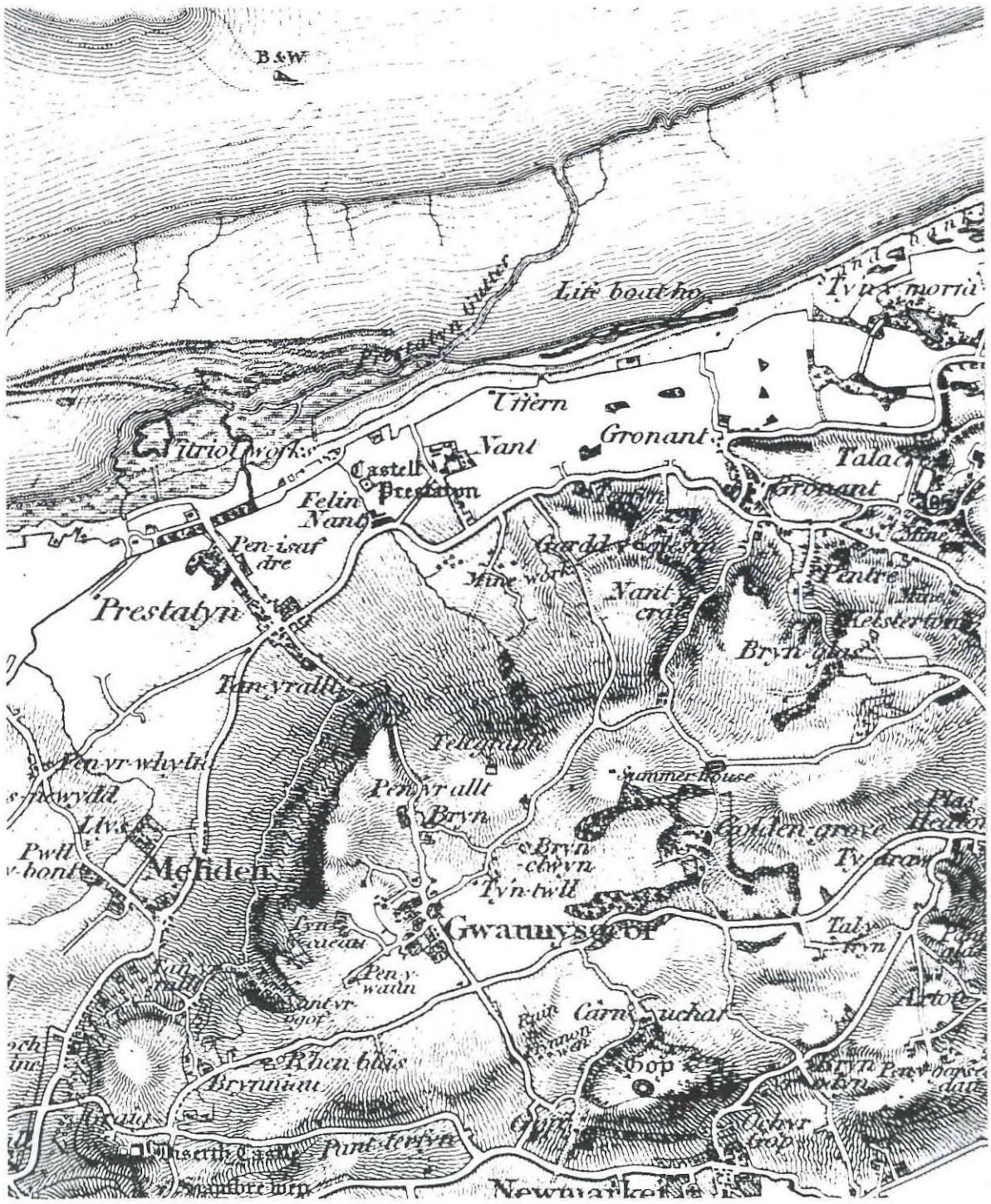
THE CLWYD-POWYS ARCHAEOLOGICAL TRUST

Proposed Prestatyn to Llanasa Sewage Pumping Main

ARCHAEOLOGICAL EVALUATION



CPAT Report No 337

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Proposed Prestatyn to Llanasa Sewage Pumping Main

ARCHAEOLOGICAL EVALUATION

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Report for Symonds Group Ltd/Hyder

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1 INTRODUCTION

1.1 The proposed development involves the construction of a new 4.5km sewage pumping main between Prestatyn Golf Links (SJ 07898410) and a sewage works south of Talacre (SJ 24588335). In September 1999 the Clwyd-Powys Archaeological Trust (CPAT) was invited by Symonds Group Ltd, on behalf of Hyder plc, to submit a quotation and specification for an archaeological field evaluation at the western end of the proposed pipeline corridor. CPAT was subsequently engaged to undertake the evaluation, which was conducted during October 1999.

1.2 A pre-planning archaeological assessment of the proposed pipeline corridor, which was undertaken by CPAT in 1997 (Frost 1997), indicated that no recorded or new surface archaeology would be affected by the development. However, the assessment highlighted the potential for significant palaeoenvironmental remains associated with an area of intact peat deposits and the possibility of buried archaeological remains similar to the Mesolithic occupation/shell middens identified at Nant Hall Road, Prestatyn.

1.3 The Curatorial Section of the Clwyd-Powys Archaeological Trust, in their capacity as advisors to the local authority, determined that further field evaluation was necessary to assess the implications of the proposed development on the archaeological resource. Accordingly a brief (No ENV 209, dated 12/3/97) was prepared by Mr M. Walters describing the scheme of archaeological works required.

2 LOCATION, TOPOGRAPHY AND GEOLOGY

2.1 The proposed scheme affects a corridor *c.* 4.5km in length from a new pumping station at SJ 07898410, to a new sewage treatment works at SJ 12458335, immediately south of the railway line and the disused Point of Ayr Colliery Site (PRN 26558).

2.2 The proposed scheme is located to the east of Prestatyn, running mainly to the south of the Chester to Holyhead Railway and north of the A548 coastal road (fig. 1). At the western end the proposed corridor crosses the Prestatyn Golf Course and Prestatyn Gutter, and then runs through mainly undeveloped reclaimed marsh land generally lying below 10m OD in height, terminating on the west side of access road to the former Point of Ayr Colliery. The landuse is largely pasture and arable farmland.

2.3 The solid geology is of Carboniferous age, comprising Holywell Shales and Gwespyr Sandstone with a boundary to the east with Lower and Middle Coal Measures (Rudeforth *et al.* 1984). Post-glacial drift deposits in the western section of the corridor are overlain by peat deposits which form the subject of the present evaluation.

3 BACKGROUND

3.1 An initial archaeological evaluation was undertaken by CPAT in 1994 to assess the archaeological sensitivity of two alternative sites for the proposed sewage works. Although no known archaeological sites were identified within the study area, the report did highlight the presence of buried waterlogged deposits at the former margin of the dry and wetland areas (Silvester and Hankinson 1994).

3.2 The peat deposits have been examined at several locations *c.* 1.2km to the south-west of the western terminus of the proposed pipeline. Small-scale excavations and environmental sampling were undertaken by CPAT during 1991 at Nant Hall Road, Prestatyn (fig. 1). The area had been identified as of potential archaeological interest due to previous discoveries of Mesolithic and Neolithic flint scatters. Four shell middens were identified and excavated, producing radiocarbon dates of 4890 ± 80BP and 4700 ± 70BP (Britnell 1991). The middens consisted of mounds of discarded shells, indicating the intensive local exploitation of shellfish in the shallow coastal waters. Further work was carried out in 1992-3 (Thomas 1992 and 1993) and resulted in radiocarbon dates of 5270 ± 80BP and 5530 ± 80BP being obtained from mussel shell middens.

3.3 There is evidence that the coastal area around Rhyl and Prestatyn was subject to a series of marine transgressions between the Mesolithic and post-Roman periods, as evidenced by the distribution of deposits of peat and estuarine clays. It has been suggested that during periods of rising sea level areas of elevated boulder clays remained above sea level and were utilised by prehistoric communities, accounting for the shell middens and other finds. During periods of regression, it is possible that lower lying areas were also occupied, only to be inundated during subsequent marine transgressions (Manley 1981). The extent of this occupation may be linked to the distribution of peat deposits, which are of themselves of considerable palaeoenvironmental potential. On the basis of existing evidence it would appear that the eastern extent of these deposits may be just west of Shore Road, Gronant (SJ 090835).

4 FIELD EVALUATION (fig. 2)

Methodology

4.1 The evaluation was undertaken by a two-person team between 20th October and 2nd November 1999, and consisted of a transect survey of the specified area, using a manual single gouge auger to take core samples every 20m along a 850m section of the proposed pipeline corridor. Cores were driven to a depth of up to 3.0m and the stratigraphic sequence recorded in written form using standard CPAT recording forms. Soil descriptions were obtained using a Munsell Soil Colour Chart and a summary record of each core sample is presented in Appendix 1.

4.2 The location of all cores was plotted using total station surveying tied in to Ordnance Datum, and located as accurately as possible in relation to the National Grid by comparison of field boundaries.

4.3 Following the completion of the survey the palaeoenvironmental potential of the deposits was assessed by a specialist (see below), during a field visit which involved taking selective new cores at key locations. Each of the new cores was immediately adjacent to a previous core, and was taken to allow a visual assessment of the deposits.

Evaluation results

4.4 In all, 54 cores were taken along the line of the proposed pipeline (fig. 2). As prescribed in the Curatorial Brief, these were at 20m intervals, with the only exceptions being where the line crossed field boundaries. The location of a gas pipeline running parallel and to the south of the railway influenced the position of the transect survey in that area.

4.5 The topography was generally flat, ranging from 4.31m OD at the eastern end to 3.98m OD close to the western end. A number of drains have been cut across the area and these were examined for possible peat exposures although no significant deposits were identified.

4.6 The results from the survey (fig. 2; Appendices 1 and 2) varied along the transect, with deposits of peat separated by areas of clay, silts and sand. In general the peat deposits were fairly shallow, often lying directly below the topsoil and extending to a depth of no more than 1.1m (auger no. 2). In all of the cores the basal deposits were of sand.

4.7 None of the cores produced any evidence of archaeological remains such as shell middens or flint scatters, or indeed any indication of human activity in layers beneath the topsoil. At one point (auger no. 34) shell fragments were noted within the peat and further cores were taken 5m to the east and west (auger nos 35 and 36) to assess the potential further. However, there appeared to be no real concentration of shells, which were in any case small and very fragmentary, probable of entirely natural deposition.

5 ASSESSMENT OF THE PALAEOENVIRONMENTAL POTENTIAL by Prof. MJC Walker[1]

5.1 A field visit was undertaken following the completion of the auger survey and the observations were used in conjunction with the data from the survey to produce a report (Walker 1999) on the archaeological/environmental potential of the area, from which the following text has been derived.

5.2 The area consists of an expanse of peat deposits that have developed behind a coastal sand dune complex, and similar peats have been traced intermittently for some distance to the west (Bell *et al.*, in prep.). Data on sea-level change suggests that these peats are underlain by marine deposits resulting from a transgression of the sea which culminated between *c.* 5800 and 4900 radiocarbon years before present (BP) (Manley 1981 and 1989). At that time, the coastline in this part of North Wales was significantly further inland (by up to 3km) than at present. Subsequent falls in sea level created marshy areas behind the coastal dune barrier in which peat deposits accumulated. The implication is, therefore, that the peats have a maximum age of 5800 radiocarbon years (equivalent to *c.* 6600 calendar years BP).

5.3 The nearby site of Nant Hall Road, Prestatyn (fig. 1), has provided evidence of Mesolithic activity in the form of shell-middens, which have been radiocarbon dated to 4700 ± 70 BP and 4890 ± 80 BP. Pollen data are also available from this, and from Melyd Avenue, Prestatyn (fig. 1), which provide a record of vegetational changes in this near-coastal area throughout parts of the later prehistoric and historic periods (Bell *et al.*, in prep.).

5.4 In the light of these records, which relate to land in relatively close proximity to the present area of investigation, it was considered important to establish whether comparable evidence was contained within the deposits along the proposed pipeline route.

5.5 Field examination of material from selected auger holes showed the deposits typically to consist of a thin topsoil underlain by variable thicknesses (although seldom exceeding 1m) of friable, relatively finely-comminuted peats. Woody material was evident in some of the profiles from the eastern part of the transect (eg auger no. 9) but, apart from occasional fragments of sedge and reed material, plant macrofossils were generally scarce. In a number of profiles, sandy material was found either embedded with, or distributed throughout the peats. Small pieces of shell were also observed. These materials are almost certainly a result of episodic sand blow from the dunes immediately to the north, and subsequent incorporation of these sediments and shell fragments into the aggrading peats. There was no evidence of archaeological material in any of the auger profiles. Beneath the peats, the basal silty clays are clearly the product of the mid-Holocene marine transgression referred to above.

5.6 The analysis of data from the auger transect (Appendices 1 and 2) shows that in none of the auger profiles does the peat exceed 1.2m in thickness and, in the majority of cases, it is less than 1.0m thick. Although the organic sediments almost certainly contain pollen, it seems likely that only a relatively limited environmental record could be recovered from them. They are much shallower than the sedimentary sequence in the nearby Nant Hall Road and Melyd Avenue sites, where between 2m and 3m of peats and/or organic muds have been excavated, and a detailed pollen, plant macrofossil and molluscan record obtained (Bell *et al.*, in prep.). Moreover, the auger profiles have shown nothing of archaeological significance along the transect and, in particular, there is no evidence of shell middens which are such a distinctive feature of the nearby Prestatyn sites.

6 CONCLUSIONS

6.1 The auger survey has revealed new information regarding the sedimentary sequence for the area concerned. However, the results have revealed nothing of archaeological or palaeoenvironmental significance from any of the 54 auger profiles.

6.2 Based on the evidence provided by the auger survey, and the fact that the pipeline is likely to be both fairly narrow and relatively shallow, it is considered that the archaeological and palaeoenvironmental impact is likely to be minimal. However, given that the survey was undertaken at 20m intervals, there remains the possibility that archaeological deposits may exist within the intervening areas. On this basis, a watching brief should be maintained during the excavation phase of the pipeline to enable the preservation by record of any archaeological features or deposits which may be encountered.

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7 ACKNOWLEDGEMENTS

7.1 The assessment was undertaken by Karina Kucharski and Ian Grant. Thanks are also due to the following for their assistance and co-operation: Prof. Mike Walker, Dept. Geography, University of Wales, Lampeter, for undertaking the palaeoenvironmental assessment; Mr Evans, tenant farmer for allowing access; and Howard Jones, Symonds Group Ltd.

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APPENDIX 1
AUGER TRANSECT SURVEY RESULTS

Layer	*depth (cms)*	*material*	*colour*	*Munsell code*	*texture*	*components*
ground level for each auger is given brackets						
Auger no. 1 (4.31m OD)						
1	0-62	sandy loam	reddish black	5R 2.5/1	loose	
2	62-92	clay	reddish grey	5R 5/1	firm	
3	92-97	peat	reddish black	5R 2.5/1	firm	small grit
4	97-107	sandy clay	dark greenish grey	5GY 3/1	firm	
5	107-245	clay	dark greenish grey	5G 3/1	firm	peat and wood frags
6	245-345	sand	dark greenish grey	10Y 4/1	loose	
Auger no. 2 (4.24m OD)						
1	0-72	peaty loam	reddish black	5R 2.5/1	loose	
2	72-89	peaty clay	brown	7.5YR 4/3	firm	
3	89-110	peat	very dark brown	7.5YR 2.5/1	firm	
4	110-180	peaty clay	dark greenish brown	5GY 3/1	firm	
5	180-260	sand	dark greenish brown	5GY 3/1	firm	
Auger no. 3 (4.30m OD)						
1	0-53	sandy loam	reddish black	5R 2.5/1	loose	
2	53-70	clay	brown	7.5YR 4/3	firm	
3	70-80	peat	very dark brown	7.5YR 2.5/1	firm	
4	80-170	clay	dark greenish brown	5G 4/1	firm	peat
5	170-270	sand	dark greenish brown	10Y 4/1	loose	
Auger no. 4 (4.22m OD)						
1	0-50	peaty loam	reddish black	5R 2.1/1	loose	
2	50-60	clay	brown	7.5YR 4/3	firm	
3	60-75	peat	very dark brown	7.5YR 2.5/1	firm	
4	75-90	peaty clay	dark greenish grey	5G 4/1	firm	
5	90-95	peat	very dark brown	7.5YR 2.5/1	firm	
6	95-170	clay	dark greenish grey	5G 4/1	firm	
7	170-305	sand	dark greenish grey	5G 4/1	loose	
Auger no. 5 (4.18m OD)						
1	0-43	loam	reddish black	5R 2.5/1	loose	
2	43-72	peat	very dark brown	7.5YR 4/3	firm	
3	72-119	peaty clay	dark greenish grey	5G 4/1	firm	
4	119-300	sand	dark greenish grey	5G 4/1	firm	some peat
Auger no. 6 (4.20m OD)						
1	0-57	loam	reddish black	5R 2.1/1	loose	
2	57-88	clay	dark greenish grey	5G 4/1	firm	
3	88-275	sand	dark greenish grey	5G 4/1	firm	
Auger no. 7 (4.38m OD)						
1	0-46	loam	reddish black	5R 2.5/1	loose	
2	46-57	sandy peat	black	10YR 2/1	loose	
3	57-60	clay	greyish brown	10YR 5/2	firm	
4	60-70	peat	black	10YR 2/1	firm	sand
5	70-76	clay	greyish brown	10YR 5/2	firm	sand
6	76-77	peat	black	10YR 2/1	firm	
7	77-78	sand	yellow	10YR 7/6	firm	peat
8	78-95	peat	black	10YR 2/1	firm	sand
9	95-119	clay	light brownish grey	10YR 6/2	firm	sand
10	119-275	sand	olive grey	5Y 5/2	firm	

Auger no. 8 (4.30m OD)

1	0-40	loam	reddish black	5R 2.5/1	loose	
2	40-51	peat	black	10YR 2/1	loose	sand
3	51-70	sand	yellow	10YR 7/6	firm	
4	70-75	peat	black	10YR 2/1	firm	
5	75-89	clay	light brownish grey	10YR 6/2	firm	
6	89-91	sand	yellow	10YR 7/6	firm	
7	91-126	clay	olive grey	5Y 5/2	firm	
8	126-147	sand	dark greenish grey	5G 3/1	firm	
9	147-300	sand	greenish grey	10Y 5/1	firm	

Auger no. 9 (4.10m OD)

1	0-47	loam	reddish black	5R 2.5/1	loose	
2	47-58	sandy peat	very dark grey	10YR 3/1	loose	
3	58-74	peat	black	10YR 2/1	crumbly	wood frags
4	74-83	clay	light brown grey	10YR 6/2	firm	
5	83-95	peat	black	10YR 2/1	firm	wood frags
6	95-129	clay	olive grey	5Y 5/2	firm	
7	129-186	sand	greenish grey	10Y 5/1	firm	peat
8	186-302	sand	greenish grey	10Y 6/1	firm	

Auger no. 10 (3.99m OD)

1	0-39	peaty loam	reddish black	5R 2.5/1	loose	
2	39-57	sandy peat	very dark grey	10YR 3/1	loose	wood frags
3	57-86	clay	light brown grey	10YR 6/2	firm	
4	86-277	sand	greenish grey	10Y 5/1	firm	peat and shell

Auger no. 11 (4.12m OD)

1	0-39	loam	reddish black	5R 2.5/1	loose	
2	39-44	clay	light brown grey	10YR 6/2	firm	
3	44-57	peat	black	10YR 2/1	firm	
4	57-80	clay	light brown grey	10YR 2/1	firm	
5	80-95	peat	black	10YR 2/1	firm	
6	95-176	sand	greenish grey	10Y 5/1	firm	

Auger no. 12 (4.20m OD)

1	0-49	loam	reddish black	5R 2.5/1	loose	
2	49-62	clay	dark greenish brown	10YR 4/2	firm	sand
3	62-90	clay	dark grey	10YR 4/1	firm	
4	90-91	peat	black	10YR 2/1	firm	
5	91-102	sand	pale brown	10YR 6/3	firm	
5	102-111	clay	dark grey	10YR 4/1	firm	
6	111-200	sand	dark grey	10YR 4/1	firm	

Auger no. 13 (4.12m OD)

1	0-45	loam	reddish black	5R 2.5/1	loose	
2	45-64	clay	dark greyish brown	10YR 4/2	firm	
3	64-72	peat	black	10YR 2/1	firm	
4	72-88	clay	dark grey	10YR 4/1	firm	
5	88-92	peat	black	10YR 2/1	firm	
6	92-300	sandy clay	dark grey	10YR 4/1	firm	

Auger no. 14 (4.10m OD)

1	0-50	peaty loam	reddish black	5R 2.5/1	loose	
2	50-74	clay	yellowish brown	10YR 5/4	firm	sand
3	74-95	sand	yellowish brown	10YR 5/4	firm	
4	95-102	clay	dark grey	10YR 4/1	firm	
5	102-300	sand	dark grey	10YR 4/1	firm	

Auger no. 15 (4.05m OD)

1	0-42	loam	reddish black	5R 2.5/1	loose	
2	42-75	sand	yellowish brown	10YR 5/4	firm	clay lenses

3	75-85	peat	black	10YR 2/1	firm	grasses
4	85-120	clay	dark grey	10YR 4/1	firm	
5	120-250	sand	dark grey	10YR 4/1	firm	

Auger no. 16 (4.03m OD)

1	0-33	loam	reddish black	5R 2.5/1	loose	
2	33-87	sandy clay	yellowish brown	10YR 5/4	firm	peat/sedges
3	87-136	sand	dark grey	10YR 4/1	loose	shell frags
4	136-278	sand	dark grey	10YR 4/1	loose	

Auger no. 17 (4.09m OD)

1	0-55	loam	reddish black	5R 2.5/1	loose	
2	55-80	sand	yellowish brown	10YR 5/4	firm	
3	80-290	sand	dark grey	10YR 4/1	firm	shell frags
4	290-300	sand	yellowish brown	10YR 5/4	firm	

Auger no. 18 (4.00m OD)

1	0-55	peaty loam	reddish black	5R 2.5/1	loose	
2	55-85	sand	yellowish brown	10YR 5/4	firm	
3	85-305	sand	dark grey	10YR 4/4	firm	shell frags

Auger no. 19 (4.00m OD)

1	0-35	peaty loam	reddish black	5R 2.5/1	loose	
2	35-60	clay	yellowish brown	10YR 5/4	firm	
3	60-67	peat	black	10YR 2/1	firm	
4	67-80	clay	yellowish brown	10YR 5/4	firm	
5	80-294	sand	dark grey	10YR 4/1	firm	small shell frags

Auger no. 20 (3.96m OD)

1	0-47	peaty loam	reddish black	5R 2.5/1	loose	
2	47-88	sand	yellowish brown	10YR 5/4	firm	
3	88-278	sand	dark grey	10YR 4/1	firm	

Auger no. 21 (4.03m OD)

1	0-45	loam	reddish black	5R 2.5/1	loose	
2	45-88	sand	yellowish brown	10YR 5/4	firm	peat
3	88-345	sand	dark grey	10YR 4/1	firm	peat and fine shell

Auger no. 22 (4.09m OD)

1	0-47	loam	reddish black	5R 2.5/1	loose	
2	47-63	peat	black	10YR 2/1	compact	
3	63-90	sandy clay	yellowish brown	10YR 5/4	firm	sand lenses
4	90-280	sand	yellowish brown	10YR 5/4	firm	peat and sedges

Auger no. 23 (4.08m OD)

1	0-41	loam	reddish black	5R 2.5/1	loose	
2	41-56	peat	black	10YR 2/1	compact	
3	56-80	sand	yellowish brown	10YR 5/4	firm	shell frags
3	80-202	sand	dark grey	10YR 4/1	firm	shell frags

Auger no. 24 (3.99m OD)

1	0-45	loam	reddish black	5R 2.5/1	firm	shell frags
2	45-90	sand	light yellowish brown	10YR 6/4	firm	clay lenses
3	90-200	sand	greenish grey	10Y 5/1	firm	shell frags

Auger no. 25 (4.21m OD)

1	0-40	loam	reddish black	5Y 2.5/1	loose	
2	40-52	peat	black	10YR 2/1	loose	
3	52-96	sand	greenish grey	10Y 5/1	firm	clay lenses
4	96-300	sand	greenish grey	10Y 5/1	firm	shell frags/sedges

Auger no. 26 (4.05m OD)

1	0-40	loam	reddish black	5R 2.5/1	loose	
2	40-50	peat	black	10YR 2/1	loose	
3	50-80	clay	yellowish brown	10YR 2/1	firm	sand lenses
4	80-115	clay	dark grey	10YR 4/1	firm	
5	115-300	sand	dark grey	10YR 4/1	firm	

Auger no. 27 (4.02m OD)

1	0-40	loam	reddish black	5R 2.5/1	loose	
2	40-62	clay	yellowish brown	10YR 5/4	firm	
3	62-71	peat	black	10YR 2/1	firm	
4	71-84	sand	dark grey	10YR 4/1	firm	clay lenses
5	84-280	sand	dark grey	10YR 4/1	firm	peat/shell frags

Auger no. 28 (4.03m OD)

1	0-45	loam	reddish black	5R 2.5/1	loose	
2	45-60	peat	black	10YR 2/1	firm	
3	60-305	sand	dark grey	10YR 4/1	firm	clay lenses/shell frags and peat

Auger no. 29 (4.06m OD)

1	0-42	loam	reddish black	5R 2.5/1	loose	
2	42-88	sand	yellowish brown	10YR 5/4	firm	
3	88-120	clay	greenish grey	5G 5/1	firm	
3	120-310	sand	greenish grey	5G 5/1	firm	

Auger no. 30 (4.02m OD)

1	0-80	loam	reddish black	5R 2.5/1	loose	
2	80-88	sand	greenish grey	10Y 5/1	firm	
3	88-135	clay	greenish grey	5G 5/1	firm	
4	135-305	sand	greenish grey	5G 5/1	firm	peat/sedges

Auger no. 31 (3.99m OD)

1	0-43	peaty loam	reddish black	5R 2.5/1	loose	sand
2	43-135	clay	greenish grey	5GY 5/1	firm	
3	135-301	sand	greenish grey	10Y 5/1	firm	sedges

Auger no. 32 (3.98m OD)

1	0-45	loam	reddish black	5R 2.5/1	loose	
2	45-59	peat	black	7.5YR 2.5/1	firm	
3	59-81	clay	greenish grey	10Y 5/1	firm	sand lenses
4	81-96	peat	black	5YR 2.5/1	firm	stony
5	96-113	clay	greenish grey	5BG 5/1	firm	iron pan
6	113-302	sand	greenish grey	10Y 5/1	firm	peat

Auger no. 33 (4.05m OD)

1	0-45	loam	black	10YR 2/1	loose	
2	45-62	peat	black	7.5YR 2.5/1	firm	
3	62-91	clay	greenish grey	10Y 5/1	firm	
4	91-94	peat	black	5YR 2.5/1	firm	
5	94-102	clay	greenish grey	10Y 5/1	firm	
6	102-185	sand	greenish grey	10Y 5/1	firm	sedges
7	185-210	clay	greenish grey	10Y 5/1	firm	
8	210-307	sand	greenish grey	10Y 5/1	firm	

Auger no. 34 (4.22m OD)

1	0-33	loam	black	10YR 2/1	loose	
2	33-44	sand	very dark grey	5YR 3/1	firm	peat
3	44-75	peat	black	5YR 2.5/1	firm	
4	75-89	sand	very dark grey	5YR 3/1	firm	peat, shell frags, quartz
5	89-110	clay	greenish grey	10Y 5/1	firm	

6	110-173	sand	greenish grey	10Y 5/1	firm	
7	173-225	clay	greenish grey	10Y 5/1	firm	
8	225-290	sand	greenish grey	10Y 5/1	firm	

Auger no. 35 (4.15m OD)

1	0-73	loam	black	10YR 2/1	loose	
2	73-102	clay	very dark grey	5YR 3/1	firm	

Auger no. 36 (4.16m OD)

1	0-25	loam	black	10YR 2/1	loose	
2	25-40	sandy loam	very dark grey	5YR 3/1	firm	
3	40-62	peat	black	5YR 2.5/1	firm	
4	62-81	peaty sand	very dark grey	5YR 3/1	firm	shell frags/pebbles
5	81-106	clay	greenish grey	10Y 5/1	firm	

Auger no. 37 (4.01m OD)

1	0-45	loam	black	10YR 2/1	loose	
2	45-67	peat	very dark grey	5YR 3/1	firm	
3	67-75	clay	dark reddish grey	5YR 4/2	firm	
4	75-79	peat	very dark grey	5YR 3/1	firm	
5	79-91	clay	dark greenish grey	10Y 4/1	firm	
6	91-92	clay	reddish brown	2.5YR 5/4	firm	
7	92-99	peat	black	5YR 2.5/1	firm	
8	99-200	clay	dark greenish grey	10Y 3/1	firm	sand lenses/sedges

Auger no. 38 (4.02m OD)

1	0-47	loam	reddish black	5R 2.5/1	loose	
2	47-64	peat	reddish black	5R 2.5/1	loose	
3	64-67	clay	dark reddish grey	10R 4/1	firm	
4	67-89	clay	grey	10YR 5/1	firm	
5	89-99	peat	reddish black	10R 2.5/1	firm	
6	99-128	clay	grey	10YR 5/1	firm	
7	128-149	sand	grey	10YR 5/1	firm	sedges
8	149-235	clay	grey	10YR 5/1	firm	
9	235-305	sand	grey	10YR 5/1	firm	

Auger no. 39 (3.96m OD)

1	0-40	loam	black	5YR 2.5/1	loose	
2	40-55	sandy peat	black	5YR 2.5/1	firm	
3	55-81	clay	grey	10YR 5/1	firm	
4	81-86	peat	reddish black	2.5YR 2.5/1	firm	
5	86-88	clay	grey	10YR 5/1	firm	
6	88-99	peat	reddish black	2.5YR 2.5/1	firm	
7	99-103	clay	grey	10YR 5/1	firm	
8	103-122	clay/sand	grey	10YR 5/1	firm	peat/sedges
9	122-150	clay	grey	10YR 5/1	firm	
10	150-235	clay/sand	grey	10YR 5/1	loose	peat/sedges
11	235-306	sand	grey	10YR 5/1	loose	

Auger no. 40 (3.94m OD)

1	0-50	loam	black	10YR 2/1	loose	
2	50-71	peat	black	5YR 2.5/1	firm	
3	71-79	clay	greenish grey	5GY 5/1	firm	
4	79-81	peat	black	5YR 2.5/1	firm	
5	81-87	clay	greenish grey	5GY 5/1	firm	
6	87-91	peat	black	5YR 2.5/1	firm	
7	91-102	clay	very dark grey	5YR 2.5/1	firm	
8	102-125	clay	greenish grey	5GY 5/1	firm	sedges
9	125-300	sand	greenish grey	5GY 5/1	firm	

Auger no. 41 (4.01m OD)

1	0-55	loam	black	10YR 2/1	loose	
2	55-68	peat	black	7.5YR 2.5/1	firm	
3	68-86	sandy peat	black	5YR 2.5/1	firm	
4	86-102	peat	black	5YR 2.5/1	firm	wood frags
5	102-135	clay	greenish grey	5GY 5/1	firm	sedges
6	135-303	sand	greenish grey	5GY 5/1	firm	sedges

Auger no. 42 (4.00m OD)

1	0-54	loam	black	10YR 2/1	loose	
2	54-73	peat	black	7.5YR 2.5/1	firm	
3	73-95	sandy peat	black	5YR 2.5/1	loose	
4	95-100	peat	black	5YR 2.5/1	firm	
5	100-116	clay	greenish grey	5GY 5/1	firm	
6	116-310	sand	greenish grey	5GY 5/1	firm	

Auger no. 43 (3.99m OD)

1	0-53	loam	black	10YR 2/1	loose	
2	53-62	peat	black	10YR 2/1	firm	
3	62-82	sandy peat	black	7.5YR 2.5/1	compact	
4	82-85	peat	black	10YR 2/1	compact	
5	85-87	clay	dark brown	7.5YR 3/2	firm	
6	87-92	sandy peat	black	7.5YR 2.5/1	firm	
7	92-97	peat	black	10YR 2/1	compact	
8	97-184	clay	greenish grey	10Y 5/1	firm	
9	184-305	sand	greenish grey	10Y 5/1	firm	sedges

Auger no. 44 (4.11m OD)

1	0-47	loam	reddish black	2.5YR 2.5/1	loose	
2	47-56	peat	reddish black	2.5YR 2.5/1	loose	
3	56-66	peat	black	10YR 2/1	firm	
4	66-89	sandy peat	very dark grey	7.5YR 3/1	firm	
5	89-97	peat	black	10YR 2/1	firm	
6	97-127	clay	greenish grey	10Y 5/1	firm	
7	127-305	sand	greenish grey	10Y 5/1	firm	

Auger no. 45 (4.15m OD)

1	0-45	loam	reddish black	5R 2.5/1	loose	
2	45-55	peat	reddish black	5R 2.5/1	loose	
3	55-68	peat	reddish brown	2.5YR 2.5/1	firm	
4	68-85	clay	greenish grey	5GY 5/1	firm	
5	85-93	sandy peat	very dark grey	7.5YR 3/1	firm	
6	93-97	peat	black	10YR 2/1	firm	
7	97-128	clay	greenish grey	5GY 5/1	firm	
8	128-205	sand	greenish grey	5GY 5/1	firm	

Auger no. 46 (4.01m OD)

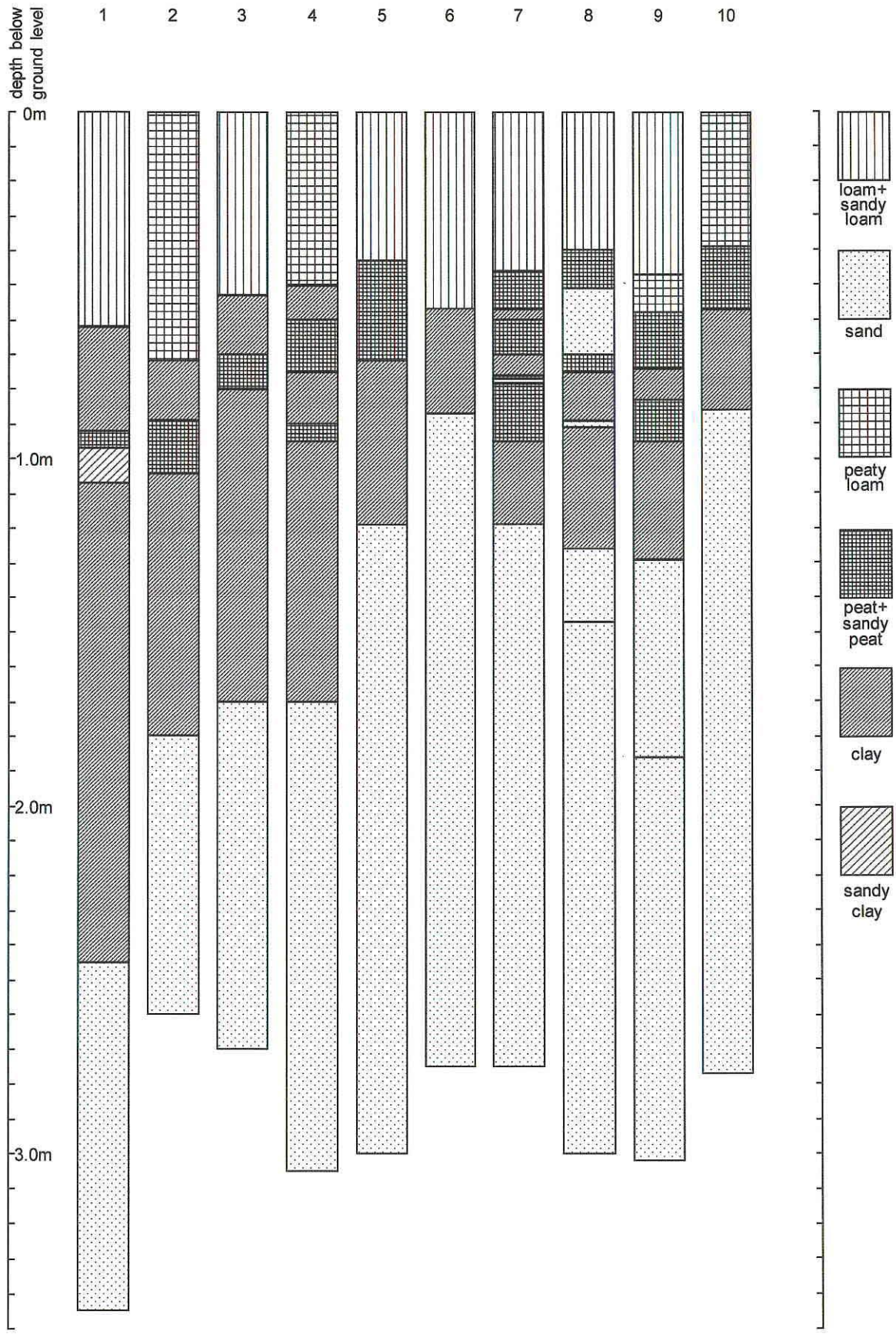
1	0-55	loam	reddish black	5R 2.5/1	loose	
2	55-62	peat	reddish black	5R 2.5/1	loose	
3	62-79	sand	very dark grey	7.5YR 3/1	firm	peat
4	79-91	peat	black	10YR 2/1	firm	
5	91-231	clay	greenish grey	5GY 5/1	firm	peat/sedges
6	231-305	sand	greenish grey	5GY 5/1	firm	

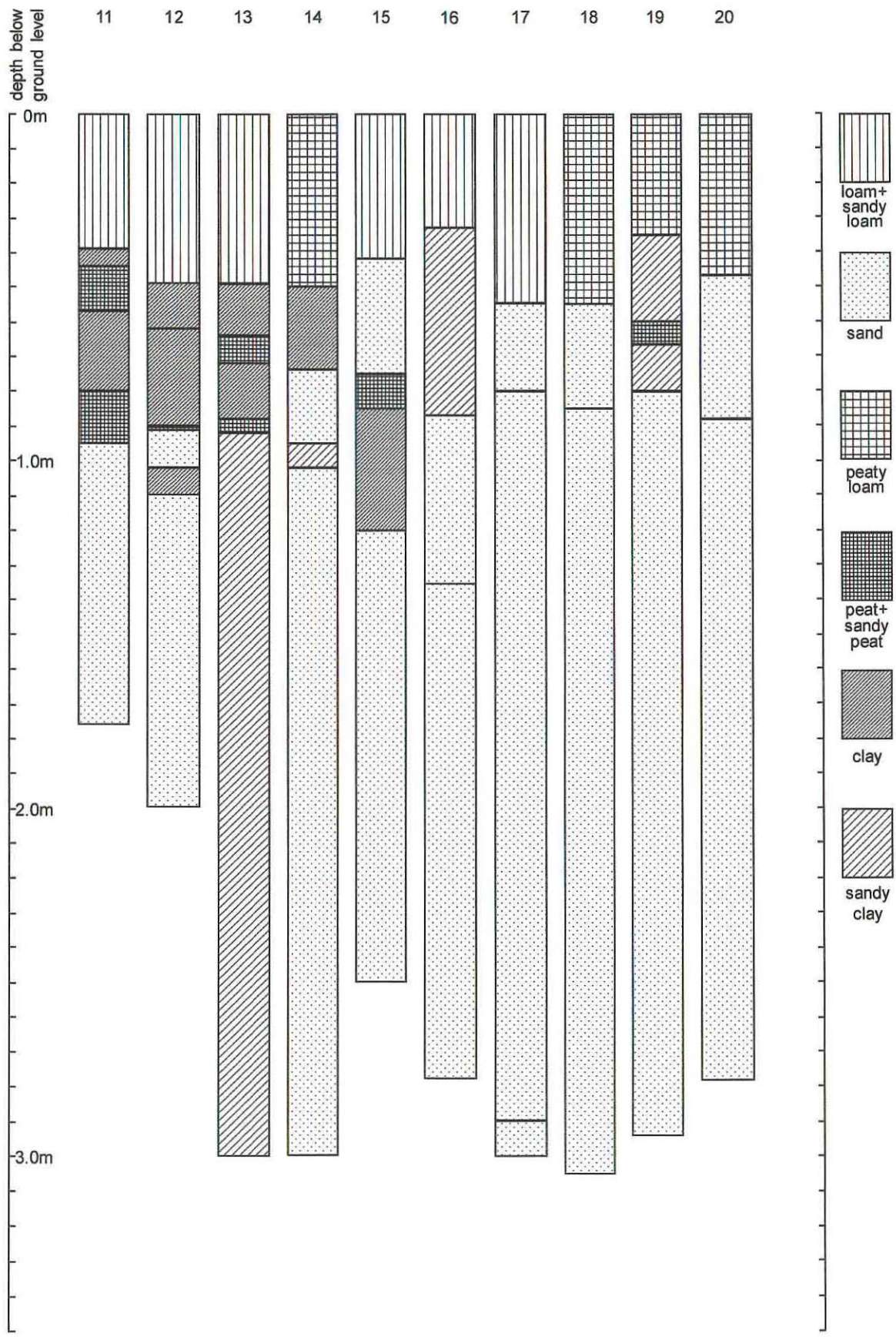
Auger no. 47 (3.92m OD)

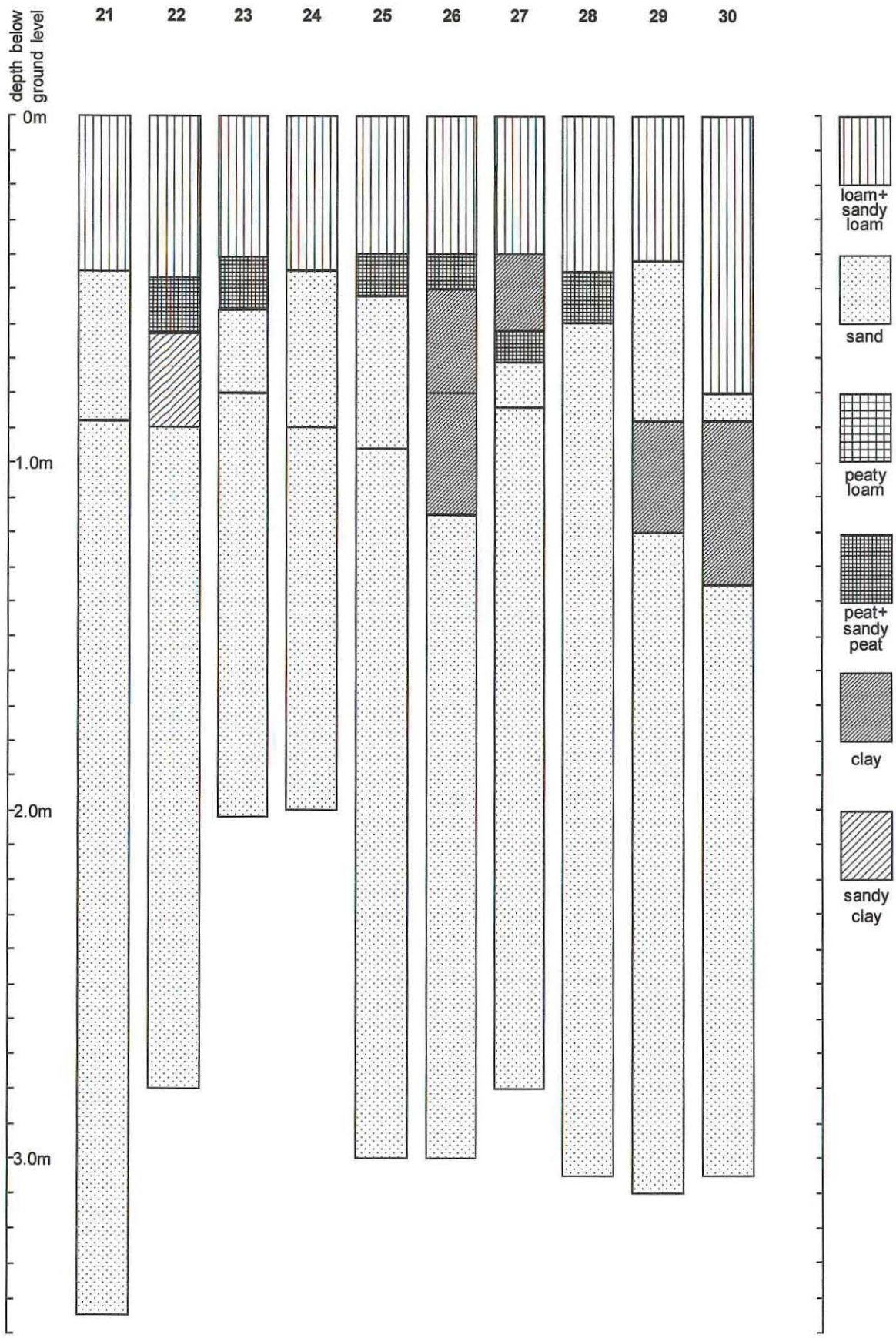
1	0-78	loam	reddish black	2.5YR 2.5/1	loose	
2	78-83	sand	very dark grey	7.5YR 3/1	loose	
3	83-94	sand	black	5YR 2.5/1	firm	
4	94-98	peat	black	10YR 2.5/1	compact	
5	98-139	clay	greenish grey	5GY 5/1	firm	
6	139-205	sand	greenish grey	5GY 5/1	firm	peat/sedges
7	205-211	clay	greenish grey	5GY 5/1	firm	

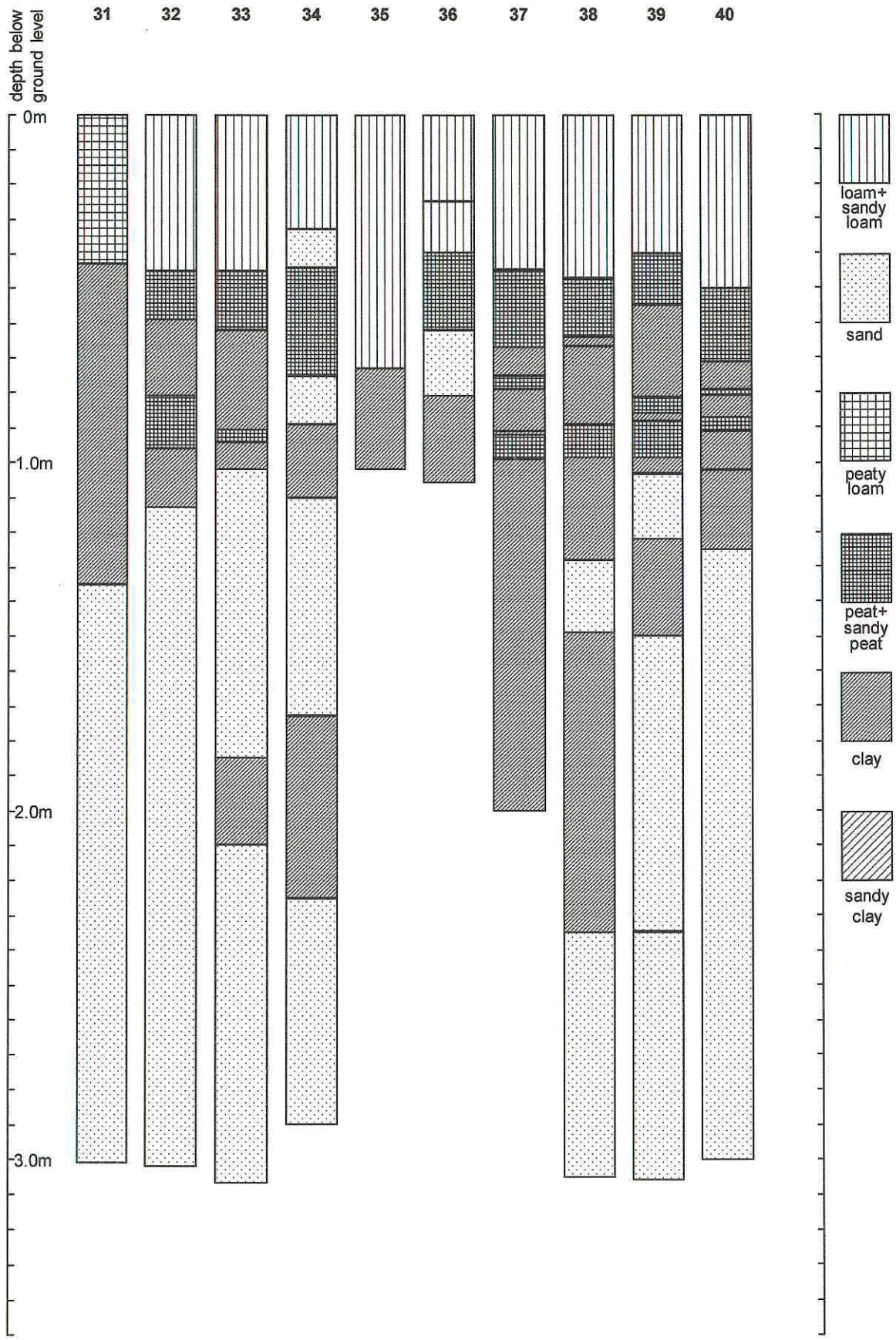
8	211-304	sand	greenish grey	5GY 5/1	firm	peat/sedges
Auger no. 48 (4.16m OD)						
1	0-66	loam	reddish black	2.5YR 2.5/1	loose	
2	66-75	peat	reddish black	2.5YR 2.5/1	firm	
3	75-92	peat	black	5YR 2.5/1	firm	sand
4	92-95	peat	black	10YR 2/1	compact	stony
5	95-106	clay	yellowish brown	10YR 5/4	firm	iron pan
6	106-149	clay	greenish grey	5GY 5/1	firm	
7	149-300	sand	greenish grey	10Y 5/1	firm	
Auger no. 49 (3.98m OD)						
1	0-50	loam	black	10YR 2/1	loose	
2	50-64	sandy loam	yellowish brown	10YR 5/4	loose	
3	64-67	peat	black	5YR 2.5/1	firm	
4	67-71	sandy loam	yellowish brown	10YR 5/4	loose	
5	71-81	peat	black	10YR 2/1	compact	
6	81-94	clay	greenish grey	10Y 5/1	firm	sand lenses
7	94-160	clay	greenish grey	10Y 5/1	firm	
8	160-310	sand	greenish grey	10Y 5/1	firm	sedges
Auger no. 50 (4.03m OD)						
1	0-45	sandy loam	black	10YR 2/1	loose	
2	45-61	sand	yellowish brown	10YR 5/4	firm	
3	61-73	peat	black	5YR 2.5/1	compact	
4	73-136	clay	greenish grey	10Y 5/1	firm	sand lenses
5	136-300	sand	greenish grey	10Y 5/1	firm	sedges
Auger no. 51 (3.96m OD)						
1	0-50	sandy loam	black	10YR 2/1	loose	sedges
2	50-62	sand	yellowish brown	10YR 5/4	loose	
3	62-74	peat	black	5YR 2.5/1	firm	plant frags
4	74-94	clay	greenish grey	10Y 5/1	firm	
5	94-167	clay	dark greenish grey	10Y 3/1	firm	sedges
6	167-300	sand	dark greenish grey	10Y 3/1	firm	sedges
Auger no. 52 (3.99m OD)						
1	0-61	sandy loam	black	10YR 2.5/1	loose	
2	61-97	sand	yellowish brown	10YR 5/4	firm	
3	97-146	clay	greenish grey	10Y 5/1	firm	
4	146-213	sand	greenish grey	10Y 5/1	firm	sedges
Auger no. 53 (4.00m OD)						
1	0-42	loam	black	10YR 2/1	loose	
2	42-55	sandy loam	black	5YR 2.5/1	loose	
3	55-67	peat	black	5YR 2.5/1	firm	
4	67-97	clay	yellowish brown	10YR 5/4	firm	sand
5	97-150	clay	greenish grey	10Y 5/1	firm	
6	150-158	clay	yellowish brown	10YR 5/4	firm	peat/sedges
7	158-207	sand	greenish grey	10Y 5/1	firm	peat/sedges
Auger no. 54 (3.98m OD)						
1	0-45	loam	black	10YR 2/1	loose	
2	45-65	peat	reddish black	2.5YR 2.5/1	firm	
3	65-89	sandy peat	black	5YR 2.5/1	firm	
4	89-202	clay	greenish grey	10Y 5/1	firm	sand/sedges
5	202-305	sand	greenish grey	10Y 5/1	firm	

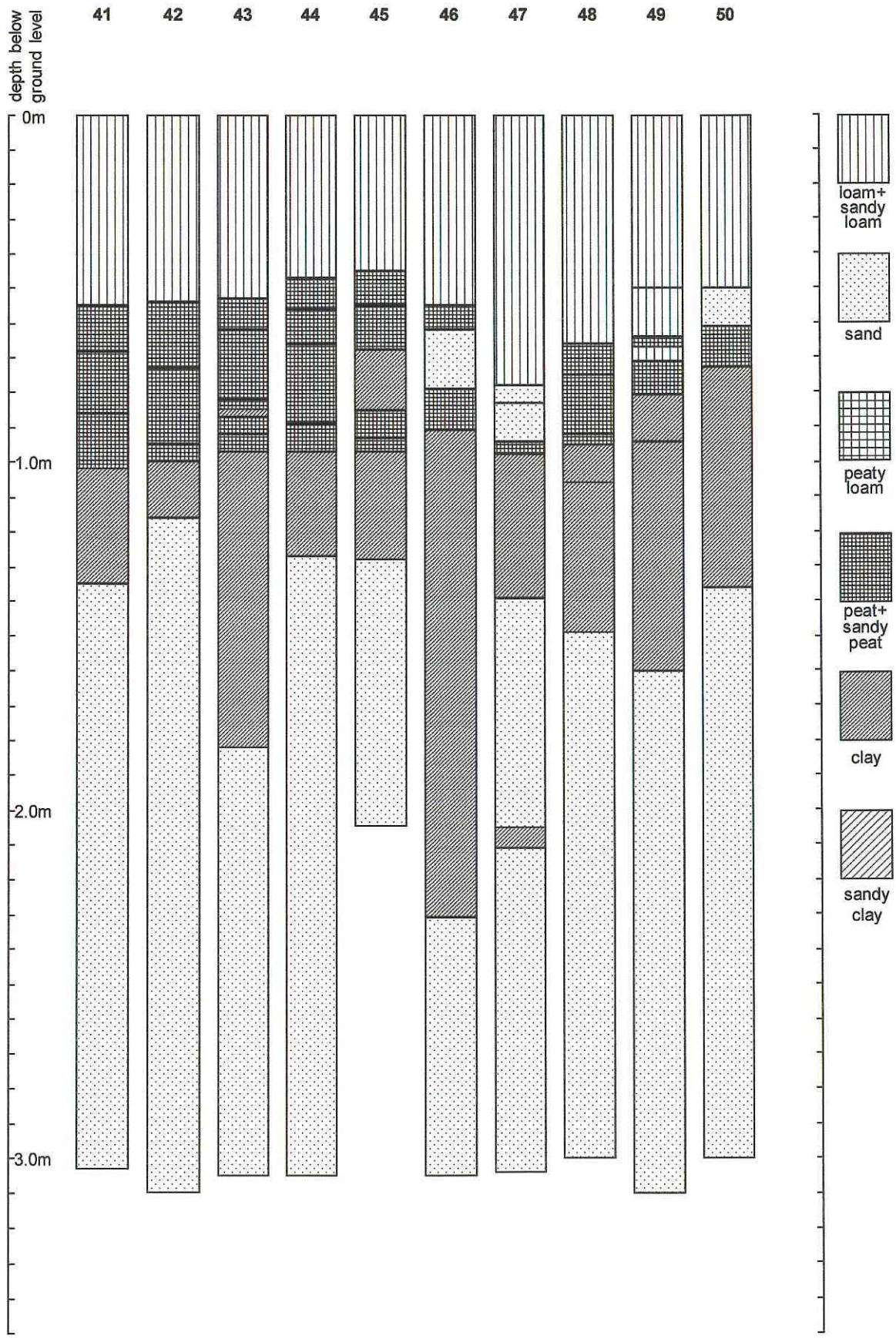
APPENDIX 2
GRAPHIC REPRESENTATION OF SURVEY RESULTS

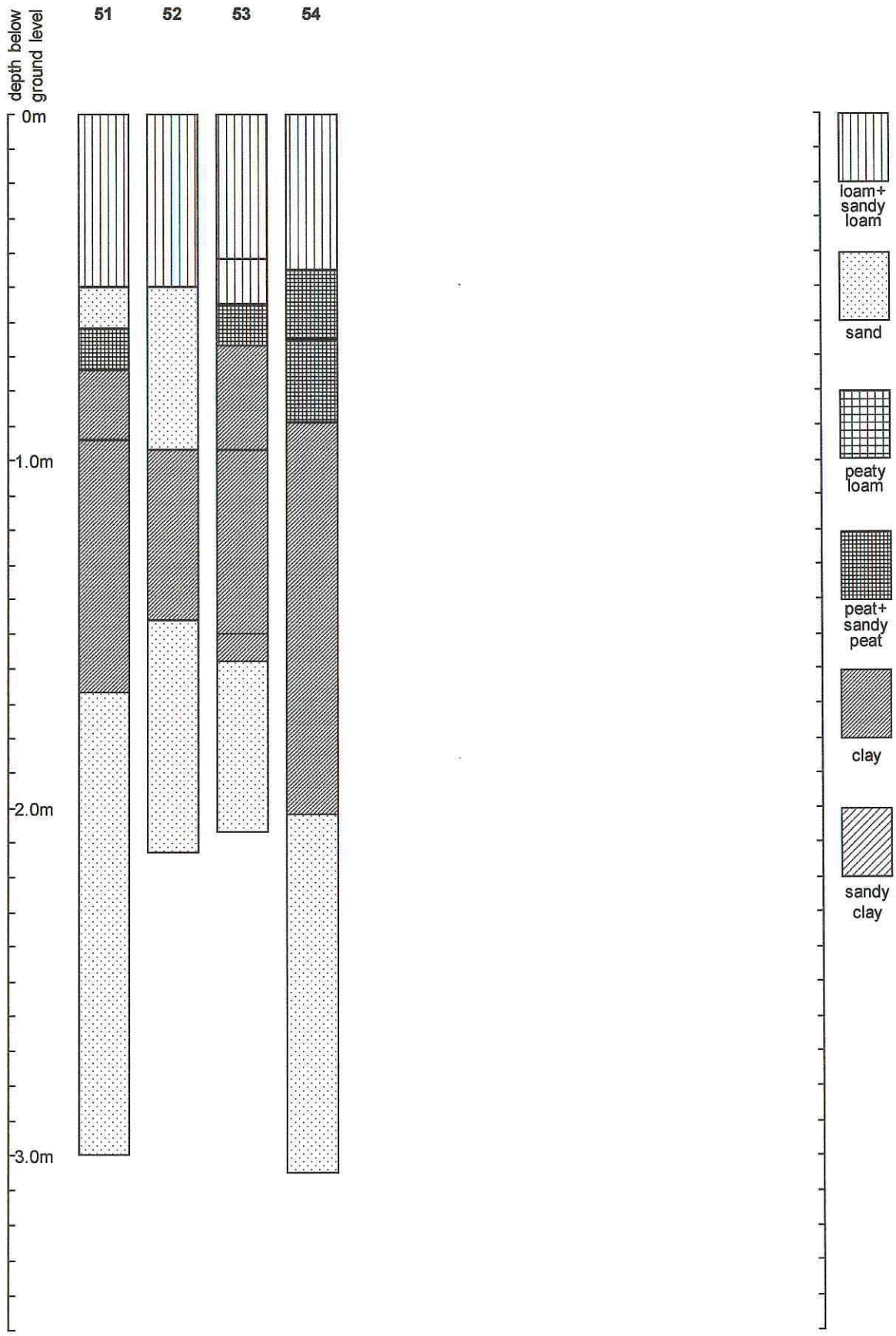



depth below ground level
11
12
13
14
15
16
17
18
19
20
0m
1.0m
2.0m
3.0m
loam+ sandy loam
sand
peaty loam
peat+ sandy peat
clay
sandy clay


21
22
23
24
25
26
27
28
29
30
depth below ground level
0m
1.0m
2.0m
3.0m
loam+ sandy loam
sand
peaty loam
peat+ sandy peat
clay
sandy clay


depth below ground level
31
32
33
34
35
36
37
38
39
40
0m
1.0m
2.0m
3.0m
loam+ sandy loam
sand
peaty loam
peat+ sandy peat
clay
sandy clay


depth below ground level
41
42
43
44
45
46
47
48
49
50
0m
1.0m
2.0m
3.0m
loam+ sandy loam
sand
peaty loam
peat+ sandy peat
clay
sandy clay


depth below ground level
51
52
53
54
0m
1.0m
2.0m
3.0m
loam+ sandy loam
sand
peaty loam
peat+ sandy peat
clay
sandy clay

APPENDIX 3

PROPOSED PRESTATYN TO LLANASA SEWAGE PUMPING MAIN SPECIFICATION FOR AN ARCHAEOLOGICAL FIELD EVALUATION BY CLWYD-POWYS ARCHAEOLOGICAL TRUST

1 Introduction

1.1 The proposed development by Welsh Water involves the construction of a new 4.5km sewage pumping main between Prestatyn Golf Links (SJ07898410) and a sewage works south of Talacre (SJ 24588335).

1.2 A pre-planning evaluation undertaken in 1997 (Frost 1997) indicated that no recorded or new surface archaeology would be affected by the development. However, the assessment highlighted the potential for significant environmental remains associated with an area of intact peat deposits and the possibility of buried archaeological remains similar to the Mesolithic occupation/shell middens identified at Nant Hall Road, Prestatyn.

1.3 The Curatorial Section of the Clwyd-Powys Archaeological Trust in their capacity as advisors to the local authority have determined that further field evaluation is necessary to assess the implications of the proposed development on the archaeological resource. Accordingly a brief (No ENV 209 dated 12/3/97) has been prepared by M. Walters which describes the scheme of archaeological works required.

2 Objectives

2.1 The objectives of the evaluation are:

2.1.1 to sample the specified area along the course of the pipeline for surviving palaeoenvironmental and archaeological deposits;

2.1.2 to assess the nature and quality of surviving deposits;

2.1.3 to obtain a stratigraphic profile through the peat/alluvial boundary and peat deposits as a whole where affected by the proposed development;

2.1.4 to prepare a report outlining the results of the field evaluation and incorporating sufficient information on the archaeological resource for a reasonable planning decision to be taken regarding the archaeological provision for the area affected by the proposed development;

2.1.5 to identify and recommendations options for the management of the archaeological resource, including any further provision for that resource where it is considered necessary.

3 Methods

3.1 The evaluation will involve the use of a manual single gouge auger to undertake a transect survey of the specified area with core samples being taken every 20m along the 850m section of the corridor. Cores will be driven to the base of the peat deposit. The primary aim will be to identify in broad terms the nature and extent of any archaeologically significant deposits together assessing the nature and extent of the peat deposit itself.

3.2 Where cores locate evidence of anthropogenic occupation (e.g. shell middens) the transect interval will be reduced initially to 5m and possibly closer. Further cores may also be taken to determine the lateral extent of the deposits. All cores will be located using total station surveying, tied in as accurately as possible to the National Grid and Ordnance Datum.

3.3 An environmental specialist will provide on-site advise and an immediate visual assessment of the nature and potential of selected samples. This will be presented as a short written report to be included within the final project report. Depending on the results of this initial assessment and any subsequent recommendations by the Curator following the production of the project report there may be a need for a further stage of sampling to include a more detailed analysis of significant deposits. This would, however, be seen as a separate phase of assessment.

3.4 Any archaeological artefacts will be recorded and processed in a manner appropriate to the material involved. Those requiring conservation or other specialist treatment will be stored in a stable environment until such times as they can examined by a specialist. All finds, except those deemed to be Treasure Trove, are the property of the landowner. It is anticipated that they will be donated to the appropriate local or regional museum, subject to agreement being reached with the landowner and the museum curator.

3.5 Following the on-site work an illustrated and bound report will be prepared according to the principles laid out in the Curatorial Brief. This will be in A4 format and contain conventional sections on: Site location, Topography and Geology; Historic Background; Archaeological and Palaeoenvironmental Resource; Conclusions and Recommendations and References, together with appropriate appendices on archives and finds.

3.6 The Curatorial brief stipulates that a watching brief should be maintained along the whole of the pipeline corridor. The exact nature of the watching brief would depend on the results from the auger assessment and Could be the subject of a separate Curatorial Brief which takes into account these results and makes recommendations based on them. Accordingly, no provision is made for a watching brief at present as this will form a later phase of archaeological works.

3.7 The site archive will be prepared to specifications laid out in Appendix 3 in the Management of Archaeological Projects (English Heritage, 1991).

4 Resources and Programming

4.1 The evaluation will be undertaken by a small team of two skilled archaeologists under the direct supervision of an experienced field archaeologist, who will also be responsible for undertaking the desk-based assessment. Overall supervision will be by R.J. Silvester, a senior member of CPAT's staff who is also a member of the Institute of Field Archaeologists.

4.2 All report preparation will be completed by or with the assistance of the same field archaeologist who conducted the evaluation.

4.3 Prof. M. Walker, University of Wales, Lampeter, will be engaged as the environmental specialist and will provide advice together with the initial assessment of samples which will be integrated into the project report.

4.4 It is anticipated that the evaluation will take no more than 10 days in all, and that the subsequent report would be prepared immediately thereafter, dependent on the client's instructions and the arrangement of a suitable timetable. The date of commencement, at the time of writing, has yet to be agreed with the client, and will be dependent on the state of the site and negotiated access. It is understood that the final report will need to be completed by the end of November 1999. The archaeological curator will be informed of the detailed timetable and staffing levels when agreement has been reached with the client.

4.4 Requirements relating to Health and Safety regulations will be adhered to by CPAT and its staff.

4.5 CPAT is covered by appropriate Public and Employer's Liability insurance.

N.W.Jones
24th September 1999

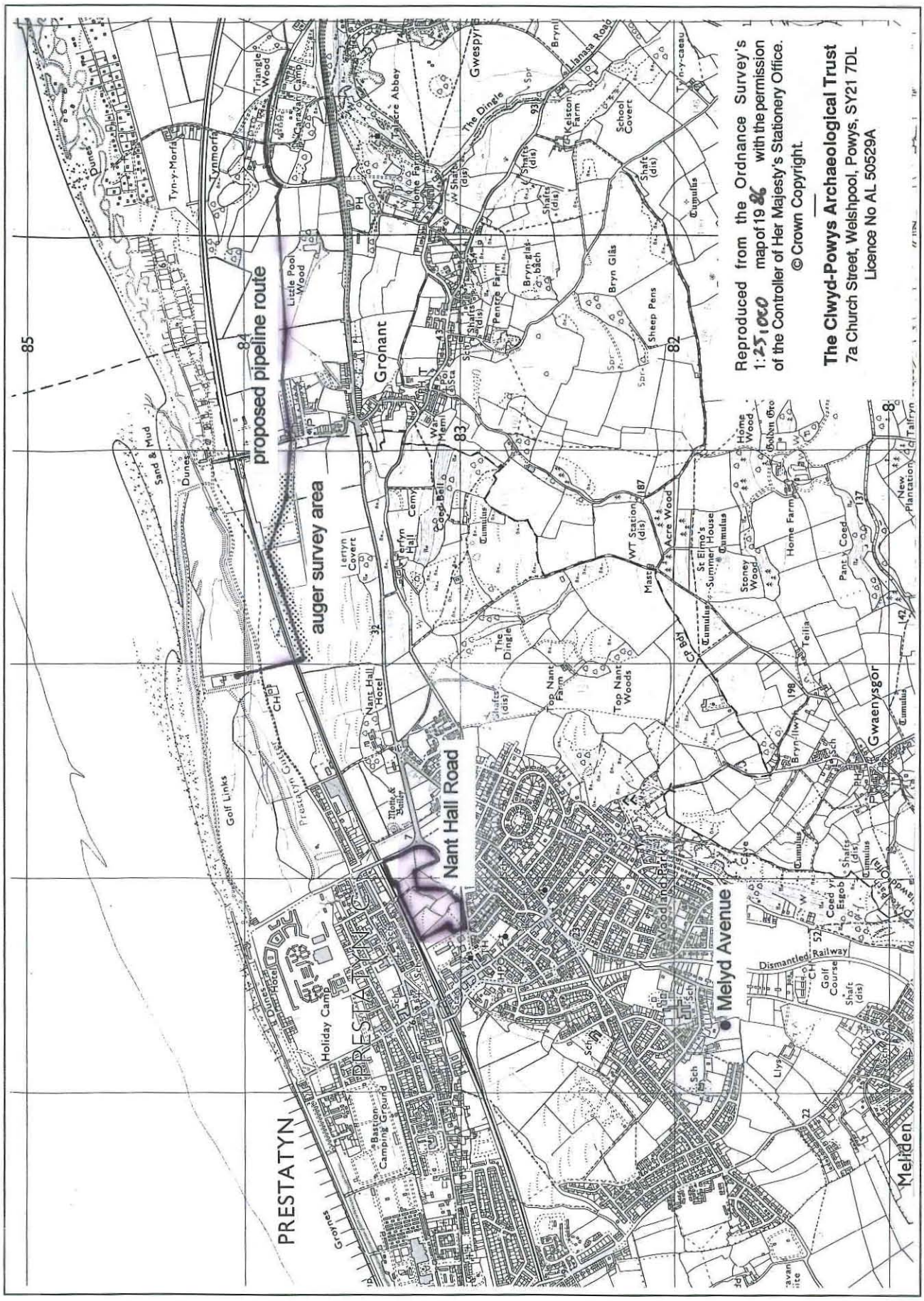


Fig. 1 Site location. Scale 1:2,500

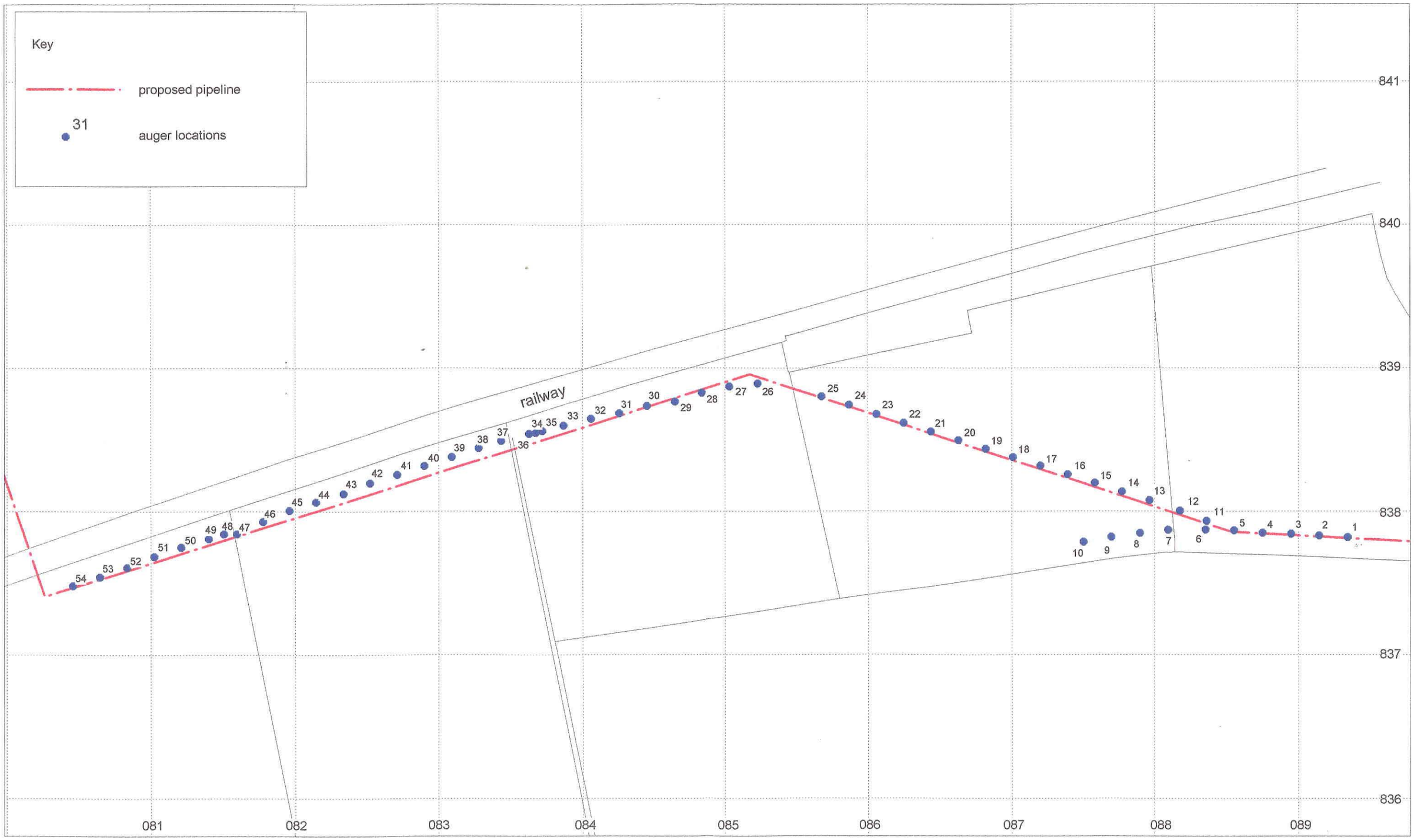


Fig. 2 Auger transect survey, scale 1:2,500