Current investigations into the early Neolithic of the Zagros foothills of Iraqi Kurdistan

The Archaeology of the Kurdistan Region of Iraq and Adjacent Regions

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Sedentism and resource management in the Neolithic of the Central Zagros

One of the most significant transformations in history took place after the last Ice Age, from *c*. 12,000 BC (all dates calibrated BC), when human communities changed from being mobile hunter-foragers to more settled farmers and stock-keepers, with domesticated crops and animals. This Neolithic transformation was a fundamental development in the human condition across much of the world and led ultimately, through surplus accumulation and social differentiation, to the emergence of towns, cities, and empires, shaping the modern world.

Neolithic developments occurred very early in Southwest Asia. In recent decades there has been much work on Neolithic developments in this region through excavations in Turkey, the northern plains of Iraq, Syria, Jordan, and the Levant, which have together demonstrated great variability in local trajectories of development from hunter-forager to villager-farmer. By contrast, one area that until recently has been little investigated since the 1970s is the Zagros Mountain region and hilly flanks of western Iran and eastern Iraq, the so-called eastern Fertile Crescent. Earlier work in this region was of key importance in developing studies of the Neolithic transformation, with excavations at sites such as Jarmo, Asiab, Sarab, Ali Kosh, and Ganj Dareh in the 1950s-70s (Braidwood and Howe 1960; Hole *et al*. 1969; Smith 1990). These researches indicated that Neolithic communities changed to sedentary lifestyles and began using fired ceramics, the earliest in Southwest Asia, by *c*. 7900 BC at sites such as Ganj Dareh in western Iran. Study of the plant and animal remains indicates that the earliest Neolithic communities in the Zagros favoured use of lentils, peas, and nuts over cereals, that wild goat were intensively hunted, and there is evidence for domestication of goat by *c*. 7900 BC (Zeder 2006).

For approximately 25 years after 1979, there was almost no fieldwork concerning the Neolithic of the eastern Fertile Crescent, and there is less up to date evidence compared to the rest of Southwest Asia and beyond. A wide range of more recent studies, however, is steadily correcting this imbalance (Matthews and Fazeli Nashli 2013; Riehl *et al*. 2013). The Central Zagros Archaeological Project (CZAP) is a collaborative programme, whose main partners are the University of Reading, Sulaimaniyah and Erbil Antiquities Directorates, Bu Ali Sina University, Hamedan, and the Iranian Centre for Archaeological Research. The objectives are to investigate research questions within the Early Neolithic of the Central Zagros region. What was the nature of early sedentism and how did it develop from temporary and seasonal to permanent and year-round? How was architecture constructed and how was early village space used and socialised? What was the role of ritual and human burial in social cohesion at this time? What modes of animal husbandry were employed, including intensive hunting, herding, management and domestication of goats, native in the wild to the Zagros? What plant resources were exploited and how? What is the absolute chronology of development in the Zagros Neolithic? These and many other questions are being addressed by excavation and inter-disciplinary analysis at four sites on a transect from the lowland to the highland Zagros, in order to study local and regional variation in the development of the Neolithic (Fig. 1). In the lowland piedmont zone in Iraqi Kurdistan, the sites comprise Bestansur and Shimshara as well as regional survey in Zarzi valley. In the highland zone, the sites comprise Sheikh-e Abad and Jani in the Central Zagros region of western Iran (Matthews *et al*. 2013; Matthews and Fazeli Nashli 2013).

The analyses and results from this research, involving the application of inter-disciplinary approaches to archaeological questions, are of value in situating the Central Zagros within the Neolithic transformation in Southwest Asia. The research assists in placing our own species within a rich context of ecological and social change that characterised the Neolithic transformation following the end of the last Ice Age, one of the most impactful episodes in human history.

Research questions: an agenda for research into the Early Neolithic of the eastern Fertile Crescent

Climate and environment

The importance of climate and environment has been re-emphasised in recent research on the Neolithic more widely as significant factors in spatial and temporal variability in biomes and thereby in the histories of early sedentism and the inter-relationships between humans, plants and animals (Zeder 2011). There is increasing evidence for local and regional variation in environment

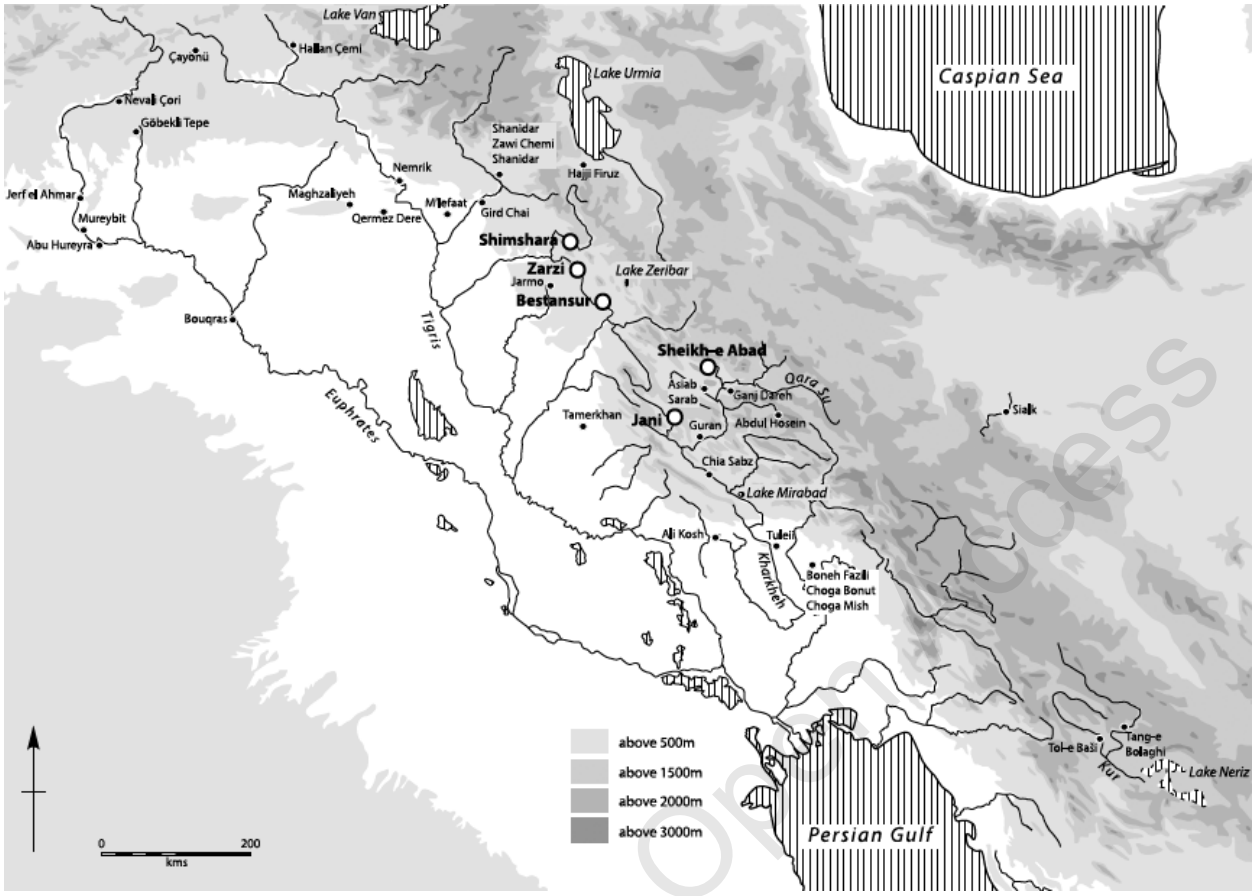

Figure 1. Map to show location of key CZAP sites.

and ecological strategies in the development of villages and agriculture across Southwest Asia, as well as globally (Willcox 2005), and in the choices made by specific communities.

Current interpretations of lake cores from Lake Zeribar, 45 km to the east of Bestansur, suggest the environment included grasslands and pistachio and almond trees in the Zagros region in the Early Holocene (Wasylikowa and Witkowski 2008). There needs to be inter-disciplinary investigation of the specific trajectories of environmental interaction followed by human communities in the Zagros region. Within the remit of CZAP, initial research has begun through collection of speleothem palaeo-climate records from local cave sites in the Iraqi Zagros, for study under the direction of Professor Dominik Fleitmann of the University of Reading in collaboration with Dr Mark Altaweel of UCL.

Sedentism

The issue of how communities become more sedentary through the Early Holocene is one of the fundamental research issues for the Neolithic period. The extent to which initial activities at Central Zagros Neolithic sites were associated with periodic hunting/gathering or with year-round settlement remains to be established. It is likely that there was periodic fission and fusion of populations in order to obtain and share resources and to socialise, as increasingly evident at other sites in Southwest Asia. High-resolution micro-stratigraphic and micro-archaeological evidence is being recovered and examined from CZAP sites in order to investigate the nature, seasonality and periodicity of activities.

Social roles and relations

As yet we know little about the nature of social organisation in Early Neolithic communities of the eastern Fertile Crescent. Was the household a key social unit, as studies of Neolithic sites in other regions have suggested (Kuijt 2000), or is there evidence of varying social units and networks as emerging at a number of sites, such as Çatalhöyük? How was space structured and organised at short and longer term timescales,

and what indicators are there of social actions, roles and interaction and exclusion during the life-cycle of individual features, spaces and buildings across the community and generations, at the scale of single deposits, sequences, site levels and the history of the settlement? These questions are being addressed through targeted excavation of intact Early Neolithic deposits, in particular at the site of Bestansur in Iraqi Kurdistan.

Technological choices and material cultural traditions

There is considerable evidence for shared knowledge of materials and technology across Southwest Asia in the Neolithic as well as for local and regional variation. Material evidence from Neolithic sites of the region includes architecture, ground stone and chipped stone tools as well as special items that have clearly been traded or exchanged over considerable distances, such as beads of carnelian and sea-shell, and tools of obsidian. What were the socio-economic practices and trans-regional connections that underpinned such long-distance movements of materials? What choices were made at Bestansur and what was the site's role in innovation more widely?

Symbolism and ritual

Finally, we consider whether there are traces of ritual and activities such as feasting, which are often argued to have played a key role in Neolithic society and life-ways (Hodder 2010). Some have argued that the Neolithic of the eastern Fertile Crescent is rather lacking in evidence for elaborate cultic or ritual activity (Bernbeck 2004) but how valid is this interpretation in the light of recent work?

Methods

The main approach in CZAP in Iraqi Kurdistan is excavation at the Neolithic sites of Bestansur and Shimshara, to investigate socio-economic and cultural strategies through the Early Neolithic. Recording and processing are managed through the web-based Integrated Archaeological Data-Base (IADB). Excavation is being conducted, employing trenches for diachronic investigation and open-area trenches to examine buildings, external areas, middens and streets/corridors. Excavated deposits are quantified, sieved, floated, sampled, and processed for recovery of lithics, ground-stone, clay tokens, figurines, faunal and botanical remains (macro and micro), phytoliths, molluscs, and architectural materials.

A consistent methodology is applied in the excavation of all trenches at Bestansur and Shimshara. Excavations begin by removal of topsoil and upper eroded and wash deposits by large pick and shovels. At Bestansur, where most of our excavation has taken place, intact Neolithic deposits are encountered at depths of 30-50 cm below the modern field and mound surfaces. Excavation of these deposits proceeds with small pick and trowel with occasional use of large tools. We employ systematic sampling procedures, collecting 250 g archive samples and 50 l whole-earth flotation samples from every context, where the deposits provide sufficient material. Additional samples are taken as required for a range of specialist purposes. Dry-sieving with 4 mm mesh is conducted on deposits once samples have been collected, except in cases where the heavy clay content of deposits makes dry-sieving unfeasible. In these cases a sample of the deposit is processed through dry-sieving and the remainder is shovelled into wheel-barrows and checked by hand before disposal on the spoil-heap, with a tally of buckets and barrows being maintained for each context. The local workmen are highly adept at hand recovery of the smallest fragments of cultural material from broken soil on the ground and in the wheel-barrow. All excavation and sampling activities are recorded on a range of forms for entry into the Integrated Archaeological Data-Base. At the end of each season all soundings are lined with organic sacking and back-filled with the original excavated material.

Additionally, intensive field survey has been conducted during 2013 in the vicinity of Zarzi cave, in the Iraqi Central Zagros, in order to investigate the prehistoric settlement of this fertile region.

Excavations at Bestansur

The mound of Bestansur is located 33 km southeast of Sulaimaniyah city, on the western edge of the Shahrizor Plain. The site was first located by Iraqi archaeologists and was more recently surveyed by a German team, catalogued as site number SSP6 and assigned to the Neolithic period on the basis of surface finds (Altaweel *et al*. 2012, 20-1). From our own work it is now clear that the upper layers of the mound belong to the Iron Age, in particular to the Neo-Assyrian period, and the Sassanian period. Preliminary excavations, by Dr Lisa Cooper of the University of British Columbia, of stone walls identified in geophysical survey in the fields to the southeast of the mound have revealed a significant Neo-Assyrian destruction layer.

Preliminary surface walking and artefact collection in 2011-2012 of the mound at Bestansur and the fields surrounding the mound identified Neolithic chert and obsidian scatters over an area of *c*. 250 m around the visible mound, suggesting that intact Neolithic levels could be excavated in the fields on all sides of the mound. Guided by the surface finds and the mound's topography we have so far excavated 13 trenches, located on the lower slopes of the mound and in the surrounding fields (Fig. 2). Neolithic architecture was identified in nine of these 13 trenches. Five trenches (Trenches 7, 9, 10

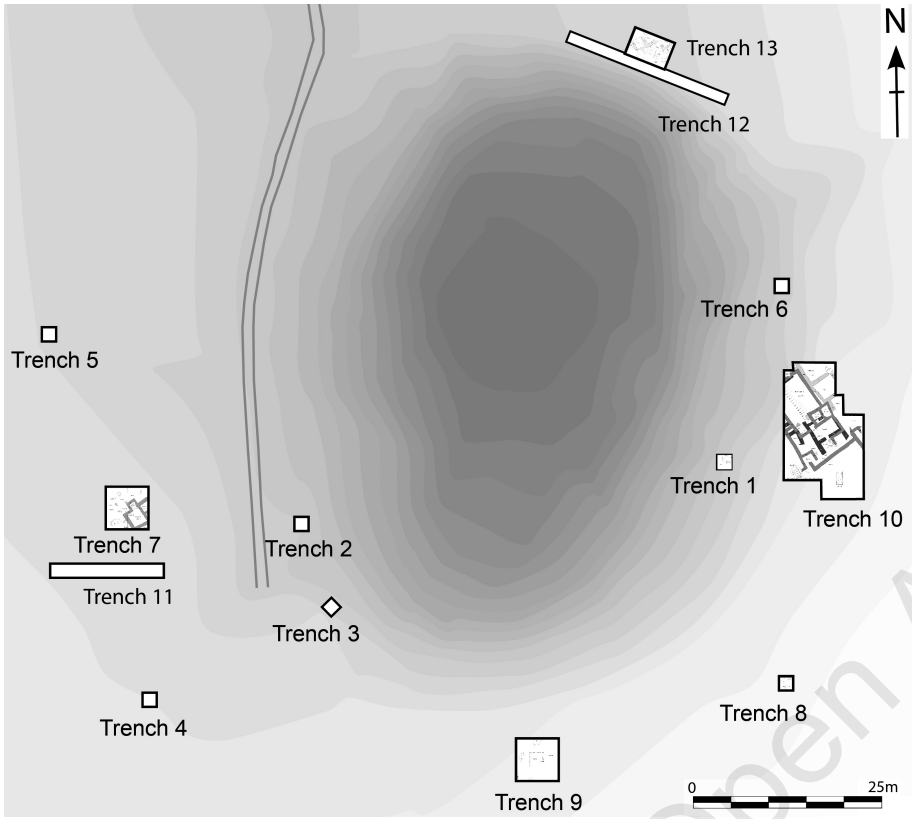

Figure 2. Plan of Bestansur to show location of excavated trenches.

and 12-13) have been expanded in order to investigate extensive Neolithic deposits and structures.

As excavation proceeded it became clear that intact Neolithic deposits survive below the modern plough soil at almost all locations and are readily accessible for excavation. Considering the overall picture from all 13 trenches, intact Neolithic deposits are preserved across an excavated area of more than 100 m north-south and 100 m east-west, in fields on all sides of the archaeological mound and under the Iron Age mound too. If contiguous and contemporary, this spread of occupation indicates a Neolithic site of at least 1.0 hectare, but the precise limits of the surface lithic spread have yet to be defined and it is likely that the Neolithic site is significantly larger, possibly >250 m in diameter. The modern surface in the fields slopes gently down from northwest to southeast.

Probable Neolithic deposits were also revealed in the base of the mound itself, in Trenches 1 and 2, in the form of deposits with Neolithic lithics and without later pottery. These basal levels without pottery, moreover, are similar in absolute height to intact Neolithic levels in the adjacent fields, further suggesting that they are Neolithic in date, at *c*. 93 m above site datum in the west in Trench 2, and at 92.13-92.05 m above site datum in the east in Trench 1. The similarity in absolute levels suggests the Neolithic site at Bestansur may have been relatively flat with a gentle northwest-southeast slope. This apparent flatness may be due to erosion and activities at the site since the Neolithic, including possible levelling for construction in later periods and modern ploughing. There could be a small Neolithic raised mound in the *c*. 52 m distance between Trenches 1 and 2, below the top of the current 7-10 m high mound, as suggested by Neolithic deposits in Trenches 12-13 which form at least the basal 1m of this mound above the fields. Further excavations on the mound will continue to investigate the nature and date of occupation levels on the mound.

Although Neolithic ceramics were identified in survey at the northwest of the site (Nieuwenhuyse *et al*. 2012), the Neolithic deposits excavated in the fields around Bestansur all appear date to the Pre-Pottery Neolithic as no definitely identifiable sherds of Neolithic pottery have been recovered in excavation. The site appears to have been abandoned for a long time at some stage after the Neolithic, with a resumption of human presence at the site only in the Iron Age several millennia later. No Chalcolithic or Bronze Age materials were found

at Bestansur, but the existence of Chalcolithic and Bronze Age sites in the vicinity of the site shows that the abandonment was local to the site and not part of a regional episode. Such shifts in precise settlement locations may have been connected with episodic movements of the major spring at Bestansur or of the river flowing from it. Future geomorphological and palaeo-environmental research in the area will address this and related questions.

Bestansur, Trench 10 architecture

Excavations in Trench 10, to the east of the mound, have revealed a cluster of multi-roomed buildings that form a Neolithic neighbourhood (Fig. 3). Radiocarbon dates from these structures and associated deposits firmly date them to 7700-7600 BC (Fig. 4). The earliest building revealed in Trench 10 is Building 8, not yet excavated. This building is constructed of boat-shaped mud-bricks set in layers of mortar, and many of the wall faces are covered in multiple layers of fine plaster with some evidence for painting.

Building 5 in Trench 10 has been almost completely revealed and excavated. This structure is constructed of reddish-brown pisé with calcitic inclusions and many of the wall faces are also plastered. The layout of Building 5 is distinctive, with a large rectangular ante-room, Space 55, a stone threshold leading into the main room, Space 50, and smaller adjacent rooms. A very unusual large carved and incised stone (Fig. 5) was set against the wall face at one side of the entrance to the building. This stone was clearly used in craft activities involving repeating cutting with sharp tools.

One of the most significant features of the building is the high number of disarticulated human remains deposited under the floors of Space 50, currently being studied by Dr Sam Walsh (Fig. 6). At least 55 individuals, many of them children and infants, have so far been excavated from Space 50. Grave goods in the form of beads of dentalium, clay, crab claw and, rarely, carnelian and jasper, were deposited with the human remains. We recovered two cowrie shells in close proximity to one human skull. The large number of interred individuals, mainly in the form of secondary burials, suggests that Building 5 had a social significance well beyond that of a single resident family.

Bestansur, Trenches 12-13

In Trenches 12-13, at the northern edge of the mound, we excavated Neolithic architecture and finely stratified deposits (Fig. 2). A single radiocarbon date from Trench 13 indicates that the latest of at least three phases of occupation here may date to *c*. 7100 BC, approximately 500 years later than the Trench 10 occupation (Fig. 4). Earlier architecture in Trenches 12-13 comprises small rooms bounded by pisé walls (Fig. 7) with some external spaces. We found significant quantities of fish bones and possible stone net-weights in this part of the site, in marked contrast to other trenches at Bestansur.

Chipped stone assemblages from Bestansur

Chipped stone tools and debitage were recovered in large quantities from all trenches at Bestansur. The tool assemblage attested at Bestansur can be broadly characterised as Mlefatian as defined by Kozlowski (1999), with an emphasis on blades and bladelets, and production of a repertoire of tool types on locally available cherts with usage of imported obsidian. Blades occur in large numbers, and the vast majority of them are broken at either one or both ends. All blade tools may have been used for a wide variety of cutting and slicing activities. Apart from blades and tools made on blades, other tool types include scrapers, drills, and borers. There are rare occurrences of microliths in the form of trapezes and crescents. A common tool form at Bestansur is the diagonal-ended bladelet, which is likely to have been set into a bone or wooden haft to serve as a barb, perhaps for fishing or spearing small game.

One of the most diagnostic tool types found at Bestansur is the so-called Çayönü tool (Fig. 8). These tools have a distinctive morphology, with thick blades showing steep, dense retouch on both edges, and often with a flaring or hooked end. In cross-section they are frequently angular and rhomboid. On their flat obverse faces they often show clear use-wear traces in the form of radial lines etched into the obsidian, interpreted by Anderson (1994) as evidence for their use in final finishing or decorating of stone objects such as marble bracelets and limestone plaques or bowls. Çayönü tools appear in a broad band of territory spanning southeast Anatolia, upper Mesopotamia and the central Zagros, and are dated to the later eighth and seventh millennia calibrated BC (Kozlowski and Aurenche 2005, 143). At Çayönü itself these tools are associated in particular with the Cell Building and subsequent sub-phases (Caneva *et al*. 1994, 263), from *c*. 7600 calibrated BC onwards.

Excavations at Shimshara

The site of Shimshara was selected for excavation within the remit of CZAP as it was known to have Neolithic levels from Mortensen's (1970) excavations in the 1950s. Shimshara is located on the Rania Plain (Fig. 1) in Sulaimaniyah Province, the second most fertile plain in Iraqi Kurdistan after the Shahrizor Plain. Since the late 1950s and the construction of the Dokan Dam, Shimshara has been periodically flooded according to seasonal water levels. At the moment, the site is at least periodically above water and accessible for excavation for part of each year. Located on a large fertile plain, 110 km northwest of Bestansur, Shimshara participated

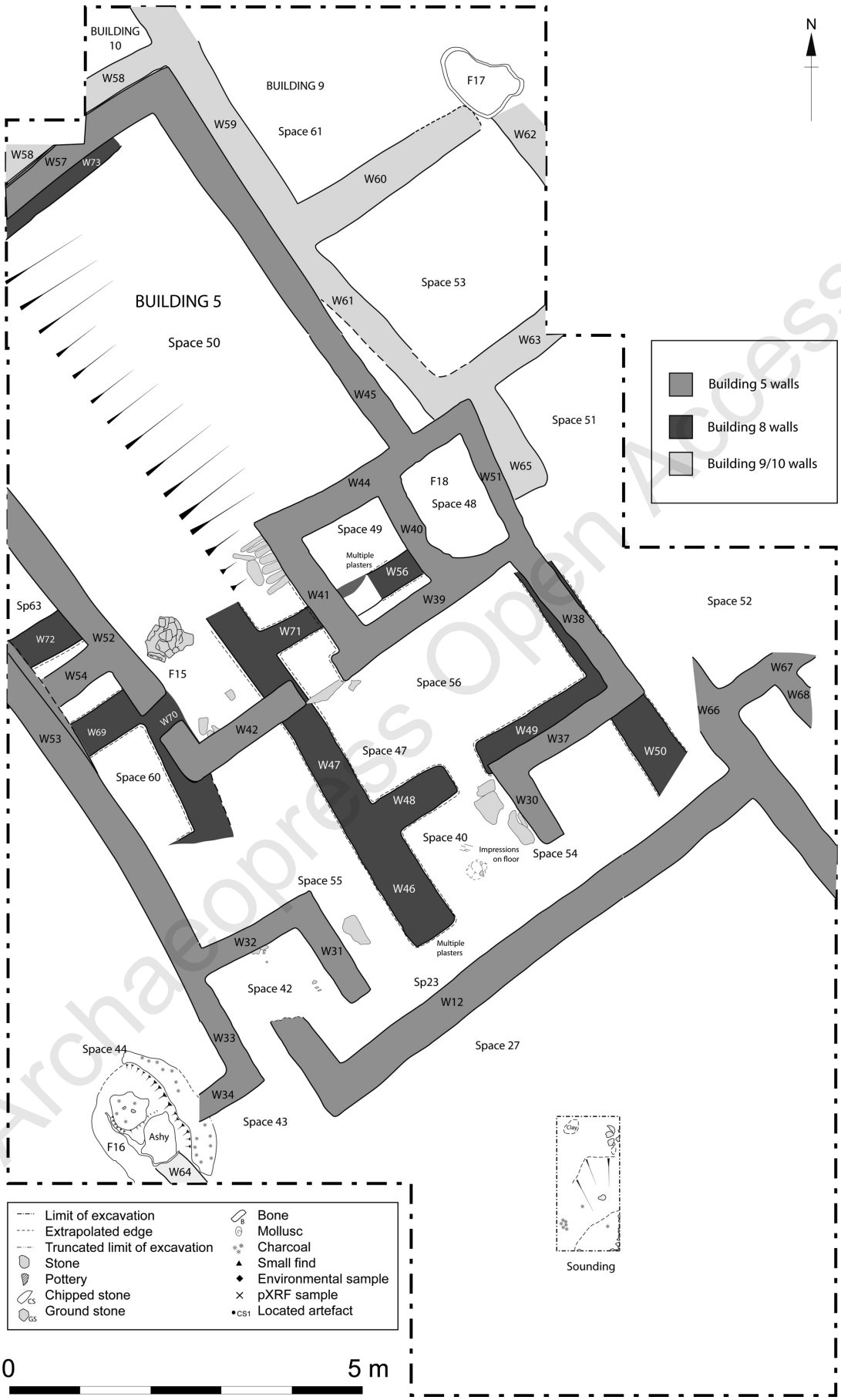

Figure 3. Bestansur, Trench 10 composite plan of architecture.

Site	Trench	Context no.	Material	Lab no.	Conventional date BP	Intercept with calibration curve Cal BC	Calibrated date BC 2 sigma (95.4%)
Bestansur	5	1078	Mollusc shell	Beta-326883	9570±40	9120-8840	9170-9160 and 9160-8780
Bestansur	10	1772	Animal bone	Beta-406556	8620±30	7595	7645-7585
Bestansur	10	1412	Goat tibia	Beta-368934	8610±50	7600	7720-7580
Bestansur	12-13	1386	Pig carpal	Beta-408868	8130±30	7075	7175-7055
Shimshara	Section		Pistacia sp.	Beta-342484	8230±40	7300 and 7220 and 7190	7450-7440 and 7420-7410 and 7360-7120 and 7110-7080

Figure 4. Radiocarbon dates from Bestansur and Shimshara.

Figure 5. Large stone at entrance to Building 5.

in different regional networks and thus provides an important comparison to Bestansur, for investigation of local and regional variation in Neolithic ecological and social strategies, a key CZAP research issue. Bestansur is close to a perennial spring while Shimshara is on the banks of a major river, the Lesser Zab (Fig. 9).

Initial assessment of the Neolithic levels at Shimshara established that there are at least 2.5 m depth of extant Neolithic deposits above natural. A radiocarbon date on charred plant material from the base of our excavations indicates occupation at c. 7300-7200 BC (Fig. 4). Two trenches were excavated at Shimshara in 2012-13 (Fig. 10). An important discovery is the identification of grey silty clay deposits with well-preserved plant remains that represent the earliest activities in this area of the site. Neolithic occupation and activities in Trench 1 include a flat working area at the edge of a break in slope, and adjacent discard deposits containing burnt stones, aggregates and animal bones. In Trench 2, the earliest excavated deposits represent diverse activities on a series of small pebble and stone surfaces, with artefact fragments such as carved marble bracelet fragments and an incised stone bowl sherd. In future investigations it would be valuable to extend excavations to the west of Trench 1 to enable open-area excavation of Neolithic levels.

The chipped stone assemblage from Shimshara includes a much greater representation of obsidian, with multiple Çayönü tools (Fig. 8). Sickle blades are also well represented, and there are examples of diagonal-ended bladelets in chert and obsidian.

Conclusions: exploring the Neolithic of the eastern Fertile Crescent

In addition to the issues discussed above, CZAP specialists are currently studying the full range of material culture and ecological evidence from the sites of Bestansur and Shimshara, including architecture, stratigraphy, micro-archaeology, animal bones, human remains, charred plants, ground-stone, chipped stone, clay objects, networks of material and resource use, radiocarbon dating, and molluscs. The CZAP team is currently preparing reports and analyses of all these aspects for publication as volume 2 of the project's final publications. Additionally, an ambitious plan of local

Figure 6. Excavation of human remains from Building 5, Space 50.

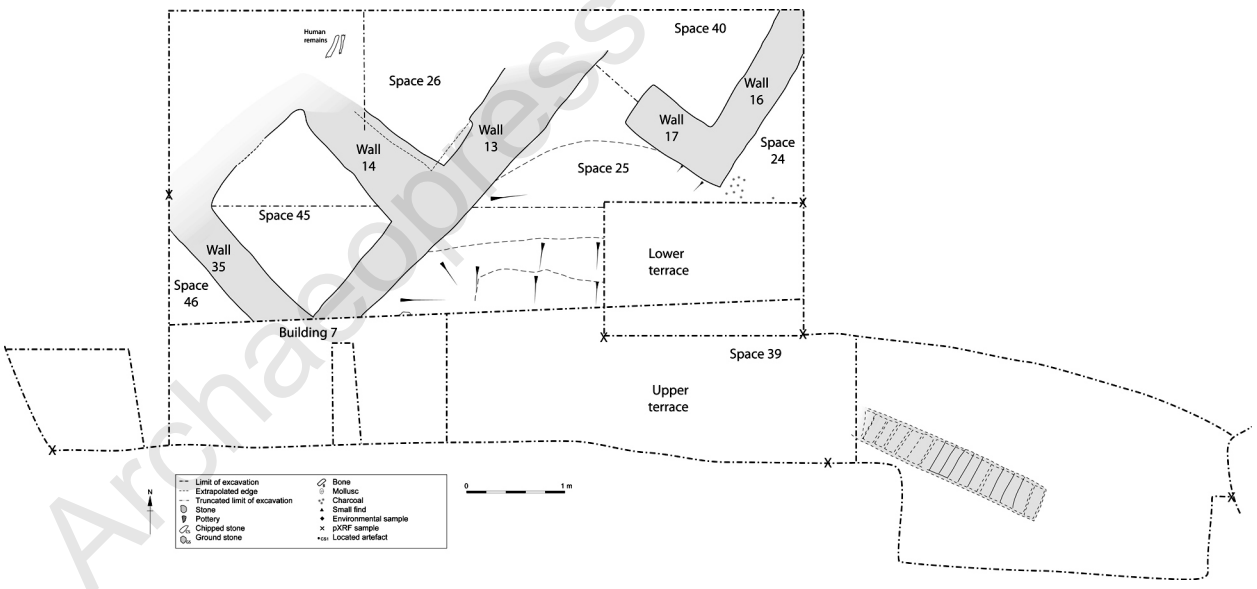

Figure 7. Bestansur, Trenches 12-13 architecture.

and regional outreach and engagement is being planned in consultation with colleagues in Sulaimaniyah and beyond.

For the first time, our excavations at Bestansur and Shimshara are shedding light on the Pre-Pottery Neolithic period of the eastern Fertile Crescent, in particular during

Figure 8. Obsidian Çayönü tool from Shimshara, re-used as blade core.

the eighth millennium BC. Excavated levels at both sites pre-date and are contemporary with the earliest Neolithic levels excavated by Braidwood at Jarmo, in the same region, and they provide new insights into the origins of sedentism, the early development of sophisticated architecture, the elaboration of human burial practices, the engagement of local communities in networks of trans-regional interaction, and local diversity in ecological, environmental and social pathways through the transition from hunter-forager to villager-herder.

Figure 9. View of Shimshara, looking south to the Dokan Dam lake.

Figure 10. Shimshara, location of Trench 1 (left) and Trench 2 (right), looking north.

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