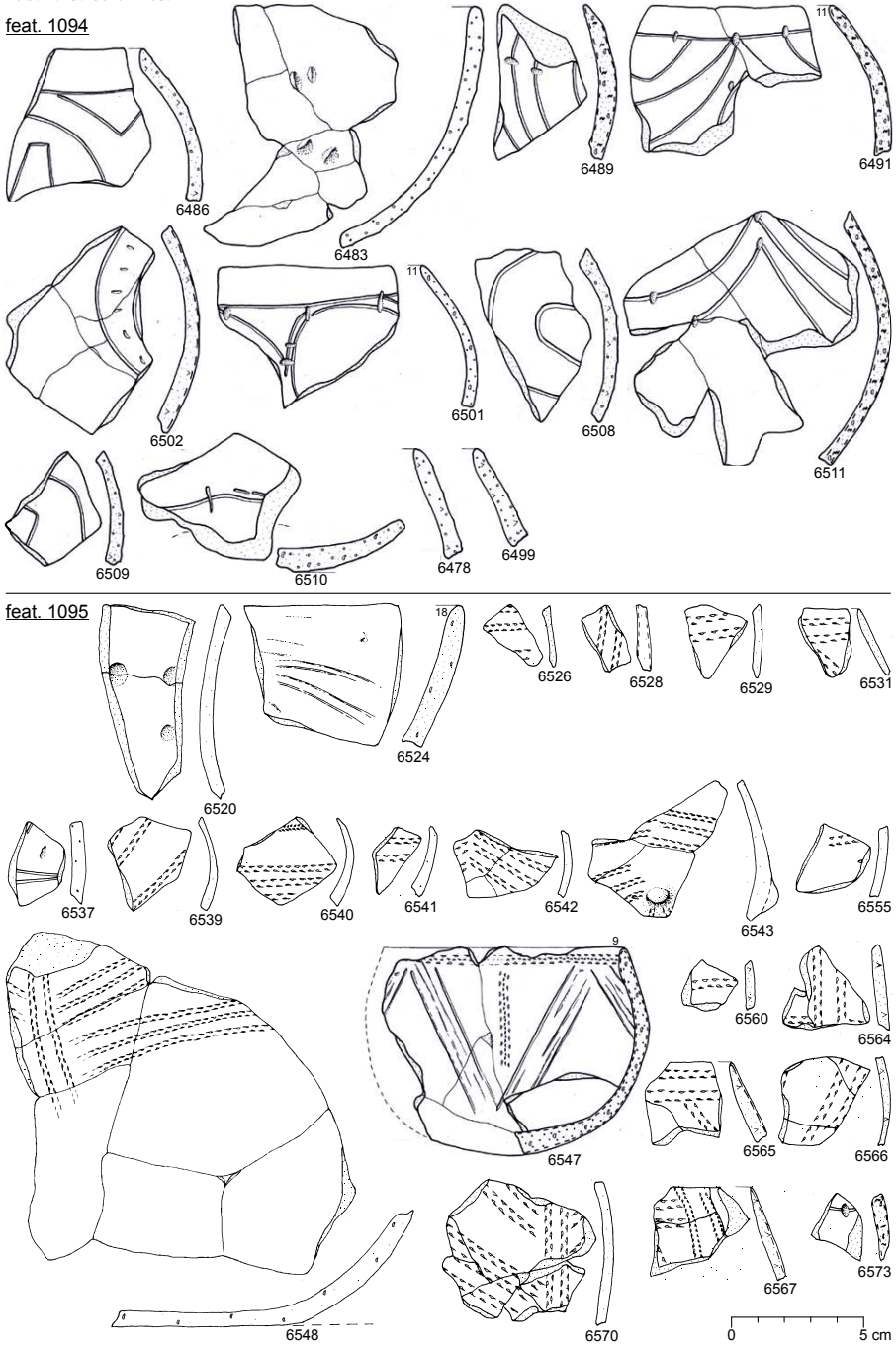

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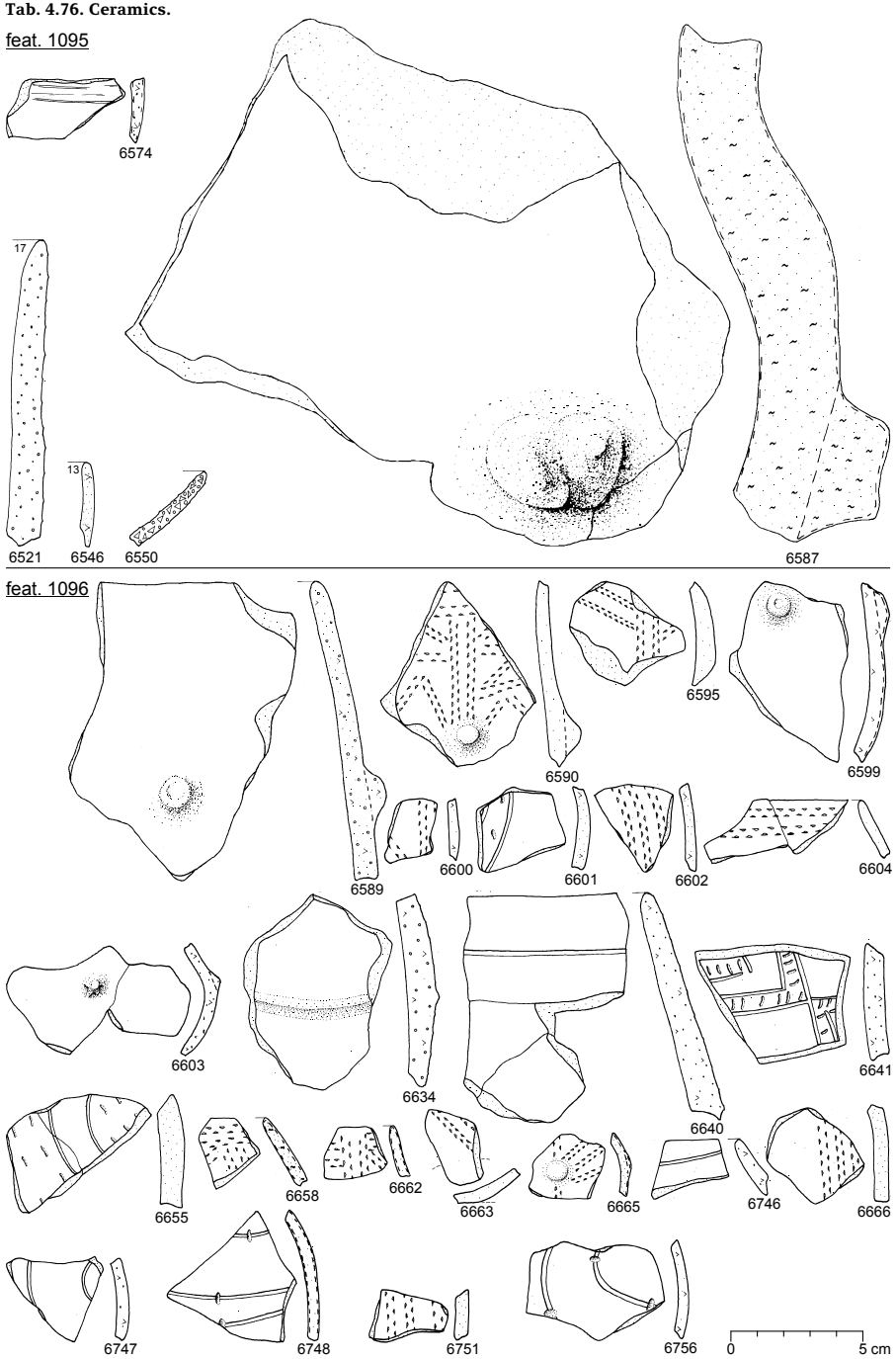

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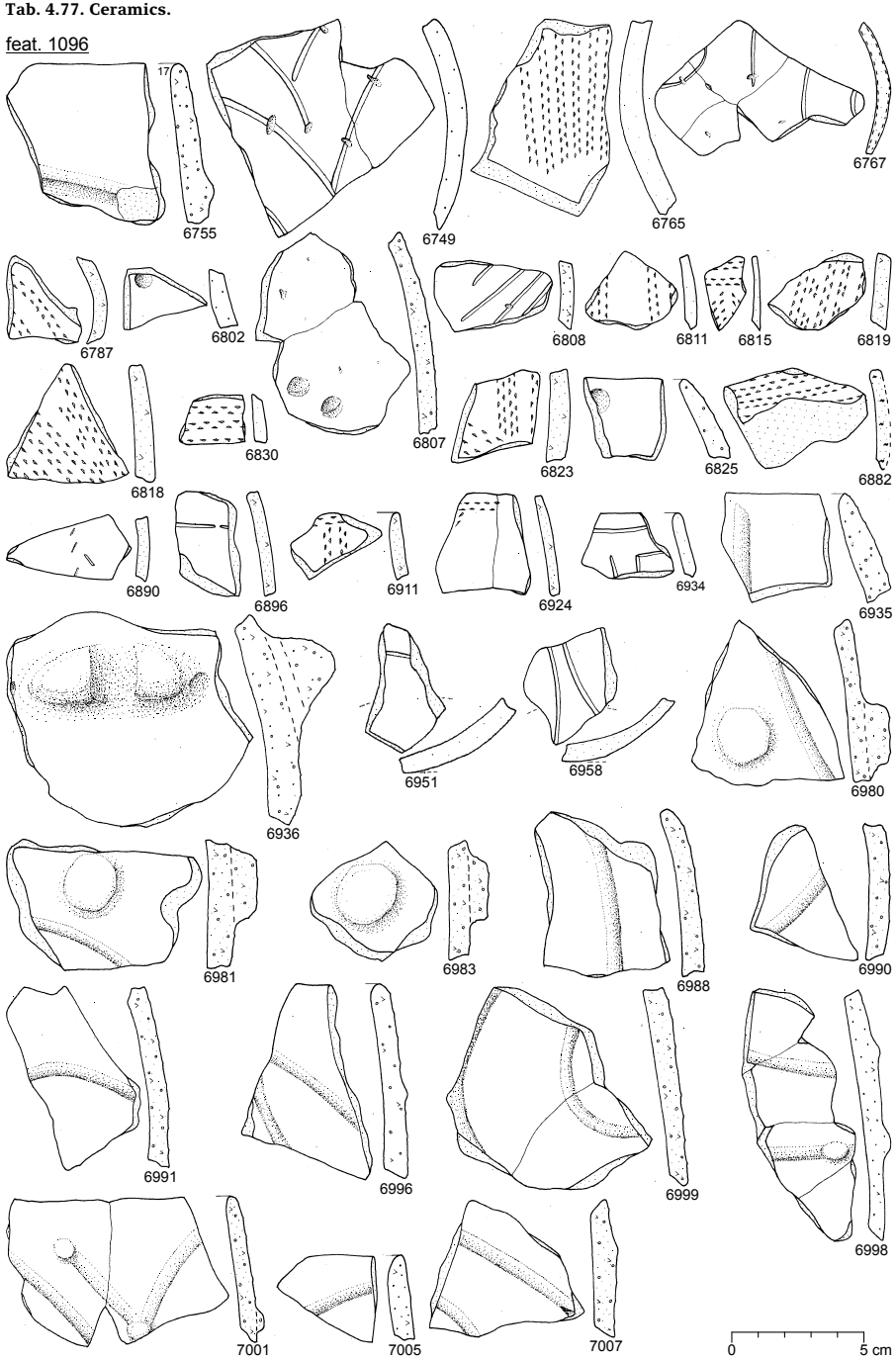

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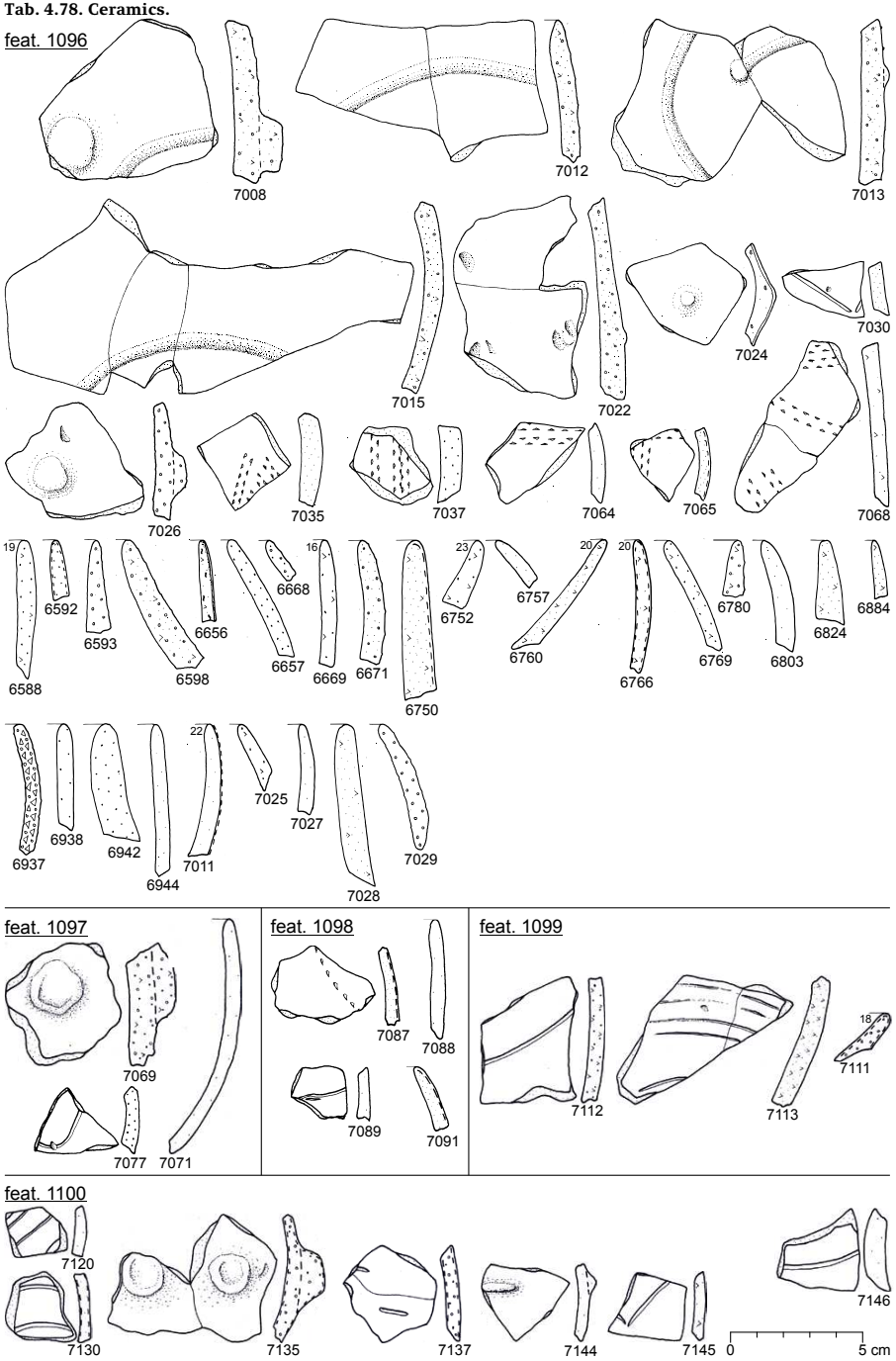

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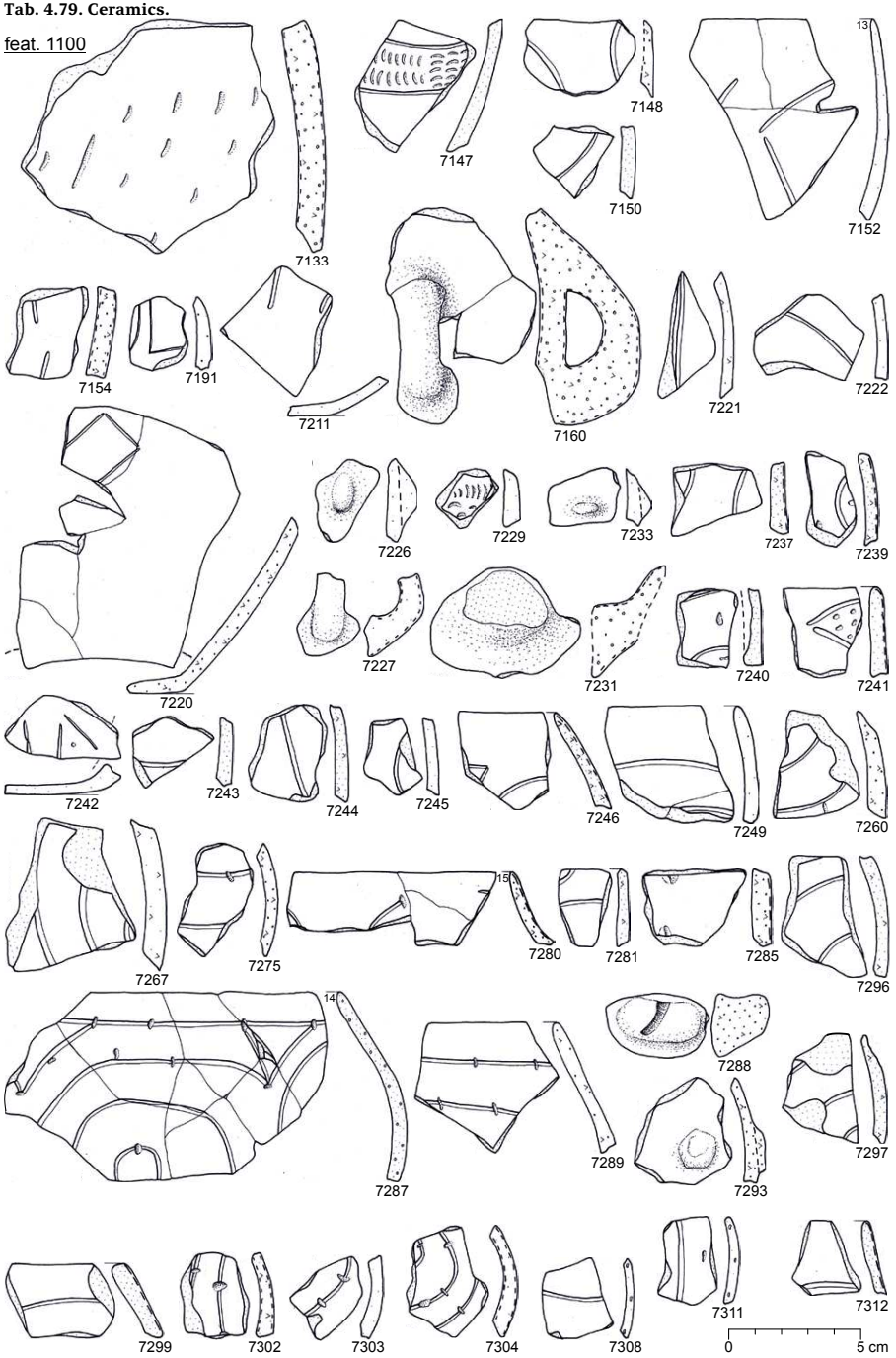
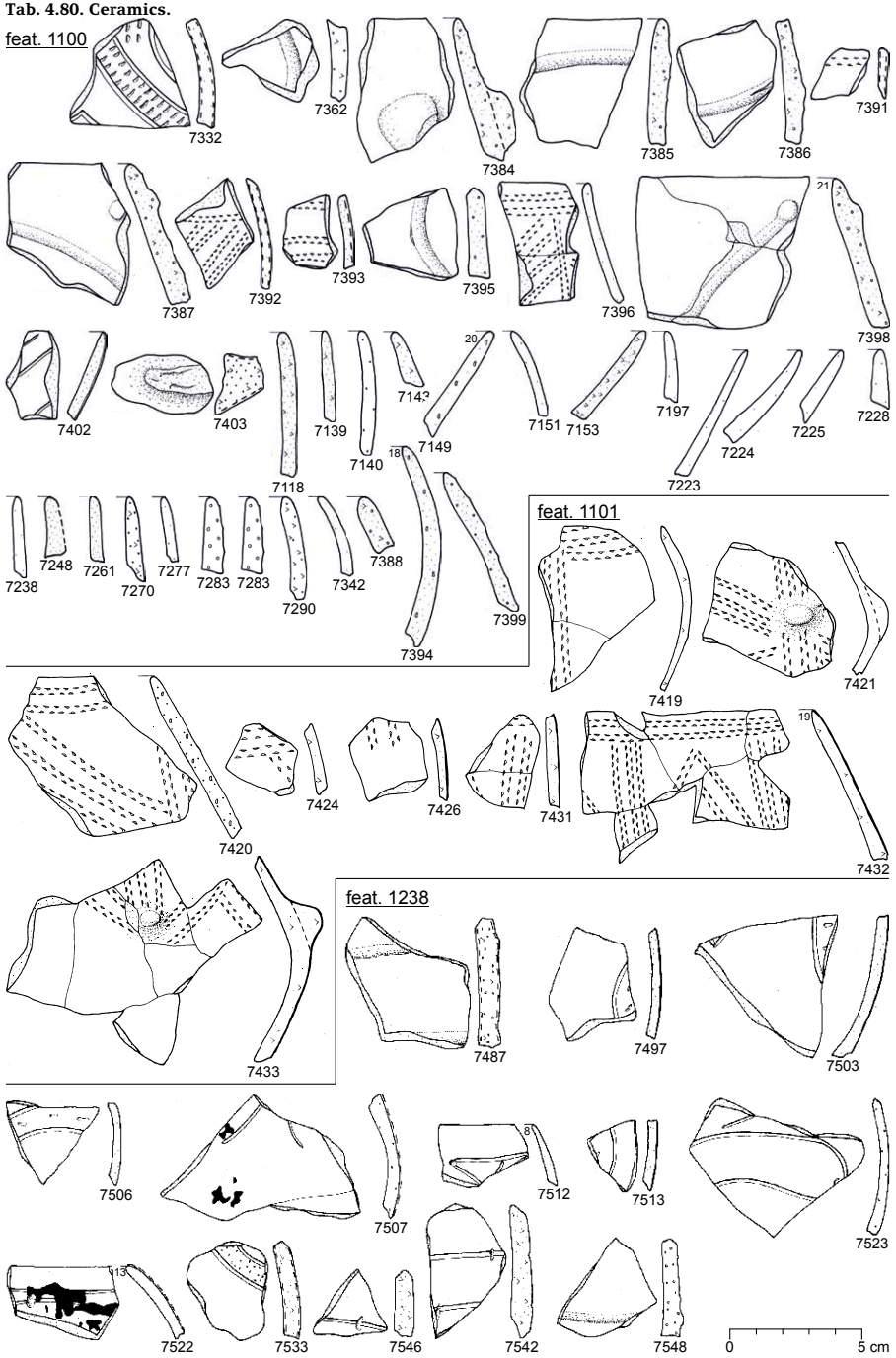


Tab. 4.80. Ceramics.



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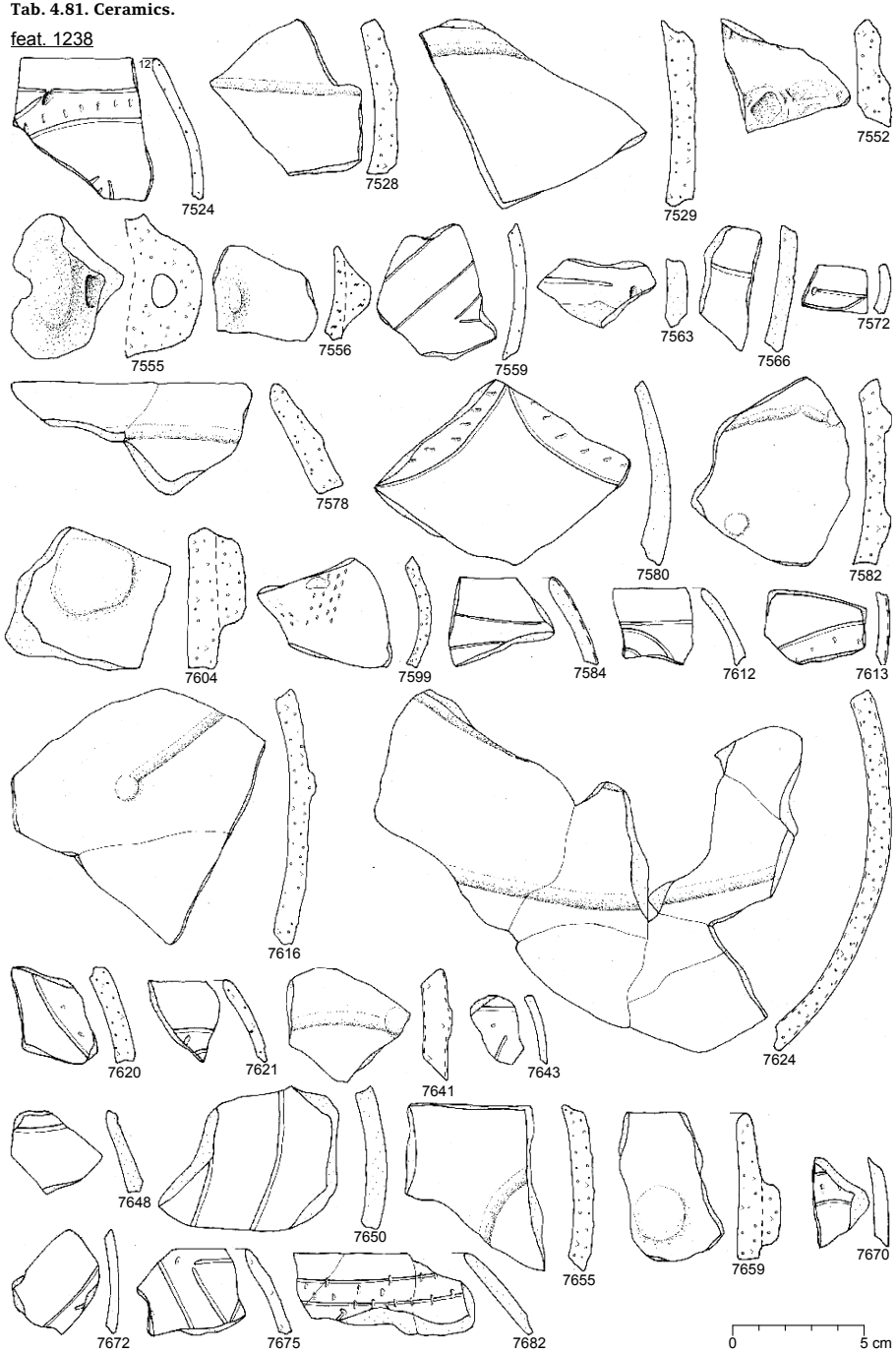
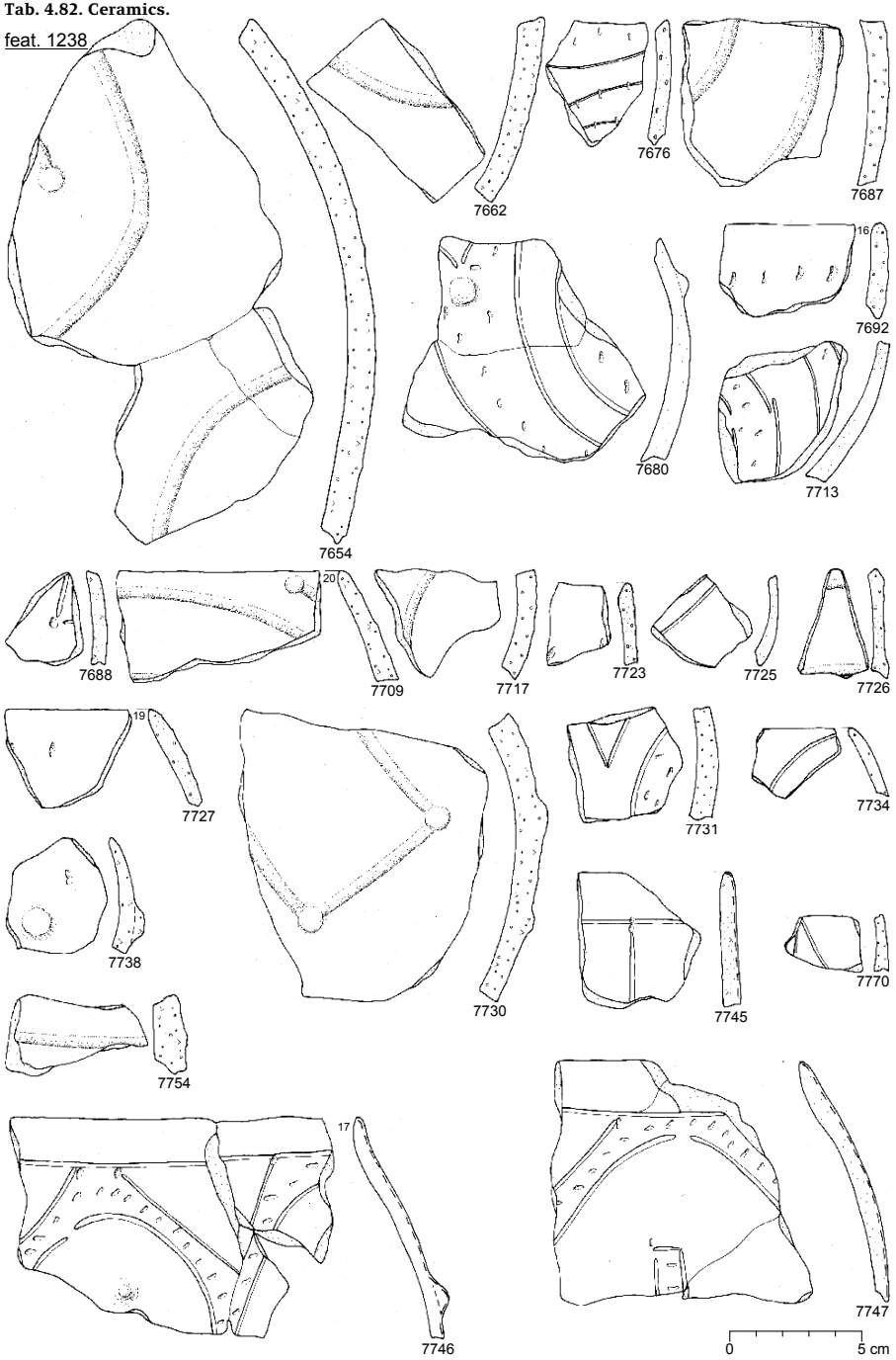


Tab. 4.82. Ceramics.

feat. 1238



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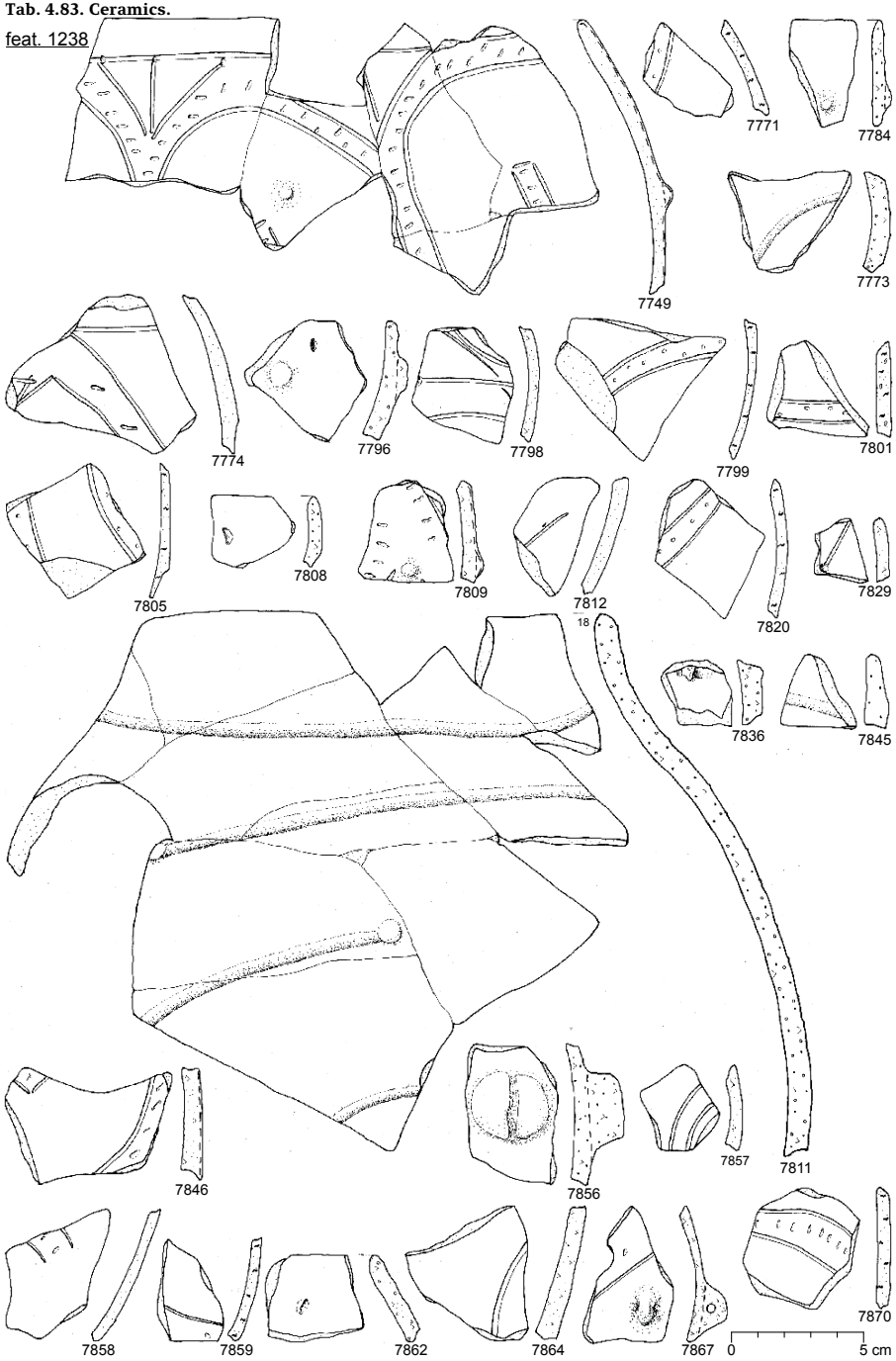
feat. 1238



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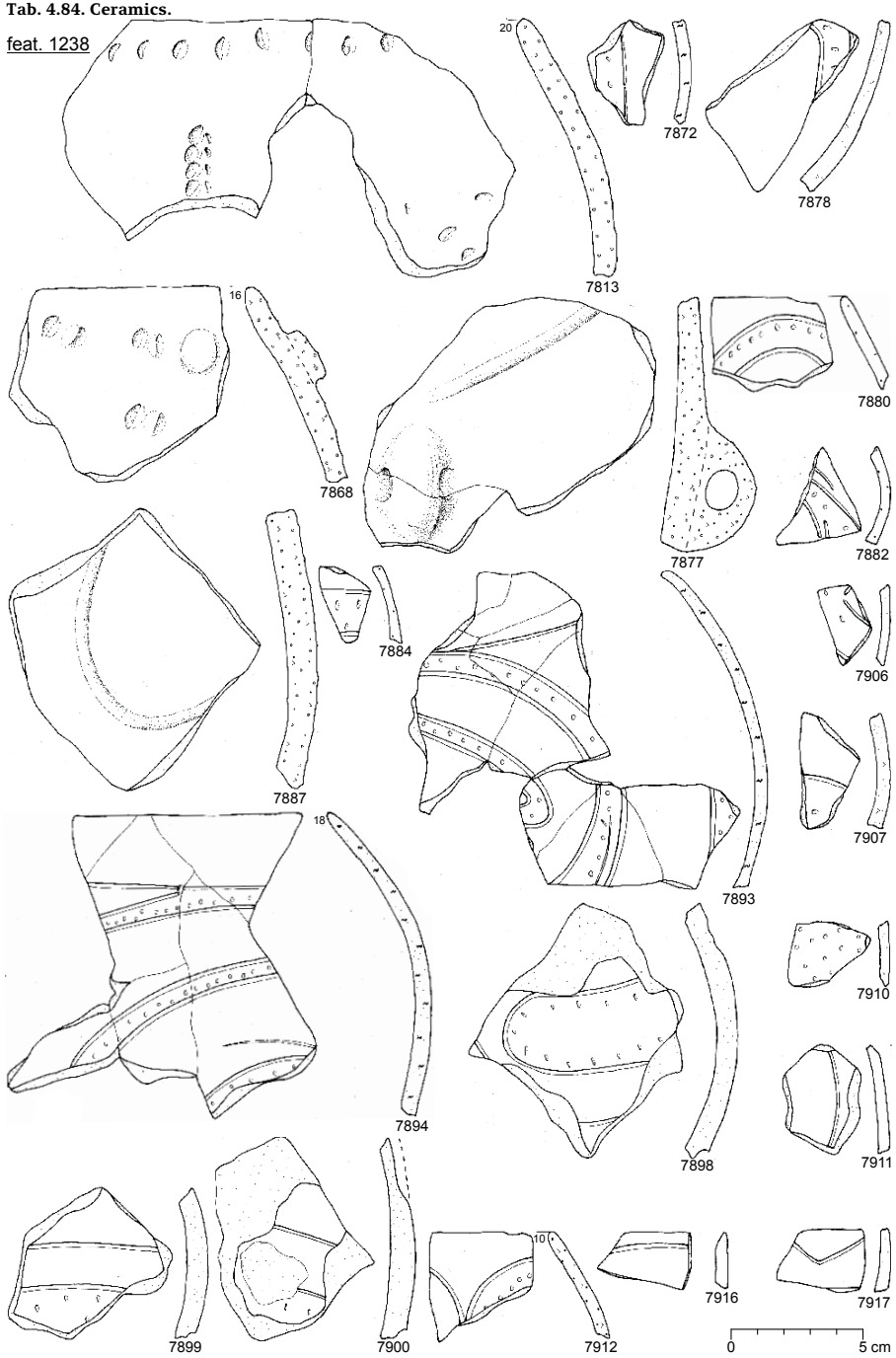
feat. 1238



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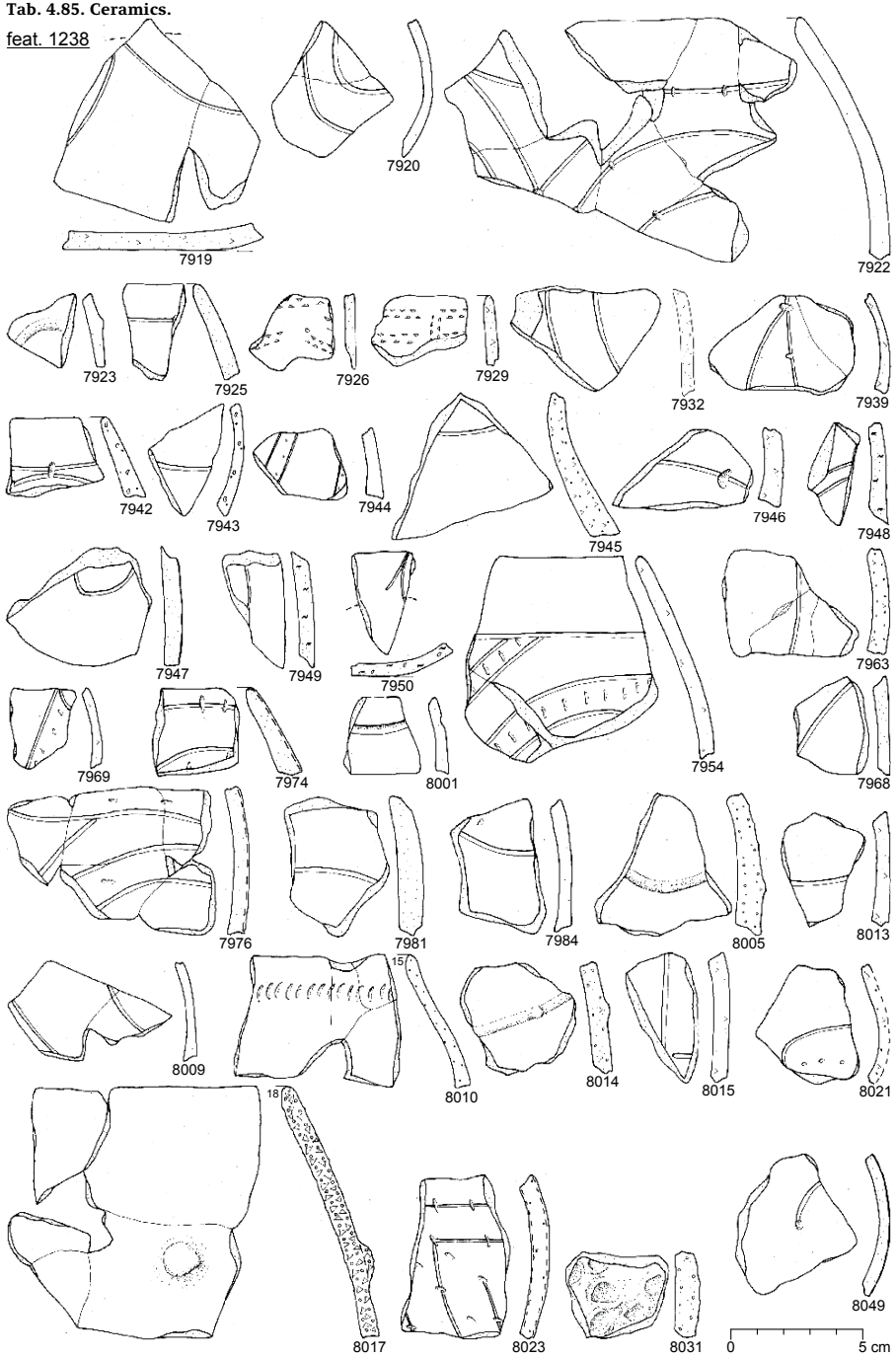

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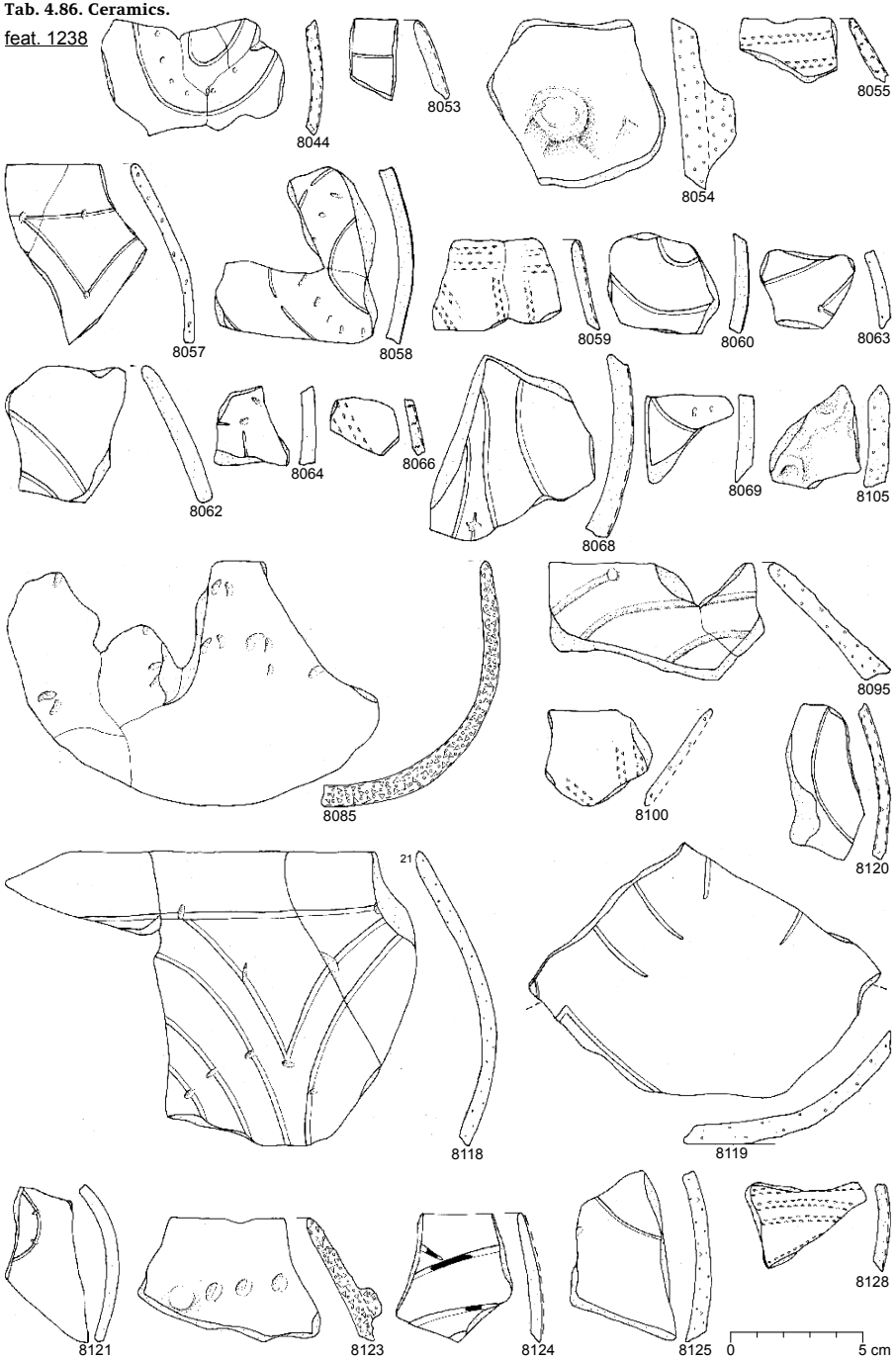
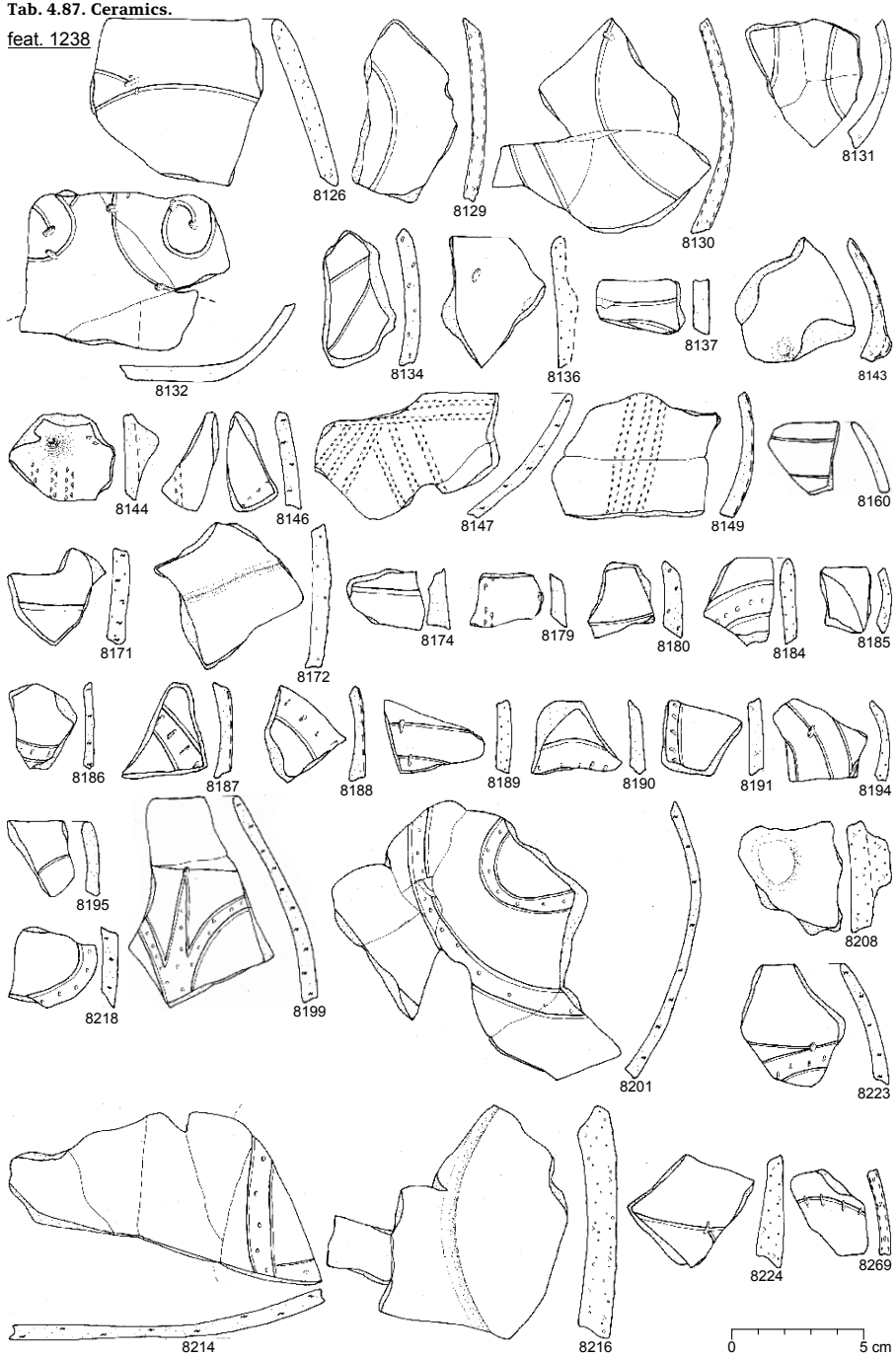


Tab. 4.87. Ceramics.

feat. 1238



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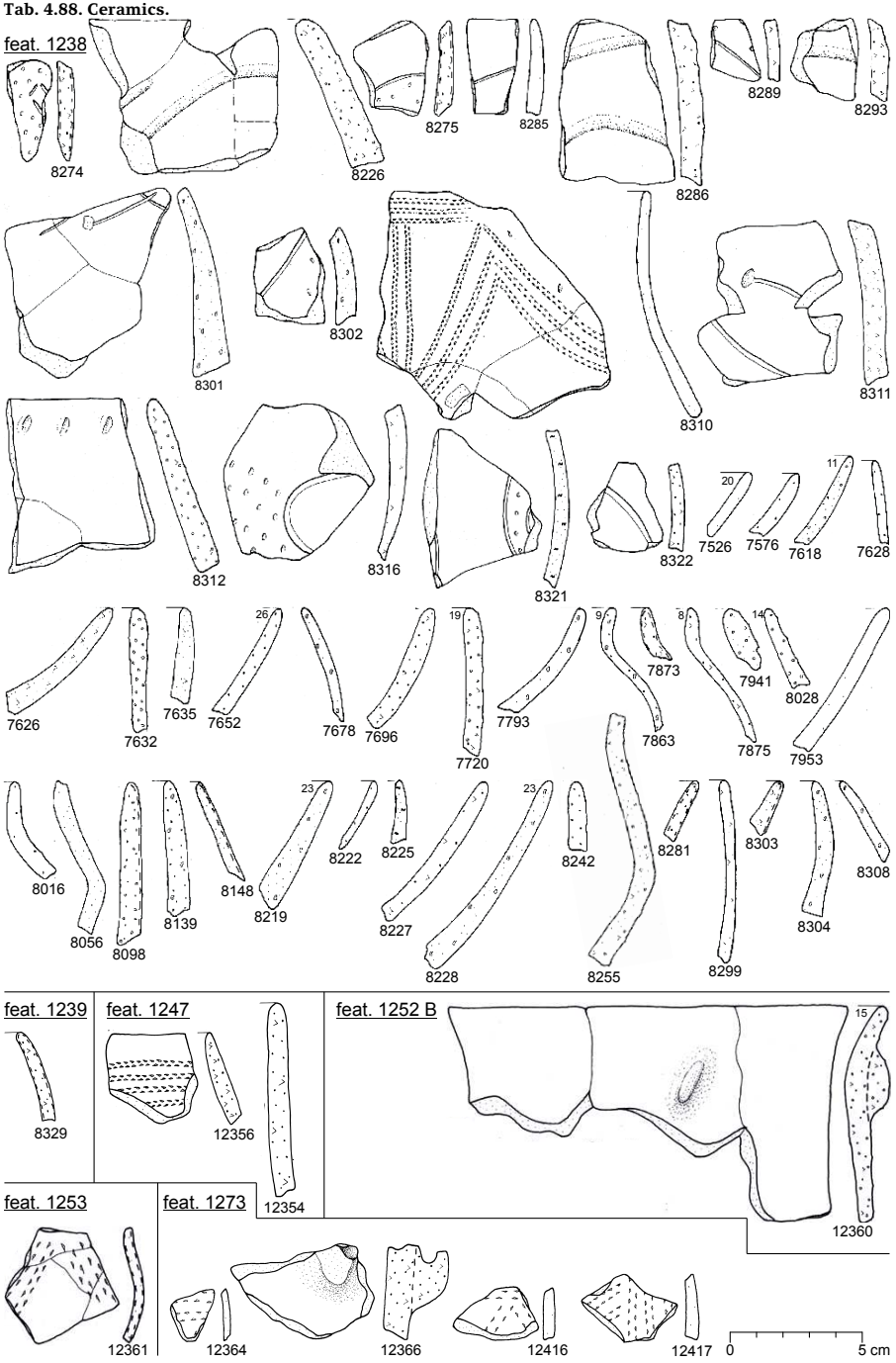

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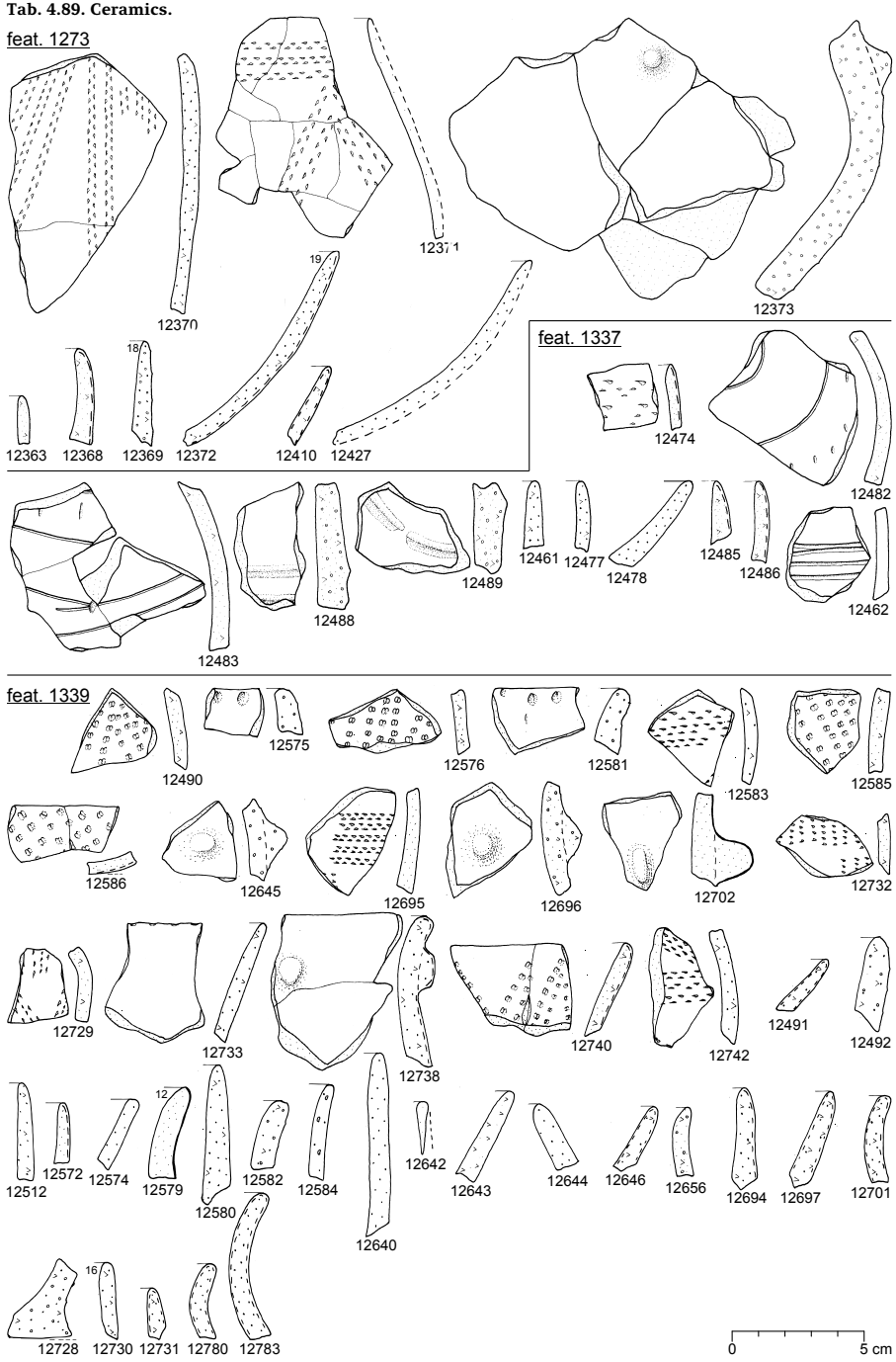

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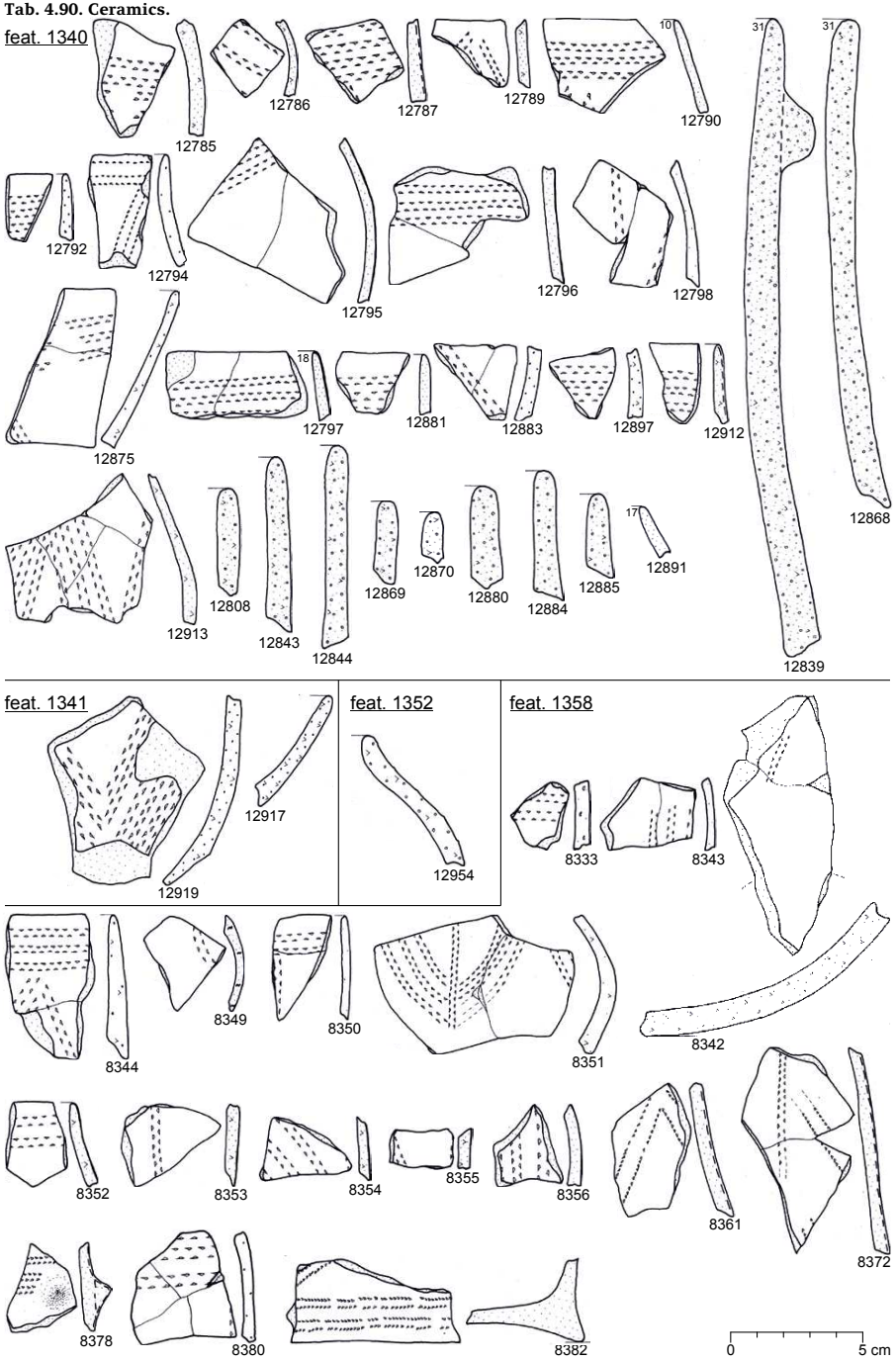

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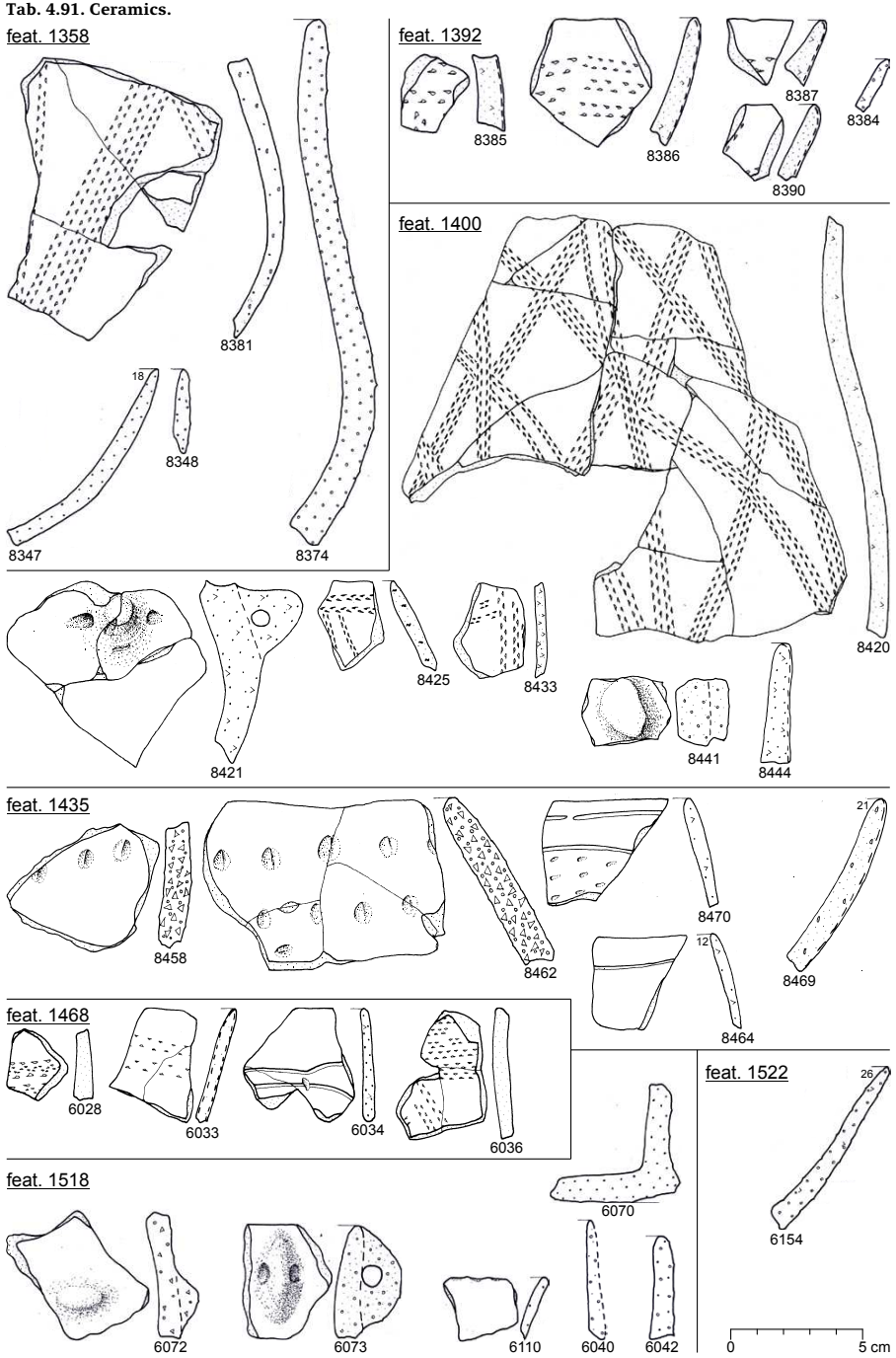
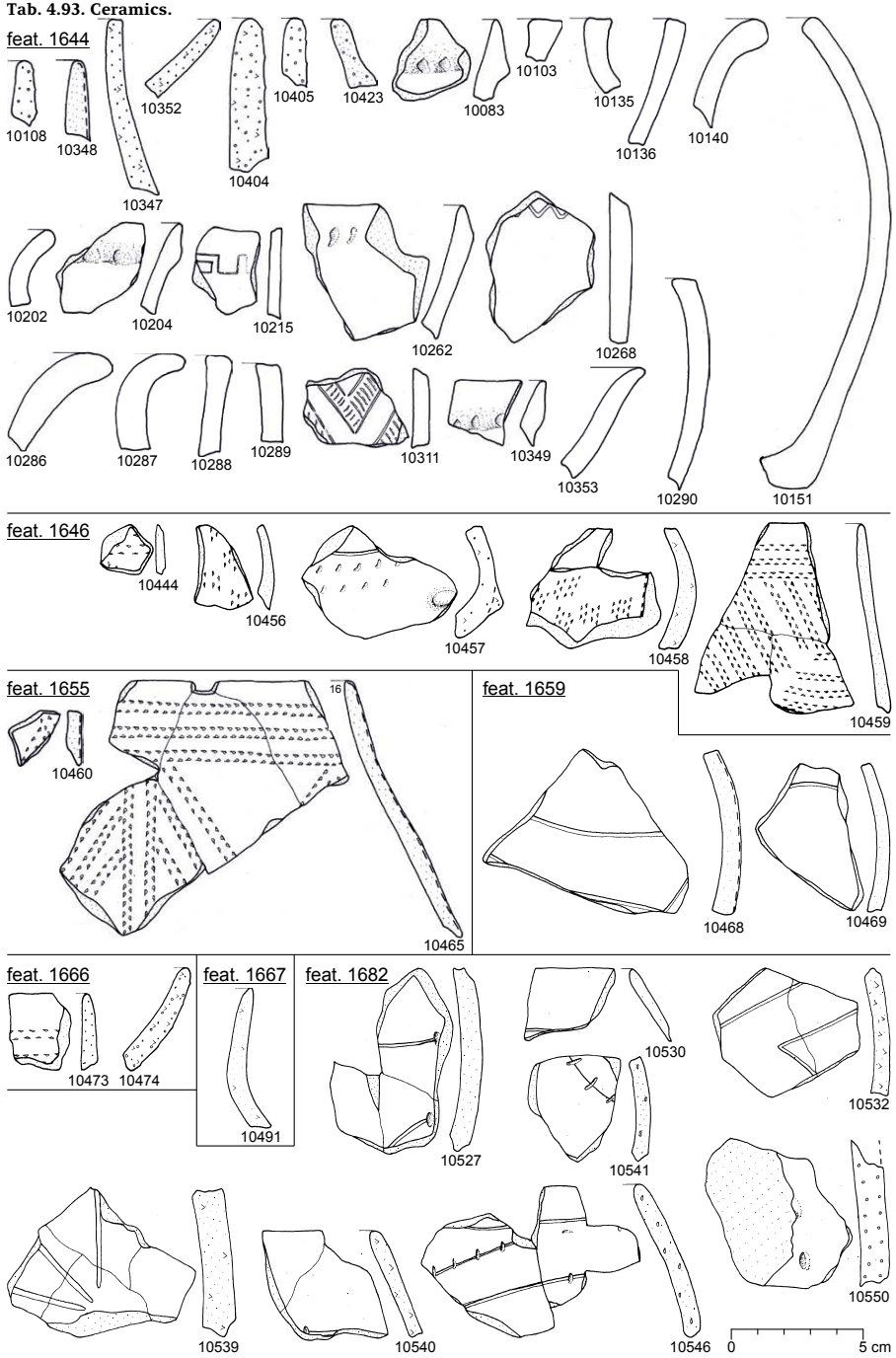


Tab. 4.92. Ceramics.

Tab. 4.93. Ceramics.



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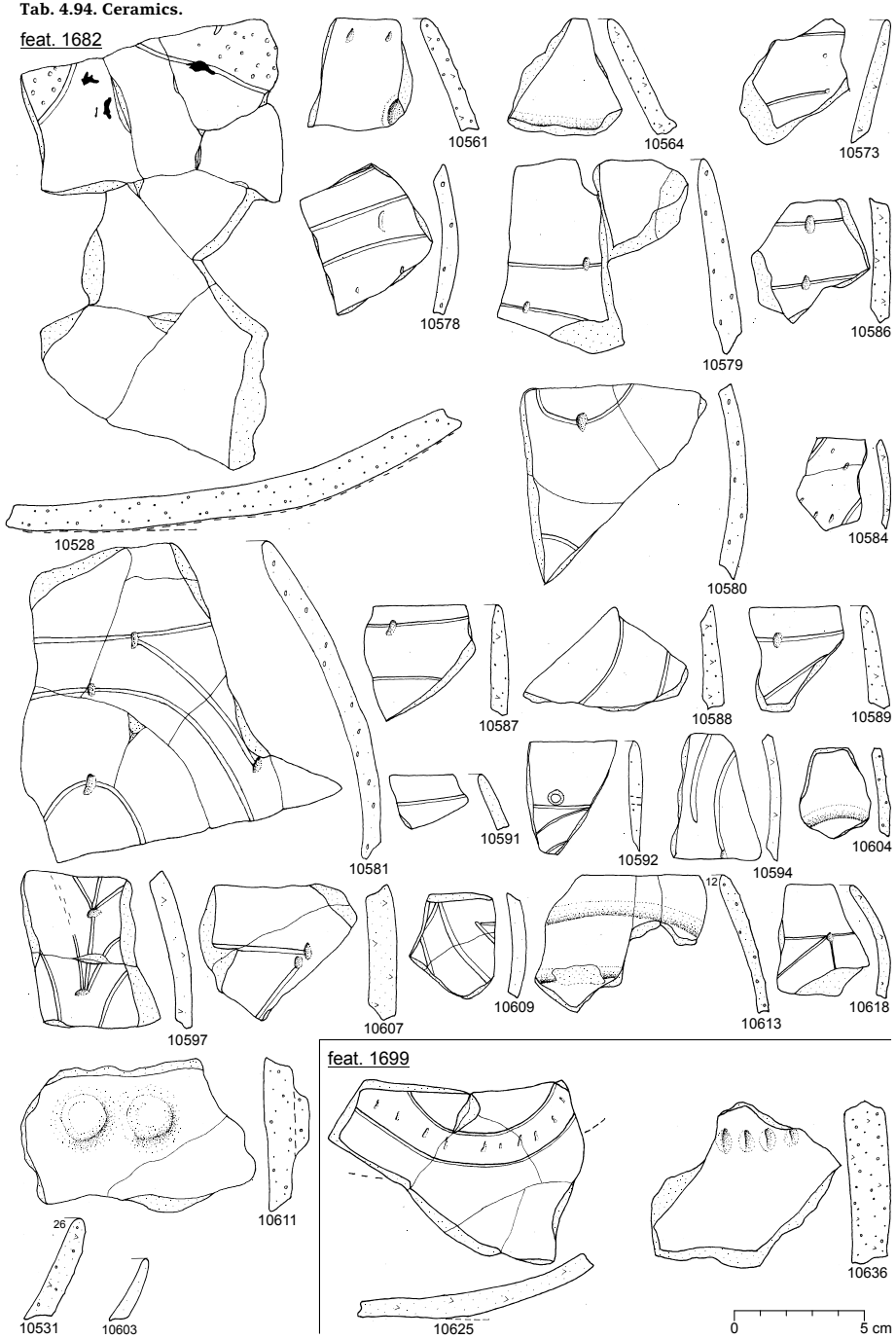

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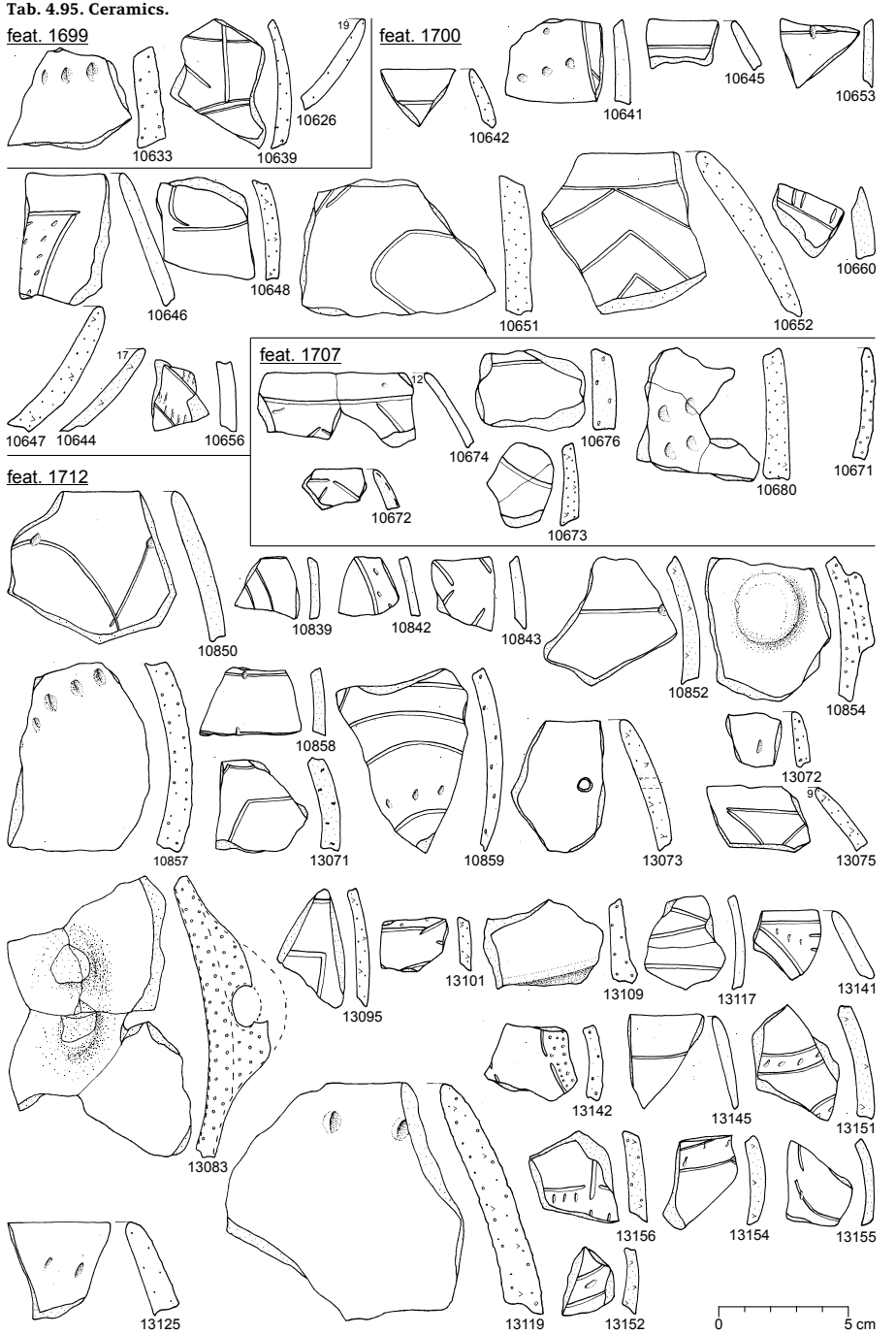


Tab. 4.96. Ceramics.

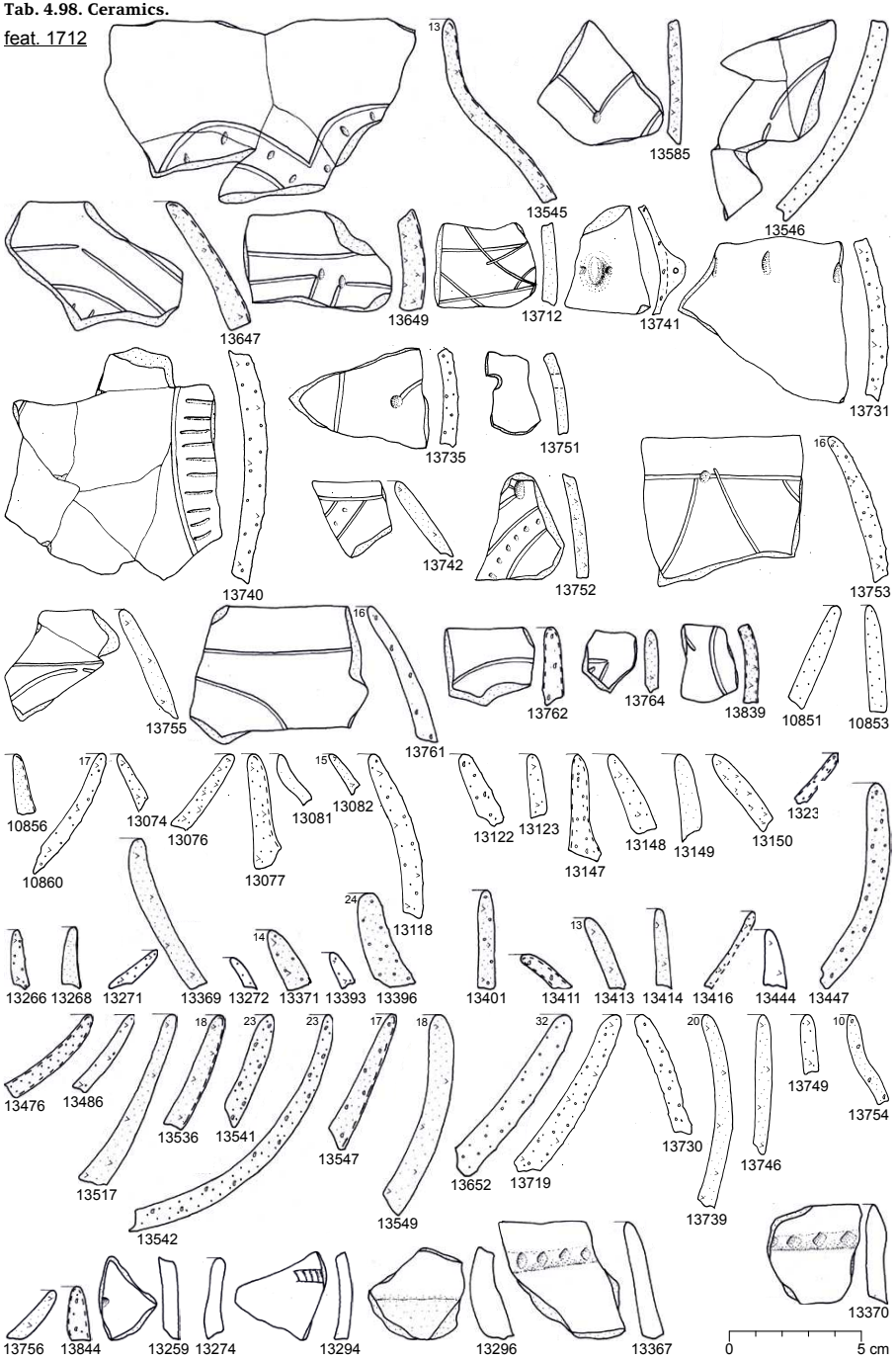
feat. 1712

Tab. 4.97. Ceramics.

feat. 1712

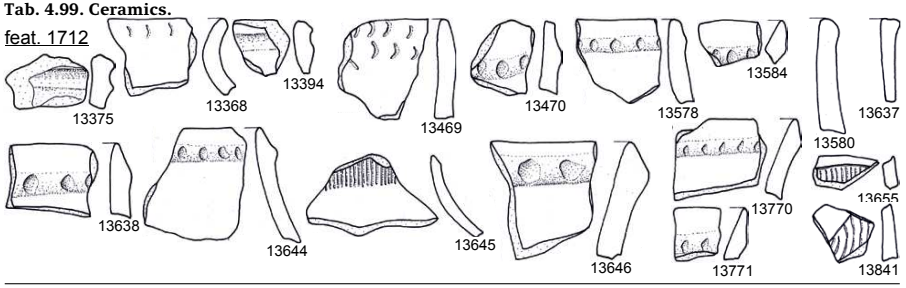
Tab. 4.98. Ceramics.

feat. 1712

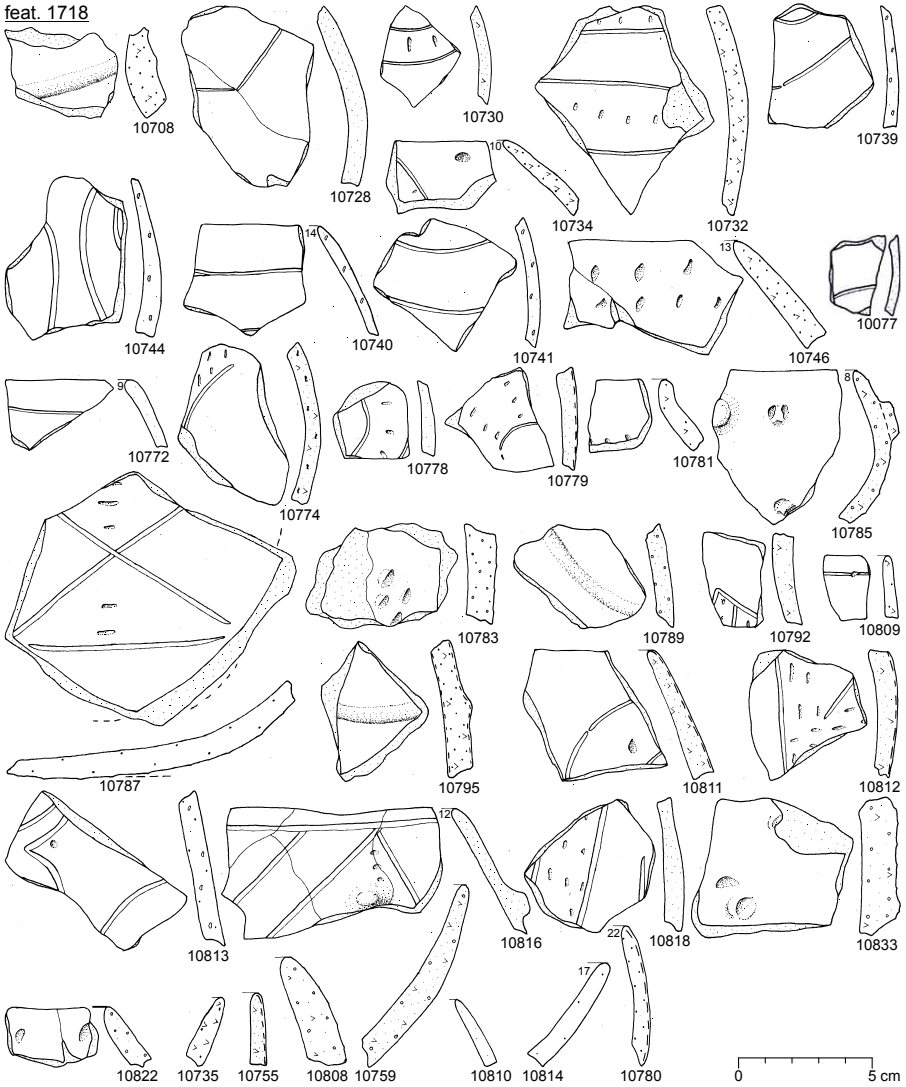


Tab. 4.99. Ceramics.

feat. 1712



feat. 1718



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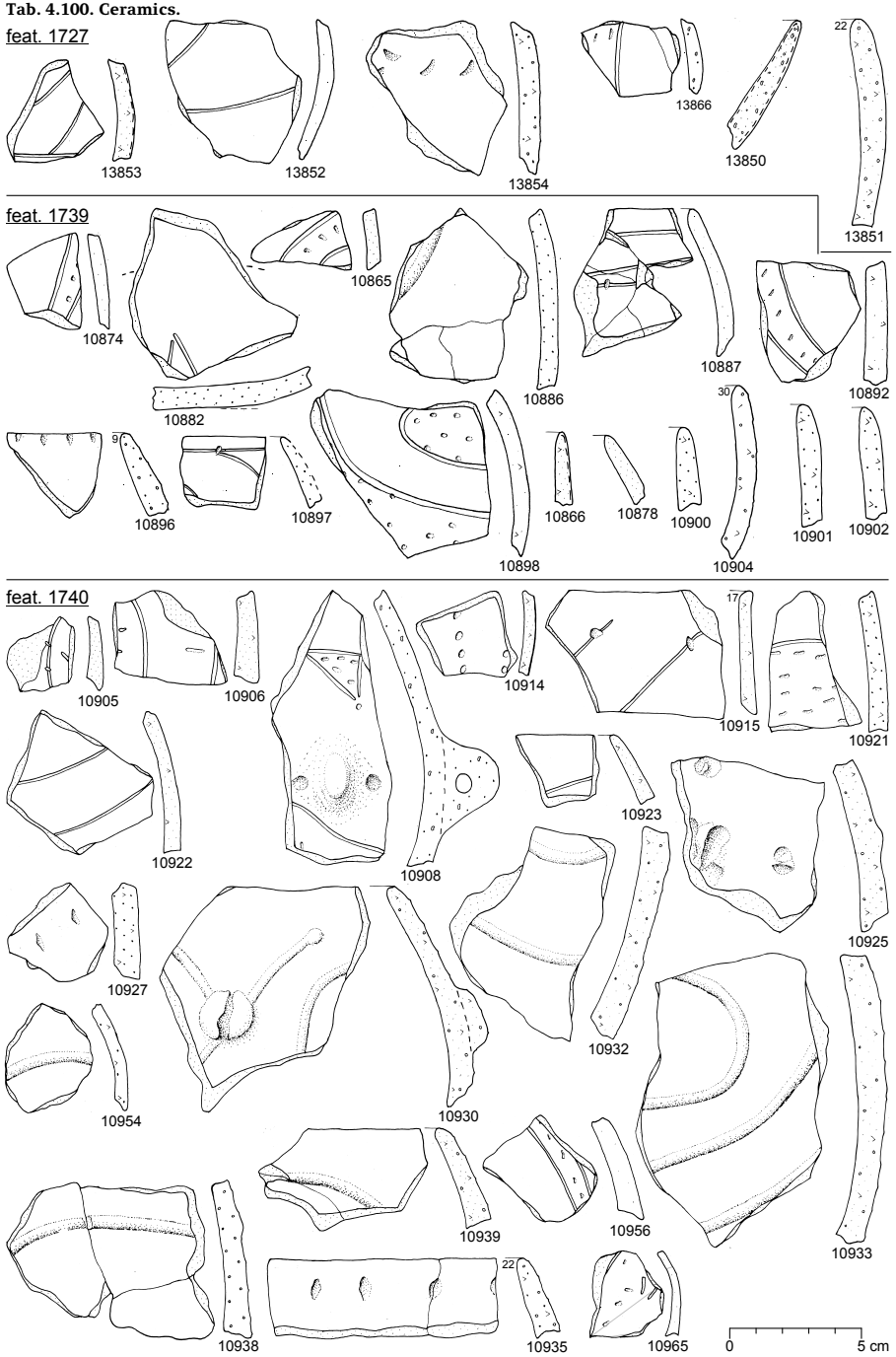
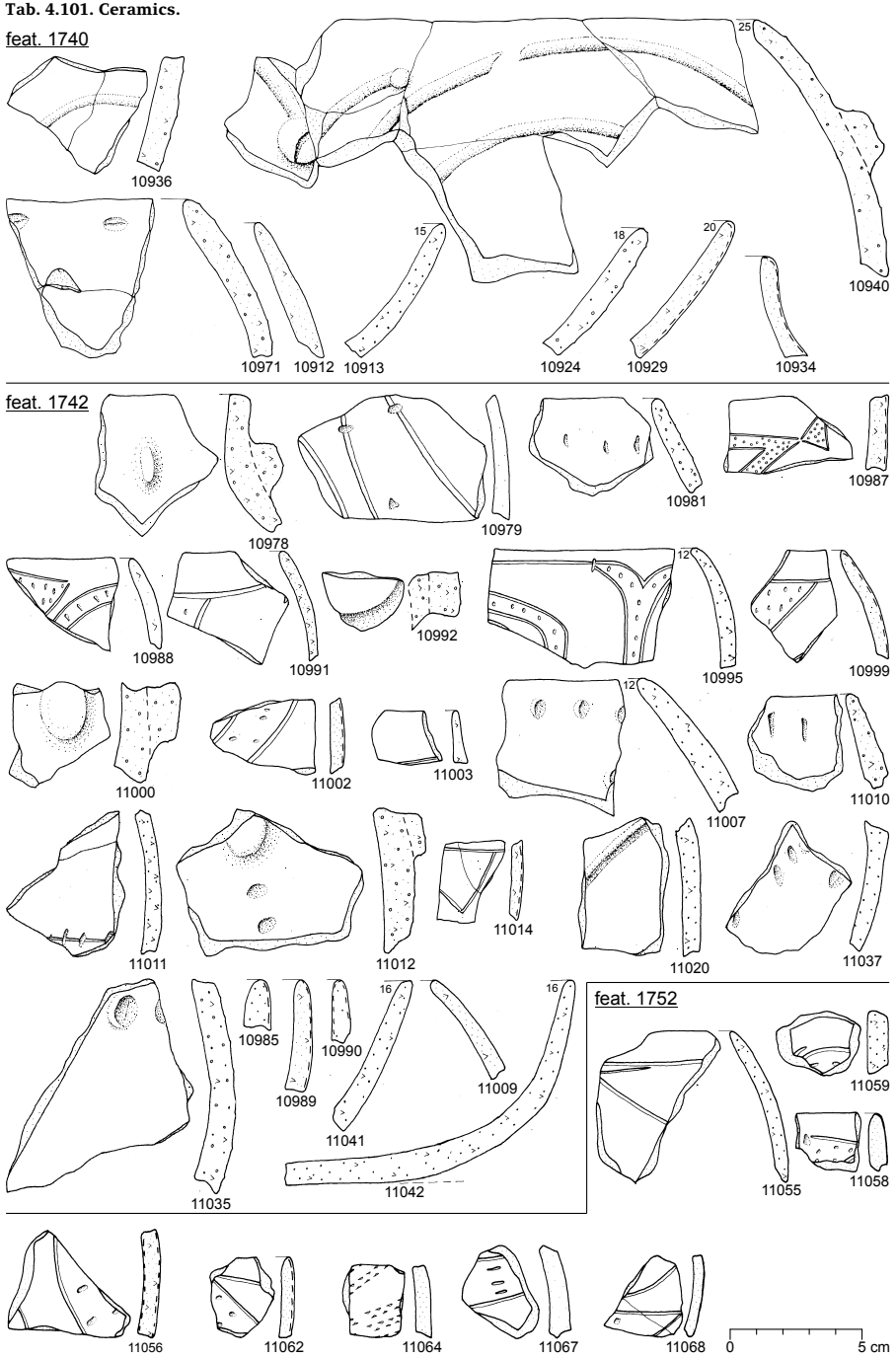


Tab. 4.101. Ceramics.



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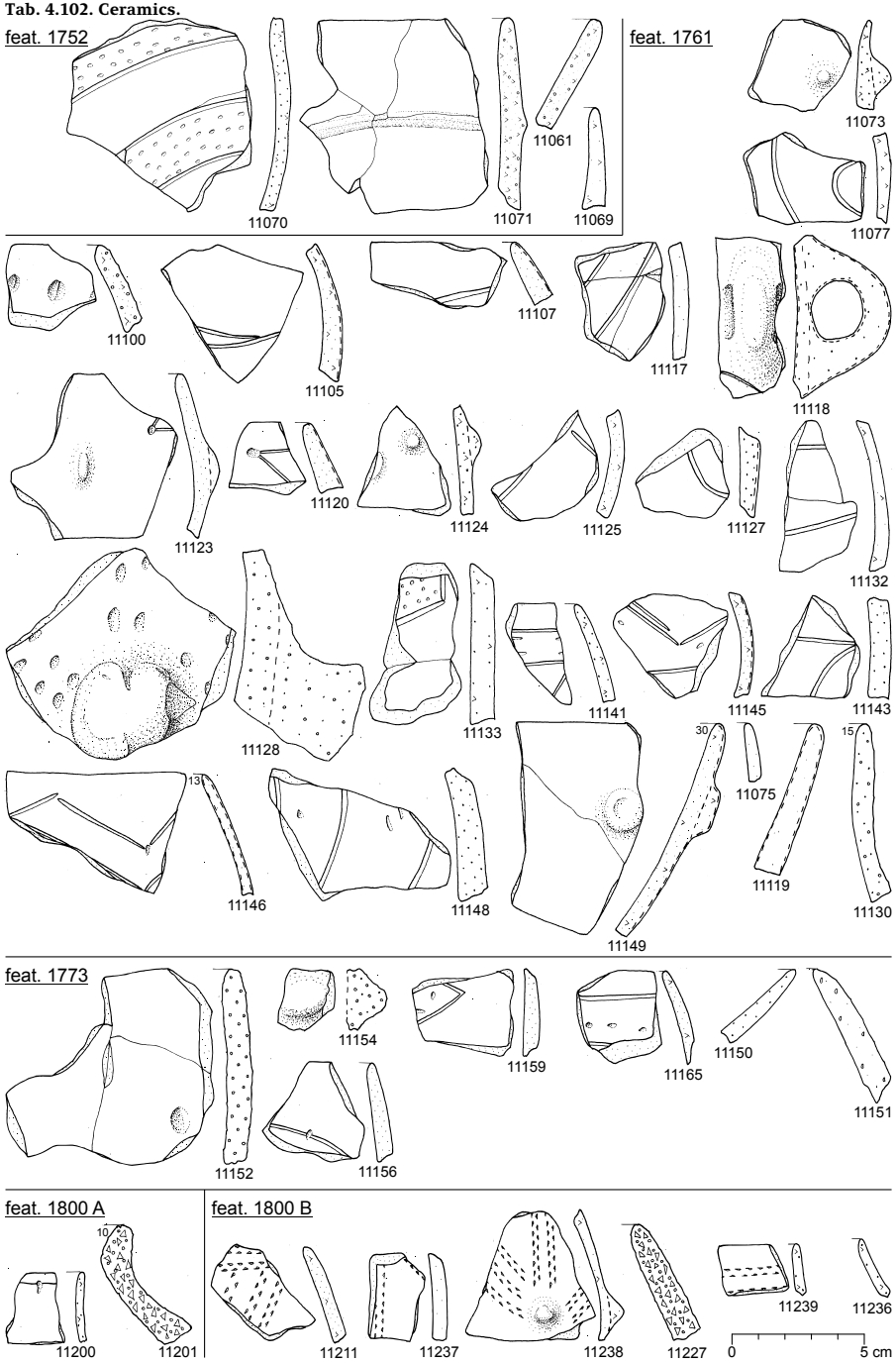

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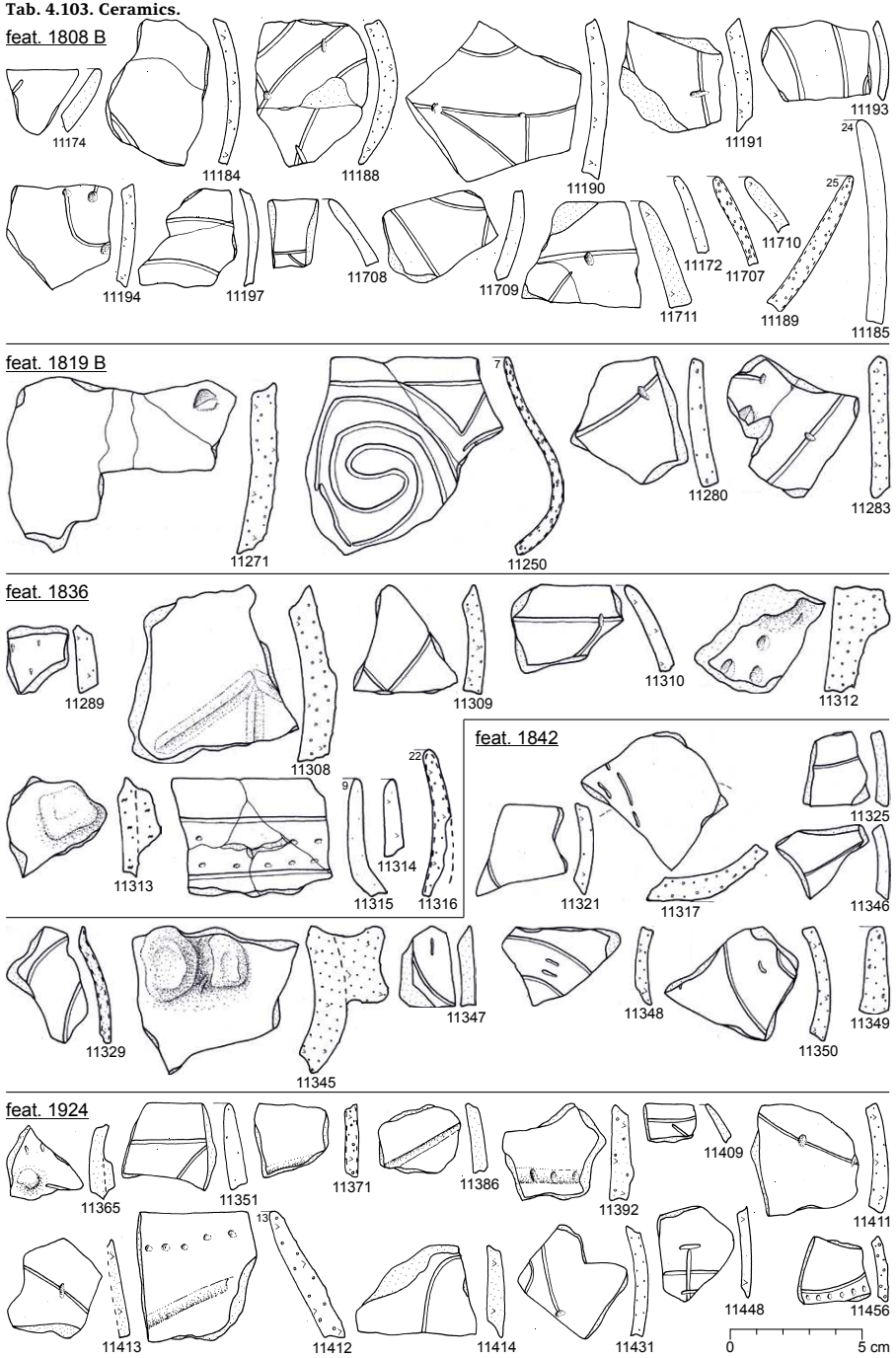

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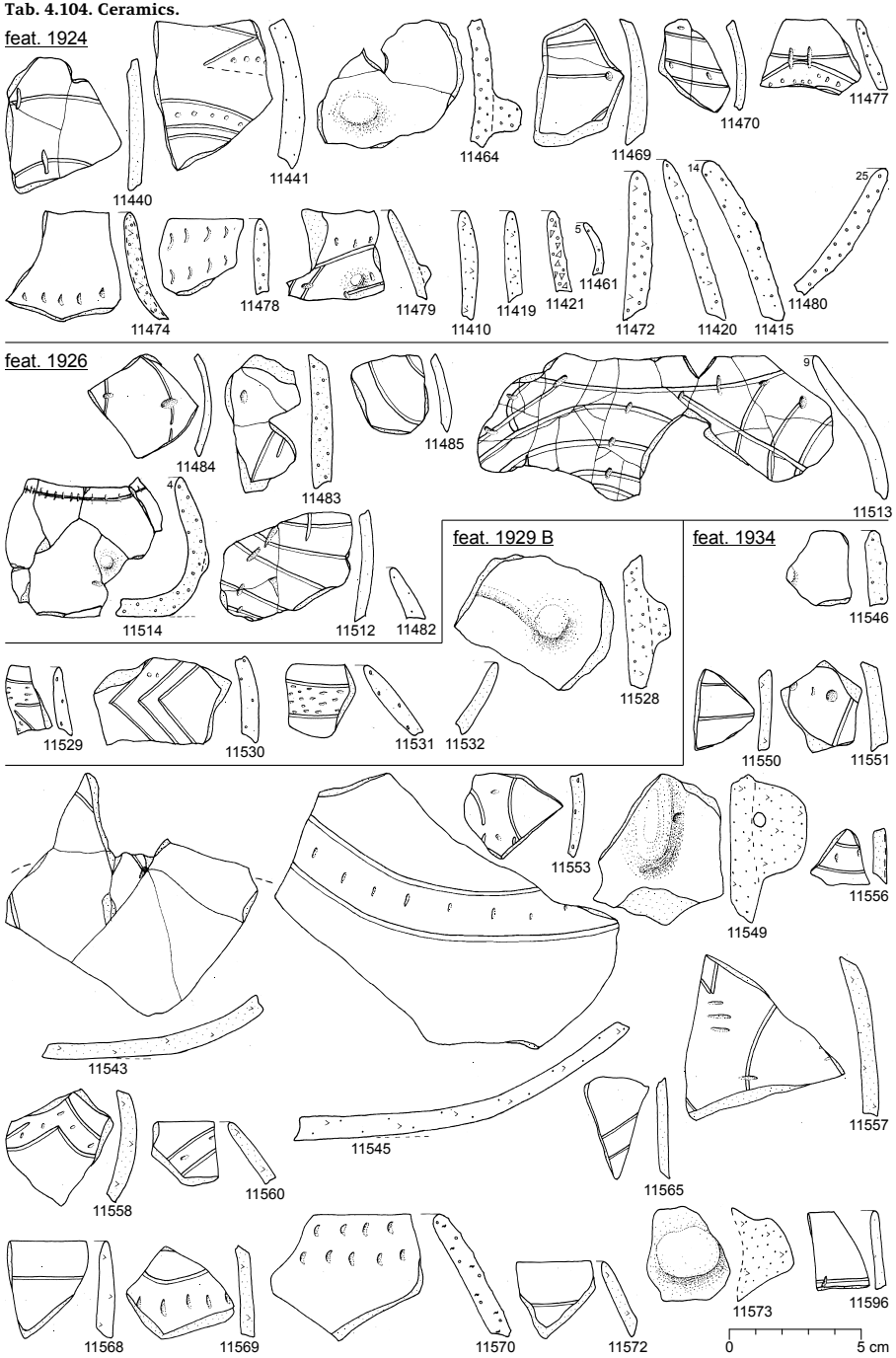

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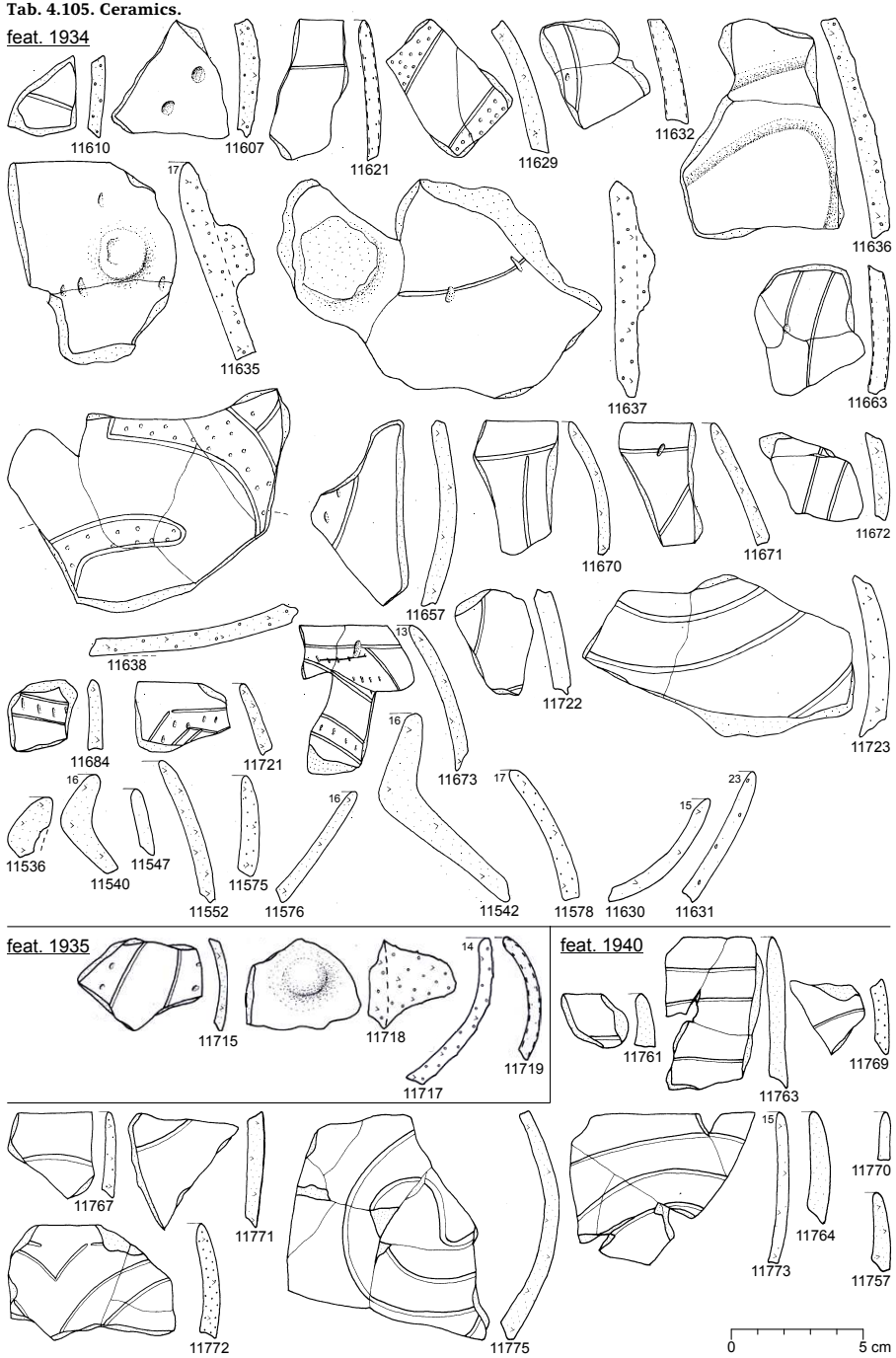

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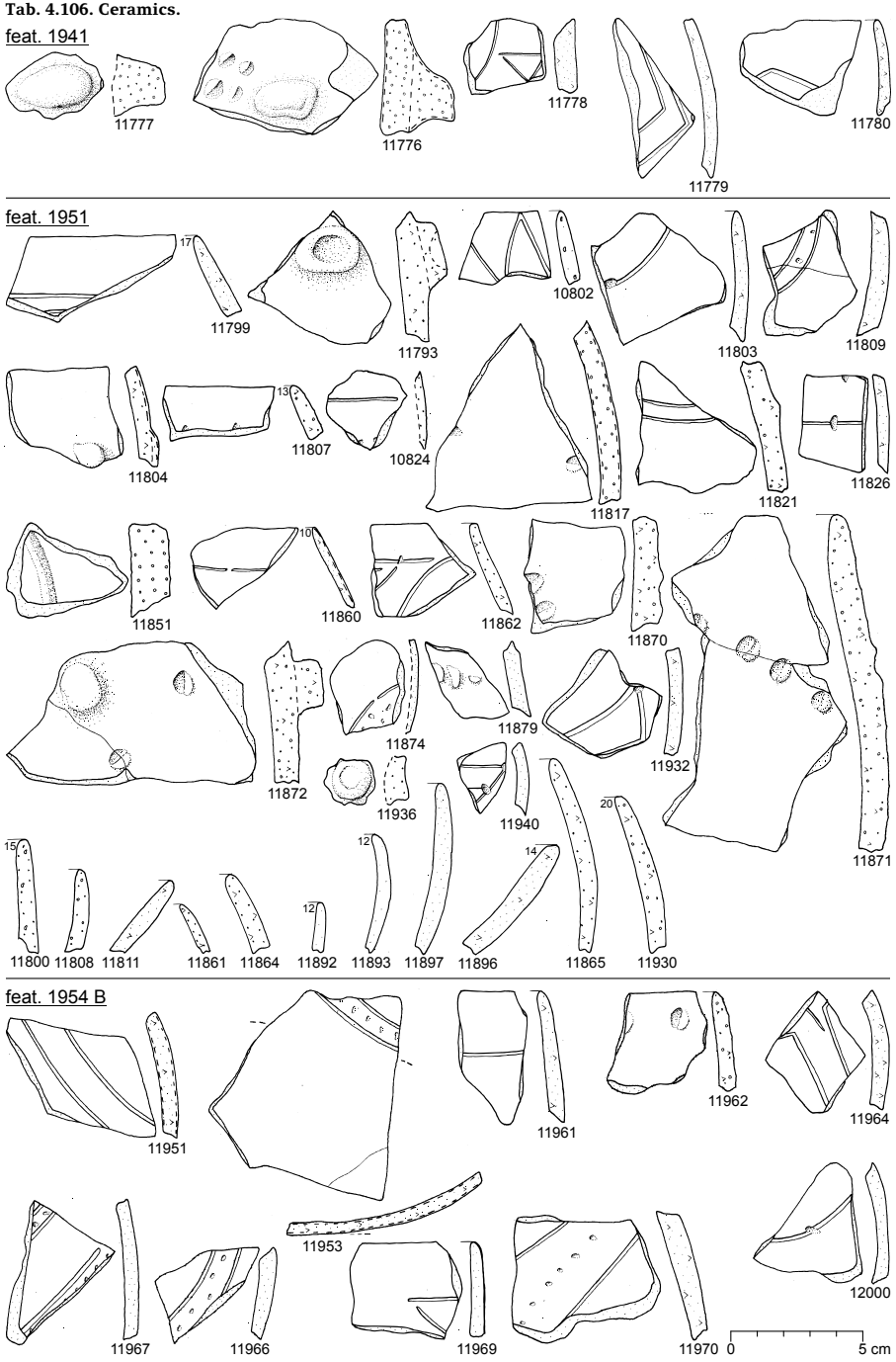

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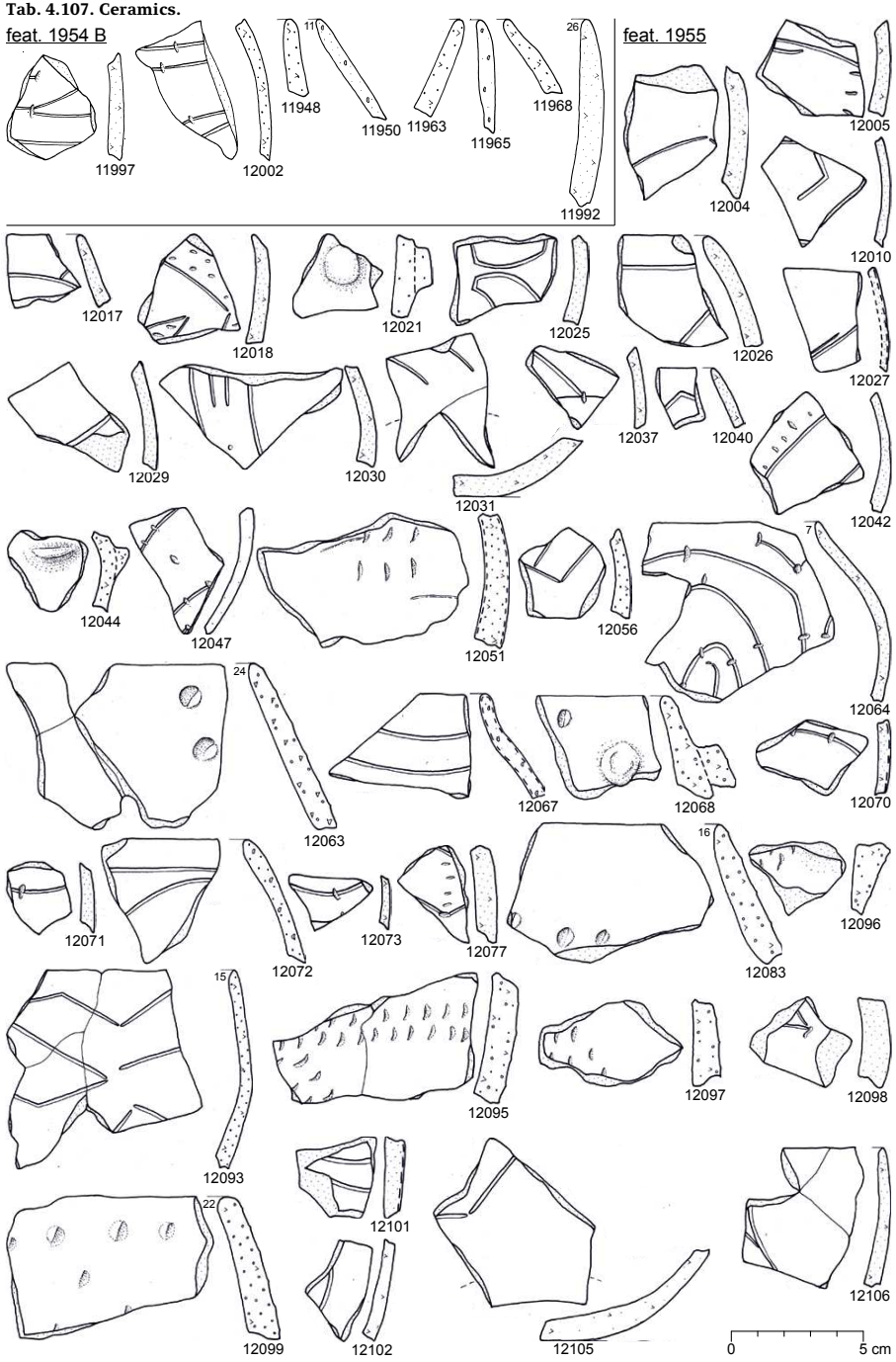

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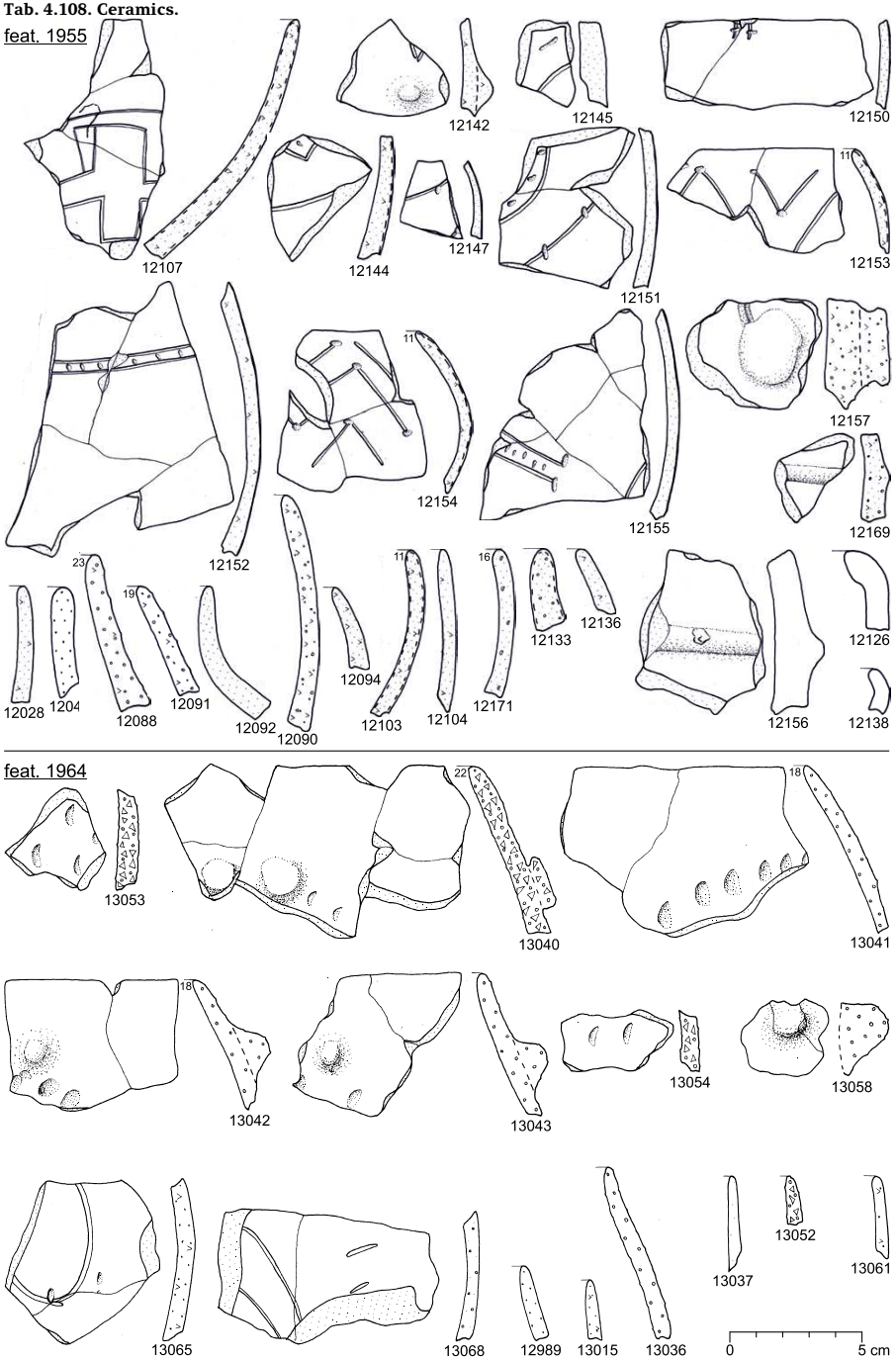

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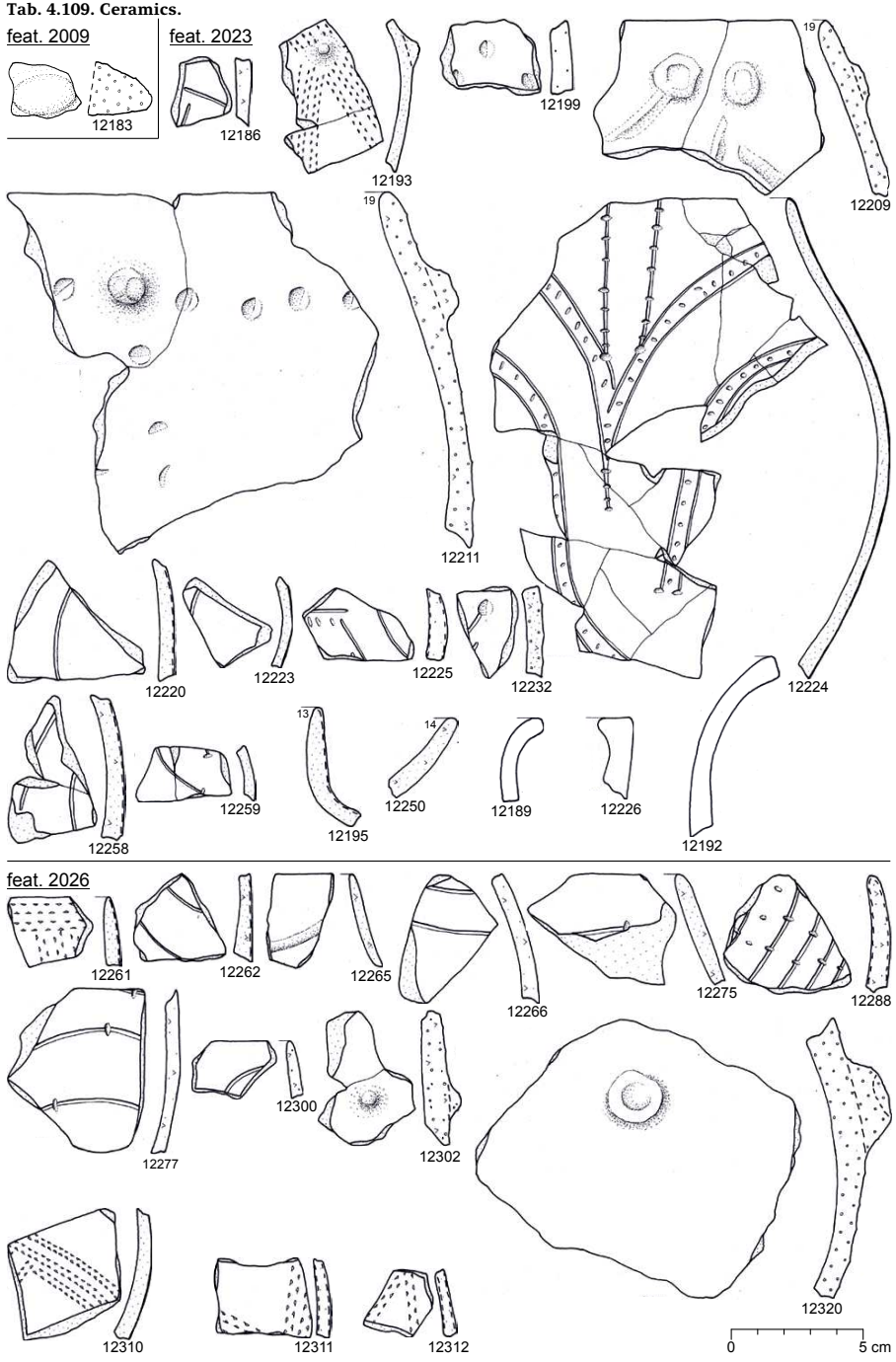

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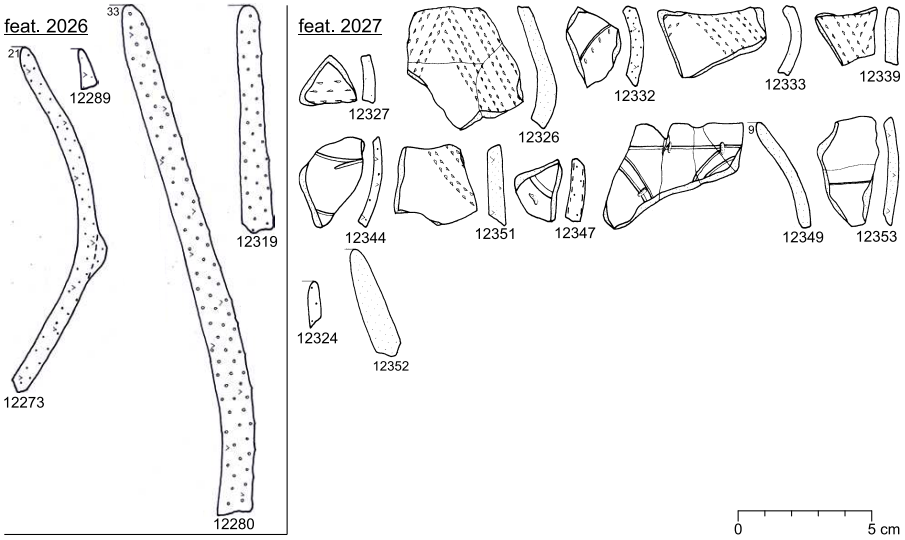


Tab. 5.1. Unpolished semiproducts from the metabasite of Jizera Mountains type.

feat. 5

Tab. 5.2. Quern and grinder from deposition in the feature 838.

feat. 838

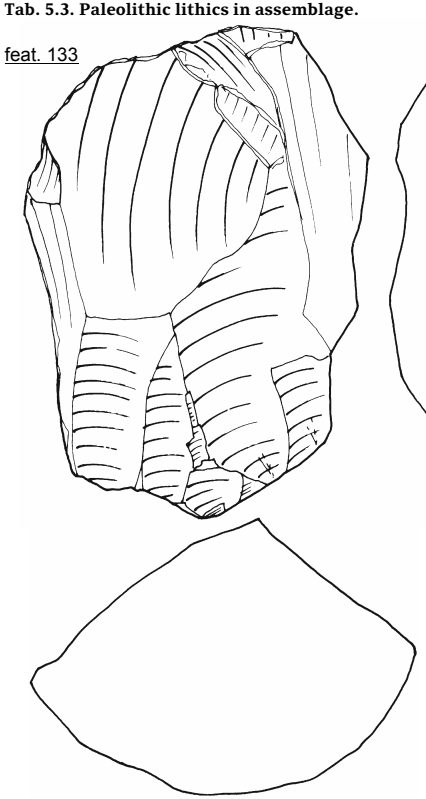
9

8

0 5 cm

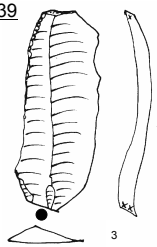
Tab. 5.3. Paleolithic lithics in assemblage.

feat. 133



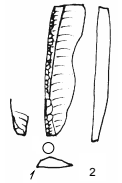
1

feat. 339



3

feat. 720 A

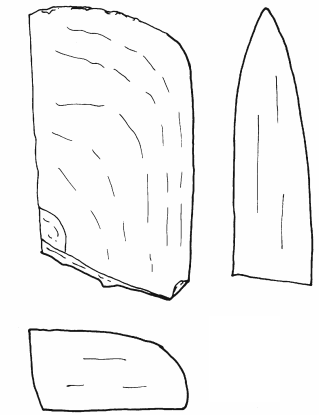


2

0 5 cm

Tab. 5.4. Lithics of the LBK I stage.

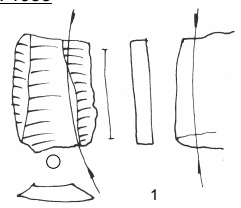
feat. 559



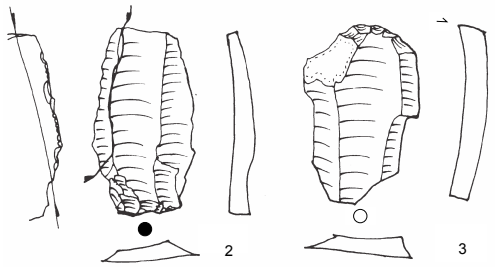
0 5 cm

Tab. 5.5. Lithics of the LBK III stage.

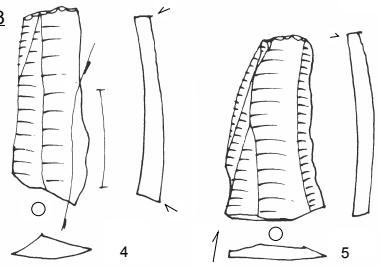
feat. 1955



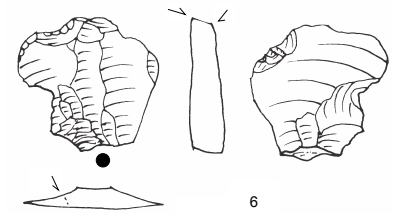
feat. 1931



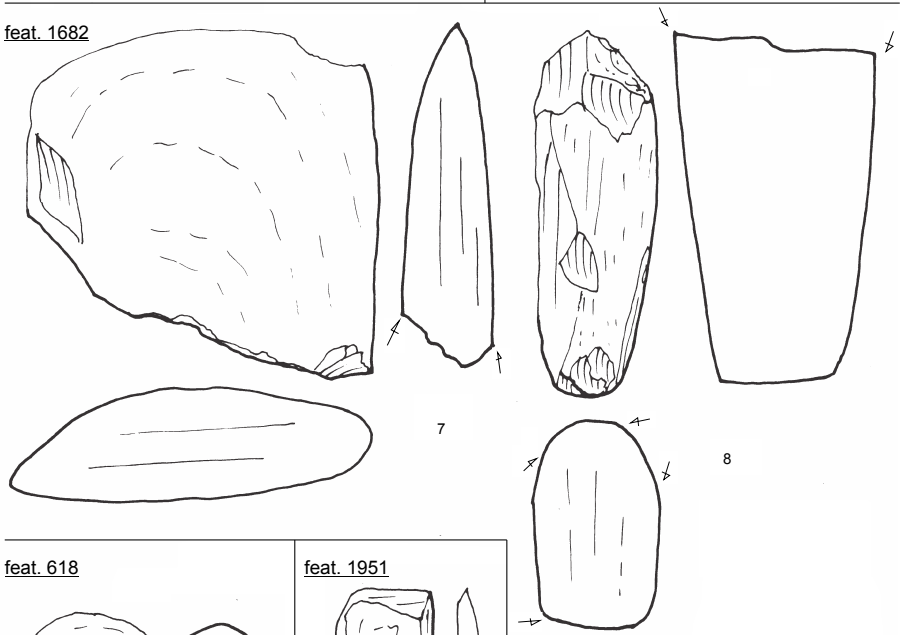
feat. 703



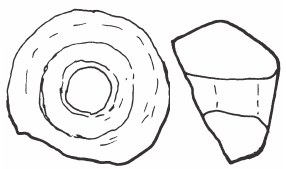
feat. 189



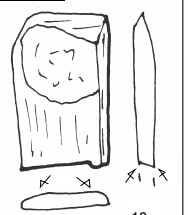
feat. 1682



feat. 618

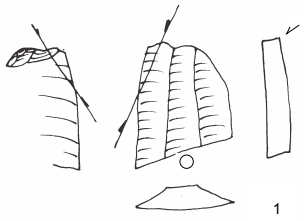


feat. 1951

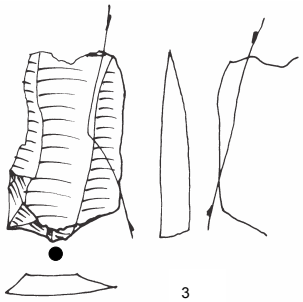


Tab. 5.6. Lithics of the LBK IV stage.

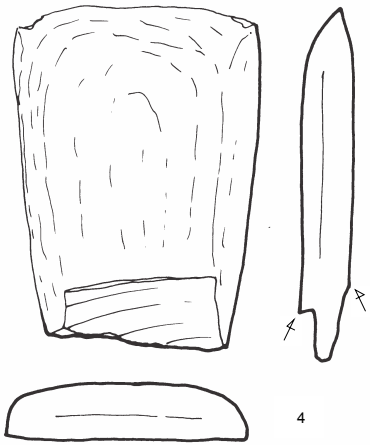
feat. 1924



feat. 1964

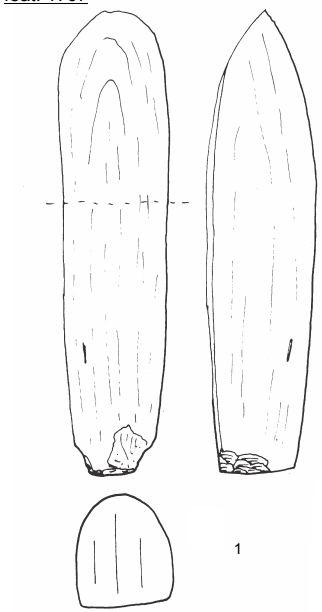


feat. 330

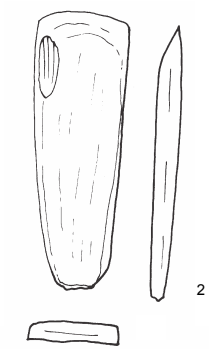


Tab. 5.7. Remaining LBK lithics.

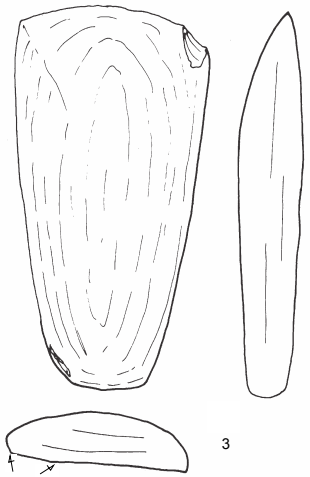
feat. 1707



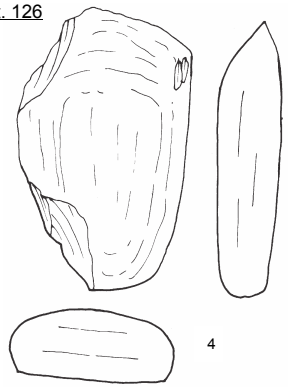
feat. 2009



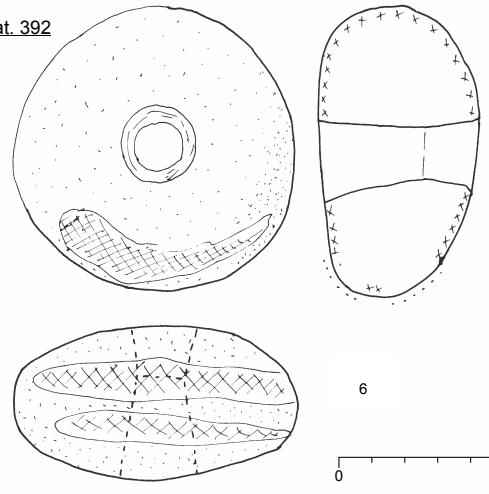
feat. 1097



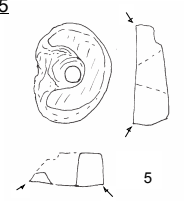
feat. 126



feat. 392

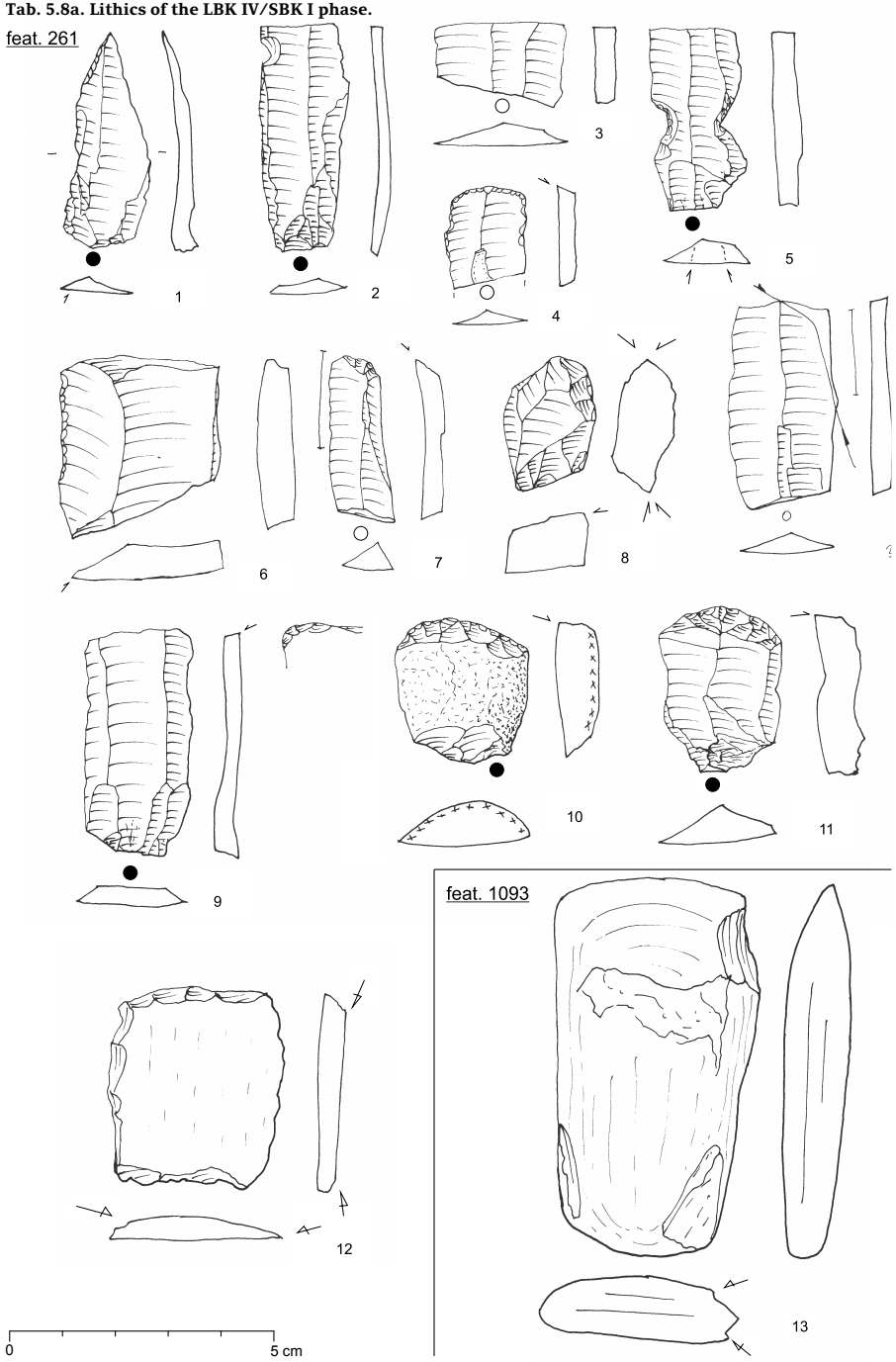


feat. 305



Tab. 5.8a. Lithics of the LBK IV/SBK I phase.

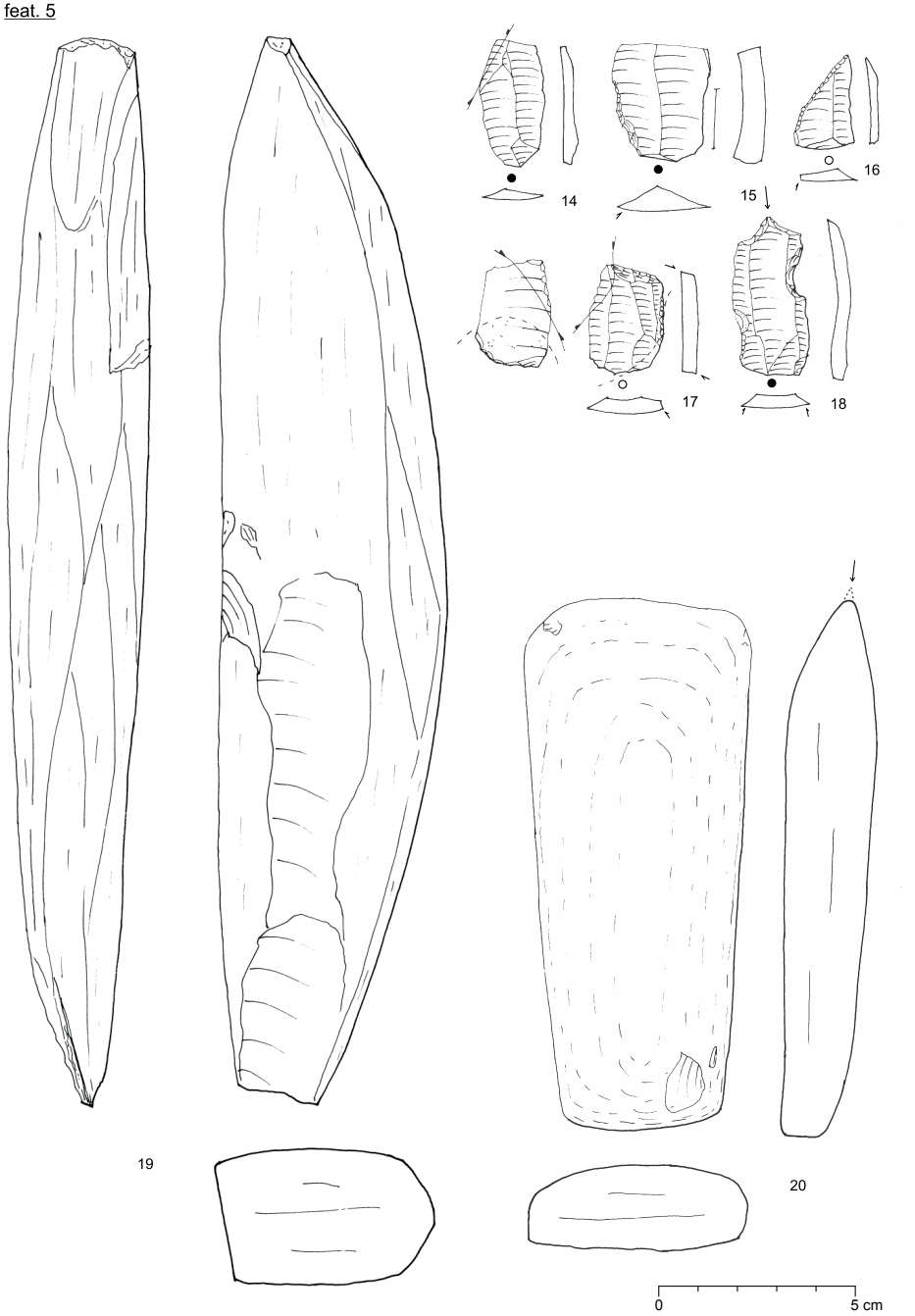
feat. 261



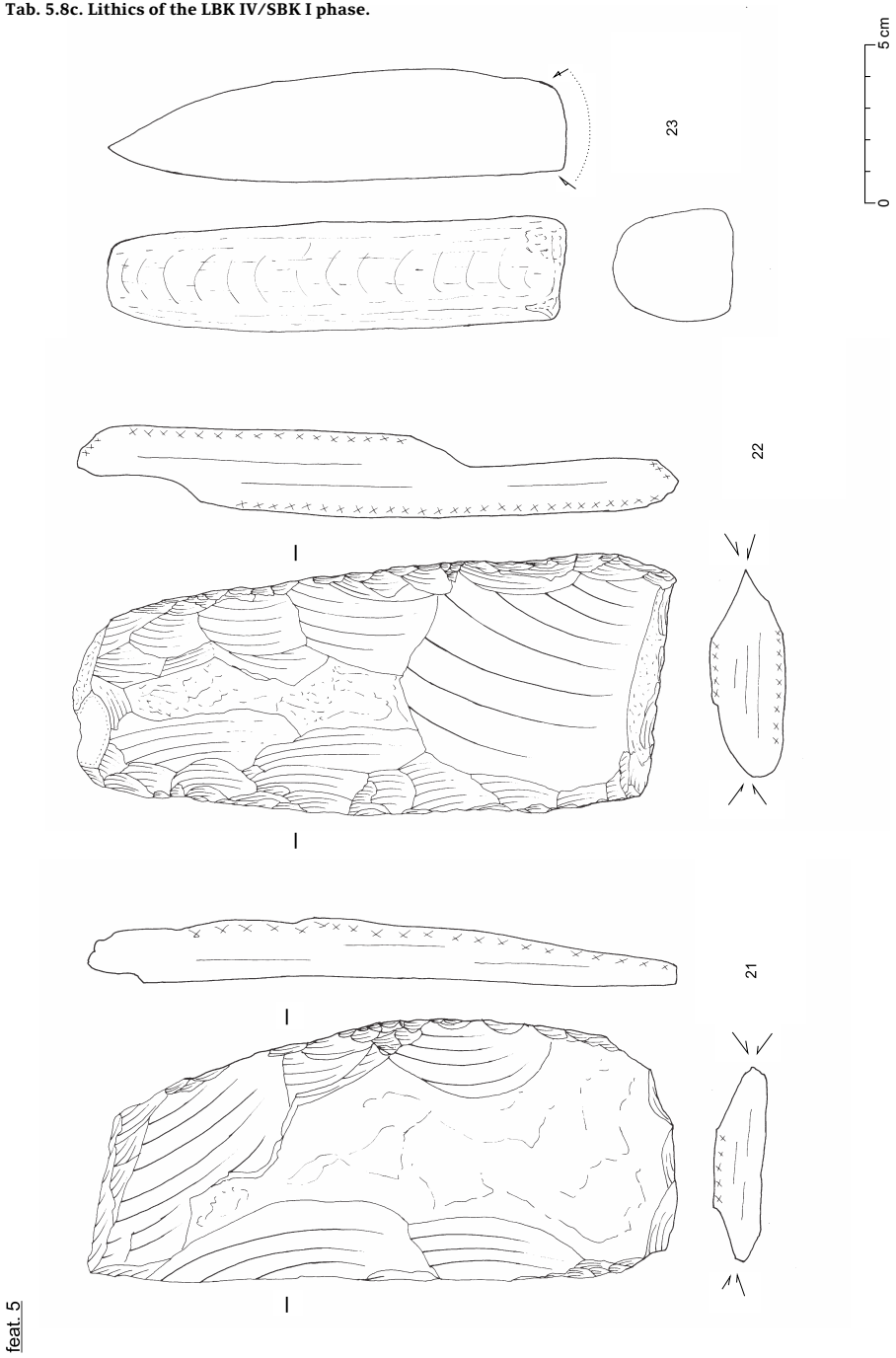
feat. 1093

Tab. 5.8b. Lithics of the LBK IV/SBK I phase.

feat. 5

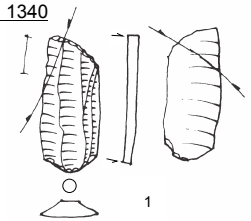


Tab. 5.8c. Lithics of the LBK IV/SBK I phase.

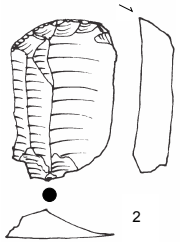


Tab. 5.9. Lithics of the SBK I-III stages.

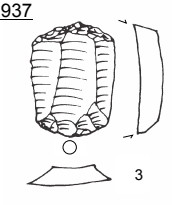
feat. 1340



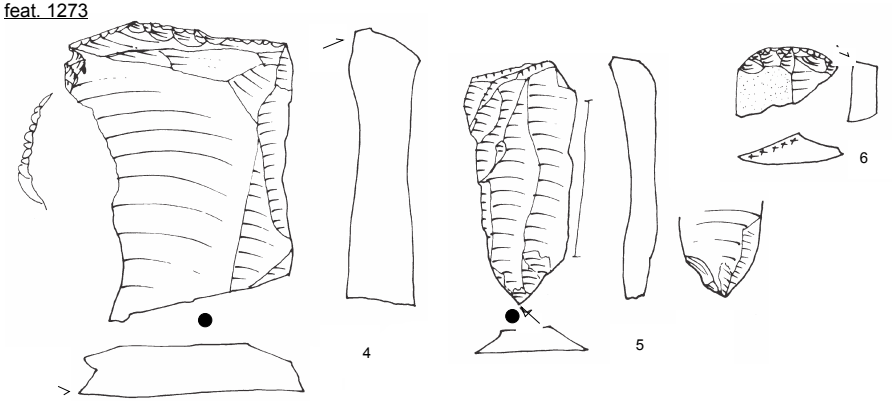
feat. 1095

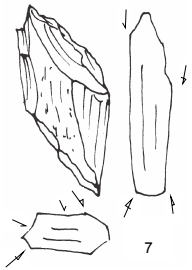


feat. 937

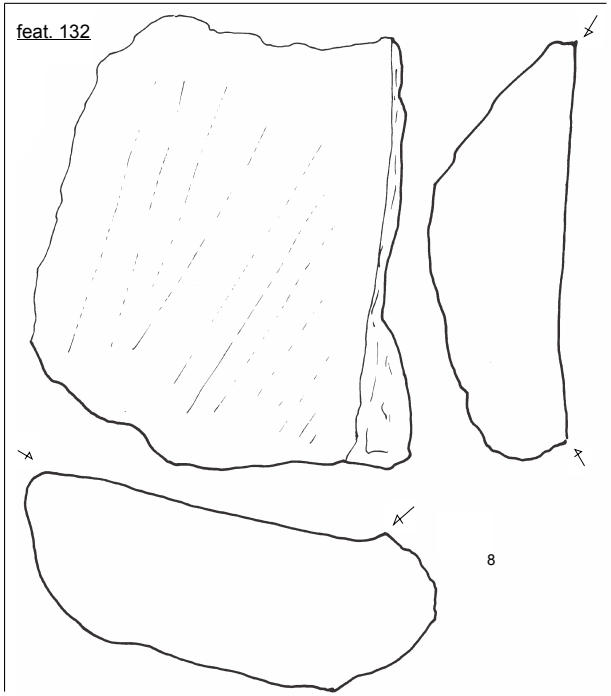


feat. 1273



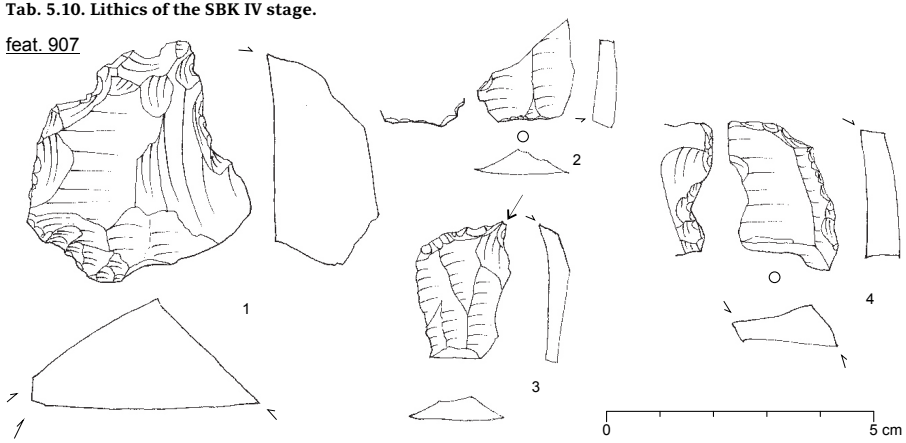


feat. 132

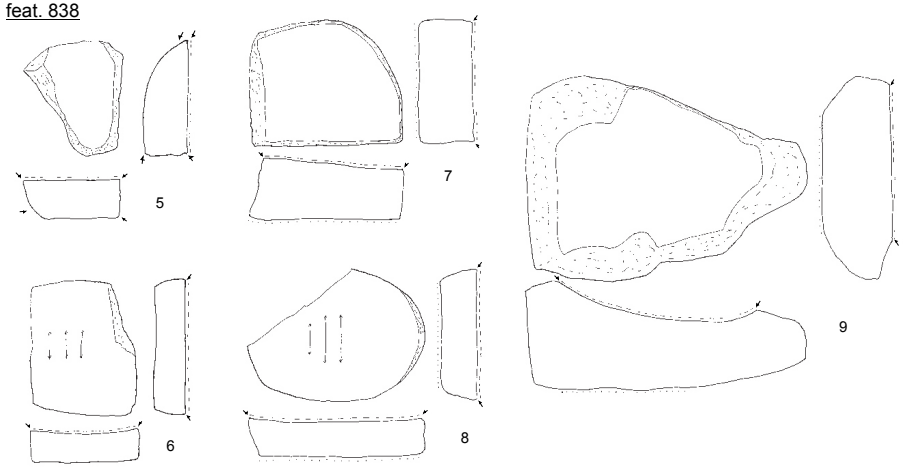


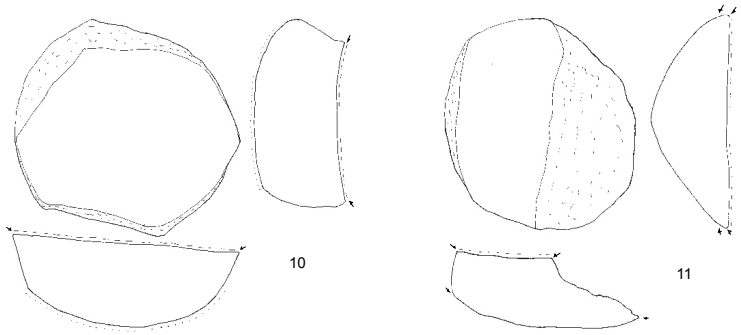
Tab. 5.10. Lithics of the SBK IV stage.

feat. 907



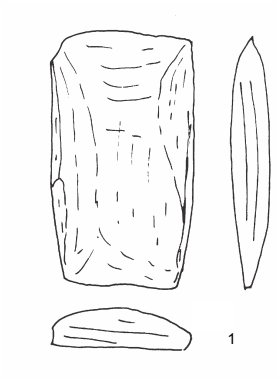
feat. 838



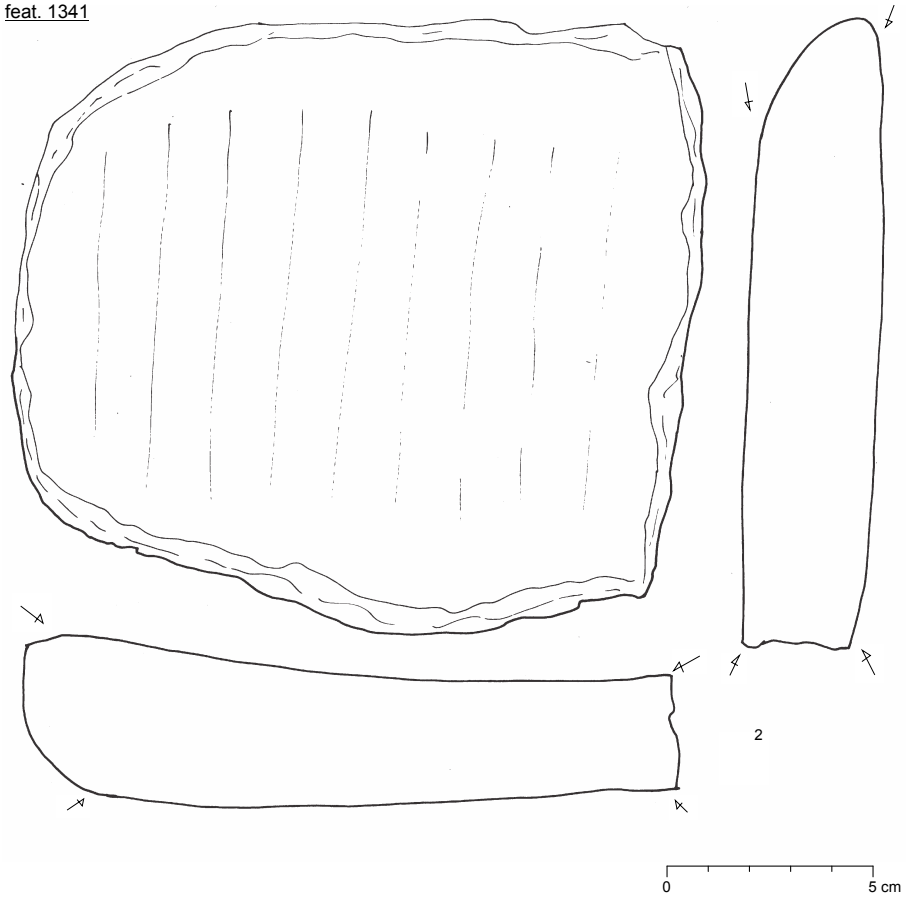


Tab. 5.11. Remaining SBK lithics.

feat. 950

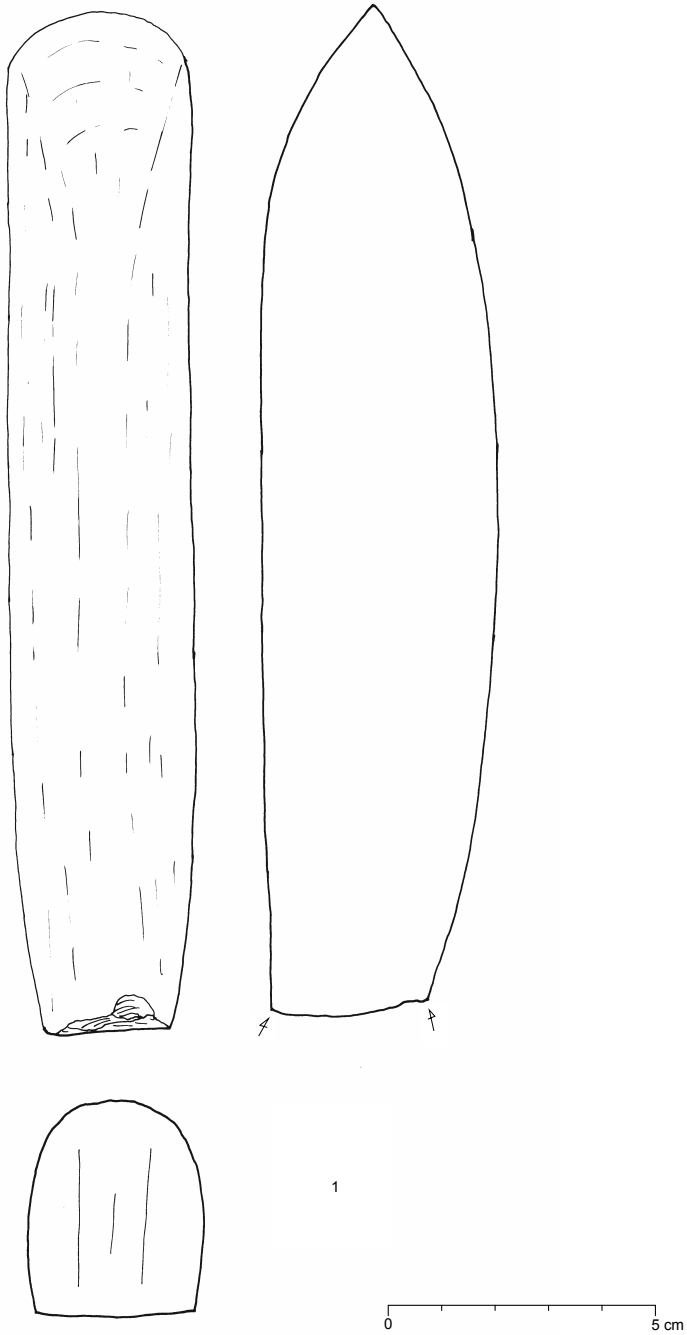


feat. 1341



Tab. 5.12. Remaining lithics of the Neolithic period

feat. 558



The Neolithic Site of **Hrdlovka**

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Václav Vondrovský
Michaela Ptáková
Lenka Kovačiková
Petr Šída

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Hrdlovka 1987-1990

area SJ and V

1:600

S-JTSK coordinate system

N

0 25 50 100 m

-784200 -784100 -784000 -783900 -783800

-980500 -980600 -980700

Hrdlovka 1987-1990

area B

1:700

S-JTSK coordinate system

N

0 25 50 100 m

-784400 -784300 -784200

-980700 -980800 -980900 -981000

935

17 18 20

1247 1248 1249 1279 1278 1252 A 1252 B 1244 1274 1273 1277 1276 1275 1245 1339 1341 1340 1246 1337 1316 1317 1318 1319 1357 1314 1356 1338 1610 B 1336 1608 1609 1624 1315 1636 1611 1623 1622 1621 1625 1626 1467 1465 1466 1620

Hrdlovka 1987-1990

area Z

1:700
S-JTSK

N

0 25 50 100 m

-784400 -784300 -784200

-980400 -980500 -980600 -980700

1633 1634 1635 1632

1637 1640 1641 1642 1644 1645 1646 1647 1649 1651 1652 1653 1654 1655 1656 1657 1658 1659 1663 1666 1667 1674 1678

1821 1822 1829 1836 1836 H 1842 1844 1846 1847 1849 1850 1851 1854 1855 1858 1861 1864 1869 1873 1876 1878 1879 1882 1885 1890 1894 1895 1902 1905

1680 1681 1682 1699 1700 1707 1712 1718 1727 1729 1739 1740 1742 1752 1758 1759 1761

1906 1907 1908 1909 1914 1924 1926 1929 B 1934 1935 1936 1937 1938 1939 1940 1941 1951 1954 PC 1955 1960 A 1963 1964 1965 1966 1773 2004 2006 1795 1800 A 1800 B 1808 B 1819 B 1820 2009 2010 2019 2021 2023 2026 2027 2028 2029 2030

47 46 48 57 54 53 52 50 63 62 61 60 59 64 65 66 69 70 72 73 44 67