

GROUND-TRUTHING THE AREA F-NORTH GPR SURVEY

THE 2021-22 BELGIAN EXCAVATIONS IN MLEIHA, U.A.E.

by

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Abstract

The winter 2021-22 excavations by the Belgian team focused on two areas at Mleiha: Area F-North and Area C. The present report discusses the Area F-North excavations. A Ground Penetrating Radar survey in 2017 had identified several anomalies in Area F-North that were interpreted by the GPR-team as possible buildings and monumental tombs. Three of these anomalies were selected for a ground-truthing excavation. A single room building was identified but no graves.

Keywords: Mleiha, GPR, graveyard, mudbrick architecture.

Introduction

Area F-North borders on the main road through Mleiha and lies immediately to the West of the Mleiha Fort AW. It is to the North of Area F-South, a graveyard area where the Belgian team excavated between 2015 to 2019 (Overlaet 2018; 2019).

In May 2017, Eastern Atlas GmbH & Co.KG and NTNU University Museum (Trondheim), executed a GPR survey of area F, covering circa 6.5 hectares, using a high-resolution multi-antenna-array DXF1820 of 3d-radar. This created data sets with a spatial resolution of 7.5 cm x 6 cm to a depth of 100 to 120 cm, visualized in 20 cm interval horizontal slices. The GPR report for Sharjah Archaeology Authority included maps with the suggested interpretation of the anomalies (Meyer et al. 2017). An extensive summary was published shortly afterwards in the journal Annual Sharjah Archaeology (anonymous 2018).



Fig. 1. The 2017 GPR areas (left) and the Northern part with “identified structures” (right). (after Meyer et al. 2017).

The 2017 GPR report interpreted two anomalies in Area F-North as large “building complexes” and some smaller structures as single cist graves (Meyer et al. 2017: 19; anonymous 2018: 21-23). However, the 2018 and 2019 excavations in the Southern part of Area F had demonstrated that the soil conditions in area F and disturbances from its use for palm gardens and for other agricultural activities had negatively impacted the reliability of the GPR survey. Whereas hardstone constructions were correctly located, mudbrick architecture and other anomalies such as burial pits proved difficult to distinguish and a ground-truthing excavation was a necessity to verify the GPR interpretations.

Ground-truthing the GPR-interpretation of Area F-North was the primary goal of the 2021 campaign and 3 of the identified features were selected for excavation: features 28, 36 and 47. Feature 28 was the largest of the two “building complexes” and displayed an unusual wall pattern and a large “floor”. Features 36 and 47 had been interpreted as tombs (Meyer et al. 2017: 19).



Fig. 2. Area F-North with the ground-truthing excavations of features 28, 36 and 47 (drone K. Kamyab, SAA).

Feature 28.

This was the most prominent feature identified by the GPR-team and described in the report as : “... A large building complex is found 150 m to the west of the Mleiha fort (feature 28) and extend over an area of at least 1,000 m². The foundations can be only identified in depths between 40 and 80 cm by GPR means, but they are most probably deeper. Indications of a paved floor can be recognized in its northwestern part at a depth of around 60 cm. The complex character of the ground-plan and the dimensions of the supposed buildings suggest that this may be a representative structure, hypothetically for administrative purposes, rather than being a funerary complex (Figure 1711-6). ...”(Meyer et al. 2017: 19-20; Anonymous 2018: 2).

The potential importance of this feature warranted further research and with the assistance of Ronny Wakit, SAA surveyor, a grid was set out with squares of 10x10 meter to excavate the northern part of the “complex”. Work started on squares D3 and D4 to include the “floor” and a selection of the walls. The top corner of the nearest stone water basin from the former date palm plantation to the NW was used as 0-meter benchmark (see Fig. 2).

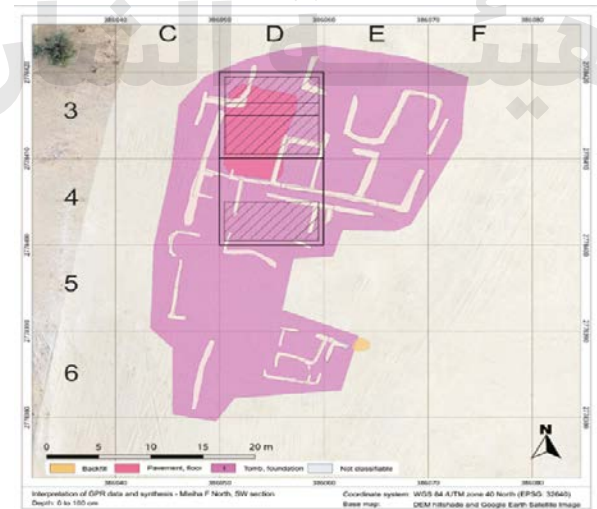


Fig. 3. Area F-North “Feature 28”. Left : plan of a “building complex” based on GPR readings (Meyer et al. 2017, Fig. 1711-6) and the position of the squares with the excavation plots (striated); Right: excavation plan.

Once the top layers had been removed, two back-filled pits were visible in D3 (Fig. 4). A channel like ditch was dug down into the top of the gravel layers at ca. 40 to 50 cm below the surface. A deeper and more irregular pit next to it may have been a planting hole for a date palm. No sherds were found in either of these pits. A deep E-W trench (9 by 1.5m.) was dug into the natural gravel layers but a floor as suggested by the GPR was not present. Since no building activity was visible in square D5 either, the excavation of feature 28 was halted. In general, very few sherds were found (none of which diagnostic) and this only in the top 20 cm surface layer.

These results prompted a review of the individual GPR depth slices in the 2017 report. Readjusting contrasts of the depth slices revealed that the suggested building plan was actually part of a grid pattern that recaptures that of date palm plantations intersected with water channels. This grid pattern also continued over the “flooring” disproved by the E-W trench. Fig. 5 shows the

overlay of the suggested building plan on the 40-60 cm depth-slice, next to the same depth slice but with enhanced contrast. It shows the same palm garden grid that is still recognizable on the surface in the areas next to Mleiha F-North (e.g. fig. 2: far right; note also the remaining water basins of the former plantations in F North).



Fig. 4. Area F-North “Feature 28”. Top and middle: two back-filled pits in square D3. Bottom: view from the North on the profile of the E-W trench descending into the alluvial gravel layer.

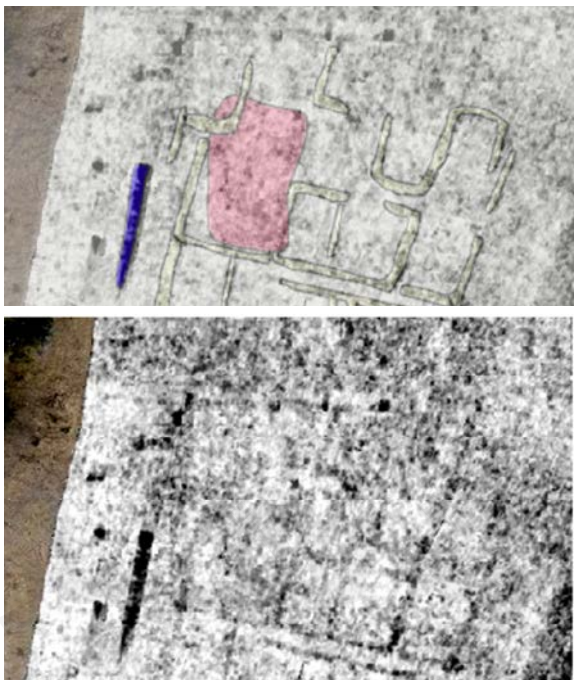


Fig. 05. The GPR depth slice 40-60cm with overlay of the “building plan of feature 28” (right) next to the same depth slice with enhanced contrast. A more complete pattern of squares and (water) channels can now be recognized.

Feature 36.

The GPR report suggested feature 36 was one of several tombs with square superstructures in area F-North: “..., some minor clusters of structures, apparently single cist graves, were identified. One group, to the northwest of the Mleiha fort (features 32 to 36 and 47).” (Meyer et al 2017: 19).

The GPR indicated a sand-filled patch inside the square to rectangular construction, something which could have indicated a robbers’ hole dug through a mud-brick floor of a funeral monument. A similar pattern had been observed in the GPR images of monumental tombs in area AV (Verdonck et al. 2014: fig. 4, 5 and 8), hence the selection of feature 36 for excavation.

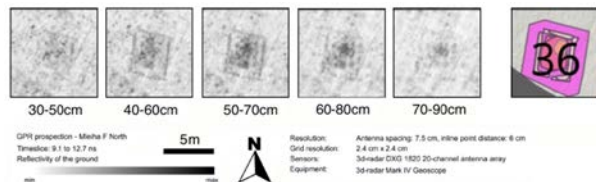


Fig. 06. The GPR depth slices and interpretation of “feature 36” (after Meyer et al. 2017).

A 10 by 10 square was set that included feature 28 and that cut in its SW corner a curving track, indicated in black on Fig. 1. It is placed in the report in the category “Paths, consolidated sand and clay” (Meyer et al. 2017: 16). The SW corner of a concrete water well to the NE was used as 0-meter benchmark (Fig. 2). Banks of 0.5 m were preserved along the sides of the square, limiting the excavated area to 9 by 9 meter square.

At about 25 cm below the surface, the “path” and the outline of the building construction became apparent. The “path” is a dense, compacted surface with two parallel tracks with a hard, mortar like composition. This appears to be the level base for water channels. In view of the available time for this ground truthing excavation, work was limited to building and the remainder of the square.

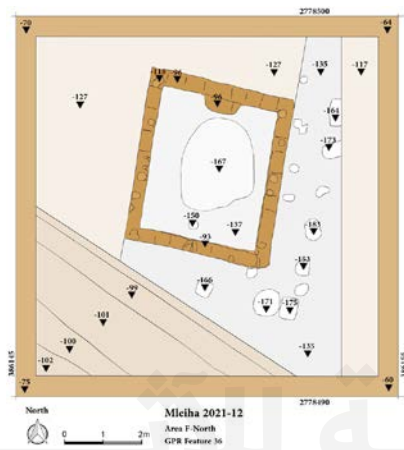


Fig. 7. Plan of feature 36.

The construction measures approximately 3.77 by 4.45m (Fig. 7-10) with an inside space of about 3.05 by 3.70 meter. Three rows of bricks of about 35 cm and 12 to 13 cm thick with up to 4 or 5 cm thick masonry joints are preserved. The top row is unfortunately very deteriorated. One or more additional bricks were laid against the center of the North wall on the inside of the building. Possibly this was a step to a doorway placed above the three rows of bricks. Vertical post-holes in the corners and at several places in the walls indicate the upper part of the building consisted of a wooden structure, probably with palm-leaf panels. Such *barasti* are ideally suited for the local climate and persist to the present day. Single room constructions with post holes in low mud brick wall bases are also documented in Mleiha area L (38 x 38 cm bricks with postholes: see Mouton 1999: 119-120, fig. 9-10; 2010: 191) where they are dated to the earliest occupation of the site. Apart from at area L (Boucharlat & Mouton 1993; Mouton 2008: fig. 31, pl. 3; 2010: 190-192, fig. 9), single room constructions were found near the camel cemetery (Jasim 1999: 91, fig. 39-40) and in area 5 (Jasim 2001: 126-127, 133, fig. 43).



Fig. 8. Area F-North, Feature 36 during (top) and at the end of the excavation (bottom).

The area inside the building was unfortunately very disturbed and no clear floor level could be distinguished, although the expected reference would be the base of the mudbrick wall (dashed line on Fig. 9). A large and shallow oval pit in the center of the building (Fig. 8) was dug through what must have been the floor level and into the dense alluvial gravel. We can only speculate on its meaning. The position and size of the pit resembles many of the robbers' holes inside the superstructures of monumental tombs (compare Verdonck et al. 2014: fig. 4, 5 and 8; Kutterer et al. 2014: figs. 2 and 4). Tomb robbers may have halted their attempt when they encountered the gravel, realizing they were not digging into the characteristic mudbrick layers that would be expected to be present above a burial pit.

A large zone to the East and South of the construction was excavated to the base level of the mudbrick walls and revealed a dense irregular pattern of pits and holes. Some of these may be postholes but the majority were probably pottery stands. Fig. 10 (right) shows in the center of the picture a ca. 67 cm large round pit that is 39 cm deep and has a rounded section. It would be an excellent stand for a large storage vessel or *dolium*. Next to it are somewhat smaller and more square pits. Also these were probably vessel stands (for in situ use, see Overlaet et al. 2019: 244, fig. 3).



Fig. 9. Area F-North, Feature 36. Top: the NW and NE corners with postholes in the mudbrick wall base. Bottom: view on the Southern wall construction.



Fig. 10. Area F-North, Feature 36. Pits near the SE-corner of the construction.

The intensive use of the F-North area for agriculture explains the disturbance of the upper layers and it is not surprising that no ceramics were found in situ. Some fragments of various types of storage vessels as well as some green glazed sherds were present. Their chronological range covers the full Mleiha period. Only a few finds were registered, among them a bronze fishhook, a fragment of a glass ribbed bowl and a fragment of chlorite bowl with an engraved camel (Fig. 11). The fragment is too uncharacteristic to suggest a date in a specific Mleiha phase (Mouton 2018).



Fig. 11. Finds from Area F-North, Feature 36. Steatite bowl fragment with engraved camel figure; glass ribbed bowl fragment; bronze fishhook.

Feature 47.

The pattern in the depth slices is less clear than in the case of feature 36 but it was also interpreted as a possible “single cist grave” (Meyer et al 2017: 19).

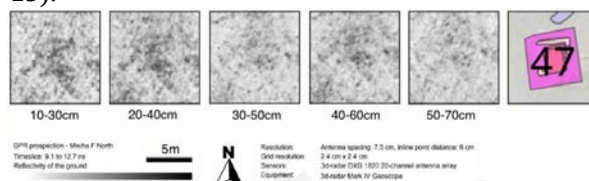


Fig. 12. The GPR depth slices and interpretation of “feature 47” (after Meyer et al. 2017).



Fig. 13. The 10 by 10-meter square on the location of “feature 47” at the start of the excavation.

A North-South directed trench of 2 by 9-meter in the center of the square was excavated to a depth of ca. 30 cm (Fig. 2). The reflection registered by the GPR in fig. 12 turned out to be the result of (recent) fly tipping with building materials, plastics and textiles. This explains the presence of the strongest GPR reflection in the top depth slices, rather than in the deeper levels as had been the case with feature 36. Once this debris was removed there were no indications of any underlying building activities and excavation was halted.

Conclusion

The Eastern Atlas report on the 2017 GPR-survey suggested that the graveyard which borders Mleiha on its Eastern and Southern side extended into area F-North, between Fort AW and habitation area L. Moreover, the presence of large building complexes was suggested in two locations. Ground-truthing was a priority since these proposals would have changed our current understanding of the distribution patterns of habitation and grave complexes.

A large “building complex” (feature 28) and two of the supposed tombs (features 36 and 47) were selected for control excavations. The GPR reflections of Feature 28 were misinterpreted. They turned out to be the result of recent agricultural activities, specifically the date palm plantations

that were reintroduced in the area in the mid-20th century. Feature 47 was not a tomb structure but the GPR reflection of a modern fly-tipping activity. Feature 36, however, was correctly identified as an archaeological feature, although it was not a tomb. It is a rectangular single room building that strongly resembled the Early Mleiha phase habitation patterns known from Area L.

While the ground-truthing work confirmed the accuracy of the GPR's raw data capture, it also demonstrated the importance of a balanced processing workflow and the need for prudence and restraint when advancing speculations as to the nature of possible archaeological structures. As it stands, area F-North seems to have been sparsely occupied in the Mleiha Phase but was not part of the Mleiha graveyard. If future excavations confirm the sparsity and distribution of structures, the area may have been largely used for modest habitation and/or agriculture. Possibly, the use of this area starts as early as the 3rd – 2nd century BCE when it was at some distance from the main center of habitation in area L. More research is needed, however, to understand the chronological implications of the use and function of the area.

Although the 2017 GPR survey did not attain optimum results, it did prove to be a valuable tool to evaluate this large area where – as a result of recent agricultural activities – archaeological surface surveying can hardly provide reliable information. In these circumstances and with the limited time and resources available, geophysical prospection methods such as this GPR are a much-needed tool that offer the unique possibility to single out potential archaeological structures for investigation.

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