



## **Nahal Mahanayem Outlet Excavation**

# **Report on the 2013 Excavation Season**

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**The CARE Foundation**



## Introduction

The seventh excavation season at Nahal Mahanayem Outlet (NMO) lasted four weeks and took place between August 4 and August 30, 2013. Team included students and volunteers from the France, Italy, Austria, Sweden and USA. In addition students from the Tel Hai College participated, as two groups, in 2 weeks field school during the 2013 season. This is the second year of very successful field school at the Tel Hai College (2 credit points) which helps bring many students to know and like archaeological work.

The goals of the 2013 season were, in a similar way to the previous season, to continue excavating in the primary excavation area – Area D, in particular towards the north, where the excavated squares are rich in finds, and to the south of the area, where additional levels of occupation were suspected (Fig. 1).

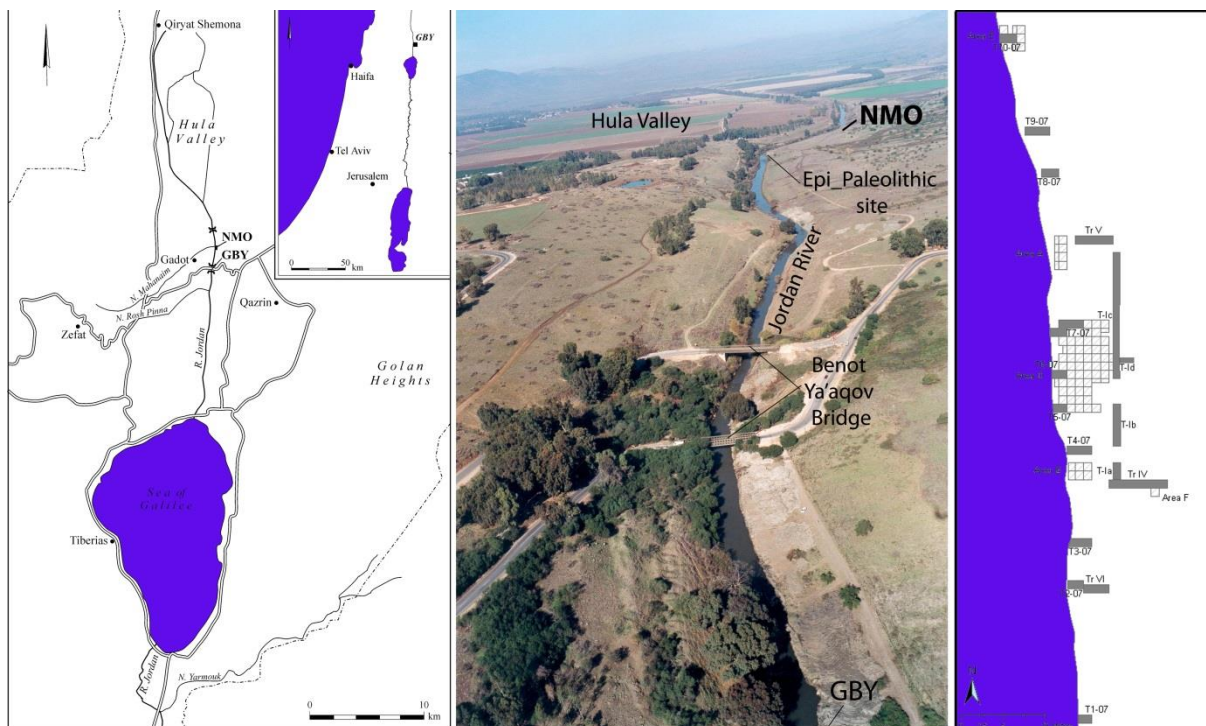


Figure 1: Location of NMO site and general map of excavation and trenches.

## **Excavation methodology**

Excavation grid and datum were based on the data from previous seasons (see previous IAA reports). The use of a Leyca total station device enabled us to return to the grid and datum of earlier excavation seasons with very high precision.

The total station device was also used for the recording of all finds, soil samples and other samples, trenches and other reference points and data at the site. Each find or sample has its spatial data recorded and organized within the site's database. Different numbering is used for the recording of flint artifacts, bones, wood and soil samples. The additional category of "other" is used for different, non-flint lithic raw materials (such as basalt) and for finds that fall outside the above categories. Soil sampling continued the policy practiced during the previous seasons. In each of the excavated squares, a section of 10 cm was left at the middle of the square during excavation. This section "pillar" (known at the site "carrot"; Fig. 2) was regularly collected in 5 cm slices as soil samples. This method ensures the collection of soil samples along the entire sedimentological sequence of each of the excavated squares. The soil samples were recorded using total station and numbered sequentially with the year, the square and the serial number recorded on the bag and in the computer (for example NMO 13/01). In addition, soil samples were collected every three days specifically for zooarchaeology (labeled RB/13/#) botany (labeled YM/13/#) and fungi (labeled ID/13/#). Specific samples were also collected from location of special interest identify during excavation. All samples are kept at the excavation storage at Kibbutz Gadot. The complete list of 2013 season soil samples is given in Appendix 2.

**Sediment sampling and sieving** – the policy of the site is to sieve all the sediments excavated. Sieving in Jordan River water is a heavy time consuming effort. The fine clay of the sediments demand long sieving process that may sum in 20-30 minutes per bucket. Some 40-50% of labor time is invested in sieving (not counting the sediment sorting time at the lab). Therefore, in squares where the sediments are almost archaeologically sterile, like when excavating the layer 3 soils above the archaeological layer 4, we adopted a different strategy in which only one bucket per spit is sampled. The sampling method is recorded in the square daily excavation pages and is constantly evaluated (attached to this report). When excavation reaches the archaeological layer, the sediment is always fully sieved.





**Figure 2: soil sample sections (carrots) in squares M162 and N162.**



**Figure 3: Sieving sediments 2013 season.**



**Finds orientation:** we have continued the previous season method of recording and indicating the in situ inclination of exposed large bones and flints. For each of the finds larger than 5 cm we record its position similar to all finds at the site. In addition, we record two points on the far ends of the find. The points are recorded as the artifact ID number with added a and b. The line between these two points will allow us to quantify the inclination of each of the finds and to discuss the taphonomy resulting.

**Bone preservation and restoration on site:** bones exposed at the site, and in particular from the lower, waterlogged squares, are found in complete form. However, when exposed by excavation they form cracks and may, if not carefully handled, collapse into many small fragments when extracted (Fig. 4). The unique completeness of the bones is one of the site's advantages for the zooarchaeology study. Complete bones are rarely found in prehistoric sites at the Levant. Such bones, when measured, can provide valuable information regarding size of animal and other crucial information. The breakage of the bones prevents these advantages and forces the investment of much time and energy in lab preservation and refitting work. In an attempt to tackle this problem, and in consultations by Ms. Gali Bainer, the site's bone preservationist, we developed and applied a method aiming for the preservation of the bones in one unit that can then be preserved at the lab. The unique conditions at the site and in particular the wet sediments present special preservation challenge. The bones are actually excavated in under-water conditions as water run into the excavated squares during excavation as well as during the night and practically "wash" the glue off the bones. It was necessary to find glue that will hold in water on the one hand and will be removable on the other hand. Such glue was found by G. Bainer and we experimented its use during the season. The selected method involves the application of glue to the bones immediately during their exposure (even before they were fully excavated) and rapping the exposed surface with gauze pads and glue. The gauze kept all parts of bone together and enabled us to extract the bones in complete form (even if cracked) into lined boxes (Fig. 5). This method was proven successful and saved great deal of conservation work.



**Figure 4: Bone at Square N161. A. exposed, cracks are notable; b. covered with gauze ready for extraction.**





Figure 5: bone preservation in the field.



**Jordan River Water Level and excavation conditions:** Water level in the Jordan River was relatively low during the season. Yet, water flow from the sediments into the excavation area demanded starting the excavation with a morning bucket chain every day (Fig. 6).



**Figure 6: Draining the site after Jordan River flooding.**

### **The 2013 Season - Report by Excavation Areas**

For general location of the excavated squares in Area D see Fig. 7. The primary excavation area of the site, Area D, was excavated with the goal of continuing the previous season excavation by enlarging the excavation area in particular sections of interest. The focus of the 2013 season was on squares at the northern, southern and western parts of Area D (Fig. 8-9). In order not to disturbed squares that were totally excavated during previous seasons (totally excavated means excavated to full exposure of the basalt cobbles of layer 5, the site's bed rock, see previous reports and Kalbe et al. 2013) we did not exposed the entire surface of Area D but opened only the squares to be excavated. The result was two "sub-areas" within Area D: Area D north and Area D south (Fig. 8). Figure 9 is a map of the excavated squares detailing the situation in each square at the end of the 2013 season. The description below will deal with each of these sub-areas separately. Additional find spot, immediately south of Area

E (Fig. 1 and see previous reports) yielded bovid bones and was briefly excavated as described below.

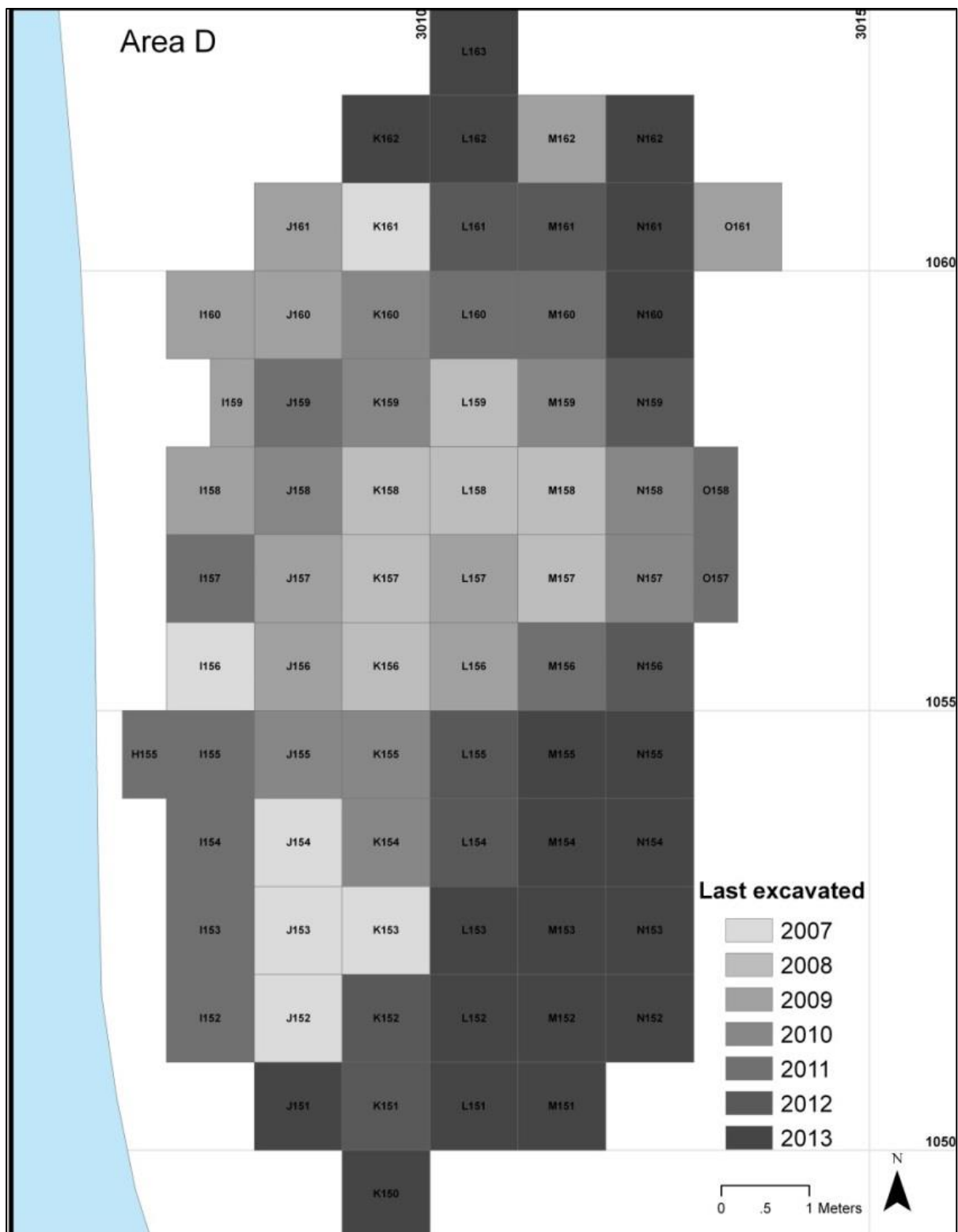


Figure 7: Excavation at Area D: map of excavation squares by year.



Figure 8: NMO excavation 2013. Area D sub areas north and south at the end of excavation.

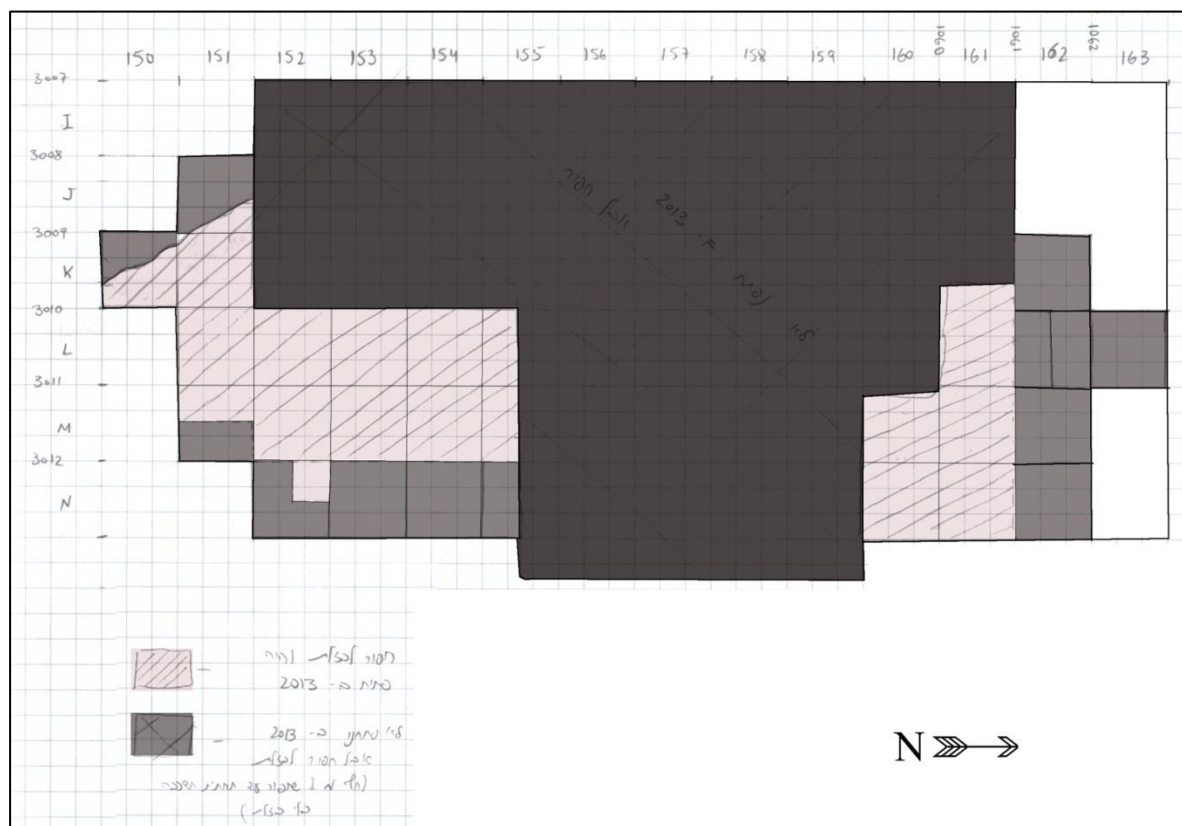
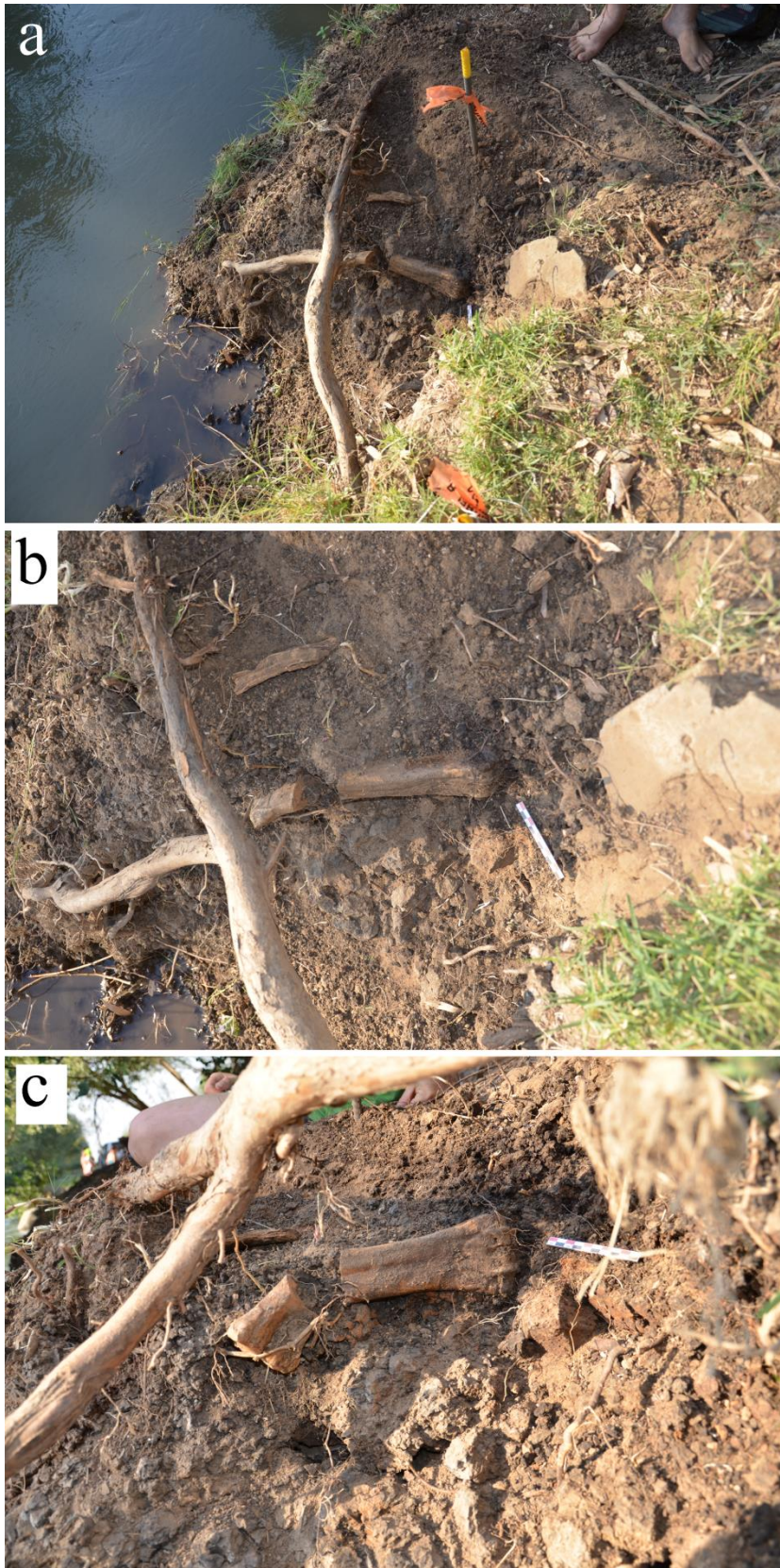


Figure 9: Area D at the end of the 2013 season



**Bones at the River Bank south of Area E** - At this location, only 1 meter south of Area E, excavated in 2011 (see report), the bones of a bovid were exposed on the east bank of the river, some 70 cm above summer-water-level of the Jordan River. The presence of bones in this locality was first observed during pre-excavation visits to the site. Many fragments were collected from the river bank of material that were identified as the remains of dried wood. These are now classified as fragment of a large horn-core. During visits to the site in 2013, prior to the excavation season, the presence of bones was observed at the river bank. A careful examination of the sediments revealed the presence of bovid metacarpal and remains of cow horn-core (Fig. 10). The bones are in bad preservation state (in comparison to the bones at the primary excavation area) probably due to their being close to the surface of the bank and drying during the summers since the drainage operation in the year 2000. The bones were carefully excavated and their location and position was recorded. They included the metacarpal, horn-core, large and flat bone and possibly a rib. No flint tools were found in immediate association with the bones here. Identification and further study are ongoing at the lab. Their stratigraphic position is estimate to be similar to the dark clay of Area E, only 1 meter to the north, which has an OSL date of ca. 70k years BP (Kalbe et al. 2013).



**Figure 10: Bovid bones north of Area E. metacarpal of bovid size.**

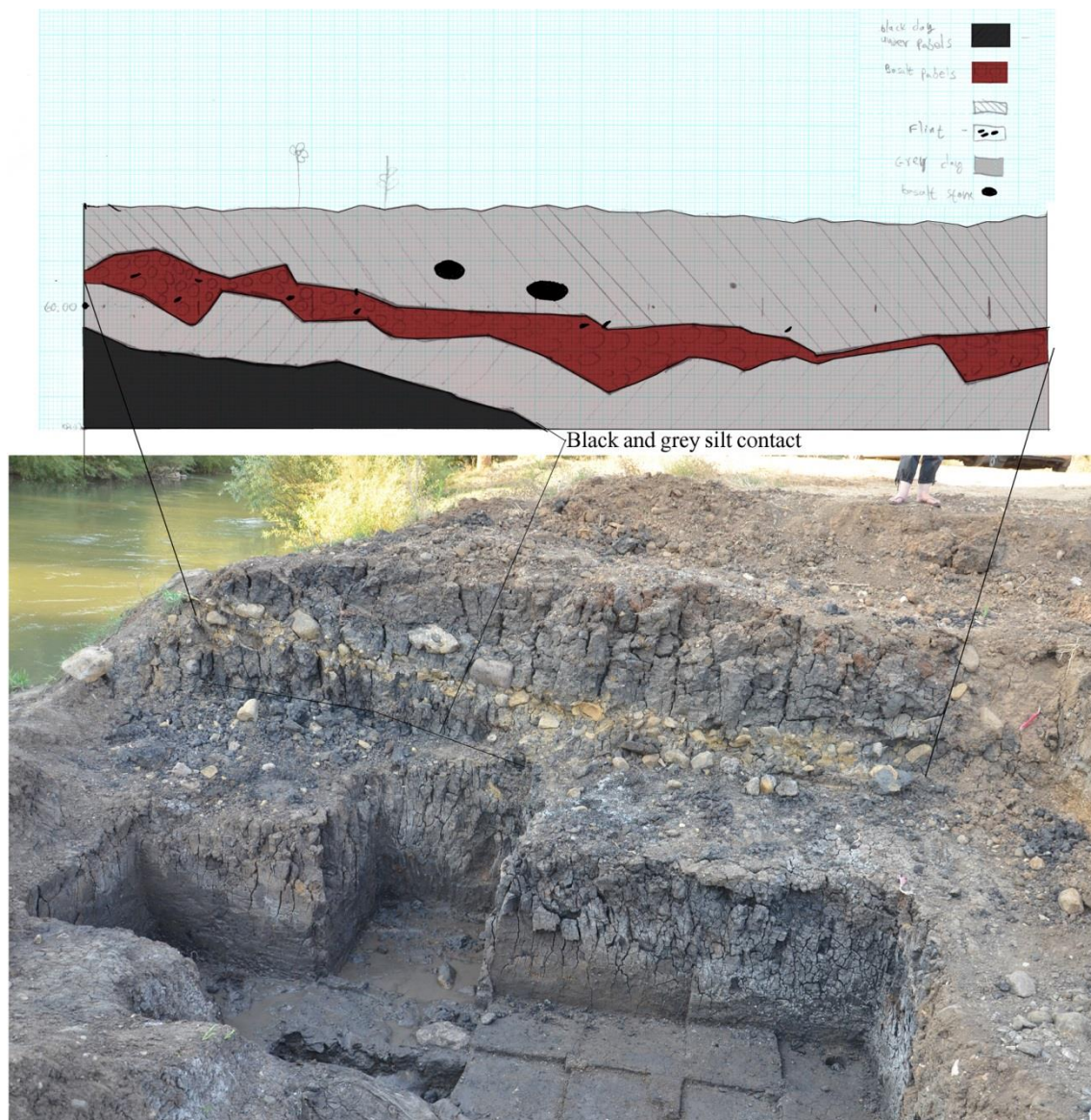
## **Area D North**

The goal of excavation in these squares (Figs. 8-9) was to enlarge the excavated surface and to continue the work in the squares that were not fully excavated in the previous year, some of which were among the richest in finds in the site. Figs. 12-13 show the location of the squares described here.

### **Northern Section Basalt Horizon**

During the re-opening of Area D north by the tractor, the north section of was moved towards the north in order to expose new squares for excavation. During this operation a new horizon of basalt cobbles was exposed, running from east to west along the entire section (Fig. 11). The horizon, comprise of heavily weathered basalt cobbles is clearly of fluvial origin. The horizon fluctuates between 50 and 10 cm in thickness with no matrix between the basalt cobbles and pebbles. This horizon is imbedded within a thick layer of grey silt that is the upper part of Layer 3 of the site. The silt unit is tilted toward the east and lay on top of the black silt of layer 4, the archaeological bearing layer of the site, in a flat and sharp contact. This contact probably represent unconformity surface possibly resulting from tectonic movement of the layers (Kalbe et al. 2013). Large cobbles were observed “floating” in the grey mud above the horizon (Fig. 11). Flint tools were found between the basalt cobbles and pebbles all along the thickness of the layer. The artifacts are slightly weathered and field observations seem to suggest that they did not include many chronologically indicative forms. Laboratory analysis of the tools will enable us to suggest a better understanding in the future. The Layer should probably be dated to the end of the Late Pleistocene, similar to the trench excavated in Area A (see 2007 season report and Sharon et al. 2010) but this chronology need to be confirmed by future research. The new basalt horizon is indication to the complex tectonic and fluvial history of the sediments prior to the accumulation of the NMO Middle Paleolithic layers. It is also clear that this complex history did not disturb the in situ nature of the MP layers.





**Figure 11: Section north 2013. Basalt fluvial horizon.**

### **Area D North**

This is a limited area (Figs. 12-13) holding two squares that needed the completing of excavation (N160 and N161) and 5 squares that were started during the 2013 season aiming to enlarge the excavation area (the richest part of the site). The plan was to excavate in a relatively fast manner and rich Layer 4, above the basalt in most of them. On the other hand, a careful excavation was needed in order to track evidences for human presence above the primary layer 4. The primary evidence for such artifacts “floating” in the silt above the layer, come from a bone and a fine flint knife found in square L162 during the 2011 excavation which actually refitted with flint from layer 4, immediately on the basalt at square L160. Such layer was suspected, but the results of the 2013 season did not result in a clear answer. Further



study, applying GIS mapping and other methods, is needed. The squares were excavated in 10 cm spits, with a single bucket sieved per spit per sub-square. Exact details can be found in daily excavation pages of the squares (attached to this report).

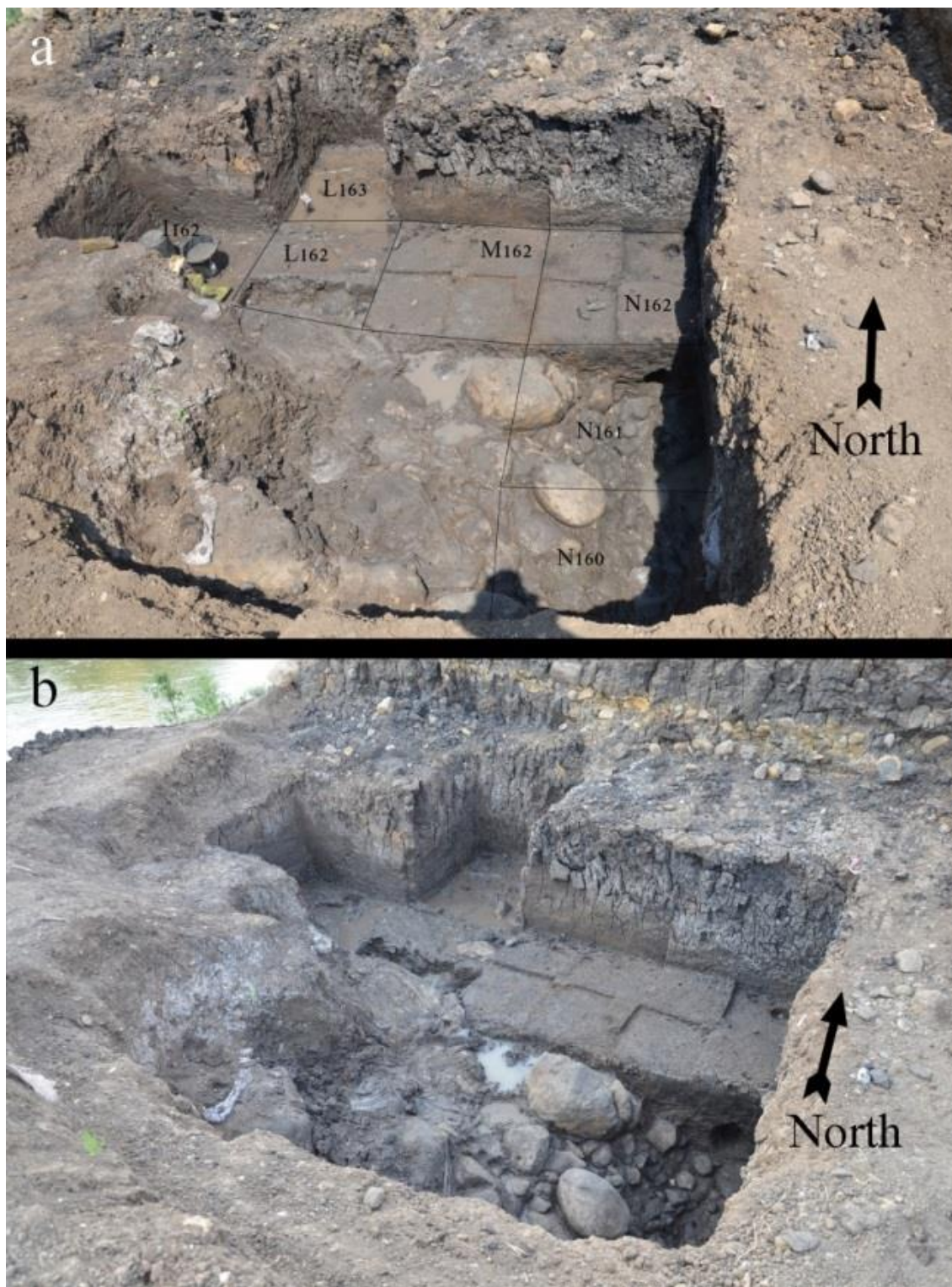


Figure 12: Area D 2013 North. a. the excavated squares; b. at the end of the excavation.



Figure 13: excavation squares at north of Area D. end of excavation.

**Squares N160 - N161** - these squares were excavated during the 2012 season and their final exposure to the basalt bed rock of Layer 5 was completed during the 2013 season. The basalt here is strongly slanting toward the east, in a similar way to the basalt in the neighboring squares. Both squares were rich in finds, primary bones and flint artifacts. The finds are located in the silt above the basalt of Layer 5 and concentrated immediately on the basalt surface. Figure 14 presents the spatial location of flint artifacts along the excavation grid L line (east to west section, Fig. 9). It can be seen that the finds are marking the presence of basalt and scattered up to 40 cm above it in the mud. Large bones, probably of bovid, but also of deer size and other animals were exposed at the squares. It seems that at least one cow, possibly a young individual, is represented by many body parts found as complete bones. The bones are not articulated and may have accumulated in mud as their position is sometime vertical.

**Taphonomical and sedimentological observations:** at both squares bones were exposed both in the mud and directly on the basalt surface. The bones exposed on the basalt were sometime packed between the basalt cobbles and hard to extract (Fig. 16). The stones around them had to be removed before they could be taken out. The bones were sometime partly covered by small, pebble size, basalts and in association with flint artifacts. Interestingly,

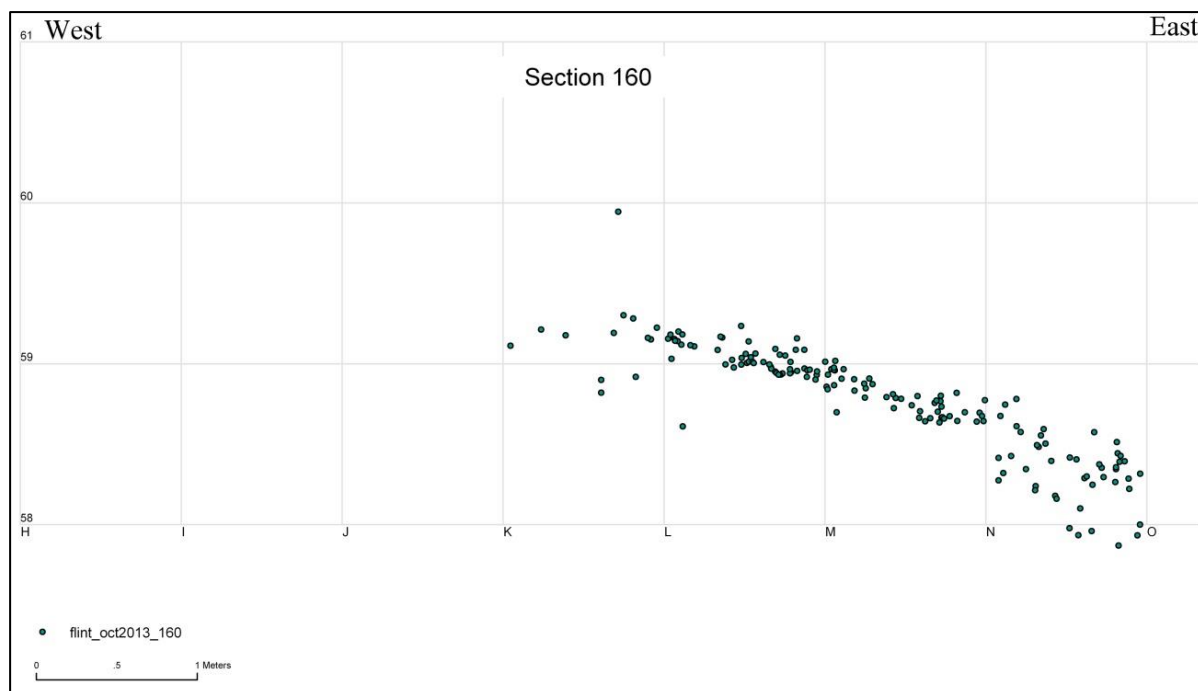


limestone cobbles are more common here than in other parts of the site (Fig. 15). The presence of many limestone pebbles here can be explained by preservation of the limestone. As in many other parts of the site, the limestone is clearly “attacked” by the sediment and deteriorates into clay. The basalt at squares N160 and N161 also show evidences to the beginning of this process. Eventually this process will cause the disappearance of the limestone. Possibly, the waterlogged condition of the sediment here preserve the basalt better than in areas where the sediments went through a periods of drying.

Additional sedimentological observation is that the concentrations of iron known at the site as “gingi” (redhead, due to their rusty color) are present here in large numbers, similar to other parts of the site, but when exposed in these squares their color was grey and not reddish (Fig. 17). XRF reading of the concentrations imply that they are similar in mineralogy to the normal “gingi” of the site (Table 1). Furthermore, after exposure to the air they were all oxidize and gained the reddish color typical of the site’s “gingi”. The presence of un-oxidize concretions at the deep squares of N160 and N161 suggest a waterlogged conditions and that the concretions were never exposed to oxygen in the past.

**Table 1: XRF reading of the oxidize concretions (Prof. G. Rytwo, MIGAL)**

	Oxidize concretion red	Oxidize concretion white
Na <sub>2</sub> O	0.7	0.6
MgO	1.7	1.2
Al <sub>2</sub> O <sub>3</sub>	9.69	6.40
SiO <sub>2</sub>	29.91	17.49
P <sub>2</sub> O <sub>5</sub>	0.46	0.43
SO <sub>3</sub>	0.20	0.58
Cl	0.06	0.02
K <sub>2</sub> O	0.81	0.50
CaO	7.04	14.24
TiO <sub>2</sub>	0.95	0.89
V <sub>2</sub> O <sub>5</sub>	0.03	0.02
Cr <sub>2</sub> O <sub>3</sub>	0.10	-
MnO	0.39	0.46
Fe <sub>2</sub> O <sub>3</sub>	47.87	57.17
SrO	0.01	0.02
ZrO <sub>2</sub>	0.03	-
PbO	0.01	-



**Figure 14: Spatial distribution of flints along the east-west L grid line.**

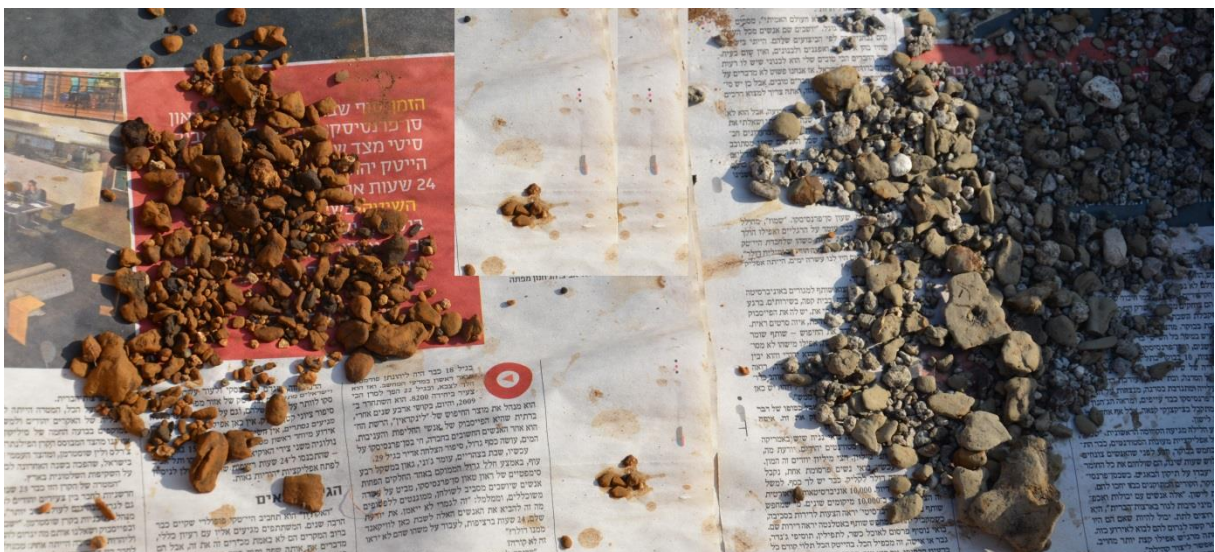


**Figure 15: Square N161. Lime-stones marked by arrows.**





**Figure 16: Square N161. Vertebra embedded within basalt Layer 5.**



**Figure 17: Iron concretions after sieving immediately after exposure. Left - oxidize; right – un-oxidize from Square N161.**

**Square N160.** This square was excavated during the 2012 season and yielded many finds.

Excavation here was completed during the 2013 season. The basalt floor of Layer 5 is slanting strongly toward the east with some boulder size rocks forming an uneven surface (Fig. 18).

Finds, including flint tools, bones and wood were exposed all along the excavation and laying on the basalt surface itself. As described above, the sediment included many un-oxidize iron



concretions. Preliminary observation of the sieved sediments indicated the presence of large amounts of micro-fauna bones.

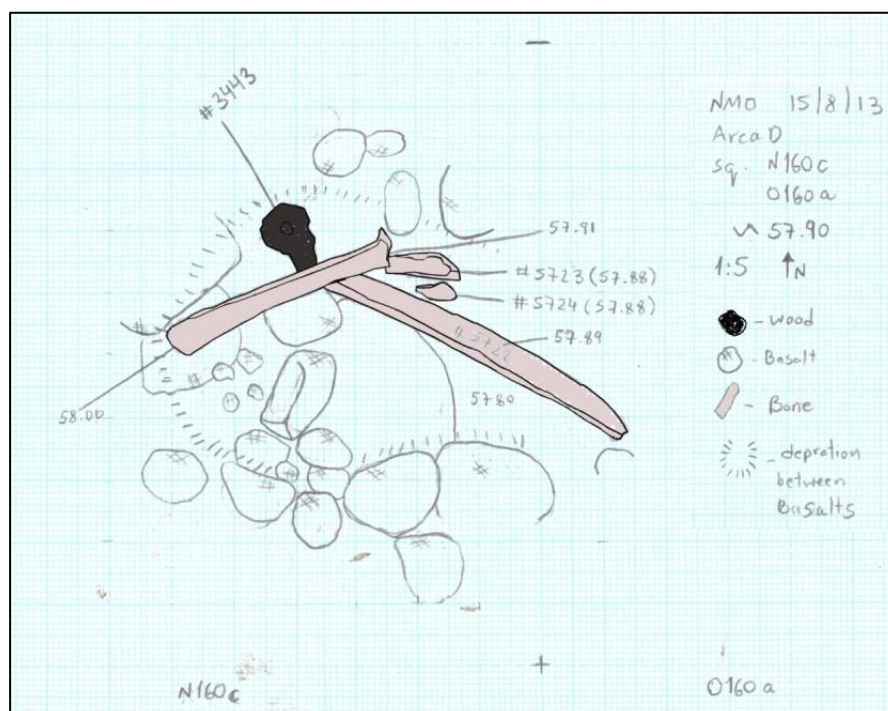
At the final stage of the excavation of the square, at level of ca. 58:70, a unique combination of bones and wood was observed on the basalt floor of Layer 5. The basalt here seems to create a depression surrounded by small cobbles. Within this depression a large piece of (probably) charred wood was found in close proximity to a tooth and two large rib bones (possibly broken pieces of a single large rib that were broken prior to deposition (Figs. 18-20). The interpretation of this unique composition is unclear. At the east section exposed during excavation a contact between two layers was observed. Possibly the contact between the black and grey silts running all along the site in this location (see previous reports).



Figure 18: Square N160 at the end of excavation season 2013.



**Figure 19: Square N160. Bone and wood at the end of excavation season; line indicates possible depression in basalt surface.**

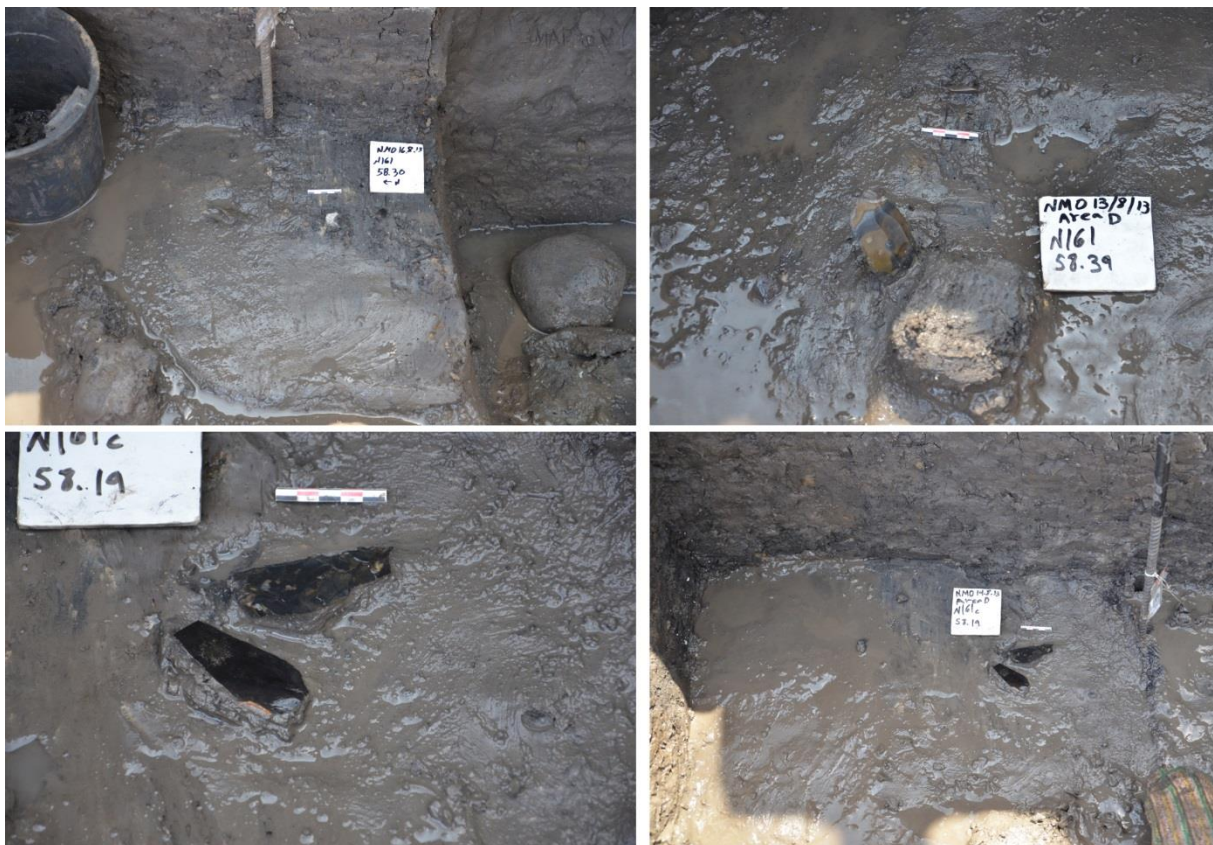


**Figure 20: Line draw of Square N160 sub-square a at the end of excavation.**



**Square N161** – This Square was fully excavated during the 2013 season. Many finds were exposed all along the excavation sequence including flint tools, bones and wood. The taphonomy was discussed above but it is worth repeating on the observation that many of the bones were “stuck” among the basalt cobbles of layer 5. They are also sometimes “covered” by small basalt pebbles that lay on top of the bones. Many limestone pebbles can be observed around the bones (Figs. 16, 22-23).

The stone tools are not yet fully analyzed but field observation indicates that they follow the nature of the assemblage as observed from previous seasons (Sharon & Oron 2013). They are in mint condition, sharp and fresh as they can get. The great majority of them are either points or knives. They are found either in different positions in the mud (including vertical standing) and laying on the basalt cobbles. Of special interest is the close association between the flint artifacts and the bones. In many cases, flints are found attached to the bones (Fig. 25). This is similar to many observations from previous seasons.



**Figure 21: Flint tools in situ at square**

Excavation at Square N161 has exposed a unique sequence of bones and flint tools scattered on the surface of the Layer 5 basalt. After the exposure of bones and flint tools in the mud above the basalt, the following was discovered along the strongly east slanting surface: First, a large vertebra was exposed at sub-square a, next a large scapula was excavated in sub-square d ca. at a level of 58:15 (Fig. 22). A (probable) calcaneus was found at the same level in to the south (Fig. 23b). The scapula was covered with small basalt and limestone pebbles and few smaller bones were also observed (Fig. 22-23c-d). When fully exposed, a flint tool was found in immediate association with the bone (Fig. 23d, marked with arrow). When the scapula was removed, a mandibular of deer size was exposed immediately below it (Fig. 24). Figure 24a show the negative of the scapula after removed and the arrow indicates the location of the mandible. Additional small bones were also observed.

At the next excavation level a group of bones was exposed including a rib, a long spin vertebra and a (probable) pelvis fragment (Fig. 25). Again, the bones are attached to the basalt floor, in excellent preservation and almost complete, covered by small basalt pebbles, in association with limestone and in immediate proximity with flint tools. Figure 26 is a combine draw of all the N161 bones and tools.



Figure 22: Square N161 at 58:15





**Figure 23: Scapula at square N161. Different excavation stages: a. general view; b. calcaneus; c. scapula not fully exposed; d. scapula before removed.**



**Figure 24: Mandible under the scapula. a. after removal. Negative of scapula clearly visible. Arrow indicate mandible; b-d. Close up after removal.**





Figure 25: Bones at last excavation stage.

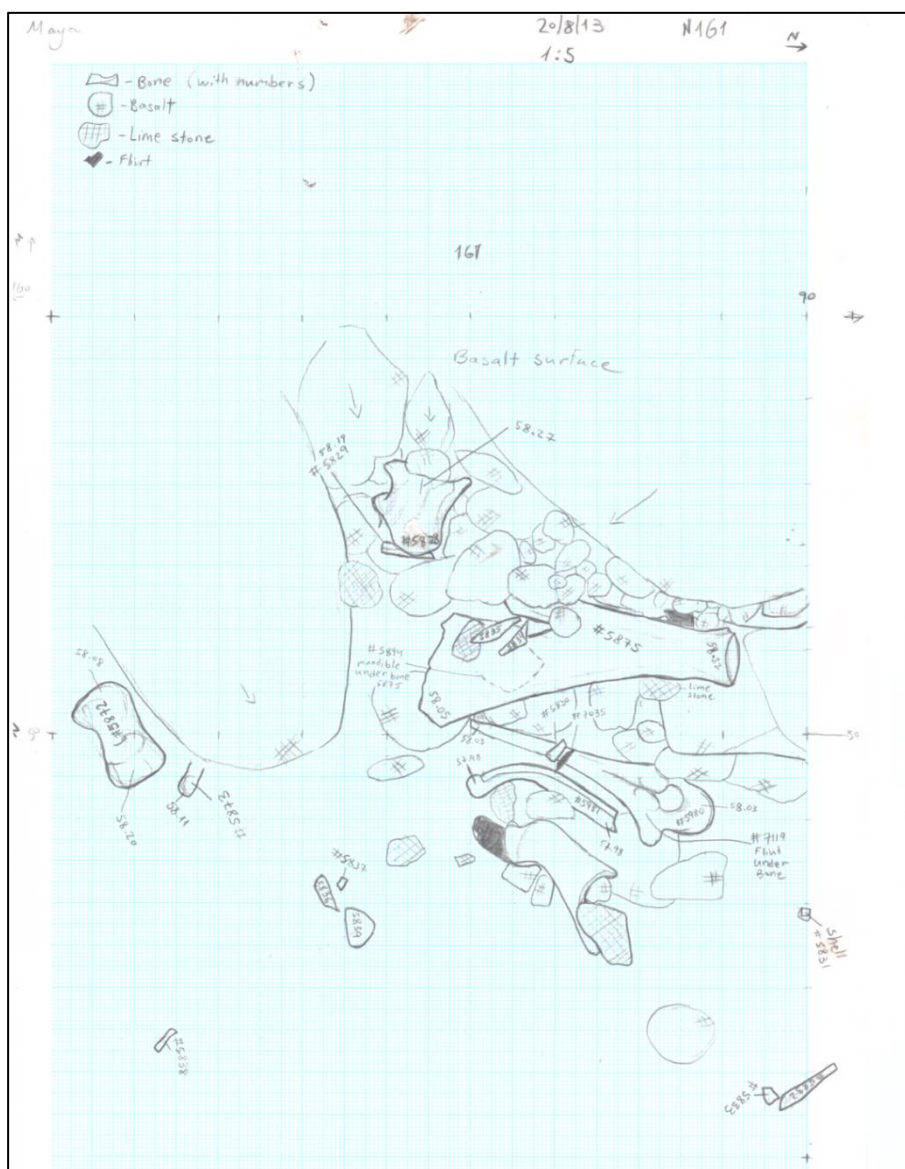
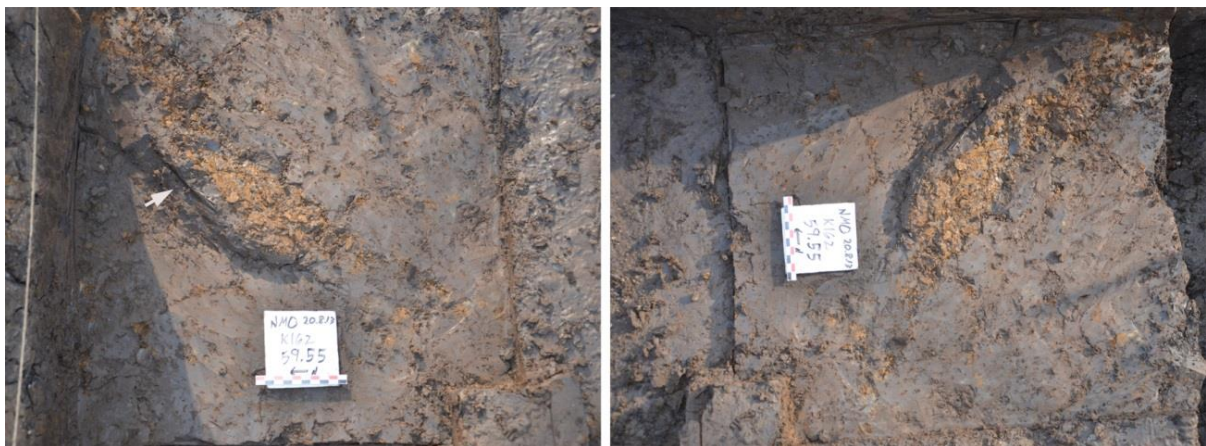


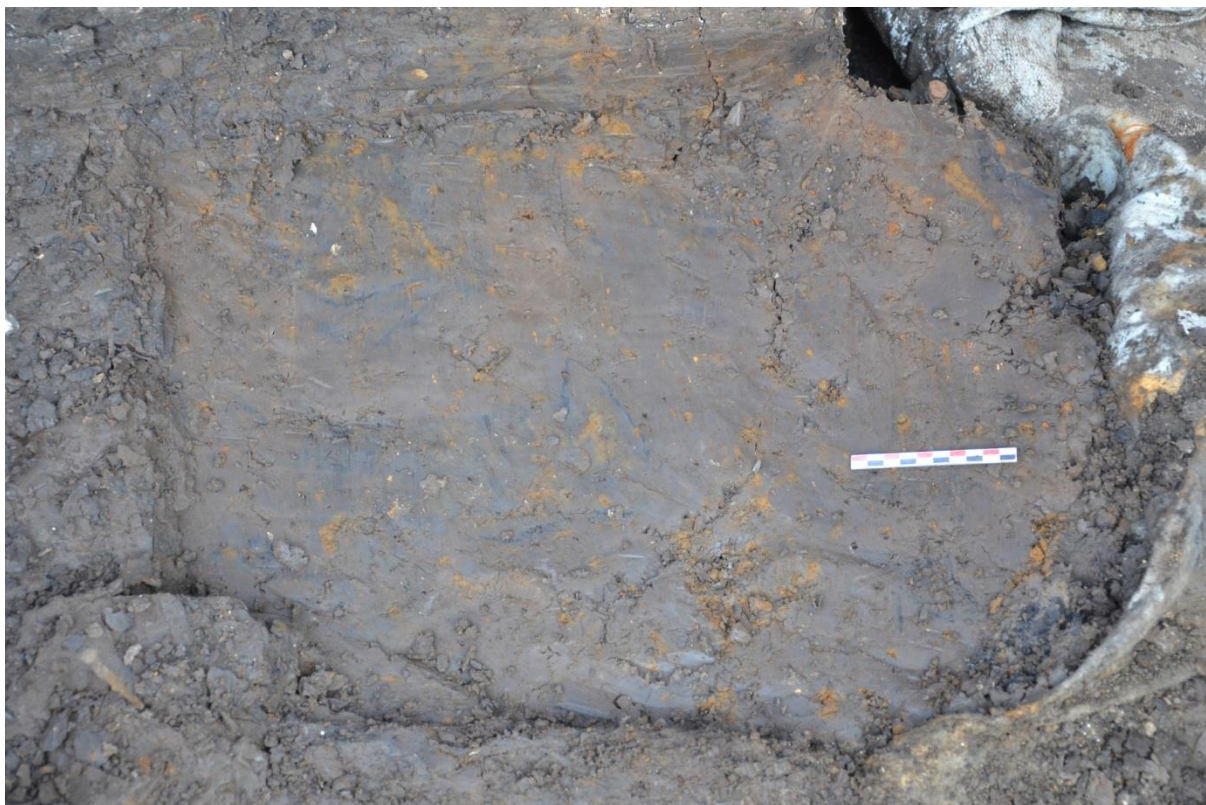
Figure 26: Map of Square N161 with all bones and finds. Draw by M. Oron.

**Squares of the 162 grid line** – This line of squares, including K162; L162; M162 and N162 (Fig. 13) was opened for the first time during the 2013 season (apart from L162 excavated during 2012). The aim was to reach the layer by means of fast excavation. This goal was not achieved as excavation has to be slower due to occasional finds (see above discussion). At most of the squares finds started to be exposed at a level of ca. 59:20. These include few small bones (frequently of tortoise) and occasional basalt and small flints. Most of the sediments are rich in botanic remains, probably roots but also possible charcoal in small fragments. Generally speaking, at all squares a layer rich in iron oxidized concretions was reached. This layer is some 20-40 cm in thickness. Below it, a layer of more sandy nature is reached which mark the archaeological Layer 4 above the basalt. This layer was fully reached only at L162 and indeed yielded bones in mint preservation state (Fig. 29-30). Above Layer 4, the sediment is mostly grey with many oxidize concretions in the form of small nodules (easily mistaken with bones) and sometimes in large horizons, possibly the remnants of a fissure in the soil that enabled oxygen to react with the iron rich basaltic soil (Fig. 27-28). Occasional basalt cobbles, bone or flint appears in this layer but not very frequently. For example, at square K162 a bone was exposed at a level of 59.40 but it was the only one all along the sequence. At the end of the 2013 season we have reached the sediments of Layer 4 in most of the 162 squares. Final level reached was: M162 – 58.60; L162 – 58:48; K162 – 58.48. The goal of next season will be to excavate theses squares into the archaeological layer 4.



**Figure 27: Oxidize concretions at Square K162. Arrow indicates small twig.**





**Figure 28:** Oxidize concretions in grey sediment at Square L16 Level 58:80. Typical sediments above the Layer 4 sediments.



**Figure 29:** Bone at Square L162. Note preservation of stone and nature of sediment (layer 4).





**Figure 30: Bones at final stage of excavation Square 1162. A vertebra and Possible pelvis.**



## South Area D

This section of the excavation is located on the expected top of the basalt hill of Layer 5 ( Fig. 8 & see previus IAA reports). Excavation at this locality is aiming to expand the exposed surface and to get a better understanding of the nature of occupation, sedimentology and taphonomy. The archaeological horizon (horizons?) exposed here seems to be different from the ones exposed in the north squares. The nature of the difference and its causes are the primary question leading the excavation. It is possible that the sediments here expose different occupaion events, later than the one represented by the finds at the north squares. The squares excavated are presented in Figures 31 to 34.



**Figure 31: Area D South: Excavated squares during the 2013 season.**



**Figure 32: Area D South at the end of the 2013 excavation season**



**Figure 33: Area D 2013 south. General look**





**Figure 34: Area D South west section at the end of the 2013 excavation season.**

Overall, the basalt of Layer 5 is at its highest elevation in the west squares of this area and is slanting toward the east. The degree of slanting seems to be less dramatic here than in the north, at least as the squares to the south are exposed. It seems that, as can be expected, the preservation of bones at the contact with the basalt seems to improve in correlation with the slanting of the basalt. The deeper the bones are, the better they are preserved. The nature of the basalt surface is also different here in comparison to the north. While in the center and north of Area D (ca. from grid line 155 onwards) the basalt seems to be better sorted with cobbles to boulder size particles well organized and sometime flat, the basalt at the top of the pile in squares along the line 154 and south, seems to be less sorted, with many small, pebble size stones on the surface (Fig. 35). Many of the upper stones are pebble size, angular and loss. Many oxidize concretions are visible and the sediment is sandy, with many small light color particles (Fig. 36). The basalt here may be flatter (horizontal) with more depressions in it. Compare to Johannes at L155-M155/4 with the flat well organized stones. It seems to present more depressions between the basalts and, it is evident that many more small to medium sized basalt cobbles are “floating” in the mud above the basalt surface (Fig. 38). The taphonomy of this is unclear. It may be that this area is exposed to atmospheric conditions



longer than the lower part of the site, that accumulation processes are different, and that different post-depositional processes are involved. For example, it may be that this area was subjected to draying during the time since its accumulation. This is more than likely since the drainage operation in 2000, but may have also happened in further past.



**Figure 35: Basalt of Layer 5 in Area D South**



**Figure 36: Square L152. Basalt Surface of Layer 5. Note oxidize concretions.**





Figure 37: Square L152. Sediment of Layer 4





**Figure 38: Square M153. Basalt flat stone floating in the mud above Layer 5 surface.**

Excavation at squares M153-L153 exposed bones and flint tools at elevation of ca. 60:00 meters above sea level (MASL). This is probably the same horizon identify during the 2012 season (see report) that included the bone of rhinoceros. The layer is comprised by scattered basalt cobbles (up to small boulder size sometimes), flint tools and bones in relatively bed preservation state. Botanic remains are present but in small amounts and in bad preservation state. It seems that some of them represent roots (possibly of recent plants, Fig. 39). May seeds of thistle (*Silybum marianum*) in harvest ant nests (Fig. 40) were observed (similar to previous years). Some of the ant borrows are exposed in the sediment but some of the thistle concentrations are located immediately on the basalt cobbles of layer 5.

The nature of this possible layer will be further explored using GIS software and mapping to document the finds level and see if indeed the layer is a real phenomenon.





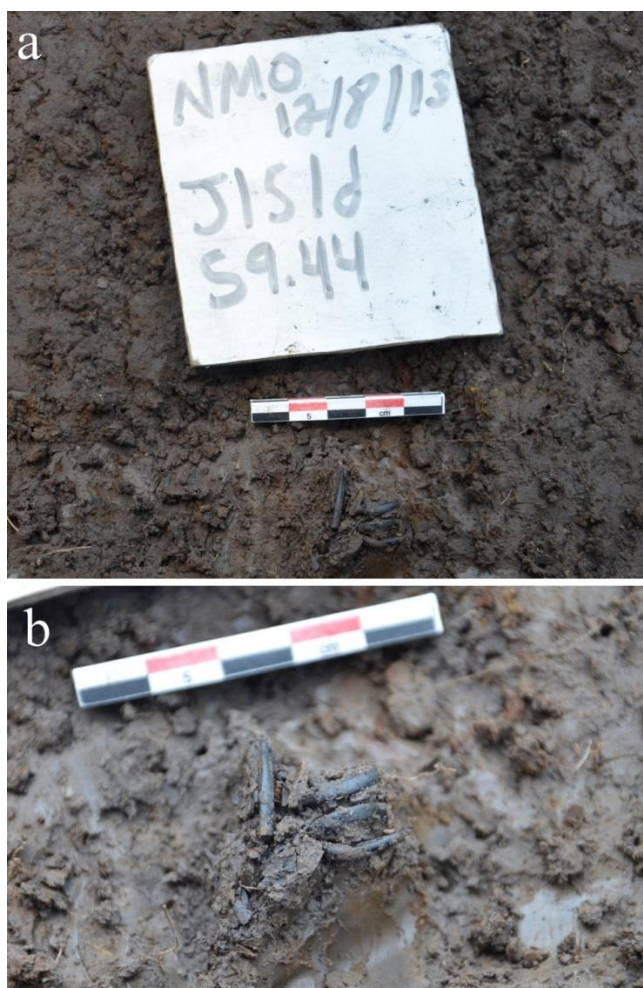
**Figure 39: Square N153. Root in sediments**





**Figure 40: Square M152: Thistle seeds in sediment. Note the ant borrow in center of picture c.  
Area D South by squares**

**Square J151-** Excavation at this square, immediately on the edge of the water, was somewhat difficult. At the upper levels of excavation, the sediment is heavily disturbed by channel comprise of sand, pebbles and shells. Same channel that truncates the top of the mud of layer 4 in the squares along this grid line (see previous reports). Only at a deep level the archaeological context is of good integrity. Once this level was reached, the finds started to emerge. Preservation of very small bones was noted at level of 59.45 (possibly the skeleton of a small rodent; Fig. 41). A large bone was exposed, possibly the distal part of a bovid horn core (Fig. 42). The bone was in bed preservation state (possibly because it is a horn core and not a regular bone. Other parts of large horn were excavated in squares to the north of J151 at the same level. After the removal, of the horn, additional bones were found primary at the east part of the square where the almost cliff morphology of the basalt is exposed (Fig. 43). At a level of ca. 59:00, the sediment becomes archaeologically sterile. This is similar to the observed change in the neighboring squares to the north.



**Figure 41: Micro-fauna bones at square J151.**



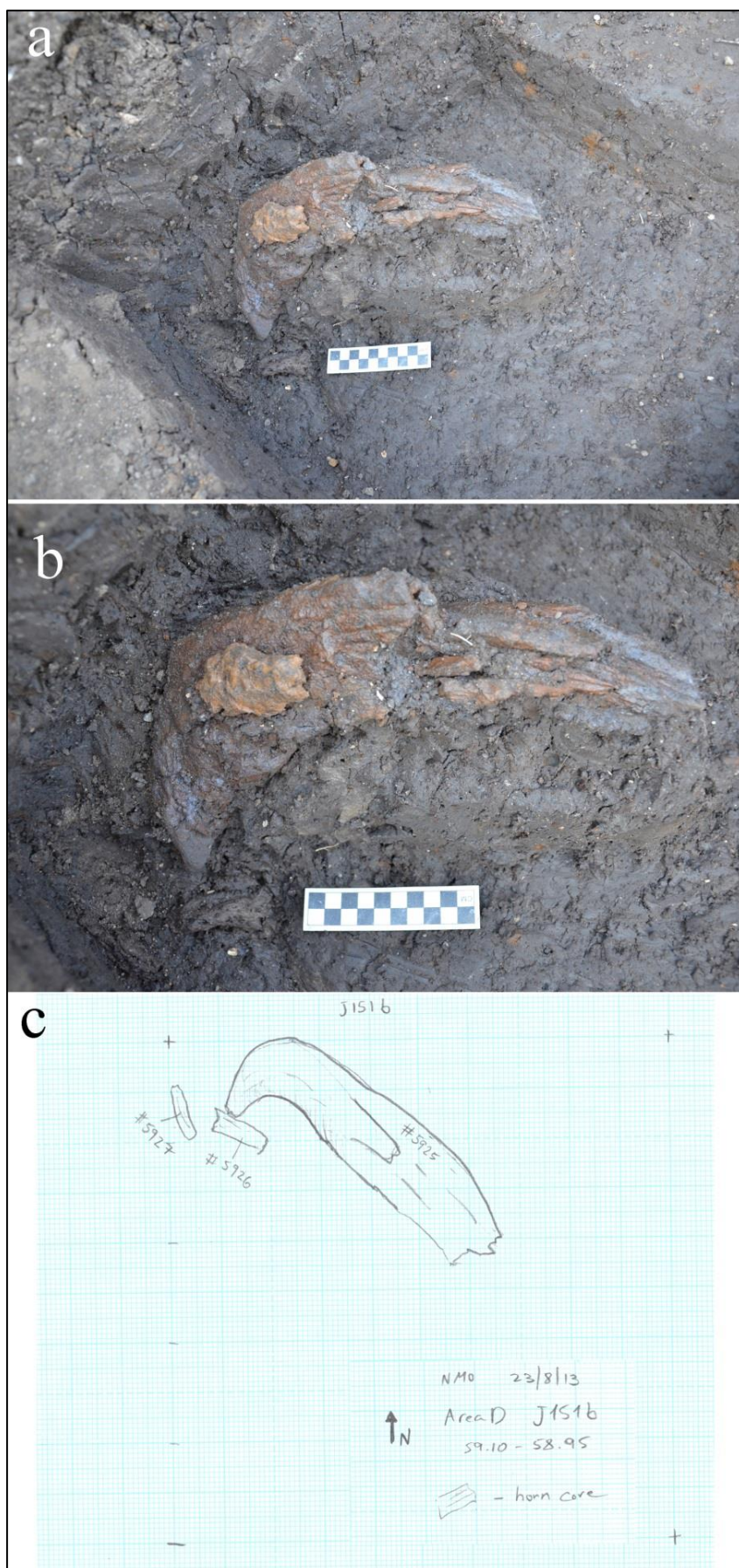


Figure 42: Horn core at Square J151.



**Figure 43: Square J151 at the end of the 2013 season. Note the basalt “cliff” of Layer 5 facing west.**

**Square L153** was fully excavated to the basalt of layer 5 at a level of ca. 59:40-59:50. Some flint artifacts and bones were exposed on the basalt. No wood remains were observed. The Layer 5 basalt here is comprised of small stones and depressions (Fig. 35).

**Square M151-** At high elevation, a large bone (probably vertebra) in very bad preservation was exposed (Fig. 44). The bone, possibly a vertebra of a large animal was found in more or less the same level (approximately at 60:00) as the large rhinoceros bone at the neighboring square of N153 during the 2012 season. The bone, in bad state of preservation, may belong to the same upper layer/horizon.





**Figure 44: Square M151. A large bone, possibly vertebra at approximately at level of 59.90. Note poor preservation state. Bone color is after application of glue.**

**Square M153** at this square, already far enough towards east to preserve the bones well, many bones have been found. In the mud above the basalt as well as on the basalt itself at the west section of the square, many seeds of thistle were collected (starting at a level of 59:40), sometimes concentrated in specific areas, similar to other squares in the area (Fig. 45). Basalt cobbles were exposed floating in the mud above the Layer 5 surface and in one place they were organized in an odd pattern (Fig. 46). Such patterns were also observed in square N153 (see below). Interestingly, flint artifacts are present as part of this pattern (Fig. 46c). When exposing the basalt of Layer 5 in the east part of the square (Sub-squares c & d), the picture was similar to the one exposed in the north squares. On top of the basalt bones were scattered together with flint artifacts. The flints are not many (but also quite a few, NMO standards) but each one is either elongated point or elongated cutting tool (Figs. 47-50). The flints are found in both in vertical and horizontal positions.





**Figure 45: Square M153. Thistle seeds and red concretions.**



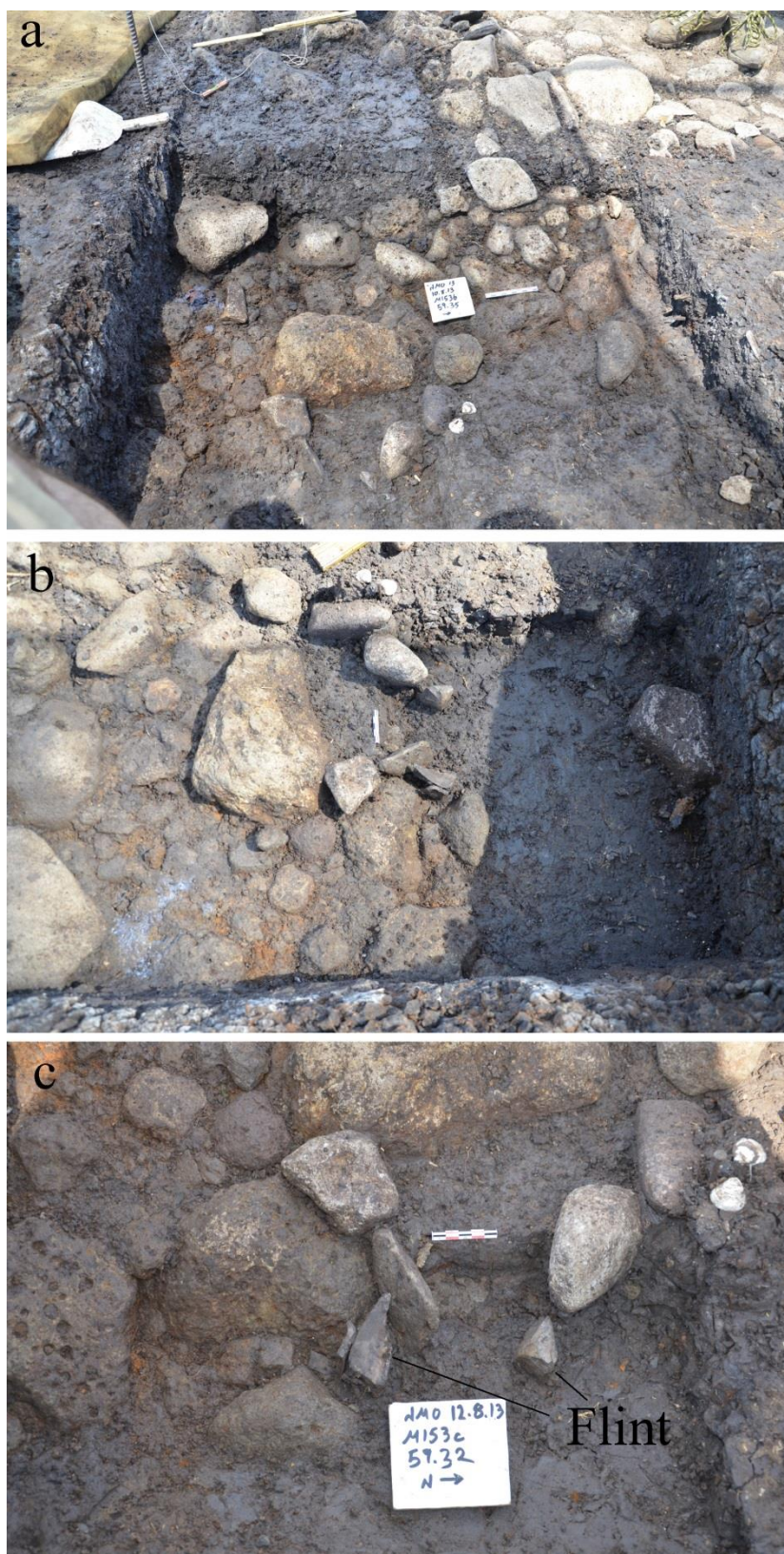


Figure 46: Square M153. Basalt structure. Note flint at the lower part.





**Figure 47: Square M153. End of excavation 2013.**



**Figure 48: Square M153. End of excavation. Note flints and bones.**





**Figure 49: Square M153. Bovid tooth.**



**Figure 50: Square M153 at the end of excavation. Flint tools and bones.**

**Square N154** – located at the northern part of this Area D south, the square exposed basalt similar to the one in the center of Area D and few interesting bones and flints (Fig 51-54). At list one possible anvil was exposed.





**Figure 51: Femur head at Square M154**



**Figure 52: Square M154a Level 59:28. Bone, tooth and flint tools.**



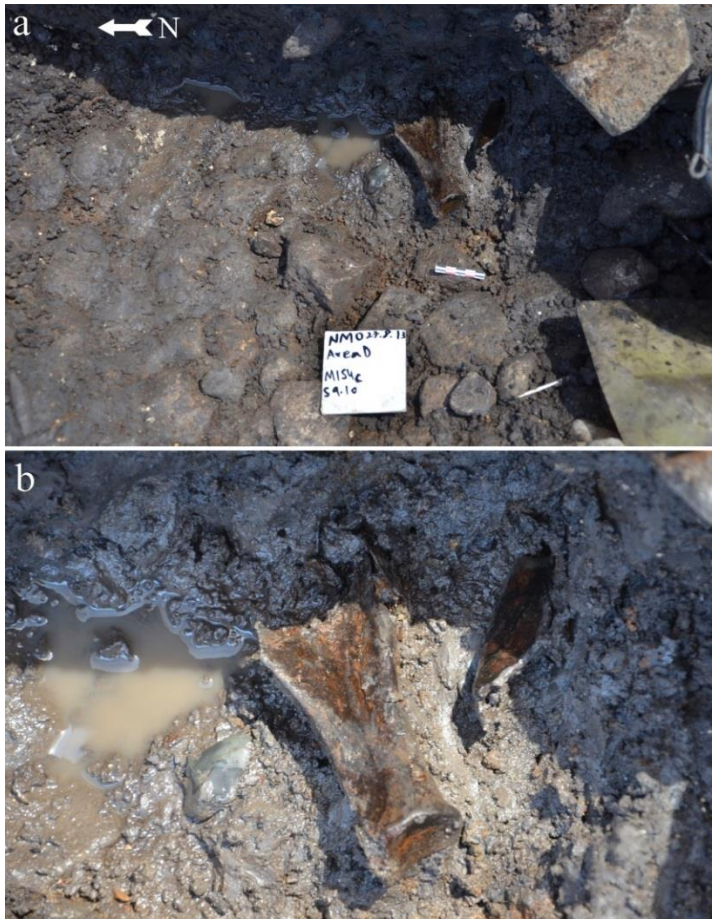


Figure 53: Square M154 at the end of excavation, Level 59:10. Large bone (scapula) and stone tools.

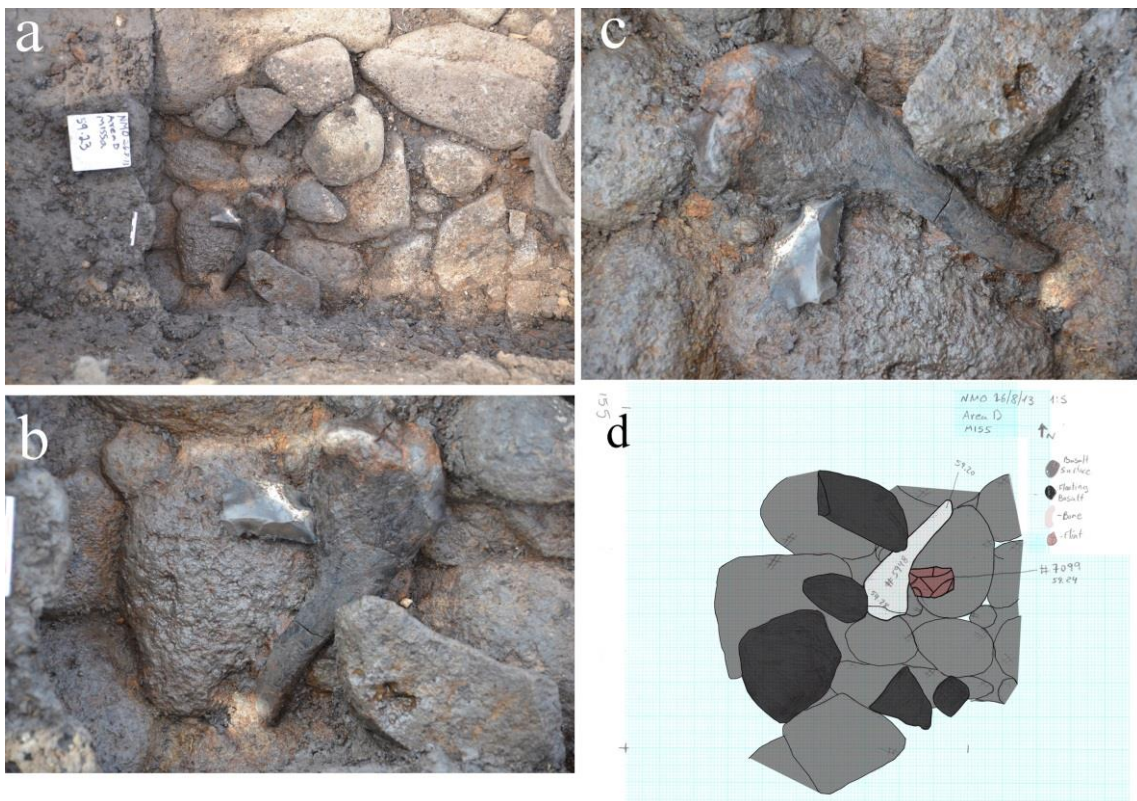


Figure 54: Square N155 bone and flint on surface of Basalt Layer 5.



**Square N153** – This is the eastern most excavated line of squares during the 2013 season. Two important observations emerged during excavation: 1. the presence of many basalt stones floating in the mud. Some of these basalts may have formed a pattern that could be assigned to human activity (Figs. 55-56). We still did not find a way to fully evaluate this suggestion. 2. The presence of structures as part of the basalt surface of layer 5. When exposed, at the end of the season, some circular pattern of stones could be observed as part of the basalt surface (Figs. 57-58). This seems to be in association with the large basalt boulder exposed in the square to the east (O153). A large long bone was exposed on the other (east) side of this boulder in bed preservation state. Interpretation of the stone pattern can be presented only after future excavation.



**Figure 55: N153. Bone structure (?) in mud level 59:20. a. close-up; b. general view.**



**Figure 56: Square N153. Basalt in lower level. Possible structure?**





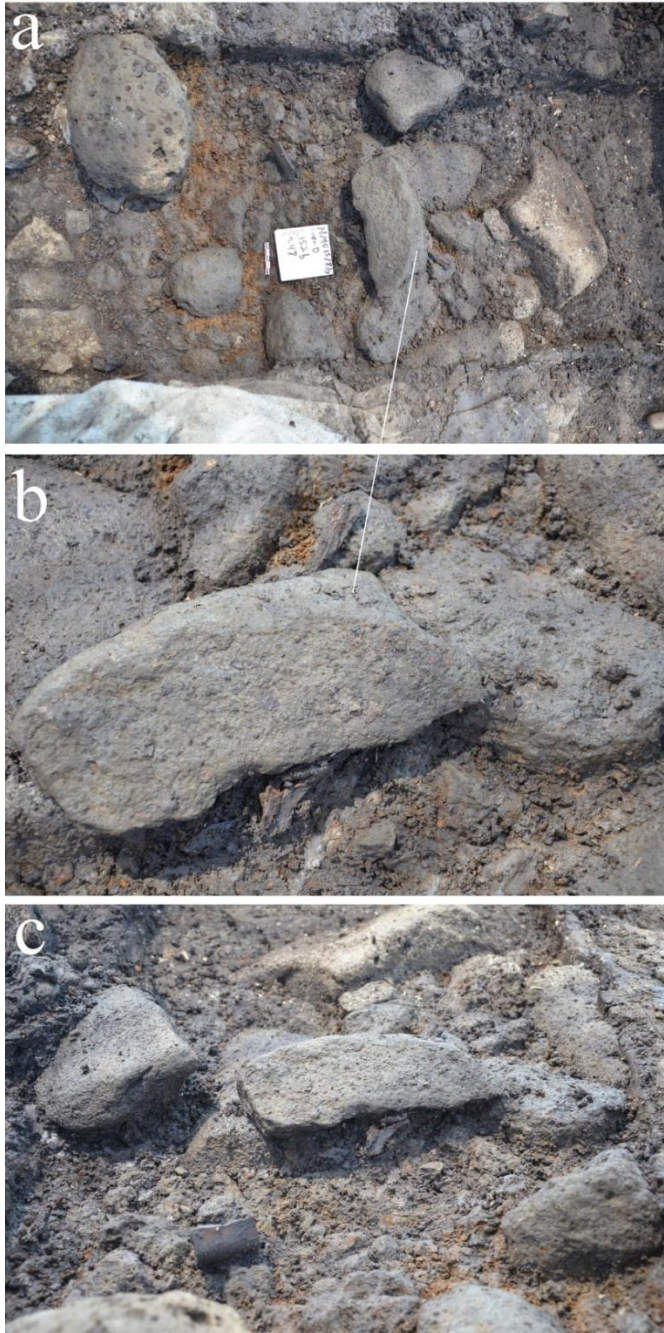
**Figure 57: Square N153. End of excavation. Note basalt morphology next to boulder.**



**Figure 58: Square N153. Basalt possible structure highlighted by dots.**



At all of the squares of Area d south may basalt cobbles and pebbles are floating in the mud above the basalt surface of Layer 5 (Figs. 59-60). Some of them are large and flat and may suggest the presence of anvils. Field observation suggests the presence of battering marks and pits on the faces of these objects. At square L152, such flat stone was exposed overlaying a long bone (Fig. 59). This may suggest that the basalt was applied as either hammer or anvil for bone processing.



**Figure 59: Flat basalt covering a bone in square L152.**





Figure 60: Square N154. Possible anvil floating in mud.

## Summary of observations

Summing up the observations from the excavation at the 2013 Area D South square the following picture can be suggested:

1. An archaeological horizon is observed at a level of ca. 60:00. The layer includes large basalt, with occasional flint artifacts and the bones of large animals (rhinoceros included).
2. Below this layer, the mud of layer 4 is accumulated toward the basalt of Layer 5. The archaeological layer starts some 30-40 cm above the basalt. Not many finds were exposed in the mud above the layer but seeds of thistle and roots are present almost everywhere.
3. The basalt of layer 5 is slanting toward the east but in a less dramatic angle than in the north squares. Toward the west, the basalt is forming a “cliff” but here, it is covered with small stones, not as large as in the northern squares.
4. The surface of the Layer 5 basalt is different, with many small pebbles and depressions between the stones. Many oxidize concretions are observed. The Layer 4 sediment immediately above the basalt is sandy, with many grey and light color particles.
5. Bones and flint tools are found, as always, more densely on the contact between layer 4 and Layer 5. Bones are better preserved to the east where this contact is deeper due to slanting of the basalt.
6. One of the primary features characterizing the mud of layer 4 in this section is the presence of many basalt cobbles and pebbles floating the mud above the Layer 5 surface. Some of these basalts are large and flat and may be interpreted as anvils. Others are small and their interpretation needs to await spatial distribution study to see if any patterns can be observed. Spatial patterns were observed in at least two cases when the basalt stones were exposed, but we need to demonstrate that the patterns were not in the eye of the beholder.

The nature of finds is different between the north and south sections of Area D. In the north, large and relatively complete bones (mostly of a bovid), are exposed, in association with flint tools. In the south, the bones may belong to smaller size animals and they seem to be more fragmented and broken (field observations). However, the nature of the lithic assemblage seems to be similar in both areas. The interpretation of the differences will wait for future study of the finds and their distribution, and hopefully further excavation.



Site covering and closing – As I the end of every excavations season, the 2013 season was ending with covering of the site with sediments by tractor. The aim is to protect the sites layers during the winter from heavy floods as well as from human activity and animal (primary cow trampling). Prior to sediment covering the layers of the site were covered by black nylon sheets. In previous seasons we used geo-technical fabric but we were noted by IAA that this is no longer considered suitable for preservation. Figures 61-63 documents the covering of the site.



**Figure 61: covering Area D North end of 2013 season**



**Figure 62: NMO 2013. Covered at the end of the season. a. general look; b. Area D South; c. Area D North.**





**Figure 63: NMO 2013 end of season. Covering the site. d. the site as left for next year.**