



# **APPENDIX A**

## **Archeology and Cultural Heritage Study for a Proposed 100MW Wind Energy Project, Kajiado District, Kenya**

Report Prepared for

**Kipeto Energy Limited**

March 2012

# **Archeology and Cultural Heritage Study for a Proposed 100MW Wind Energy Project, Kajiado District, Kenya**

*Prepared for:*

**Kipeto Energy Limited**

14 Riverside, Riverside Drive, Westlands

P. O. Box 8366 – 00200

Nairobi, Kenya

*Prepared by:*

**Ms. Angela Kabiru – Archeologist**

**National Museums of Kenya**

**NAIROBI**

**March 2012**

**Compiled by:**

---

**Ms. Angela Kabiru – Archeologist**

# TABLE OF CONTENTS

1	INTRODUCTION .....	6
1.1	Aim and objectives of the study.....	6
1.2	The Team.....	7
1.3	Methodology .....	7
1.4	Legislative Framework .....	9
2	Geological, Archaeological and Historical Background .....	10
2.1	Geological Formations .....	10
2.2	Archaeology.....	11
2.2.1	The Early Stone Age: 2.6 million – 200,000 years ago.....	11
2.2.2	The Middle Stone Age (200,000-50,000years ago) .....	12
2.2.3	Later Stone Age (50,000-2,000years ago) .....	13
2.2.4	Iron Age to Recent occupation (2000 years ago – 1700AD) .....	14
2.2.5	The Historical Period: The Maasai Occupation .....	16
2.3	Suitability for Past Habitation and Use .....	16
3	FIELDWORK AND ANALYSIS.....	19
3.1	Physical setting .....	19
3.2	Site surveying and sampling.....	22
3.3	Findings and Analysis.....	25
3.3.1	Archaeology.....	25

3.3.2	Cultural and Historical Analysis .....	39
3.4	Deductions from field surveys and literature review .....	44
4	IMPACT ASSESSMENT .....	46
4.1	Archaeological Impacts.....	46
4.2	Cultural Impacts.....	47
5	MITIGATION MEASURES .....	50
5.1	Archaeology.....	50
5.2	Cultural measures.....	51
5.3	Conclusions.....	51
6	REFERENCES .....	52

#### List of Tables

Table 1:	Locations of clearings selected for survey.....	24
Table 2:	Locations where collections were made .....	28
Table 3:	Summary of site potential.....	47

#### List of Figures

Figure 1:	Map showing the Archaeology of the Kajiado area.....	15
Figure 2:	Map showing location of Kajiado District .....	20
Figure 3:	The different vegetation/surface covers on the proposed development site.....	21
Figure 4:	Figure showing clearings marked for survey .....	23
Figure 5:	Artifacts from Site 1.....	32
Figure 6:	Artifacts from Site 2.....	33
Figure 7:	Artifacts from Site 3.....	34

Figure 8: Artifacts from Site 4.....	35
Figure 9: Artifacts from Site 5.....	36
Figure 10: Human remains from cave burial.....	38
Figure 11: Potential Neolithic site settings.....	39
Figure 12: Domestic animals kept by the Maasai.....	40
Figure 13: Piles of manure outside the cattle enclosure.....	41
Figure 14: The Maasai now build traditional <i>enkangs</i> alongside modern <i>mabati</i> houses .....	42
Figure 15: Maasai women in traditional dress.....	43
Figure 16: Burial sites are usually marked by stone cairns.....	43
Figure 17: <i>Olpul</i> used by men for meat eating feasts.....	44

# 1 INTRODUCTION

The proposed development of a site located within the Kipeto area of Kajiado District, Kenya, will involve the construction of temporary and permanent structures including some buried services. This construction alongside the influx of construction workers and associated locals into this area has the potential to impact on sites of archaeological and historical interest and importance. This report details the results of a survey of the sites that are likely to be impacted by the proposed development at Kipeto. The report also contains an assessment of the potential nature of those impacts and suggestions as to how they might be mitigated.

## 1.1 Aim and objectives of the study

The overall aim of the study was to undertake an archeological and cultural heritage assessment within the development area and to assess the archaeological and cultural heritage impacts that are likely to arise from the planning and implementation of the proposed development.

This Impact Assessment study is guided by the following objectives:

- Develop an understanding of the likely archeological and cultural heritage resources that may be found on the basis of a literature review of historical activities in the area.
- Detail the likelihood of archeological and cultural heritage resources being present in the area on the basis of the natural setting and suitability for past habitation and/or use.
- Following a visit to site and discussions with affected communities, identify and map all cultural heritage resources in the area, including graves.
- Assess the impact of development on such heritage resources.
- Provide management measures for mitigation of any adverse effects on archeological and cultural resources during and after the completion of the proposed development.

## 1.2 The Team

This survey was carried out by a team from the National Museums of Kenya headed by Angela Kabiru. Miss Kabiru (MSc) has worked for the Archaeology Section for more than 10 years, and has also been a team member in other major Archeological Impact Assessment (AIA) surveys such as the Turkana Wind Power Project, the British Army Training Unit in Kenya (BATUK) Project in Laikipia, and several others. The other team members included Freda Nkirote, Cecilia Ngugi and John Munyiri from Archaeology section; Matthew Macharwas from the section of Palaeontology and Mercy Kinyua from Ethnography, National Museums of Kenya.

## 1.3 Methodology

This AIA is carried out in accordance with the National Museums of Kenya requirements for Archaeological Impact Assessment within areas proposed for development in Kenya.

Evaluation of resources included theoretical analysis and field surveys to determine the potential of the area. The theoretical work combined a study of existing documents and cartographic information. In addition, a survey of the area was conducted to determine the current condition of the site in relation to the documentation. The field survey included walking the ground to look for signs of prehistoric or historic occupations. The field survey further included belt transects by technical/field experts along the areas of interest between determined distances such as a few meters to hundreds of meters dependent on the distribution of archaeological material on the ground. The survey concentrated on gullies and other exposed sections and all high points. All areas with important archaeological material were mapped, described in detail through field notes and photographs. Results of the Archaeological Inventory Survey were used to suggest further investigation or mitigation measures, as necessary.

Following the evaluation, further assessment was carried out to determine the potential of the proposed project in destroying archeological and cultural heritage resources. This assessment was determined by the condition of the resources, its preservation and distribution within the proposed area of development. In addition, the relative significance and relevance of the resources was determined in order to draw up recommendations. Further archeological and cultural heritage work may be necessary after studying in detail the plans of the proposed development to determine the resources that may be affected. A technical expert will be required at the site during the development period especially when the wind turbines are erected in order to evaluate the areas where foundations for the wind turbines will be excavated. Should there be material of relevance, then the location of the wind turbines will have to be changed. This exercise is necessary as the area is covered by a thick black cotton soil which may hinder visual evidence of any archaeological material. It was not prudent to undertake archaeological test pits within the whole area during the field survey and therefore the necessity to have a technical expert to evaluate the location of wind turbines while they are under construction will be beneficial.

Using the evaluation and assessment results, a set of recommendations was drawn for the developers. The recommendations detail the action to be taken and reasons for these actions. The actions may include:

- i). No further action during the construction phase or
- ii). Detailed full excavations for recovery of the resources,
- iii). Redesign of the proposed development to avoid destruction of part of the resources or
- iv). A complete halt into the development.

Since some of the recommendations can be very costly, it is important that these evaluations and assessments are carried out from the very early planning stages of the development plans.

## 1.4 Legislative Framework

The National Museums and Heritage Act (2006) protects all archaeological and historical cultural heritage objects of historical interest and other protected objects. These objects of historical interest include:

- Antiquities - any moveable object other than a book or document made in or imported into Kenya before the year 1895, or any human, faunal or floral remains of similar minimum age.
- Object of archaeological or paleontological interest in existence before the year 1800.
- Object of historical, cultural or scientific interest which came into existence in or after the year 1800.
- Architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of universal value from the point of view of history, art or science.
- Works of humanity or the combined works of nature and humanity, and areas including archaeological sites which are of outstanding value from the historical, aesthetic, ethnological or anthropological point of view.
- Protected areas are sites which have been declared under sections 25(1) (a), (c) or (f) by the Minister to be protected areas.

## 2 Geological, Archaeological and Historical Background

### 2.1 Geological Formations

The oldest rocks in Kajiado District are gneisses, limestones and quartzites that form the Basement system that is known to be of the Precambrian age. They are all sedimentary and also cover a large part of East Africa. The lower layers were probably laid down in deep water, and later depositions were made in shallow water. Subsequent compression and folding of the basement rock led to the formation of mountain chains which have been intensely eroded, and by the end of the cretaceous the whole area had been reduced to a peneplain, now remnant at Lemilebbu hill. More uplift and erosion led to the formation of the sub-Miocene peneplain, onto which the volcanics of Tertiary age were deposited. The Kapiti phonolite is the oldest of these volcanics and covers a vast area to the east and north east of Kajiado. As no central volcanoes have been located, the phonolite may have been extruded from small vents. Phonolite is the main raw material for the Early Stone Age industries at Olorgesailie and Isenya prehistoric sites.

The volcanoes of Olorgesailie and Ol Esakut are younger than the phonolites as they both lie on the earlier volcanic of Kapiti and Kerichwa Valley Tuff respectively. The faulting that followed placed the two main volcanoes on the floor of the Rift Valley, while further volcanic activity introduced basalt and trachytes on the floor of the Rift Valley. Where Basement soils occur, they degrade into grey sandy soils, while black cotton soils such as those found on the proposed development site are formed on volcanic soils. The proposed development area is part of what is known as the Ol Doinyo Narok plateau, covered by Ol Doinyo Narok agglomerates and Kerichwa Valley tuffs. The agglomerate is responsible for the great number of lava blocks strewn across the surface, and also the phonolites and trachytes that are both coarse and fine grained.

Other deposits in this area have been transported to location, such as those in the now dry lake Olorgesailie bed, and the layers of diatomite that formed when the lake was fed by the Ol Keju Nyiro river, and that now signal the existence of a once thriving wet land that supported large herds of big mammals and plants. The story of Kajiado thus goes a long way; back in time when *Homo Erectus* roamed the earth.

## 2.2 Archaeology

### 2.2.1 The Early Stone Age: 2.6 million – 200,000 years ago

The oldest stone tools attributed to the genus Homo (Mode 1 industry) have not been recorded anywhere in Kajiado district. However, tools belonging to Mode 2 that date to between 1.7 million to 200,000 years ago are well represented. These later tools also referred to as Acheulian, have been found in various parts of the district, with the most famous sites excavated being Olorgesailie and Isenya.

Olorgesailie Prehistoric Site (GwJj sites 1-23) is located on the floor of the Rift Valley between Mts Ologesailie and Ol ESakut, 80 km south of Nairobi off the Nairobi Magadi Road. The site stands in a depression that formerly contained a lake that dried up about 200,000 years ago. The drying up of the lake was caused by a series of earth movements that caused the Ol Keju Nyiro River to flow through the area towards the south. The earth movements also lifted the deposits in the western half relative to the eastern half thereby creating a slope out of which the fossils and artifacts wash out. This is where the excavations were first carried out, and where the site museum is located.

The artifacts were first reported by JW Gregory and Mr. C W Hopley in 1919. It was not until 1942 that the site was first excavated by the Leakey's exposing stone tools that had been buried in the lake silts. These, together with hundreds of other stone tools that litter the surface, now make up the in-situ exhibit at the site museum.

The stone tools found at Olorgesailie belong to the Acheulian tradition, mainly characterized by hand axes and cleavers. This tradition has a very long duration from about 1.7 million to about 200,000 years ago, is widespread over much of the Old World, and is attributed to *Homo erectus*. In 2003, a 930,000 year old cranial fragment of *Homo erectus* was discovered at Olorgesailie. Other animal species now extinct are also well represented. Apart from the Early Stone Age lithics represented by the Acheulian tradition, more recent tools classified as Middle Stone Age have also been recovered. Excavations at Olorgesailie continue to this day, and it is still the richest Acheulian site known to date. Many of the stone tools here are made out of phonolite.

Isenya (GwJI 1-3) is an Acheulian open air site 60km south of Nairobi on the Athi Plains. It is located on the banks and bed of the Isenya River, a tributary of the Athi River. Both upstream and downstream of the Isinya Bridge are outcrops of phonolite dated towards the end of the Miocene and the beginning of the Pliocene about 13 million years. This phonolite represents most of the raw material used on the site. Excavated in 1984, the main tool types represented include hand axes and cleavers, while the fauna includes bovine, equids, crocodile, rodents, fish giraffe and hippopotamus. Four other sites bearing similar artifacts are recorded in this area. Isenya 1 is dated 700,000 years ago.

Other sites of similar age are located along the Mataragush River (GxJI7), Lenderut (HaJ1), Kitengela river (GvJk12), Isenya river (GwJI13), GxJj0/3, and Nkoile (GxJI1).

#### 2.2.2 The Middle Stone Age (200,000-50,000 years ago)

After about 300,000 years ago, the pace of innovation in stone technology began to accelerate. Hand axes eventually gave way to smaller, more diverse toolkits, with an emphasis on flake tools rather than larger core tools. These toolkits were established by at least 285,000 years in some parts of Africa, and by 250,000-200,000 years in Europe and parts of western Asia.

One of the main innovations was the application of 'prepared core technique,' in which a core was carefully flaked on one side so that a flake of predetermined size and shape could be produced in a single blow. Middle Stone Age toolkits included points, which could be hafted on to shafts to make spears. When smaller points were made, eventually, they could be attached to smaller, sleeker shafts to make darts, arrows, and other projectile weapons. Stone awls, which could have been used to perforate hides, and scrapers that were useful in preparing hide, wood, and other materials, were also typical tools of the Middle Stone Age. The main raw material used here is quartz, chert/chalcedony, and lava.

Middle Stone Age sites in this area include those at Olorgesailie (GwJj 24), HaJi5, HaJi3, GxJj0/7 and Turoka (GxJk1).

### 2.2.3 Later Stone Age (50,000-2,000years ago)

Later Stone Age (LSA) tools are very diverse and reflect stronger cultural diversity than in earlier times. *Homo sapiens* experimented with diverse raw materials (bone, ivory, stone), the level of craftsmanship increased, and different groups sought their own distinct cultural identity and adopted their own ways of making things. Collections from LSA sites around the area include microliths, potsherds, rubbing stones and palettes, and Ostrich egg shell beads. LSA open sites can be in open areas, but cave sites become more common at this time, and human burials within rock shelters are a common feature. Reported sites with LSA assemblages include Ongata Iturot (GxJi2), Pickford's site(GuJj14), Salasun GuJj13, GuJj 10, 12Olorgesailie Rockshelter ngong GvJk2, GxJj0/6, GxJj0/1, Turoka GxJk1and Olkena.

The presence of obsidian flakes and tools in these sites indicates long distance contacts and movements as obsidian is not available locally. Obsidian is a common raw material in LSA assemblages as it produces a very sharp cutting edge which is easily retouched for reuse, and is easily flaked into microliths which make up the bulk of Later Stone Age toolkits.

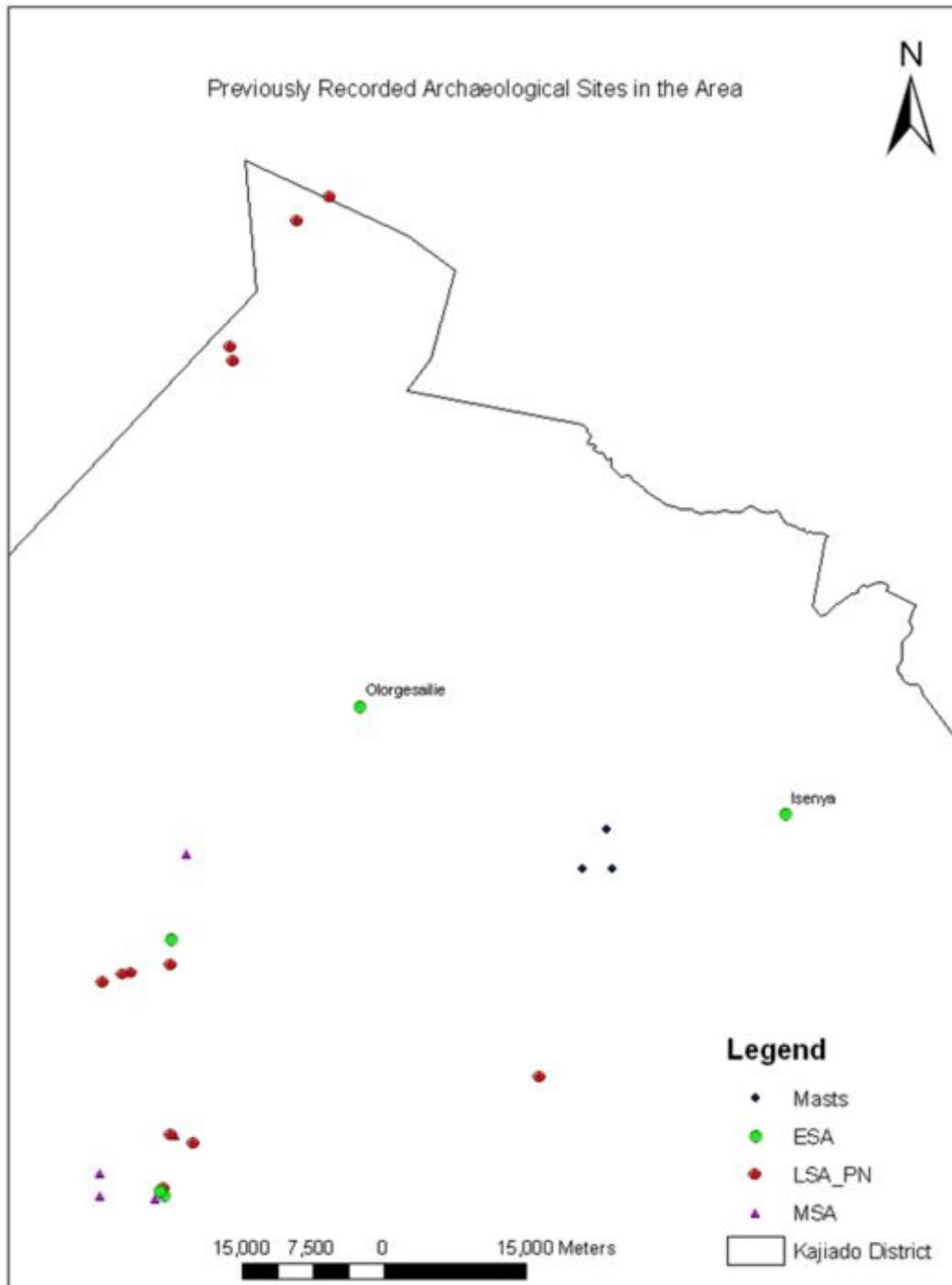
The beginnings of agriculture are indicated by the appearance of pottery with characteristic decoration motifs. Ostrich Egg Shell (OES) beads also appear at this time, and are the oldest ornamental items recorded in Kenya. One of the sites well known for its OES bead collection is Olkena (GxJi 4). The assemblage here consists of crescents and backed blades, thumbnail scrapers, micro-drills, OES beads and pre-forms.

#### 2.2.4 Iron Age to Recent occupation (2000 years ago - 1700AD)

The production of iron in East Africa began much later than in many other parts of the continent especially North Africa. The spread of iron smelting has been attributed to the Bantu expansion, as they are thought to have been instrumental in the beginnings of agriculture, and therefore needed to produce iron implements that were useful in the clearing of forest for farming. It is however unclear exactly when iron production began, although many Iron Age sites have been recorded. It is also assumed that many iron producers were sedentary, and the presence of Iron Age sites here is an indication of permanent dwellings in the area.

Iron Age sites have been recorded at Tandala Trench, Rombo, Nkurele, and the Ngong Forest Site. A map showing the archeology of the Kajiado area is given in Figure 1.

<sup>1</sup>Figure 1: Map showing the Archaeology of the Kajiado area



<sup>1</sup> Some of the best sites are Olorgesailie and Isenya. The masts shown in black are on the proposed development site.

### 2.2.5 The Historical Period: The Maasai Occupation

According to linguistic studies, in the distant past most of sub-saharan Africa was occupied by a people speaking Khoisan languages characterized by clicks (Ambrose, 1982). The Maasai, who belong to the Eastern Nilotic group of languages (together with the Samburu and Ilchamus) spread from their homeland on the Uganda /Sudan/Kenya border area early in the first millennium AD. They absorbed and displaced Southern Nilotes and Southern Cushites on their way south, and now occupy all that area from Lake Turkana to the Pare Hills of Eastern Tanzania. A more recent displacement of the Maasai took place early in the 19<sup>th</sup> century with the signing of the Maasai treaties of 1902 and 1911 that led to their mass movement from the area north of Mt Kenya to the southern reserves to make way for European settlements.

The mortuary practice of burying the dead in rock crevices is attributed to the Savannah Pastoral Neolithic (SPN), and is usually associated with large obsidian blades, stone bowls, pestle grinders and thin palettes for grinding ochre, none of which was recovered from the burial discussed below.

The Keekonyokie Maasai currently inhabit the Ol Doinyo Narok plateau and according to oral narratives, came from the Kinangop.

There are five major clans and about 40 sub-clans of Maasai in Kajiado district. The clans are grouped into two moieties namely *Orok Kiteng* and *Odomongi*, each descended from one of the two first Maasai ancestor.

## 2.3 Suitability for Past Habitation and Use

Although no sites have been recorded on the Ol Doinyo Narok Plateau, there are several factors that present a compelling case for suitability of past human use and habitation.

1. The presence of obsidian/chert tools and flakes and pottery is an indication of human activity, local or transported. Similar Stone Age tools are known from other sites around the plateau and it is therefore known that they are produced by human activity. Although the source of obsidian cannot be established right away, it is also known that the raw material

was transported over long distances to places that were favored for settlement, especially when sedentary settlements became established.

2. Most Early Stone Age (ESA) and Middle Stone Age (MSA) sites are known to be located close to water sources because of the convenience of attaining water, and the ease of shooting/killing game when they came to water. Most of these sites are open, and are found even where no caves are present. In contrast, many caves and rock shelters make up Later Stone Age (LSA) sites, either as living quarters or burials. There are many caves of good size here that would make nice camping grounds for medium sized families.
3. The area altitude and climate is similar to that of other areas like the Laikipia Plateau and the Mau Escarpment where many LSA and Neolithic sites have been reported. Most of these areas were suitable for the growth of grain/ grasses that may have been exploited at the beginning of the agricultural revolution. The high ground is also located a distance away from large water bodies, and consequently away from dangerous large mammals that come to water. However the grasslands also supported large numbers of grazers who may have formed part of the diet of the inhabitants. Thomson's and Grants gazelle and zebra can still be seen grazing today.
4. The report that human skeletons had been exhumed from one of the caves is an indication of intentional human burial, one of the later developments of human behavior attributed to the LSA. This multiple burial inside the cave was piled with stones, and as the Maasai did not bury their dead when they moved here, it will be assumed that the burial is Pre-Maasai. Other burials of this kind have been reported in other areas of Kenya where LSA and Neolithic sites occur.
5. Although most river/stream beds within the plateau are dry most of the year, the main river has a few permanent pools that the local population still depends on for their supply. The water levels may have been higher in the past and may have supported larger herds although the human population may have been lower.

6. The occurrence of archaeological artifacts all around the plateau in itself suggests the likelihood that humans may have settled on the plateau at some point in the past; the absence of specific sites does not exclude the possibility that the land was exploited, especially considering reports that the plateau was much more heavily forested than it is now, until as recently as 50 years ago.
7. The lack of visibility of sites on the surface may be due to the fact that though the plateau is not covered by forest, the thick cover of black cotton soil with corresponding thick grass layer sufficiently covers up most of the small artifacts. Erosion on the plateau is not extensive so finding exposed sections where material may be eroding out is not easy. Since oral reports claim that some areas were more heavily forested until the 1970s, settlement may have been restricted to those areas where the forest opened into grassy areas, and which are not very apparent from the ground presently due to the patchy trees and extensive grass cover.

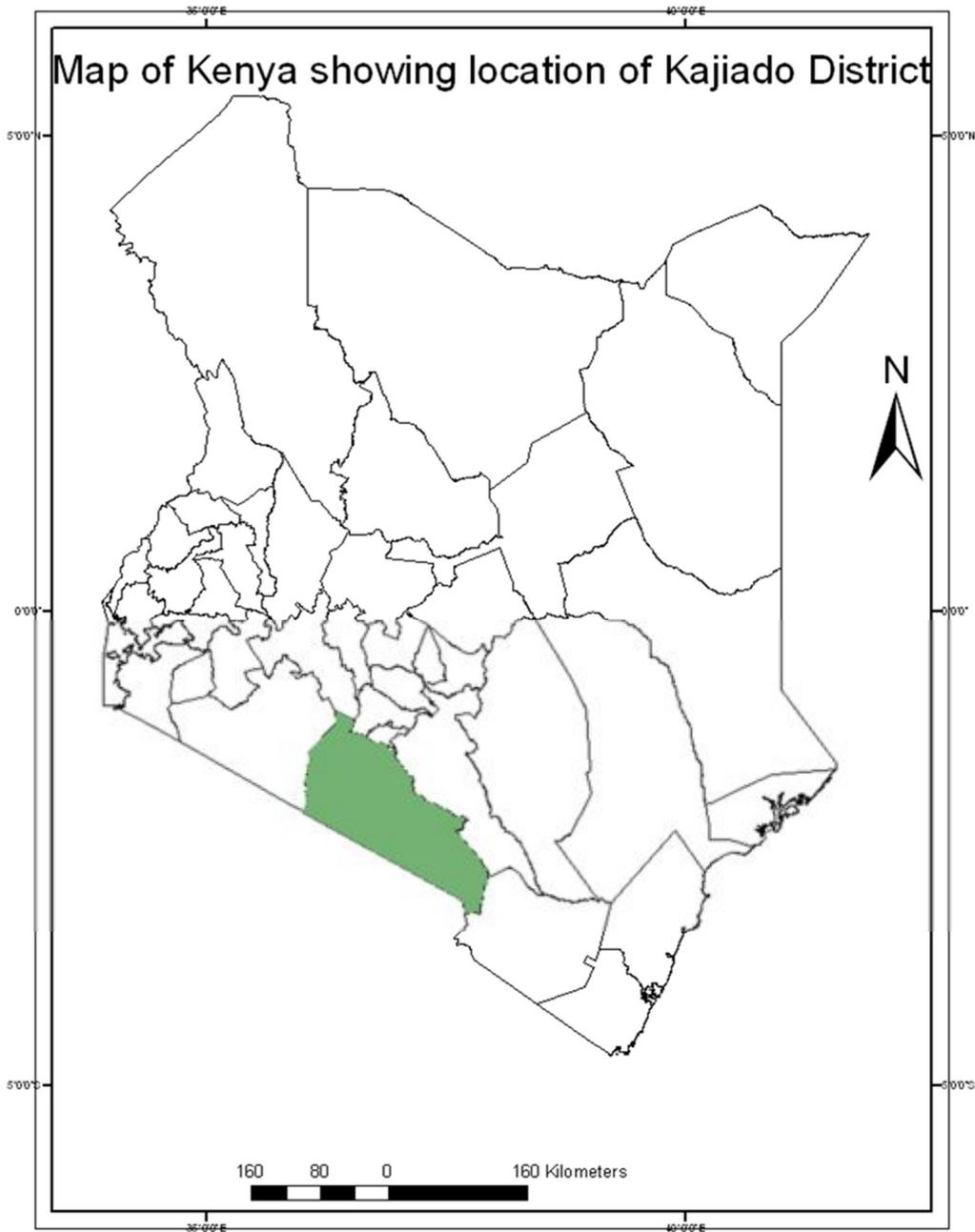
### 3 FIELDWORK AND ANALYSIS

Field work was carried out in three sessions. The first one was between the 8<sup>th</sup> and 12<sup>th</sup> August; the second between the 12<sup>th</sup> and 17<sup>th</sup> September and the last between the 18<sup>th</sup> and 22<sup>nd</sup> October 2011. The weather in session 1 was cold and dry and the last two days were wet; it was dry and hot during the second session; the weather during the last one was hot and wet.

#### 3.1 Physical setting

The proposed development site is located in Kajiado district (Figure 2), at the top of what is known as the Ol Doinyo Narok plateau, which rises gently in the East but forms a steep escarpment on the Western side, from which side Mt Olorgesailie can be seen in the distance. The white diatomite layers on which the archaeology sites are located can also be seen from here. The plateau lies in roughly N-S direction with Kajiado town in the southeast and Isenya roughly to the East.

**Figure 2: Map showing location of Kajiado District**

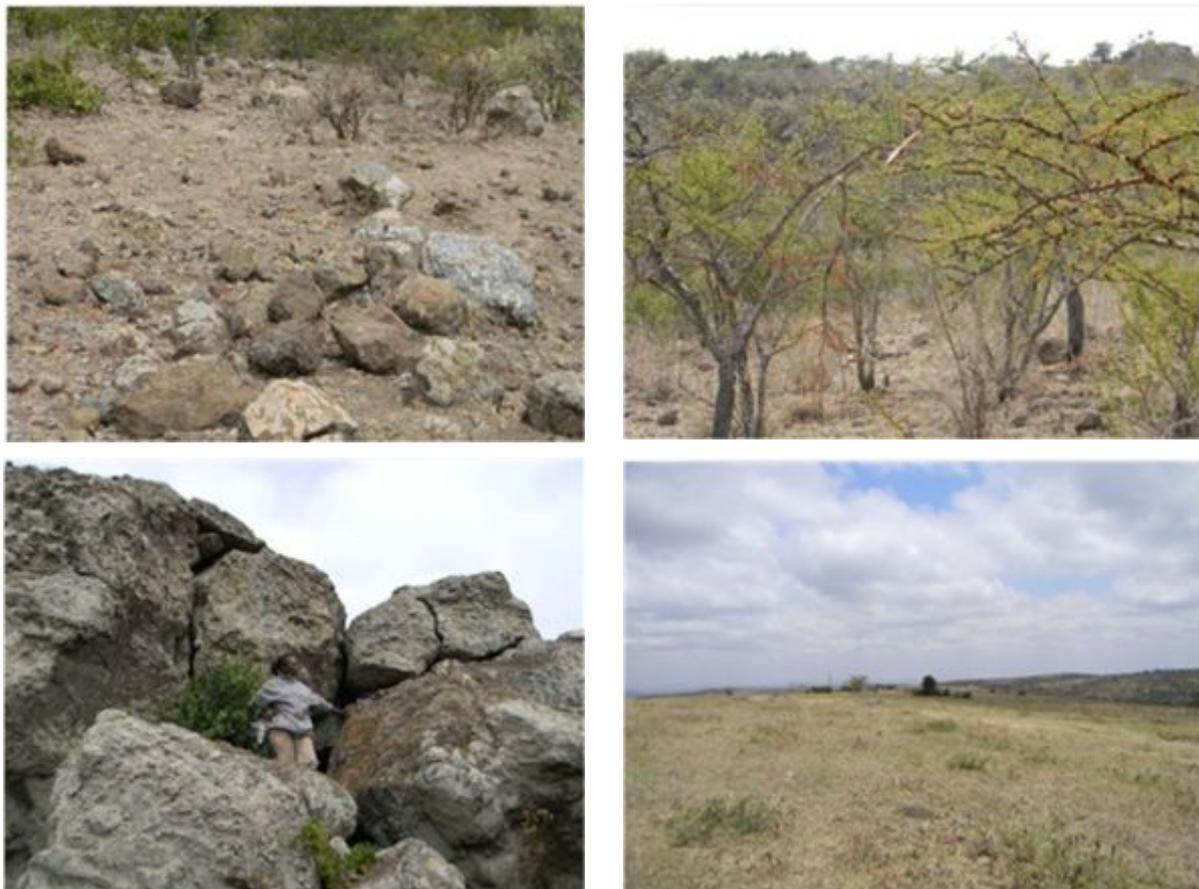


The Ol Doinyo Narok plateau rises about 2000 meters above sea level, in contrast to Olorgesailie at 1024m and Isenya at 1673m above sea level. The latter two sites lie on the Rift floor where the temperatures are much higher than the top of the plateau; similarly, the grass at the top is much thicker than at the bottom of the rift.

The main vegetation type is *Acacia* sp., mainly whistling thorn and Yellow barked acacia. However the trees are not dense and are mostly concentrated in the valleys away from the areas used for settlement. In some areas the trees give way to patches of bare rock where the soil is thin and lightly covered by other shrubs. Large boulders that occasionally hide a rock shelter dominate in some areas, though these are rather scattered. Most of the land though is covered by grass, and this is where human habitation areas and animal grazing areas are located (Figure 3).

Due to the thick grass cover, soil erosion has been restricted and so there has been minimum movement of material by water. However whatever lies on the surface is heavily trampled by grazing cows, sheep and goats.

**Figure 3: The different vegetation/surface covers on the proposed development site**



## 3.2 Site surveying and sampling

Site survey involves the complete or partial inspection of a proposed project area for the purpose of locating archaeological sites. Archaeological site surveys often involve both surface inspection and subsurface testing.

Normally, this should be based on intensive survey of every portion of the impact area, as maximum areal coverage will provide the most comprehensive understanding of archaeological resource density and distribution. However, in many cases the size of the project area may render a complete survey impractical because of time and cost considerations. In this case then it may be practical to intensively survey only a sample of the entire project area.

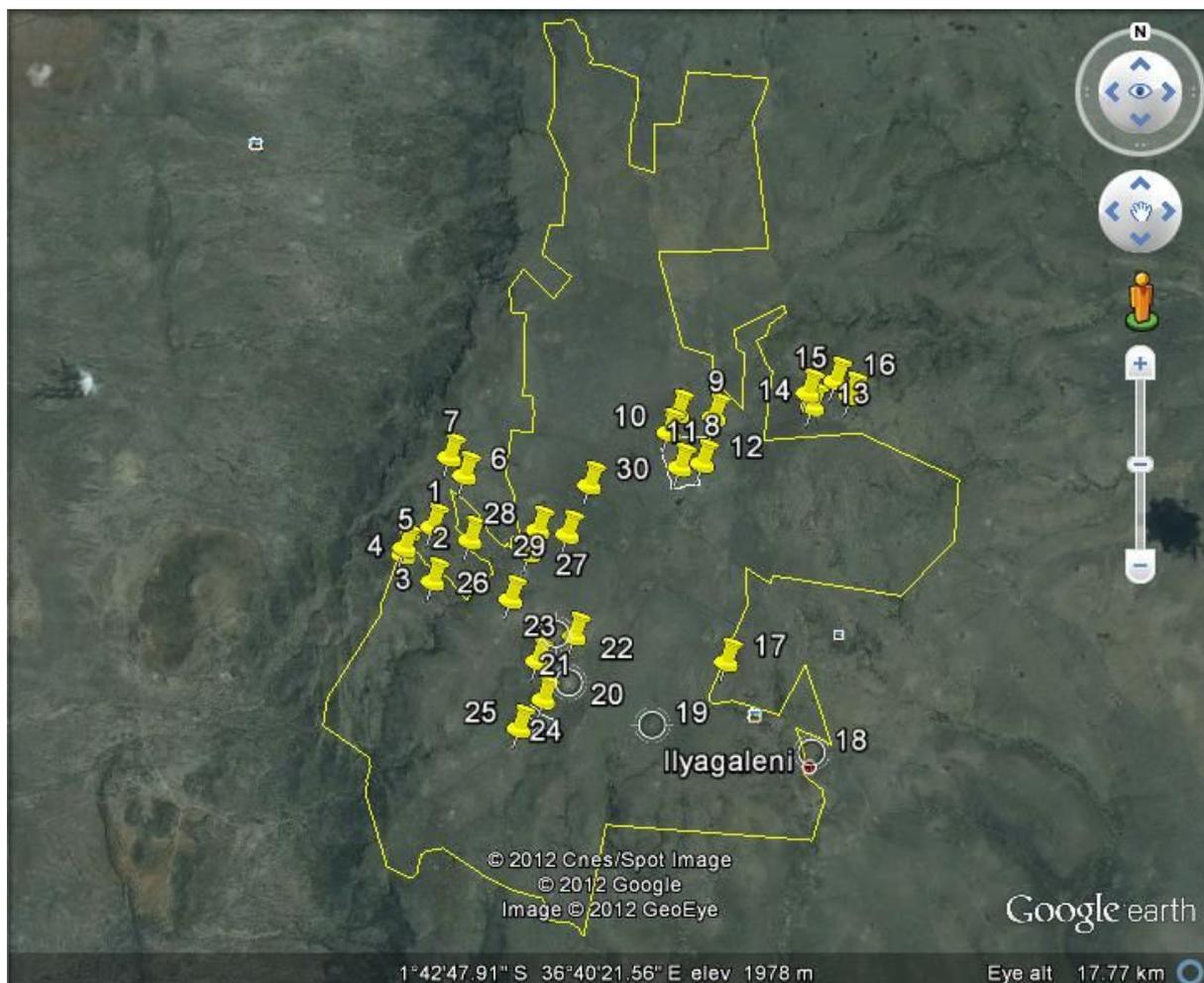
The sampling procedure may depend on the size of the land in question, the kind of archaeological resources in the area, land use or type of vegetation.

Systematic Survey Sampling is designed to locate a representative sample of archaeological resources within the project area. A statistically valid sample will allow predictions to be made regarding total resource density, distribution and variability. In systematic sample surveys it may be necessary to exempt certain areas from intensive inspection owing to excessive slope, water bodies, landslides, land ownership, land use or other factors.

Judgmental Survey Sampling involves surveying only in those areas which can reasonably be expected to contain archaeological sites. This requires a sufficient understanding of the cultural and biophysical factors which influenced or accounted for the distribution of these sites over the landscape. Factors such as past patterns of settlement, land use and resource exploitation, physical terrain, climate, soil types and sources of water are useful.

Since the proposed development area is large, the first field session concentrated on finding exposed sections such as gullies and dry river beds to establish if there was any archaeological or fossil material that had been washed away by water. This survey revealed very little and did not point to any areas that required looking over. This is the reason a judgmental sampling survey was employed in the second session in order to identify areas that were not apparent from the ground. This method involves the identification of Neolithic patches from space. Google Earth satellite images were used for this exercise. Thirty light-colored patches as suggested by Lane (2011) were marked for exploration; their coordinates were marked and used to trace the areas on the ground (Figure 4). The team then walked over all the 30 marked areas and made collections of archaeological objects on the sites. The judgmental survey also noted any archaeological concentrations appearing in areas that had not previously been marked.

**Figure 4: Figure showing clearings marked for survey**



The locations of these clearings are listed in the table below.

**Table 1: Locations of clearings selected for survey**

Number	Latitude (S)	Longitude (E)	Comments
1	1 43 10.75	36 38 51.63	No collection
2	1 43 16.99	36 39 9.62	No collection
3	1 43 37.52	36 38 51.04	Modern bone; recent occupation
4	1 43 20.82	36 38 37.52	No collection
5	1 43 24.29	36 38 36.84	No collection
6	1 42 44.01	36 39 07.90	No artifacts
7	1 42 36.17	36 38 59.93	No artifacts, recent ash deposits
8	1 42 14.66	36 40 51.42	Area within these points; starting just north of Esilanke Dam. Scattered finds
9	1 42 16.33	36 41 09.29	
10	1 42 23.98	36 40 47.02	
11	1 42 41.05	36 40 52.62	
12	1 42 39.08	36 41 03.60	
13	1 42 05.76	36 42 16.47	Area contained within these points. No collection
14	1 42 11.05	36 41 57.53	
15	1 42 04.47	36 41 55.39	
16	1 41 58.47	36 42 09.09	
17	1 44 17.10	36 41 15.34	Near mast 1
18	1 44 57.58	36 41 58.10	No collection
19	1 44 38.28	36 40 42.43	Near pastor Julius' house
20	1 44 17.32	36 40 01.58	No collection
21	1 43 53.39	36 39 55.17	Near mast 2
22	1 44 04.40	36 40 00.86	No collection
23	1 44 17.05	36 39 42.67	No collection

Number	Latitude (S)	Longitude (E)	Comments
24	1 44 36.03	36 39 45.62	No collection
25	1 44 50.63	36 39 33.43	No collection
26	1 43 46.44	36 39 29.37	OES sample
27	1 43 23.33	36 39 38.61	North of Ezekiel's house
28	1 43 12.05	36 39 43.04	No collection
29	1 43 14.08	36 39 57.53	North of Ezekiel's house
30	1 42 49.95	36 40 08.38	No collection

During the third field session, random sampling was employed in order to get a representative sample of the total area.

Ethnographic and historical/cultural information was collected through interviews with older members of the society. Voice recorders, camera and notebook were used to record information.

### 3.3 Findings and Analysis

#### 3.3.1 Archaeology

No archaeological features were located or recorded on the proposed development area. Features are elements of an archaeological site that cannot be removed from the site without losing its physical integrity. Post holes, walls, and stone hearths are examples of features.

A number of archaeological artifacts were noted and collected from locations that are recorded as scattered as well as from areas thought to represent actual sites. A site is defined as a place that contains the remains of past human activity in its original context. Sites include concentrations of debris from making stone tools, artifact-filled pits, food remains and burials. Even in areas where a definite concentration cannot be located, the widespread occurrence of material is an indication of human activity, either as living, manufacturing or disposal sites. The sites found in this area have been recorded as ESA, LSA and/or Neolithic based on the material found at each location.

Following is a general description of the archaeological materials collected.

**Lithics:** Lithics refer to artifacts made of stone. Lithic artifacts include ground and chipped stone tools and the debris resulting from their manufacture. A lithic assemblage refers to the collection of stone artifacts recovered from a site. All of the artifacts collected were chipped, and constituted both formal tools and simple flakes. All the tools are types that are known to have been made and used during the Later Stone Age (LSA) and therefore constitute a LSA assemblage. Several raw materials are represented within this assemblage signifying a wide choice of raw material and also the advanced knapping abilities of the population occupying this area. The raw material includes the following:

**Obsidian (OBS)** is a natural glass produced by volcanic action. It was highly prized for its ease of flaking and sharp cutting edge and comes in different colors depending on its exact chemical composition. There are several sources of obsidian within the Rift Valley and without the aid of a chemical analysis it is difficult to ascertain the exact source of the gray coloured obsidian. The green type is however only known to come from the Eburru area near Naivasha, and this shows the existence of exchange mechanisms over long distances.

Cryptocrystalline silicates (CCS) include lithic materials such as chert, jasper, chalcedony, agate and onyx and were widely used by prehistoric peoples to manufacture stone tools. They are usually found in nodules or beds that form as secondary deposits in rocks that are mostly composed of calcium carbonate in limestone and chalks. These materials are often difficult to differentiate so the team collectively referred to them as CCS. Since most of these materials do not occur as large nodules, knapped pieces are usually small in size; finer ones such as chert are often used in the manufacture of micro blades that are struck off similarly small cores. However not all of them are small in this case, but this also depends on the sources and the size of nodules occurring naturally. Tools made out of this material found in the broader project area include scrapers and simple flakes.

Quartz and quartzite are metamorphic rocks that have been used since the Middle Stone Age in the manufacture of tools. Tools made from this material are hard to define but it is easy to recognize simple flakes. In the presence of the other two above, quartz was not used extensively due to its difficulty in knapping due to its large grains and resulting rough cutting edge.

Pottery: Pottery is commonly found on archaeological sites that are labeled as Neolithic because the making and use of clay vessels is thought to correspond to the practice of agriculture. The two most common items at Neolithic sites are pots and ground stone implements but the latter were not found anywhere on the proposed site. However the field survey found several potsherds that can be said to have come from different pots, judging from the differences in thickness, clay paste and motifs. Decorative attributes are one aspect that is used to define pottery, but we do not have enough decorated potsherds to classify them into distinct groups. We also found several pieces of rim sherds which are also classified as diagnostic. All the rest of the potsherds are plain body sherds but they cannot tell us much other than point out the presence of pottery at the particular sites. All sites where pottery was found have been classified as potential Neolithic sites.

Bones: Fragments of bone are also common at LSA sites, and especially Neolithic sites. Although very few pieces were found, it is evident that the bone fragments were eroding out of the layers containing artifacts and so are contemporaneous. Bones give information on ecology as well as diet; domesticated animal bones confirm that the population kept domestic animals even where crop farming was not established. The fragments collected belong to small mammals but they are too fragmentary to establish what kinds of animals they were. They also seem to be burnt; either from cooking or burning rubbish dumps. Bones are usually recovered from refuse dumps or human burials.

Ostrich Egg Shell: Ostrich Egg Shell (OES) has been used for a long time in the manufacture of beads. These beads are found in LSA and Neolithic sites in many parts of Africa. However all the shell collected here was un-worked and consequently there was no evidence of bead manufacture. OES can however be dated to give an estimate of the period of occupation, in particular those fragments that were recovered from the burial discussed below.

Following a survey of the 30 clearings identified above, it became apparent that not all of them constitute archaeological sites, mainly due to a lack of artifacts. The summary of material collected from each site is presented below. The table also includes collections made from locations that were not previously marked but which contain significant concentrations of artifacts.

**Table 2: Locations where collections were made**

	Site/Location	Material found	Cultural affiliation
1	Clearing 3	OBS, CCS, Bead fragment	LSA
2	Clearing 19	OBS, CCS, Quartz, OES fragments, Bead	LSA
3	01 43 00.4S 036 39 55.5E	OBS, Pottery, CCS	Neolithic
4	Clearing 26 01 43 45.6S	OBS, CCS, Pottery, Bead OES fragments	Neolithic

	Site/Location	Material found	Cultural affiliation
	036 39 30.7E		
5	Clearing 4	OBS	LSA
6	01 41 49.7S 036 42 08.4E	OBS	LSA
7	01 44 50.5S 036 40 56.7E	QTZ CCS	LSA
8	Clearing 29	OBS, CCS, Cowries shell Beads	LSA
9	Clearing 27	OBS, CCS, QTZ	LSA
10	Clearing 7 01 42 36. S 036 38 59.5E	OBS, CCS, OES fragments	LSA
11	01 42 10.5S 036 41 57.0E	OBS, CCS, Pottery	Neolithic
12	01 45 04.1S 036 41 59.9E	OBS, CCS, Pottery, Tuyere fragment, Bead	Neolithic
13	01 43 07.9S 036 40 23.0E	OBS, CCS, QTZ, Lava, Pottery OES, Beads	Neolithic
14	01 44 34.0S 036 39 04.9E	OBS, CCS, Bone, Pottery, Tuyere	Neolithic
15	01 40 09.1S 036 39 38.5E	Phonolite flakes, cores	Possible ESA

	Site/Location	Material found	Cultural affiliation
16	01 40 18.2S 036 39 40.0E	OBS, CCS, Pottery	Neolithic
17	0139 42.8S 036 40 41.8E	Phonolite flakes and cores	Possible ESA
18	01 40 07.9S 036 40 39.8E	Pottery, OBS, CCS	Neolithic
19	01 40 10.0S 036 40 45.1E	Pottery, OBS, CCS	Neolithic
20	01 40 08.4S 036 40 45.9E	Phonolite cores, flakes	Possible ESA
21	01 40 07.0S 036 41 03.4E	Pottery, OBS, CCS	Neolithic
22	01 40 05.6S 036 41 01.9E	Phonolite flakes	Possible ESA
23	01 40 02.5S 036 41 04.1E	Phonolite flakes	Possible ESA
24	01 40 04.1S 036 41 03.4E	CCS, OBS, Pottery	Neolithic
25	01 39 54.8S 036 41 05.4E	CCS, OBS	LSA
26	01 39 28.3S 036 40 39.8E	CCS, OBS	LSA

	Site/Location	Material found	Cultural affiliation
27	01 44 49.6S 036 41 07.9E	OES	Modern
28	Near esilanke	OES	Modern
29	Near mast 3	OES	Modern
30	01 40 38.1S 036 39 37.3E	OES	Modern
31	01 40 18.2S 036 39 37.7E	OES	Modern
32	01 40 09.1S 036 39 38.5E	OES	Modern
33	Cave 2 Human Burial	OBS, CCS, OES, Bone/teeth	LSA/Neolithic

The following section discusses each of the locations identified as distinct sites and which were noted as having potential for excavation. See Map 5 for locations of these sites.

1. Site 1 (01 45 04.1S, 036 41 59.9E, Elevation 1858m) Neolithic

This site is located just south of Wind Mast 2. The archaeological artifacts occur on a gentle slope and seem to be washing out of a location higher up the slope. It is an open site that slopes towards the south, and about a 100 metres south of here is a Maasai homestead. Although it was difficult to establish exactly which layer the material was washing out of, there was a sizeable concentration of artifacts and pottery on the surface to warrant its identification as a Neolithic site. The scatter is spread over an area of approximately 50 by 50m.

The lithics collected here are made from obsidian, cryptocrystalline silicates and quartzite. Most of the pieces can be classified as waste and most are under 2cm long. There are also several simple flakes, 5 side scrapers and 1 crescent. Most of the potsherds are undecorated but there are 2 rim sherds, one decorated and 1 plain. A plastic bead was also collected but it may have been deposited later. The *tuyere* fragment is interesting because *tuyere* is part of iron smelting equipment. However, no furnace remains were observed neither was there any iron slag, the waste from the smelting process. No bones were seen on the surface (Figure 5).

**Figure 5: Artifacts from Site 1**



2. Site 2 (01 42 10.5S, 036 41 57.0E, Elevation 1981m) Neolithic

This is an open site located near the North eastern boundary of the area marked for development. Part of the site is within a piece of land that is fenced while a road runs through the southern edge. It was not possible to establish the size of the scatter due to the thick grass on the other side of the fence. The pieces of obsidian collected are mainly worked pieces; no specific tool types noted. The collection also includes a few plain potsherds and one decorated rim (Figure 6). Good potential for excavation but archaeological layer needs to be established.

**Figure 6: Artifacts from Site 2**



3. Site 3 (01 43 00.4S, 036 39 55.5E, elevation 1935) Neolithic

This is an open site near clearing 29. It slopes eastwards with a dry riverbed on its eastern border. A large cluster of boulders marks the western extent. Among the tools collected are 2 side scrapers and flakes. Also collected was 1 plain body sherd, but many more were left at the site (see Figure 7). Excavation potential: good.

**Figure 7: Artifacts from Site 3**



4. Site 4 (01 44 34.0S, 036 39 04.9E, Elevation 1843m) Neolithic

This site is located a short distance south of the secondary school at Loiyangalani. It slopes gently towards the north, and the scatter is spread out between several large boulders. There is a considerable scatter of both obsidian and pottery on the surface and few bone fragments are washing out. Most of the potsherds collected are plain body sherds but there are also 3 pieces of plain rim sherds. Two rimsherds may belong to the same vessel, but the third is obviously different, suggesting the presence of more than one vessel. A difference in thickness of the other sherds also indicates they came from different pots. There is also a fragment of what looks like a *tuyere*, suggesting that the population may have practiced iron production (Figure 8).

**Figure 8: Artifacts from Site 4**



The bone fragments collected appeared to be partially burnt and it is not possible to say which animal is represented, however one of them appears to be a small bovid.

The lithics are badly trampled with most of the collection being composed of debris. There was however one end, one concave and three thumbnail scrapers that were identified. The CCS pieces are mainly worked flakes with no formal tools noted.

Due to the large amounts of pottery and obsidian, the site is considered high potential for excavation.

5. Site 5 ( 01 43 07.9S, 036 40 23.0E, Elevation1965m) Neolithic

Unlike the other sites, this site shows a clear archaeological layer with all kinds of material eroding out of it. These include obsidian, pottery, bone and OES. The pieces of obsidian are fairly large, mainly worked flakes but also include 1 crescent fragment. The CCS collection consists of small cores and flakes, and many of the pieces are made from green chert. Quartzite was also used in the manufacture of tools and several flakes are eroding out with the obsidian. The potsherds are of medium size and do not show signs of heavy trampling, which means they have been recently eroded. The pottery collection includes 4 plain rimsherds and 3 decorated sherds (Figure 9).

2 small plastic beads were collected but it is not possible to say if they came from the archaeological layer. This layer also contains fragments of OES but none of them is worked. Some bits of bone are burned but all of them are fragmentary so it is not possible to make a positive ID although they can be said to belong to small mammals. This site has good potential for excavation.

**Figure 9: Artifacts from Site 5**





#### 6. Site 6 (cave 2)

This is the cave from which human remains were recovered. Although marked as a site the original context has been destroyed as the contents inside the cave have been dug out and deposited outside. It seems most of the bones are lost in the heap of soil and rocks that initially covered them and only a few were saved. These include 2 cranial fragments, a few lumbar vertebrae, some long bone fragments, a collarbone, 1 complete mandible and 3 mandibular fragments (Figure 10). The jawbones come from four different individuals so we know that it was a multiple burial. As the original context of the burial has been tampered with, it provides little information of the history of the population at the time of occupation. Dating the bones may be the only way of establishing the approximate time of occupation of the population in question.

Intentional burials are known to have begun during the Later Stone Age. One important thing to note is that the mandibles seem to have had all their teeth at the time of death, and cannot therefore be Maasai, who are known to extract two lower teeth at a young age. This practice is widespread among the Nilotes of Eastern Africa and its exact origin is not understood. The burials can therefore be assigned to a group of people before the arrival of the Maasai. In addition, the practice of burying the dead is fairly recent among the Maasai and so it is unlikely that they are Maasai burials.

**Figure 10: Human remains from cave burial**



7. The possible ESA sites recorded during the last field survey are open sites littered with phonolite cobbles interspersed with what looks like flaked cores and flakes. It was impossible to estimate the spatial extent of these sites as large areas are covered with cobbles. It was also not possible to establish if the tools were spread only over the surface or some are buried but it is apparent that they have been exposed for a long time.
8. Other Neolithic sites recorded during the last visit contain material similar to that found at other Neolithic sites. No exceptional objects or decorated pottery was collected (See table of recorded sites below).

It is important to note that most of the Neolithic sites are located close to large boulders (Figure 11) which may have served as wind breaks as the area is very windy. The caves within clusters of boulders may also have been used for protection and possibly habitation.

**Figure 11: Potential Neolithic site settings**



### 3.3.2 Cultural and Historical Analysis

This community is made up of two major clans and several sub clans who are culturally similar. The two major clans are *Odonongi* and *Orok'kiteng*. *Odonongi* is made up of *Ilmolelian*, *Ilmokesen*, and *Irkerinkishu* sub clans while *Orok'kiteng* is made up of *Ilukumae* and *Ilaiser* sub clans.

The community has an age set system of social organization. The first age group according to a key informant was *litalala*. This is the age group that migrated from Kerio valley and settled in Kinangop. Ilpeles was the next age group and the one that continued the journey from Kinangop to settle in their present location in Kajiado. Other subsequent age groups are *lITUATI*, *lITRAENKOLONG*, *lIMISHUKI*, *lIOSHORON*, *lIMARIDANI*, *lINYANGUSI* (the key informant's age group), *lISEURI*, *lIRKITOIP* and *lIKESHIRO* in that order. There is an interval of approximately twenty years between age groups.

The Maasai are traditionally polygamous but this tradition is slowly dying out as it has become increasingly difficult to maintain a large number of wives and children. Most of the younger men now have one wife and send their children to school, in contrast to older men who still selectively send only the male children to school. This then results in girls getting married at a very young age as soon as they are initiated. The younger the age at which the girls get married, the higher the likelihood of having many children, and there are records of women having as many as 12 children. In the past it was easy for a man to marry many wives because it was also easy to maintain large herds of cows, but the number of animals kept by each

family has reduced drastically in recent years. This is due to several factors, mainly, a rise in population and a shortage of pasture for the animals.

The Maasai keep cows, goats, sheep and donkeys (Figure 12). The large numbers of animals required by the Maasai to maintain their livelihood, the effects of climate change and their displacement from the Northern grazing lands have all contributed to a change in their subsistence to a certain extent. The private ownership of land and fencing off what was once accessible grazing lands have restricted the movement of the Maasai in search of pasture for their animals, with the result that they lose nearly all their animals during droughts. Their diet now no longer consists of milk, meat and blood, and they have to rely on other Kenyan staple foods such as *ugali* and beans.

**Figure 12: Domestic animals kept by the Maasai**



Despite the fact that they understand the problems they face in terms of food supply, the Maasai are not willing to start farming, not only to supplement their own diet, store dry foods for hard times and to exchange any extra for much needed cash, their land still lies idle and it is only used for grazing. A few have tried fencing off small units for farming but there was nothing growing when this fieldwork was done. Some have said that farming is very difficult while others claim that it cannot succeed because animals jump the fences and eat the plants. Large piles of manure lie outside the animal enclosure (Figure 13); it is then later burned to reduce it. No effort has been made to spread manure on the *shambas* or sell it to other farmers.

**Figure 13: Piles of manure outside the cattle enclosure**



Unlike in other parts of Maasailand where the manyatta enclosure is made of thornbush and quite difficult to penetrate, the kraals in this area have flimsy fences, pointing to the lack of wild animals in the region. There was a report of a leopard that had attacked and killed several goats belonging to the Pastor Julius' household, but the other animals are mainly grazers.

Typical households are small, though they may still house several sons' families. As Bekure (1999) points out, in the last 20 years the average size of the *boma* has reduced markedly and the single family *boma* has become increasingly common as the Maasai become increasingly sedentary and move towards individualization of production. Houses (*enkang*) are basically made from sticks, mud and cow dung. Nowadays, it is becoming common to see traditional *enkangs* built next to *mabati* houses (Figure 14), depending on the relative wealth of the inhabitants.

**Figure 14: The Maasai now build traditional *enkangs* alongside modern *mabati* houses**



The mode of dressing is also mixed; the older members still use the traditional *shuka* while the younger members dress in western attire. The women are especially particular about their traditional dress and will wear it to any public gathering or function (Figure 15).

**Figure 15: Maasai women in traditional dress**



The Maasai are patriarchal; the father is head of the *boma* while women have little or no rights. Each circumcised man belongs to an age set; a woman adopts the age set of her husband. Similarly, women have no rights as far as animals or money is concerned; they simply follow what the men say. When a man wants to subdivide his land, this is done according to the number of wives in which case her sons thereafter have authority on matters relating to land and animals. Women are allowed to milk the cows and goats but cannot sell them without permission from the husband.

The main source of energy is firewood that they use for cooking. Burials are usually located outside the main enclosure and marked by a pile of stones (Figure 16). It was however difficult to get the locals to show us where the graves are located for purposes of recording so it is not known exactly how many graves are scattered in the general area. The Maasai in this area do not seem to have any areas set aside for communal ceremonies and rituals.

**Figure 16: Burial sites are usually marked by stone cairns**



From information received, it seems that each family organizes to hold each function within the homestead; ceremonies such as circumcision that were in the past communal are now individual, and all those areas that were in the past set aside for such functions are now within individual farms. No caves, trees or similar feature are considered sacred. There are no areas considered important for particular herbal plants. The only features still in use are *olpul* (Figure 17), caves located along the river that are used for meat eating feasts lasting anywhere between 3 weeks and 3 months. These feasts are usually for men only. In the past these *olpul* were used by *Ilmuran* for the period they were required to stay in the bush. Now the *moran* stage of development has been skipped and the community no longer has practicing *morans*.

This is thought to be a consequence of education, modernization and development, though Maasai in other areas notably Narok still hold on to this tradition.

**Figure 17: *Olpul* used by men for meat eating feasts**



### 3.4 Deductions from field surveys and literature review

- Reference to the Archaeological Site survey inventory has shown that no fieldwork has been carried out previously within the proposed development area. No aerial photographs of the area were available.
- No monuments or features were found on the area proposed for development.

- Archaeological artifacts are scattered over most of the plateau but only a few sites have been identified. It is possible that a greater number of sites exist but their exact locations cannot yet be determined.
- It has been established that a good number of Neolithic sites are located close to large boulders, possible for security reasons. Caves may have been used for habitation or burials.
- From the large number of archaeological artefacts strewn on the surface, it is apparent that the plateau was occupied over a long time. Long distance movement and trade is indicated by the presence of obsidian whose source area is not local.
- It is not known how long the Maasai have occupied this area; oral narratives do not record the presence of another group when the Maasai arrived here.
- The main economic activity is animal herding with very little agriculture. Many of the Maasai customs are no longer practiced here due to modernization.

## 4 IMPACT ASSESSMENT

### 4.1 Archaeological Impacts

This Archeological Impact Assessment (AIA) has identified the archaeological impacts discussed below.

Since the archaeological artifacts collected during the field surveys and transect walks are found in the soil, the mechanical removal of topsoil and underlying layers might potentially destroy or disturb artifacts or sites located in areas where wind turbines are to be erected. Similar disturbances may also potentially affect those areas marked for the development of roads, site office, camps, etc. In addition, any areas not marked for construction may be adversely affected by trampling.

Even in areas not identified as sites for archeological excavation, there is a possibility that potential sites will be destroyed when construction begins. At present there is no way of identifying all sites as their presence is indicated by surface occurrences whose visibility depends on general surface conditions.

There are no recorded Monuments or immovable features within the proposed development area. As a result there would be limited adverse impact on this kind of archaeological resource.

There are more than 10 locations identified as Neolithic sites, many scatters that are potential Later Stone Age (LSA) sites, and 5 recorded potential Early Stone Age (ESA) sites within the development area. There would be resulting adverse negative impacts on these sites if turbines or access roads were positioned in these localities as that would lead to total destruction of the sites.

Following analysis of the surface finds, the following conclusions can be made.

All the sites, though invisible from a layman’s point of view, have research significance because there are no previously recorded archaeological sites on this plateau. Although evaluative testing was not carried out, the integrity of the sites is recorded as good owing to the restricted land use practices of the Maasai so their disturbance is minimal (See summary in table 3).

**Table 3: Summary of site potential**

	Evaluative testing done?	Significance	Integrity	Level of potential Impact
Site 1	No	Research	Good	Severe
Site 2	No	Research	Good	Severe
Site 3	No	Research	Good	Severe
Site 4	No	Research	Good	Severe
Site 5	No	Research	Good	Severe

Evaluative testing or subsurface probe is carried out to provide an idea of the content and structure of a site so that a reliable evaluation of significance can be made; although the content can be deduced from the surface collection as has been done in this case. Site integrity refers to the degree to which an archaeological site has been disturbed as a result of past and current land use.

#### 4.2 Cultural Impacts

On the basis of the field survey observations on the current state of cultural heritage within the project area, it is evident that there will be no adverse impacts on the culture of the Maasai living in Kipeto. The effects of living relatively close to Kajiado and Nairobi urban areas can already be seen in form of modern housing and dressing. It will be expected that increased income accruing from the project will motivate more Maasai to build more timber and *mabati* houses, and these may eventually outnumber the traditional *enkang*. The older members still prefer the traditional houses and

so a complete replacement will however take some time. The same applies to their style of dressing, and very young children are now no longer dressed in *shukas*. The changes that will occur cannot therefore only be directly linked to this project, since they are changes that have been taking place over a period of time. It is true that the project may hasten the speed at which these developments will move, but it is known that cultures are not static, but continually change over time in response to different stimuli.

The wind power project will change the community in a positive way. Although it is generally thought that development may lead to the gradual erosion of Maasai traditions, it is well known that the Maasai are very resistant to new ideas especially those that directly impact on their way of life. For instance, they will still keep cows for prestige and food, as long as there is grazing land for their animals. Since the project will minimally interfere with grazing areas, there will be no negative impact as far as that is concerned, and all disturbed land will be restored. The turbines will occupy a very limited amount of space which does not actually reduce the amount of grazing land for each farmer. Of course grazing will be interrupted during the construction phase but once this is complete the animals will move around freely. The number of animals owned by the Maasai in Kajiado has reduced substantially since the 1940s and the continuing hard time may soon force the Maasai into farming. Now, one of the reasons some give for not getting into farming is the scarcity of water, which could be alleviated by the provision of boreholes for domestic, animal and farm use. These could either be the ones that will be sunk specifically to provide water for the construction phase, and also those that may be sunk as part of the communal development project, funded by the communal trust fund. Farming is expected to provide diversification of diet, and the provision of water saves the women and donkeys trekking long distances in search of water. These in combination will translate in improved quality of life for the Maasai.

If this communal fund also bears the cost of constructing more schools, then this might encourage more children to attend school and also save time for children who have to trek long distances to Kipeto School, the only Primary school in the area.

What is clear is that the implementation of the project will lead to the opening up of the area for commerce and business. Local residents will get employment, there will be increased demand for food and facilities; generally there will be more money in the local economy. However this sort of development also comes hand in hand with negative effects such as tempting young men into vices such as drinking, drugs, commercial sex, etc.

The employment of young men however prevents them from being idle, as well as giving them money to spend, since they claim that all monies paid by the project only go to their elders and they have no claim to it.

Being a patriarchal society with a man being head of the household, money paid for the lease of the land by the wind power project goes to the head of the family. Many young men and all the women complain that they have not been consulted as far as spending the money is concerned. The women seem resigned to their fate, but there is a growing discontent among the young men who think they are entitled to their share of the property. This in due course will cause division among families, as most of them have still not figured out how to share it. Putting money in the hands of a few people when most have none will surely cause conflicts considering that most homes are polygamous. Subdivision of land in future will therefore be heavily dependent on the location and number of turbines on each farm.

Since there are no general communal grounds, sacred sites and objects, special ritual grounds, it is expected that there will be no impacts on the communal functions and ceremonies.

There will be no impacts on communal cultural spaces for special use such as those used by the *Ilmurran*, as this stage no longer exists.

There are no communal burial grounds; each family chooses where to bury their dead on their respective farms. Disturbing known graves will be considered a negative impact.

## 5 MITIGATION MEASURES

### 5.1 Archaeology

Where the site does not lie in an area marked for the installation of a turbine, construction of an access road or other works, no mitigation measures need to be carried out as long as the activity is not within a 200m buffer zone around the site.

It is recommended that exhaustive rescue excavations be carried out on sites that have been marked for erection of a turbine or construction of an access road before construction begins.

Where a rescue operation cannot be carried out for any reason, relocation of the turbines is recommended.

It is also recommended that in order to minimize the chance of destruction of potential sites not apparent from surface finds, the removal of topsoil and overburden on all construction sites should be monitored so that any exposed artifacts may be recovered. The monitoring should be carried out by a qualified archaeology practitioner. Should any material be exposed in the course of construction, all activity should be halted until all artifact collections have been made.

Where stray artifact concentrations have been located on a site marked for construction it is recommended that pre-development test trenching be carried out to assess the depth and general conditions of the finds, after which further measures will be suggested.

Where turbines, roads, camps or other works will be situated close to the sites, a buffer of at least 200m around the site should be maintained to minimize trampling.

Monitoring should also be carried out where proposed access roads and other works will be located and throughout the duration of the construction phase.

## 5.2 Cultural measures

Since no areas have been set aside for communal rituals, ceremonies or functions, no sacred areas, groves or objects require conservation, therefore no mitigation strategies for such sites have been suggested. It is suggested that where graves exist, a distance of at least 100m from turbines should be maintained. Since communal burial areas do not exist buffers should be maintained for individual graves.

Other cultural developments may only be impacted indirectly by this development; therefore no mitigation measures are suggested. This is mainly because culture is dynamic and it is already clear that the community is fast moving towards modernization. The pace of change may be faster but this course of events cannot be altered; controls may be put in place for negative developments arising thereafter but these cannot be directly related to the wind power project.

## 5.3 Conclusions

The present survey has covered the area known as Kipeto on the Ol Doinyo Narok plateau, earmarked for the development of a new Wind power Project. A number of sites of archaeological interest were located, with a larger number of scatters being located all over the proposed construction area. However, due to the size of the site and the sampling methods used, a significant portion of the land has not been surveyed, and it is possible that many more sites exist. Mitigation strategies that include relocating turbines, exhaustive rescue operations, and/or test trenching are suggested to protect these finds. All sites recorded in this area will then be entered into the National Archaeological database for excavation in the future. All archaeological remains found within the survey area have been identified and those which may have been missed should be located and recorded during the construction phase. More archaeological work is required at the site to save these sites from destruction.

## 6 REFERENCES

Survey of Kenya maps: Ref sheet 160/2, 160/3, 161/2, 160/3, 160/4, 161/4

Archaeology Accession Database: Accession No. 3309, 3310, 2341 and 2342 National Museums of Kenya Archaeology Site Survey Inventory

Isaac, G. (1979) Visitor's Guide to the Olorgesalie Prehistoric Site. Revised by Angela Kabiru

Bethany A. Bye, Francis H. Brown, Thure E. Cerling & Ian McDougall (1987) Increased age estimate for the Lower Palaeolithic hominid site at Olorgesailie, Kenya. *Nature* 329, 237-239

Potts, R. (1994) Variables versus models of early Pleistocene hominid land use. *Journal of Human Evolution*, 27, pp. 7-24.

Matheson, B. (1966) Geology of the Kajiado Area. Degree Sheet 51, S.E. Quarter. Ministry of Natural Resources and Wildlife, Geological Survey of Kenya

Lane, P. (2010) An Outline of the Later Holocene Archaeology and Precolonial History of the Ewaso Basin, Kenya. *Smithsonian Contributions to Zoology*, No. 632, pp. 11-30.

Roche, H. et al. (1988) Isenya: état des recherches sur un nouveau site acheuléen d'Afrique orientale. *African Archaeological Review*, 6. pp. 27-55

Roche, H. (2000) Variability of Pliocene lithic productions in East Africa. *Acta Anthropologica Sinica*

Bekure, S., et al (1991) Masai Herding. Eds. *An analysis of the Livestock Production System of Maasai Pastoralists in Eastern Kajiado District, Kenya*. International Livestock Center for Africa, Addis Ababa, Ethiopia

Ambrose (1982) Archaeology and Linguistic Reconstructions of History in East Africa. In Ehret, C. and M. Posnansky (Eds.) *The Archaeological And Linguistic Reconstruction of African History*. University of California Press, pp. 104-157