ARCHAEOLOGICAL MITIGATION AT THE PROPOSED GOUDA WIND ENERGY FACILITY, TULBAGH MAGISTERIAL DISTRICT, WESTERN CAPE

(Work carried out per HWC requirements and under permit 2169.)

Prepared for

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EXECUTIVE SUMMARY

ACO Associates cc was asked by Blue Falcon Trading 140 (Pty) Ltd to undertake the archaeological mitigation work required in advance of construction of the Gouda Wind Energy Facility. Earlier surveys of the property and power line route revealed the presence of significant pre-colonial archaeological remains which required mitigation prior to their disturbance and/or destruction during development. The sites are located on the Remainder of Farm 397 and Kleine Berg Rivier 72, between Gouda and Saron.

Four scatters of Early Stone Age (ESA) and one of Later Stone Age (LSA) artefacts were mitigated. The ESA artefacts were collected and analysed on site through measurement and photography with the aim of documenting the technology used. The artefacts were then redistributed into the wheat fields away from the areas to be impacted by the proposed development. The LSA site had material collected from its surface through excavation, sieving and sorting. The material was returned to Cape Town where it was analysed. It will be curated in the IZIKO South African Museum for future research purposes.

The analyses showed that the ESA hand-axes were made largely through retouch of only three edges and the vast majority lacked a high degree of symmetry. The flakes produced from the cores were generally smaller than the flakes recorded on site suggesting either that the flakes were brought in from elsewhere or that our collection was biased towards larger and more easily visible flakes. However, the number of removals on cores exceeds the number of collected flakes almost ten-fold. The type of cores present, specifically the radial cores, suggests a relatively late phase of the Acheulean, perhaps younger than 600 000 years.

The LSA site is dominated by scrapers and, with no pottery being found, the site likely pre-dates 2000 years ago. The focus on scrapers and lack of backed tools suggests a late-mid-Holocene occupation, although one broken backed piece was likely a segment, a typically mid-Holocene tool form. The larger scraper forms are unusual and might even indicate an age of closer to 8000 years.

The mitigation work is deemed to have served its intended purpose and captured sufficient data on the local archaeology. It is recommended that the proposed development be allowed to proceed with no further archaeological work required. It should be noted, however, that if any substantial collections of stone artefacts are unearthed during the excavation work for the project then these should be reported to an archaeologist for assessment. The same applies to any burials that may be found, although such finds are deemed highly unlikely to occur.

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1. INTRODUCTION

ACO Associates cc was asked by Blue Falcon Trading 140 (Pty) Ltd (trading as Gouda Wind Energy Facility) to undertake the archaeological mitigation work required in advance of construction of the Gouda Wind Energy Facility. Earlier surveys of the property and power line route revealed the presence of significant pre-colonial archaeological remains which required mitigation prior to their disturbance and/or destruction during development (Orton 2010, 2012a; Orton & Webley 2013). The sites are located on the Remainder of Farm 397 and Kleine Berg Rivier 72, between Gouda and Saron (Figure 1). While five sites were mitigated, a further one, BE2012/001, located in the north-western part of the study area was not mitigated since the realigned turbine rows no longer impacted on it.

The earlier surveys had recommended mitigation in two forms: for Early Stone Age (ESA) artefact scatters it was suggested that artefacts be collected, measured and recorded, and then redistributed on site; the Later Stone Age (LSA) site, on the other hand, should be excavated with artefacts collected, analysed and curated for future research.

2. METHODS

2.1. Literature survey

A survey of available literature was carried out to assess the general archaeological context of the area. This literature included published material and unpublished commercial reports and aided interpretation of the findings of the present work.

2.2. Field methods

2.2.1. ESA sites

At each ESA site we walked over the area and began collecting all visible artefacts. The time spent on this at each site varied as required. At some sites the number of unmodified flakes was very large and after a while we focused our search on cores and hand-axes only, since it is these two types of artefacts that provided the greatest amount of information on the technology present. After analysis in the field, the artefacts were redistributed in the wheat fields away from the areas to be impacted by turbine, cable and road construction.

Artefacts were classified as either flakes or cores. Flakes have been defined as a piece of rock removed from a core either by percussion or pressure, while cores were defined as the rock being reduced by the removal of flakes (Andrefsky 2005). Cores were then also broken into further categories, namely chopper cores, platform cores, irregular cores, and radial cores, while the large bifacially worked cutting tools, more commonly known as hand-axes, were also identified. Many of the bifaces appeared to be in an unfinished state; these were recorded as preforms (Figure 2).

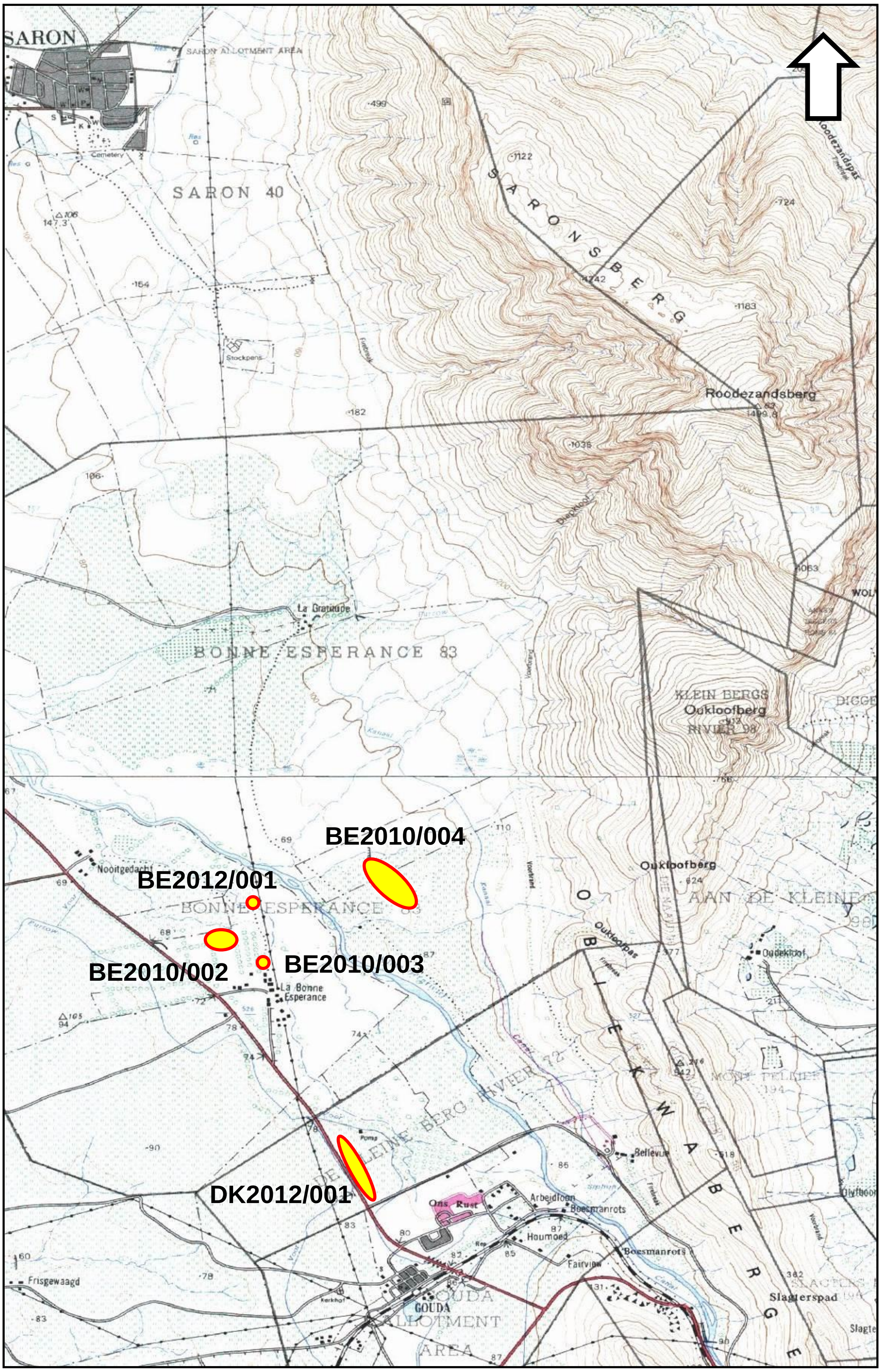

Figure 1: Map showing the location of the five sites at which mitigation was conducted (site outlines not to scale). (3319AA&AC. Mapping information supplied by - Chief Directorate: Surveys and Mapping. Website: w3sli.wcape.gov.za)

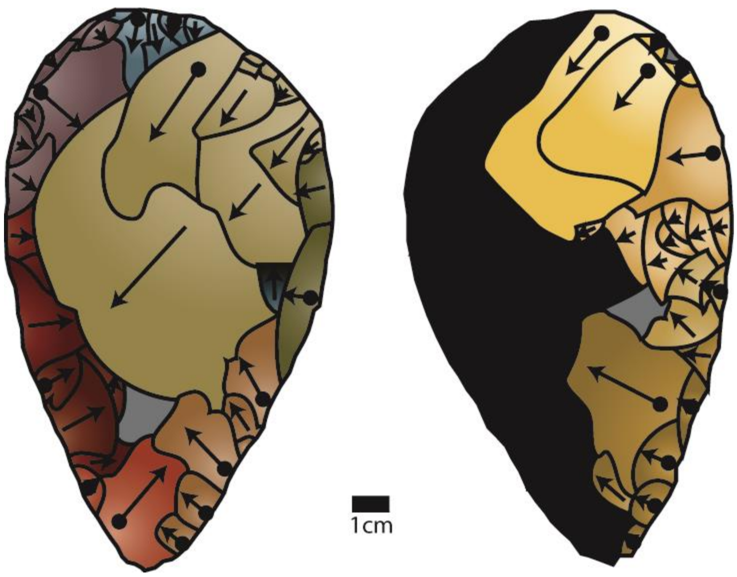

Figure 2: Model of flaking pattern for unfinished hand-axes or preforms recovered within the study area. Unflaked surface shown in black.

Technological length and width were recorded on all flakes recovered (Figure 3). Technological length recorded the distance from the point of percussion to the distal tip of the flake along the technological axis of the piece (perpendicular to the major axis of the striking platform of the flake). Flake width recorded the distance from the lateral margins of the ventral surface on an axis perpendicular to the technological axis of the flakes at the midpoint of the technological length measurement.

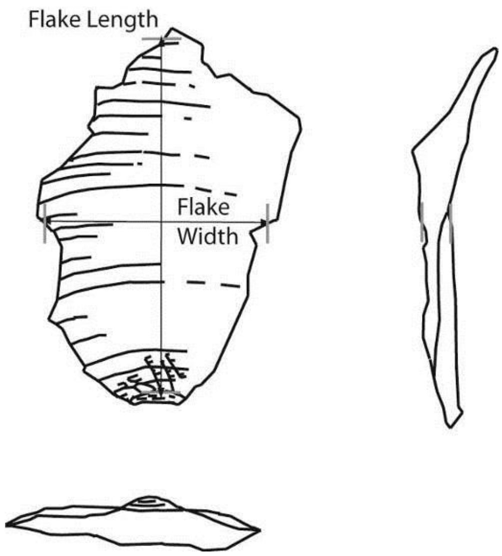

Figure 3: Illustration of technological length and width measured on flakes.

On the cores, the number of flake scars and the size of the largest flake removal were recorded. The size of the flakes removed was calculated as for flakes. These serve to test whether or not the number of flakes recovered would coincide with the number of removals and to test whether or not the flakes were being left on site or transported away.

The percentage of cortex present was recorded on all flakes, since the amount of cortex present in an assemblage has been shown to correlate with the extent of travel that artefacts have experienced from their source (Dibble *et al.* 2005; Douglass *et al.* 2008; Lin *et al.* 2010).

Quantitative analysis and interpretation of morphological variation in large bifacially flaked cutting tools or hand-axes has been the focus of many studies (Archer & Braun 2010). Bordes (1961) and Roe (1964) provide the standard measurements upon which the majority of contemporary studies are based (Figure 4). The length and width are the maximum dimensions of the artefacts. Tip Width was recorded at 1/5 of the total length from the tip. Mid width was recorded at the midpoint of the total length. Base width was recorded at 4/5 of the total length. Thickness was recorded at the thickest part of the biface.

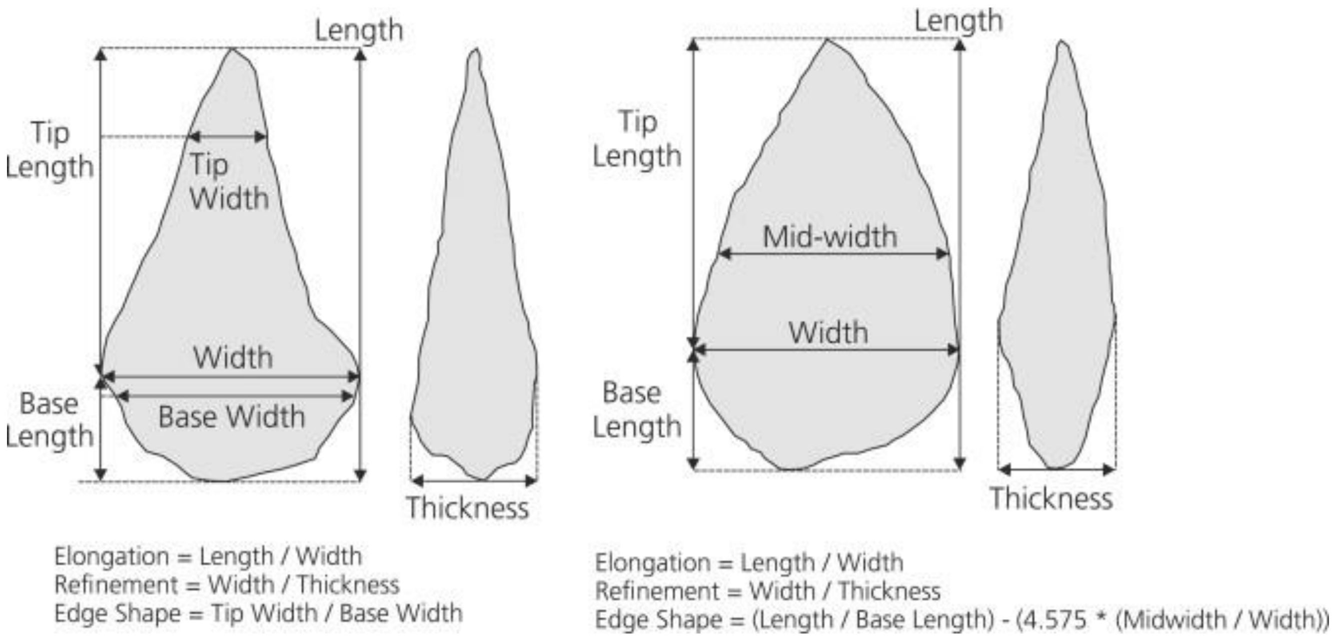

Figure 4: Bordes (1961) and Roe (1964) measurements for hand-axes (Source: Iovita 2011: fig. 1).

Traditional measures of elongation and refinement were calculated as (length)/(width) and (width)/(thickness) respectively. Edge shape was calculated as (length)/(baselength) – 4.575 x (midwidth)/(maxwidth) (Bordes, 1961). Roe (1964) also considered edge shape, but calculated this as (tip width)/(base width).

2.2.2. LSA site

The vast majority of the area of the LSA site appeared to have quite a low density coverage of artefacts. For this reason, it was decided to use a grid of 2m by 2m squares for excavation purposes, expanding the grid in whatever direction seemed most appropriate to maximise collection of artefacts. A large puddle in the centre of the site precluded excavation of that area. At first a few squares had all visible artefacts collected from them. Then, in order to gauge if this was an appropriate collection strategy, some of these squares were excavated and sieved. This process revealed further artefacts that were hidden in the fine surface gravels and suggested that excavation was the better strategy. The ground was very hard with pockets of loose sand and surface gravel present in the eroding surface. This loose material was collected up, sieved and sorted. Due to poor weather conditions, some squares were wet sieved in a puddle on site, while others were dry sieved when possible.

Only stone artefacts were recovered and laboratory analysis of these artefacts followed a typology devised by one of us (JO) and used extensively along the west coast of South Africa (e.g. Dewar 2008; Orton 2006, 2012c). The artefacts will be stored and curated by the IZIKO South African Museum for future research purposes.

2.3. Limitations

The inclement weather made conditions very difficult on site. In terms of the ESA scatters, use of electronic equipment (specifically camera and digital scale) had to be curtailed at times when it was raining too hard. This meant that we could take less photographs of artefacts than was desirable, with BE2010/003 being particularly affected in this regard. Due to time constraints, however, measuring and recording proceeded anyway under an umbrella. At the LSA site excavation, sieving and sorting were all hampered by the rain and excavation was only conducted on open ground – grassed areas were ignored as these would have been too time-consuming to deal with. Despite these difficulties, we consider the data captured to be a good representative sample of the archaeological heritage that will be disturbed during the development.

3. DESCRIPTION OF THE ARCHAEOLOGICAL SITES

The ESA sites manifested as artefacts scattered about in the wheat fields and along and in a gravel road near the farm werf. The artefacts have been moved back and forth through the years by ploughing but, given that we could reasonable easily define the edges of the scatters while walking across them, the artefacts are probably still in the same general area where they were originally left. There is clearly a huge difference in artefact density from place to place across the farm. Figures 5 to 7 give an indication of the general context of the ESA sites and the appearance of their surfaces. All three were taken during the 2010 survey.

Figure 5: View northwards across the northern part of BE2010/002.

Figure 6: View northwards across the southern part of BE2010/002.

Figure 7: View towards the west across BE2010/004 with the Klein Berg River in the trees in the background.

The LSA site was located in the corner of a field alongside a gate where cattle must regularly congregate (Figure 8). This has led to accelerated erosion of the surface and is no doubt the reason for exposure of the artefacts. The hard surface was undulating – the result of water erosion and wind deflation – with loose sand and gravel caught in the low-lying hollows (Figure 9).

Figure 8: Panoramic view towards the east showing the compacted and eroded surface with a large rainwater puddle at far left. Artefacts were visible in all the denuded areas visible in the photograph.

Figure 9: View of the surface of square A4 showing the hard surface (lower right) and hollows (centre and left) after excavation. Non artefactual stones remain in the square.

4. HERITAGE CONTEXT

Very little archaeological research has ever been conducted in the vicinity of Gouda. Only two research projects have been carried out, both more than twenty years ago. The first (Hart 1987) was conducted along the Berg River stretching northwards from Gouda towards Porterville. Smith (1984) had earlier suggested that pre-colonial pastoralists may have made use of the different soils of the south-western Cape at different times of the year and, as a result, they might have spent part of the year in the study area (Figure 10). Hart (1984) therefore proposed to survey the completely unknown landscape along this part of the Berg River in order to document what archaeological remains were present in the vicinity.

Hart's (1984) results show that in general LSA material was uncommon but that MSA and ESA artefact scatters were frequent with artefacts of these ages occurring in almost every searched area. The ESA artefacts were mostly made on quartzite river cobbles with the result that there were "large numbers of cobble choppers and round based disc cores. Also characteristic were 'unifacial hand axes made on flakes struck from the outer edges of river rounded cobbles" (Hart 1984:414). The MSA material included Levallois flakes and large blade cores. It was noticeable that cobble tools were far more common close to the river than on the higher-lying plains and that ESA artefacts were usually found in stoney soil.

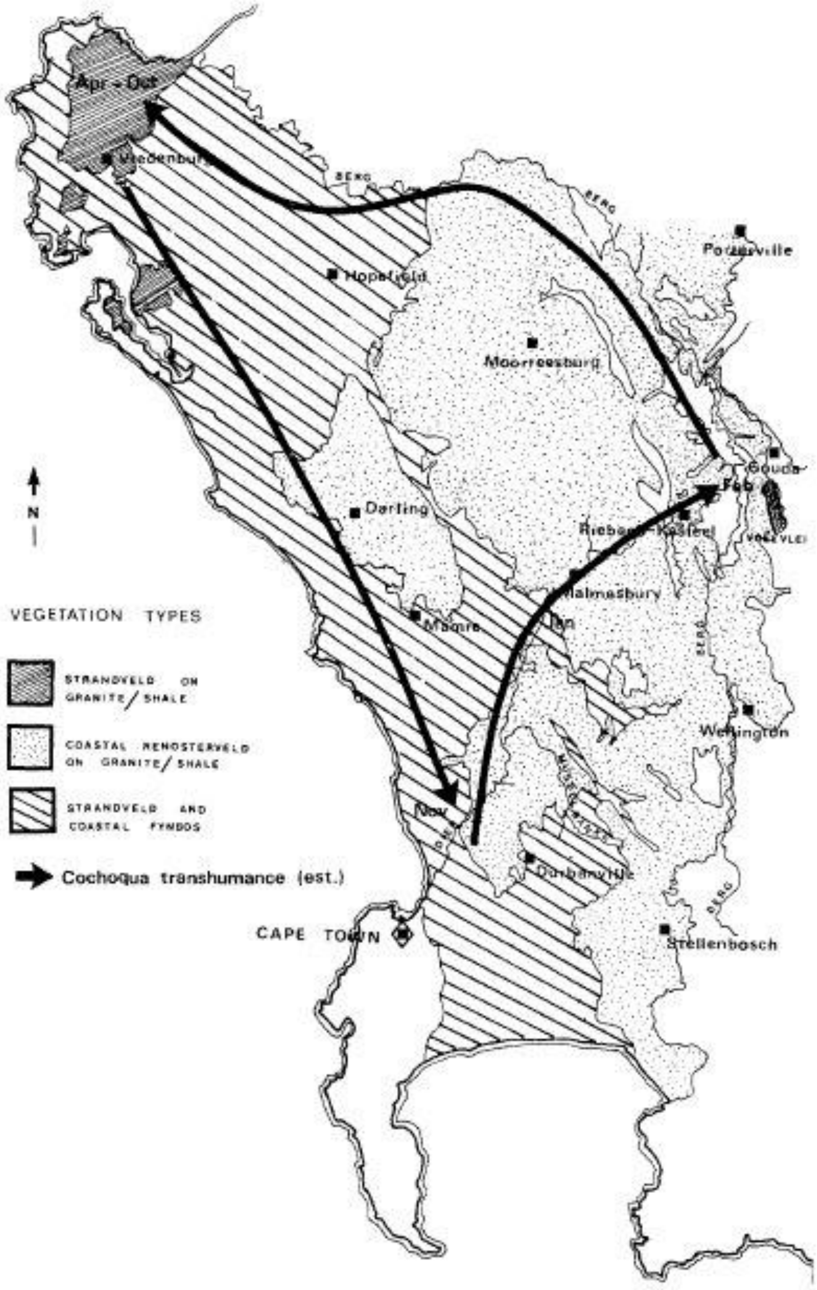

Figure 10: Estimation of the route of seasonal transhumance used by the south-western Cape Khoekhoen. The stippled area denotes Renosterveld which was suggested to have been important for summer grazing. Gouda and the Voelvlei Dam lie at middle right (source: Smith 1984: fig. 1).

Hart (1984) did find a number of LSA sites, with almost all being located in cultivated lands and most being relatively ephemeral scatters close to water sources, either springs or the Berg River. Quartz and quartzite were generally the dominant stone materials and manuports and large flakes and chunks were typically characteristic. Hart (1984:418) lists artefacts found at three of the sites – these included a quartz segment and two silcrete adzes at Grootvlei 1, while Vrugbaar 1 was a pottery site that also had a silcrete adze. Toorkrans 5 was a very large site immediately alongside the Berg River and that included pottery, a silcrete adze and two other “trimmed pieces”. All three sites revealed that quartz was flaked most commonly (*c.* 50-60%), followed by quartzite (*c.* 30-40%), silcrete (*c.* 10-20%) and cryptocrystalline silica (CCS; *c.* 1-4%).

The other (related) research project was a pair of small rock shelter excavations conducted by Smith *et al.* (1991). Voëlvlei, located near the southeast corner of Voëlvlei Dam, was found amongst a set of sandstone boulders with rock paintings on them. Judging by their typological analysis, there may well be some mixing of the deposits. In terms of formal tools, the pre-pottery levels yielded only scrapers, while the pottery levels produced several tools typical of the mid- to late mid-Holocene. These included a backed scraper, a segment and two drills (a.k.a. borers). A large pottery sample (290 sherds) was collected. Many ostrich eggshell fragments were found along with 81 beads, only one of which was less than 5 mm in diameter. The few historical items found included a glass bead, a copper bead and fragments of lead and iron. Animal bones (mostly tortoise), marine shell fragments and plant material were also recovered. Three radiocarbon dates indicate occupation starting approximately 2000 years ago but with most apparently within the last 500 years.

Driebos is a small shelter, also with rock art, located on the mountainside some way to the north of Gouda. Similar sorts of stone artefacts were found with backed scrapers (typically mid-Holocene tools; Orton 2012) again present in the pottery levels. Unlike Voëlvlei where silcrete formal tools were slightly more common than those in quartz, Driebos shows many more quartz tools. Adzes were again common, but this time restricted to the pottery levels. A good pottery collection was made and fauna was also present. Other categories of finds appear to have been absent and the site was not dated.

Aside from the above series of observations, the only other records we have for this area come from commercial work. These have generally shown that ESA material is common (Orton 2008b, 2012) with one site in the town of Gouda possibly even having *in situ* material (Orton 2008a).

A general background for the ESA in South Africa is also relevant here. The earliest evidence of the ESA in southern Africa occurs significantly later than in east Africa with the oldest dates ranging from 2.1mya -1.9mya at Swartkrans in Member 1 (Herries *et al.* 2009).

The ESA is characterised by crude chopper-like tools and cores made on river cobbles. The most recognisable form in ESA assemblages is without doubt the Acheulean biface or hand-axe. These tools were made either on cobbles or large flakes. The oldest known Acheulean sites in southern Africa date from around 1.7 million years ago (mya) to 1.4 mya at Sterkfontein (Kuman & Clarke 2000).

The study of hominin behaviour has been the focus of many research projects; stone tools are by far the largest portion of any assemblage recovered especially in Early Stone Age contexts where preservation bias ensures that lithic technology is often the only material recovered. In order to understand behaviour that can account for artefact variation it is required to build links between artefact morphology and hominin activities (Archer & Braun 2010). Variation in tool morphology forms the foundation of descriptive and analytical studies in lithic technology (Archer & Braun 2010).

5. FINDINGS

5.1. BE2010/002

A total of 162 artefacts were recovered from this site. Five bifaces were recorded along with 30 radial cores, 21 chopper cores, 20 platform cores, 38 irregular cores and 48 flakes (Figure 4).

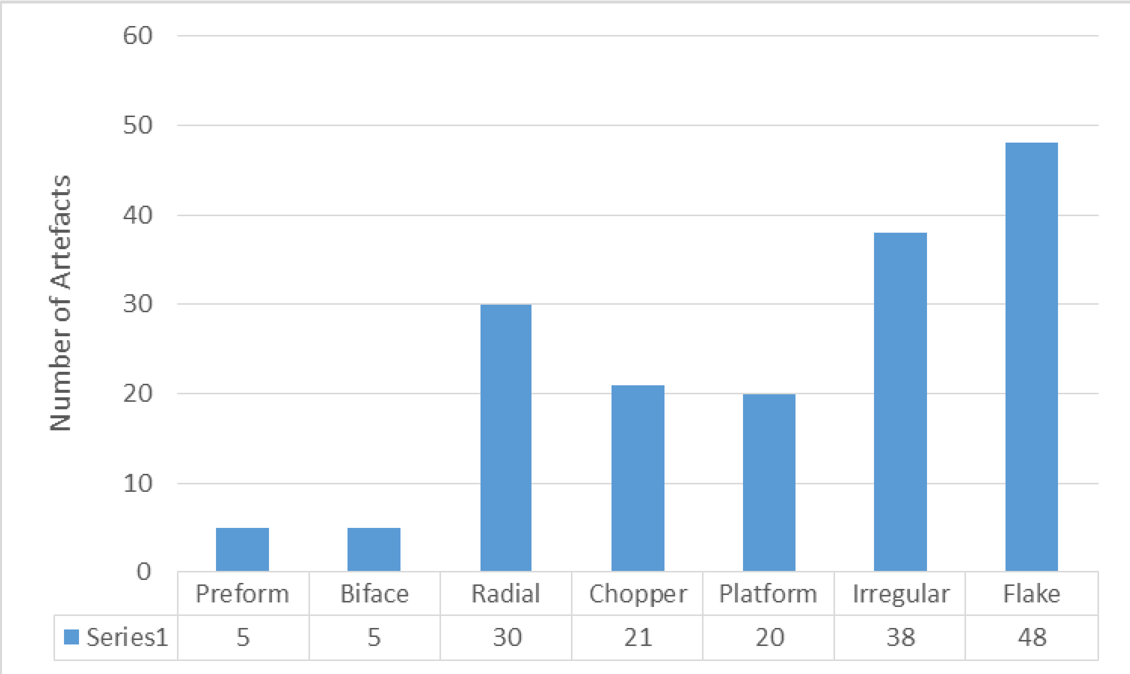

Figure 11: Assemblage composition at BE2010/002.

Chopper-cores are artefacts made on rolled pebbles or cobbles, with a number of either unifacial or bifacial flake removals, leaving a large portion of the cortex intact (Kuman 1996), while platform cores have repeated removals from the same surface, usually one previously created on the core. Chopper and platform cores form an important part of Oldowan technology in the Early Stone Age (Kuman 1996). Radial cores and similar Levallois technology replace large cutting tools such as bifaces during the transition to the Middle Stone Age (Dibble & Bar-Yosef 1995). Radial cores have multiple removals from around their roughly circular perimeter.

Figure 12 shows the distribution of flake size of all flakes and of flake scars from the cores. Although there is some overlap in the distribution, it is clear that the area of the whole flakes recovered is larger than the area of the flakes produced on any of the cores found at this site. Five of the flakes recovered from this site appeared to be hand-axe ‘blanks,’ some of these were retouched in such a way to suggest that they were in an unfinished state (see Figure 2).

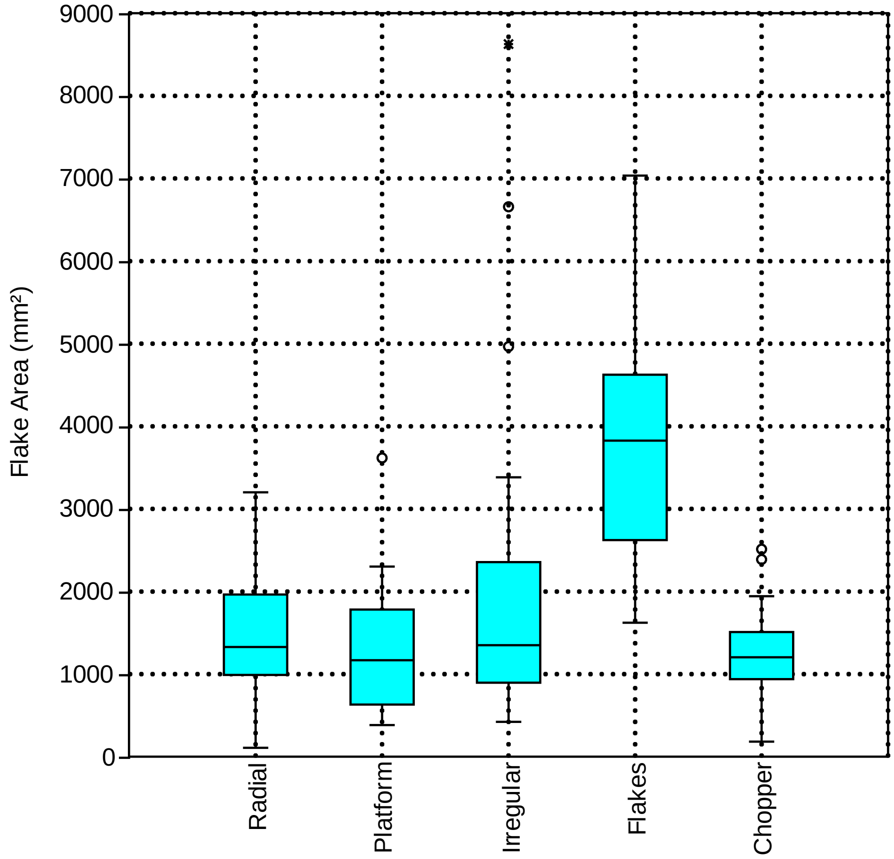

Figure 12: Distribution of flake area at BE2010/002.

5.2. BE2010/003

This site had a relatively small collection of artefacts found alongside and on a gravel farm road; artefacts here seemed more rolled, with their edges being less sharply defined than the other three sites recorded. The presence of a very thin background Middle Stone Age scatter was also noted (Figure 13). All the artefacts recorded totalled 67, with the majority (37) of these being flakes. The distribution of artefact types can be seen in Figure 14.

Figure 13: Photograph of MSA flakes found at BE2010/003.

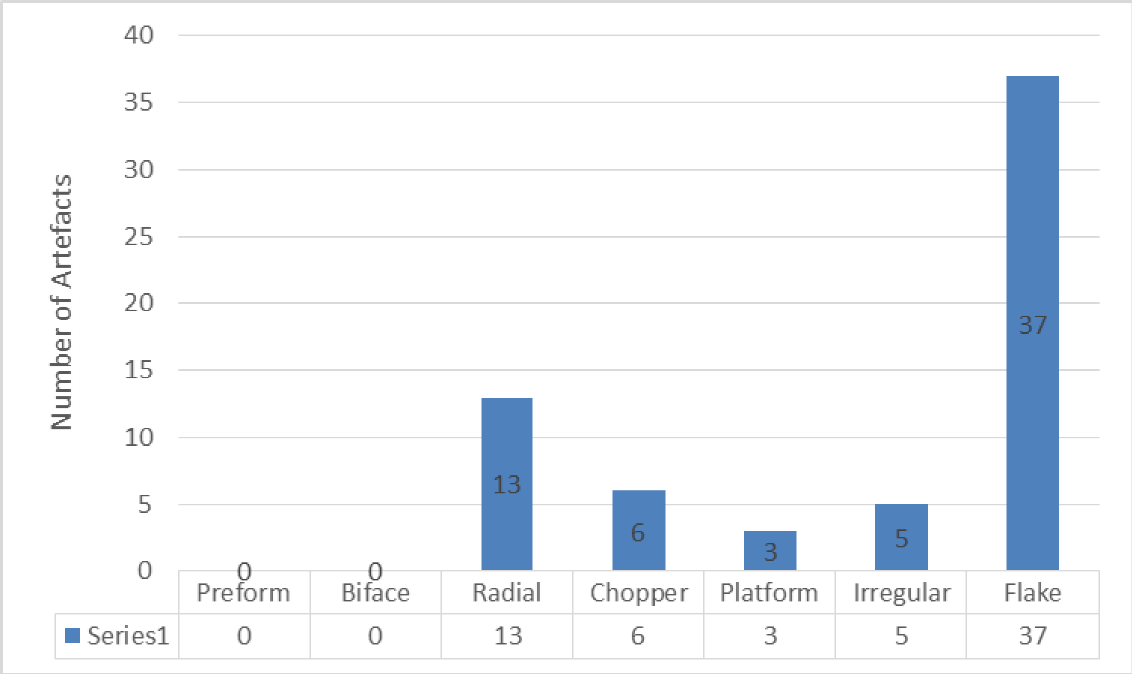

Figure 14: Assemblage composition at BE2010/003.

Similar to BE2010/002, the flakes recovered at BE2010/003 appear to be generally larger (Figure 15), although this pattern is not as pronounced and there is a substantial overlap in flake area on flakes produced from platform cores and the actual flakes recovered. There is also a noticeable absence of bifaces at Site 2, which also coincides with a lack of larger cobbles, as were found at all three other sites within the study area.

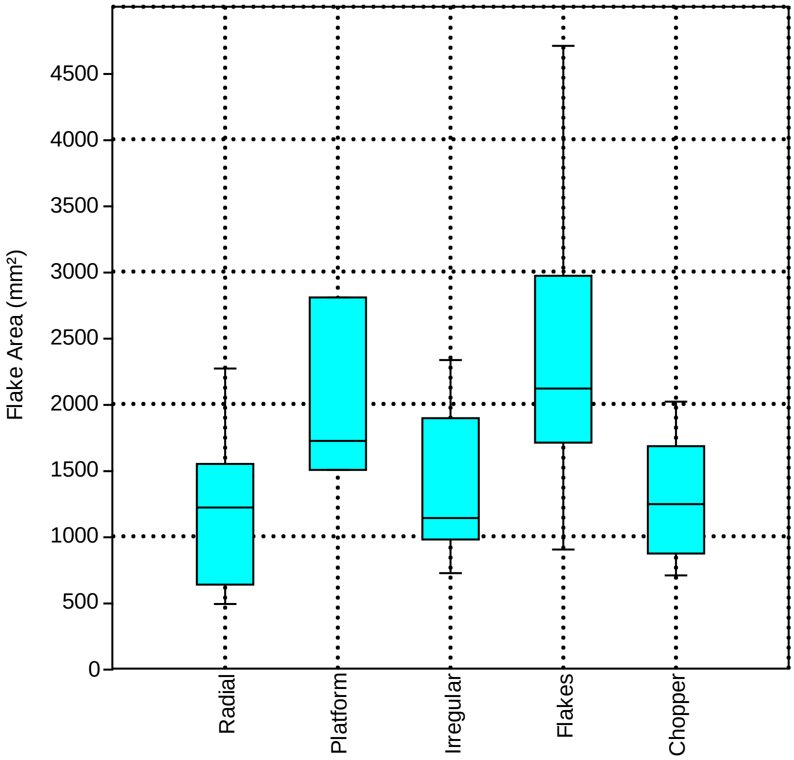

Figure 15: Distribution of flake area at BE2010/003.

5.3. BE2010/004

This site had the largest concentration of bifaces, with a total of 21 recorded (Figure 16) and a large number of preforms. It should be noted that due to the adverse weather conditions while working on this site many flakes were left unrecorded so the flake count here is artificially lower. The largest component of the assemblage from this site is radial cores which number 34. This pattern can be seen in both BE2010/003 and DK2012/001 as well. The presence of these radial cores suggests that this Acheulean assemblage is either late, or that there are two Early Stone Age components to this site, with hand-axes forming the older component. It is more likely that this assemblage is younger than 600 000 years as Kuman *et al.* (2005) state that most Acheulean sites in South Africa are younger than 1 million years and most likely younger than 600 000 years. The presence of the radial cores confirms this as the presence of such cores has been documented as far back as 500 000 years ago (Tryon 2006). A distribution of flake area (Figure 17) yet again shows that flakes produced from the cores are smaller than the flakes being recovered on site.

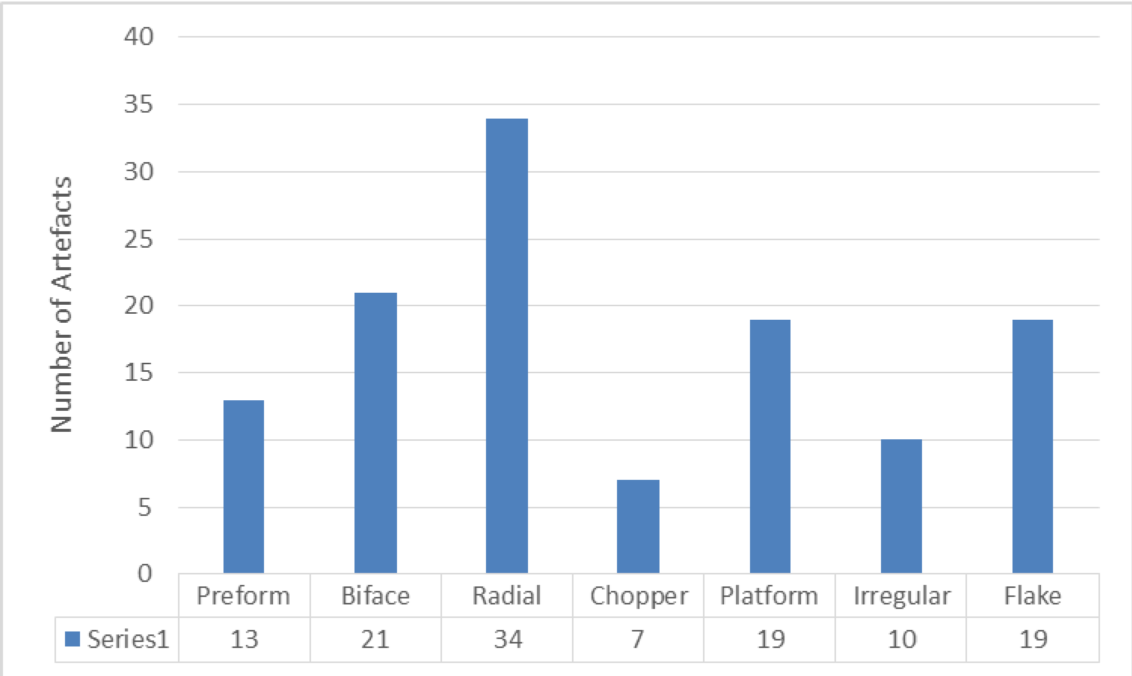

Figure 16: Assemblage composition at BE2010/004.

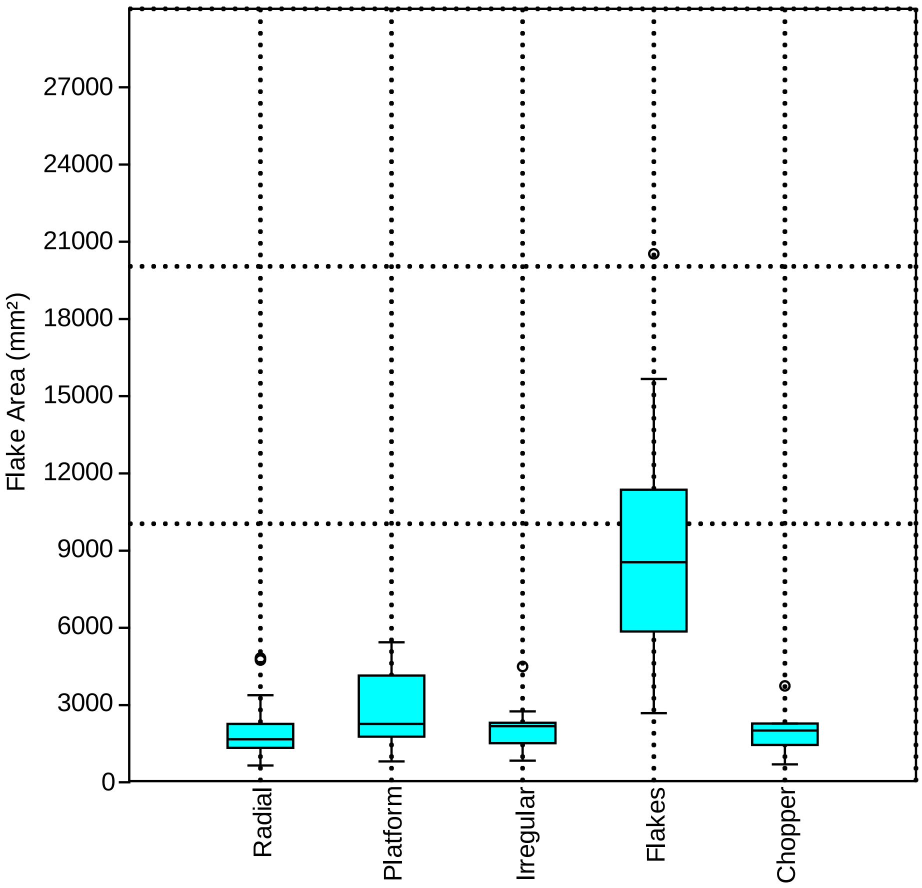

Figure 17: Distribution of flake area at BE2010/004.

5.4. DK2012/001

This site was a scatter of artefacts stretching approximately 500 m across a ploughed field. There were no noticeable concentrations of artefacts, although the boundaries of the site were defined by the lack of artefacts at the extent of this area, particularly in the north and south directions that were covered by the original survey. There were eight bifaces recovered from this site. The same pattern of high numbers of radial cores was recorded here (Figure 18). The size for all flakes and flakes scars was again recorded (Figure 19). The overall size of the flakes recovered was yet again larger than the largest flakes produced from the cores, except for platform cores, where there is some overlap.

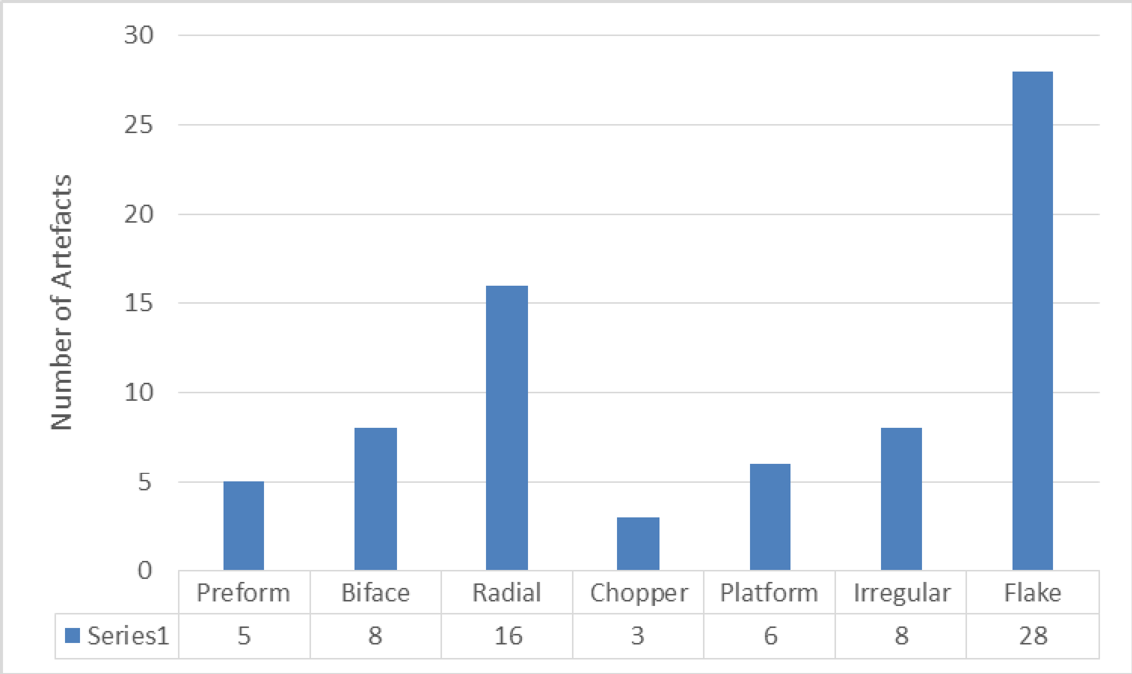

Figure 18: Assemblage composition at DK2012/001.

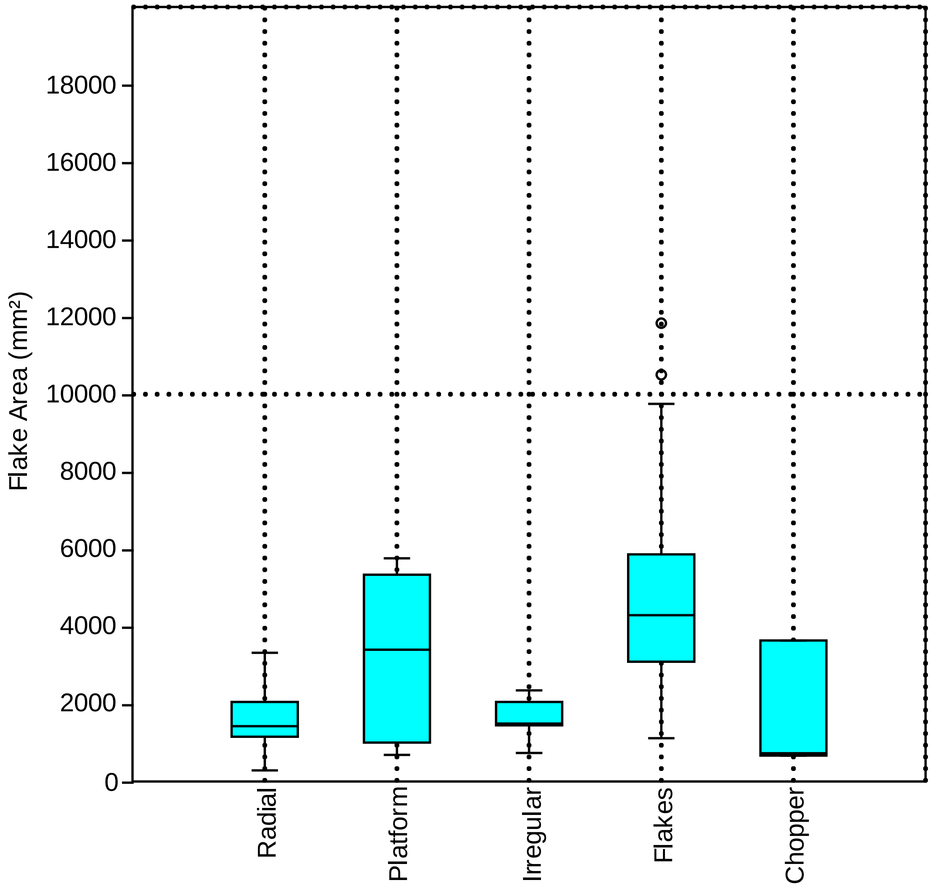

Figure 19: Distribution of flake area at DK2012/001.

5.5. Discussion of the hand-axes

Bifaces or hand-axes are bifacially worked large cutting tools, either made on cobbles, or large flakes. These tools have sharp cutting edges which converge to a point (Wynn 1995). This is a strict definition, but the names biface or hand-axe are often associated with unifacially worked artefacts with a range of shapes from triangular to ovate (Leakey1971; Clark & Kleindienst 2001).

Interpretations of the function of these tools vary; Gamble (1999) suggests that they were signs of group affiliation, while others such as Kohn and Mithen (1999) suggest that they played a role in the process of sexual selection. Symmetry is a common feature in hand-axes, although this is more pronounced in later Acheulean assemblages (Klein 2000).

Table 1 shows the results of the measurement of the hand-axes. In total, 34 hand-axes were found and recorded. Biface size can be measured in numerous ways, but the most consistent and often recorded measurement is length (Iovita & McPherron 2011). While there is a reasonable amount of consistency in size between those from BE2010/004 and DK2012/001, the sample from BE2010/002 appears to include smaller tools. The thickness of the hand-axes, however, is far more standardised across all three sites.

Table 1: Bordes (1961) and Roe (1964) standard measures for the bifaces.

Site	N	Length (mm)		Width (mm)		Thickness (mm)		Base Length (mm)		Tip Length (mm)	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
BE2010/002	5	128.68	8.37	82.71	6.57	49.48	5.48	25.74	1.67	102.94	6.70
BE2010/004	21	153.17	22.97	90.56	14.63	50.30	7.72	30.63	4.59	122.53	18.38
DK2012/001	8	150.15	25.05	85.50	15.10	45.92	9.45	30.03	5.01	120.11	20.04

Biface shape is usually considered through three criteria: elongation, refinement and edge shape (Archer & Braun 2010; Iovita & McPherron 2011). Multivariate studies (Wynn & Tierson 1990; McPherron 2006; Archer and Braun 2010) have consistently supported the importance of these measurements (Iovita & McPherron 2011). Values for elongation, refinement and edge shape can be seen in Figure 12.

Table 2: Bordes (1961) and Roe (1964) elongation, refinement and edge shape indices for the bifaces.

Site	N	Elongation		Refinement		Roe Edge Shape		Bordes Edge Shape	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
BE2010/002	5	1.57	0.19	1.69	0.22	0.67	0.04	-2.73	0.30
BE2010/004	21	1.71	0.23	1.82	0.29	0.64	0.10	-2.97	0.57
DK2012/001	8	1.76	0.11	1.91	0.31	0.68	0.12	-2.35	0.39

The hand-axes recovered from the study area do not show signs that they belong to the class of highly refined hand-axes present in the later Acheulean assemblages. Kohn and Mithen (1999) have suggested that hand-axes, which appear too large or are odd, are indeed elaborate social displays. With the exception of one biface, recovered from BE2012/002, none of the bifaces recovered are particularly symmetrical. None of these bifaces are exceptionally large when compared to hand-axes from other sites around the world (Brande 1991; Iovita 2011; Noll & Petraglia 2003; Norton 2006).

Figure 20: Examples of hand-axes from BE2010/002. Scale in cm.

Figure 21: Examples of hand-axes from BE2010/004. Scale in cm.

5.6. General discussion of the ESA sites

A total of 378 artefacts were recovered from the four sites within the study area. There were 34 bifaces and 23 preforms. Irregular cores numbered 61, platform cores 48, chopper cores 37 and radial cores 93. A total of 132 flakes were recovered and recorded from these sites. Based on the technology present, it is suggested that all sites are roughly contemporaneous, with broadly similar patterns being observed across all of them.
All the flakes are generally larger than the largest flakes being produced on the cores. This would suggest that the flakes were brought in from elsewhere or that the cores on which they were produced were taken away. This could simply be explained by sampling bias: smaller flakes are easier to miss, but the number of flakes produced on these cores should total 1115 pieces altogether. However, only 132 flakes were recovered, although a few were omitted from analysis at BE2010/004 due to the rain. Another possible explanation for this is that the artefact scatters were all located either in ploughed fields or on the sides of farm roads. It is possible that winnowing of the sites has taken place, as smaller artefacts would be subject to more displacement. A third possibility is that the cores could have been heavily reduced such that only small scars are present, but the generally large amount of cortex remaining on them suggests this not to be the case.

Due to the relatively high number of unfinished bifaces recovered and the easy access to raw materials in the form of large quartzite cobbles, it is easy to believe that bifaces were manufactured on some of these sites, and that many of the finished hand-axes have been removed. This would also account for the relatively large flake size which is seen across all 4 sites as some of the handaxes present were produced on large, side-struck flakes.

5.7. BE2012/001

This site yielded only stone artefacts. They were made in five different materials (Figure 22), although one, ‘other’, actually represents a variety of unknown or very rarely flaked rocks. In practice, quartzite and sandstone were very difficult to separate with only a few artefacts being clearly in one or the other material. For this reason they were combined. In any case, it was notable that poor quality sandstone was absent from the flaked assemblage with all being very well cemented. These rocks made up the majority of the assemblage at just under 50%, with quartz, at 35%, being the next most frequent. These two rocks would be easily available in the local landscape and for this reason they strongly dominate the assemblage. Quartzite and sandstone cobbles, in particular, would have been collected from the larger rivers in the area. Silcrete would have been available from a number of locations in the Swartland with many outcrops already on record (Roberts 2003: fig. 4.2a). None have been documented archaeologically in the Gouda area though. CCS would likely have been very difficult to come by in this area and, in common with Hart’s (1987) records, is very rare in the present assemblage.

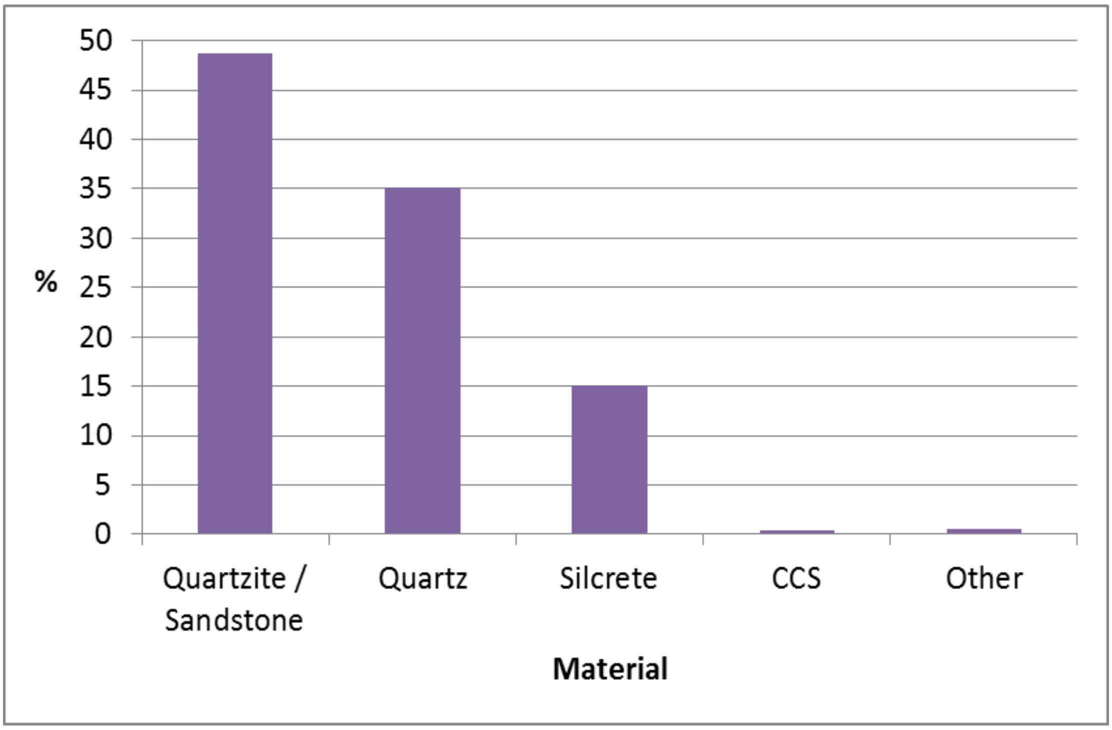

Figure 22: Frequencies of stone materials in the flaked assemblage at BE2012/001.

The retouched tool assemblage is interesting. It is comprised mostly of scrapers but, oddly, four of the nine whole scrapers are large scrapers (Figure 23: K, L, M & O). Such scrapers (greater than 30 mm in maximum dimension) are usually rare inclusions in assemblages from western South Africa, but large scrapers with a characteristically D-shape are present in the early Holocene at Elands Bay Cave (Orton 2006). There are also three broken scrapers whose original form cannot be ascertained (e.g. Figure 23: F & G), while the remaining five tools are an adze, a miscellaneous backed piece, a backed piece fragment and two miscellaneous retouched pieces. The backed piece fragment is very likely to have been a segment (Figure 23: I). None of these tools is strongly diagnostic of any particular age, although segments are usually found in mid-Holocene assemblages. Because of the lack of pottery one can be fairly confident that the assemblage does not date to within the last approximately 2000 years or at least does not have a late Holocene component overprinted. Based on the large scrapers, there is a small chance that it is close to 8000 years old, perhaps reflecting components of the early Holocene non-microlithic and the Holocene microlithic (Orton 2006).

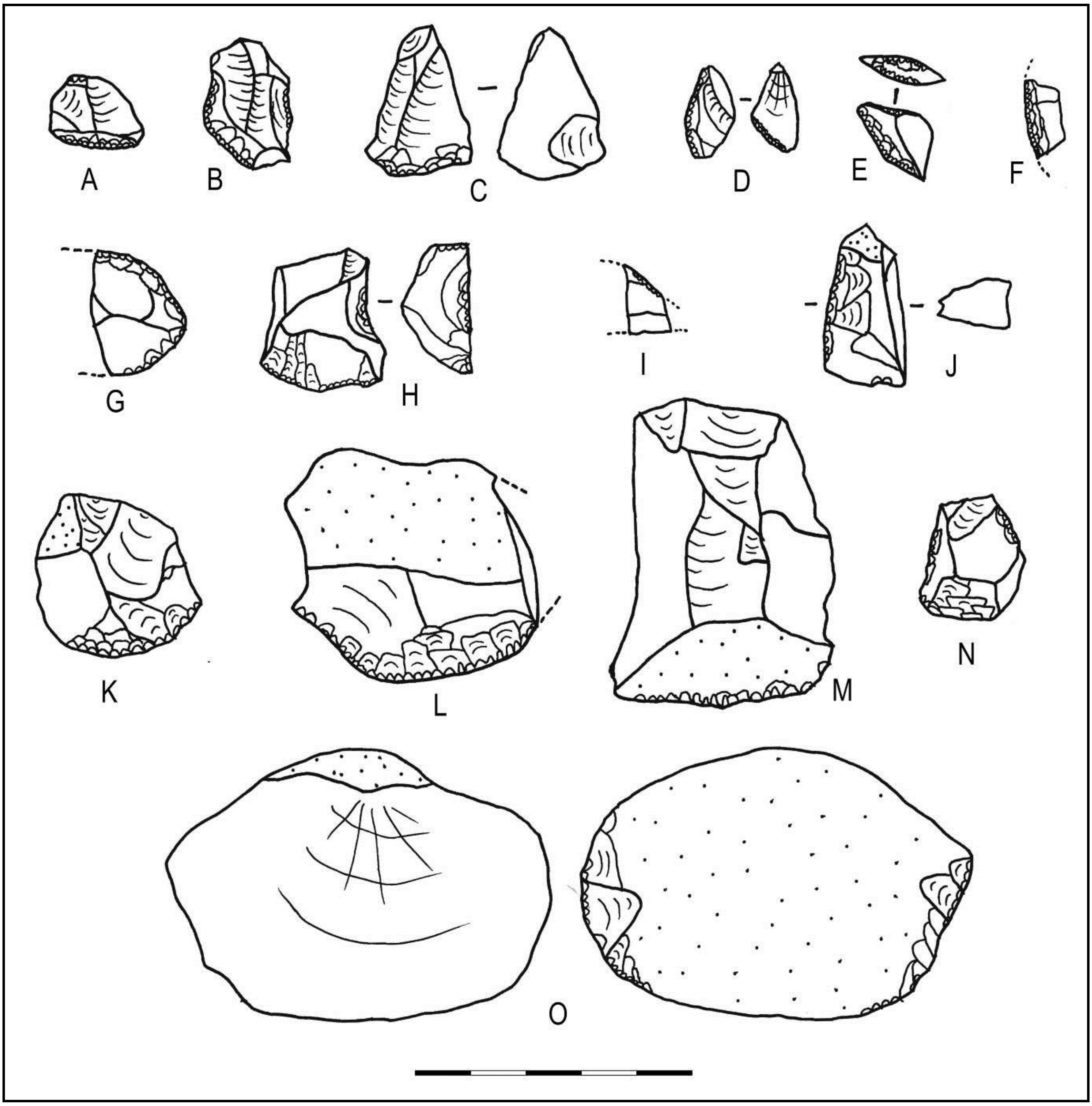

Figure 23: Drawings of various retouched artefacts from BE2012/001. Scale in cm. Stippling denotes cortex. All in silcrete except M & O which are in quartzite. A: C4, thumbnail scraper; B: D8: side-endscraper; C: I12, endscraper; D: C4, miscellaneous backed scraper; E: miscellaneous backed scraper; F: E4, scraper fragment; G: I3, scraper fragment; H: E5, miscellaneous scraper; I: D6, backed piece fragment; J: H3, adze; K: F5, large thumbnail scraper; L: large thumbnail scraper; M: large endscraper; N:miscellaneous retouched piece; O: E3, large double-endscraper.

The general appearance of the assemblage suggests a degree of informality, despite the eighteen retouched tools found. There are many large quartzite/sandstone flakes (e.g. Figure 24) and many have cortex indicating that the rocks were collected and flaked close to the site. This is generally an expedient strategy. The formal tools, however, indicate a curated component to the assemblage, since the silcrete in particular, of which most formals are made, would likely have been collected elsewhere and transported to the site. Interestingly, although the quartzite is likely to be a locally sourced material, there are only two cores (0.4% of the flaked assemblage). This suggests that the cobbles were collected and flaked at the river with just the flakes brought back to the site. Quartz and silcrete, on the other hand, are available in far smaller nodules which are more readily transportable as indicated by the greater frequencies of cores in those materials. The eighteen quartz cores and nine silcrete cores represent 4.6% and 5.3% of the material totals respectively.

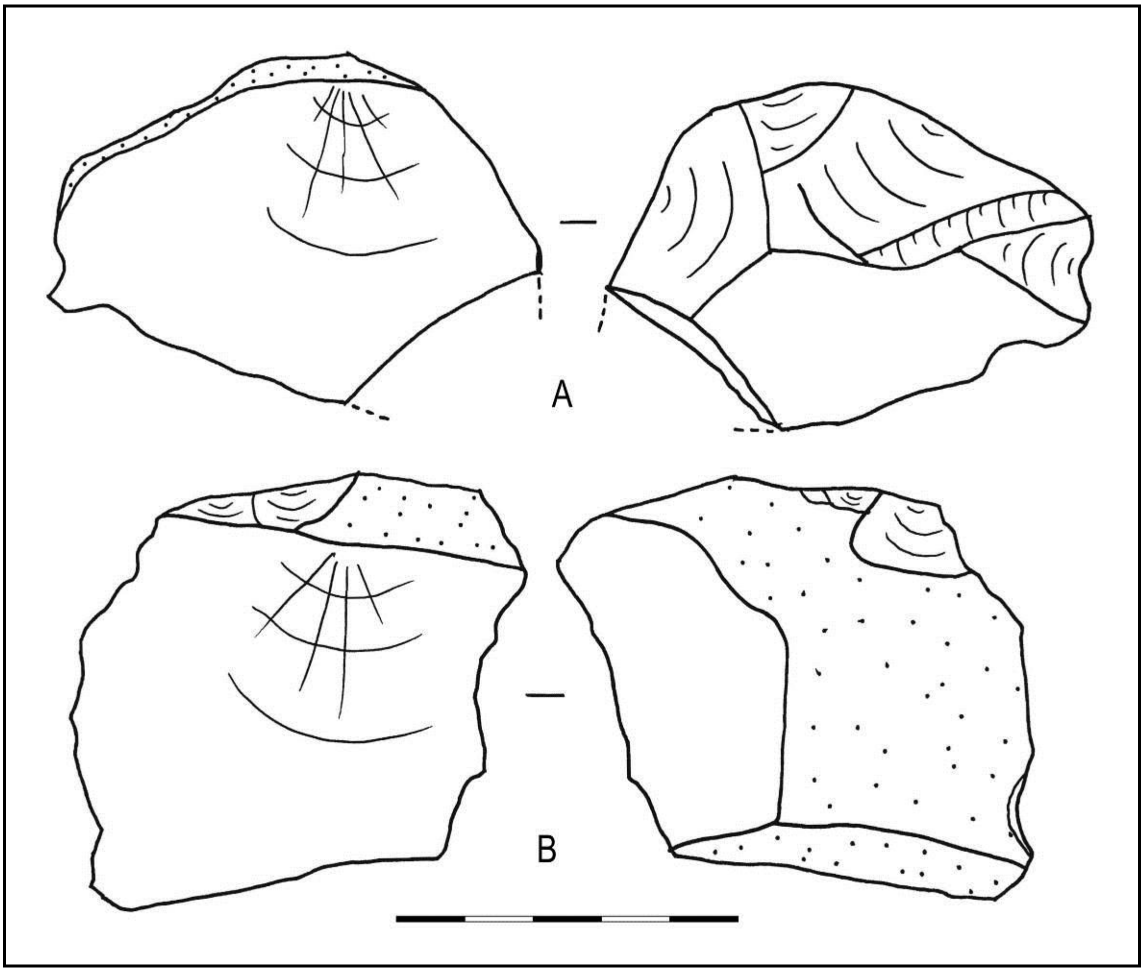

Figure 24: Drawing of two large quartzite flakes from BE2012/001. Scale in cm. Stippling denotes cortex. A: D6, B: D7.

The vast majority of the artefacts found on the site are certainly LSA in age, however, a single very clearly MSA flake was collected from the surface of an unexcavated part of the site to the north of the grid. It displays the typical triangular shape (Figure 25) and faceted platform (Figure 26) characteristic of MSA technology.

Figure 25: Ventral and dorsal views of the MSA flake collected from the surface of an unexcavated part of BE2012/001. Scale in mm.

Figure 26: The faceted platform of the collected MSA flake.

In total, 232 m^2 were sampled from the site in 4 m^2 excavation units. Of these, eight squares, or 24 m^2, were subjected only to a surface collection, the remainder were excavated. The collection produced 1116 artefacts, excluding the one MSA flake noted above. The highest density of artefacts on the site, in square G5, is approximately 17 artefacts per square metre, although over much of the area density is less than five artefacts per square metre (Figure 27). Despite the condition of the site, there did appear to be some spatial patterning as is evident from the densities of both all artefacts (Figure 27) and retouched artefacts only (Figure 28). However, whether this density is a product of the erosion of the surface, with rain washing the artefacts towards the low ground, is impossible to say. Unfortunately, this could not easily be tested, as excavation within the muddy puddle would have been too difficult. It does seem likely though, that the main occupation must have occurred at or very close to this high density area with the other artefacts resulting from spreading through natural causes as well as from repeated ploughing of the land.

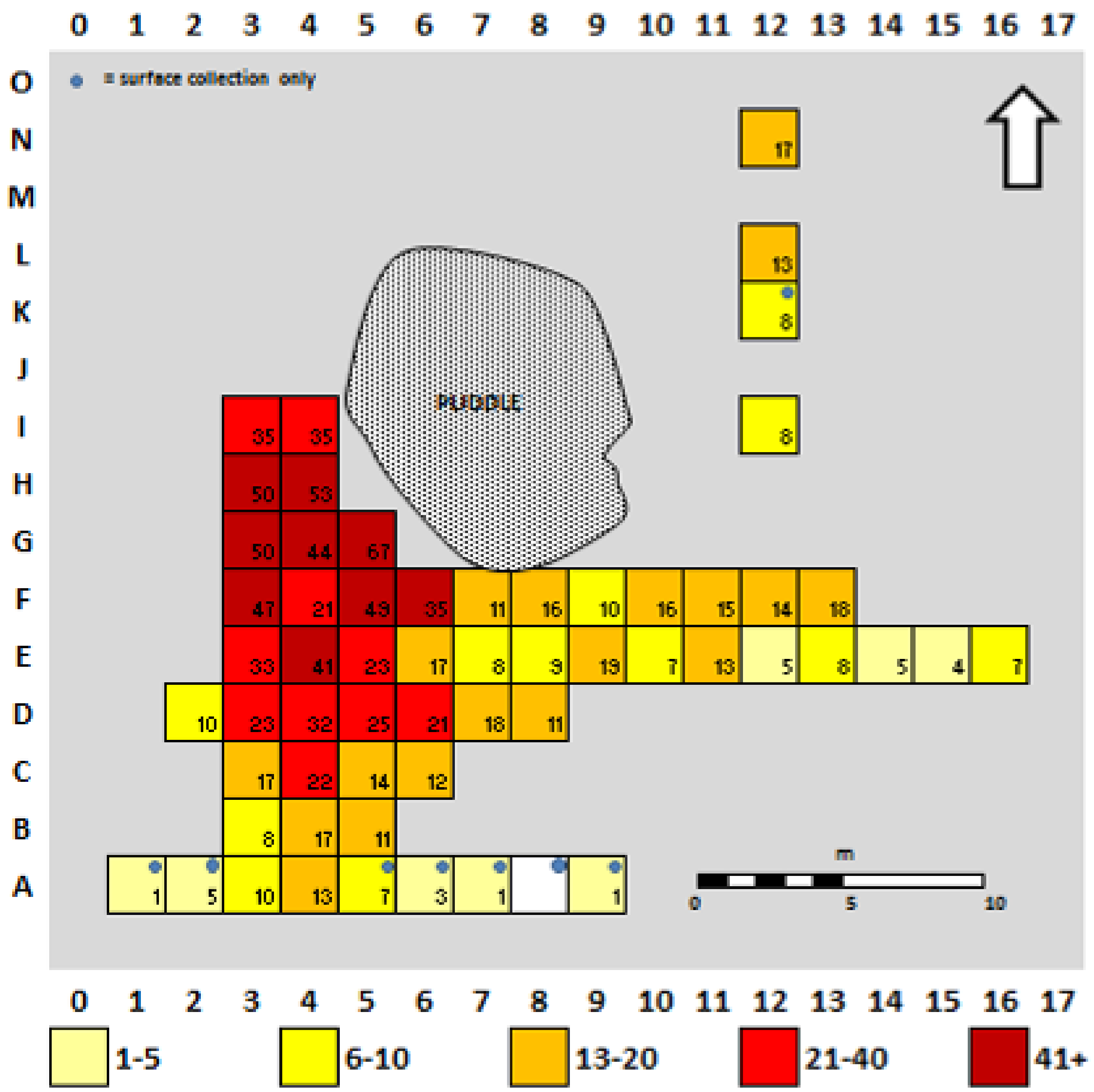

Figure 27: Plan of BE2012/001 showing the density of all stone artefacts per 4m^2. The squares with a blue dot in them had only surface collections taken from them.

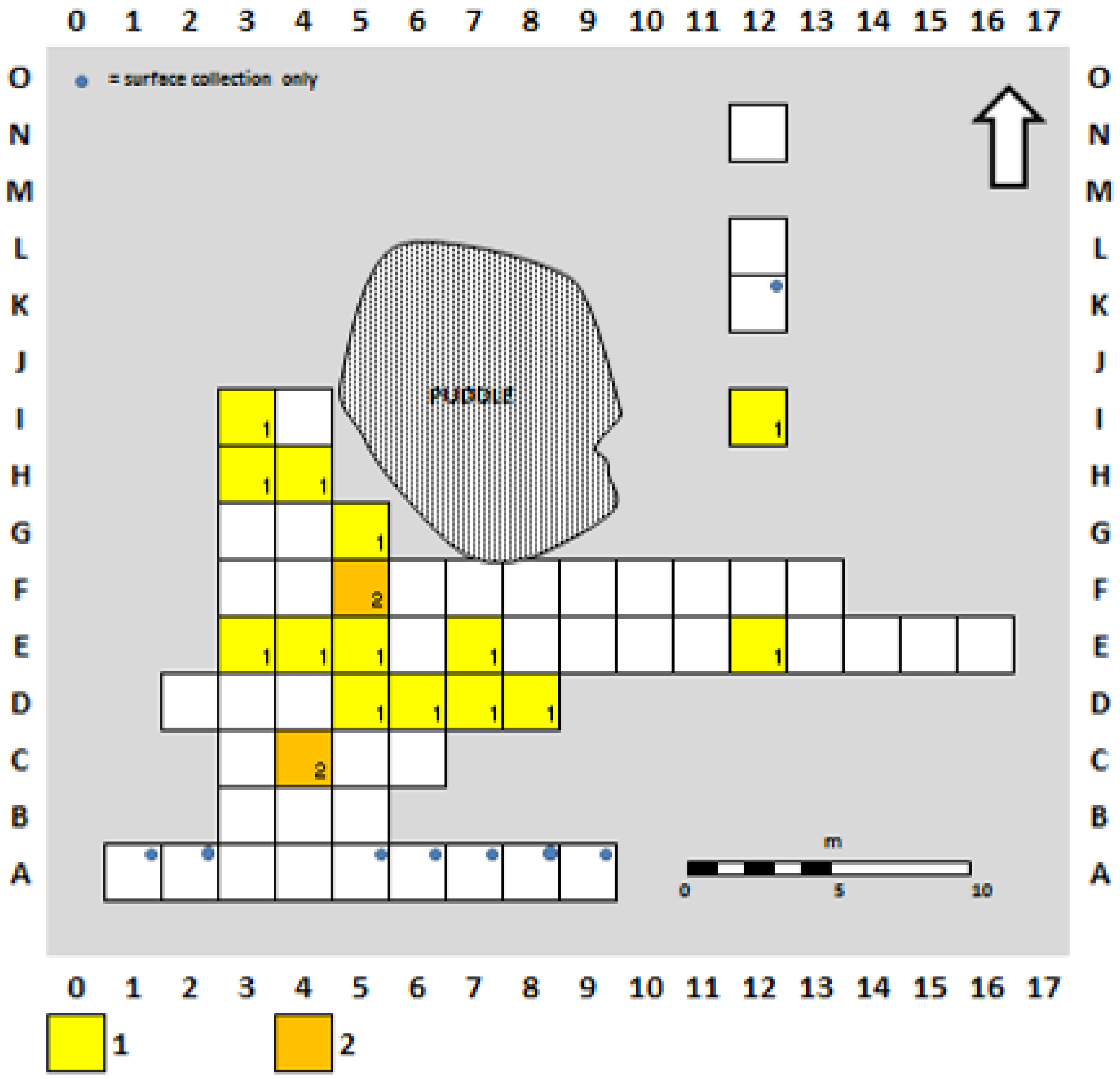

Figure 28: Plan of BE2012/001 showing the density of retouched stone tools per $4m^2$. The squares with a blue dot in them had only surface collections taken from them.

6. DISCUSSION AND CONCLUSIONS

With very little archaeological research ever having been done in Gouda, this mitigation project has made an important contribution to our knowledge of the archaeology of the area. Hart (1987) showed that archaeological sites of varying age are present in the area and collected some data from a few sites. This project has added to his observations. Smith *et al.*’s (1991) work documented late Holocene occupations in local rock shelters, although probably with some degree of mixing of the assemblages. The present project has added an earlier LSA observation (site BE2012/001) as well as a suite of observations into the ESA technology as practiced in the Gouda area. That the style of hand-axe manufacture here was noted by Hart (1987) further to the north as well shows that it may be a more widespread phenomenon, since such forms are uncommon elsewhere. An excellent sample of the ESA artefacts present was recorded. However, as the context of these four ESA assemblages is severely compromised by the ploughing of fields for agricultural purposes, these sites have limited research potential over and above the capture of data as carried out here.

7. RECOMMENDATIONS

The mitigation work presented above is deemed to have served the purpose it was intended to serve and captured sufficient data on the local archaeology. It is recommended that the proposed development be allowed to proceed with no further archaeological work required. It should be noted, however, that if any substantial collections of stone artefacts are unearthed during the excavation work for the project then these should be reported to an archaeologist for assessment. The same applies to any burials that may be found, although such finds are deemed highly unlikely to occur.

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