

Site Linlithgow Palace

County West Lothian

District West Lothian

Parish Linlithgow

N.G.R NT 0020 7734

Project Description Monitoring of boreholes

Report

Monitoring was undertaken of engineer's boreholes extracted from areas to the west, north and east of Linlithgow Palace. The purpose of the boreholes was to examine the structure and morphology of the parent material beneath the Palace, with a view to formulate plans to counteract the subsidence problem which currently affects the building.

Before the archaeological presence was in place, four boreholes had been drilled, with a fifth hole due to be inserted at a later date. Some archaeological material had been retained, although it is likely that other information was not recognised as archaeologically sensitive, and has been lost. In only two of the boreholes is the depth to natural subsoil established. The engineer's system of numbering (LP 1-4) is used throughout this report.

LP1 was located approximately 3.5m to the west and 8m south of the north-west corner of the Palace, on an area of the highest ground upon which the Palace is constructed, a level platform to the west of the present structure. A total of 9 bags of material had been retained by the engineers from this borehole. The first 4 bags derived from the topmost metre of the borehole, which comprised coarse brown silt with much charcoal and mortar, along with small stones throughout the matrix. Fragments of bone and shell were also recorded. The fifth bag, representing deposits to a depth of between 1 and 1.5m, contained a grey, clay-rich silt, with much charcoal and stone. Bags 6 and 7, from between 1.5 and 3m below present ground surface, contained a reddish brown sand, with some charcoal and occasional mortar flecks. Bags 8 and 9, from a depth of 4m and deeper, contained a light grey-brown fine sand with very occasional charcoal flecks and patches of orange clay. Below the levels represented by the retained, bagged material was a clean, coarse sand, which in turn overlay gravel, representing the natural subsoil, a glacially-derived horizon.

LP2 was located approximately 3.5m north and 5m to the south of the north-west corner of the Palace. The hole reached a maximum depth of 15m, but as all the 19 bags retained contained archaeological material, it is clear that the natural subsoil had not been reached. Bag 1 contained material from a depth of between 0.1 and 0.7m, comprising a dark grey loose silt, presumably the topsoil material. Bags 2 to 4, from depths of between 0.7 and 2.15m held a light brown, very coarse silt, with much mortar, charcoal and stone. Bags 5 to 10, deriving

from between 2.2 and 6.1m below the present ground surface, contained similar material to bags 2 to 4, but with no mortar, and in some cases substantial quantities of charcoal. Bags 11 to 18, from 6.1 to 13.7m depths, represented a coarse light brown silt, with little stone and much charcoal. Bag 19 contained material from between 14 and 15m comprising a dark brown fine sand, with much gravel and some charcoal.

LP3 was sited 14m west and 3m north of the north-east corner of the Palace. Five bags were retained, representative of deposits up to 3.5m below the surface, and the final bag contained natural subsoil. Bags 1 to 2, from ground level to up to 1m depth, contained a dark brown sandy silt, with much charcoal and some small stones. Bag 3, deriving from deposits 1 to 1.5m deep, held a light grey coarse silt with much charcoal and gravel. Bag 4 contained material from 1.5 to 2.5m in depth, comprising a light grey-brown sand with much small, sub-angular sandstone and no visible charcoal. Bag 5 contained a coarse light brown sand with abundant gravel, from a depth of 2.5 to 3.5m, and interpreted as natural subsoil.

LP4 was positioned approximately 2m to the east and 6m south of the north-east corner of the Palace. A total of 13 bags were analysed, from a maximum depth of 9m. As all 13 bags yielded archaeological material, it is clear that the natural subsoil had not been reached. Bags 1 to 5, from 0.2 to 4.2m deep deposits, contained a dark grey coarse silt with much stone and charcoal, along with some blaze. Bags 6 to 8, from between 4.2 and 7m held a light brown sand, with much stone and some charcoal. Bags 9 and 10 represented material extracted from between 7.9 and 9m, comprising a dark grey sand with much stone and some charcoal. Bags 11 to 13 held a light brown sandy silt with much stone and very occasional charcoal flecks.

Any conclusions drawn from such a small sample, extracted by non-archaeological methods, with the attendant loss of some information, must remain tentative.

However, a few points can be raised. Firstly, the boreholes have in some cases revealed the extreme depth of the archaeological deposits, which show no correlation with the present ground surface. LP4, the lowest of the boreholes taken from the Palace environs, produced archaeological deposits to a depth of at least 9m, whereas LP3, located somewhat higher on the present slope, encountered natural subsoil at the relatively shallow depth of 2.5m. The basal deposits from holes LP1 and LP2 may be representative of redeposited natural, indicative perhaps of a major earthwork.

A1.0 APPENDIX 1 : CORE SOIL DESCRIPTIONS

A1.1 LP1

Bag No.	Depth (m)	Description
1	0 - 0.2	Light grey-brown coarse sand with much charcoal and some mortar flecking. Includes angular sandstone fragments (5-20cm) and smaller rounded pebbles (<5cm)
2	0.2 - 0.4	As bag 1, but with fragments of bone and oyster shell
3	0.4 - 0.7	As bag 1, but with bone fragments
4	0.7 - 1.0	As with bag 1
5	1.0 - 1.5	Light grey, clay-rich, fine silt. Sandstone up to 15cm and smaller rounded pebbles <5cm. Much charcoal
6	1.5 - 2.0	Reddish brown sand. Sandstone up to 10cm and smaller rounded pebbles <5cm
7	2.0 - 3.0	Similar to bag 6, but with very little stone and charcoal, and some mortar
8	3.0 - 4.0	Light brown to light grey very fine sand. Stone free, with very occasional charcoal flecks and orange clay patches
9	?	As bag 8
10	?	Coarse sand over gravel

A1.2 LP2

Bag No.	Depth (m)	Description
1	0.1 - 0.7	Dark grey loose silt, with much stone, mortar and charcoal
2	0.7 - 1.2	Light brown coarse silt with much mortar, charcoal and stone
3	1.2 - 1.9	As bag 2
4	1.9 - 2.15	As bag 2
5	2.2 - 3.0	As bag 2, but with little mortar or charcoal
6	3.0 - 3.5	As bag 2, but with abundant charcoal
7	3.5 - 4.5	As bag 6
8	4.5 - 5.5	As bag 5
9	5.5 - 5.7	As bag 6
10	5.7 - 6.1	As bag 6
11	6.1 - 7.3	Coarse light brown silt, with little stone and much charcoal
12	7.3 - 7.5	As bag 11
13	7.5 - 7.9	As bag 11, but with more stone
14	7.9 - 8.5	As bag 13
15	8.5 - 9.0	As bag 13
16	9.0 - 9.3	As bag 13
17	9.3 - 10.0	As bag 13, but more gravel
18	10.0 - 13.7	As bag 17
19	14.0 - 15.0	Dark brown fine sand, with much gravel and some charcoal

AI.3

LP3

Bag No.	Depth (m)	Description
1	0 - 0.5	Dark brown sandy silt with much charcoal and some small (<10cm) sandstone fragments
2	0.5 - 1.0	As bag 1
3	1.0 - 1.5	Light grey coarse silt with much charcoal and gravel
4	1.5 - 2.5	Light grey to light brown sand with much small (<10cm) sandstone fragments and no charcoal
5	2.5 - 3.5	Coarse light brown sand and much gravel

AI.4

LP4

Bag No.	Depth (m)	Description
1	0.2 - 0.6	Dark grey coarse silt with much stone and charcoal and some blaze
2	0.6 - 1.2	As bag 1
3	1.2 - 2.2	As bag 1, but with large amounts of charcoal
4	2.2 - 3.2	As bag 3
5	3.2 - 4.2	As bag 3, but with shell
6	4.2 - 5.2	Light brown sand, with much sandstone (5-15cm) and charcoal
7	5.2 - 6.2	As bag 6, but only occasional sandstone
8	6.2 - 7.0	As bag 7
9	7.0 - 7.4	Dark grey sand with much sandstone (5-15cm) and charcoal
10	7.4 - 7.9	As bag 9, but with only occasional charcoal
11	7.9 - 8.2	Light brown sandy silt, with much stone and occasional charcoal
12	8.2 - 8.4	As bag 11
13	8.4 - 9.0	As bag 11