Appendix VI

Additional Palaeoenvironmental Evidence

Details of preliminary results from minor sites not analysed fully

Killerby Hall (SE264960)

This site lies next to the river Swale to the east of Killerby Hall, where a core was taken in a small depression in the field. The stratigraphy recorded was: topsoil (0–50 cm), peat with seeds, wood and other organic detritus (50–174 cm), *Chara* marl (174–345 cm) and blue/grey clay (345–400 cm). Samples for pollen analysis were taken at ten centimetre intervals in the peat (Table 1).

Table 1: Pollen counts from Killerby Hall

Depth (cm)	50	60	70	80	90	100	110	120	130	140	150	160	170
Betula	3	13	14			1	10	18	2		2	75	50
Pinus	25	24	33	1		1	16	44	2		9	22	7
Ulmus	8	12	16	2			5	5					
Quercus	14	10	12					1					
Tilia	4												
Alnus	22	2	6										
Corylus	50	75	86	4	6	7	66	55			1	3	1
Salix	1	3					1	1				20	9
Hedera		1											
Sambucus			1										
Calluna			1				2						
Juniperus													1
Poaceae	31	23	15			3	14	27			2	48	115
Cyperaceae	50	34	29	1	3	14	94	48	4	4	6	37	15
Cirsium-type	2												1
Taraxacum-type	4		1										
Umbelliferae	1												
Rumex	1												
Aster-type	3	1											
Stellaria-type	1												
Artemisia						1						1	
Filipendula							1			1	6	2	
Typha angustifolia	1		1										
Potamogeton	1	1											
Pteridium	2		1										
Polypodium	6	3	1					3	1		1	5	1
Sphagnum	1		1									2	1
Filicales	81	21	50	8	3	1	4	14	4	7	20	5	6
Lycopodium selago		1											

The Killerby Hall pollen record covers the period from the early Holocene to the early stages of the *Alnus* rise at about 7000 ¹⁴C BP, with birch, hazel and the mixed-oak-forest deciduous trees assuming dominance in turn. There are no clear indications of human activity. The site was not fully analysed because pollen preservation was poor in several levels and a pollen record covering the same period was obtained for the northern part of the study area from nearby Newby Wiske (see Chapter 3.3).

Table 2: Pollen counts from Kirklington

Depth (cm)	50	115	275
Betula	17	55	27
Pinus	42	2	2
Ulmus		1	
Quercus	1		
Tilia	1		
Alnus	4	2	16
Corylus	59	1	2
Salix	3	4	
Sambucus			3
Juniperus			9
Empetrum Empetrum			1
Poaceae	19	71	9
Cyperaceae	44	45	8
Taraxacum-type	2	1	
Ranunculus-type	1		
Potentilla-type	2	1	
Umbelliferae	1	1	
Rumex		1	
Sinapis-type	3		
Artemisia		4	
Cirsium-type		1	2
Filipendula		6	
		1	1
Typha angustifolia		3	
Potamogeton		1	
Alisma		1	
Myriophyllum alterniflorum		1	
Myriophyllum spicatum		1	
Selaginella		1	
Equisetum		25	
Polypodium	3	1	
Sphagnum	42		1
Filicales	198		1
Pediastrum	5	13	
Botryococcus		17	

Kirklington (SE 328806)

Coring was undertaken at Kirklington in a low-lying area, apparently a channel feature, in the field to the east of Green Lane. The deepest core revealed the following stratigraphy: silty clay topsoil (0–50 cm), peat (50–80 cm), organic silt (80–100 cm), shelly yellow marl (100–112 cm), grey-blue clay–silt with shells (112–270 cm), brown organic clay–silt (270–280 cm), clayey silt (280–300 cm) and coarse yellow sand (300–310 cm). Three samples were prepared for pollen analysis (Table 2).

The sequence at Kirklington is likely to represent a Lateglacial and early Holocene record with birch important but the mixed-oak-forest deciduous trees hardly present. Hazel and pine rise in the upper part of the profile, replacing birch. The alder frequencies are difficult to interpret, with high percentages at the base of the sequence. There are no indications of human activity. High percentages of aquatic algae show that the site became open water in the early Holocene, supported by the high frequencies for Cyperaceae pollen and the presence of a range of aquatic plants. The site was not analysed fully as other sites in the research area had already provided a good record covering these periods.

Great Langton (Langton Quarry: SE293964)

A 2 metre deep core was sampled at the entrance to the restored quarry site at Great Langton, near to the public pathway. From 2–108 cm, the sediments consist of alternating black clays and silts and green/grey clays/silts. River alluvium overlies organic-rich black clays at 108 cm. The organic clays are not rich enough to yield macrofossils. The area was walked to assess further suitable sites but none of the areas between the man-made lakes yielded any organic sediments. A low-lying area by the entrance to the quarry looked to be a potential site, but this was obviously fenced off from the public amenity site and presumably in private ownership. Pollen counts were made from within the clay and silt units to ascertain the potential of the sediments for analysis (Table 3).

The pollen data show the whole of the clay/silt unit to be post-elm decline in date, so more recent than 5000 ¹⁴C BP. The area supported substantial woodland, although mostly of a scrub type, with hazel, alder and willow. There was a considerable amount of heathland locally. Except for willow, which probably grew locally by the wetland, percentages for woody taxa decline up-core, as grass pollen frequencies increase. This spread of grassland coincides with indications of agricultural activity, with cereal-type pollen and grassland weeds, including *Plantago lanceolata*, increasing.

The site was not fully analysed because others in the project area had already provided a good record covering these periods.

Table 3: Pollen counts from Great Langton

Depth (cm)	110	120	130	199
Betula	8	10	10	12
Pinus	1	2	1	6
Ulmus	5	5	3	1
Quercus	2	8	4	4
Tilia		3		
Alnus	8	18	18	25
Fraxinus		1	1	
Corylus	12	31	39	59
Salix	57	17	15	1
Hedera	1			1
Sambucus		3		
Sorbus	1	1		
Calluna	21	60	91	84
Poaceae	64	35	18	10
Cyperaceae		2	6	4
Cereal-type		3		
Aster-type	7		1	
Serratula-type				1
Taraxacum-type		2		
Caltha-type				1
Ranunculus-type		4		1
Umbelliferae		2		
Rumex	8	1	1	1
Sinapis-type			1	
Artemisia				1
Trifolium-type			1	
Potentilla-type	4	1		2
Filipendula			1	
Plantago lanceolata	5	3	2	3
Plantago major-media	1			
Mentha-type	1			
Typha angustifolia				2
Potamogeton	1			1
Pteridium				1
Polypodium		2		2
Sphagnum	2	30	22	5
Filicales	1	5	8	4
Reworked pollen	5	10	10	2

II. Details of additional stratigraphical records from the main Washlands sites

Snape Mires, Ings Lane core transect (see Chapter 3.8; Fig. 3.18)

Depth (cm)	Description
Ings Lane 1	
0–110	Laminated stiff silty clay, slightly oxidized As3, Ag1, nig.2+, strf.2, elas.0, sicc.3
Ings Lane 2	
0–112	Laminated stiff silty clay, slightly oxidized As3, Ag1, nig.2+, strf.2, elas.0, sicc.3
Ings Lane 3	
0–40	Disturbed soil stratum confusum
40–98	Homogenous grey clay As4, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
98–104	Grey clay with roots As4, Th ¹ +, nig.2., strf.0, elas.0, sicc.0, lim.sup.0
104–147	Grey clay As4, nig.2+, strf.0, elas.0, sicc.3, lim. sup.0
Ings Lane 4	
0–70	Stiff laminated mottled oxidized grey clay As4, nig., 2+, strf.2, elas.0, sicc.3
Ings Lane 5	
0–60	Disturbed clay topsoil
60–80	Grey clay As4 Nig.2, strf.0, elas.0, sicc.3, lim.sup.0
80–104	Pebbly sand Gs4, Gg(min.)+ Nig.3, strf/0, elas.0, sicc.3, lim.sup.0
104–130	Wet clayey sand with pebbles Gs3, As1, Gg(min.)+, nig.3, strf.0, elas.0, sicc.2, lim.sup.0
130+	Laminated grey clay As4, nig.2+, strf.2, elas.0, sicc.2, lim.sup.0
Ings Lane 6	
0–66	Topsoil with tufa
66–110	Shell marl Lc4, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
110–116	Brown transitional deposit, root layer to base
116–167	Soft grey homogenous clay As4, nig.2+, strf.0, elas.0, sicc.2, lim.sup.0

Ings Lane 7	
0–43	Organic topsoil grading into peat Sh4, nig.3, strf.0, elas.0, sicc.3
43–55	Tufa, root layer at base
55+	Grey clay As4, nig.2+, strf.0, elas.0, sicc.2, lim.sup.0
Ings Lane 8	
0–40	Peaty topsoil stratum confusum
40–80	Oxidized slightly laminated lake clays As4, nig.3, strf.+, elas.0, sicc.3, lim.sup.0
Ings Lane 9	
0–40	Peat Sh4, nig.3, strf.0, elas.0, sicc.2
40–65	Clay As4, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
Ings Lane 10	
0–78	Peat, oxidized at surface, with <i>Phragmites</i> stems Sh4, Th ² (Phra.)++, nig.3, strf.0, elas.0, sicc.3
78–85	Shell marl
85–95	Brown limus Ld4, nig.3, strf.0, elas.0, sicc.2, lim.sup.0
95–200	Well laminated blue-grey clay with fine sand laminations As4, Ga+, nig.2+, strf.2, elas.0, sicc.2, lim.sup.0
Ings Lane 11	
0–55	Brown amorphous peat Sh4, nig.3, strf.0, elas.0, sicc.2
55–67	Grey clay As4, nig.2+, strf.0, elas.0, sicc.2, lim.sup.0
67–95	Pebbly sand Gs4, Gg(min.)+, nig.3, strf.0, elas.0, sicc.2, lim.sup.0
Ings Lane 12	
0–58	Black peat Sh4, nig.4, strf.0, elas.0, sicc.2
58–67	Peaty shell marl Sh2, Lc2, part.test(moll)++, nig.3, strf.0, elas.0, sicc.2, lim.sup.0
67–77	Shell marl Lc4, nig.2+, strf.0, elas.0, sicc.2
77–117	Brown limus Ld4, nig.3, strf.0, elas.0, sicc.2, lim.sup.0

Shell marl
Clayey shell marl As2, nig.2+, strf.0, elas.0, sicc.2, lim.sup.0
Laminated clay As4, nig.2+, strf.2, elas.0, sicc.2, lim.sup.0
Dark brown amorphous peat Sh4, nig.3, strf.0, elas.0, sicc.3
Peaty shell marl Sh2, Lc2, nig.3, strf.0, elas.0, sicc.3, lim.sup.0
Shell marl Lc4, nig.2+, strf.0, elas.0, sicc.2
Grey clay As4, nig.2+, strf.0, elas.0, sicc.2, lim.sup.0
Laminated pebbly clay As4, Gg(min)+, nig.2+, strf.3, elas.0, sicc.2
Gravel Gg(min)4, nig.3, strf.0, elas.0, sicc.2, lim.sup.4

Snape Mires, Mill House MH2 (see Chapter 3.8.3; Plates 2.7 & 2.8)

Depth (cm)	Description
0–9	Clayey peat Sh3, As1, nig.3, strf.0, elas.0, sicc.3
9–82	Medium yellow sand with organic inclusions Ga4, Sh+, nig.2, strf.0, elas.0, sicc.3, lim.sup.0
82–105	Grey silty clay (peat bleb at 98) As3, Ag1, nig.2, strf.0, elas.0, sicc.3, lim.sup.2
105–108	Clayey peat Sh2, As2, nig.3, strf.0, elas.0, sicc.3, lim.sup.2
108–142	Grey silty clay (molluscs at 112, pebble at 122, silt partings at 122) As3, Ag1, part.test.(moll)+, Gg(min)+, nig.2, strf.0, elas.0, sicc.3, lim.sup.2
142–180	Homogenous stiff dark grey clay As4, nig.2+.strf.0, elas.0, sicc.2, lim.sup.0

Snape Mires, the Gallop, core TG1 (see Chapter 3.8.4; Fig. 3.18)

Depth (cm)	Description
0–18	Peaty topsoil stratum confusum
18–23	Crumbly yellow marl Lc, nig.2, strf.0, elas.0, sicc.3, lim.sup.0
23–155	Grey-buff laminated silt—clay with silt partings. Clearly laminated near the base. As3, Ag1, nig.2+, strf.3, elas.0, sicc.2, lim.sup.4

Langland's Farm (see Chapter 3.9.1; Fig. 3.27)

Depth (cm)	Description
LF1	
0–64	Grey sticky silt–clay Ag2, As2, Th+, nig.2, strf.0, elas.0, sicc. 2
64–100	Humified peat Sh3 Ag1, Th+, Dl+, nig.3, strf.0, elas.0, sicc. 2, lim.sup.0
100–124	Brown limus Ld3, Ag1, Dh++, nig.2+, strf.0, elas.0, sicc. 2, lim.sup.0
124–131	Soft grey silt Ga2, Ag2, As+, Dh+, nig.2, strf.0, elas.0, sicc.2, , lim.sup.0
131–138	Grey sand with detrital organic material Ga3, Ag1, Dh++, nig.2, strf.0, elas.0, sicc.2, , lim.sup.0
138–310	Grey clay–silt with occasional sand partings and rare detrital organics. Ag2, As2, Dh+, nig.2, strf.1, elas.0, sicc.2, , lim.sup.0
LF2	
0–51	Grey sticky silt–clay Ag2, As2, Th+, nig.2, strf.0, elas.0, sicc. 2
51–76	Humified peat Sh3 Ag1, Th+, Dl+, nig.3, strf.0, elas.0, sicc. 2, , lim.sup.0
76–207	Grey clay—silt with occasional sand partings and rare detrital organics, , lim.sup.0. As 2 Ag 2 Dh+, nig.2, strf.1, elas.0, sicc.2
LF3	
0–50	Grey sticky silt–clay Ag2, As2, Th+, nig.2, strf.0, elas.0, sicc. 2
50-82	Humified peat Sh3 Ag1, Th+, Dl+, nig.3, strf.0, elas.0, sicc. 2, , lim.sup.0
82–165	Grey clay—silt with occasional sand partings and rare detrital organics, , lim.sup.0. As 2 Ag 2 Dh+, nig.2, strf.1, elas.0, sicc.2
LF4	
0–47	Grey sticky silt–clay Ag3, As1, Th+, nig.2, strf.0, elas.0, sicc. 2
47–64	Humified peat Sh4, Ag++, Th+, Dl+, nig.3, strf.0, elas.0, sicc.2, lim.sup.0
64–170	Grey clay–silt with occasional sand partings and rare detrital organics. As2, Ag2, Dh+, nig.2, strf.1, elas.0, sicc.2, , lim.sup.0
LF5	
0–45	Grey sticky silt–clay Ag2, As2, Th+, nig.2, strf.0, elas.0, sicc. 2

45–52	Humified peat Sh4, Ag+, Th+, Dl+, nig.3, strf.0, elas.0, sicc. 2, lim. sup.0
52–168	Grey clay-silt with occasional sand partings and rare detrital organics. As2, Ag2, Dh+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0
LF0	
0–46	Grey sticky silt–clay Ag2, As2, Th+, nig.2, strf.0, elas.0, sicc. 2
46–55	Silty peat with iron staining Sh4, Ag++, Th+, Lf+, nig.3, strf.0, elas.0, sicc. 2, lim. sup.0
55-100+	Silty sand with iron staining and charcoal fragments. Ga3, Ag1, Lf+, anth+, nig.2+, strf.0, elas.0, sicc.2, lim. sup.0
LF(-1)	
0-100	Grey sticky silt-clay
100–210	As2, Ag2, nig.2, strf.0, elas.0, sicc. 2 Silty sand with iron staining and charcoal fragments Ga2, Ag2, Lf+, anth+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0

Thornton's Plantation (see Chapter 3.9.2; Fig. 3.29)

Depth (cm)	Description
TP 1	
0–74	Mottled brown-grey sand and silt with iron staining Ga2 Ag2 Lf+, nig.2, strf.0, elas.0, sicc.2
74–81	Light brown organic silt with rootlets Ag2, Sh2, Th ² +, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
81–110	Dark brown well humified crumbly peat with charred wood. Occasional silt laminations near base Sh4, Ag+, Dl+, nig.3+, strf.1, elas.0, sicc.2, lim.sup.0
110–169	Soft grey silt clay Ag2, As2, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
169–174	Organic-rich soft clay with detrital woody material. As2, Ag1, Dh1, Sh+, nig.2+, strf.0, elas.0, sicc.2, lim.sup.0
174–234	Laminated grey silt-clay with sand partings and occasional detrital organic material; stiff at base. As2, Ag2, Dh+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0
TP 2	
0–57	Mottled brown-grey sand and silt with iron staining Ga2 Ag2 Lf+, nig.2, strf.0, elas.0, sicc.2
57–64	Light brown organic silt with rootlets Ag3, Sh1, Th ² +, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
64–112	Dark brown well humified crumbly peat. Occasional silt laminations near base Sh4, Ag+, nig.3+, strf.1, elas.0, sicc.2, lim.sup.0
112–147	Soft grey silt clay Ag2, As2, nig.2, strf.0, elas.0, sicc.2, lim.sup.0

147–150	Organic-rich soft clay with detrital woody material. As2, Ag2, Dl+, Sh+, nig.2+, strf.0, elas.0, sicc.2, lim.sup.0
150–223	Laminated grey silt-clay with sand partings; stiff at base. As2, Ag2, Ga+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0
TP 3	
0–52	Mottled brown-grey sand and silt with iron staining Ga2 Ag2 Lf+, nig.2, strf.0, elas.0, sicc.2
52–60	Light brown organic silt with rootlets Ag2, Sh2, Th ² +, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
60–80	Dark brown well humified crumbly peat. Occasional silt laminations near base Sh4, Ag+, nig.3+, strf.1, elas.0, sicc.2, lim.sup.0
80–97	Soft grey silt clay Ag2, As2, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
97–100	Organic-rich soft clay with detrital woody material. As2, Ag2, Dl+, Sh+, nig.2+, strf.0, elas.0, sicc.2, lim.sup.0
100–194	Laminated grey silt-clay with sand partings; stiff at base. As2, Ag2, Ga+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0
TP 4	
0–58	Mottled brown-grey sand and silt with iron staining Ga2 Ag2 Lf+, nig.2, strf.0, elas.0, sicc.2
58-70	Light brown organic silt with rootlets Ag2, Sh2, Th ² +, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
70–100	Dark brown well humified crumbly peat with charred wood. Occasional silt laminations near base Sh4, Ag+, Dl+, nig.3+, strf.1, elas.0, sicc.2, lim.sup.0
100–104	Soft grey silt-clay Ag3, As1, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
104–190	Laminated grey silt-clay with sand partings; stiff at base. As2, Ag2, Ga+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0
TP 5	
0–54	Mottled brown-grey sand and silt with iron staining Ga2 Ag2 Lf+, nig.2, strf.0, elas.0, sicc.2
54–190	Laminated grey silt-clay with sand partings; stiff at base. As2, Ag2, Ga+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0
TP 0	
0–55	Mottled brown-grey sand and silt with iron staining Ga3 Ag1 Lf+, nig.2, strf.0, elas.0, sicc.2
55–61	Light brown organic silt with rootlets Ag2, Sh2, Th ² +, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
61–141	Laminated grey silt-clay with sand partings; stiff at base. As2, Ag2, Ga+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0

TP (-1)	
0–43	Mottled brown-grey sand and silt with iron staining Ga2 Ag2 Lf+, nig.2, strf.0, elas.0, sicc.2
43–58	Light brown organic silt with rootlets Ag2, Sh2, Th ² +, nig.2, strf.0, elas.0, sicc.2, lim.sup.0
58-82	Laminated grey silt-clay with sand partings; stiff at base. As2, Ag2, Ga+, nig.2, strf.1, elas.0, sicc.2, lim.sup.0